5 INCH BINDER COVER INSERT

Cut to size

then insert over top

of spine insert.

Cut Line

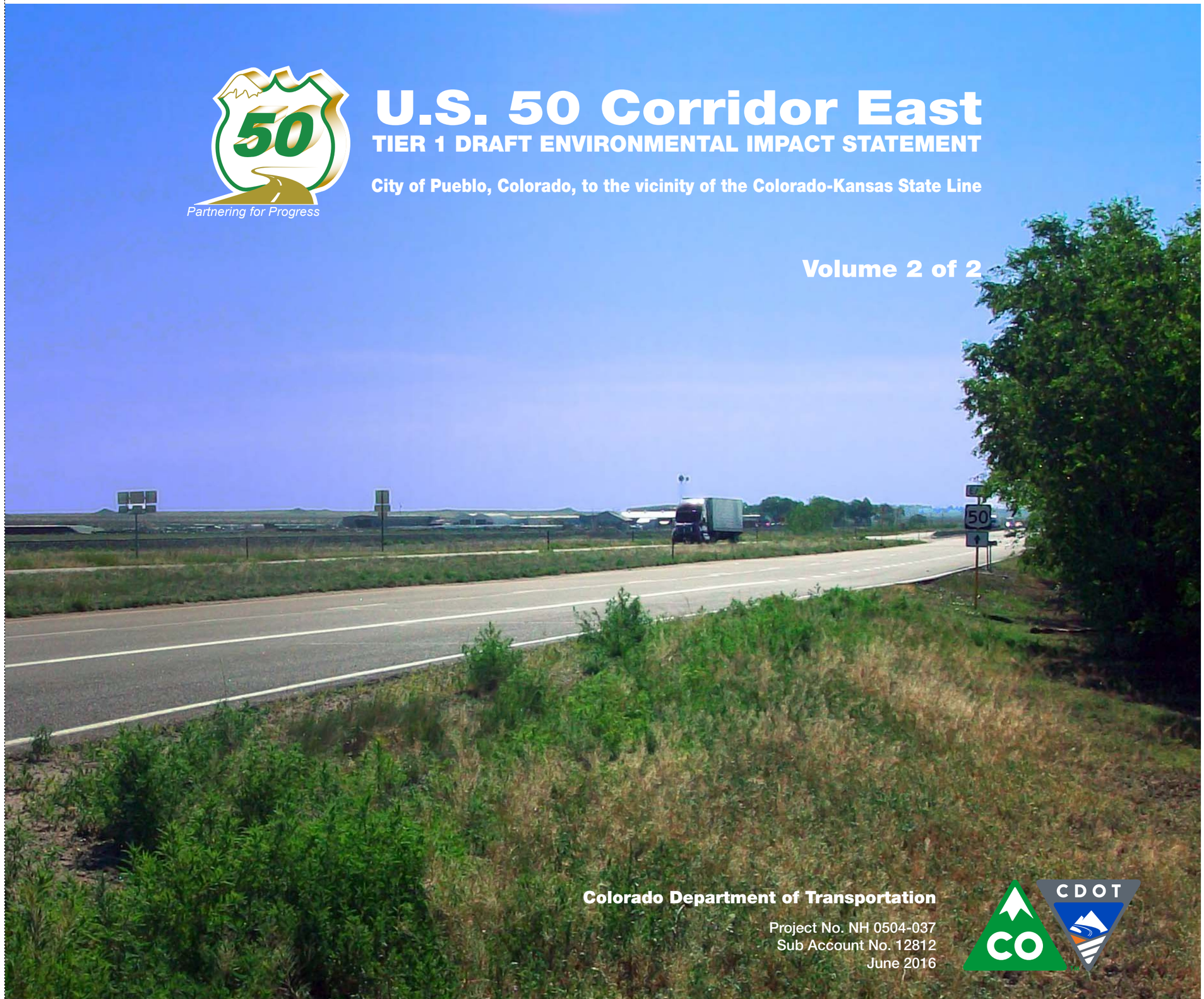
Partnering for Progress

U.S. 50 Corridor East

TIER 1 DRAFT ENVIRONMENTAL IMPACT STATEMENT

City of Pueblo, Colorado, to the vicinity of the Colorado-Kansas State Line

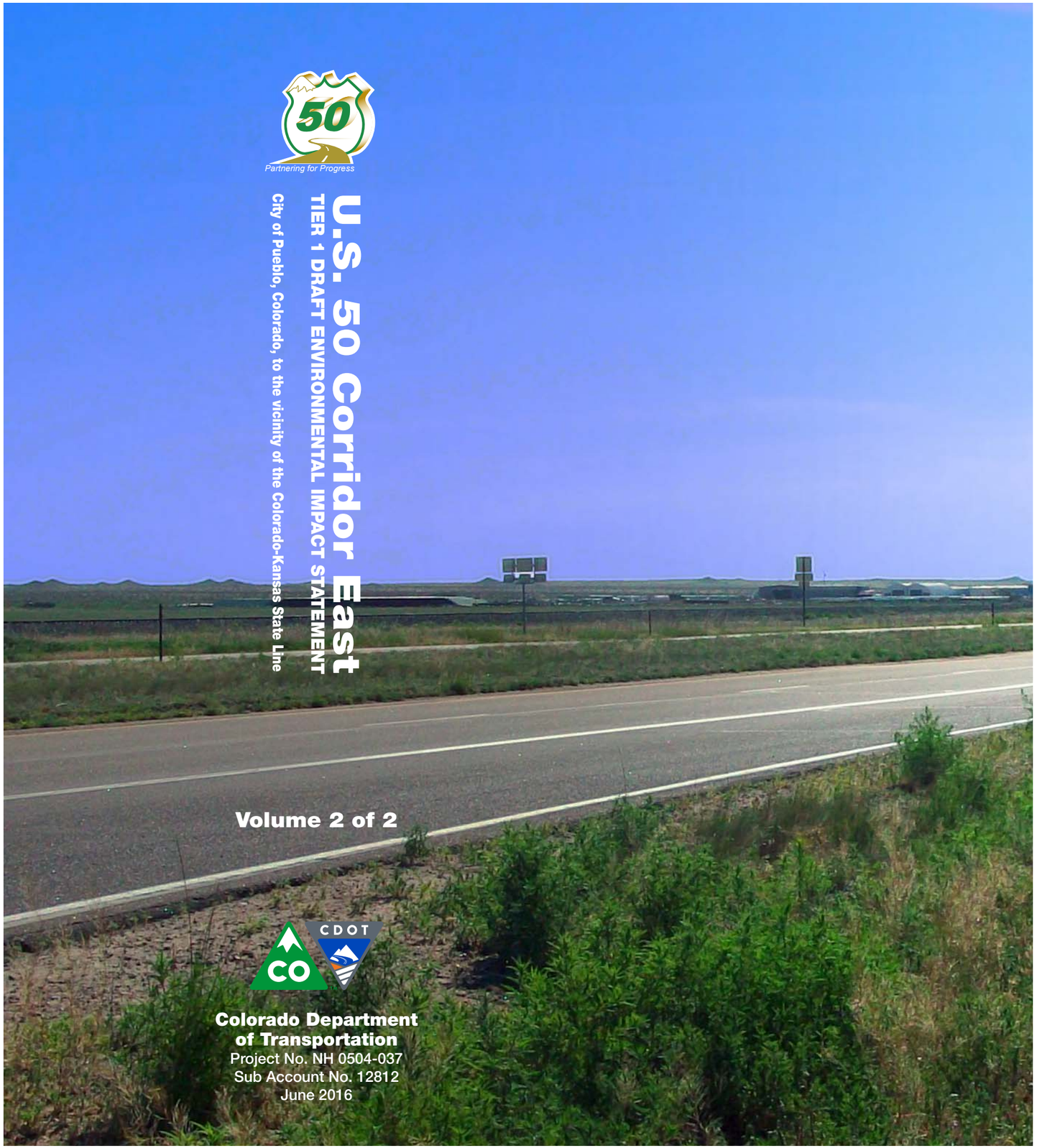
Volume 2 of 2



Colorado Department of Transportation

Project No. NH 0504-037
Sub Account No. 12812
June 2016

CO CDOT



Partnering for Progress

U.S. 50 Corridor East

TIER 1 DRAFT ENVIRONMENTAL IMPACT STATEMENT

City of Pueblo, Colorado, to the vicinity of the Colorado-Kansas State Line

Volume 2 of 2

Colorado Department of Transportation

Project No. NH 0504-037
Sub Account No. 12812
June 2016

5 INCH BINDER SPINE INSERT

No need to cut.

Insert into binder first.

Then insert cover over top.

APPENDIX A INDEX LISTING

Appendix A contains the following resource-specific technical memoranda:

- Agricultural Resources
- Air Quality
- Biological Resources
- Cumulative Effects
- Economics
- Hazardous Materials
- Historic and Archaeological Resources
- Land Use and Social Considerations
- Minority and Low-Income Populations
- Section 4(f) and Section 6(f) Resources
- Traffic Noise
- Wetland and Riparian Resources

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Agricultural Resources Technical Memorandum

June 2016

Table of Contents

Chapter Pages

1. Project Overview 1
2. Resource Definition 2
3. Applicable Laws, Regulations, and Guidance 4
3.1. Farmland Protection Policy Act of 1981 4
3.2. FHWA Technical Advisory T6640.8A 4
4. Methodology 5
4.1. Relevant Data or Information Sources 5
4.2. Data Collection and Analysis Methodology 6
4.3. Project Area 11
4.4. Effects 11
4.5. Mitigation Options 13
4.6. Deliverables 13
5. Existing Conditions 14
5.1. Agricultural Economy 14
5.2. Agricultural Resources 15
5.3. Farmland of Statewide or Local Importance, Unique Crops, and Farming Methods 18
6. Effects Analysis 19
6.1. No-Build Alternative 19
6.2. Build Alternatives 19
7. Mitigation Strategies 31
8. References 32
Appendix A. Resource Methodology Overview for Agricultural Resources 37
Appendix B. Abbreviations and Acronyms 39
Appendix C. Figures (C-1 through C-21) 41

Tables

Table 4-1. Prime Farmland and Farmland of Statewide Importance 7
Table 4-2. Enterprise Budget Information for Crops Grown in the Lower Arkansas Valley (all figures are per acre) 9
Table 5-1. Percent of Total (Direct) Employment by Sector and County in 2011 (NAICS Based) 14
Table 5-2. State Rank (Top 10 Only) for Acres of Crop Production by County 16
Table 5-3. Farmland and Ranch Lands in the Project Area by County 16
Table 6-1. Summary of Potentially Affected Agricultural Resources by Section for the Build Alternatives 21

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 4-1. Tier 1 vs. Tier 2 Decision 11
Figure 6-1. Build Alternatives Overview 20
Figure 7-1. Example of Uneconomical Remainders 31

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right-of-way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 50 near County Road (CR) C-C and extends nine miles to State Highway (SH) 196. Therefore, alternatives at Lamar are not considered in this U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Important farmlands are defined as part of the Farmland Protection Policy Act of 1981 (FPPA) (7 CFR 658). The purpose of the FPPA is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. As part of the NEPA process, agencies are required to identify prime and unique farmland that will be impacted by federally funded transportation projects. The Natural Resources Conservation Service (NRCS) identifies important farmlands in each county based on national regulations and state guidance.

The FPPA defines four types of important farmlands: prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance.

- Prime farmland is land that has the combination of physical and chemical characteristics for production of food, feed, and other agricultural crops.
- Unique farmland is land other than prime farmland that is used for production of specific high-value agricultural products.
- Farmland of statewide importance has been determined by the Colorado State Experiment Station, the Colorado State Department of Agriculture, and the Colorado State Soil Conservation Board.
- Farmland of local importance is identified by a local agency or agencies as certain additional lands that are important to the local community, but do not qualify as prime, unique, or of statewide importance.

In the project area, agricultural resources generally are defined as:

- Prime and unique farmland, as identified by the U.S. Department of Agriculture's NRCS (FPPA 1984)
- Farmland of statewide importance in Colorado, as defined by the Colorado Department of Agriculture (FPPA 1984)

Data from the NRCS identified the majority of the land within the project area as prime and unique farmland. To differentiate between these types of land, additional analysis was conducted to categorize them based on their agricultural use. More information about this categorization process is presented in Section 4.3. It should be noted that no farmland of local importance was identified within the project area, so this type will not be discussed further.

The Lower Arkansas Valley has a long history of agricultural activities that dates back to the arrival of the first settlers in the area in the late 1800s. These activities have been, and continue to be, the foundation of the region's economy. For this reason, this analysis considered more than just farmland. The agricultural resources evaluated for the U.S. 50 Tier 1 EIS include the following:

- Farmland—land used for crop production
- Ranch lands—land used for ranching and grazing activities
- Feedlots—confined areas where livestock is prepared for market
- Irrigation canals and ditches—man-made channels that allow water from the Arkansas River to reach non-adjacent farmland
- Permanent roadside produce markets—facilities that sell agricultural products from nearby farms, such as produce, directly to consumers
- Agricultural product storage facilities—facilities that store products produced on nearby farms, such as grain, before it is sold
- Livestock sales facilities—operations that facilitate the transfer of livestock from one owner to another

All of these resources were evaluated because of their importance to the agricultural-based economy of the Lower Arkansas Valley. Removing farmland or ranch lands from production does not simply affect the land, but it also affects the people and other businesses that derive their livelihoods from it. Farms, ranches, feedlots, and other agricultural businesses provide employment directly for producers and owners, but they

also provide jobs for other local businesses. For example, farmers make annual purchases for items such as seeds and fertilizer, and they also make capital investments in farm equipment and irrigation systems. The local businesses that provide these goods and services depend on the primary businesses for their continued operation.

The system of irrigation canals and ditches that were excavated by the earliest settlers of the Lower Arkansas Valley are still in use today. It is important to identify possible effects to them because there may be resulting effects on the farmland drawing water from them.

Permanent roadside produce markets, agricultural storage facilities, and livestock sales facilities are important businesses in the Lower Arkansas Valley for more than just the money they add to the local economy. They all serve very specific, but important, roles in the delivery of agricultural products to markets within and outside the area.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 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 adhered to during this analysis of agricultural resources. They are described in more detail below.

- Farmland Protection Policy Act of 1981
- FHWA Technical Advisory T6640.8A

3.1. Farmland Protection Policy Act of 1981

According to the FPPA, the purpose of the Act is to "... minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses" (1984, Sect 2(b)). In addition to defining how farmland should be identified, the Act requires federal agencies to:

- "... take into account the adverse effects of their programs on the preservation of farmland
- consider the alternative actions, as appropriate, that could lessen adverse effects
- ensure that their programs, to the extent practicable, are compatible with State and units of local government and private programs and policies to protect farmland" (FPPA 1984, Sect 3(b))

The regulations outlined in 7 CFR 658 provide guidance regarding implementing the requirements of the Act.

3.2. FHWA Technical Advisory T6640.8A

FHWA Technical Advisory T6640.8A provides the following guidance about how an environmental impact statement should consider farmland issues (FHWA 1987, Sect V(G)):

- Farmland includes prime and unique farmland, as well as farmland of state and local importance.
- The draft EIS should include results of consultations with the NRCS and state and local agriculture agencies, as appropriate.
- The draft EIS should discuss farmland affected by the Build Alternatives under consideration, show those impacts on maps, and identify measures to avoid or reduce these impacts.
- If it is not possible to avoid impacts to farmland, efforts to minimize them should be considered.

4. Methodology

The U.S. 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 U.S. 50 facility beginning at Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 agricultural 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 sources of data and information were used to identify agricultural resources for the U.S. 50 Tier 1 EIS:

- NRCS soil surveys and farmland reports for the counties in the project area

- An agricultural economist with 20 years of experience working in the Lower Arkansas Valley provided information about the agricultural use of the non-urbanized land within the project area and the productivity of that land (productivity data came from enterprise budgets focused on crops grown in the project area)
- A guide listing farmers' markets in Colorado produced by the Colorado Department of Agriculture
- A list of livestock sales facilities from the Colorado State Board of Stock Inspection Commissioners
- U.S. Department of Agriculture aerials covering the project area

In addition to these sources, consultations were held with federal, state, and local agencies and communities to obtain information about agricultural resources within their jurisdictions. NRCS staff located in the following U.S. Department of Agriculture field offices were consulted between July 10 and August 9, 2006:

- Southeast Colorado Resource Conservation and Development Office
- Rocky Ford Field Service Center
- Las Animas Field Service Center
- Lamar Field Service Center
- Northeast Prowers Conservation District
- Pueblo Field Service Center

During these consultations, NRCS staff members were asked to provide information regarding farmland, unique crops, and important farming methods in use in the Lower Arkansas Valley. These individuals also were asked to provide any other agricultural-related information they felt the resource specialist should be aware of for this analysis of agricultural resources.

Individuals working for the Colorado Department of Agriculture were consulted between December 2006 and January 2007. These consultations included interviews with department staff and local U.S. 50 residents who volunteer for the department within their own communities. The following conservation districts were contacted and asked to provide information regarding unique crops and farming practices within the U.S. 50 project area:

- Central Colorado
- Turkey Creek
- South Pueblo County
- Olney-Boone
- West Otero
- East Otero
- Bent
- Prowers
- Northeast Prowers

Consultations with local farmers occurred during the following meetings held along the corridor:

- Public scoping meetings held in each of the cities and towns along U.S. 50 (10 meetings total) between February 27 and March 7, 2006
- Community workshops held in each of the cities and towns along U.S. 50, except Pueblo (9 meetings total), between August 7 and August 16, 2006

4.2. Data Collection and Analysis Methodology

The methodologies used to identify and evaluate agricultural resources for the U.S. 50 Tier 1 EIS are discussed below by the type of resource. These include farmland and ranch lands, feedlots, irrigation canals and ditches, permanent roadside produce markets, agricultural product storage facilities, and livestock sales facilities.

4.2.1. Farmland and Ranch Lands

Prime and unique farmland was mapped originally using NRCS data in consultation with NRCS staff. The FPPA enables federal agencies to identify farmland in one of two ways, by using the criteria established in Section 5 of the Act, or by requesting that the NRCS make that determination. For the U.S. 50 Tier 1 EIS, the NRCS was asked to identify farmland in the project area. In consultation with the agency's staff, relevant farmland was identified using a geographic information system (GIS) overlay process, which involved the following steps:

1. NRCS soil survey data were downloaded (in GIS format) from the agency's online data service, the Soils Data Mart, in August 2006. Soil survey data identify and locate existing soil types in an area. Soil survey data were collected on a county-wide basis for all four counties within the project area (i.e., Pueblo, Otero, Bent, and Prowers counties).
2. NRCS *Prime and Other Important Farmlands Reports* were downloaded from the agency's website in August 2006. These reports detail the soils that the NRCS has identified as prime and unique farmland soils. The data are provided on a county-wide basis, and reports were collected for all four counties in the project area.
3. These two datasets were overlaid to identify and locate the prime and unique farmland soils that exist within the four counties in the Build Alternatives.
4. It is worth noting that some of the soils that the NRCS identifies as prime and unique farmland soils only qualify for that designation if certain conditions exist, such as if the land is irrigated. For the purposes of the Tier 1 EIS, all lands containing prime and unique farmland soils were considered prime and unique farmland, regardless of the condition of those lands. This decision was made to ensure that the analysis remained within the Tier 1 level of effort (as outlined in the resource methodology overview located in Appendix A).
5. The project area boundaries then were compared to this county-wide dataset of prime and unique farmland soil locations to identify the prime and unique farmland soils located within the project area.

Prime farmland and farmland of statewide importance was calculated for each of the project counties within the 1,000-foot-wide Build Alternatives. There is a total of 2,343,000 acres of prime and unique farmland within the four project counties (NRCS 2005). As shown in Table 4-1, Prowers County has the second largest number of acres of prime farmland and is the only county in the project area to have impacts to farmland of statewide importance. Maps showing the location of these lands within the project area (by county) are presented in Appendix C (Figure C-1 through Figure C-4).

Table 4-1. Prime Farmland and Farmland of Statewide Importance

County	Prime Farmland (Acres)	Farmland of Statewide Importance (Acres)	Total (Acres)
Pueblo	705,357	—	705,357
Bent	444,525	—	444,525
Otero	371,707	—	371,707
Prowers	675,030	146,296	821,326
Total	2,196,619	146,296	2,342,915

Source: NRCS 2005

To further differentiate between impacts to farmland resources, an additional level of analysis was performed to identify the relative productivity of the agricultural land in the project area. This effort was completed with the assistance of Jeffrey E. Tranel, an agricultural economist who has been researching agricultural issues in the Lower Arkansas Valley for Colorado State University for 20 years. The productivity of both farmland and ranch lands was considered, since both are important parts of the Lower Arkansas Valley's agricultural-based economy. Effects to farmland and ranch lands were evaluated based on the number of acres affected and the loss in productive value of those acres. The productive value of farmland and ranch lands was calculated by estimating the potential profit that could be generated from one growing season of farming or

one year of grazing. Profitability was estimated differently for farmland and ranch lands due to the way each type of land is used.

To identify the relative productivity of agricultural lands in the project area, the historic agricultural use of the land was identified, which is the type of agricultural activity that typically has taken place on the land in recent years. The following three categories of agricultural use were developed based on the most prominent agricultural uses that have existed, and currently exist, in the project area.

- Vegetables (farmland)—land used to grow melons, onions, fruit, sod, and other non-grain crops
- Alfalfa/corn (farmland)—land used to grow alfalfa, corn, and other grain crops
- Ranching/grazing (ranch lands)—all other non-urbanized land where ranching or grazing activities could occur

The next step was to rank these categories from most productive (1) to least productive (3) based on the profitability of each agricultural use. The profitability of farmland (vegetables and alfalfa/corn) was estimated based on the income and expenses associated with the production of certain crops grown in the Lower Arkansas Valley in 2007. Enterprise budgets were developed for these crops, which enumerate the income and expenses related to the production of an acre of a particular crop. This information was compared to identify the potential profitability of the land. The enterprise budgets used for this analysis:

- Were completed, in part, using existing information about agricultural expenses and receipts, including but not limited to crop prices, labor rates, equipment maintenance costs, and the cost of agricultural inputs, such as seed, fertilizer, and water
- Do not represent the income or expenses related to any one individual farm operation
- Do not represent a single set of farm management practices
- Involve typical incomes and expenses for each crop
- May not predict future income or expenses due to changing costs, prices, or farming practices
- Include information obtained from certain farmers, researchers, and input suppliers who were interviewed about issues related to their operations
- Do not consider *factor payments*, which are costs such as returns to land, operator's labor, management, and the risk associated with growing the crop

Enterprise budgets were developed for certain crops that have been grown historically in the Lower Arkansas Valley, including watermelon, tomatoes, pumpkins, onions, cantaloupe, sweet corn, chili peppers, alfalfa, and corn. The income (i.e., gross receipts) and expenses (i.e., direct costs) of growing an acre of each crop were calculated. The difference between these figures represents the net income (i.e., profit) that could be expected from producing an acre of that crop.

The net incomes of the vegetable crops were averaged to determine an estimated profitability for that category of agricultural land use. These crops included watermelon, tomatoes, pumpkins, onions, cantaloupe, sweet corn, and chili peppers. Similarly, the net incomes of alfalfa and corn were averaged to determine an estimated profitability for that category of agricultural land use. These calculations are presented in Table 4-2.

Table 4-2. Enterprise Budget Information for Crops Grown in the Lower Arkansas Valley (all figures are per acre)

Crop	Gross Receipts	Pre-Harvest Costs	Harvest Costs	Property and Ownership Costs	Total Direct Costs	Net Profits[d]
Watermelon	$7,500	$1,143	$120	$82	$1,345	$6,155
Tomatoes	$10,000	$1,001	$600	$68	$1,669	$8,331
Pumpkins	$2,400	$880	$120	$74	$1,074	$1,326
Onions	$5,000	$748	$300	$84	$1,132	$3,868
Cantaloupe	$6,175	$1,145	$1,375	$78	$2,597	$3,578
Sweet corn	$4,500	$543	$180	$70	$794	$3,706
Chili peppers	$6,000	$797	$500	$71	$1,368	$4,632
All vegetables[a]	**$5,939**	**$894**	**$456**	**$75**	**$1,426**	**$4,514**
Alfalfa[b]	$720	$190	$96	$115	$304	$416
Corn[b]	$720	$230	$39	$54	$323	$397
Alfalfa/corn[c]	**$720**	**$210**	**$68**	**$84**	**$314**	**$406**

[a]Average of all vegetables listed
[b]Grown under flood irrigation
[c]Average of alfalfa and corn
[d]Before factor payments
Source: Tranel 2008b

The enterprise budgets revealed that the average net income (i.e., profitability) from one acre of alfalfa or corn production is approximately $400 per acre per growing season, while that figure for vegetable crop production is roughly $4,500 (see Table 4-1). Thus, it is approximately 11 times more profitable to grow vegetables than alfalfa/corn crops in the Lower Arkansas Valley. As a result, this analysis afforded an effect to land used for vegetable production as more severe than an effect to land used for alfalfa/corn production. It is important to note that these estimates are intended to show the relative loss in productive value that would occur when farmland is affected by the alternatives. They do not represent actual profits generated by individual farms in the Lower Arkansas Valley. They are estimates derived from available aggregate data.

The profitability of ranch lands was estimated based on the amount of money an owner of an acre of ranch land in southeastern Colorado could earn from grazing livestock on it. The estimate involved identifying how much livestock could be grazed on an acre of ranch land and how much money a rancher could earn from that activity in one year. The number of acres required to graze one unit of livestock (i.e., one cow-calf pair) depends on many factors, including the type of animal, what months the grazing takes place, and pasture conditions. This analysis did not identify these factors for each ranching operation in the 150-mile-long project area. Instead, several estimates were obtained and averaged. This process resulted in a determination that 45 acres of ranch land is needed to graze one unit of livestock in southeastern Colorado (Baker 2009, Fankhauser 2009, Stulp Farms 2009). This figure assumes that the animals are grazed for 12 months and supplemental feed may be necessary during the winter months.

The next step was to determine how much money a rancher could earn from grazing one cow-calf pair on 45 acres of ranch land. The most common charge for grazing in 2007 ranged from $18.00 to $25.50 per cow-calf pair per month depending on the type of land (Tranel 2008b). Assuming the greatest charge ($25.50), a rancher could expect to earn approximately $306 per cow-calf pair in one year. Since that cow-calf pair would require 45 acres of ranch land, this translates into $306 per year for every 45 acres of ranch land, or approximately $7 per acre per year ($306 divided by 45 acres). Similar to the profitability estimates stated above, this figure does not represent actual profits generated by individual ranches in the Lower Arkansas Valley. It is an estimate based on available aggregate information.

This method for calculating grazing land also makes the assumption that most cattle production operators are not landowners. Calculating the loss in land productivity based upon loss in beef sales revenue, as opposed to the loss in leasing value, would result in higher negative impacts (more than twice the value per acre), yet this difference is negligible when compared to impacts to vegetable production and alfalfa/corn farms. The determination of relative impacts to land is overwhelmingly influenced by the higher quality farmland within the study area.

From the information above, each category of agricultural land use was ranked from highest (1) to lowest (3) productivity as follows. The profitability of an acre of each use is noted in parentheses.

1. Vegetables ($4,500 per acre)
2. Alfalfa/corn ($400 per acre)
3. Ranching/grazing ($7 per acre)

All agricultural land within the project area was placed into one of these three productivity categories. It is important to note that this effort involved a high-level identification of general areas of productivity, not a field-specific identification. Additionally, the following caveats apply to this effort:

- The historic agricultural use of the land was identified using the best available information. This effort did not include speaking to every farm or ranch owner in the 150-mile-long project area to obtain information about production on individual parcels.
- Land was placed in the highest category possible. Areas that were borderline between two categories were placed in the higher (i.e., more productive) category.
- The agricultural use identified for each area represents the historical and reasonably expected future use of that area as of April 2008, given the information known at that time. These data should be considered a “snapshot in time” and not a guarantee of the future use of any specific parcel(s) of land.
- This analysis does not consider water rights. It used historic production (i.e., what crop(s) have been grown on the land) to extrapolate future production (i.e., what crop(s) are likely to be grown on the land in the near future) without considering how changes in water rights may alter this condition.
- The analysis does not consider crop rotation from year to year. The primary use of the land determined the category to which it was assigned. If multiple crops were known to be grown, then the crop grown the majority of the time was used to determine the category. If multiple crops were grown a relatively equal amount of the time, the area was placed in the highest category relative to the crops grown.
- The productivity categories were developed to provide a general understanding of farmland effects associated with the Build Alternatives recommended by the U.S. 50 Tier 1 EIS. This information was not intended to associate a particular monetary value to any particular parcel of land.
- The analysis does not consider new or changing technologies or management practices. New seed varieties, soil amendments, etc. may allow a farmer to grow a higher-value crop on land that has historically been used to produce lower-value crops.

The result of the tasks described above was the assignment of agricultural land in the project area to one of the three agricultural use categories (i.e., vegetables, alfalfa/corn, or ranching/grazing). This information was utilized to calculate the potential loss in productivity to the Lower Arkansas Valley from the Build Alternatives. The number of acres of land affected was multiplied by the estimated productivity (i.e., profitability) of the associated agricultural use to determine the loss in productivity to the area.

4.2.2. Feedlots

Feedlots were identified using the U.S. Environmental Protection Agency’s (EPA) Enforcement and Compliance History Online (ECHO) data query tool. Feedlots that are not currently regulated by the EPA were not included in these results.

4.2.3. Irrigation Canals and Ditches

The irrigation canal and ditch system in the project area was excavated in the late 1800s when the first settlers arrived to the region. For this reason, these features were primarily identified during the historic

resources evaluation for the U.S. 50 Tier 1 EIS. More information about them and how they were identified can be found in the U.S. 50 Tier 1 EIS Historic and Archaeological Resources Technical Memorandum.

4.2.4. Permanent Roadside Produce Markets

Permanent roadside produce markets were defined as markets located along or near U.S. 50 that are housed in permanent structures (i.e., buildings or other non-mobile structures). They were identified primarily using a guide published by the Colorado Department of Agriculture that listed markets operating in Colorado in 2008. In addition to these permanent markets, seasonal markets also operate along U.S. 50 in the Lower Arkansas Valley on a temporary basis. Because it is impossible to know which of these markets will open during any given season, or where they may be located, they were not included in this analysis.

4.2.5. Agricultural Product Storage Facilities

Agricultural storage facilities were identified primarily using U.S. Department of Agriculture aerial photography of the project area.

4.2.6. Livestock Sales Facilities

Livestock sales facilities were identified using a list of existing, operational facilities acquired from the Colorado State Board of Stock Inspection Commissioners. The list includes all facilities operating in Colorado in April 2008.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

The purpose of the U.S. 50 Tier 1 EIS is to identify the 1,000-foot-wide Build Alternatives within which a 250-foot-wide (maximum) roadway footprint (i.e., alignment) would be identified during Tier 2 studies (see Figure 4-1). Direct and indirect effects to agricultural resources were estimated based on the type of resources, as indicated below.

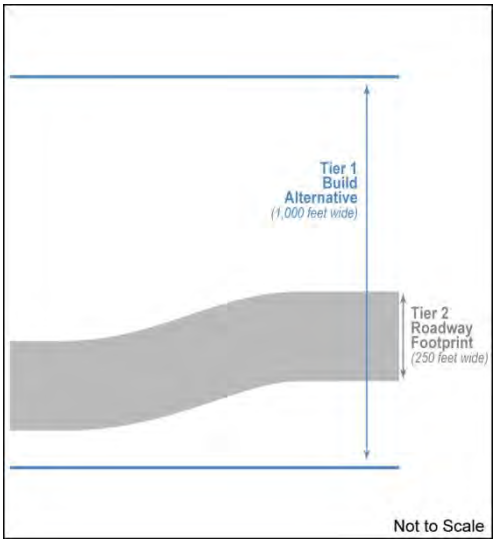


Figure 4-1. Tier 1 vs. Tier 2 Decision

4.4.1. Direct Effects

Direct effects to farmland and ranch lands, feedlots, irrigation canals and ditches, permanent roadside produce markets, agricultural storage facilities, and livestock sales facilities are discussed below by resource type.

Prime Farmland and Farmland of Statewide Importance

Prime and unique farmland and farmland of statewide importance was identified using spatial data from the NRCS National Cooperative Soil Survey (2003). Impacts to prime and unique farmland are the total acres of prime and unique farmland within the Build Alternatives, rounded to the nearest

acre. All farmland identified as having any potential to be prime farmland, depending on irrigation and other land management practices, was considered prime.

Prime farmland area calculations for the Build Alternatives were multiplied by a conversion factor to better estimate impacts of a 250-foot-wide highway footprint. The conversion factor was necessary because the purpose of this document is to determine the location of a 1,000-foot-wide alternative within which a 250-foot-wide (maximum) roadway footprint would be identified during Tier 2 studies. The conversion factor, generally 0.25, reflects that only one-quarter of the alternative width would be needed for highway right of way. This conversion provides a more realistic value for expected effects from the Build Alternatives.

Farmland and Ranch Lands

Effects to farmland and ranch lands were calculated by identifying the total number of acres affected by each segment of the 1,000-foot-wide Build Alternatives and multiplying that total by a conversion factor of 0.25 (i.e., dividing the total by 4). This converted figure provided a more realistic value of the potential direct effect to farmland and ranch lands during Tier 2 studies.

Due to the varied width of certain segments (slightly more or less than 1,000 feet), four segments used different conversion factors (i.e., not 0.25), including Pueblo (1.0), Pueblo to Fowler (0.2), Rocky Ford (0.31), and La Junta to Las Animas (0.19). The number of acres of farmland or ranch lands potentially affected by the Build Alternatives (after applying the conversion factor) was multiplied by the estimated productivity of that land (i.e., $4,500 for acres producing vegetables, $400 for acres producing alfalfa/corn, or $7 for ranch lands) to determine the potential loss in productivity to the agricultural economy of the Lower Arkansas Valley.

Feedlots

Feedlots were considered potentially affected if any part of the property was located within the Build Alternatives. Feedlots require a significant amount of infrastructure investment. Therefore, effects to them not only include the value of the land, but also the value of this infrastructure. This analysis did not identify the specific value of the infrastructure held by feedlot owners in the project area because these figures require facility-specific information about capital expenses. Access to U.S. 50 is also an issue for feedlots. They depend on regional roadways to get their livestock to market. Therefore, it is important for these facilities to maintain some type of connection between their property and the regional roadway network. This access also must accommodate large vehicles that haul feed and are used to transport livestock.

Irrigation Canals and Ditches

Irrigation canals and ditches were considered potentially affected if any part of the canal or ditch was located within the Build Alternatives. The fact that U.S. 50 would cross a canal or ditch does not necessarily result in adverse effects to it. In fact, U.S. 50 crosses many canals and ditches today with no adverse effect to water flows. Canals and ditches would be adversely affected only if their water flows were altered to prevent the water from reaching receiving fields. During Tier 2 studies, improvements to U.S. 50 would be designed to avoid or minimize adverse effects to water flows. Additionally, roadways used to monitor and maintain canals and ditches would be preserved or replaced so that these operations could continue.

Permanent Roadside Produce Markets

Permanent roadside produce markets were considered potentially affected if any part of the market (including associated parking areas) was located within the Build Alternatives. Access to U.S. 50 is also an important issue for these markets. As their name implies, roadside produce markets depend heavily on passing travelers for their customer base. Therefore, it is essential that drivers are able to see the markets from the road and access them at the time they are spotted. Since the U.S. 50 Tier 1 EIS is recommending that access to U.S. 50 be more limited than it is today, it is likely that the Build Alternatives would result in changes in access for some of these markets. Additionally, markets currently located within U.S. 50 communities may be affected by a reduction in pass-by traffic after the new alignment of U.S. 50 (either north or south of town) is constructed.

Agricultural Product Storage Facilities

Agricultural product storage facilities were considered potentially affected if any part of the storage facility was located within the Build Alternatives. Since U.S. 50 is a primary farm-to-market route for farmers in the Lower Arkansas Valley, access to the highway is important for these facilities. Since the U.S. 50 Tier 1 EIS is recommending that access to U.S. 50 be more limited than it is today, it is likely that the Build Alternatives would result in changes in access for some of these facilities.

Livestock Sales Facilities

Livestock sales facilities were considered potentially affected if any part of the property was located within the Build Alternatives. Access to U.S. 50 is also an issue for these facilities. They operate on regional, not local, scales. Therefore, it is important for these facilities to maintain some type of connection to the regional roadway network. This access also must accommodate large trucks used to transport livestock.

4.4.2. Indirect Effects

Indirect loss of farmland cannot be quantified at this Tier 1 level of analysis. These indirect losses, also called uneconomical remainders, are the portions of farm fields rendered unusable due to their small size or an inability of the farmer to get to them or water them. The U.S. 50 Tier 1 EIS identifies a 1,000-foot-wide general corridor location, within which just 250 feet (or possibly less) would be needed for the roadway alignment (this alignment will be identified during Tier 2 studies). Since this analysis cannot determine which specific fields will be affected, it cannot identify indirect losses or uneconomical remainders that might result. However, because this is an important issue for farmers and ranchers in the Lower Arkansas Valley, mitigation strategies for these potential losses have been included in Section 7.

4.5. Mitigation Options

Avoidance or minimization will be the primary mitigation options for handling agricultural resources.

4.6. Deliverables

This technical memorandum is the primary deliverable related to agricultural resources for the U.S. 50 Tier 1 EIS. Farmland Conversion Impact Rating Forms will not be completed during this Tier 1 EIS since no farmland will be converted by the resulting federal action. These forms will be completed during Tier 2 studies when a roadway alignment (i.e., footprint) is identified.

5. Existing Conditions

The presence of the Arkansas River and the man-made irrigation canals running from it allowed the Lower Arkansas Valley to build a strong agricultural industry early in its history, and the industry has been an important part of life in the area for more than 100 years. These activities have provided jobs to local residents, contributed significantly to the development of the region, contributed to both the local and statewide economies, and account for more than half of the land use in the project counties (i.e., Pueblo, Otero, Bent, and Prowers counties) (Agricultural Census 2007a, Agricultural Census 2002b, U.S. Census 2010). Thus, it is important that these lands be recognized as a valuable resource.

The Census of Agriculture defines *farms* (i.e., farmland and ranch lands) as lands primarily used for crops, pasture, or grazing, as well as certain woodlands and wastelands that are part of a farm where at least $1,000 of agricultural products have been produced and sold, or normally would have been sold annually (Agricultural Census 2007a). By 1900, all four counties in the project area reported at least 100,000 acres of farmland and ranch lands, with Pueblo County reporting over 450,000 acres (Historical Census Browser 2007). This land area constituted roughly 11 percent of the total farmland and ranch lands in the state of Colorado during that year (Historical Census Browser 2007).

Since 1982, farming activities along the Arkansas River have decreased due to urban demand for water, pressure from communities downstream (i.e., the state of Kansas), and shifting of water supplies to electric generation (*Pueblo Chieftain* 2007). However, even with this decline, agricultural activities remain the economic foundation of the region. In 2007, 3.5 million acres of land in the project counties were used for farming and ranching (Agricultural Census 2007a).

The sections below discuss the agricultural economy and current resources that exist in the Lower Arkansas Valley.

5.1. Agricultural Economy

Employment data show the importance of agricultural activities to the economic life of the Lower Arkansas Valley. In 2011, the agricultural sector provided nearly 8 percent of all jobs in Otero County, 11 percent of jobs in Prowers County, and more than 26 percent of employment in Bent County (see Table 5-1) (Colorado Economic and Demographic Information System [CEDIS] 2013). In Bent County, the sector is the second largest employer behind government entities (CEDIS 2013).

Table 5-1. Percent of Total (Direct) Employment by Sector and County in 2011 (NAICS Based)

Economic Sector	Colorado	Pueblo County	Otero County	Bent County	Prowers County
Agriculture	1.4%	1.2%	7.8%	26.3%	11.3%
Construction	5.9%	8.0%	3.3%	—	5.0%
Finance, Insurance, and Real Estate	7.6%	5.3%	4.6%	—	6.2%
Government	16.2%	22.8%	23.1%	40.4%	25.8%
Manufacturing	4.8%	7.4%	5.8%	—	5.7%
Mining and Extractive Industries	1.1%	0.1%	—	—	1.8%
Services	33.7%	20.6%	—	—	—
Transportation, Communications, and Utilities	11.6%	14.8%	—	—	10.0%
Wholesale and Retail Trade	13.3%	16.4%	14.5%	7.1%	16.0%
Arts and Education	4.4%	3.3%	—	—	—

Source: CEDIS 2013, (*) = suppressed data
NAICS = North American Industry Classification System

It also should be noted that these data only describe direct employment within the agricultural sector. While this analysis does not include an estimate of the number of jobs indirectly created by the industry, it is fair to say that a certain number of jobs in the Lower Arkansas Valley exist to support agricultural activities. Thus, these jobs can be indirectly attributed to the industry's strong presence there.

Additionally, in 2007, the Colorado Department of Agriculture reported that nearly 3.5 million acres of farmland and ranch lands in the project counties produced over $500 million in agricultural goods. This figure represented roughly 9 percent of the value of all agricultural products produced in the state of Colorado (Agricultural Census 2007b, Agricultural Census 2007a). Of Colorado's 64 counties, the project counties rank 6th (Prowers), 12th (Otero), 17th (Bent), and 24th (Pueblo) for agricultural production in terms of the market value of all products sold (Agricultural Census 2007a). Some of these acres were used to graze cattle and facilitated the sale of approximately 323,000 cattle and calves in 2007, which represented roughly 10 percent of all these animals sold in the state of Colorado in that year (Agricultural Census 2007a).

5.2. Agricultural Resources

Agricultural resources in the project area are described below by the type of resource. They include prime farmland and farmland of statewide importance, farmland and ranch lands, feedlots, irrigation canals and ditches, permanent roadside produce markets, agricultural product storage facilities, and livestock sales facilities.

5.2.1. Farmland and Ranch Lands

The project area contains approximately 83,000 acres of farmland (Tranel 2008a). These acres generally are located adjacent to the Arkansas River or the system of irrigation canals and ditches associated with it. 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. For example, Prowers County ranks sixth in the state for the total dollars in crop sales, earning $82,147,000 per year (Agricultural Census 2007a). Each of the project counties produces at least one crop that ranks it within the top 10 statewide for the number of acres in production (see Table 5-2).

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

Project County	Crop	State Rank[b]	Universe[a]
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 silage	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

[a]The number of Colorado counties producing this item—out of 64 counties
[b]Vegetables ranked by acres in production per year; grain measured in dollar sales; all other crops ranked by acres harvested per year.
Source: Agricultural Census 2007a

The project area contains approximately 92,000 acres of ranch lands (Tranel 2008a). These lands lie primarily outside the irrigated agricultural areas and areas immediately surrounding the project municipalities.

Table 5-3 shows the location of farmland (i.e., vegetables and alfalfa/corn) and ranch lands within the project area by county. It is important to reiterate that these are acres of farmland or ranch lands within the portions of the counties that are also within the project area (not the entire county); therefore, countywide figures would be higher than those shown.

Table 5-3. Farmland and Ranch Lands in the Project Area by County

County	Vegetables[a] (acres)	Alfalfa/Corn[b] (acres)	Ranching/ Grazing[c] (acres)	Total per County (acres)
Pueblo	24	3,330	30,570	33,924
Otero	17,690	16,191	31,462	65,343
Bent	0	21,748	17,237	38,985
Prowers	343	24,019	12,311	36,673
Total (all counties)	**18,057**	**65,288**	**91,580**	**174,925**

[a]Includes melons, onions, fruit, sod, and other non-grain crops
[b]Includes alfalfa, corn, and other grain crops
[c]Includes all other agricultural (i.e., non-urbanized) land where ranching or grazing activities could occur
Source: Tranel 2008a

The locations of these acres are shown on maps located in Appendix C (Figure C-5 through Figure C-8).

5.2.2. Other Agricultural Resources

The other agricultural resources identified within the project area are listed below. The locations of these resources are shown on maps located in Appendix C (Figure C-9 through Figure C-12).

Feedlots

A total of four facilities were identified at the following locations.

- Rocky Ford Feedyard, northwest of Rocky Ford at U.S. 50 and CR 16
- United Feeders, southeast of Rocky Ford at CR 20.5 and CR Dd
- Ribeye Feeders, north of Rocky Ford on CR 19
- JBS Five Rivers Cattle Feeding, west of Lamar on the south side of U.S. 50 near the junction of U.S. 50 and U.S. 287.

Irrigation Canals and Ditches

A total of 24 irrigation canals or ditches were identified, and they are listed below.

- Amity Canal
- Buffalo Canal
- Catlin Canal
- Consolidated Ditch
- Excelsior Ditch
- Fort Lyon Canal
- Granada Ditch
- Holly Ditch
- Jones Ditch
- Lamar Canal
- Las Animas Town Ditch
- Lubers Drainage Ditch
- Main Leach Canal
- Manvel Canal
- McClave Drainage Ditch
- Miller Ditch
- Otero Canal
- Oxford Farmers Ditch
- Riverview Ditch
- Rocky Ford Canal
- Rock Ford Highline Canal
- Sunflower Ditch
- Vista Del Rio Ditch
- X-Y Canal

Permanent Roadside Produce Markets

The following six markets were identified, and their general locations are listed.

- Mills Brothers Farm Market—located on U.S. 50 west of Rocky Ford
- O'Neal Produce (Arkansas Valley Produce)—located on U.S. 50 west of Rocky Ford
- Knapp's Farm Market—located on SH 71 west of Rocky Ford
- Sackett Farm Market—located on U.S. 50 between Rocky Ford and Swink
- Mary's Farm Market (Hanagan Farms)—located on U.S. 50 just west of Swink
- Lusk Farms (Grasmick's Produce)—located on U.S. 50 just east of Swink

Agricultural Product Storage Facilities

A total of six facilities used to store agricultural products were identified at the following locations.

- In Fowler near Santa Fe Avenue and 7th Street
- In La Junta near 1st Street and Smithland Avenue
- In Granada near North Main Street and East Half Avenue
- West of Holly near CR EE.5 and the BNSF (formerly Atchison, Topeka, and Santa Fe) Railway
- West of Holly near Road 30.5 and the BNSF Railway
- In Holly near Vinson Street and the BNSF Railway

Livestock Sales Facilities

The following three facilities were identified, and their general locations are listed.

- Clark Livestock—on U.S. 50 just west of Fowler
- Winter Livestock—on U.S. 50 in La Junta
- La Junta Livestock Commission—on U.S. 50 in La Junta

5.3. Farmland of Statewide or Local Importance, Unique Crops, and Farming Methods

Consultations were held with the NRCS, the Colorado Department of Agriculture, and local farmers to identify farmland of statewide or local importance, unique crops, and unique farming methods within the project area. A summary of these consultations (i.e., who was consulted with and when) can be found in Section 4.2. The results of those consultations are discussed below.

The FPPA defines farmland of statewide or local importance as “farmland, other than prime or unique farmland, that is of statewide or local importance for the production of food feed, fiber, forage, or oilseed crops, as determined by the appropriate State or unit of local government agency or agencies” (1984, Sect 2(c)(1)(C)). This information is combined with prime and unique land identification. There are acres of land identified as having statewide importance, all of which are located within Prowers County.

It should be noted that the area surrounding Rocky Ford has historically been known for melon and seed production (CDOT 2008). Additionally, an agricultural economist from Colorado State University (Jeffrey Tranel) indicated that the farmland south of Swink, which is currently in use for vegetable production, is some of the highest quality farmland in Colorado and is rivaled in quality by only a few small pockets of land in the Midwestern United States (Tranel 2008a).

Only one individual who was consulted provided feedback regarding farming methods in the project area. An NRCS staff member working out of the Rocky Ford Field Service Center provided the following information (Miller 2006):

- Much of the subsurface drip irrigation in Otero County has been installed in farm fields adjacent to U.S. 50. This type of irrigation system raises the value of that land substantially. It usually costs around $1,300 an acre to install, and it significantly raises the yields on crops planted with the system every year after it is installed.
- There are many irrigation siphons that currently cross U.S. 50 and also cross the railroad right of way. These siphons were engineered to move the water the existing distance; thus, to lengthen their delivery will mandate further engineering.

6. Effects Analysis

This evaluation of effects uses the worst-case scenario (i.e., the largest number of resources that could possibly be affected). It should be noted that many of the resources identified within the Tier 1 Build Alternatives could be avoided during future Tier 2 studies.

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 U.S. 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.

Since routine maintenance and repairs are conducted on the existing highway, they would not cause permanent effects to agricultural resources. Smaller scale improvements may require acquisition of farmland or ranch land currently being used for agricultural activities. Those acquisitions would occur directly adjacent to the existing highway and are expected to be minimal.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

The Build Alternatives have the potential to affect agricultural resources. It could affect between 3,600 and 4,588 acres of farmland or ranch lands, depending on which alternatives are chosen at each around-town route. Table 6-1 summarizes these effects.

How was the Productivity of Farmland and Ranch Lands Calculated?

The productivity of farmland and ranch lands was calculated by multiplying the number of acres affected by the Build Alternatives by the estimated profit that could be made from the lands' historic agricultural use. The following levels of profit were estimated for categories of agricultural use:

- Vegetables—$4,500 per acre
- Alfalfa/corn—$400 per acre
- Ranch lands—$7 per acre

More information about how these profit levels were estimated is presented in Section 4.2.

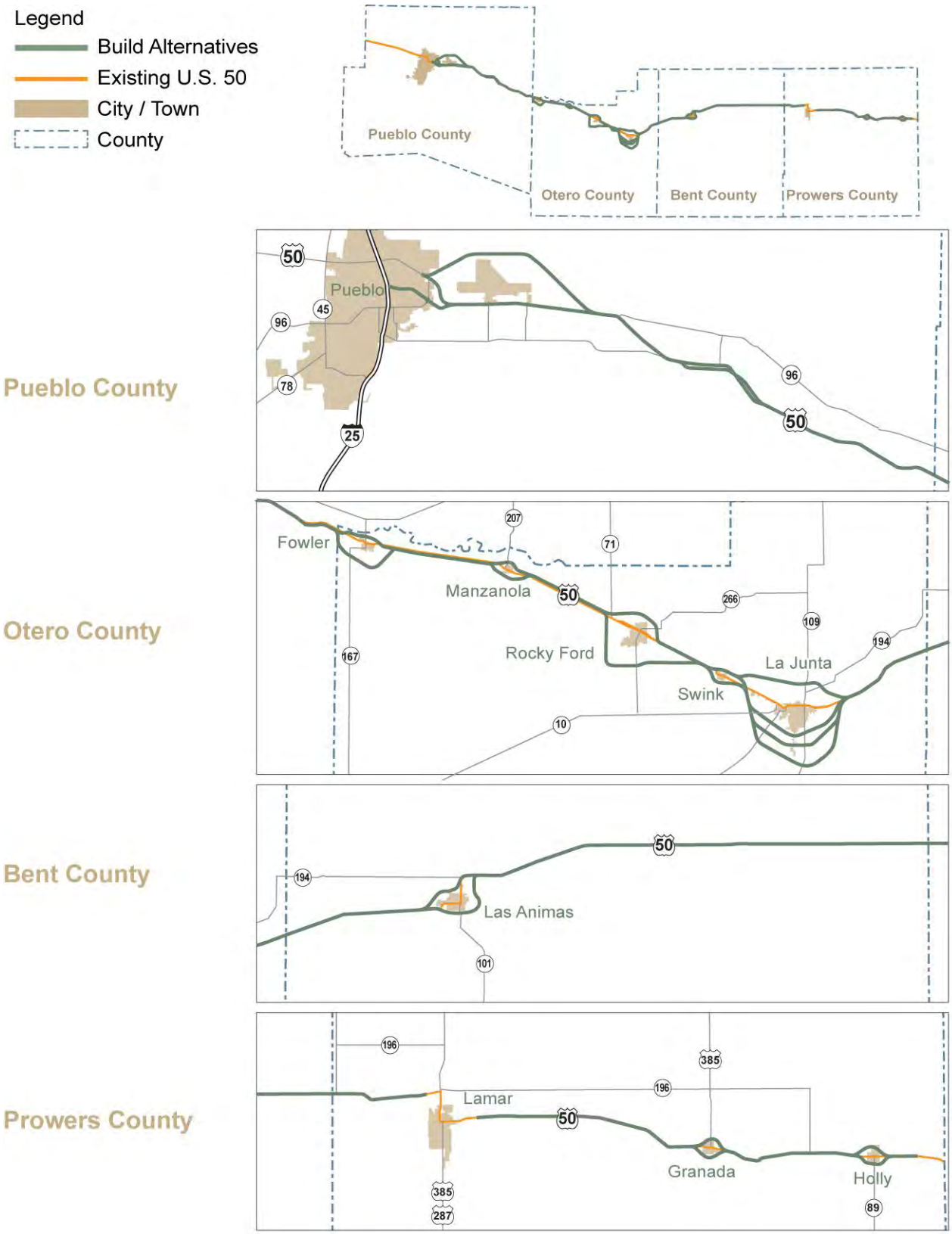


Figure 6-1. Build Alternatives Overview

Table 6-1. Summary of Potentially Affected Agricultural Resources by Section for the Build Alternatives

Section	Build Alternatives (if more than one)	Acres					Productive Value				Feedlots[f]	Irrigation Canals and Ditches	Permanent Roadside Produce Markets[g]
		Prime and Unique Farmland[e]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[g])	Alfalfa/ Corn ($400[g])	Ranching/ Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)			
Section 1: Pueblo	Alternative 1: Pueblo Airport North	41	0	2	350	352	$0	$755	$2,454	$3,208	0	0	0
	Alternative 2: Pueblo Existing Alignment	12	0	1	130	131	$0	$300	$909	$1,209	0	0	0
	Alternative 3: Pueblo SH 47 Connection	12	0	0	103	103	$0	$75	$721	$796	0	0	0
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	361	0	86	533	619	$0	$34,412	$3,733	$38,145	0	3	0
	Alternative 2: Fort Reynolds Realignment	377	0	117	499	616	$0	$46,855	$3,490	$50,345	0	3	0
Section 3: Fowler	Alternative 1: Fowler North	76	0	51	38	89	$200	$20,569	$268	$21,037	0	2	0
	Alternative 2: Fowler South	146	0	144	2	146	$0	$57,760	$15	$57,775	0	2	0
Section 4: Fowler to Manzanola	—	170	3	171	12	186	$13,937	$68,412	$82	$82,432	0	2	0
Section 5: Manzanola	Alternative 1: Manzanola North	78	0	56	22	78	$0	$22,242	$152	$22,395	0	2	0
	Alternative 2: Manzanola South	79	14	58	5	77	$62,186	$23,294	$33	$85,512	0	2	0

Section	Build Alternatives (if more than one)	Acres					Productive Value				Feedlots[f]	Irrigation Canals and Ditches	Permanent Roadside Produce Markets[g]
		Prime and Unique Farmland[e]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[g])	Alfalfa/ Corn ($400[g])	Ranching/ Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)			
Section 6: Manzanola to Rocky Ford	—	163	49	105	10	164	$220,363	$41,917	$69	$262,348	0	1	2
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	223	170	0	66	236	$764,431	$0	$463	$764,894	1	2	2
	Alternative 2: Rocky Ford South	219	164	59	25	248	$738,050	$23,635	$173	$761,857	1	4	2
Section 8: Rocky Ford to Swink	—	24	25	3	3	31	$111,223	$1,087	$23	$112,333	1	0	0
Section 9: Swink	Alternative 1: Swink North	39	23	12	26	61	$102,193	$4,786	$184	$107,164	0	0	1[d]
	Alternative 2: Swink South	71	74	0	2	76	$333,195	$0	$15	$333,210	0	0	1[d]

Section	Build Alternatives (if more than one)	Acres					Productive Value				Feedlots[f]	Irrigation Canals and Ditches	Permanent Roadside Produce Markets[g]
		Prime and Unique Farmland[e]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[g])	Alfalfa/ Corn ($400[g])	Ranching/ Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)			
Section 10: La Junta	Alternative 1: La Junta North	61	7	16	239	262	$29,925	$6,599	$1,672	$38,196	0	1	0
	Alternative 2: La Junta South	91	39	3	211	253	$175,236	$1,181	$1,480	$177,896	0	1	0
	Alternative 3: La Junta South	89	48	0	246	294	$213,977	$104	$1,722	$215,803	0	1	0
	Alternative 4: La Junta South	79	48	17	294	359	$214,170	$6,625	$2,055	$222,850	0	1	0
Section 11: La Junta to Las Animas	—	230	0	46	281	327	$0	$18,486	$1,970	$20,456	0	2	0
Section 12: Las Animas	Alternative 1: Las Animas North	70	0	33	68	101	$0	$13,142	$475	$13,617	0	2	0
	Alternative 2: Las Animas South	122	0	36	105	141	$0	$14,249	$734	$14,983	0	2	0
Section 13: Las Animas to Lamar[a]	—	690	0	488	245	733	$0	$195,118	$1,717	$196,835	2	7	0
Section 14: Lamar to Granada[a]	—	280	6	279	138	423	$25,494	$111,705	$963	$138,161	0	2	0

Section	Build Alternatives (if more than one)	Acres					Productive Value				Feedlots[f]	Irrigation Canals and Ditches	Permanent Roadside Produce Markets[g]
		Prime and Unique Farmland[e]	Vegetable (farmland)	Alfalfa/Corn (farmland)	Ranch Lands	Total	Vegetable ($4,500[g])	Alfalfa/ Corn ($400[g])	Ranching/ Grazing ($7)	Estimated Value of Farmland and Ranch Land Production (2007 dollars)			
Section 15: Granada	Alternative 1: Granada North	63	3	45	0	48	$14,999	$18,144	$1	$33,145	0	2	0
	Alternative 2: Granada South	18	15	0	47	62	$66,993	$192	$327	$67,513	0	1	0
Section 16: Granada to Holly	—	208	0	148	100	248	$0	$59,337	$701	$60,037	0	2	0
Section 17: Holly	Alternative 1: Holly North	50	0	31	20	51	$0	$12,357	$139	$12,496	0	0	0
	Alternative 2: Holly South	58	0	20	43	63	$0	$7,953	$302	$8,256	0	0	0
Section 18: Holly Transition	—	71	0	44	66	110	$0	$17,392	$465	$17,857	0	2	0
Total[b]		**2,866 to 3,047**	**279 to 403**	**1,531 to 1,805**	**1,790 to 2,380**	**3,600 to 4,588**				**$1.9 million to $2.6 million**	**5**	**49[c]**	**6**

[a] The Build Alternatives do not include alternatives in Lamar, as discussed in Chapter 3, Alternatives Considered.
[b] The total range does not necessarily summarize the same alternatives, but is simply the least and greatest impact by farmland type.
[c] The same 24 irrigation canals and ditches would be affected by the Build Alternatives no matter which alternatives are selected as the Preferred Alternative.
[d] There is one market located within the Swink north alternative and a different market located within the Swink south alternative; therefore, both of these markets have been included in this total (because it is not known which one may be affected during Tier 2 studies).
[e] Source: NRCS 2005
[f] Source: EPA ECHO 2013
[g] Source: Tranel 2008

6.2.1. Build Alternatives Effects by Location

The following section describes the agricultural resources by section (i.e., location) and Build Alternative. Table 6-1 summarizes these effects.

Section 1: Pueblo

Alternative 1: Pueblo Airport North. This alignment replaces the existing route south of the airport with a route to the north of airport property and includes a connection to SH 47 at the western end of the alignment. Approximately 41 acres of land identified as prime farmland could be impacted by this alternative. This impact to prime farmland is the greatest effect of the alternative considered at the Pueblo location. No land at this location is classified as having statewide importance by the NRCS (2005). Alternative 1 would affect 352 acres of farmland and ranch lands, which are composed of two acres of alfalfa/corn and 350 acres of ranch lands. Loss of these farmlands and ranch lands would result in an estimated loss of $3,000 in annual productive value. This productive loss is the highest for Section 1, as it primarily involves construction of a new roadway through undeveloped land.

Alternative 2: Pueblo Existing Alignment. Approximately 12 acres of land identified as prime farmland could be impacted by Alternative 2: Pueblo Existing Alignment. No land at this location is classified as having statewide importance by the NRCS (2005). Alternative 2 would affect 131 acres of farmland and ranch lands, which are composed of one percent alfalfa/corn production (one acre) and 99 percent ranch lands (130 acres). Loss of this area for agricultural use would result in an estimated $1,000 loss in annual productive value to the agricultural economy of the Lower Arkansas Valley. This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This loss in productive value is low relative to most other portions of the Build Alternative because most of the affected areas are ranch lands, which have relatively low productive value.

Alternative 3: Pueblo SH 47 Connection. Alternative 3 at Pueblo includes the existing alignment to the south of the airport, with the addition of a connection to SH 47. The impacts to farmland are similar to Alternative 2: Pueblo Existing Alignment and less than Alternative 1: Pueblo Airport North. Alternative 3 would affect slightly less than103 acres of farmland and ranch lands, which are composed of less than one percent alfalfa/corn land (less than one acre) and 99 percent ranch lands (102 acres). Loss of this area would result in an estimated $1,000 loss in annual productive value. As with Alternative 2, 12 acres of prime farmland could be impacted by the alternative. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005).

Section 2: Pueblo to Fowler

Alternative 1: Fort Reynolds Existing Alignment. Approximately 361 acres of prime farmland could be impacted by Alternative 1. No land at this location is classified as having statewide importance by the NRCS (2005). This alternative would affect 619 acres of farmland and ranch lands, with an estimated $34,000 loss of annual productive value. Alfalfa/corn crops make up 90 percent of the loss in productive value (86 acres); the remaining 10 percent loss in annual productive value consists of impacts to ranch lands (533 acres). It is likely the alternative would bridge the canals and have minimal impact.

Alternative 2: Fort Reynolds Realignment. The alignment of Alternative 2 is similar to the existing alignment with the exception of approximately three miles around Fort Reynolds. Approximately 377 acres of land identified as prime farmland would be affected by Alternative 2. The impact to prime farmland is similar to the impact estimated for Alternative 1. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). Alternative 2: Fort Reynolds Realignment would affect 616 acres of farmland and ranch lands and incur an estimated loss of $50,000 of annual productive value. Alfalfa/corn crops make up 93 percent of the loss in productive value (117 acres); the remaining 7-percent loss in annual productive value is due to impacts to ranch lands (499 acres). This alternative also would potentially affect the Excelsior and Oxford Farmers ditches and the Rocky Ford Highline Canal. It is likely that Alternative 2 would have a minimal impact on these irrigation resources, but further effects would be analyzed during Tier 2 studies.

Section 3: Fowler

Alternative 1: Fowler North. Approximately 76 acres of prime farmland would be affected by Alternative 1. This is almost half the amount of acres of prime farmland impacted by Alternative 2: Fowler South. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). This alternative would affect 89 acres of farmland and ranch lands and incur an estimated loss of $21,000 of annual productive value. Alfalfa/corn crops account for 98 percent of the loss in productive value (51 acres); the remaining 2-percent loss in annual productive value is due to impacts to ranch lands (38 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This alternative also would affect the Otero Canal.

Alternative 2: Fowler South. Approximately 146 acres of prime farmland would be affected by Alternative 2. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). The south alternative would affect 146 acres of farmland and ranch lands and experience an estimated loss of $58,000 of annual productive value. Alfalfa/corn crops constitute more than 99 percent of the loss in productive value (144 acres). Impacted ranch lands (two acres) would result in less than one percent of the loss of annual productive value. This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This alternative also would affect the Rocky Ford Highline Canal and Oxford Farmers Ditch.

Section 4: Fowler to Manzanola

The Build Alternative from Fowler to Manzanola would impact approximately 170 acres of prime farmland. It would affect 184 acres of farmland and ranch lands, at an estimated loss of $82,000 of annual productive value. Losses in productive value are made up of 17 percent from impacts to vegetable farmland (three acres), 83 percent from impacts to alfalfa/corn farmland (171 acres), and a small portion from impacts to ranch lands (10 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the Otero and Catlin canals.

Section 5: Manzanola

Alternative 1: Manzanola North. Approximately 78 acres of prime farmland would be impacted by Alternative 1. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). The Manzanola North Alternative would affect 78 acres of farmland and ranch lands and sustain an estimated loss of $22,000 of annual productive value. Losses in productive value are made up of more than 99 percent of impacts to alfalfa/corn farmland (56 acres) and less than 1 percent of impacts to ranch lands (22 acres). Under the Manzanola North Alternative, efforts would be made to avoid fragmentation of farmland and uneconomical remainders of farm fields. This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. Impacts to farmland also would have minor impacts to local irrigation demand on the Otero and Catlin canals.

Alternative 2: Manzanola South. Approximately 79 acres of prime farmland would be impacted by Alternative 2. This impact to prime farmland is very similar to the estimated impact for Alternative 1. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). Alternative 2 would affect 77 acres of farmland and ranch lands, with an estimated $86,000 loss in annual productive value. Lost productive value is made up of 73 percent vegetable production (14 acres), 27 percent alfalfa/corn production (58 acres), and less than 1 percent ranch lands (five acres). Although this is a minor impact relative to the entire corridor, the effect of Alternative 2 on productive value is significant for this location compared to Alternative 1: Manzanola North. This is primarily because 73 percent of the land impacted is used for vegetable production, the most valuable of the agricultural land uses in the Lower Arkansas Valley. There also would be minor impacts to local irrigation demand on the Otero and Catlin canals.

Section 6: Manzanola to Rocky Ford

Between Manzanola and Rocky Ford, the Build Alternative would impact approximately 163 acres of prime farmland. No land impacted by this alternative is classified as having statewide importance by the NRCS

(2005). The Build Alternative would affect 164 acres of farmland and ranch lands and incur an estimated $262,000 loss in annual productive value. Lost productive value is made up of 84 percent vegetable production (49 acres), 16 percent alfalfa/corn production (105 acres), and less than 1 percent ranch lands (10 acres). This would be considered a minor impact as far as acreage goes, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A, but note that the effect on productive value is significant, given that 84 percent of the loss is vegetable production. It also has the potential to affect Mills Brothers Farm Market and O'Neal Produce (Arkansas Valley Produce). Efforts will be made to avoid direct effects to these permanent roadside produce markets during Tier 2 studies. Impacted businesses would be relocated following provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended. Indirect effects related to vehicle access from U.S. 50 also will be reviewed in more detail during Tier 2 studies when a final alignment for U.S. 50 in this area has been identified. The Build Alternative in this area also would affect the Main Leach Canal.

Section 7: Rocky Ford

Alternative 1: Rocky Ford North. Approximately 223 acres of prime farmland would be impacted by Alternative 1. No land impacted by this alternative is classified as having statewide importance by the NRCS. The Rocky Ford North Alternative would affect 236 acres of farmland and ranch lands, incurring an estimated $765,000 loss in annual productive value. Lost productive value is made up of 72 percent vegetable production (170 acres) and less than 1 percent ranch lands (66 acres). This is the highest loss in productive value of all the sections by a substantial margin. In fact, it is $432,000 higher than the next largest loss, which is $333,000 resulting from the Swink South Alternative. The loss is expected to be high because of the large number of highly productive vegetable acres that would be affected. It also could affect Sackett Farm Market and the parking lot of Knapp's Farm Market (both are permanent roadside produce markets). Impacted commercial areas to be acquired would be identified during the final decision and would be relocated according to the Uniform Act. Efforts will be made to avoid direct effects to these facilities during Tier 2 studies. Indirect affects related to vehicle access from U.S. 50 also will be reviewed in more detail during Tier 2 studies after a final alignment for U.S. 50 in this area has been identified. The Rocky Ford North Alternative in this area also would affect the Main Leach and Rocky Ford canals.

Alternative 2: Rocky Ford South. Approximately 219 acres of prime farmland would be impacted by Alternative 2. This is similar to the impact on prime farmland estimated for Alternative 1. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). This alternative would affect 248 acres of farmland and ranch lands and sustain an estimated $762,000 loss in annual productive value. Lost productive value is made up of 66 percent vegetable production (164 acres), 24 percent alfalfa/corn production (59 acres), and 10 percent ranch lands (25 acres). This is less than the effect to productive value estimated for Alternative 1: Rocky Ford North, but a relatively high loss compared with other sections along the corridor. The Rocky Ford South Alternative also has the potential to affect two feedlots, United Feeders and Rocky Ford Feedyard. The Rocky Ford South Alternative also would affect the Catlin, Otero, Rocky Ford Highline, and Rocky Ford canals.

Section 8: Rocky Ford to Swink

Approximately 24 acres of prime farmland would be impacted by the Rocky Ford to Swink Build Alternative through this section. No land impacted by the Build Alternative is classified as having statewide importance by the NRCS (2005). The Build Alternative would affect 31 acres of farmland and ranch lands and experience an estimated $112,000 loss in annual productive value. Lost productive value is made up of close to 99 percent vegetable production (25 acres), 1 percent alfalfa/corn production (3 acres), and less than 1 percent ranch lands (3 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. The Build Alternative in this area also has the potential to affect a feedlot, which is located west of Swink on the north side of U.S. 50. Efforts will be made to avoid direct effects to this feedlot during Tier 2 studies.

Section 9: Swink

Alternative 1: Swink North. Approximately 39 acres of prime farmland would be impacted by Alternative 1: Swink North. No land impacted by this alternative is classified as having statewide importance by the NRCS. This alternative would affect 61 acres of farmland and ranch lands, with an estimated $107,000 loss in annual productive value. Lost productive value is made up of 95 percent vegetable production (23 acres), 5

percent alfalfa/corn production (12 acres), and less than 1 percent ranch lands (26 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This alternative also would affect (directly or indirectly) a permanent roadside produce market—Mary's Farm Market (Hanagan Farms). Efforts will be made to avoid direct effects to this market during Tier 2 studies. Impacted businesses would be relocated following provisions of the Uniform Act. In addition, vehicle access to the market from U.S. 50 was considered an indirect effect and also will be reviewed in more detail during Tier 2 studies after a final alignment for U.S. 50 has been identified.

Alternative 2: Swink South. Approximately 71 acres of prime farmland would be impacted by Alternative 2 in Swink. This is almost twice the area of prime farmland estimated to be impacted by Alternative 1. No land impacted by this alternative is classified as having statewide importance by the NRCS. The Swink South Alternative would affect 76 acres of farmland and ranch lands and incur an estimated $333,000 loss in annual productive value. Lost productive value is made up of more than 99 percent vegetable production (74 acres) and less than 1 percent ranch lands (two acres). The agricultural land south of Swink has been identified as some of the highest quality farmland in the state of Colorado and is rivaled in quality by only a few small pockets of land in the Midwestern United States (Tranel 2008a). While it is difficult to put a numerical value on this characteristic, this unique quality suggests that these resources be given a higher level of protection than other farmland or ranch lands. Alternative 2 also would affect (directly or indirectly) a permanent roadside produce market—Lusk Farms (Grasmick's Produce). Efforts will be made to avoid direct effects to this market during Tier 2 studies. Vehicle access to it from U.S. 50 was considered an indirect effect, so this also will be reviewed in more detail during Tier 2 studies after a final alignment for U.S. 50 has been identified.

Section 10: La Junta

Alternative 1: La Junta North. Approximately 61 acres of prime farmland would be impacted by Alternative 1, which is the smallest impact to prime farmland of all three alternatives in this section. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). La Junta North would affect 262 acres of farmland and ranch lands and incur an estimated $38,000 loss in annual productive value. Lost productive value is made up of 78 percent vegetable production (7 acres), 17 percent alfalfa/corn production (16 acres), and 5 percent ranch lands (239 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This alternative would affect the Fort Lyon Canal, which is not currently impacted by the existing highway alignment.

Alternative 2: La Junta South . Approximately 91 acres of prime farmland would be impacted by Alternative 2. No land impacted by this alternative is classified as having statewide importance by the NRCS. Alternative 2 would affect 253 acres of farmland and ranch lands, sustaining an estimated $178,000 loss in annual productive value. Lost productive value is made up of 99 percent vegetable production (39 acres) and less than 1 percent of both alfalfa/corn production (3 acres) and ranch lands (211 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This alternative also would affect the Otero Canal, which is not currently impacted by the existing highway alignment.

Alternative 3: La Junta South . Approximately 89 acres of prime farmland would be impacted by Alternative 3. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). Alternative 3 would affect 295 acres of farmland and ranch lands and experience an estimated $216,000 loss in annual productive value. Lost productive value is made up of 99 percent vegetable production (48 acres) and less than 1 percent of both alfalfa/corn production (one acre) and ranch lands (246 acres). This alternative also would affect the Otero Canal, which is not currently impacted by the existing highway alignment.

Alternative 4: La Junta South . Approximately 79 acres of prime farmland would be impacted by Alternative 4. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). Alternative 4 would affect 359 acres of farmland and ranch lands and incur an estimated $223,000 loss in annual productive value. Lost productive value is made up of 96 percent vegetable production (48 acres),

three percent of alfalfa/corn production (17 acres), and 1 percent ranch lands (294 acres). This alternative also would affect the Otero Canal, which is not currently impacted by the existing highway alignment.

Section 11: La Junta to Las Animas

La Junta to Las Animas Build Alternative would impact 230 acres of prime farmland between La Junta and Las Animas. The Build Alternative would affect 327acres of farmland and ranch lands and incur an estimated $20,000 loss in annual productive value. Lost productive value is made up of 90 percent alfalfa/corn production (46 acres) and 10 percent ranch land production (281 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the Consolidated and Jones ditches.

Section 12: Las Animas

Alternative 1: Las Animas North. Approximately 70 acres of prime farmland would be impacted by Alternative 1. This is slightly more than half of the area of prime farmland estimated to be impacted by Alternative 2: Las Animas South. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). Alternative 1: Las Animas North would affect 101 acres of farmland and ranch lands, incurring an estimated $14,000 loss in annual productive value. Lost productive value is made up of 97 percent alfalfa/corn production (33 acres), and 3 percent ranch lands (68 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the Consolidated and Las Animas Town ditches. Under Alternative 1, efforts would be made to avoid fragmentation of farmland and uneconomical remainders of farm fields.

Alternative 2: Las Animas South. Approximately 122 acres of prime farmland would be impacted by Alternative 2. No land impacted by this alternative is classified as having statewide importance by the NRCS (2005). This alternative would affect 141 acres of farmland and ranch lands, sustaining an estimated $15,000 loss in annual productive value. Lost productive value is made up of 95 percent alfalfa/corn production (36 acres) and 5 percent ranch land production (105 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. Alternative 2: Las Animas South also would affect the Consolidated and Las Animas Town ditches.

Section 13: Las Animas to Lamar

Approximately 690 acres of prime farmland would be impacted by the Build Alternative from Las Animas to Lamar. This is slightly more that 0.16 percent of the total prime farmland within Bent County. No land impacted by the alternative at this location is classified as having statewide importance by the NRCS (2005). The Build Alternative would affect 733 acres of farmland and ranch lands and incur an estimated $196,000 loss in annual productive value. Lost productive value is made up of 99 percent alfalfa/corn production (488 acres) and 1 percent ranch land production (245 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. This section affects more acres of farmland and ranch lands and the most acres of alfalfa/corn production. This is because it is one of the longest sections, and, therefore, largest in total area. The Build Alternative in this area also has the potential to affect two feedlots. These facilities are located east of Las Animas on the north side of U.S. 50 near CR 14.5 and CR JJ.5 and west of Lamar on the south side of U.S. 50 near the junction of U.S. 50 and U.S. 287. Efforts will be made to avoid direct effects to these facilities during Tier 2 studies. The Build Alternative in this area also would affect seven irrigation canals and ditches, including Amity Canal, Millers Ditch, Lubers Drainage Ditch, McClave Drainage Ditch, Sunflower Ditch, Riverview Ditch, and the Vista Del Rio Ditch.

Section 14: Lamar to Granada

Approximately 280 acres of prime and unique farmland are impacted in this section, of which 112 acres is classified as having statewide importance (NRCS 2005). The Build Alternative between Lamar and Granada would affect 423 acres of farmland and ranch lands and sustain an estimated $138,000 loss in annual productive value. Lost productive value is made up of close to 19 percent vegetable production (6 acres), 81 percent alfalfa/corn production (279 acres), and less than 1 percent ranch lands (138 acres). This would be

considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the Manvel and Lamar Canals.

Section 15: Granada

Alternative 1: Granada North. Approximately 63 acres of prime farmland would be impacted by Alternative 1. Of this land, 43 acres are classified as having statewide importance (NRCS 2005). This is much greater impact to prime and unique farmland than the estimated impacts of Alternative 2: Granada South. Alternative 1 would affect 48 acres of farmland and ranch lands and incur an estimated $33,000 loss in annual productive value. Lost productive value is made up of 45 percent vegetable production (three acres) and 55 percent alfalfa/corn production (45 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. Alternative 1 also would affect the X-Y Canal and the Granada Ditch.

Alternative 2: Granada South. Approximately 18 acres of prime and unique farmland would be impacted by Alternative 2. Of this area, 13 acres are classified as having statewide importance (NRCS 2005). Alternative 2 would affect 63 acres of farmland and ranch lands and experience an estimated $67,000 loss in annual productive value. Lost productive value is made up of 99 percent vegetable production (15 acres) and less than 1 percent of both alfalfa/corn (one acre) and ranch land production (47 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the X-Y Canal.

Section 16: Granada to Holly

Approximately 208 acres of prime and unique farmland would be impacted by this section; 19 percent of this area is classified as having statewide importance (39 acres) (NRCS 2005). The Build Alternative would affect 248 acres of farmland and ranch lands, with an estimated loss of $60,000 of annual productive value. Losses in productive value are made up of 99 percent alfalfa/corn farmland production (148 acres) and 1 percent ranch lands production (100 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the X-Y Canal and Granada Ditch.

Section 17: Holly

Alternative 1: Holly North. Approximately 50 acres of prime and unique farmland would be impacted by Alternative 1. Of this acreage, 22 percent is classified as having statewide importance (11 acres) (NRCS 2005). Alternative 1 would affect 51 acres of farmland and ranch lands and incur an estimated loss of $12,000 of annual productive value. Losses in productive value are made up of 99 percent alfalfa/corn farmland production (31 acres) and 1 percent ranch lands production (20 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A.

Alternative 2: Holly South. Approximately 58 acres of prime and unique farmland would be impacted by Alternative 2. Of this area, 3 percent is classified as having statewide importance (two acres) (NRCS 2005). Compared to Alternative 1: Holly North, this is a similar impact to prime and unique farmland in general, but a lesser impact to farmland of statewide importance. The Holly South Alternative would affect 63 acres of farmland and ranch lands and sustain an estimated loss of $8,000 of annual productive value. Losses in productive value are made up of 96 percent alfalfa/corn farmland production (20 acres) and 4 percent ranch lands production (43 acres).

Section 18: Holly Transition

Approximately 71 acres of prime and unique farmland would be impacted by Section 18, of which three acres are classified as having statewide importance (NRCS 2005). The Holly Transition Build Alternative would affect 110 acres of farmland and ranch lands and experience an estimated loss of $18,000 of annual productive value. Losses in productive value are made up of 97 percent alfalfa/corn farmland production (44 acres) and three percent ranch lands production (66 acres). This would be considered a minor impact, as identified in the Economics Technical Memorandum included with the U.S. 50 East Corridor EIS in Appendix A. It also would affect the Buffalo Canal and Holly Ditch.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific agricultural resources would be affected by the Build Alternatives. However, the following mitigation strategies have been developed to ensure that negative effects to these resources are minimized during Tier 2 studies.

Effects to farmland and ranch lands should be minimized by routing Tier 2 highway alignments to follow section lines and existing roads where possible. Section lines and existing roads are important because they frequently serve as boundaries between areas of farmland and ranch lands. If farmland cannot be avoided, Tier 2 highway alignments should be routed to minimize the number of uneconomical remainders when possible. Uneconomical remainders are the portions of farmland rendered unusable (see Figure 7-1) for a number of reasons, including:

- Their small size
- The farmer's inability to get to them
- The farmer's inability to water them
- The farmer's inability to reasonably move equipment between them

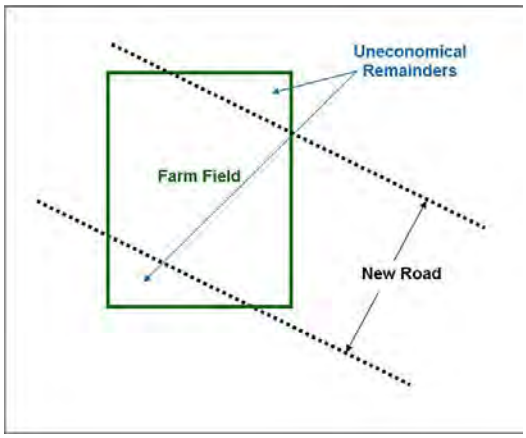


Figure 7-1. Example of Uneconomical Remainders

When the route of the highway alignment causes uneconomical remainders, CDOT will purchase that land.

To minimize effects to feedlots, Tier 2 highway alignments should be routed around the facilities when feasible. When this is not possible, all reasonable methods should be employed to route alignments in such a manner that a feedlot could continue operations.

During Tier 2 studies, water flows through the Lower Arkansas Valley's extensive system of irrigation canals and ditches will be identified and effects to them analyzed. Tier 2 highway projects should be constructed in a manner that maintains the water flows of these systems. This does not mean that highway alignments would not cross them. However, in these instances, CDOT should ensure that mitigation measures maintain the functionality of these systems, including associated maintenance roads.

To minimize effects to permanent roadside produce markets, Tier 2 highway alignments should be routed in a manner that avoids direct effects to them where possible. In the event a market cannot be avoided, reasonable methods will be employed to ensure that owners are compensated.

Agricultural activities require the ability to move goods to market. Since U.S. 50 is the primary east-west route through the Lower Arkansas Valley, the highway is frequently used for this purpose. Construction activities should, when possible, be scheduled to minimize disruptions (including closures) to key portions of U.S. 50 that are heavily used for farm-to-market travel activities, especially during harvest times. These key portions include areas where co-ops and feedlots are located.

8. References

U.S. Department of Agriculture (USDA). 2007 Census of Agriculture. *County Profiles for Pueblo, Otero, Bent, and Prowers Counties.* 2007. Web. 22 Oct. 2013. <http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Colorado/>. [Agricultural Census 2007b]

U.S. Department of Agriculture (USDA). 2007 Census of Agriculture. *Volume 1, U.S. Summary and State Reports.* 2007. Web. 24 Oct. 2013. <http://www.agcensus.usda.gov/Publications/2007/Full_Report/>. [Agricultural Census 2007a]

Baker, C. Natural Resources Conservation Service (NRCS) Rocky Ford Field Office. Consultation about the carrying capacity of ranch lands for livestock grazing. Feb 2009.

Colorado Department of Agriculture. *Colorado Farm Fresh: Your Guide to Colorado Farmers' Markets, Roadside Stands, U-Picks, and Agritourism Activities.* Lakewood, CO: Colorado Department of Agriculture; 2008. Print.

Colorado Department of Agriculture. Colorado Ag Facts (CO Ag Facts). *Value of Agricultural Products Sold by County.* 2002. Web. Feb. 2006. <http://www.ag.state.co.us/mkt/AgStatsMap.pdf>.

Colorado Department of Local Affairs (DOLA). Colorado Economic and Demographic Information System (CEDIS). *Colorado Jobs by Sector in 2011—NAICS Based (2001 to Current).* 2001. Web. 16 Oct. 2013. <https://dola.colorado.gov/demog_webapps/jsParameters.jsf?sic=F>.

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Community Workshops Report.* Colorado Springs, CO: Colorado Department of Transportation Region 2, Aug. 2006. Print. [CDOT 2006a]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Public Scoping Report.* Colorado Springs, CO: Colorado Department of Transportation Region 2, 18 Apr. 2006. Print. [CDOT 2006b]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Historic Context Overview.* Denver, CO: Colorado Department of Transportation Region 2, 2008. Print.

Colorado Economic and Demographic Information System (CEDIS). *Economic Information from 2010.* Denver, CO: Colorado Department of Local Affairs. 2010. Web. 7 Oct. 2013. <http://www.dola.colorado.gov/demog_webapps/jsn_parameters.jsf>.

Colorado State Board of Stock Inspection Commissioners (Colorado Brand Board). *Public Livestock Markets in the State of Colorado.* Denver, CO: Colorado State Board of Stock Inspection Commissioners, 21 Apr. 2008. Obtained by facsimile transmittal on 23 Jan. 2009.

Conrad, K. Natural Resources Conservation Service (NRCS). Consultation with the Lamar Field Service Center. 2 Aug. 2006 and 9 Aug. 2006.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. 1978.

Farmland Protection Policy Act of 1981 (FPPA) Regulations. 7 CFR 658.

Fankhauser, T. Colorado Cattleman's Association. Consultation about the carrying capacity of ranch lands for livestock grazing. Feb. 2009.

Historical Census Browser. *Agricultural Data from 1900 to 1974.* Charlottesville, VA: University of Virginia Library. Web. Feb. 2007. <http://fisher.lib.virginia.edu/collections/stats/histcensus/>.

Macklin, T. Natural Resources Conservation Service (NRCS). Consultation with the Lamar Resource Conservation and Development Office. 10, 24, and 25 Jul. 2006.

Mestas, A. "One in a Melon." *Pueblo Chieftain*. 4 Aug 2009. Print.

Miller, D. Colorado Department of Agriculture. Consultation with the West Otero Conservation District. 2, 4, 8, and 9 Aug. 2006.

Myers, D. Colorado Department of Agriculture. Consultation with the Bent Conservation District. 14 Dec. 2006.

National Environmental Policy Act (NEPA) Regulations. 23 CFR 771. 1987.

Natural Resources Conservation Service (NRCS). *Digital Soil Survey: Soil Data for Eastern Colorado.* ESRI ArcGIS 9.2. Lakewood, CO: Natural Resources Conservation Service (NRCS), 25 Jan. 2005. Print.

Natural Resources Conservation Service (NRCS) *Soil Data Mart: Prime and Other Important Farmlands Reports for Pueblo, Otero, Bent, and Prowers Counties.* 20 Dec. 2005. Web. Aug. 2006. <http://soildatamart.nrcs.usda.gov/>.

Natural Resources Conservation Service (NRCS) *Soil Data Mart: Soil Surveys for Pueblo, Otero, Bent, and Prowers Counties.* Web. Obtained corrected datasets in geographic information system format from Shannon Phillipus (Colorado Department of Transportation (CDOT) geographic information system staff) on 30 May 2006.

Pueblo Chieftain. Agricultural Decline to Continue in Arkansas River Valley. 11 Mar. 2007. Web. <http://www.chieftain.com>.

Rhoades, R. Natural Resources Conservation Service (NRCS). Consultation with the Pueblo Field Service Center. 8 Aug. 2006.

Schleining, C. Natural Resources Conservation Service (NRCS). Consultation with the Las Animas Field Service Center. 28 Jul. 2006 and 9 Aug. 2006.

Stulp Farms. *Carrying Capacity of Ranch Lands for Livestock Grazing.* Web. Feb. 2009. <www.cminet.net/~stulp/>.

Terry, J. Colorado Department of Agriculture. Consultation with the Colorado State Conservation Board. 4 and 11 Dec. 2006.

Tranel. J. *Identification of Highest and Best Agricultural Use of Non-Urbanized Land in the Project Area.* Lafayette, CO: WYCO Associates, LLC. 24 Apr. 2008. Print. [Tranel 2008a]

Tranel. J. *Enterprise Budget Information for Certain Groups of Crops Grown in the Lower Arkansas Valley.* Lafayette, CO: WYCO Associates, LLC. 13 Aug. 2008. Print. [Tranel 2008b]

U.S. Census Bureau. State and County QuickFacts. *Land Area Data for Pueblo, Otero, Bent, and Prowers Counties*. 2000. Web. 4 Dec. 2006. <http://quickfacts.census.gov/qfd/index.html>.

U.S. Congress. Farmland Protection Policy Act of 1981 (FPPA). 7 USC 658, as amended. 5 Jul. 1984.

U.S. Congress. Moving Ahead for Progress in the 21st Century Act (MAP-21) P.L. 112-141, 6 Jul. 2012.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Department of Agriculture (USDA) Aerials. Aerial Photography Field Office. Flown Jun. 2004.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Technical Advisory T6640.8A. Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. Washington, D.C.: GPO, 30 Oct. 1987. Web. 13 Oct. 2005. <http://www.fhwa.dot.gov/legsregs/directives/techadvs/t664008a.htm>.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Agricultural Resources

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 used subsequently by the project's resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 (corridor location) decision.

Table A-1. Resource Methodology Overview for Agricultural Resources

Methodology Overview	Agricultural Resources	
	Tier 1	**Tier 2**
Relevant Data/ Information Sources	• NRCS soil surveys for counties in study area and other appropriate data sources • Input from community leaders	Review and update Tier 1 data search and collect additional data required to complete the appropriate Tier 2 analysis
Collection and/or Analysis Methodology	• Map prime and unique farmland soils • Consult with local farmers, NRCS, and the Colorado Department of Agriculture to identify farming practices in the project area • Identify unique crops grown in the study area	Sufficient for standard NEPA documentation
Project area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the vicinity of the Colorado-Kansas state line	Tier 2 specific SIUs corridor boundaries
Impacts	Prime and unique farmland soils occurring in the study area will be mapped through a GIS overlay process. Tier 1 impacts will be estimated by taking the full Tier 1 corridor alternative width at that specific location, multiplying the potentially impacted acreage of the recommended ultimate typical section footprint divided by the Tier 1 corridor width at that location. [For example, if a 1,000-foot-wide Tier 1 corridor impacts 5 acres and the recommended ultimate typical section is 300 feet, the Tier 1 impact at this site would be calculated as: 5 acres x (300 feet / 1,000 feet) = 1.5 acres]	Impacts on farmland will be determined through a GIS overlay process that will identify direct as well as indirect impacts, with an emphasis on the conversion of prime and unique farmland soils in the study area
Mitigation Options	Avoidance and/or minimization will be the primary mitigation options	Same as Tier 1
Deliverables	Farmland Technical Memorandum will include boundaries of prime, unique, and irrigated farmland	• NRCS-CPA Form No. 106 (Farmland Conversion Form) as needed • Prime and Unique Farmland Technical Report of findings and documentation of avoidance and minimization efforts if needed
Regulatory Guidance/ Requirements	• FHWA Technical Advisory T6640.8A • Farmland Protection Policy Act of 1981 (7 USC 658) • 7 CFR 658, as amended at 59 *Federal Register* 31117, June 17, 1994	

Appendix B. Abbreviations and Acronyms

CDOT	Colorado Department of Transportation
CEDIS	Colorado Economic and Demographic Information System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CR	County Road
EA	Environmental Assessment
ECHO	Enforcement and Compliance History Online
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act of 1981
GIS	Geographic information system
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act of 1969
NRCS	Natural Resources Conservation Service
SH	State Highway
SIU	Section of independent utility
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. Highway 50 Tier 1 Environmental Impact Statement
USC	United States Code

This page left intentionally blank.

Appendix C. Figures (C-1 through C-21)

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

Figure C-1: Prime and Unique Farmland—Pueblo County
Figure C-2: Prime and Unique Farmland—Otero County
Figure C-3: Prime and Unique Farmland—Bent County
Figure C-4: Prime and Unique Farmland—Prowers County
Figure C-5: Historic Agricultural Use—Pueblo County
Figure C-6: Historic Agricultural Use—Otero County
Figure C-7: Historic Agricultural Use—Bent County
Figure C-8: Historic Agricultural Use—Prowers County
Figure C-9: Other Agricultural Resources—Pueblo County
Figure C-10: Other Agricultural Resources—Otero County
Figure C-11: Other Agricultural Resources—Bent County
Figure C-12: Other Agricultural Resources—Prowers County
Figure C-13: Potential Effects to Agricultural Resources—Pueblo
Figure C-14: Potential Effects to Agricultural Resources—Fowler
Figure C-15: Potential Effects to Agricultural Resources—Manzanola
Figure C-16: Potential Effects to Agricultural Resources—Rocky Ford
Figure C-17: Potential Effects to Agricultural Resources—Swink
Figure C-18: Potential Effects to Agricultural Resources—La Junta
Figure C-19: Potential Effects to Agricultural Resources—Las Animas
Figure C-20: Potential Effects to Agricultural Resources—Granada
Figure C-21: Potential Effects to Agricultural Resources—Holly

This page left intentionally blank.

Figure C-1. Prime and Unique Farmland—Pueblo County

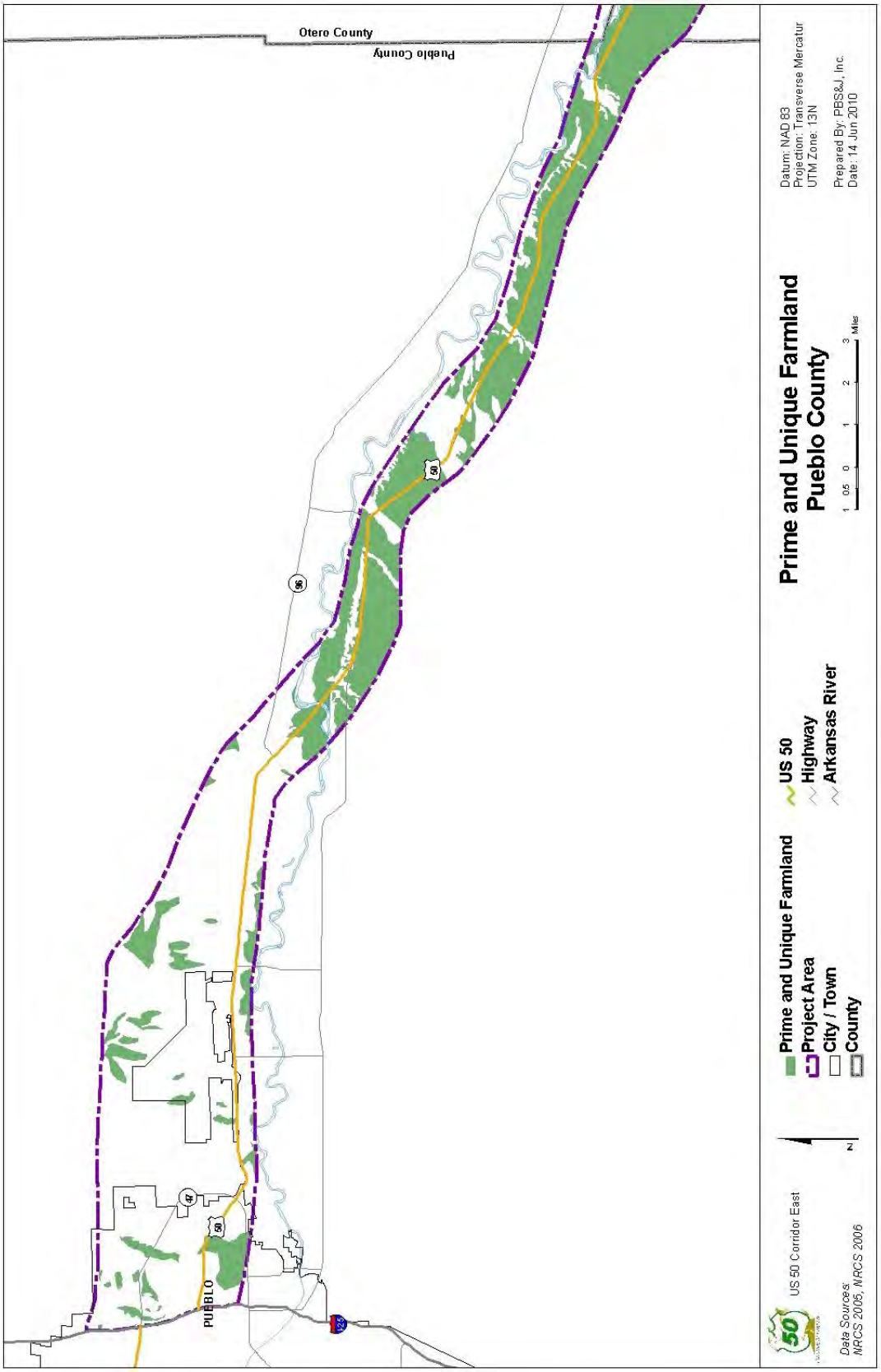


Figure C-2. Prime and Unique Farmland—Otero County

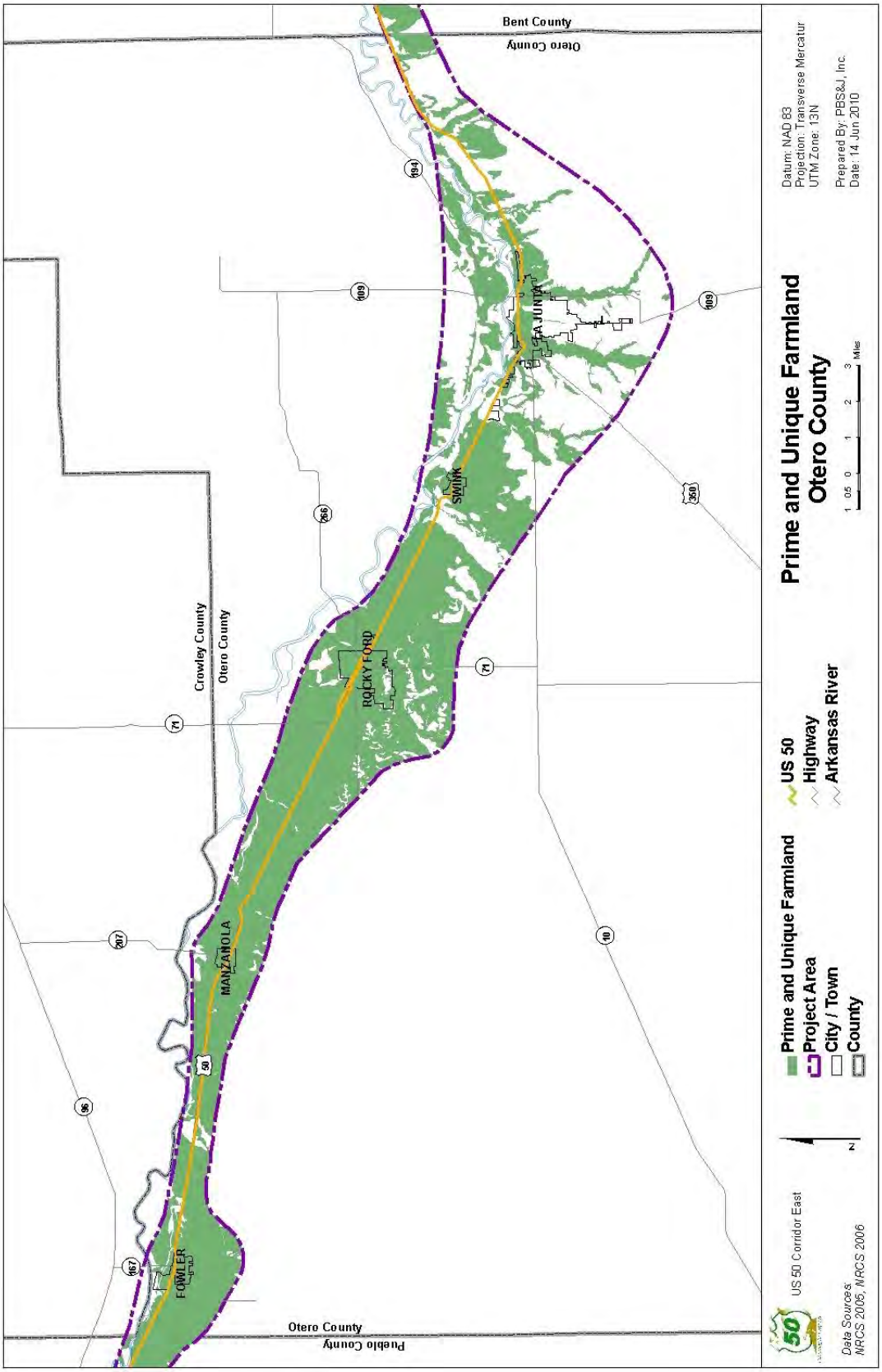


Figure C-3. Prime and Unique Farmland—Bent County

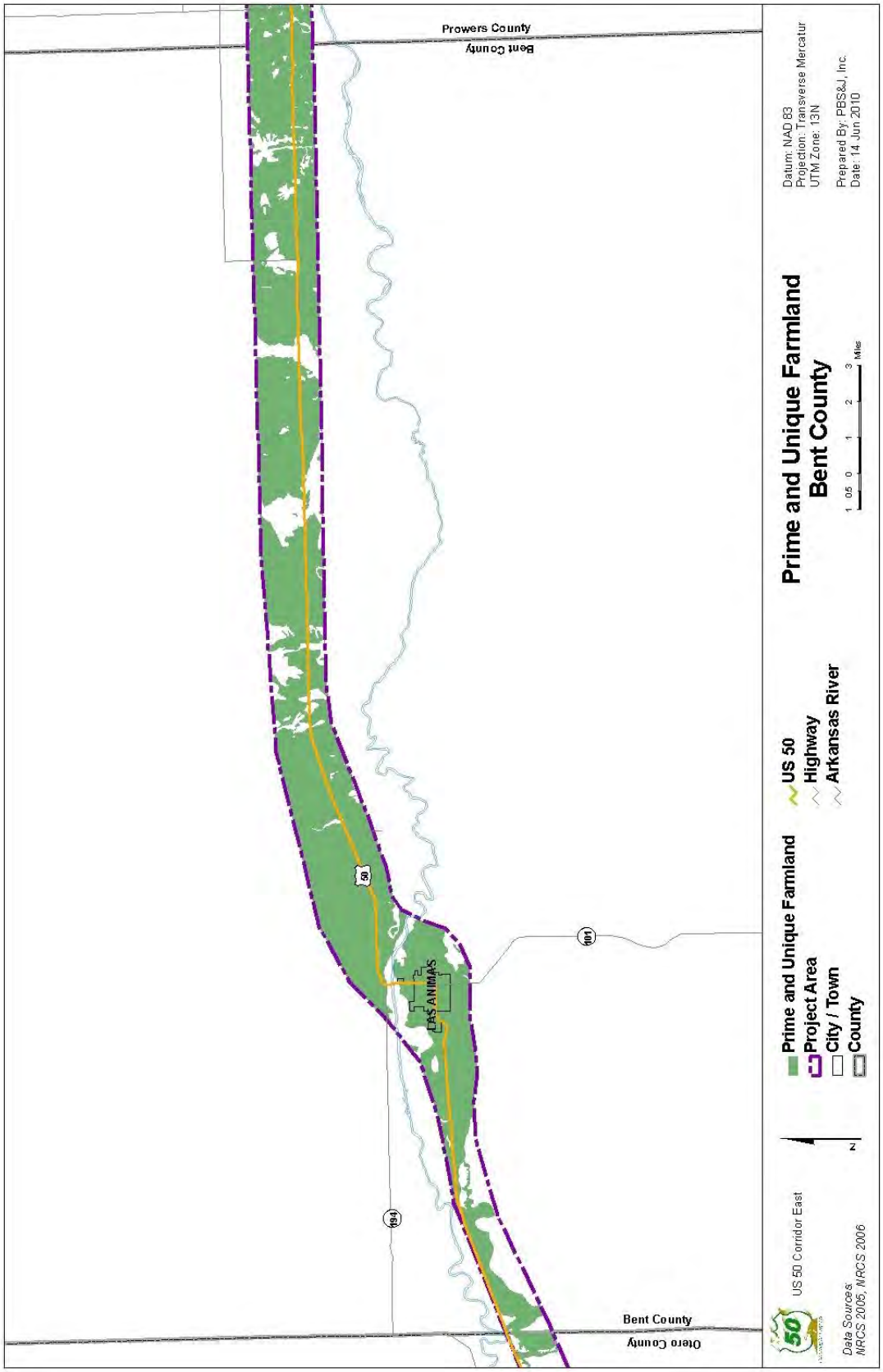


Figure C-4. Prime and Unique Farmland—Prowers County

Figure C-5. Historic Agricultural Use—Pueblo County

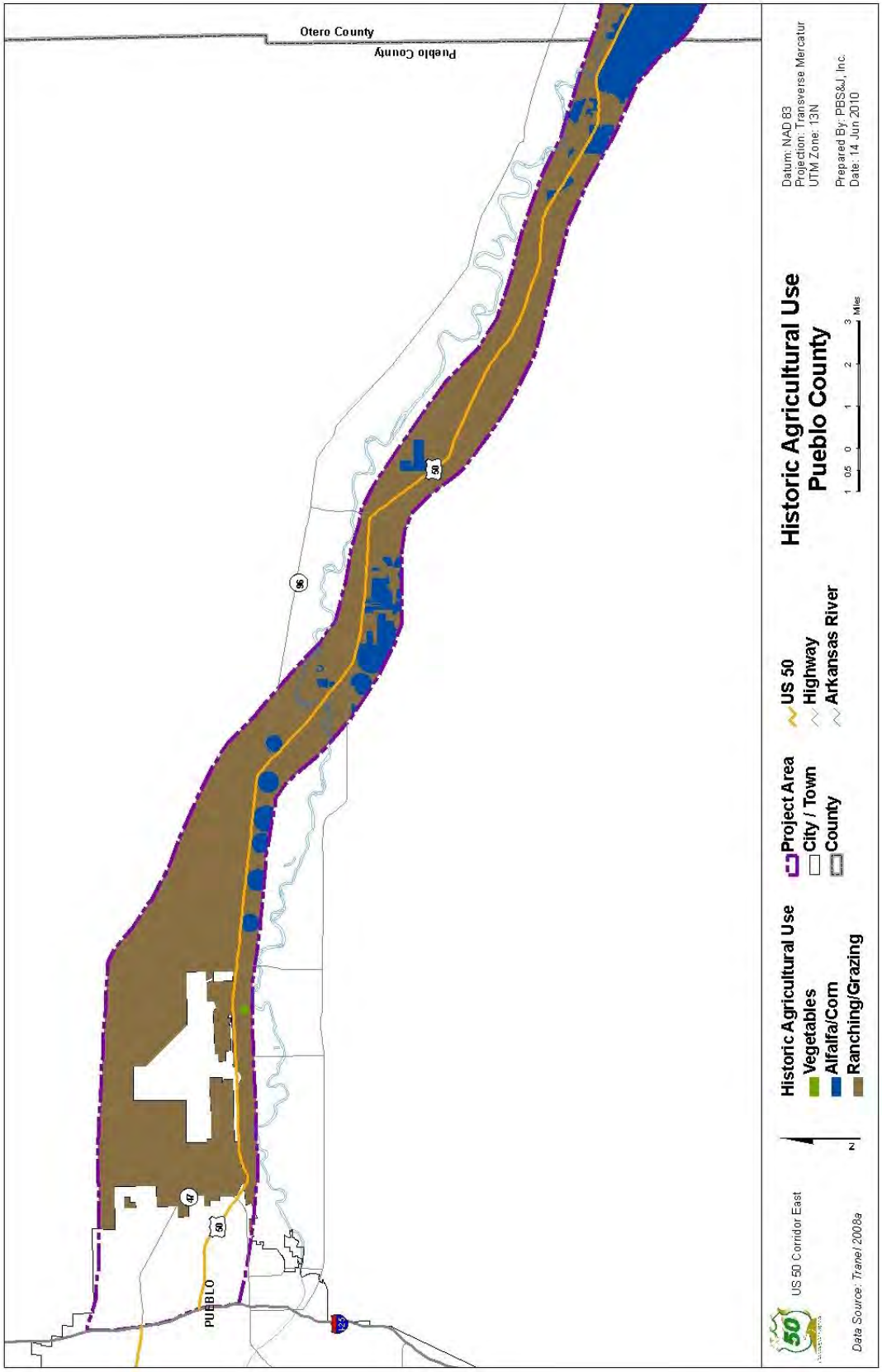


Figure C-6. Historic Agricultural Use—Otero County

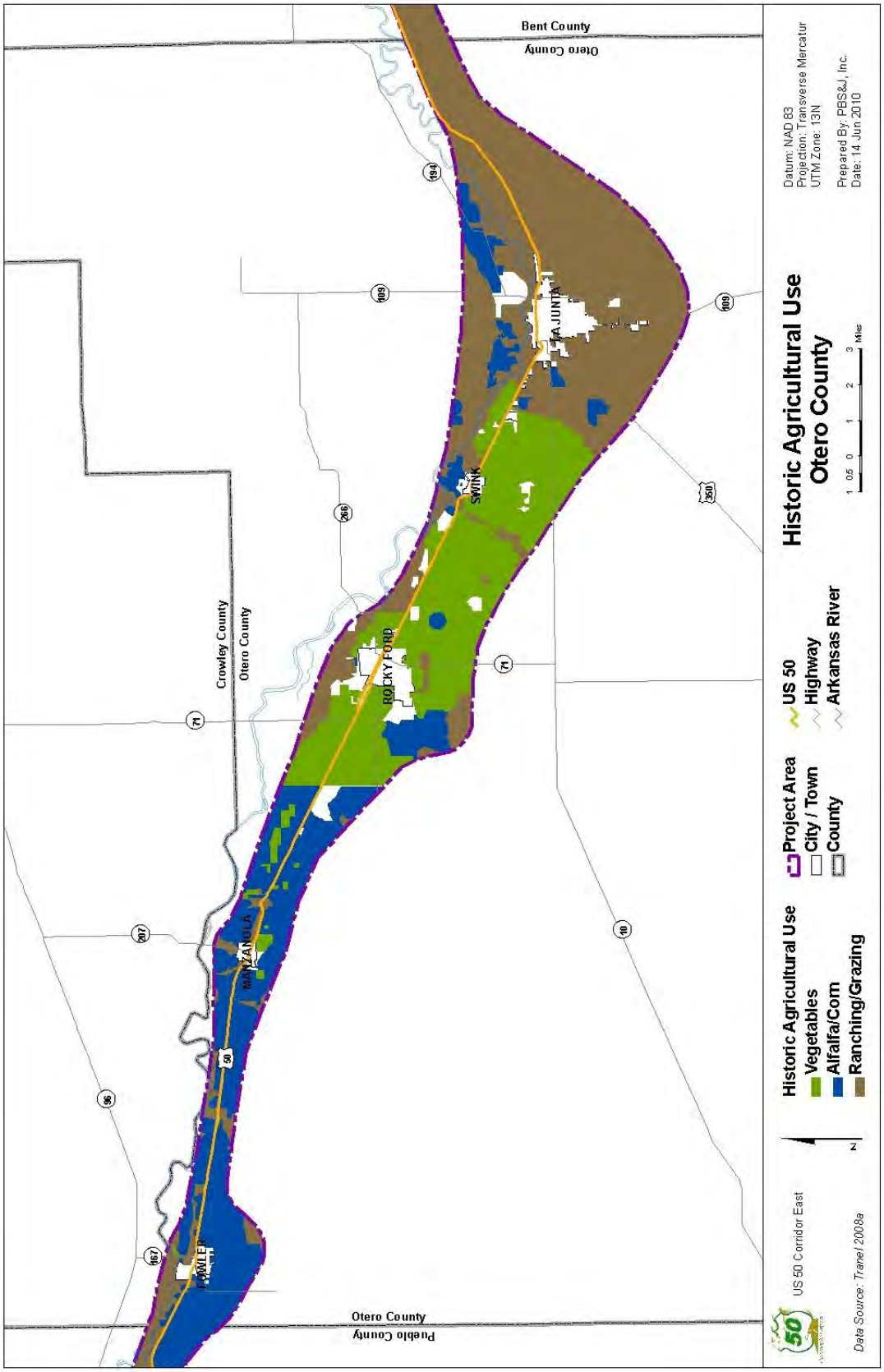


Figure C-7. Historic Agricultural Use—Bent County

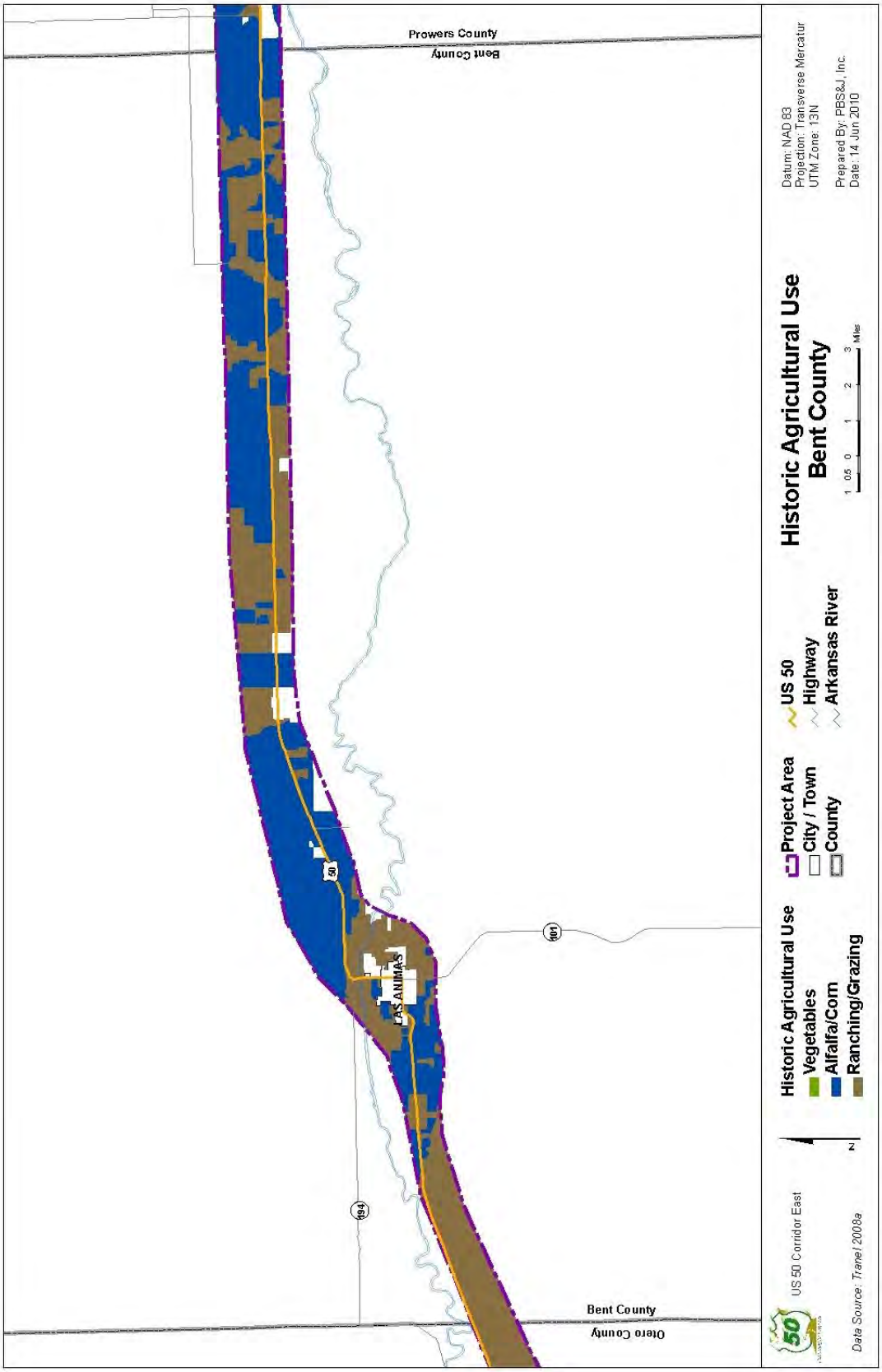


Figure C-8. Historic Agricultural Use—Prowers County

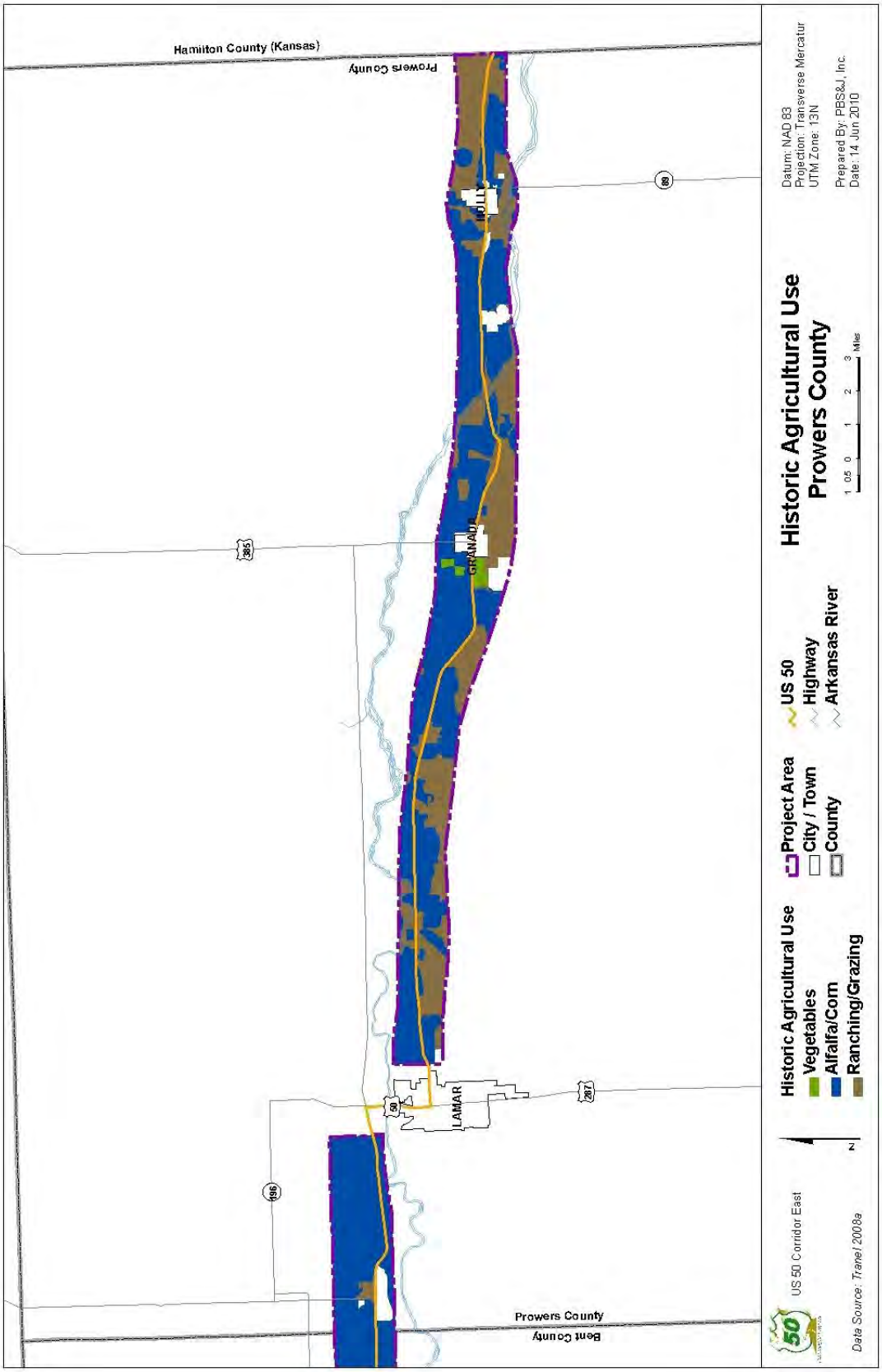


Figure C-9. Other Agricultural Resources—Pueblo County

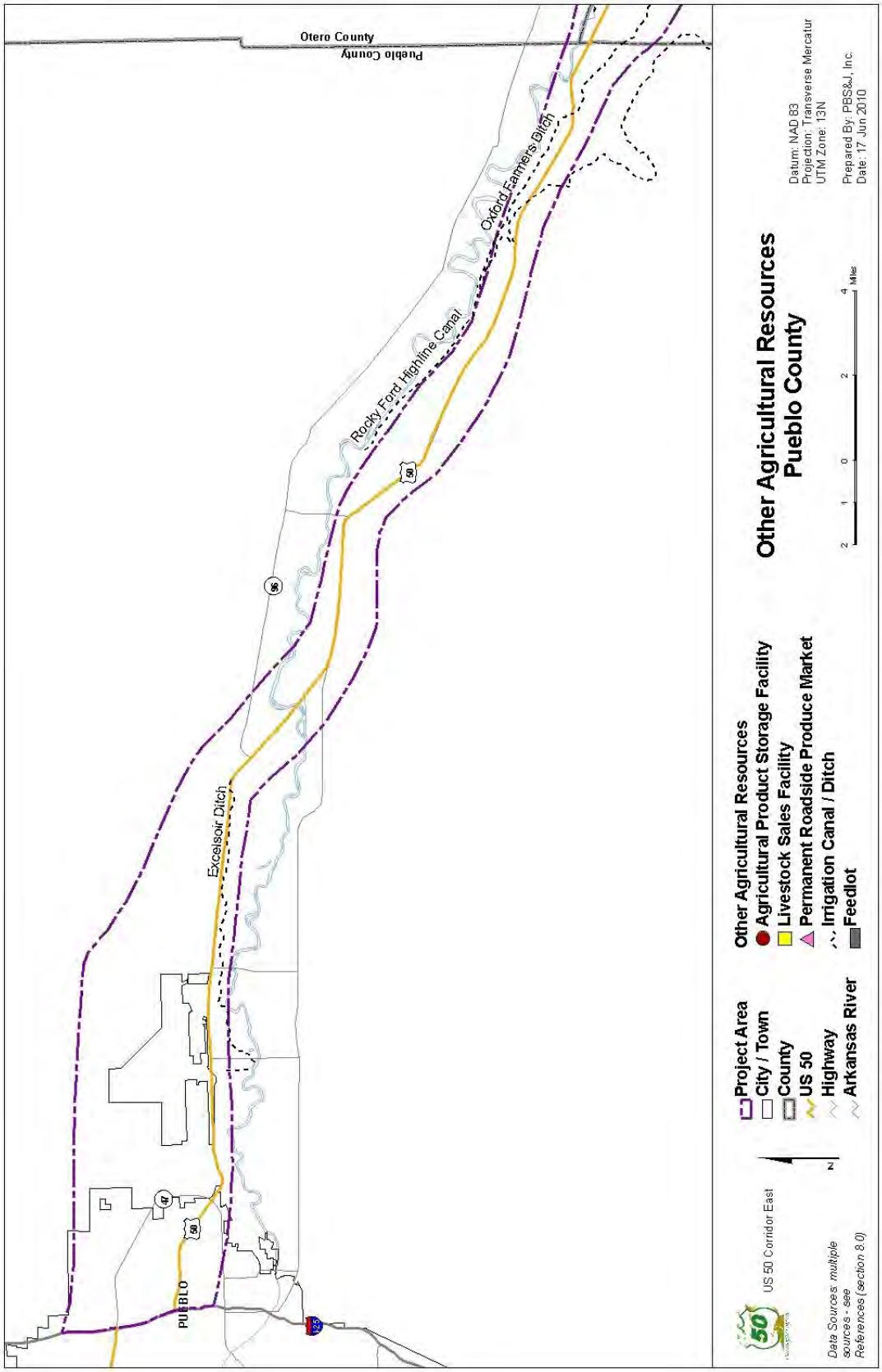


Figure C-10. Other Agricultural Resources—Otero County

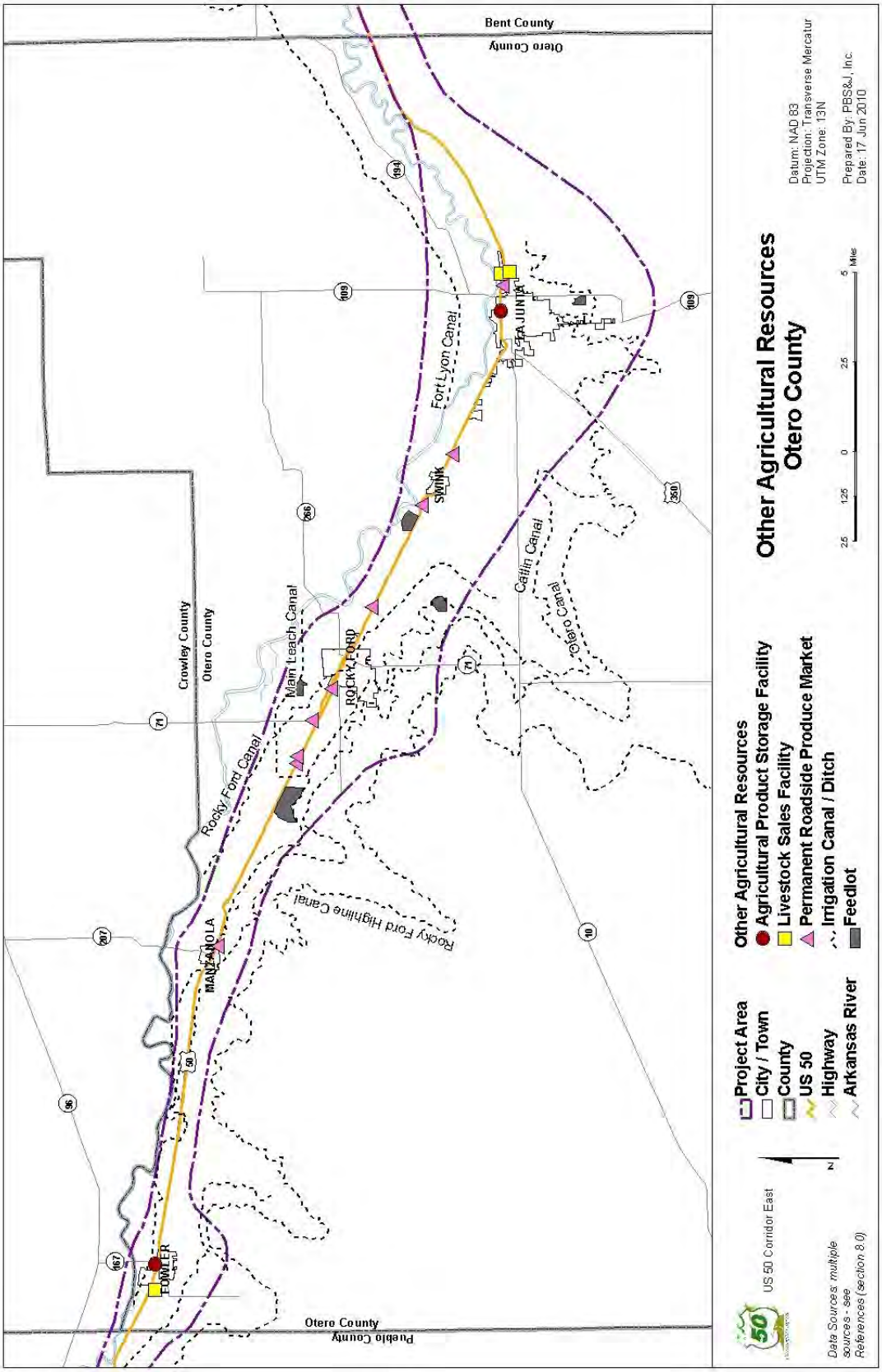


Figure C-11. Other Agricultural Resources—Bent County

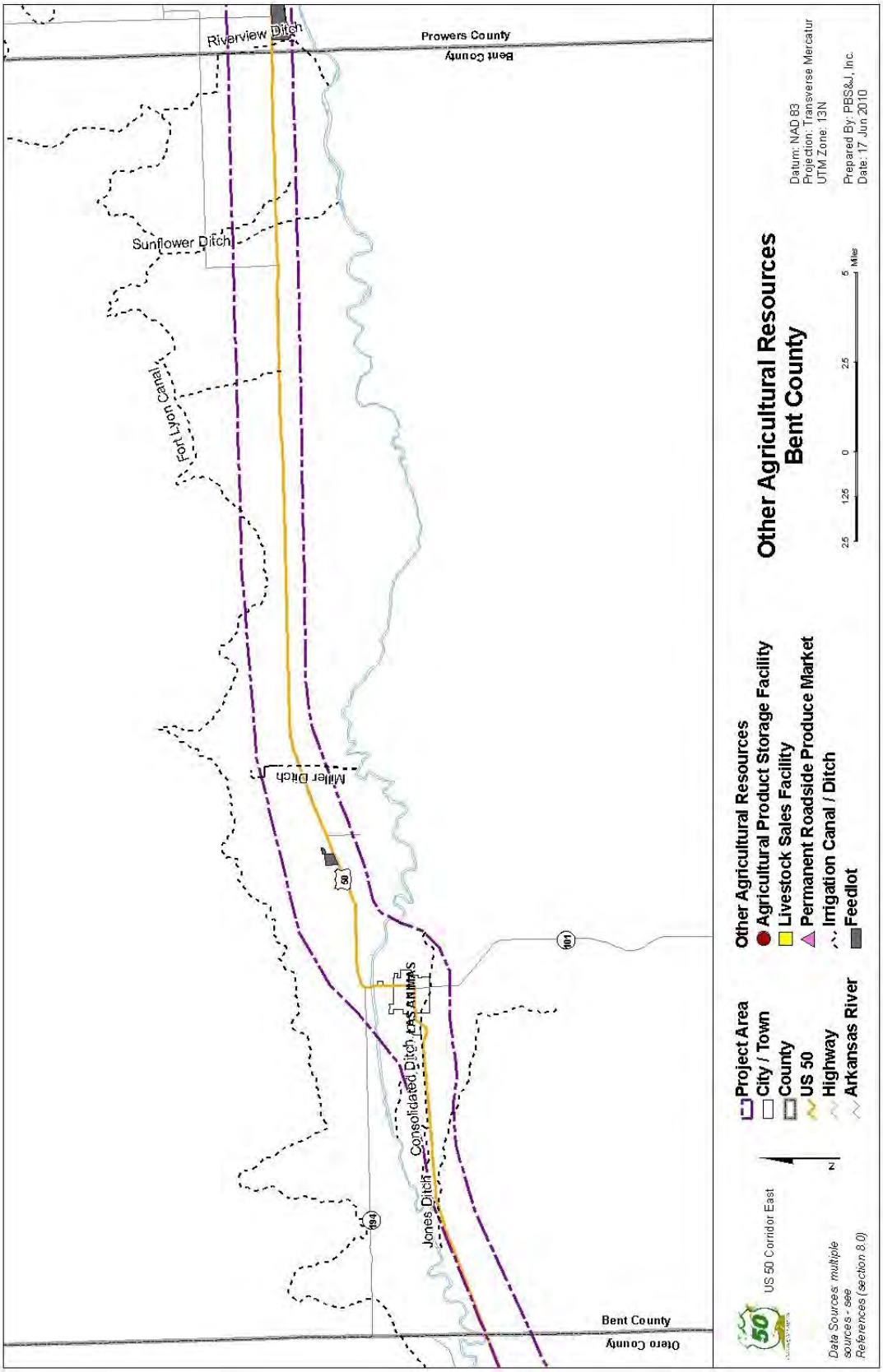


Figure C-12. Other Agricultural Resources—Prowers County

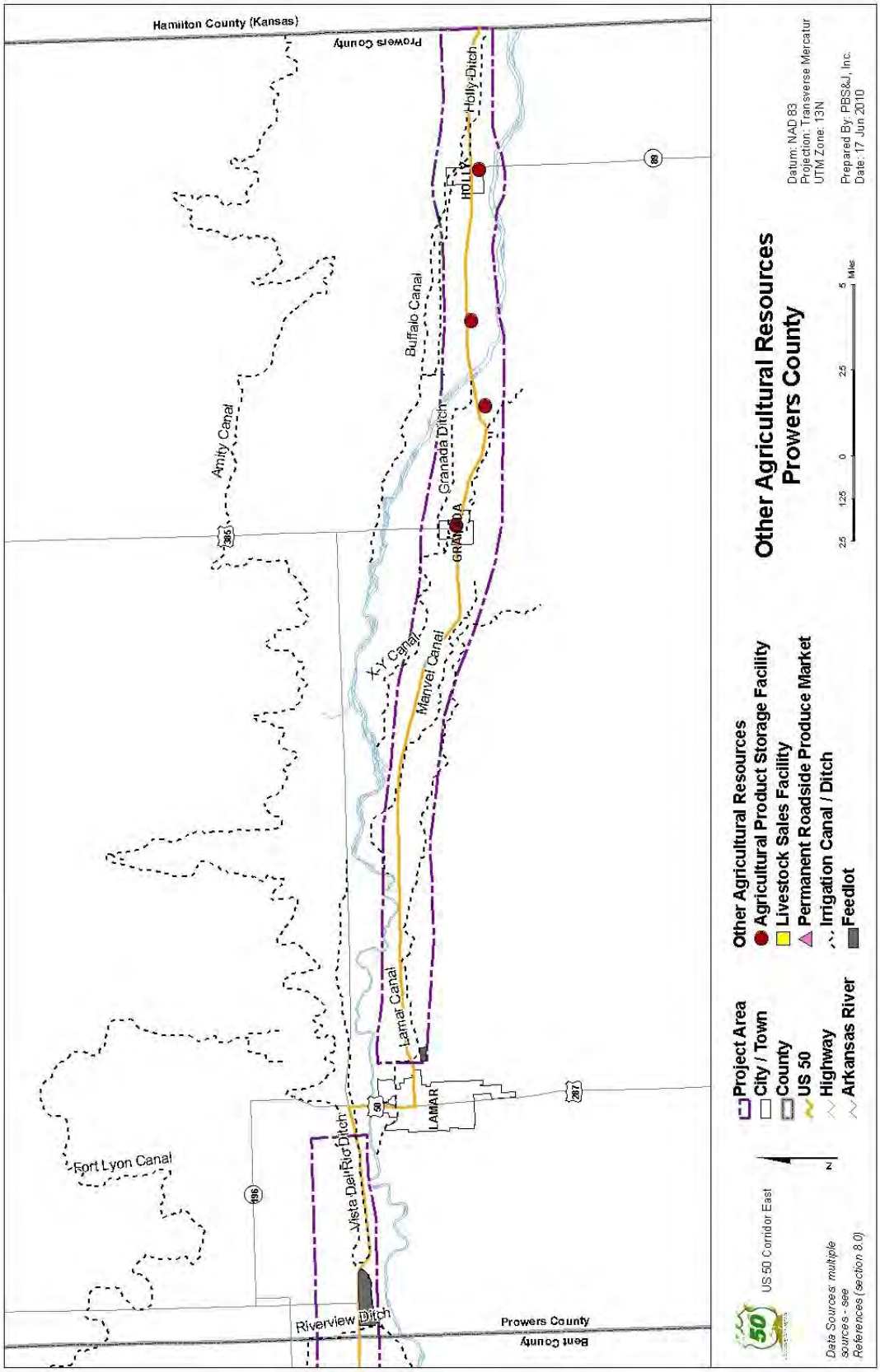


Figure C-13. Potential Effects to Agricultural Resources—Pueblo

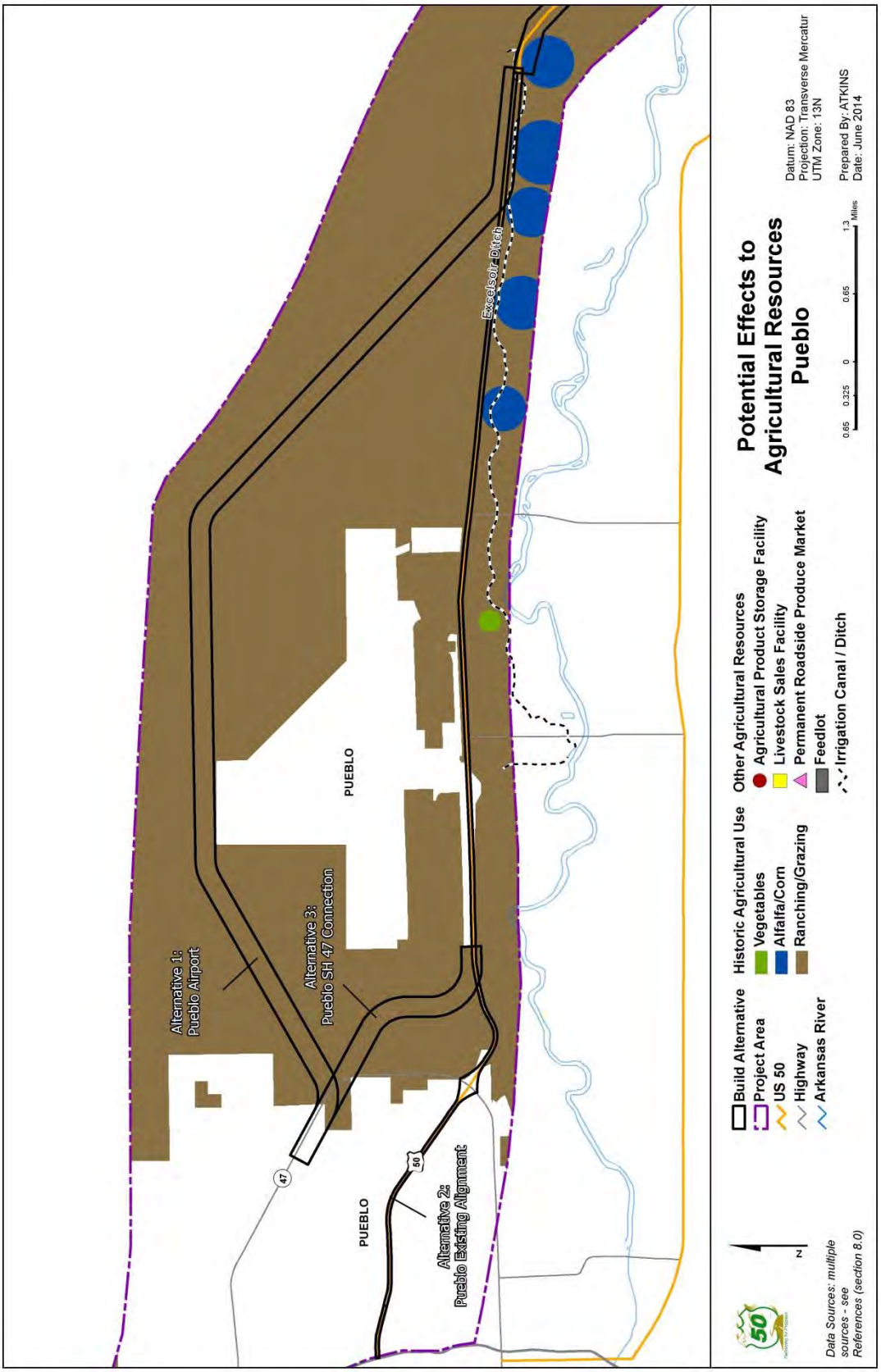


Figure C-14. Potential Effects to Agricultural Resources—Fowler

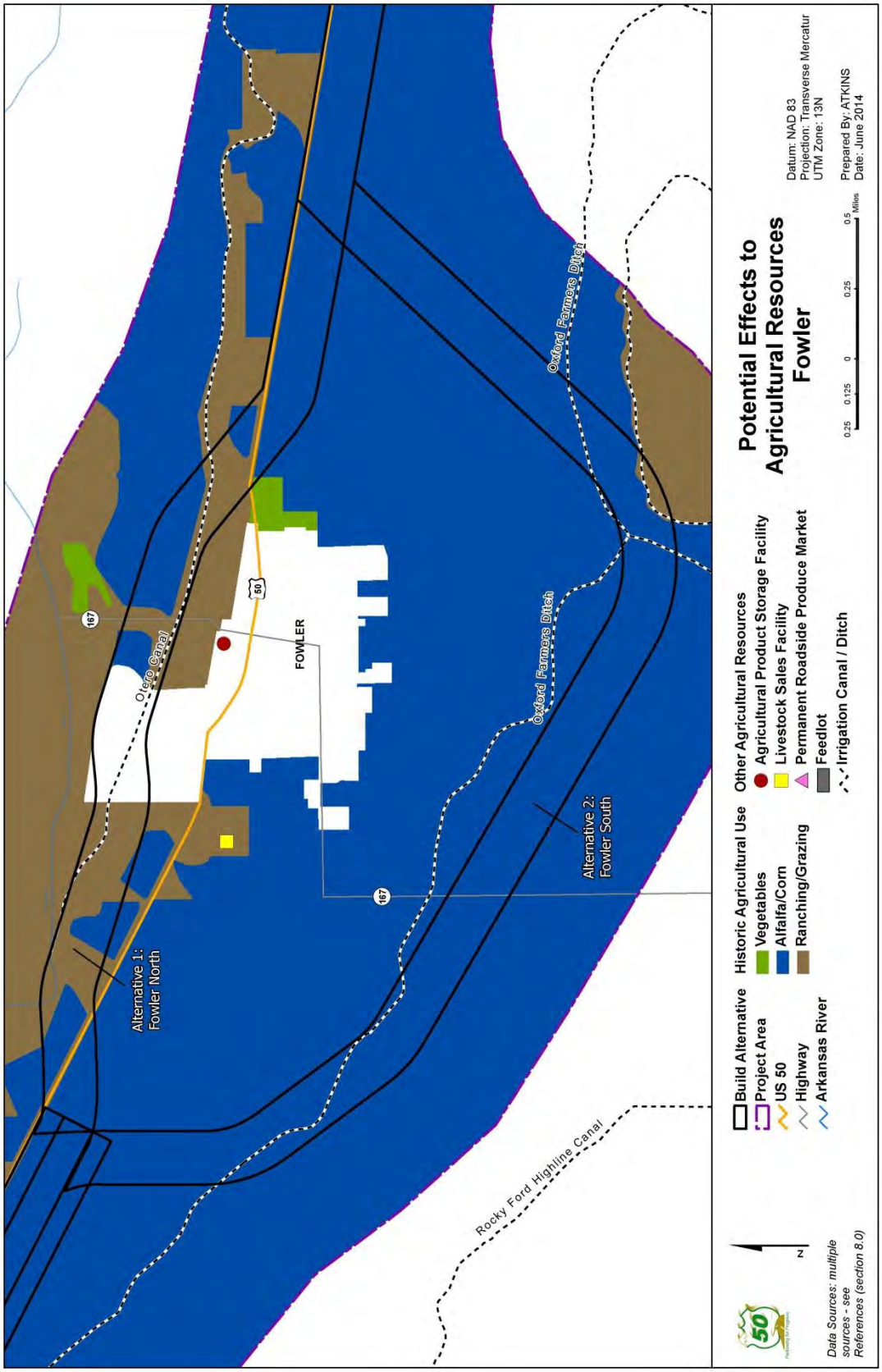


Figure C-15. Potential Effects to Agricultural Resources—Manzanola

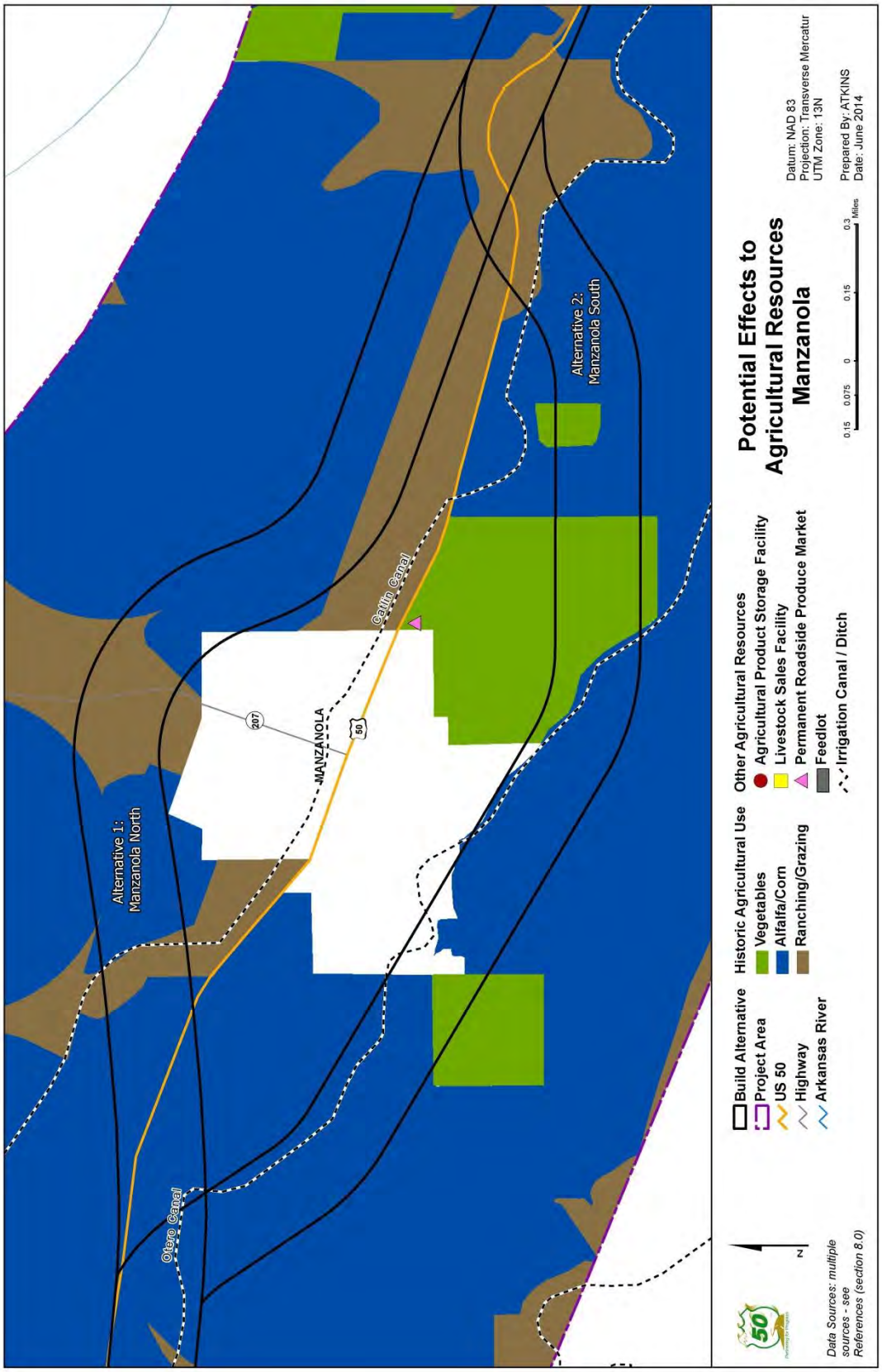


Figure C-16. Potential Effects to Agricultural Resources—Rocky Ford

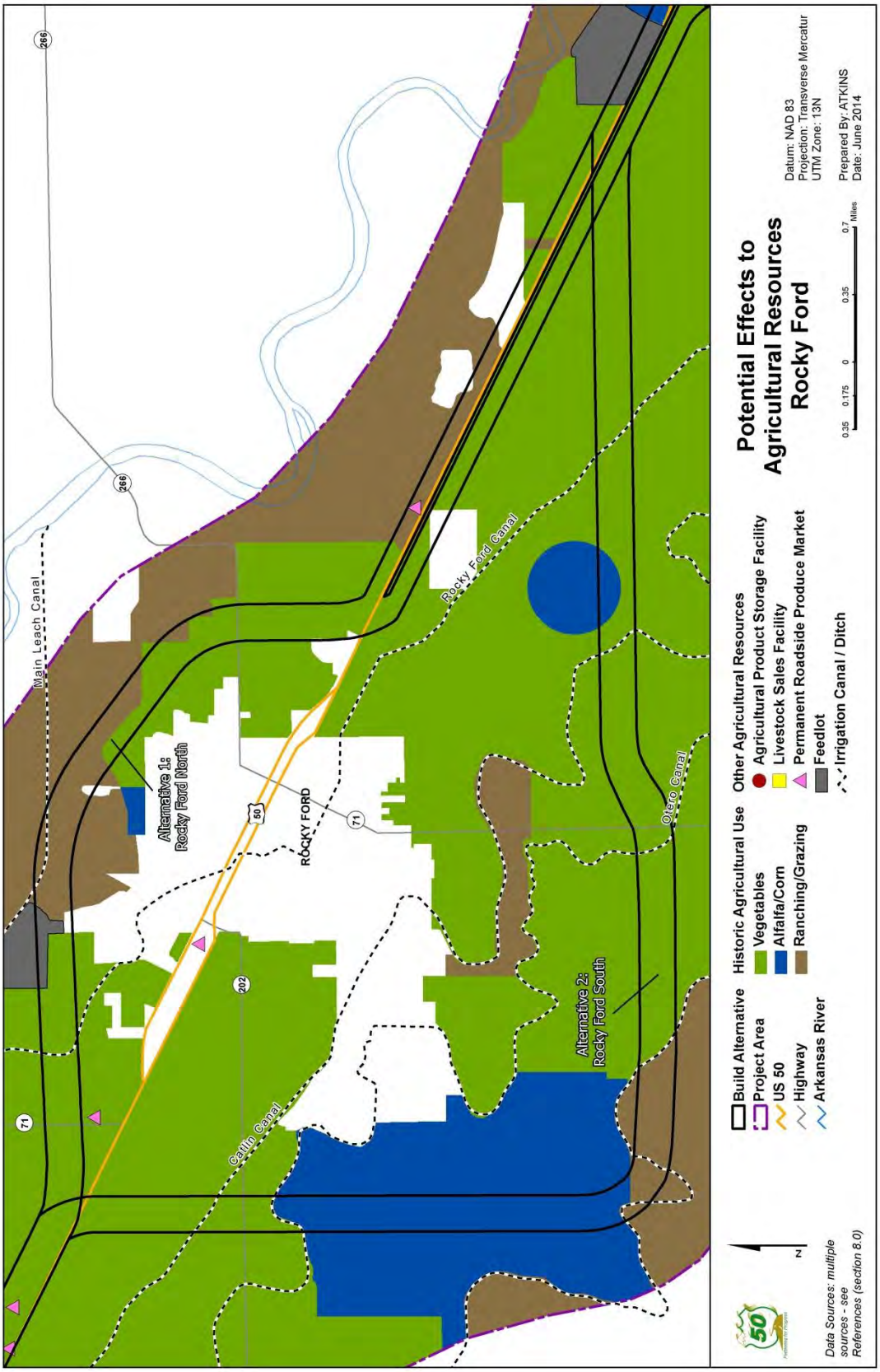


Figure C-17. Potential Effects to Agricultural Resources—Swink

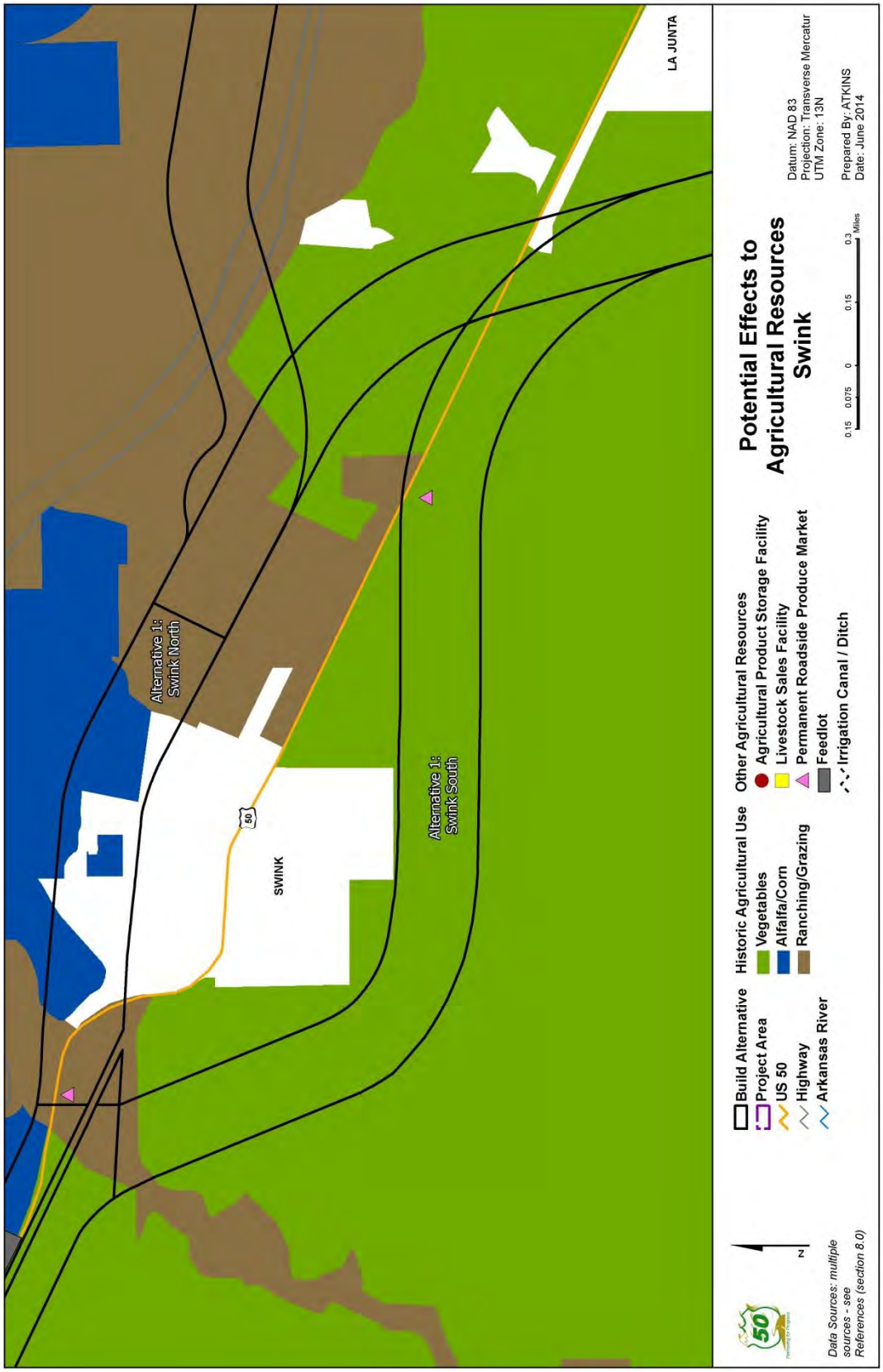


Figure C-18. Potential Effects to Agricultural Resources—La Junta

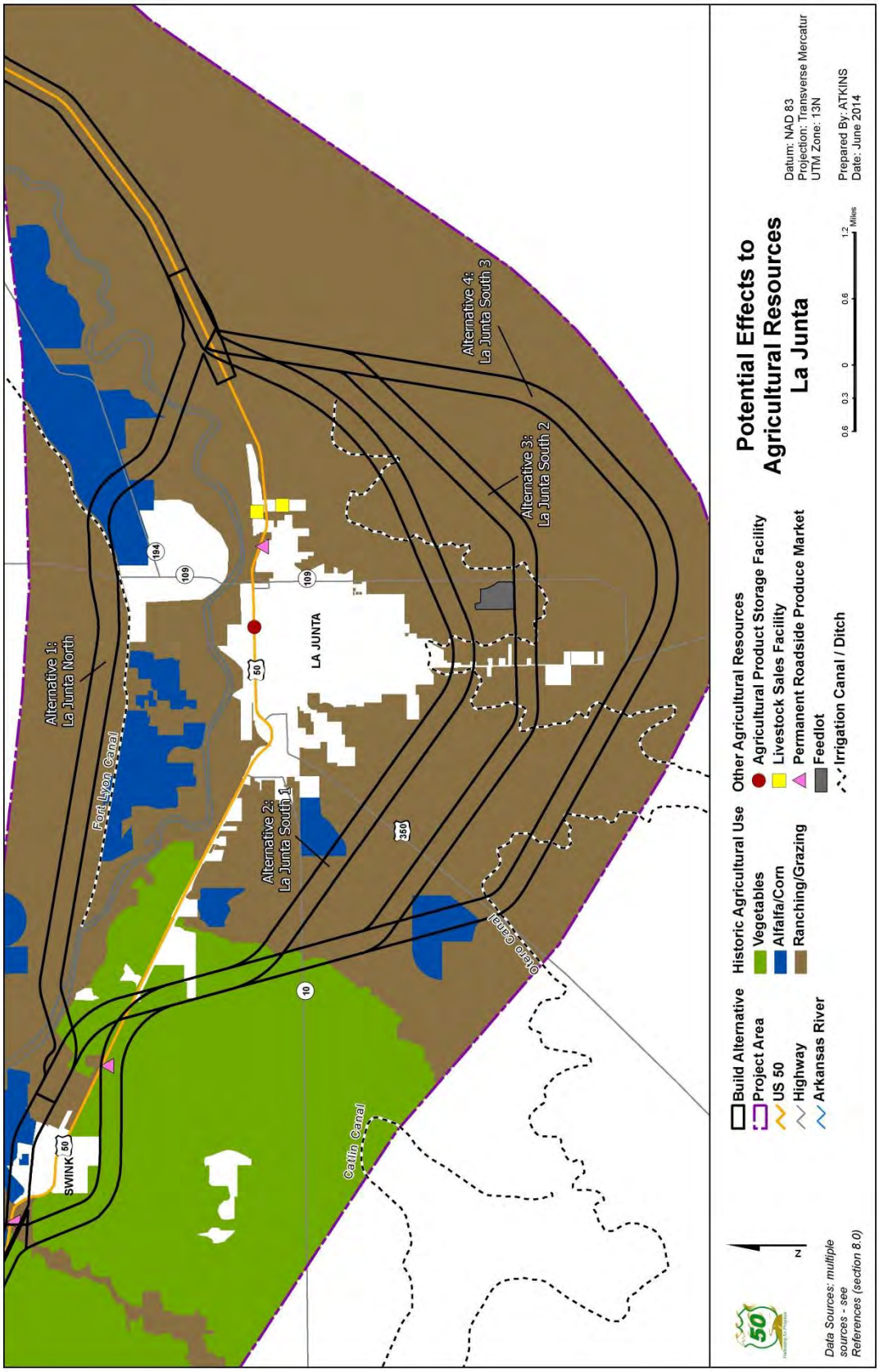


Figure C-19. Potential Effects to Agricultural Resources—Las Animas

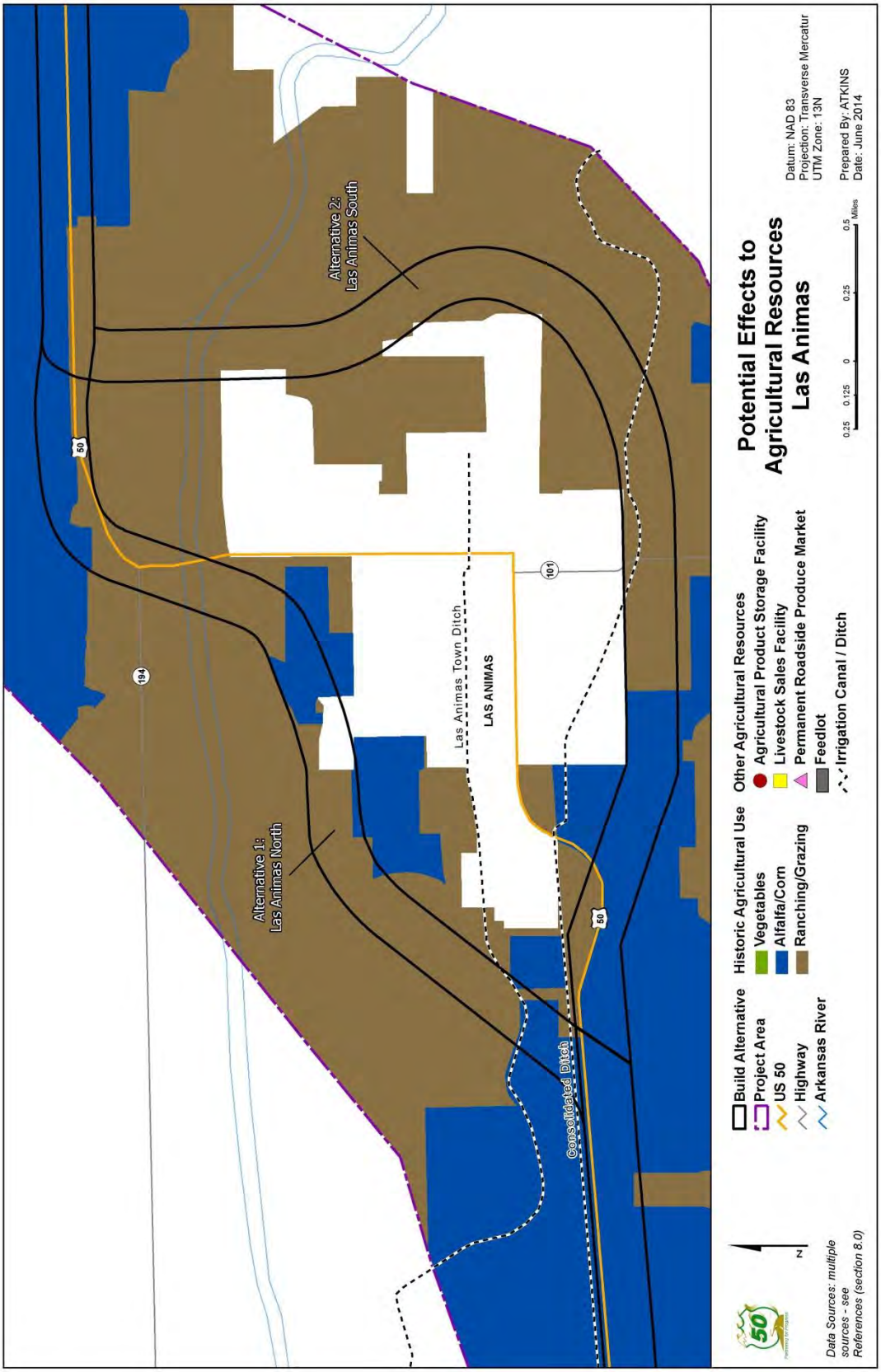


Figure C-20. Potential Effects to Agricultural Resources—Granada

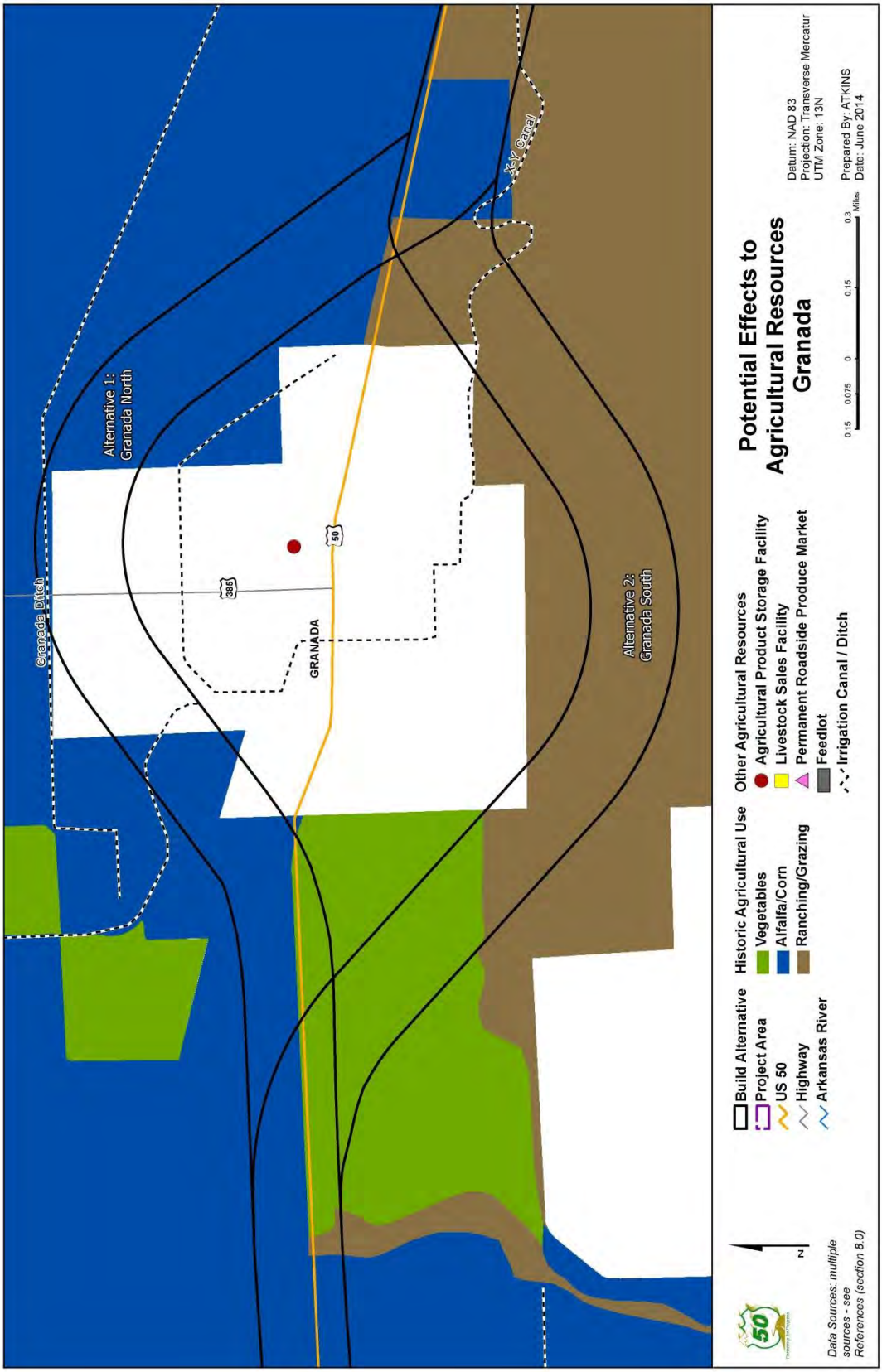
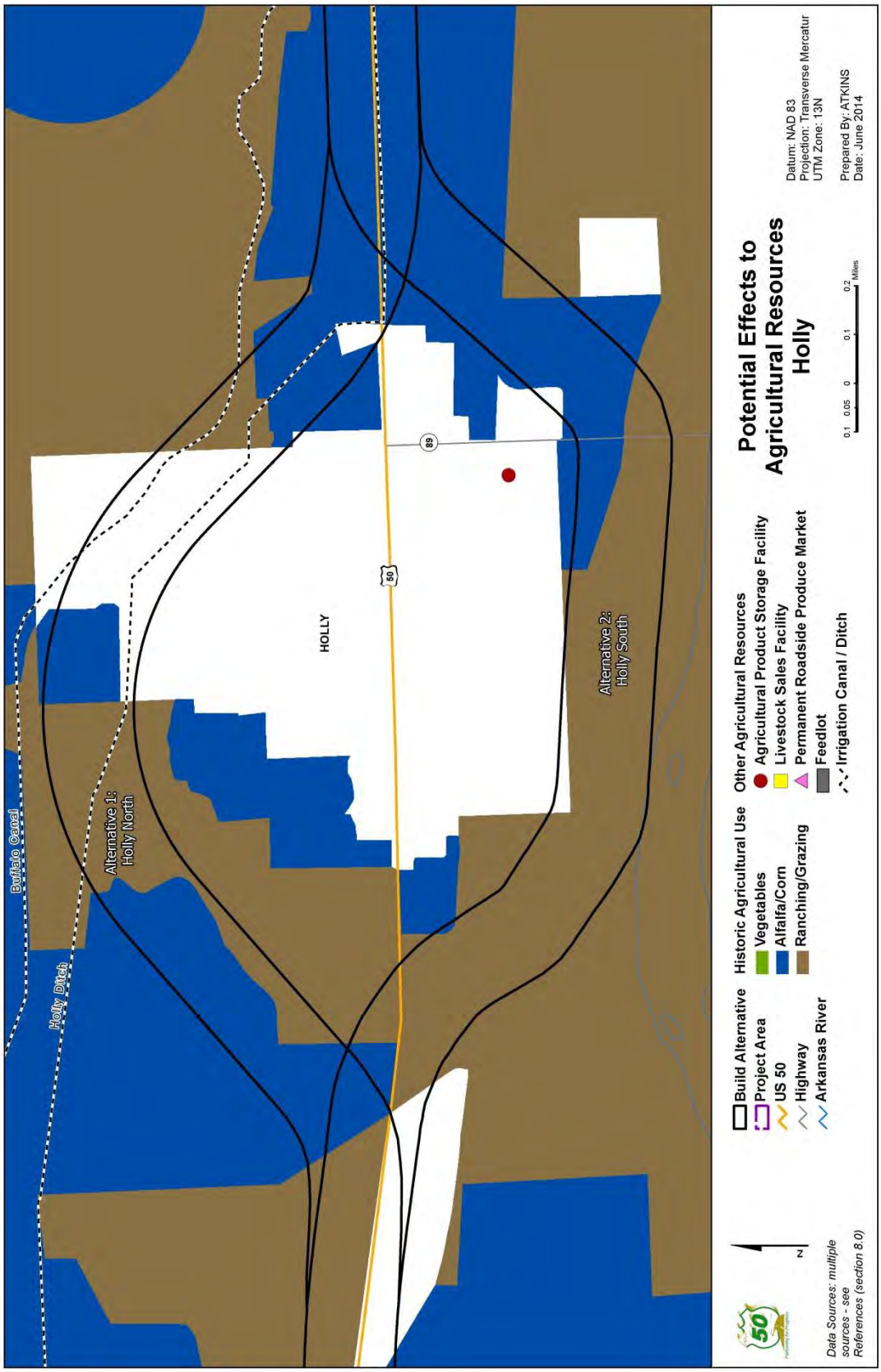


Figure C-21. Potential Effects to Agricultural Resources—Holly



This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East
Tier 1 Draft Environmental Impact Statement

Air Quality Technical Memorandum

June 2016

Table of Contents

Chapter Pages

1. Project Overview 1
2. Resource Definition 2
3. Applicable Laws, Regulations, and Guidance 3
3.1. Clean Air Act of 1990 3
4. Methodology 5
4.1. Relevant Data or Information Sources 5
4.2. Data Collection and Analysis Methodology 6
4.3. Project Area 6
4.4. Effects 7
4.5. Mitigation Options 7
4.6. Deliverables 7
5. Existing Conditions 8
5.1. Climate 8
5.2. Air Quality 8
5.3. Traffic Conditions 11
6. Effects 13
6.1. No-Build Alternative 13
6.2. Build Alternatives 13
7. Mitigation Strategies 17
8. References 18
Appendices 21
Appendix A. Resource Methodology Overview for Air Quality 23
Appendix B. Abbreviations and Acronyms 25
Appendix C. National Ambient Air Quality Standards 27
Criteria Pollutants 27
National Ambient Air Quality Standards Compliance (Attainment vs. Non-Attainment) 28

Tables

Table 5-1. Air Emissions Inventory for Pueblo, Otero, Bent, and Prowers Counties by Source Category (2004) 9
Table 5-2. Monitored Values Summary for Pueblo and Prowers Counties 10

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1

Figure 5-1. Average Annual Daily Traffic on I-25 through Pueblo and on U.S. 50 in the Lower Arkansas Valley (2011 and projected 2040) 11
Figure 6-1. Build Alternatives Overview 14

This page left intentionally blank.

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (.

Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

The U.S. Environmental Protection Agency (EPA) sets standards for the amount of certain pollutants that can be in the air before they become harmful to public health and the environment. Air quality is measured by the amount of these pollutants in the air when compared to these standards.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to 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), regulations and guidance provided within the Clean Air Act of 1990 (CAA) also were followed during this analysis of air quality.

3.1. Clean Air Act of 1990

The Clean Air Act of 1990 and its associated regulations are the basic federal statutes and regulations governing air pollution. The provisions that are potentially relevant to this project are the National Ambient Air Quality Standards (NAAQS) (CAA 2003, part 50), the transportation conformity rules (CAA 2003, part 93), and mobile source air toxics (MSATs). Each of these provisions is discussed below.

3.1.1. National Ambient Air Quality Standards

The Clean Air Act of 1990 requires the EPA to establish NAAQS for pollutants considered harmful to public health and the environment (CAA 2003, part 50). Primary standards set limits to protect public health, including the health of “sensitive” populations, such as people with asthma, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA has established NAAQS for six principal pollutants, which are called “criteria” pollutants. They are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), particulate matter with particle diameters of 10 microns or less (respirable particulate matter) (PM_{10}), particulate matter with diameters of 2.5 microns or less (fine particulate matter) ($PM_{2.5}$), and sulfur dioxide (SO_2). The NAAQS are summarized in Appendix C.

3.1.2. Transportation Conformity Rules

The transportation conformity rule focuses on the conformity of transportation plans, programs, and projects that are developed, funded, or approved by the U.S. Department of Transportation and by metropolitan planning organizations or other recipients of federal funds (CAA 2003, part 93). These regulations set forth policy, criteria, and procedures for demonstrating and assuring conformity of such activities to an applicable implementation plan developed pursuant to the Clean Air Act of 1990. A determination of conformity is made by the metropolitan planning organization and the U.S. Department of Transportation.

The transportation conformity regulations of July 2004 require that transportation projects that are regionally important, federally funded, or both demonstrate transportation conformity to state implementation and maintenance plans. These regulations require that the project:

- Be included in a fiscally constrained regional transportation plan,
- Be included in a fiscally constrained transportation improvement plan, and
- Not cause or contribute to any new or existing violations of NAAQS.

3.1.3. Mobile Source Air Toxics

In addition to the NAAQS, the Clean Air Act of 1990 requires the EPA to regulate air toxics. MSATs are a subset of the air toxics defined by the Clean Air Act of 1990. MSATs are compounds emitted from highway vehicles and non-road equipment. Some air toxic compounds are present in vehicle fuel and are emitted into the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Some air toxics also result from engine wear or from impurities in oil or gasoline used in vehicles.

The EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline substantially over the next several decades. Based on current and future pollution control measures, an analysis of national trends with the EPA's MOVES2010b model forecasts a combined reduction of 83 percent in the total annual emission rate for priority MSATs from 2010 to 2050, while vehicle-miles of travel are projected to increase by 102 percent (FHWA 2012).

FHWA provides guidance on how to analyze MSATs during NEPA documentation. The most recent guidance is titled *Interim Guidance Update on Mobile Source Air Toxics Analysis in NEPA*, published on December 6, 2012.

4. Methodology

The U.S. 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 U.S. 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 air quality 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 sources were used for this analysis of air quality:

- Colorado Climate Center (CCC), Natural Resources Conservation Service (NRCS), and Western Regional Climate Center (WRCC)—regional and local meteorological conditions

- EPA and Colorado Department of Public Health and Environment(CDPHE)—current pollutant levels by county
- EPA—NAAQS and attainment status by county
- CDOT—current (2008) and projected future (2040) traffic volumes on U.S. 50 in southeastern Colorado

Additionally, air quality-sensitive receptors in the project area were identified. They include schools, churches, residences, hospitals, playgrounds, and other recreational facilities. Various sources were used to locate these receptors. Schools were identified using the U.S. Department of Education's Center for Education Statistics. Residences were identified using municipal zoning ordinances from the communities in the project area. All areas categorized as residential in those ordinances were assumed to include residences. Hospitals were located using a licensure database maintained by the CDPHE. Playgrounds and other recreational facilities were located using information from the city of Pueblo's website (facilities in Pueblo only), information from a previous U.S. 50 study, and a field review conducted as part of the Section 4(f) analysis for the U.S. 50 Tier 1 EIS project. Receptors also were located using U.S. Department of Agriculture aerial photography.

4.2. Data Collection and Analysis Methodology

The following tasks were completed during this review of air quality and are described in detail below (all tasks were completed on a county level for Pueblo, Otero, Bent, and Prowers counties unless otherwise noted).

- Collection and review of air quality emissions inventory data
- Collection and review of air quality emissions monitoring data
- Review of attainment status
- Review of traffic volumes on U.S. 50
- Identification of air quality-sensitive receptors (in the project area only)

Air emissions inventory data were obtained from a public database maintained by the CDPHE. This emissions information is broken out by area source, point source, highway vehicle, and off-highway vehicle emission categories based on the 2004 emissions inventory. These data provide a reasonable base from which to compare potential project emissions. Emissions monitoring and attainment status data (i.e., NAAQS data) were obtained from the EPA's public database. These data are used in this analysis to evaluate potential changes in air quality. Also, CDOT traffic data were obtained to evaluate how predicted (i.e., future) changes in traffic volumes on U.S. 50 could affect air quality in the project area. Air quality-sensitive receptors were located to determine how the Build Alternatives could affect them.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

This analysis of air quality consisted of a qualitative assessment of whether the Build Alternatives would likely cause a violation in the NAAQS in the project area. Potential effects to air quality-sensitive receptors also were considered.

4.5. Mitigation Options

Air quality would not be affected by the U.S. 50 Tier 1 EIS because no construction-related activities would be authorized. Therefore, mitigation options for the Build Alternatives will be evaluated as part of Tier 2 studies.

4.6. Deliverables

This Air Quality Technical Memorandum is the primary deliverable being produced for the U.S. 50 Tier 1 EIS related to air quality issues.

5. Existing Conditions

The following sections describe the climate, air quality status, and traffic conditions on U.S. 50 in Pueblo, Otero, Bent, and Prowers counties.

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 (CCC 2007). Winters are cold and dry, and summers warm to hot. The mean annual temperature is approximately 54 degrees Fahrenheit throughout most of the project area and ranges from roughly 52 degrees Fahrenheit at Pueblo to 55 degrees at Las Animas (WRCC 2006). The average annual maximum temperature is nearly 72 degrees Fahrenheit compared to an average annual minimum temperature of roughly 36 degrees (WRCC 2006). Extreme summer temperatures can be above 100 degrees Fahrenheit, and extreme winter temperatures can fall below zero degrees Fahrenheit (WRCC 2006).

The mean annual precipitation ranges from over 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 4 inches at La Junta to a high of just over 29 inches at Holly. 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 over 170 days at Holly (WRCC 2006). The moisture and soil temperature regimes are described as ustic or as aridic and mesic (NRCS 2002).

5.2. Air Quality

CDPHE air emissions inventory data for Pueblo, Otero, Bent, and Prowers counties is presented in Table 5-1. Communities along U.S. 50 have industrial as well as agricultural-based economies. Thus, air quality is affected by dust from local agricultural plowing, unpaved roads and open lands, highway and off-highway vehicle emissions, commercial manufacturing, and industrial activities. As shown in Table 5-1, the major producers of air emissions are highway and off-highway vehicles. Oxides of nitrogen (NO_x) and SO_2 emissions also are attributed to point sources such as fuel combustion equipment at industrial facilities. The majority of the particulate matter emissions are area source emissions, such as from agricultural activities. Biogenic sources, such as trees and vegetation, contribute to background emissions of nitrogen, CO, and volatile organic compounds.

Table 5-1. Air Emissions Inventory for Pueblo, Otero, Bent, and Prowers Counties by Source Category (2004)

County	Source Category	Tons per Year					
		CO	NO_X	PM_{10}	SO_2	VOC	Benzene
Pueblo	Area	5,600	300	7431	17	3,160	31
	Point	3,292	8,625	946	14,486	1,114	10
	Highway vehicles	34,208	3,227	82	96	2,193	82
	Off-highway vehicles	9,222	659	68	16	720	20
	Railroads	83	840	21	48	31	0
	Biogenic	3,903	596	0	0	20,379	0
	Subtotal	**56,308**	**13,651**	**8,548**	**14,663**	**7,218**	**143**
Otero	Area	1,756	80	2,225	8	618	9
	Point	110	71	32	1	190	2
	Highway vehicles	4,403	598	18	20	297	10
	Off-highway vehicles	1,526	123	14	3	183	5
	Railroads	27	278	7	16	10	0
	Biogenic	2,991	482	0	0	14,875	0
	Subtotal	**10,813**	**1,632**	**2,296**	**48**	**16,173**	**26**
Bent	Area	133	12	1,302	0	189	1
	Point	141	194	29	1	22	1
	Highway vehicles	1,704	269	8	10	110	4
	Off-highway vehicles	1,725	144	20	4	508	13
	Railroads	28	286	7	16	11	0
	Biogenic	2,907	777	0	0	13,416	0
	Subtotal	**6,638**	**1,682**	**1,366**	**31**	**14,256**	**19**
Prowers	Area	499	43	5,156	2	641	3
	Point	441	586	234	4	198	1
	Highway vehicles	3,646	524	16	18	243	8
	Off-highway vehicles	1,892	711	73	18	209	5
	Railroads	10	98	2	6	4	0
	Biogenic	2,520	1,468	0	0	9,223	0
	Subtotal	**9,008**	**3,430**	**5,481**	**48**	**10,518**	**17**
ALL	**TOTAL**	**82,767**	**20,395**	**17,691**	**14,790**	**48,165**	**205**

CO = carbon monoxide
NO_x = oxides of nitrogen
PM_{10} = respirable particulate matter
SO_2 = sulfur dioxide
VOC = volatile organic compounds
Source: CDPHE 2004

Additionally, Pueblo, Otero, Bent, and Prowers counties are currently designated as "unclassifiable/attainment" under the NAAQS (CAA 2003, part 81). Monitor value data for Pueblo and Prowers counties are available from the EPA's public database, but only for fine particulate matter ($PM_{2.5}$)

and respirable particulate matter (PM_{10}). Other contaminants are not monitored currently in these counties. A summary of these monitored values is presented in Table 5-2. Monitor value data are not available in the EPA's database for Bent and Otero counties (i.e., ambient air is not currently monitored in these counties). The data in Table 5-2 show no exceedance of the NAAQS for $PM_{2.5}$ and PM_{10}.

Table 5-2. Monitored Values Summary for Pueblo and Prowers Counties

County	Year	98th Percentile 24-hour Value for $PM_{2.5}$ ($\mu g/m^3$)	Annual Mean Value for $PM_{2.5}$ ($\mu g/m^3$)	2nd 24-hour Value for PM_{10} ($\mu g/m^3$)	Annual Mean Value for PM_{10} ($\mu g/m^3$)
Pueblo	1996			49	26
	1997			56	27
	1998			52	25
	1999	13	6.8	51	25
	2000	20	7.8	64	24
	2001	19	8.5	63	25
	2002	17	7.8	61	27
	2003	17	7.6	64	25
	2004	16	6.8	56	23
	2005	13	7.2	50	22
	2006	19	8.7	53	23
Prowers	1996			80	24
	1997			98	23
	1998			100	26
	1999			145	29
	2000			136	29
	2001			133	31
	2002			138	31
	2003			120	29
	2004			82	24
	2005			110	21
	2006			127	24
	NAAQS	**35**	**15.0**	**150**	**50**

Blank entries = no monitoring data available
$PM_{2.5}$ = fine particulate matter
PM_{10} = respirable particulate matter
$\mu g/m^3$ = micrograms per cubic meter
Source: EPA 2007

Even though Lamar is not located in the project area, it was included here because the community is designated as "attainment/maintenance" under the NAAQS. In Lamar, particulate matter was monitored at levels that violated pollutant standards in the 1980s, but this was primarily due to other sources of pollution, with minimal contribution from motor vehicle use. More recent violations occurred in 1996, 1999, and 2000 due to high wind conditions. The state of Colorado determined, and the EPA agreed, that high wind events caused these violations, which would not have occurred otherwise (CDPHE 2001). In 2005, the EPA approved a maintenance attainment plan documenting that the past problem had been remedied, the air

quality standard had been met for 10 years, and no further violations were anticipated in the foreseeable future (EPA 2005).

Air quality-sensitive receptors in the project area were identified. The vast majority of these receptors are located within the cities and towns along U.S. 50. Very few receptors were identified outside these areas. This is because urban development in the Lower Arkansas Valley is concentrated within these municipalities. Land outside town generally is used for farming or ranching and only inhabited by the farmers and ranchers who own the land.

Implementation of the Build Alternatives would likely be federally funded and considered regionally important. Under those conditions, they would be required to undergo conformity determination. U.S. 50 through the Lower Arkansas Valley is listed as a high priority for improved mobility and safety in the Southeast Transportation Planning Region's 2040 Regional Transportation Plan and the Pueblo Area Council of Governments 2040 Long-Range Transportation Plan (PACOG 2015).

5.3. Traffic Conditions

Along U.S. 50 in the Lower Arkansas Valley, emissions from motor vehicles are a major source of air pollution; however, emissions levels have never been high enough to cause a violation of air pollution standards. As shown in Figure 5-1, the average traffic volume on U.S. 50 was roughly 5,500 vehicles per day (vpd) in 2011. This figure ranged widely from roughly 13,500 vpd in Pueblo to about 1,700 vpd from Holly to the Colorado-Kansas state line. In contrast, I-25 through Pueblo averaged approximately 47,846 vpd in 2012 (CDOT 2012).

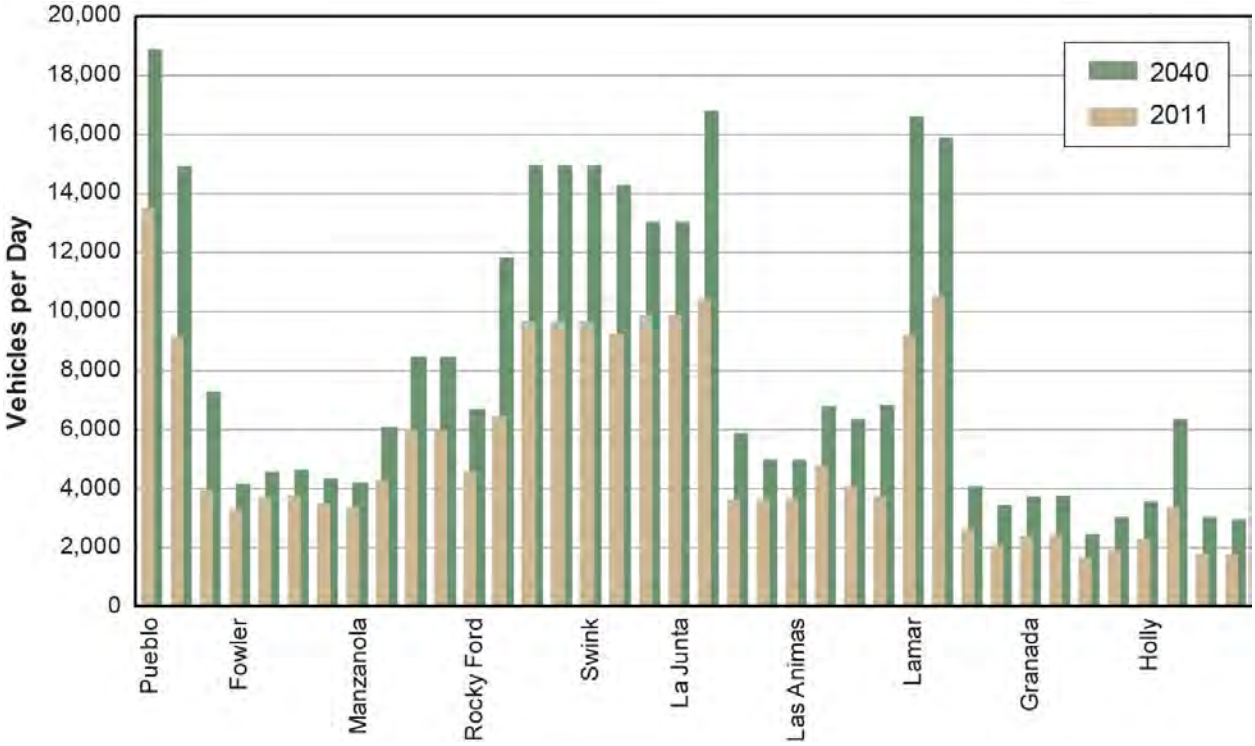


Figure 5-1. Average Annual Daily Traffic on I-25 through Pueblo and on U.S. 50 in the Lower Arkansas Valley (2011 and projected 2040)

On average, traffic volumes are expected to rise by approximately 52 percent by 2040 (see Figure 5-1) along the U.S. 50 corridor. The traffic volumes on U.S 50 in Pueblo will increase by 40 percent adding just over 5,500 vpd between 2011 and 2040. The most substantial increase in vpd is expected to occur in the town of La Junta. Traffic through La Junta is projected to increase by 60 percent, adding 6,000 vpd (CDOT 2012). Despite these increases in traffic, future volumes are not expected to cause a violation in pollution standards in any of the communities along the U.S. 50 corridor.

Additionally, traffic data show that nearly 12 percent of the vehicles driving on U.S. 50 in 2012 were commercial trucks. This proportion varied widely along the corridor, from six percent in Pueblo to more than 25 percent near the Colorado-Kansas state line (CDOT 2012). This is important because commercial trucks generally have diesel engines, and these engines produce emissions that are considered a pollutant of concern for sensitive sites, such as schools, hospitals, and elder care facilities. The percentage of commercial trucks on the highway is expected to remain about the same through 2040 (CDOT 2012). However, while a sizable percentage of the vehicles driving on U.S. 50 are commercial trucks, vehicle-related pollution has not been an issue along U.S. 50 in the Lower Arkansas Valley, and it is not expected to be an issue through 2040. Additionally, recent advances in diesel technology have already reduced emissions from these types of engines, and this trend is expected to continue into the future (Trucking Industry Mobility and Technology Coalition [TIMTC] 2010).

6. Effects

The following sections discuss the potential of the No-Build Alternative and the Build Alternatives to affect air quality in the project area.

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 U.S. 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. However, no direct effects to air quality are expected.

Several conditions will continue to affect air quality in the Lower Arkansas Valley, including the following:

- Between 2011 and 2040, average traffic volumes on U.S. 50 through project corridor are expected to increase by approximately 52 percent, so there will be more motor vehicles producing emissions (CDOT 2012). However, continued improvements in fuel and motor vehicle technologies are expected to result in lower emission rates for engine- and exhaust-related criteria pollutants, MSATs, and greenhouse gases (GHGs) in the future. These reductions could offset some of the expected emissions increases from additional traffic.
- Non-vehicle-related sources of air pollution will continue to affect air quality. Feedlots, which generate large amounts of animal waste in a concentrated area, are one of these sources. There are eight feedlots located along or near U.S. 50 in the Lower Arkansas Valley, and several of them are located directly adjacent to the highway (Tranel 2008).
- Communities are actively pursuing economic diversification, which could include new emission sources (i.e., more industrial activity). However, assuming that any new emission generators comply with established air quality regulations, there is no reason to anticipate any air quality problems stemming from these facilities for the foreseeable future.
- Soils in the area are sensitive to disturbances that cause airborne dust and debris. Highway construction activities will temporarily increase the number of sources of dust. These impacts can be reduced with the use of spraying and other dust control measures.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

In the aforementioned eight communities, the average traffic volume in 2011 was just over 5,600 vpd (CDOT 2012). In 2040, this figure is expected to rise by approximately 56 percent to just over 8,800 vpd (CDOT 2012).The Build Alternatives would move a portion of this traffic out of town, potentially improving air quality in these downtown areas. Many of these communities have expressed a desire to revitalize their downtowns, making them more suitable for pedestrians (CDOT 2006a). The Build Alternatives could help those communities reach this goal by improving air quality in these areas.

Although traffic volumes on U.S. 50 in the project area are expected to increase up to 52 percent, the increased number of vehicles averages 8,800 vpd (CDOT 2012). These volumes are not expected to cause a violation in pollution standards in any of the communities along U.S. 50 in the Lower Arkansas Valley.

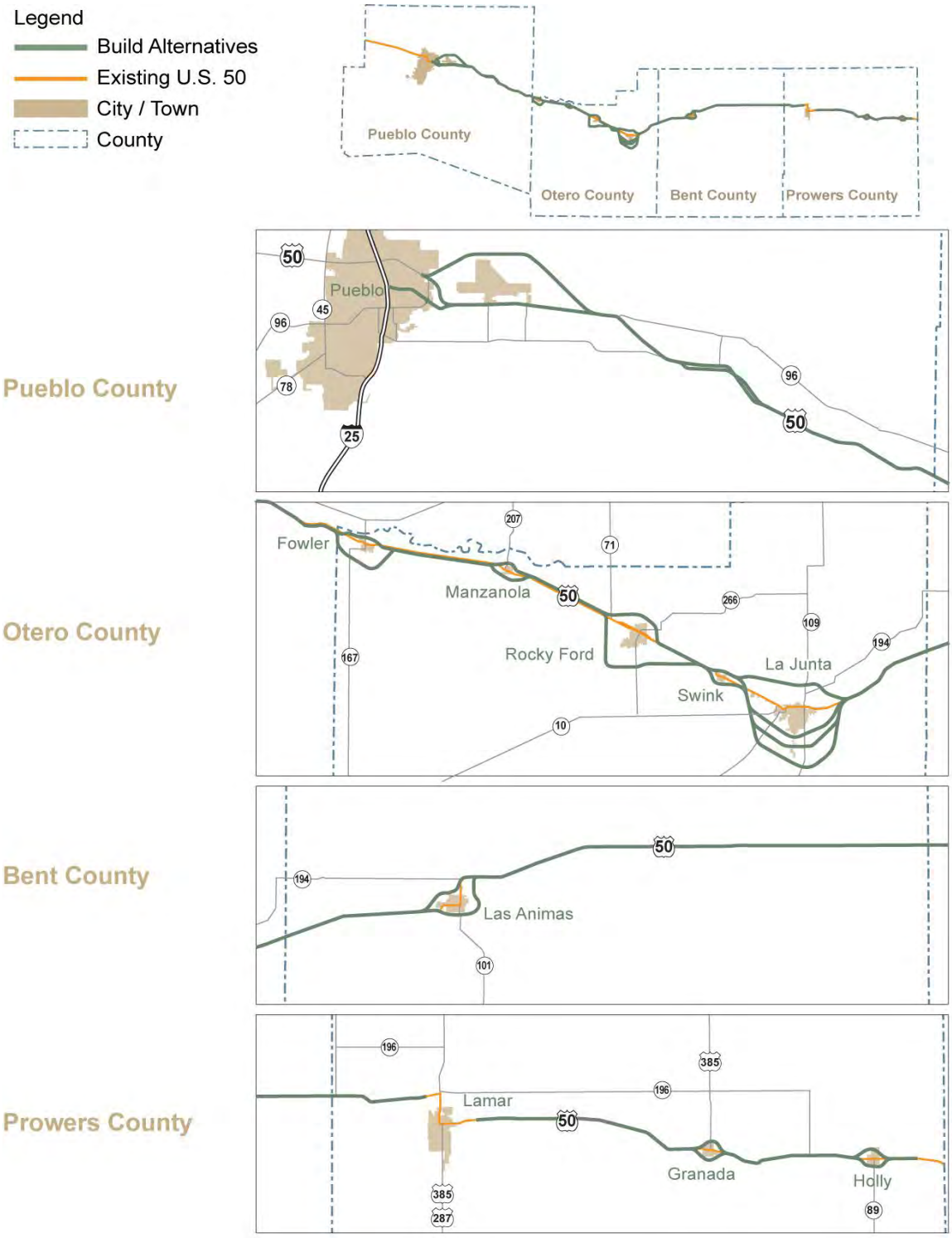


Figure 6-1. Build Alternatives Overview

Air quality effects from the Build Alternatives would include air contaminant emissions from combustion of fuel in vehicles, idling of vehicles, re-entrained road dust, and fugitive dust generated by construction activities during Tier 2 studies. Rerouting U.S. 50 to around-town locations at eight municipalities would remove emissions originating from traffic on the highway, including commercial trucks, away from populated areas in town to the less populated periphery of these communities.

6.2.1. Sensitive Receptors

Most sensitive receptor sites, such as schools, hospitals, and elder care facilities, are located in town, so the Build Alternatives would move traffic away from these locations. However, the Build Alternatives would move the highway closer to sensitive receptors at locations in Alternative 2: Fort Reynolds Realignment, Alternative 2: Swink South, Alternative 2: La Junta South, Alternative 1: Las Animas North, and Alternative 1: Holly North. With the exception of alternatives in Swink and Holly, the Build Alternatives would locate the highway farther than 1,000 feet from sensitive receptor locations. Impacts at Swink and Holly are described below.

Potential Effect on Air Quality

The Build Alternatives would move U.S. 50 to around-town locations in eight communities: Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This would move traffic, and resulting emissions, from populated areas in town to less populated areas outside of town.

Section 10: Swink

Alternative 1: Swink North would reroute U.S. 50 traffic farther away from the school complex than it is today, potentially reducing pollutant levels at the site. Alternative 2: Swink South would reroute U.S. 50 traffic closer to the public school complex, which includes an elementary school and a junior-senior high school. Schools generally are considered sensitive sites in air quality analyses because of the large number of children, who may be more susceptible to the effects of pollution. While this alternative does have the potential to increase pollutant levels (caused by vehicle emissions) above the levels experienced today, this change is not expected to increase pollutant levels enough to exceed EPA standards at this location.

Section 20: Holly

Alternative 1: Holly North would reroute U.S. 50 traffic closer to the Holly Junior-Senior High School and would potentially increase pollutant levels (caused by vehicle emissions) from the levels experienced today. Alternative 2: Holly South would move the highway farther from the school than it is today, potentially reducing pollutant levels at the site.

6.2.2. Construction Activities

Construction activities resulting from Tier 2 studies are expected to produce diesel particulate, nitrogen oxide, and hydrocarbon emissions from the use of construction equipment and dust emissions from ground disturbance. These emissions would result in minor, short-term effects on air quality in the immediate vicinity of the activities. However, it also is expected that clean vehicle technologies would be applied to construction equipment. Therefore, it is likely that the equipment used to construct the Build Alternatives in the future would produce fewer emissions than today's equipment. More specific effects to air quality by construction-related activities should be identified during Tier 2 studies.

Additionally, this analysis includes the EPA's assessment of the respirable particulate matter maintenance plan for the City of Lamar (revised on December 20, 2012). This review was intended to determine the adequacy of the emissions budgets for respirable particulate matter contained in the maintenance plan for purposes of conformity with the state implementation plan. The conformity rule spells out limited technical and administrative criteria that the EPA must use in determining adequacy of submitted emissions budgets. Based on the plan submittal, the EPA determined that these criteria were satisfied, and the budgets were adequate for transportation conformity purposes (EPA 2012).

In the Lamar maintenance plan, Colorado established a new mobile source emissions budget of 764 pounds per day for the year 2025 and beyond (EPA 2012). The new mobile source emissions budget is the total of the 2025 mobile source PM_{10} emissions budget and includes emissions from vehicle exhaust, highways, paved arterial and local roads, and gravel roads. The EPA's approval of 764 pounds per day for Lamar as the budget for this area means that this value must be used for conformity determinations for 2025 and beyond. This information will be considered during Tier 2 studies.

The purpose of the U.S. 50 Tier 1 EIS is to improve safety and mobility for local, regional, and long-distance users of U.S. 50 through the Lower Arkansas Valley. It is important to state that existing mobility issues on the highway are not related to traffic congestion. There are no traffic congestion problems on this portion of the highway at this time, and congestion is not expected to become an issue in the foreseeable future. Addressing existing safety and mobility issues on the highway will be accomplished by correcting roadway deficiencies, while balancing the mobility and access needs of these users and providing flexibility to meet future travel demands. This project has been determined to generate minimal air quality effects for criteria pollutants regulated by the Clean Air Act of 1990 (and its amendments) and has not been linked with any special concerns about MSATs. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in effects from MSATs from the project when compared to the No-Build Alternative.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades (FHWA 2009). Based on regulations now in effect, an analysis of national trends with the EPA’s MOBILE6.2 model forecasts a combined reduction of 72 percent in the total annual emission rate for priority MSATs from 1999 to 2050, while vehicle miles of travel (vmt) are projected to increase by 145 percent. This will reduce both the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify specific air quality effects from the Build Alternatives. However, the following mitigation strategies have been developed to ensure that negative effects are minimized during Tier 2 studies.

- Dust control—techniques include watering the areas disturbed by construction
- CDOT air quality directive—CDOT should implement the appropriate air quality mitigation measures included in CDOT Air Quality Policy Directive #1901

8. References

City of La Junta. Engineering Department. *Zoning Ordinance*. 2006. Print.

City of Pueblo. Pueblo Municipal Code. *Zoning Ordinance.* Web. 19 Jun. 2006. <http://pueblo.us/cgi-bin/gt/tpl_page.html,template=1&content=282&nav1=1&>.

City of Rocky Ford. Planning Commission. *Zoning Ordinance*. 2006. Print.

Clean Air Act of 1990 (CAA) Regulations. 40 CFR 50-99. Jul 1, 2003.

Colorado Climate Center (CCC). *Climate Information.* Web. Jan. 2007. <http://ccc.atmos.colostate.edu/climateofcolorado.php>.

Colorado Department of Public Health and Environment (CDPHE). Air Pollution Control Division. *Draft Revised PM_{10} Maintenance Plan for the Lamar Attainment/Maintenance Area, Colorado.* Denver, CO: CDPHE, Nov. 2001. Print.

Colorado Department of Public Health and Environment (CDPHE). *Hospitals in Colorado.* Web. 10 Oct. 2006. <http://www.cdphe.state.co.us/hf/static/hospital.htm>.

Colorado Department of Public Health and Environment (CDPHE). *Technical Services Program, Air Quality Reporting System, Emissions Inventory*. 2004. Web. 2007. <http://apcd.state.co.us/psi/main.html>.

Colorado Department of Transportation (CDOT). *A Corridor Selection Study: A Plan for U.S. 50*. Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Sep. 2003. Print.

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Community Workshops Report.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Aug. 2006. [CDOT 2006a]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Section 4(f) Resources Evaluation Data Collection Summary.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Sep. 2006 and Oct. 2006. [CDOT 2006b]

Colorado Department of Transportation (CDOT). *Draft Air Quality Policy Directive #1901.* 20 Apr. 2009. Print.

Colorado Department of Transportation (CDOT). *Future Traffic Volumes of SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010a]

Colorado Department of Transportation (CDOT). *Traffic Information for I-25 from MP 93 to MP 104 (Pueblo).* Web. 15 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010b]

Colorado Department of Transportation (CDOT). *Traffic Information for SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010c]

Colorado Department of Transportation (CDOT). *Online Transportation Information System (OTIS) Data for 2012*. Web. Mar. 2014. <http://dtdapps.coloradodot.info/otis>. [CDOT 2012]

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. 1978.

National Center for Education Statistics (NCES). *Public School Districts, 2003-2004 School Year.* Web. 11 Oct. 2006. <http://nces.ed.gov/ccd/districtsearch/>.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987. Print.

Natural Resources Conservation Service (NRCS).*Climate Data for WETS Stations: Holly, CO4076; Lamar, CO4770; Las Animas, CO4834; Pueblo WSO AP, CO6740; and Rocky Ford 2 SE, CO7167.* 2002. Web. Apr. 2006. <http://www.wcc.nrcs.usda.gov/climate/clim-reports.html>.

Otero County. Land Use Department. *Zoning Ordinance*. 2006. Print.

Pueblo Area Council of Governments (PACOG 2015). *2040 Long-Range Transportation Plan*. Pueblo, CO: PACOG, 2Nov. 2015. Web.http://www.pacog.net/

Pueblo County. Planning and Zoning Commission. *Zoning Ordinance.* Web. 19 Jun. 2006. <http://pueblo.us/cgi-bin/gt/tpl_page.html,template=1&content=282&nav1=1&>.

Southeast Transportation Planning Region (SE TPR). *2035 Regional Transportation Plan*. Jan. 2008.

Town of Fowler. Planning and Zoning Board. *Zoning Ordinance*. 2006. Print.

Town of Manzanola. *Zoning Ordinance.* 2006.

Town of Swink. *Zoning Ordinance*. 2006.

Tranel. J. *Identification of Highest and Best Agricultural Use of Non-Urbanized Land in the Project Area.* Lafayette, CO: WYCO Associates, LLC. 24 Apr. 2008. Print.

Trucking Industry Mobility and Technology Coalition (TIMTC). *Green Trucks: The View from the Road.* Webinar presented on 11 Feb. 2010. <http://www.freightmobility.org>.

U.S. Congress. Clean Air Act of 1990 (CAA). 42 USC 7609. 1990.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Department of Agriculture (USDA) Aerials. USDA Aerial Photography Field Office. Flown Jun. 2004.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents.* 6 Dec. 2012. Print.

U.S. Environmental Protection Agency (EPA). *Adequacy Status of the Lamar and Steamboat Springs, Colorado PM_{10} Maintenance Plans for Transportation Conformity Purposes.* 2002. Web. 2007. <http://www.epa.gov/fedrgstr/EPA-AIR/2002/October/Day-28/a27345.htm>.

U.S. Environmental Protection Agency (EPA). *AirData.* Web. 2007. <http://www.epa.gov/air/data/geosel.html>.

U.S. Environmental Protection Agency (EPA). "Approval and Promulgation of Air Quality Implementation Plans; CO; PM_{10} Designation of Areas for Air Quality Planning Purposes, Lamar; State Implementation Plan Correction." *Federal Register.* 70 No 233: 72597-72598. 6 Dec. 2005. Print.

U.S. Environmental Protection Agency (EPA). *National Ambient Air Quality Standards (NAAQS).* Web. Feb. 2009. <http://www.epa.gov/air/criteria.html>.

U.S. Environmental Protection Agency (EPA). Office of Air Quality Planning and Standards. *Memorandum: Boundary Guidance on Air Quality Designations for the 8-Hour Ozone National Ambient Air Quality Standards.* 28 Mar. 2000. Print.

U.S. Environmental Protection Agency (EPA). “Transportation Conformity Rule Amendments.” *Federal Register.* 69 (126). 1 Jul. 2004.

Western Regional Climate Center (WRCC). *Climate of Colorado Narrative and State Temperature and Precipitation Data.* 2006. Web. Jan. 2007. <http://www/wrcc/dri.edu>.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Air Quality

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 used subsequently by the project's resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 (corridor location) decision.

Table A-1. Resource Methodology Overview for Air Quality

Methodology Overview	Air Quality	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Local meteorological conditions and pollutant levels • NAAQS/attainment status	Update Tier 1 data collection sufficiently for standard NEPA documentation
Collection and/or Analysis Methodology	Collect existing data related to attainment status within the corridor	• Document regulatory requirements, including a summary of potential health effects of criteria pollutants • Document local meteorological conditions and/ or quality monitored data in study area • Identify attainment status of towns within corridor • Outline conformity requirements for projects proposed in maintenance areas
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the vicinity of the Colorado-Kansas state line	Non-attainment or maintenance areas within Tier 2 specific SIU corridor boundaries
Impacts	Identify maintenance areas within the study area and qualitatively determine if the proposed action would likely cause or nearly cause a violation in the NAAQS	• Perform qualitative PM_{10} analysis • Summarize attainment status-related information • Develop acceptable methodology for analysis, coordinating between Air Pollution Control Division and EPA • Air Pollution Control Division to perform regional and corridor analysis with EPA coordination • Particulate emissions (PM_{10}) from motor vehicles (There is no EPA-approved hot spot model for PM_{10}. However, FHWA has developed qualitative guidance for evaluating the localized impacts of mobile source PM_{10} emissions)
Mitigation Options	None expected	Methods to reduce airborne dust during construction
Deliverables	Air Quality Technical Memorandum outlining air quality attainment status and recommendations for projects to be included in the State Implementation Plan modeling	Air Quality Technical Report outlining the potential air quality impacts as appropriate for Tier 2 SIUs level of NEPA documentation and a determination of conformity for projects located in maintenance areas
Regulatory Guidance/ Requirements	• Transportation Equity Act of the 21st Century, Sections 1110 and 6101 • FHWA Technical Advisory T6640.8a • Applicable SIP Plan • Clean Air Act of 1990 (42 USC 7400; 23 USC 109(j); 23 USC 149; 23 USC 102(a); and 23 USC 110(c)) • 40 CFR Parts 51 and 93 • 23 CFR 770	

Appendix B. Abbreviations and Acronyms

CAA	Clean Air Act of 1990
CCC	Colorado Climate Center
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon monoxide
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GHG	Greenhouse gas
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
MSAT	Mobile source air toxic
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NRCS	Natural Resources Conservation Service
O_3	Ozone
Pb	Lead
$PM_{2.5}$	Fine particulate matter
PM_{10}	Respirable particulate matter
SH	State Highway
SIU	Section of independent utility
SO_2	Sulfur dioxide
TIMTC	Trucking Industry Mobility and Technology Coalition
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. Highway 50 Tier 1 Environmental Impact Statement
USC	United States Code
vmt	Vehicle miles traveled
vpd	Vehicles per day
WRCC	Western Regional Climate Center

This page left intentionally blank.

Appendix C. National Ambient Air Quality Standards

Criteria Pollutants

The EPA has established NAAQS for six principal pollutants, or "criteria" pollutants, which are listed in Table C-1 below and described in more detail below. Primary standards set limits to protect public health, including the health of "sensitive" populations such as people with asthma, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Table C-1. NAAQS Criteria Pollutants

Criteria Pollutant	Primary Standards	Averaging Times	Secondary Standards
CO (Carbon monoxide)	9 ppm (10 mg/m^3)	8-hour[1]	None
	35 ppm (40 mg/m^3)	1-hour[1]	None
Pb (Lead)	0.15 µg/m^3	Quarterly Average	Same as Primary
NO_2 (Nitrogen dioxide)	0.053 ppm (100 µg/m^3)	Annual (Arithmetic Mean)	Same as Primary
	100 ppb	1-hour[3]	None
PM_{10} (Respirable particulate matter)	Revoked[2]	Annual (Arithmetic Mean)	
	150 µg/m^3	24-hour[3a]	Same as Primary
$PM_{2.5}$ (Fine particulate matter)	12 µg/m^3	Annual[4] (Arithmetic Mean)	15 µg/m^3 Annual[4]
	35 µg/m^3	24-hour[5]	Same as Primary
O_3 (Ozone)	0.075 ppm	8-hour[6]	Same as Primary
SO_2 (Sulfur dioxide)	75 ppb[7]	1-hour	
	—	3-hour	0.5 ppm[1]

[1]Not to be exceeded more than once per year.
[2]The annual average standard for PM_{10} was revoked by EPA in a rule-making in September 2006. The previous standard was 50 µg/m^3.
[3]This standard is obtained from the 98th percentile, averaged over three years.
[3a]Not to be exceeded once per year on average over 3 years.
[4]To attain this standard, the three-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15 µg/m^3.
[5]This standard was revised from 65 to 35 µg/m^3 by EPA in a rule-making in September 2006, and will be implemented over a lengthy period. To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3.
[6]EPA lowered the ozone standard from 0.08 ppm to 0.075 ppm on March 12, 2008. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour ozone average concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
[7]This standard was set in a ruling on June 2, 2010. It will be measured from the 99th percentile of 1-hour daily maximum concentrations averaged over three years.
Source: EPA 2013 (40 CFR part 50)

Carbon Monoxide

CO is a colorless, odorless, tasteless gas. It may temporarily accumulate at harmful levels, especially in calm weather during winter and early spring, when fuel combustion reaches a peak and CO is chemically more stable due to the low temperatures. CO usually dissipates quickly over a large area, posing minimal threat to human health. Transportation activities, indoor heating, and open burning are among the anthropogenic (i.e., manmade) sources of CO.

Nitrogen Dioxide

NO_2, nitric oxide, and nitrate radical are collectively called NO_x. These three species are interrelated, often changing from one form to another in chemical reactions. NO_2 is the species commonly measured in ambient air monitors. NO_x generally are emitted in the form of nitric oxide, which is oxidized to NO_2. The principal manmade source of NO_x is fuel combustion in motor vehicles and power plants. Reactions of NO_x with other atmospheric chemicals can lead to the formation of ozone and acidic precipitation.

Ozone

Ground-level ozone is a secondary pollutant, formed from daytime reactions of NO_x and volatile organic compounds rather than being directly emitted by natural and anthropogenic sources. Volatile organic compounds, for which no NAAQS are established, are released in industrial processes and from evaporation of organic liquids, such as gasoline and solvents.

Fine Particulate Matter and Respirable Particulate Matter

Particulate matter is separated into two different sizes for purposes of the NAAQS: fine particulate matter and respirable particulate matter. Respirable particulate matter is considered inhalable and fine particulate matter is considered to be in the respirable range, meaning these particles can reach the alveolar region of the lungs and penetrate deeper than respirable particulate matter. There are many sources of particulate matter, both natural and manmade, including dust from construction activities, industrial activities, and combustion of fuels.

Lead

Dominant industrial sources of lead emissions include waste oil and solid waste incineration, iron and steel production, lead smelting, and battery and lead alkyl manufacturing. The lead content of motor vehicle emissions, which was the major source of lead in the past, has significantly declined with the widespread use of unleaded fuel.

Sulfur Dioxide

SO_2 is emitted in natural processes, such as volcanic activity, and by anthropogenic sources such as combustion of fuels containing sulfur, sulfuric acid manufacturing, etc. SO_2 emissions in the atmosphere can lead to the formation of acidic precipitation (i.e., acid rain).

National Ambient Air Quality Standards Compliance (Attainment vs. Non-Attainment)

The Clean Air Act of 1990 also requires the EPA to assign a designation for each area of the United States regarding compliance with the NAAQS. The EPA categorizes the level of compliance or noncompliance as follows:

- Attainment—an area that meets the NAAQS for any pollutant
- Maintenance—an area that currently meets the NAAQS, but has previously been out of compliance
- Non-attainment—an area that does not meet the NAAQS or that contributes to ambient air quality in a nearby area that does not meet the NAAQS.
- Unclassifiable—any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

The EPA delegates authority for air quality monitoring and compliance to the Colorado Air Quality Control Commission. The CDPHE takes the lead in air quality planning and the development of air quality-related strategies, as well as specific programs to reduce air contaminant emissions.

This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Biological Resources Technical Memorandum

June 2016

Plan Design Enable

Table of contents

Chapter Pages

Table of contents ..... **i**

Tables ii

Figures ii

1. Project Overview **1**

2. Resource Definition **2**

3. Applicable Laws, Regulations, and Guidance **3**

3.1. Endangered Species Act of 1973 3

3.2. Bald and Golden Eagle Protection Act of 1940 3

3.3. Migratory Bird Treaty Act of 1918 3

3.4. Fish and Wildlife Coordination Act of 1934 3

3.5. Surface Transportation and Uniform Relocation Assistance Act of 1987, Section 130 (Wildflowers) 4

3.6. Executive Order 13112, Invasive Species 4

3.7. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds 4

3.8. FHWA Technical Advisory T6640.8A 4

3.9. Colorado Noxious Weed Act 4

3.10. Integrated Noxious Weed Management Plan 4

3.11. CDOT Black-Tailed Prairie Dog Policy 4

3.12. CDOT Shortgrass Prairie Initiative 4

4. Methodology **5**

4.1. Relevant Data or Information Sources 5

4.2. Data Collection and Analysis Methodology 6

4.3. Project Area 7

4.4. Effects 7

4.5. Mitigation Options 8

4.6. Deliverables 8

5. Existing Conditions **9**

5.1. Climate 9

5.2. General Vegetation 10

5.3. Noxious Weeds 16

5.4. Terrestrial Wildlife 18

5.5. Wildlife Crossings 25

5.6. Wildlife Migration Routes 27

5.7. Aquatic Resources 27

5.8. Special-Status Species 28

6. Effects 29

6.1. No-Build Alternative 29

6.2. Build Alternatives 29

7. Mitigation Strategies 46

8. References 47

Appendices 53

Appendix A. Resource Methodology Overview for Biological Resources 55

Appendix B. Abbreviations and Acronyms 59

Appendix C. U.S. Fish and Wildlife Service Letter Pertaining to Federally Listed Species 61

Appendix D. Accuracy Assessment of Southwest Regional Gap Analysis Project and Colorado Division of Wildlife Riparian Vegetation Mapping Along the U.S. 50 Corridor 65

D.1. Introduction 65

D.2. Results 65

D.3 Observations and Possible Explanations for Discrepancies 68

Appendix E. CDOT Noxious Weed List (2013) 69

Appendix F. Animals, Fish, and Plant Species Likely to Occur in the Project Area 73

Appendix G. Special-Status Species Potentially Occurring in the Project Area 95

Appendix H. Common or Abundant Fish Species Documented in the Project Area 101

Appendix I. Species Considered to be Critically Imperilled by the Colorado Natural Heritage Program Potentially Occurring in the Project Area 103

I.1. Natural Heritage Program Classification Scheme 106

Appendix J. Figures (J-1 through J-39) 109

Tables

Table 5-1. Estimates for Land Use/Cover within the Project Area 11
Table 5-2. State Rank (Top 10 Only) for Acres of Crop Production by County 12
Table 5-3. State-Listed Noxious Plant Species Documented in the Build Alternatives 16
Table 5-4. Wildlife Crossings on U.S. 50 in the Build Alternatives 26
Table 6-1. Summary of Direct, Permanent Effects to Land Use/Cover Types by Location (Acres) 31

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 4-1. Tier 1 vs. Tier 2 Decision 7
Figure 5-1. Average, Maximum, and Minimum Annual Temperatures for the Project Area 9
Figure 5-2. Average, Maximum, and Minimum Annual Precipitation for the Project Area 10
Figure 5-3. Sand Sage Habitat Near the Granada State Wildlife Area in Prowers County 13
Figure 5-4. The Central Flyway 19
Figure 5-5. Areas Along U.S. 50 with the Highest Number of Animal Collisions Documented (1996 to 2006) 25
Figure 6-1. Build Alternatives Overview 30

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 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 U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Biological resources for the U.S. 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 *U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement 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 U.S. 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 U.S. 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 U.S. 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.

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 U.S. 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. 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 U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 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 U.S. 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 U.S. 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 U.S. 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 U.S. 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 U.S. 50 roadway and utilize more site-specific mapping for their effect calculations, making future Tier 2 estimates of effects more precise.

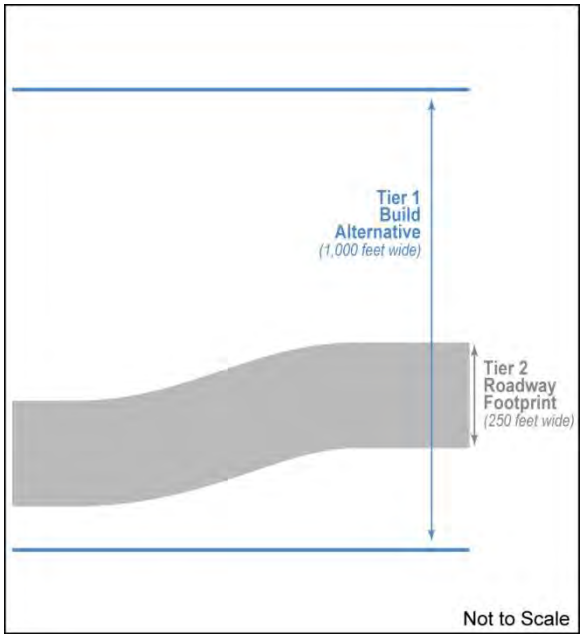


Figure 4-1. Tier 1 vs. Tier 2 Decision

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) (see Figure 4-1). 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

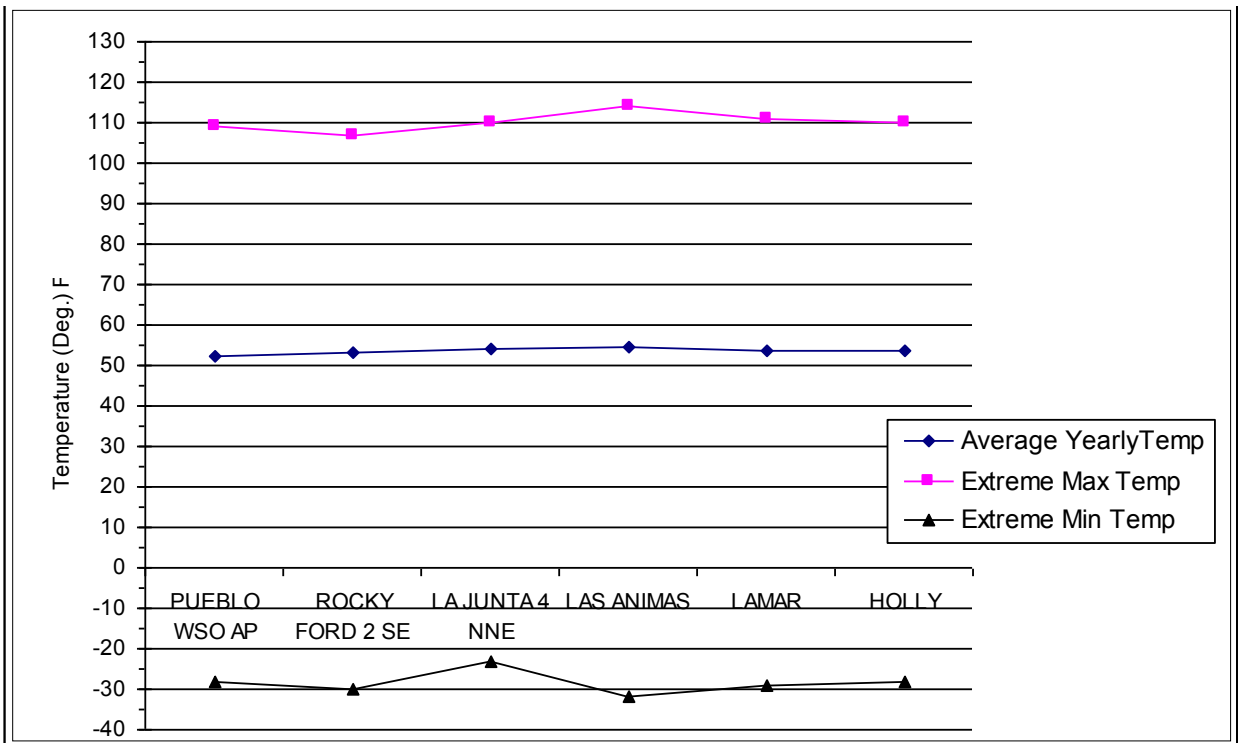
This Biological Resources Technical Memorandum is the primary deliverable being produced for this analysis of biological resources for the U.S. 50 Tier 1 EIS. This memorandum will form the basis for a biological assessment, conducted during Tier 2 studies, for any federally protected species that may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

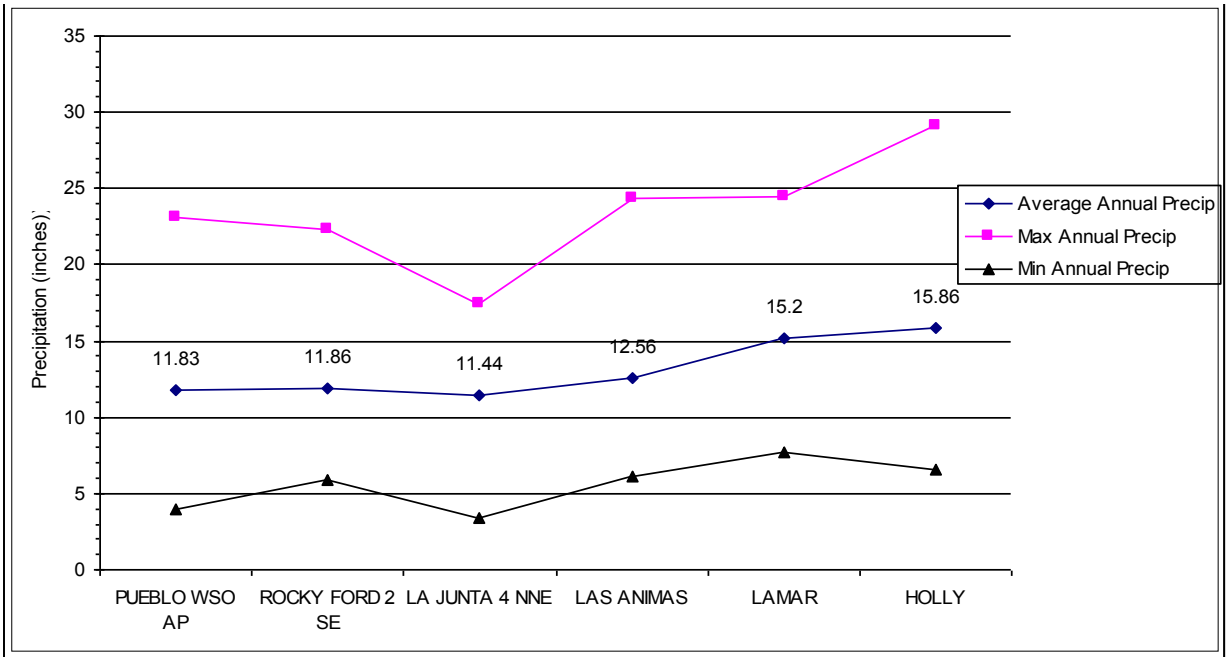
Eastern Colorado lies within the rain shadow east of the Rocky Mountains. The climate of the Great Plains grasslands is a semi-arid regime with characteristic low relative humidity, abundant sunshine, infrequent rains and snow, moderate to high wind movement, and a large seasonal range in temperature (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) 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

[a]Other 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

[a]Vegetable ranked by acres in production per year; grain measured in dollar sales; all other crops ranked by acres harvested per year.
[b]The 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). 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.

Sand sage habitat near Granada State Wildlife Area.

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

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 U.S. 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*).

Common graminoids include sand bluestem (*Andropogon hallii*), little bluestem, sand dropseed, prairie sandreed (*Calamovifla 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 U.S. 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). 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	*Cirsium arvense*	B	Pueblo	Yes
Chicory	*Cichorium intybus*	C	Pueblo	No
Cutleaf teasel	*Dipsacus laciniatus*	B	Pueblo	No
Field bindweed	*Convolvulus arvensis*	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Hoary cress	*Cardaria draba*	B	Bent	Yes
			Prowers	Yes
Johnsongrass	*Sorghum halepense*	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Musk thistle	*Carduus nutans*	B	Pueblo	No
Perennial pepperweed	*Lepidium latifolium*	B	Pueblo	No
Prickly lettuce	*Latuca serriola*	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Puncturevine	*Tribulus terrestris*	C	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	*Acroptilon repens*	B	Bent	Yes
			Otero	Yes
			Pueblo	Yes
Russian olive	*Elaeagnus angustifolia*	B	Bent	No
			Otero	No
			Prowers	No
			Pueblo	Yes
Salt cedar (Tamarisk)	*Tamarix ramosissima*	B	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Scotch thistle	*Onopordum tauricum*	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 Russion 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 watershedand 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 pricincipal 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. The likely occurrence and habitat affinities of selected terrestrial wildlife species are summarized in the following subsections.

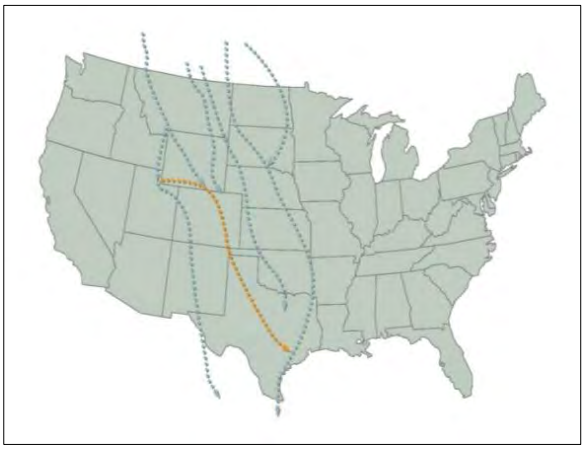


Figure 5-4. The Central Flyway

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. 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 (*Zenaida 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 (*Eromophilla 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.

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). 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.

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.

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.

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 spurious*). Many species of migrants 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 U.S. 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 U.S. 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 serpentine*), 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.

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.

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 U.S. 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.

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 U.S. 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 located 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 U.S. 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).

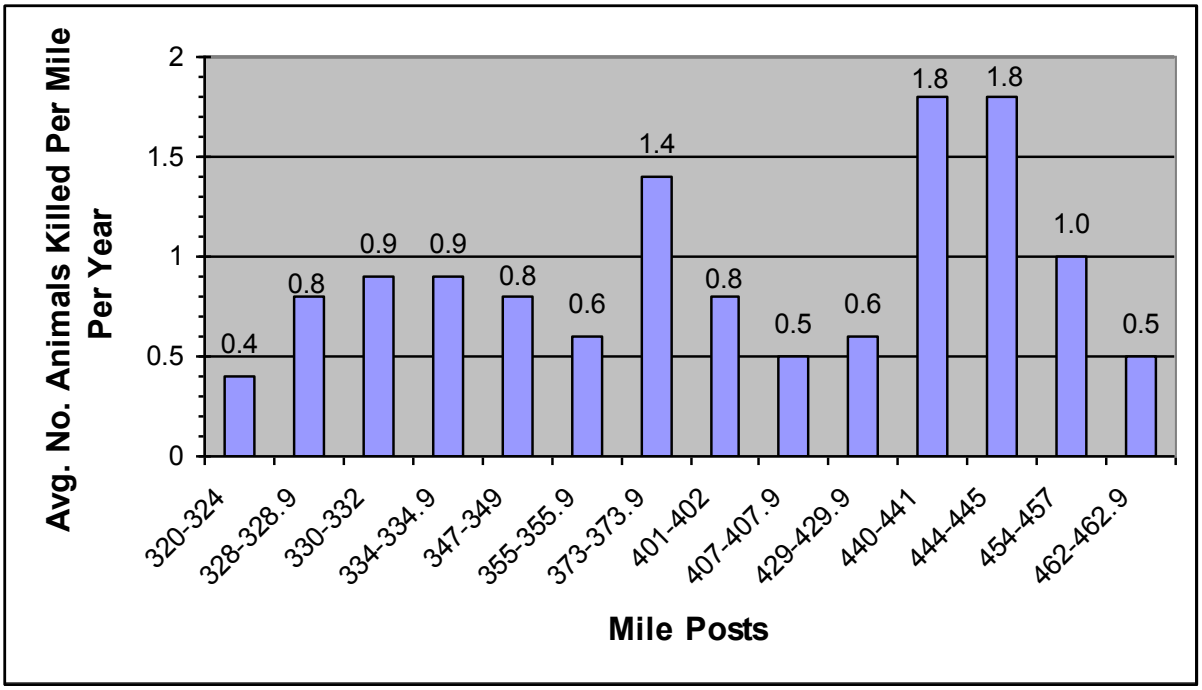
5.5. Wildlife Crossings

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 U.S. 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 U.S. 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.

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 U.S. 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 U.S. 50 in the Build Alternatives

Milepost(s)[a]	Description	Relative Priorityb
320–324	Near the Pueblo Memorial Airport	Moderate
329	Between Pueblo and Fowler where U.S. 50 crosses Chico Creek	High
330–332	Between Pueblo and Fowler where U.S. 50 crosses the Arkansas River	High
334–336	Between Pueblo and Fowler where U.S. 50 crosses the Huerfano River	High
347–349	Just west of Fowler where U.S. 50 is adjacent to the Arkansas River and crosses the Oxford Farmer's Ditch	High
355	Between Fowler and Manzanola where U.S. 50 crosses the Apishapa River	High
373–374	Just west of Swink where U.S. 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 U.S. 50 is adjacent to the Vista Del Rio (irrigation) Ditch	High
440–442	Between Lamar and Granada where U.S. 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 U.S. 50 is directly adjacent to several drainages	High
444–445	Between Lamar and Granada where U.S. 50 crosses the Manvel (irrigation) Canal	Very high
445–446	Between Lamar and Granada where U.S. 50 is directly adjacent to the Manvel (irrigation) Canal	High
454–458	Between Granada and Holly where U.S. 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

[a]Rounded to the nearest milepost
[b]Moderate = 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 U.S. 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. 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.

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 U.S. 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. 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. 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 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.

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 U.S. 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 U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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 Bulid Alternatives could occur as direct or indirect effects. These effects are discussed below.

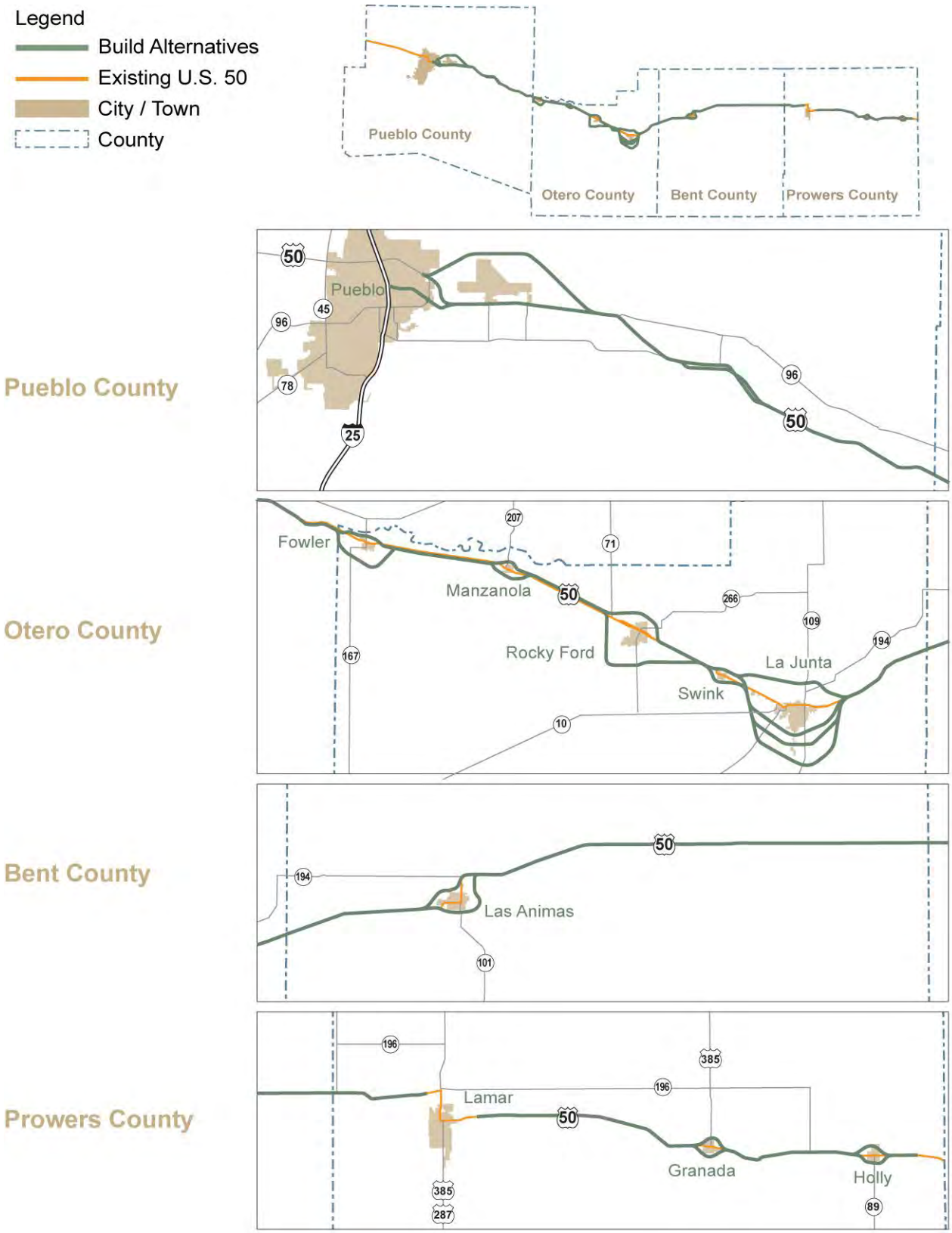


Figure 6-1. Build Alternatives Overview

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 of this report and are listed in Appendix F. Also, because the U.S. 50 Tier 1 EIS only identifies a general location for the future U.S. 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 (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 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 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 U.S. 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 U.S. 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 U.S. 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.

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. These effects are presented in Figure J-17, located in Appendix J.

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. 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. 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 Alternative

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 Alternative

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, 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.

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.

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.

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, athough 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.

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

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.

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

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.

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.

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.

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.

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 ditchesNo 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.

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.

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, U.S. 50 already crosses this reservoir at it’s 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.
- 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.

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 U.S. 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.
- 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 U.S. 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.

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 threatenedspecies). 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.

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 U.S. 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.

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 U.S. 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.
- 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 U.S. 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 alternative 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.

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.

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.

Appoximately 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 U.S. 50, the railroad, agricultural activities, and residential development.
- Increased noise levels—Increased noise levels (i.e., from traffic on U.S. 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 U.S. 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 U.S. 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 U.S. 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.

8. References

U.S. Department of Agriculture. 2002 Census of Agriculture. *County Profiles for Pueblo, Otero, Bent, and Prowers Counties.* Washington, D.C.: National Agricultural Statistics Service. 2002. Web. Dec. 2006. <http://www.nass.usda.gov/Census_of_Agriculture/2002/index.asp>.

Alexander, S.M., N.M. Waters, and P.C. Paquet. "Traffic Volume and Highway Permeability for a Mammalian Community in the Canadian Rocky Mountains." *The Canadian Geographer* 49.4 (2005): 321–331. Print.

Allen, E.B.,and M.F. Allen. "Facilitation of Succession by the Nonmycotrophic Colonizer Salsola Kali on a Harsh Site; Effects of Mycorrhizal Fungi." *American Journal of Botany* 75.2 (1988): 257-266. Print.

Anderson, R.L. "Characterizing Weed Community Seedling Emergence for a Semi-Arid Site in Colorado." *Weed Technology* 8.2 (1994): 245-249. Print.

Andrews, R., and R. Righter. *Colorado Birds.* Denver, CO: Denver Museum of Natural History, 1992. p. 442. Print.

Bailey, R.G. *Description of the Ecoregions of the United States.* 2nd ed. rev. Washington, D.C.: U.S. Department of Agriculture (USDA), U.S. Forest Service (USFS), 1995. Print.

Bent County, City of Las Animas. *Bent County/City of Las Animas Comprehensive Plan.* 2002. Print.

Bissonette, J.A., and C. Kassar. *Data Issues in Describing Road Mortality Hotspots and Creating Predictive Models.* 2006. Web. Feb. 2008. <http://www.wildlifeandroads.org/john/documents/ Bissonette%20and%20Kassar%20Data%20Issues.pdf>.

Black, T. Consultation regarding Colorado Division of Wildlife newly established (interim) state wildlife areas. 20 Apr. 2009.

Black, T. (Lamar area wildlife manager), M. Smith (conservation biologist), B. Will (Colorado Division of Wildlife (CDOW). Consultation regarding state wildlife areas in the project area. 5 Nov. 2007.

Boerboom, C.K. "Kochia Scoparia L. Schrad." *Weeds Today* 15.3 (1993): 5-8. Print.

Bottorff, R.L. "Cottonwood Habitat for Birds in Colorado." *American Birds* 28 (1974): 975-979. Print.

Brotherson, J.D., and D. Field. "Tamarix: Impacts of a Successful Weed." *Rangelands* 9.3 (1987): 110-112. Print.

Burt, W.H., and R.P. Grossenheider. *Peterson Field Guides: A Field Guide to Mammals.* New York: Houghton Mifflin Company, 1980. Print.

Busch, D.E., and S.D. Smith. "Effects of Fire on Water Salinity Relations of Riparian Woody Taxa." *Oecologia* 94.2 (1993): 186-194. Print.

Campbell, E. Consultation regarding noxious weeds in Pueblo County. 23 Jan. 2007.

Carman, J.G., and J.D. Brotherson. "Comparison of Sites Infested and Not Infested with Salt Cedar (Tamarix pentandra) and Russian Olive (Elaeagnus angustifolia)." *Weed Science* 30 (1982): 360-364. Print.

Central Flyway Council (CFC). *Location of the Central Flyway.* Web. Feb. 2008. <http://www.centralflyway. org/>.

Chapman, S., G. Griffith, J. Omernik, A. Price, J. Freeouf, and D. Schrupp. *Ecoregions of Colorado.* Reston, VA; U.S. Geological Survey (USGS). 2006. Web. May 2010. <http://www.epa.gov/wed/pages/ecoregions/co_eco.htm>.

Cincotta, R.P., D.W. Uresk, and R.M. Hansen. U.S. Department of Agriculture (USDA), U.S. Forest Service (USFS), Rocky Mountain Forest and Range Experiment Station. "Plant Compositional Change in a Colony of Black-Tailed Prairie Dogs in South Dakota." *9th Great Plains Wildlife Damage Control Workshop.* Fort Collins, CO: USDA, USFS, 1989. Print.

Cleverly, J.R., S.D. Smith, A. Devitt, and A. Dale. "Invasive Capacity of Tamarix Ramosissima in a Mojave Desert Floodplain: The Role of Drought." *Oecologia* 111.1 (1997): 12-18. Print.

Cochran, V. Consultation regarding noxious weeds in Prowers County. 21 Jan. 2007.

Colorado Climate Center (CCC). *Climate and Elevation Information.* Web. Jan. 2007. <http://ccc.atmos.colostate.edu/ climateofcolorado.php>.

Colorado Department of Agriculture. *Noxious Weed Species.* Web. Oct. 2013. <http://www.colorado.gov/cs/Satellite/ag_Conservation/CBON/1251618874438>.

Colorado Department of Transportation (CDOT). Consultation regarding CDOT's Black-Tailed Prairie Dog Policy. 1 Jun. 2005.

Colorado Department of Transportation (CDOT). *Draft Corridor Safety Assessment Report of SH050B from MP 316 to MP 468.* Denver, CO: Colorado Department of Transportation, Jul. 2002. Print.

Colorado Department of Transportation (CDOT). *Future Traffic Volumes of SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010a]

Colorado Department of Transportation (CDOT). *Noxious Weed Data.* CDOT Online Transportation Information System (OTIS). Web. Oct. 2013. <http://dtdapps.coloradodot.info/noxiousweeds/>.

Colorado Department of Transportation (CDOT). Roadkill Database. 2009. Provided by Jeff Peterson, Colorado Department of Transportation (CDOT) Wildlife Program Manager. Apr. 2010.

Colorado Department of Transportation (CDOT). *Shortgrass Prairie Initiative.* Denver, CO: Colorado Department of Transportation, 2001. Print.

Colorado Department of Transportation (CDOT). *Straight Line Diagram of SH050B from MP 316 to MP 468.* Web. 4 Jun. 2007. <http://dtdexternal.dot.state.co.us/sld/>.

Colorado Department of Transportation (CDOT). *Traffic Information for SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010b]

Colorado Division of Wildlife (CDOW) and Colorado Grassland Species Working Group. *Conservation Plan for Grassland Species in Colorado.* Denver, CO: Colorado Division of Wildlife, Nov. 2003. Print. [CDOW 2003a]

Colorado Division of Wildlife (CDOW). *Colorado State Wildlife Area (SWA) Boundaries*. ESRI ArcGIS 9.0. Published Apr 17, 2003. [CDOW 2003b]

Colorado Division of Wildlife (CDOW). Meeting notes from Travis Black (CDOW Area 12 Wildlife Manager), Mike Smith (CDOW Area 12 Habitat Biologist), and Richard McEldowney (Post, Buckley, Schuh and

Jernigan, Inc. Ecologist) regarding habitat and wildlife issues along U.S. 50 in southeastern Colorado. 24 Oct. 2006. Print.

Colorado Division of Wildlife (CDOW). Colorado State Wildlife Areas (SWA). Web. Jan. 2007. <http://wildlife.state.co.us/Apps.swa/view.asp>. [CDOW 2007a]

Colorado Division of Wildlife (CDOW). Colorado State Wildlife Areas (SWA). Web. Jul. 2009. <http://wildlife.state.co.us/LandWater/StateWildlifeAreas/>.

Colorado Division of Wildlife (CDOW). Fisheries data for streams along U.S. 50 from 1979 to 2005 extracted from the fisheries database by Jim Ramsay (CDOW Area 12 Aquatic Biologist). Data extracted Jan. 2007. [CDOW 2005]

Colorado Division of Wildlife (CDOW). Species Information. Web. Jan. 2007. <http://wildlife.state.co.us/species>. [CDOW 2007b]

Colorado Noxious Weed Act. CRS 35-5.5-101 thru 119. Aug 6, 2003.

Colorado Water Conservation Board (CWCB). "Tamarisk Inventory for the Colorado, Arkansas, and Purgatoire Rivers." *2006 Tamarisk Coalition Annual Conference.* Presented by the Tamarisk Coalition, 25 Jan. 2006.

Cross, F.B., R.E. Moss, and J.T. Collins. *Assessment of Dewatering Impacts on Stream Fisheries in the Arkansas and Cimarron Rivers.* Lawrence, KS: University of Kansas, Natural History Museum, 1985. Print.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. 1978.

DeLoach, C.J., and R.I. Carruthers. "Salt Cedar; Tamarix Ramosissima, T. Chinensis, T. Parviflora, T. Canariensis, T. Gallica, and hybrids." *Biological Control of Invasive Species of the United States*. Corvallis, OR: Western Society of Weed Science, University of Oregon Press, 2004. Print.

Dittberner, P.L., and M. Olson. U.S. Department of the Interior (USDOI), U.S. Fish and Wildlife Service (USFWS). The Plant Information Network (PIN) Database: Colorado, Montana, North Dakota, Utah, and Wyoming (FWS/OBS-83/86). Washington, D.C.: USDOI, USFWS; 1983. Print.

Dudley, T.L., J.C. DeLoach, J.E. Lovich, and R.I. Carruthers. "Saltcedar Invasion of Western Riparian Areas: Impacts and New Prospects For Control." *65th North American Wildlife And Natural Resource Conference in Rosemont, IL, 24-28 Mar. 2002.* Washington, D.C: Wildlife Management Institute, 2002. Print.

U.S. Forest Service. *Ecosystem Provinces: Great Plains Steppe Province and Great Plains-Palouse Dry Steppe Province.* Web. Jan. 2007. <http://www.fs.fed.us/colorimagemap/images/332 and 331>.

Endicott, C. Consultation regarding aquatic resources. 19 Jan. 2007.

Executive Order 13112. Invasive Species. 3 Feb 1999.

Executive Order 13186. Responsibilities of Federal Agencies to Protect Migratory Birds. 10 Jan. 2001.

Farley, G.H., L.M. Ellis, J.N. Stuart, J.N., and N.J. Scott. "Avian Species Richness in Different-Age Stands of Riparian Forests Along the Middle Rio Grande, New Mexico." *Conservation Biology* 8.4 (1994): 1098-1108. Print.

Fleharty, E.D. “Some Aspects of Small Mammal Ecology in a Kansas Remnant Prairie.” *Second Midwest Prairie Conference, 18-20 Sep. 1972.* Madison, WI: University of Wisconsin Arboretum, 1972. Print.

Forcella, F. “Invasive Weeds in the Northern Rocky Mountains.” *Western Wildlands* 18.2 (1992): 2-5. Print.

Forcella, F. “Spread of Kochia in the Northwestern United States.” *Weeds Today*. 16.1 (1985): 406. Print.

Hammerson, G.A. *Amphibians and Reptiles in Colorado*, 2nd ed. Boulder, CO: University Press of Colorado and Colorado Division of Wildlife (CDOW), 1999. Print.

Harris, G.A. “Cheatgrass: Invasion Potential and Managerial Implications.” *1990 Pacific Northwest Range Management Short Course.* Washington State University, Department of Natural Resource Sciences, Cooperative Extension. 1990. Print.

Iverson, L.R., and W.K. Mohan. “Ecology of Kochia Scoparia on Surface Mined Lands.” *North Dakota Academy of Science Proceedings*. 35 (1981): 7. Print.

Jackson, T. and R. McEldowney. Personal communication with Colorado Division of Wildlife (CDOW) herptile coordinator and Post, Buckley, Schuh and Jernigan, Inc., ecologist. 6 Mar. 2008.

Kern, E., and J.P. Dobrowolski, J.P. “Vegetation Dynamics and Environmental Attributes of a Great Basin Valley Exhibiting Widespread Shrub Dieback.” *Proceedings—1990 Symposium on Cheatgrass Invasion, Shrub Die-Off and Other Aspects Of Shrub Biology and Management.* U.S. Department of Agriculture (USDA), U.S. Forest Service (USFS), Intermountain Research Station.1990. Print.

Larson, G.E. *Aquatic and Wetland Vascular Plants of the Northern Great Plains*. Fort Collins, CO: USDA, USFS, 1993. Print.

Lindauer, I.E. A Comparison of the Plant Communities of the South Platte and Arkansas River Drainages in Eastern Colorado. *The Southwestern Naturalist* 28.3 (1983): 249-259. Print.

Lovich, J.E., and R.C. DeGouvenain. “Saltcedar Invasion in Desert Wetlands of the Southwestern United States: Ecological and Political Implications.” *Ecology of Wetlands and Associated Systems.* The Pennsylvania Academy of Science, 1998. Print.

McLean, S. Colorado Division of Wildlife (CDOW). Consultation regarding riparian mapping data. 28 Apr. 2006.

Mouinsif, M., C. Wan, and R. Sosebee. “Effects of Top-Soil Drying on Saltcedar Photosynthesis and Stomatal Conductance.” *Journal of Range Management*. 55.1 (2002): 88-93. Print.

National Environmental Policy Act (NEPA) Regulations. 23 CFR 771. 1987.

Natural Diversity Information Source (NDIS). *Species and Habitat Information.* 2007. Web. Jan. 2007. <http://ndis.nrel.colostate.edu/wildlife.asp>.

Natural Resources Conservation Service (NRCS). *Climate Data for WETS Stations: Holly, CO4076; Lamar, CO4770; Las Animas, CO4834; Pueblo WSO AP, CO6740; and Rocky Ford 2 SE, CO7167.* 2002. Web. Apr. 2006. <http://www.wcc.nrcs.usda.gov/climate/clim-reports.html>.

U.S. Department of Agriculture (USDA). Natural Resources Conservation Service (NRCS). *Land Resources Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. Handbook 296.* 2006. Web. Jan. 2007. <http://soils.usda/gov/survey/geography/mlra/index.html>.

Nature Serve Explorer (NSE). *Ecological System Comprehensive Report—Western Great Plains Shortgrass Prairie.* Web. Jan. 2007. <http://www.natureserve.org/explorer/>.

Nesler, T.P., C. Bennett, J. Melby, J., G. Dowler, G., and M. Jones. “Inventory and Status of Arkansas River Native Fishes in Colorado.” *Aquatic Wildlife Section, Colorado Division of Wildlife (CDOW). Final Report.* 1999. Print.

Norton, J. “Chemical Depot Plans to Eradicate Tamarisks.” *Pueblo Chieftain*. 12 Apr. 2006.

Nutty Birdwatcher. *North American Flyways.* Web. Feb. 2008. <http://www.birdnature.com/flyways.html>.

Ramsay, J. Consultation regarding aquatic species in the project area. 9, 11, and 22 Jan. 2007.

Rich, T.D., *et al. Partners in Flight: North American Landbird Conservation Plan.* Ithaca, NY: Cornell Lab of Ornithology, 2004. Print.

Schulz, D. Consultation regarding noxious weeds in Otero County. 19 Jan. 2007.

Smith, S.D., *et al.* Water Relations of Riparian Plants from Warm Desert Regions. *Wetlands*. 18.4 (1998): 687-696. Print.

Snyder, W.D., and G.C. Miller. “Changes in Plains Cottonwood along the Arkansas and South Platte Rivers—Eastern Colorado.” *Prairie Naturalist* 23.2 (1991): 165-176. Print.

Southwest Regional Gap Analysis Project (SWReGAP). *Land Cover Datasets*. 2006. Web. Jan. 2007. <http://fws-nmcfwru.nmsu.edu/swregap/>.

Sparks, R.A., D.J. Hanni, and M. McLachlan. “Section-Based Monitoring of Breeding Birds Within the Shortgrass Prairie Bird Conservation Region (BCR 18).” *Rocky Mountain Bird Observatory (RMBO)*. Brighton, CO: RMBO, 2005. Print.

Steppuhn, H., and K. Wall. “Kochia Scoparia Emergence from Saline Soil Under Various Water Regimes.” *Journal of Range Management.* 46.6 (1993): 533-538. Print.

Taylor, C.M., and R.J. Miller. “Reproductive Ecology and Population Structure of the Plains Minnow, Hybognathus Placitus (Pisces: Cyprinidae), in Central Oklahoma.” *American Midland Naturalist* 123.1 (1990): 32-39. Print.

Tomelleri, J.R. “Front Range Native Minnows: Lake Chub, Northern Redbelly Dace, Southern Redbelly Dace and Common Shiner.” *Wildlife in Danger.* Web. Jan. 2007. <http://www. wildlife.state.co.us/ NR/rdonlyres/DFBF3DEB-600A-4AF8-BCB6-65CO20449117/0/frontrange.pdf>.

U.S. Army Corps of Engineers (USACE). *Arkansas River from John Martin Reservoir to the Colorado-Kansas State Line: Channel Capacity and Riparian Habitat Planning Study.* Prepared for the Colorado Conservation Board, Denver, CO. Planning Assistance to States Program. Albuquerque District, New Mexico. Jul. 1999. Print.

U.S. Congress. Bald and Golden Eagle Protection Act. 16 USC 668-668d. 1940.

U.S. Congress. Endangered Species Act. 16 USC 1531-1543. 1973.

U.S. Congress. Fish and Wildlife Coordination Act. 16 USC 661-666c. Mar 10, 1934, as amended.

U.S. Congress. Migratory Bird Treaty Act. 16 USC 703-711. 1918.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Congress. Surface Transportation and Uniform Relocation Assistance Act of 1987, Section 130 (wildflowers). 1987.

U.S. Department of Transportation. Federal Highway Administration (FHWA). *Technical Advisory T6640.8A. Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* 30 Oct. 1987.

U.S. Fish and Wildlife Service (USFWS). Letter from Susan Linner (USFWS Colorado Field Office Supervisor) to Michael Perez (Colorado Department of Transportation (CDOT) Region 2 Project Manager). List of threatened and endangered (T & E) species potentially occurring in the U.S. 50 project area (ES/CO: T&E/Species List TAILS: 65412-2007-SL-0075). 22 Nov. 2006.

U.S. Fish and Wildlife Service (USFWS). Information for Planning and Conservation System, Official Species List. Web. September 24, 2015. <http://ecos.fws.gov/ipac>.

Waller, J.S., and C. Servheen. "Documenting Grizzly Bear Highway Crossing Patterns Using GPS Technology." *The Third International Conference on Wildlife Ecology and Transportation.* G. Evink, P. Garret, and D. Zeigler, editors. Missoula, MT. 1999. Print.

Weber, W.A., and R.C. Wittmann. *Colorado Flora Eastern Slope*. Boulder, CO: University Press of Colorado, 1996. Print.

Western Regional Climate Center (WRCC). *Climate of Colorado Narrative and State Temperature and Precipitation Data.* 2006. Web. Jan. 2007. <http://www/wrcc/dri.edu>.

Whitson, T.D., *et al.* (eds). *Weeds of the West*. 5th ed. Western Society of Weed Science in cooperation with the Western United States Land Grant Universities and Cooperative Extension Services. 1996. Print.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Biological Resources

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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	• 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	Review and update Tier 1 data search and collect additional data required to complete the appropriate Tier 2 analysis.

Methodology Overview	Biological Resources	
	Tier 1	**Tier 2**
Collection and/or Analysis Methodology	• 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.	• 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 U.S. 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.	• 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: • 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	• 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	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.	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.
Regulatory Guidance/ Requirements	• 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	

This page left intentionally blank.

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
U.S. 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

This page left intentionally blank.

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

CDOT

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

NOV 2 2 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(e)); 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 (*Typanuchus 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

This page left intentionally blank.

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

D.1. Introduction

Vegetation mapping data were field-checked for accuracy along the U.S. 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 U.S. 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**

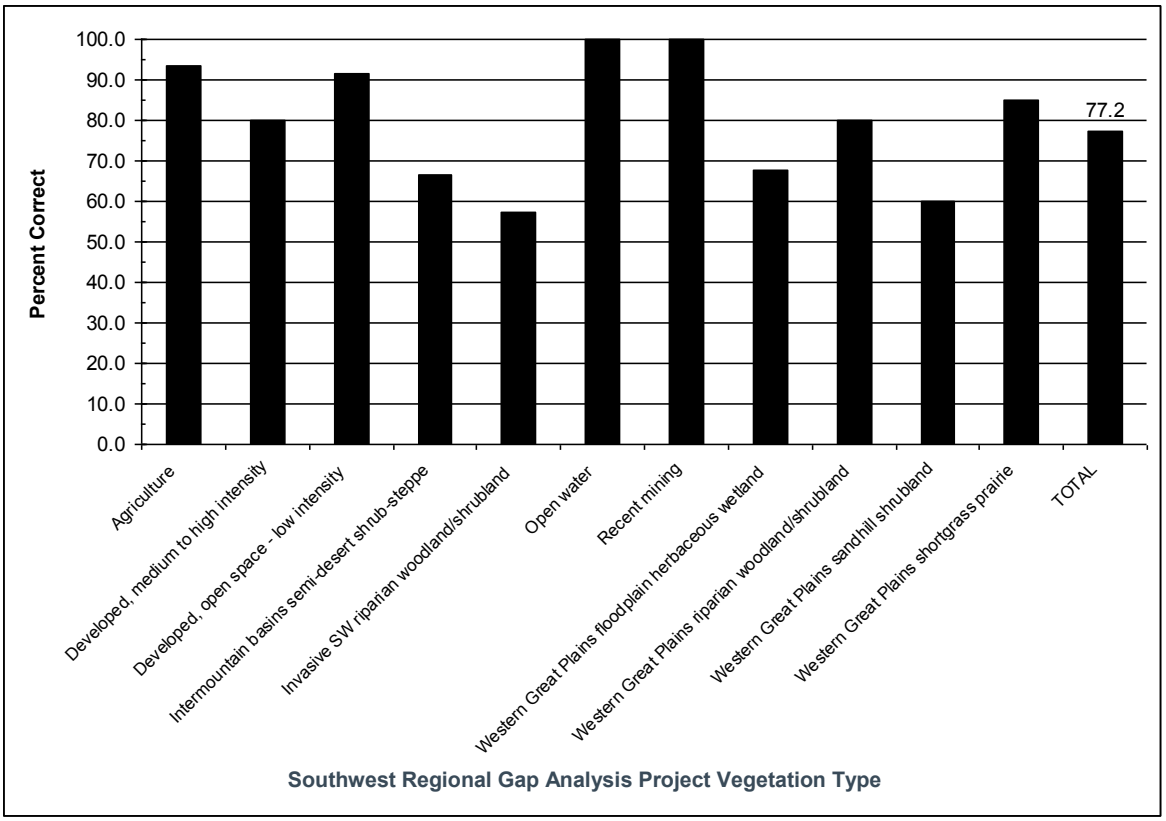


Figure D-1. Summary of Accuracy Assessment for Southwest Regional Gap Analysis Project Data Along the U.S. 50 Corridor from Pueblo to the Kansas State Line

Table D-2. Accuracy Assessment of Colorado Division of Wildlife Data Along the U.S. 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**

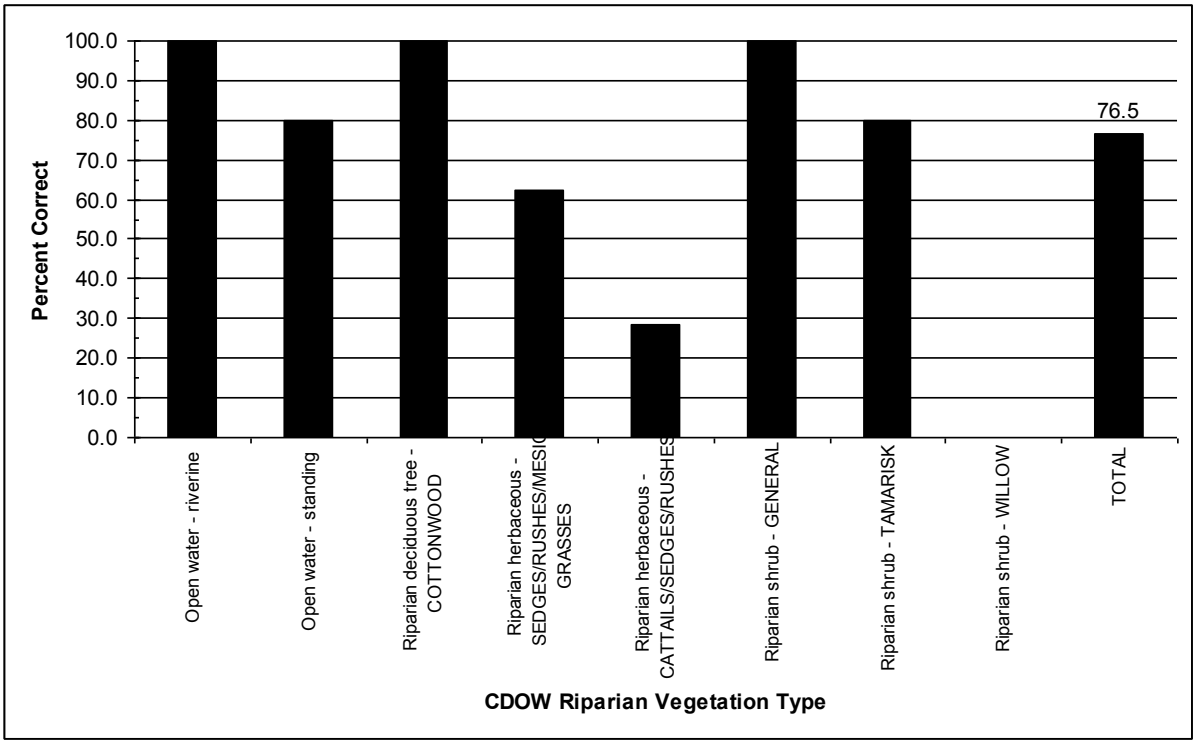


Figure D-2. Summary of Accuracy Assessment for Colorado Division of Wildlife Data Along the U.S. 50 Corridor from Pueblo to the Kansas State Line

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:

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

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:

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

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:

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

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:

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

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	Rana catesbeiana					X	X				
Couch's spadefoot toad	Scaphiopus couchii		X								
Great Plains toad	Bufo cognatus	X		X							
New Mexico spadefoot toad	Spea multiplicata		X	X							
Plains leopard frog	Rana blairi					X	X				
Plains spadefoot toad	Spea bombifrons	X	X	X		X					X
Red-spotted toad	Bufo punctatus				X	X					
Tiger salamander	Ambystoma tigrinum					X					
Western chorus frog	Pseudacris triseriata					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	Bufo woodhousii	X	X	X							X
BIRDS											
American Avocet	Recurvirostra americana					X	X				
American Bittern	Botaurus lentiginosus					X	X				
American Coot	Fulica americana					X	X				
American Crow	Corvus brachyrhynchos	X		X		X			X	X	
American Dipper	Cinclus mexicanus					X				X	
American Goldfinch	Carduelis tristis	X				X			X		
American Kestrel	Falco sparverius	X	X			X			X		
American Pipit	Anthus rubescens					X	X				
American Redstart	Setophaga ruticilla					X			X		
American Robin	Turdus migratorius				X	X			X	X	
American Tree Sparrow	Spizella arborea			X							
American White Pelican	Pelecanus erythrorhynchos						X				
American Wigeon	Anas americana	X				X	X		X		
Baird's Sandpiper	Calidris bairdii						X				
Bald Eagle	Haliaeetus leucocephalus		X			X	X				
Bank Swallow	Riparia riparia	X				X					
Barn Swallow	Hirundo rustica	X				X		X		X	
Bewick's Wren	Thryomanes bewickii			X	X	X					
Black Rail	Laterallus jamaicensis					X					
Black Tern	Chlidonias niger					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	Pluvialis squatarola					X	X				
Black-billed Magpie	Pica pica	X			X	X			X	X	
Black-capped Chickadee	Poecile atricapillus					X			X	X	
Black-crowned Night-Heron	Nycticorax nycticorax					X	X				
Black-headed Grosbeak	Pheucticus melanocephalus				X	X					
Black-necked Stilt	Himantopus mexicanus						X				
Black-throated Sparrow	Amphispiza bilineata			X	X						
Blue Grosbeak	Guiraca caerulea	X		X		X					
Blue Jay	Cyanocitta cristata					X			X		
Blue-gray Gnatcatcher	Polioptila caerulea				X	X					
Blue-winged Teal	Anas discors	X				X	X				
Bobolink	Dolichonyx oryzivorus	X	X								
Bonaparte's Gull	Larus philadelphia						X				
Brewer's Blackbird	Euphagus cyanocephalus	X	X			X			X		
Brewer's Sparrow	Spizella breweri			X							
Broad-tailed Hummingbird	Selasphorus platycercus					X					
Brown Thrasher	Toxostoma rufum					X				X	
Brown-headed Cowbird	Molothrus ater	X	X	X		X					
Bufflehead	Bucephala albeola					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	Icterus bullockii					X			X		
Burrowing Owl	Athene cunicularia		X								
California Gull	Larus californicus	X					X				
Canada Goose	Branta canadensis	X				X	X		X	X	X
Canyon Towhee	Pipilo fuscus			X	X						
Canyon Wren	Catherpes mexicanus							X			
Cassin's Kingbird	Tyrannus vociferans				X						
Cassin's Sparrow	Aimophila cassinii		X	X							
Cedar Waxwing	Bombycilla cedrorum	X			X	X			X		
Chestnut-collared Longspur	Calcarius ornatus	X	X								
Chihuahuan Raven	Corvus cryptoleucus		X	X							
Chimney Swift	Chaetura pelagica								X	X	
Chipping Sparrow	Spizella passerina			X	X	X					
Cinnamon Teal	Anas cyanoptera	X				X	X				
Clark's Grebe	Aechmophorus clarkii					X	X				
Clay-colored Sparrow	Spizella pallida			X		X			X		X
Cliff Swallow	Petrochelidon pyrrhonota	X					X	X		X	
Common Goldeneye	Bucephala clangula					X	X				
Common Grackle	Quiscalus quiscula	X				X			X		
Common Loon	Gavia immer						X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Common Merganser	Mergus merganser					X	X				
Common Nighthawk	Chordeiles minor	X	X	X	X	X			X		
Common Raven	Corvus corax							X			
Common Snipe	Gallinago gallinago					X					
Common Yellowthroat	Geothlypis trichas					X					
Cooper's Hawk	Accipiter cooperii				X	X					
Curve-billed Thrasher	Toxostoma curvirostre				X	X					
Dark-eyed Junco	Junco hyemalis				X	X			X		
Dickcissel	Spiza americana	X	X			X					
Double-crested Cormorant	Phalacrocorax auritus						X				
Downy Woodpecker	Picoides pubescens					X			X	X	
Eared Grebe	Podiceps nigricollis					X	X				
Eastern Kingbird	Tyrannus tyrannus	X				X					
Eastern Screech-Owl	Otus asio					X				X	
European Starling	Sturnus vulgaris	X				X			X	X	
Evening Grosbeak	Coccothraustes vespertinus								X		
Ferruginous Hawk	Buteo regalis		X	X				X			
Field Sparrow	Spizella pusilla	X				X					
Forster's Tern	Sterna forsteri						X				
Franklin's Gull	Larus pipixcan	X					X				
Gadwall	Anas strepera	X	X			X	X				
Golden Eagle	Aquila chrysaetos		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	Regulus satrapa				X	X				X	
Grasshopper Sparrow	Ammodramus savannarum		X	X							
Gray-crowned Rosy Finch	Leucosticte tephrocotis			X					X	X	
Great Blue Heron	Ardea herodias					X	X				
Great Horned Owl	Bubo virginianus	X				X			X		
Greater Sandhill Crane	Grus canadensis tabida	X				X	X				
Great-tailed Grackle	Quiscalus mexicanus					X					
Green-tailed Towhee	Pipilo chlorurus			X	X	X					
Green-winged Teal	Anas crecca					X	X				
Harris' Sparrow	Zonotrichia querula	X		X					X		
Hermit Thrush	Catharus guttatus				X	X					
Herring Gull	Larus argentatus						X				
Horned Grebe	Podiceps auritus						X				
Horned Lark	Eremophila alpestris	X	X	X							
House Finch	Carpodacus mexicanus				X				X		
House Sparrow	Passer domesticus	X							X	X	
House Wren	Troglodytes aedon					X					
Killdeer	Charadrius vociferus	X				X	X			X	
Lapland Longspur	Calcarius lapponicus	X	X								
Lark Bunting	Calamospiza melanocorys		X	X							

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

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

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

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

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

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
American beaver	Castor canadensis					X	X				
American elk	Cervus elaphus			X							
Big brown bat	Eptesicus fuscus								X	X	
Black-tailed jackrabbit	Lepus californicus		X								
Black-tailed prairie dog	Cynomys ludovicianus		X								
Bobcat	Lynx rufus				X			X			
Botta's pocket gopher	Thomomys bottae	X	X	X	X						
Brush mouse	Peromyscus boylii				X	X					
Common muskrat	Ondatra zibethicus					X	X				
Common porcupine	Erethizon dorsatum				X						
Coyote	Canis latrans	X	X	X				X			
Deer mouse	Peromyscus maniculatus	X	X	X							X
Desert cottontail	Sylvilagus audubonii	X	X	X							
Desert shrew	Notiosorex crawfordi			X							
Eastern cottontail	Sylvilagus floridanus		X	X							
Eastern woodrat	Neotoma floridana			X		X					
Fox squirrel	Sciurus niger					X			X		
Hispid cotton rat	Sigmodon hispidus	X	X								
Hispid pocket mouse	Chaetodipus hispidus		X								
Hoary bat	Lasiurus cinereus				X	X					
House mouse	Mus musculus	X							X	X	
Least chipmunk	Tamias minimus				X			X			
Little brown myotis	Myotis lucifugus				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	Neotoma mexicana				X			X			
Mountain cottontail	Sylvilagus nuttallii		X	X	X	X					
Mountain lion	Felis concolor							X			
Mule deer	Odocoileus hemionus		X	X	X	X					
Northern grasshopper mouse	Onychomys leucogaster		X	X							X
Ord's kangaroo rat	Dipodomys ordii		X	X	X						
Pallid bat	Antrozous pallidus			X	X			X			
Pinyon mouse	Peromyscus truei				X			X			
Plains harvest mouse	Reithrodontomys montanus		X								
Plains pocket gopher	Geomys bursarius	X	X			X					
Plains pocket mouse	Perognathus flavescens		X	X							X
Prairie vole	Microtus ochrogaster		X	X							X
Pronghorn	Antilocapra americana		X	X							
Raccoon	Procyon lotor	X				X	X		X	X	
Red fox	Vulpes vulpes	X		X		X	X				
Rock squirrel	Spermophilus variegatus							X			
Silky pocket mouse	Perognathus flavus		X		X						
Silver-haired bat	Lasionycteris noctivagans							X		X	X
Southern Plains Woodrat	Neotoma micropus		X					X			
Striped skunk	Mephitis mephitis	X			X			X	X	X	
Swift fox	Vulpes velox		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	Spermophilus tridecemlineatus	X	X	X							
Virginia opossum	Didelphis virginiana		X			X					
Western harvest mouse	Reithrodontomys megalotis		X	X		X					X
Western pipistrelle	Pipistrellus hesperus			X				X			
Western small-footed myotis	Myotis ciliolabrum							X		X	X
Western spotted skunk	Spilogale gracilis			X	X						
White-footed mouse	Peromyscus leucopus				X	X		X			
White-tailed deer	Odocoileus virginianus	X	X	X		X		X		X	
White-throated woodrat	Neotoma albigula				X						
Yellow-faced pocket gopher	Cratogeomys castanops	X	X	X							
Yuma myotis	Myotis yumanensis				X	X					
REPTILES											
Coachwhip	Masticophis flagellum		X		X	X		X			X
Collared lizard	Crotaphytus collaris			X	X			X			
Fence lizard	Sceloporus undulatus			X	X			X			
Glossy snake	Arizona elegans		X								X
Gopher snake	Pituophis catenifer			X							
Great Plains skink	Eumeces obsoletus					X		X			
Ground snake	Sonora semiannulata		X					X			

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Lesser earless lizard	Holbrookia maculata		X	X							X
Lined snake	Tropidoclonion lineatum		X			X			X		
Massasauga snake	Sistrurus catenatus		X	X							
Milk snake	Lampropeltis triangulum		X	X	X						
Northern water snake	Nerodia sipedon					X	X				
Ornate box turtle	Terrapene ornata		X	X							X
Painted turtle	Chrysemys picta					X					
Plains black-headed snake	Tantilla nigriceps		X	X				X			
Plains garter snake	Thamnophis radix		X			X				X	
Racer	Coluber constrictor		X	X		X					
Rat snake	Elaphe guttata		X	X		X					
Six-lined racerunner	Cnemidophorus sexlineatus			X							
Snapping turtle	Chelydra serpentina					X					
Spiny softshell	Apalone spinifera					X	X				
Texas horned lizard	Phrynosoma cornutum		X								X
Triploid checkered whiptail	Cnemidophorus neotesselatus		X	X							
Western hognose snake	Heterodon nasicus		X	X		X					
Western rattlesnake	Crotalus viridis		X	X	X						X
Western terrestrial garter snake	Thamnophis elegans					X					

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
FISH											
Arkansas darter	Etheostoma cragini						X				
Black bullhead	Ameiurus melas						X				
Black crappie	Pomoxis nigromaculatus						X				
Bluegill	Lepomis macrochirus						X				
Channel catfish	Ictalurus punctatus						X				
Common carp	Cyrinus carpio						X				
Fathead minnow	Pimephales promelas						X				
Flathead chub	Platygobio gracilis						X				
Green sunfish	Lepomis cyanellus						X				
Largemouth bass	Micropterus salmoides						X				
Longnose dace	Rhinichthys osculus						X				
Longnose sucker	Catostomus catostomus						X				
Plains killfish	Fundulus zebrinus						X				
Pumpkinseed	Lepomis gibbosus						X				
Red shiner	Cyrinella lutrensis						X				
Sand shiner	Notropis stramineus						X				
Smallmouth bass	Micropterus dolomieu						X				
Stoneroller	Campostoma anomalum						X				
Suckermouth minnow	Phenacobius mirabilis						X				
Walleye	Stizostedion vitreum						X				
White sucker	Catostomus commersoni						X				
Yellow perch	Perca flavescens						X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
PLANTS											
Herbaceous Species											
Alkali Sacaton	Sporobolus airoides		X	X							
Big Bluestem	Andropogon gerardii		X								
Blue grama	Bouteloua gracilis		X	X				X			
Buffalograss	Buchloe dactyloides		X								
Bulbous bluegrass	Poa bulbosa										X
Cheatgrass	Bromus tectorum										X
Common Mediterranean grass	Sporobolus cryptandrus										X
Crested wheatgrass	Agropyron cristatum										X
Galleta	Pleuraphis jamesii		X	X							
Green needlegrass	Nessella viridula		X								
Hairy grama	Bouteloua hirsute		X	X							
Halegeton	Halegeton glomeratum										X
Indian ricegrass	Achnatherum hymenoides		X								
Intermediate wheatgrass	Thinopyron intermedium										X
Kentucky bluegrass	Poa pratensis										X
Kochia	Kochia scoparia										X
Lehmann lovegrass	Eragrostis lehmannianna										X
Little bluestem	Schizachyrium scoparium		X	X							
Mountain muhly	Muhlenbergia montana		X								
Needle and thread	Hesperostipa comata		X	X							

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Prairie Junegrass	Koeleria cristata		X								
Prairie sandreed	Calamovifla gigantean		X	X				X			
Russian thistle	Salsola spp.										X
Sand bluestem	Andropogon hallii		X	X							
Sand dropseed	Sporobolus cryptandrus		X	X							
Sandberg bluegrass	Poa secunda		X	X							
Scentless chamomile	Matricaria perforate										
Side oats grama	Bouteloua curtipendula		X	X				X			
Smooth brome	Bromus inermis										X
Soft chess	Sporobolus airoides										X
Thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus		X	X							
Three-awn	Aristida purpurea		X								
Western wheatgrass	Agropyron smithii		X	X							
Wild oats	Avena fatus	X									X
Noxious Weeds											
Bull thistle	Cirsium vulgare	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Canada thistle	Cirsium arvense	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Common teasel	Dipsacus fullonum	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Dalmatian toadflax	Linaria dalmatica	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
	Linaria genistifolia										
Diffuse knapweed	Centaurea diffusa	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Downy brome	Bromus tectorum	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
Field bindweed	Convolvulus arvensis	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Hoary cress	Cardaria draba	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Houndstongue	Cynoglossum officinale	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Johnsongrass	Sorghum halepense	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Jointed goatgrass	Aegilops cylindrica	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Musk thistle	Carduus nutans	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Myrtle spurge	Euphorbia myrsinites	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Oyeye daisy	Chrysanthemum leucanthemum	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Perennial pepperweed	Lepidium latifolium	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Poison hemlock	Conium maculatum	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Puncturevine	Tribulus terrestris	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Purple loosestrife	Lythrum salicaria	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Russian knapweed	Centaurea repens	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Russian olive	Eleagnus angustifolia	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Salt cedar	Tamarix sp.	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Scotch thistle	Onopordum acanthium	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
	Onopordum tauricum										
Spotted knapweed	Centaurea maculosa	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Yellow starthistle	Centaurea solstitialis	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
Shrubs											
Big sagebrush	Artemisia tridentata			X				X			
Broom snakeweed	Gutierrezia sarothrae			X							
Chickasaw plum	Prunus angustifolia			X							
Four-winged saltbush	Atriplex canescens			X							
Fringed sagebrush	Artemisia frigida			X							
Green rabbitbrush	Chrysothanmus viscidiflorus			X							
Horsebrush	Tetradymia spp.			X							
Mesquite	Prosopis glandulosa			X							
Nevada ephedra	Ephedra nevadensis			X							
Pale wolfberry	Lycium pallida			X							
Sand sagebrush	Artemisia filifolia			X							
Saltbush	Atriplex sp.			X							
Shadescale	Atriplex confertifolia			X							
Skunkbrush sumac	Rhus trilobata			X				X			
Soapweed yucca	Yucca glauca		X	X							
Spiny hopsage	Atriplex spinosa			X							
Wild buckwheat	Eriogonum spp.			X							
Winterfat	Krascheninnikovia lanata			X							
Wyoming big sagebrush	Artemisia tridentata spp. wyomingensis			X				X			

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Trees											
Rocky Mountain juniper	Juniperus scopulorum				X						
Pinyon pine	Pinus edulis				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).

This page left intentionally blank.

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	*Scaphiopus cauchii*	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	*Rana pipiens*	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	Low	
Plains leopard frog	*Rana blairi*	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	*Falco peregrines*	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	*Haliaeetus leucocephalus*	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 U.S. 50
Burrowing Owl	*Athene cunicularia*	ST	G4S4B	Grasslands, prairie dog colonies	Rodents, small birds, eggs, nestlings, reptiles and insects	High	Occurs in prairie mid-March to September
Ferruginous Hawk	*Buteo regalis*	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	*Grus canadensis tabida*	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	*Sterna antillarum athalassos*	FE, SE	G4S1B	Wetland/riparian areas, open water—Breed and nest along reservoirs on bare sandy shoreline, migrants reservoirs, lakes, rivers	Small fish	High	Nest at John Martin Reservoir; should not be an issue for the project area
Lesser Prairie Chicken	*Typanuchus pullidicinctus*	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	*Numenius americus*	SC	G5S2B	Grasslands—Shortgrass prairie, grain fields: nests near water	Crustaceans, worms	High	Documented in Pueblo, Otero, Bent, and Prowers counties
Mexican Spotted Owl	*Strix occidentalis lucida*	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	*Charadrius montanus*	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	*Charadrius melodus*	FT, ST	G3S1B	Wetland/riparian areas, open water—Mudflats open shorelines or reservoirs and lakes	Marine worms, fly larvae, beetles, crustaceans, mollusks	Moderate	Occur in the area at John Martin Reservoir
Western Snowy Plover	*Charadrius alexandrinus*	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	*Etheostoma cragini*	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
Greeenback cutthroat trout	*Oncorhynchus clarki stomias*	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	*Hybopsis gracilis*	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	*Hybognathus placitius*	SE	Not tracked	Main channel areas of streams with some current and sandy bottoms	Aquatic plants	Low	Has not been documented in the project area
Southern redbelly dace	*Phoxinus erythrogaster*	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	*Phenacobius mirabilis*	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	*Mustela nigripes*	FE	G1S1	Grasslands—In association with prairie dog colonies	Prairie dogs	Low	No known population exists in the project area
Black-tailed prairie dog	*Cynomys ludovicianus*	SC	G4S3	Grasslands—Shortgrass prairie	Grass and forbs	High	Associated species—see Figure J-9 through Figure J-12, located in Appendix J

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
Botta's pocket gopher	*Thomomys bottae*	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	*Lynx canadensis*	FT	SE	High alpine, coniferous forests, with the presence of snowshoe hair (their primary prey).	Snowshoe Hair and other small mammals and birds.	Low	None
Swift fox	*Vulpes velox*	SC	G3S3	Grasslands—Shortgrass prairie	Mammals, birds, invertebrates, vegetation	High	Populations stable within southeast Colorado
Townsend's big-eared bat	*Plecotus townsendii*	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	*Lampropeltis getula*	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	*Sistrutrus catenatus*	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	*Phrynosoma modestum*	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	*Leptotyphlops dulcis*	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	*Phrynosoma cornutum*	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	*Cnemidophorus neotesselatus*	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	*Kinosternon flavescens*	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

[a]Listing 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
[b]CNHP status: G = Global Rank; S = State Rank; T = Intraspecific taxon; B = Breeding; GU or SU = not rankable; 5 = secure; 1 = critically imperiled
[c]Potential 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

This page left intentionally blank.

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

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.

This page left intentionally blank.

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 Imperilled by the Colorado Natural Heritage Program Potentially Occurring in the Project Area

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

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

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

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

This page left intentionally blank.

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

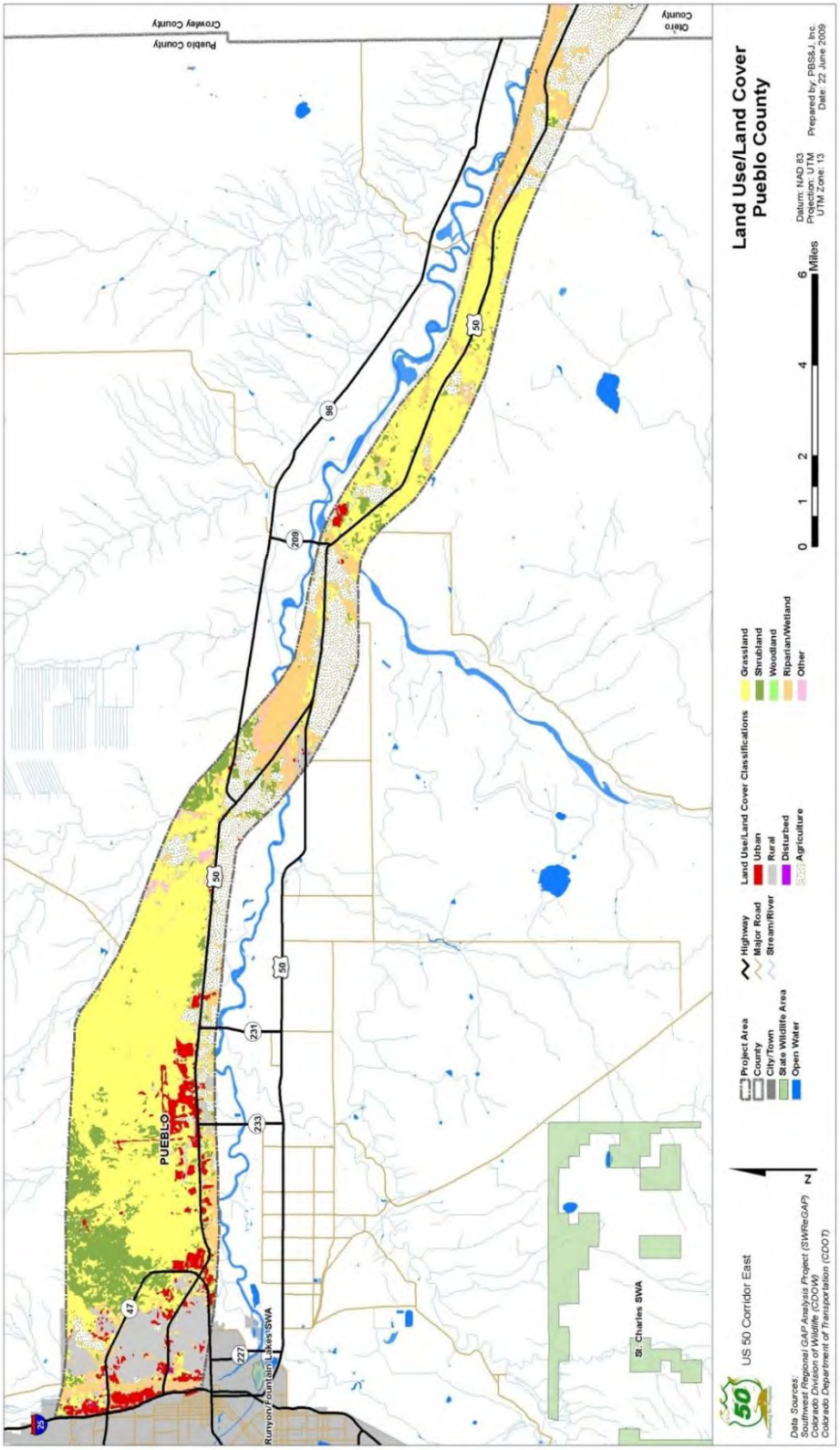


Figure J-2. Land Use/Land Cover—Otero County

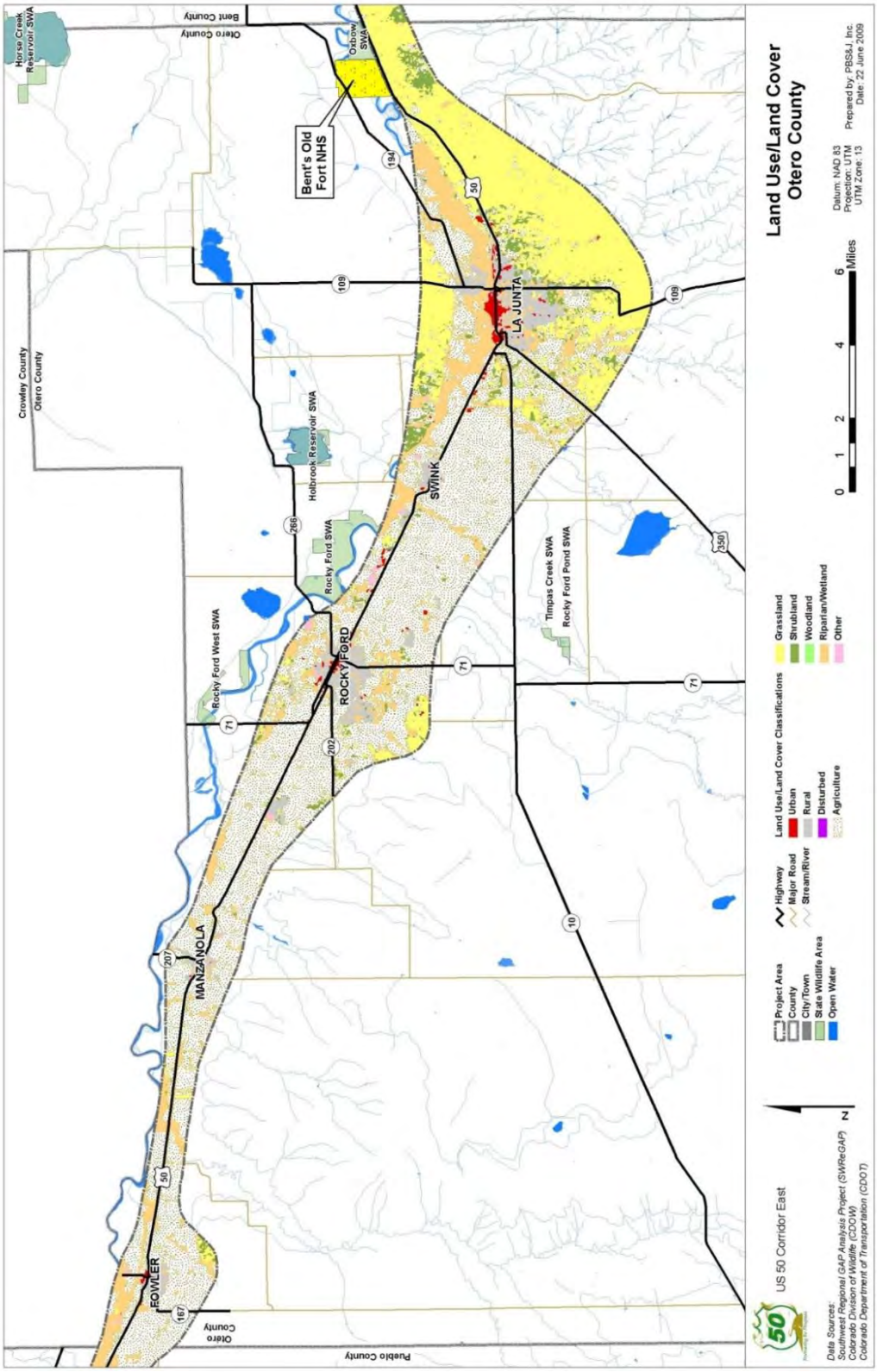


Figure J-3. Land Use/Land Cover—Bent County

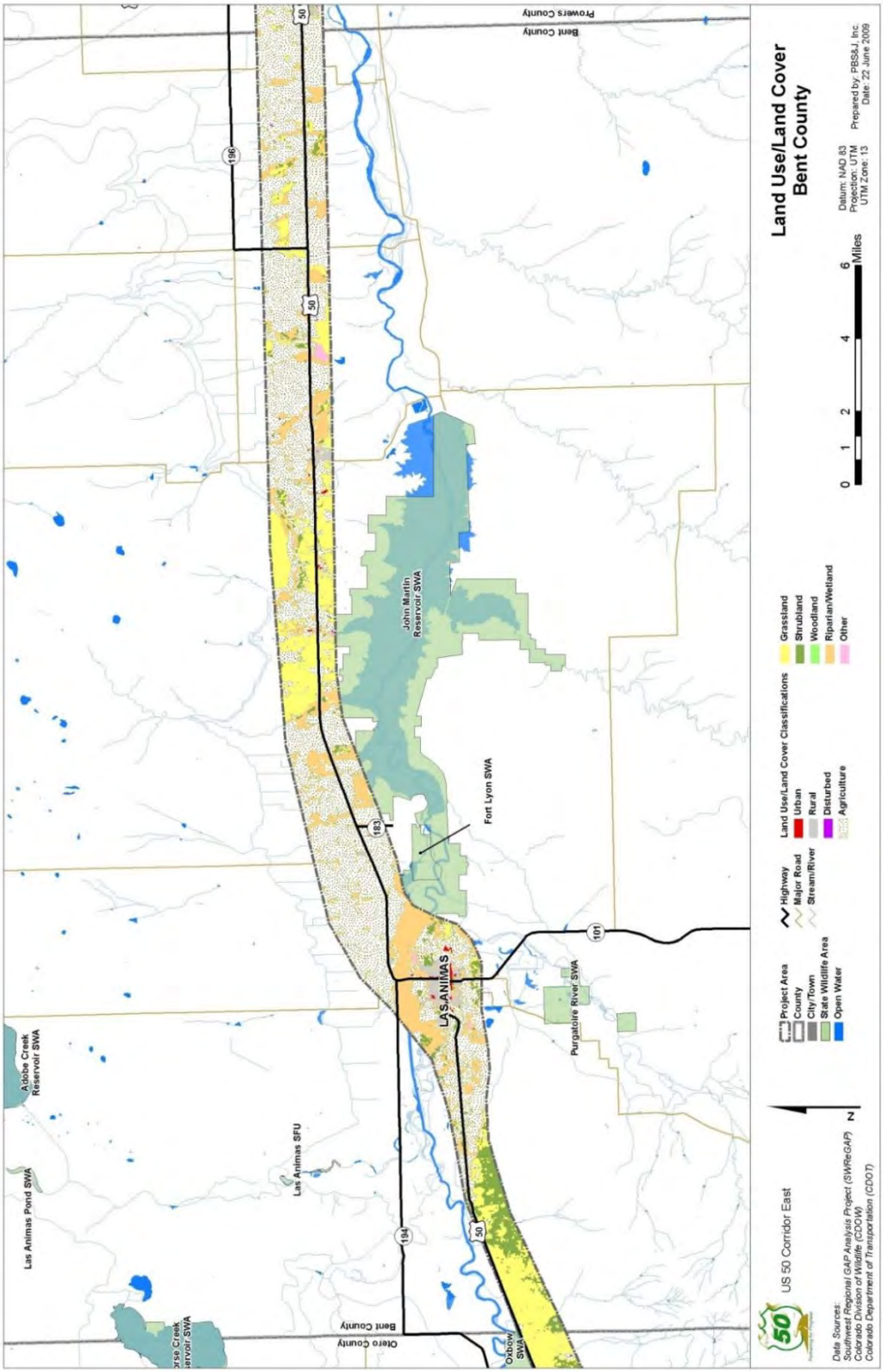


Figure J-4. Land Use/Land Cover—Prowers County

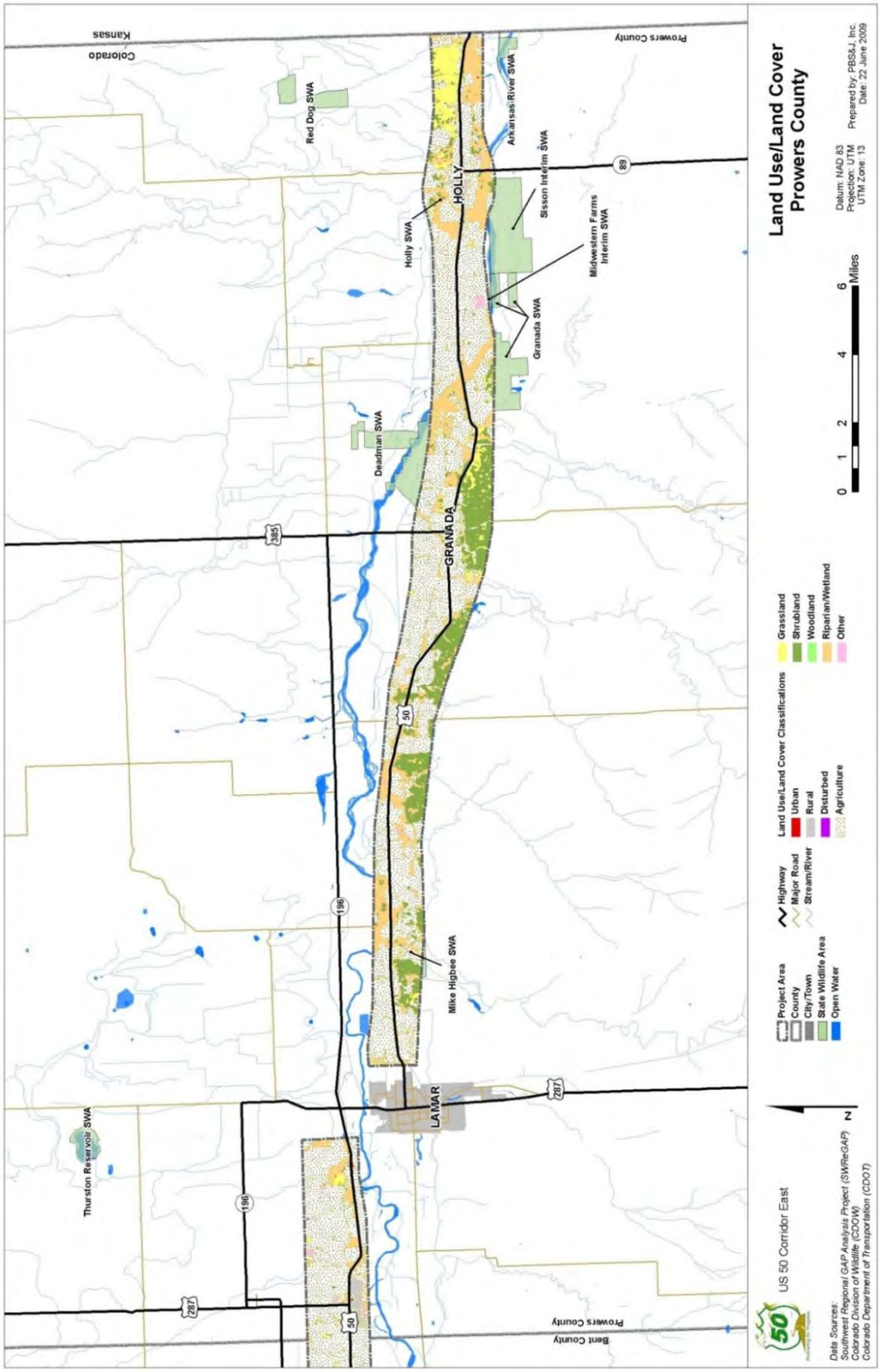


Figure J-5. Noxious Vegetation—Pueblo County

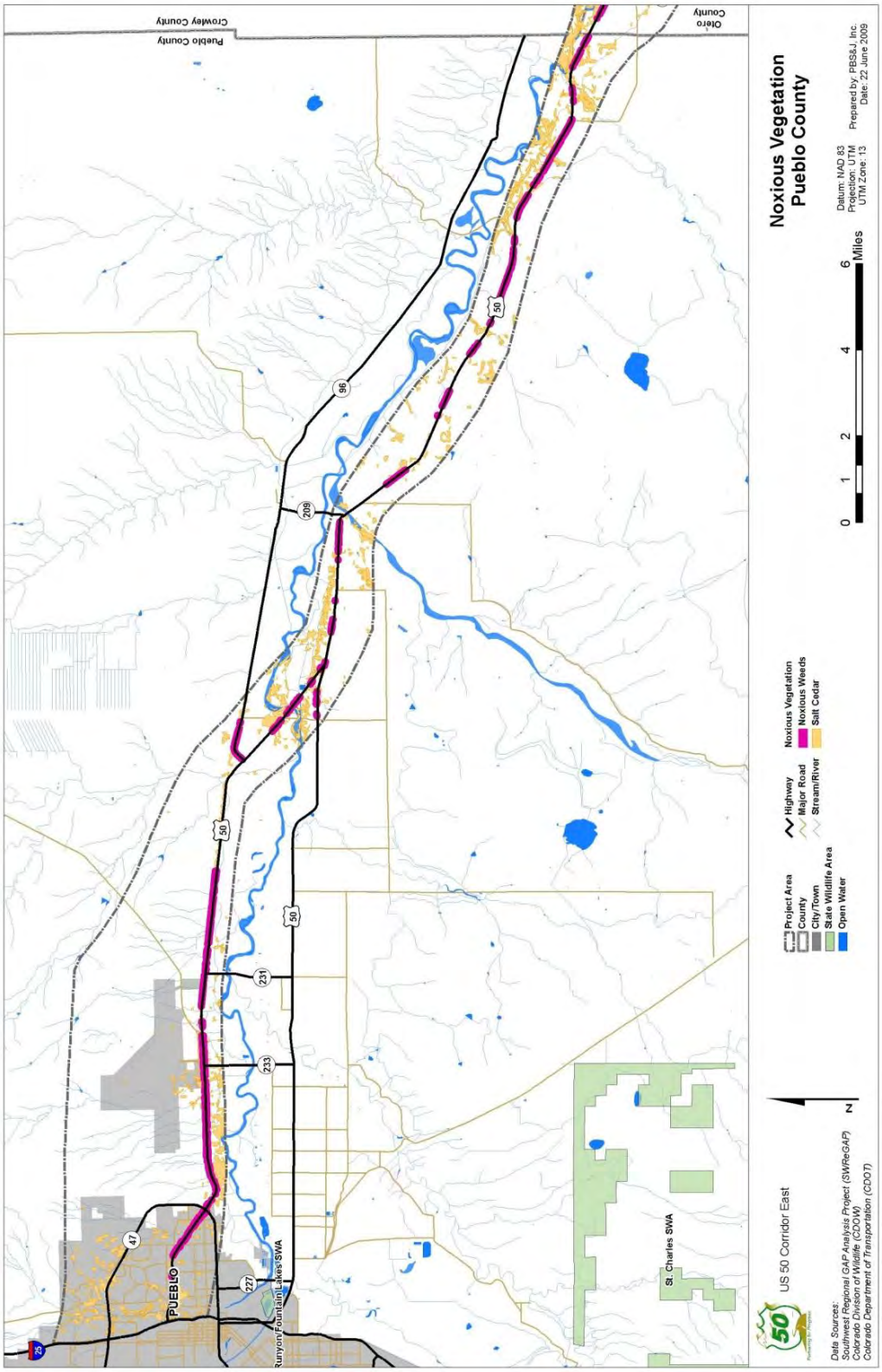


Figure J-6. Noxious Vegetation—Otero County

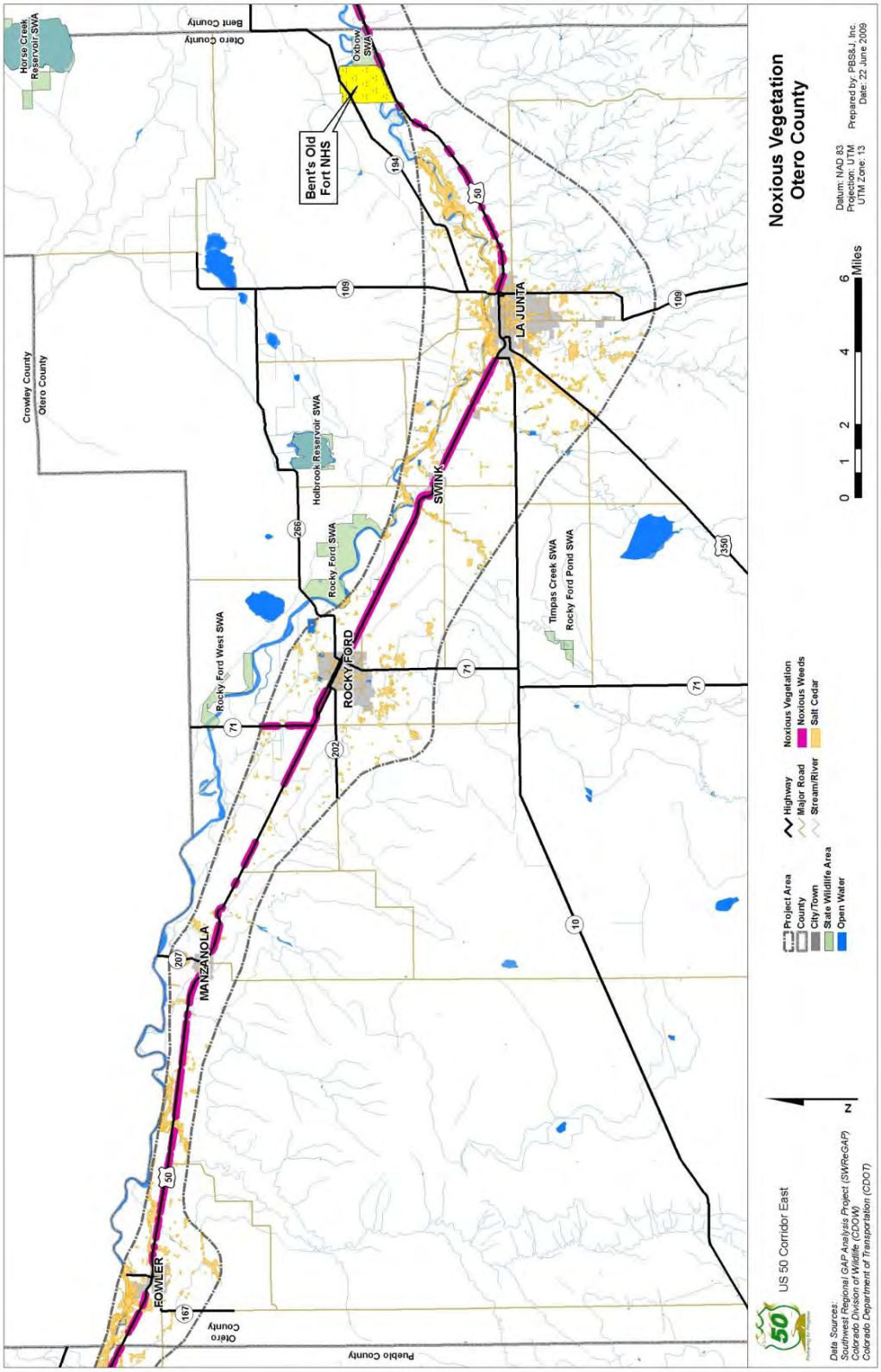


Figure J-7. Noxious Vegetation—Bent County

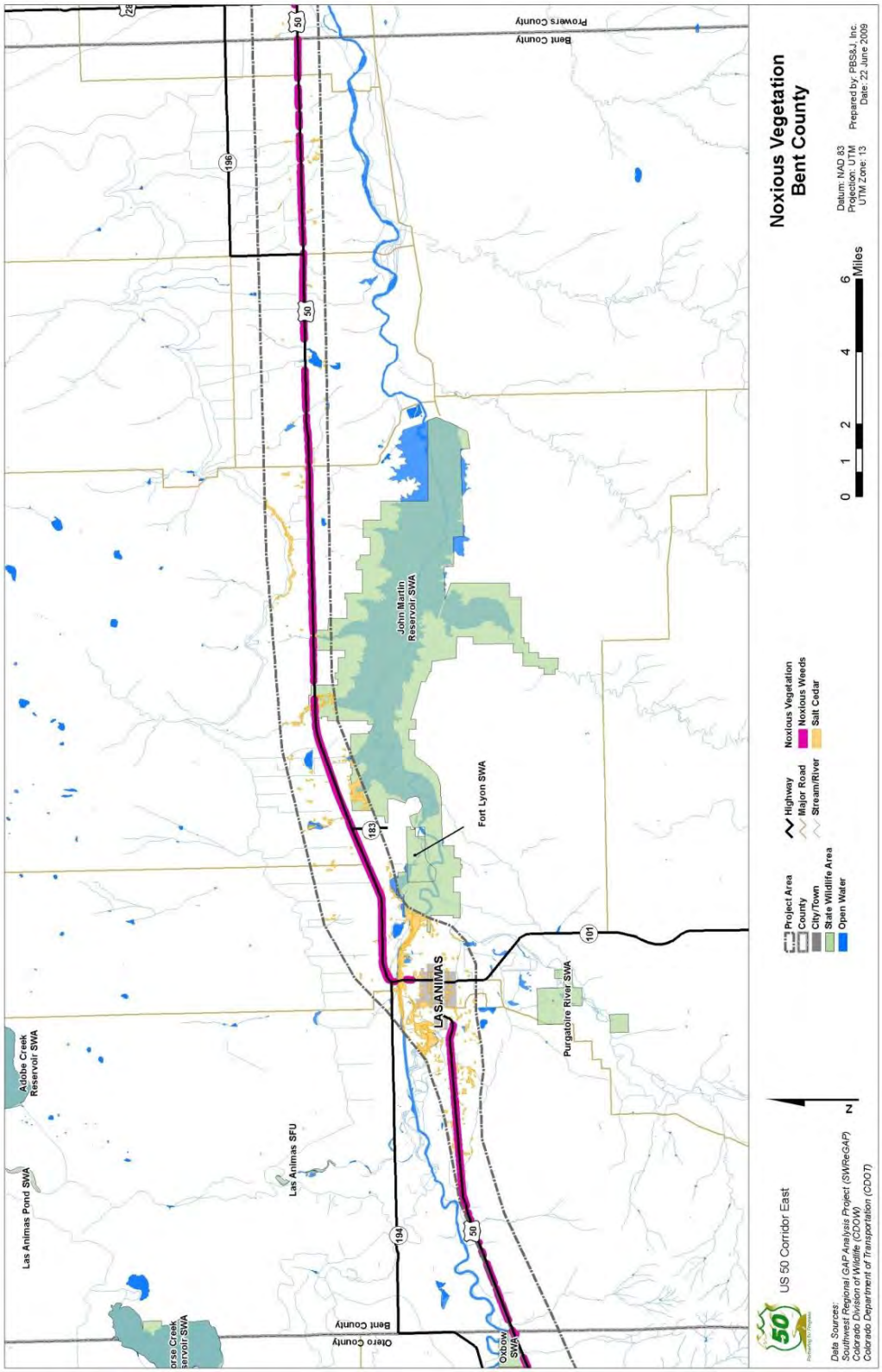


Figure J-8. Noxious Vegetation—Prowers County

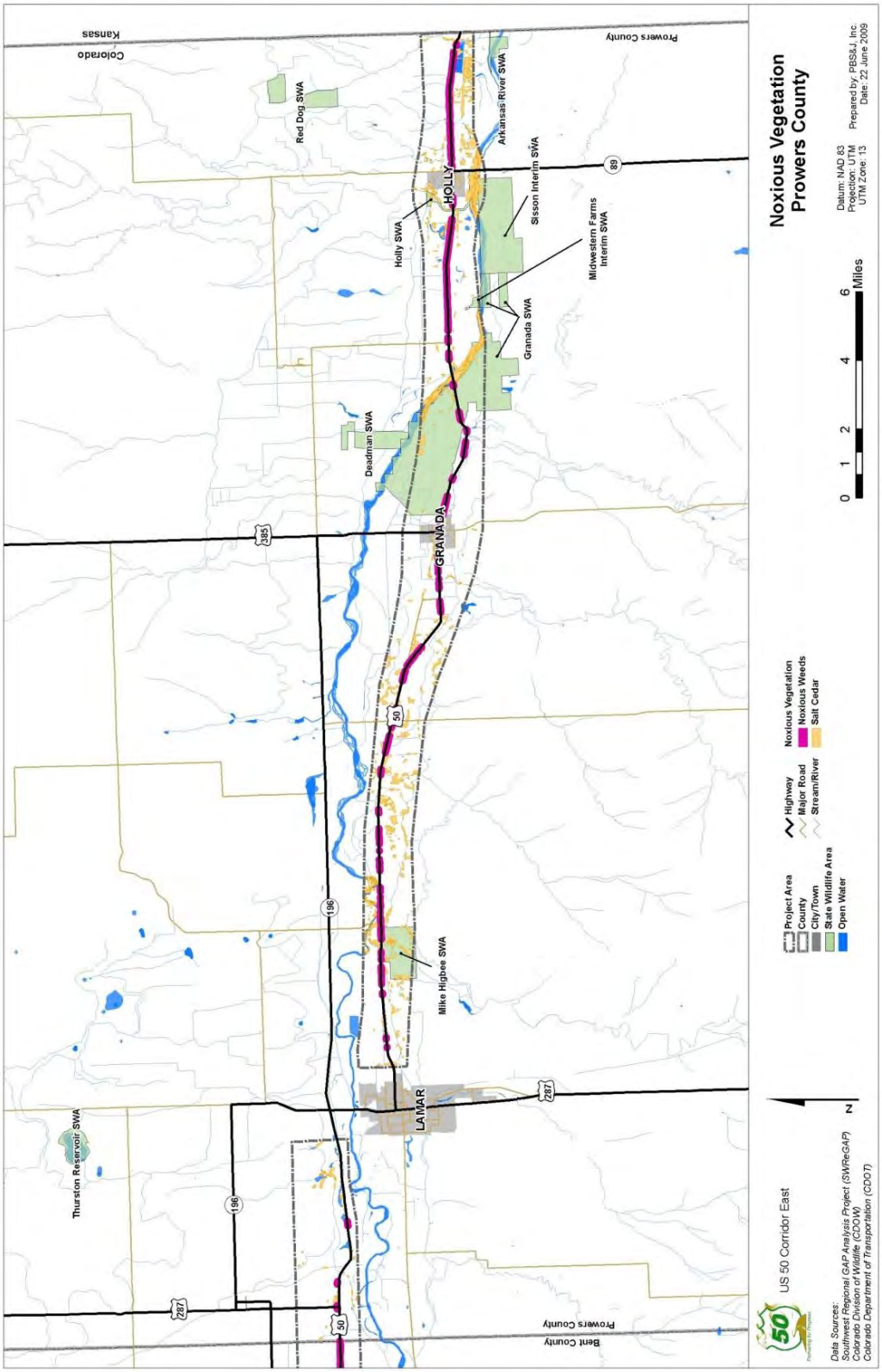


Figure J-9. Black-tailed Prairie Dog Activities—Pueblo County

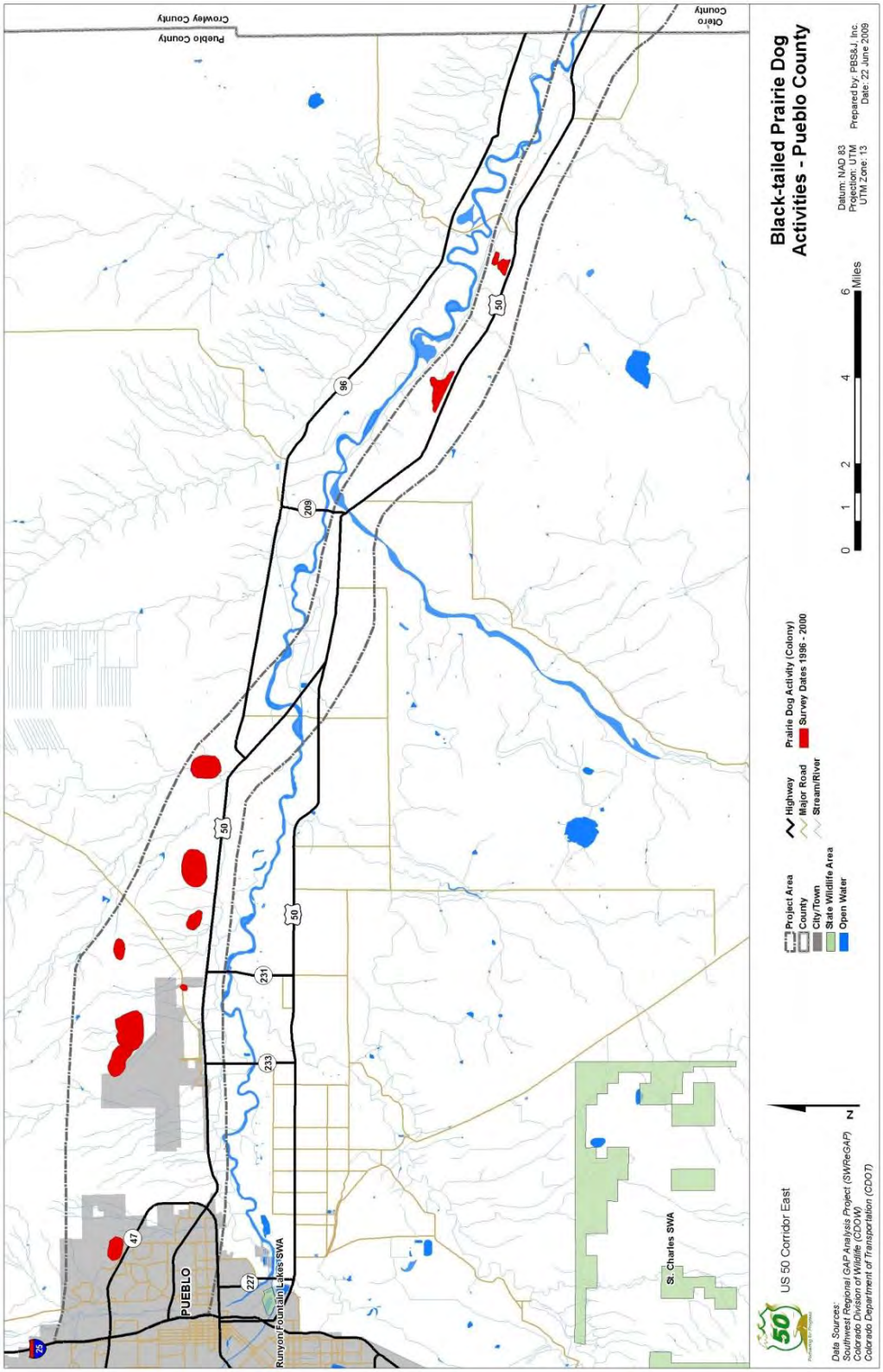


Figure J-10. Black-tailed Prairie Dog Activities—Otero County

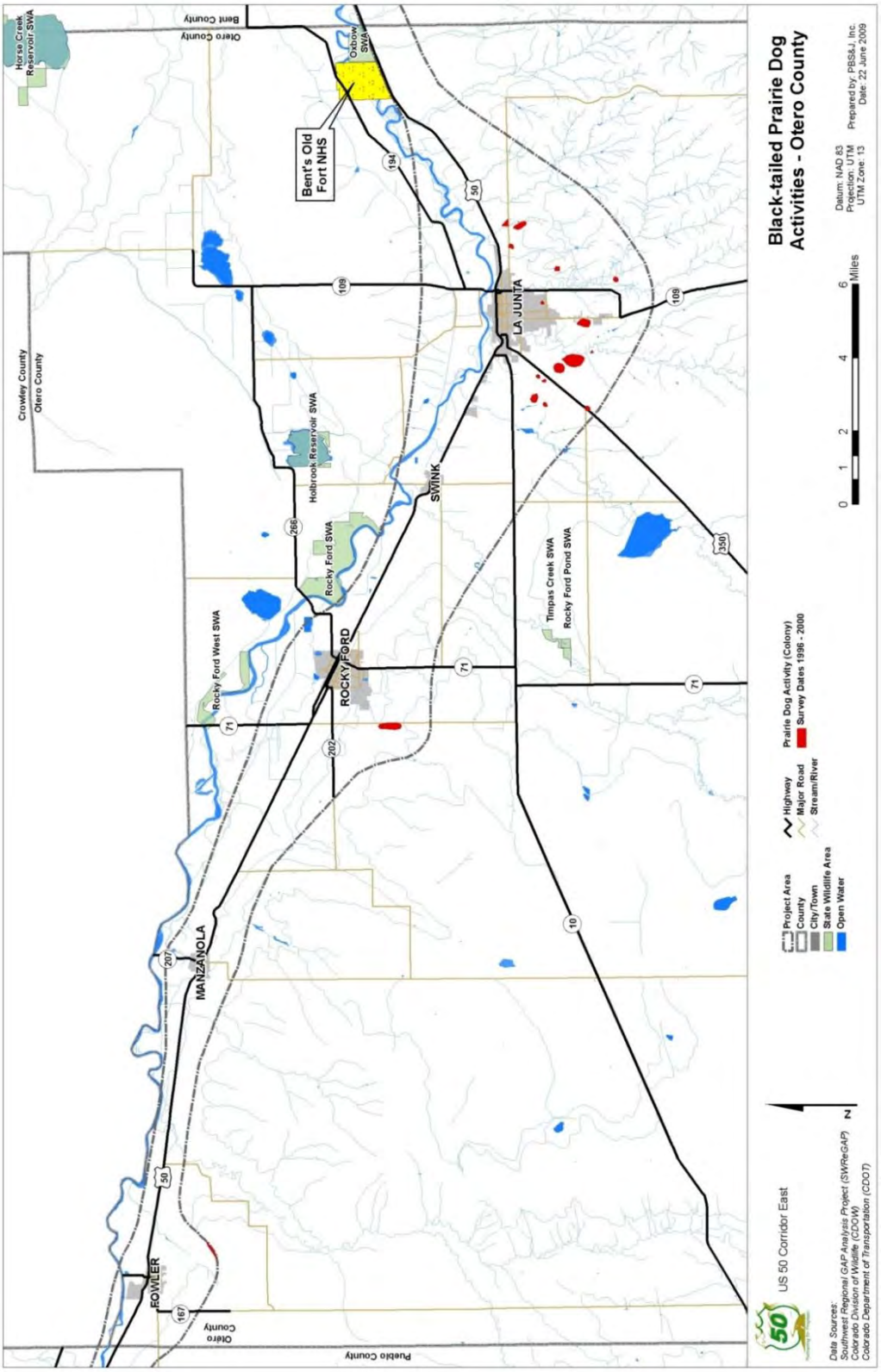


Figure J-11. Black-tailed Prairie Dog Activities—Bent County

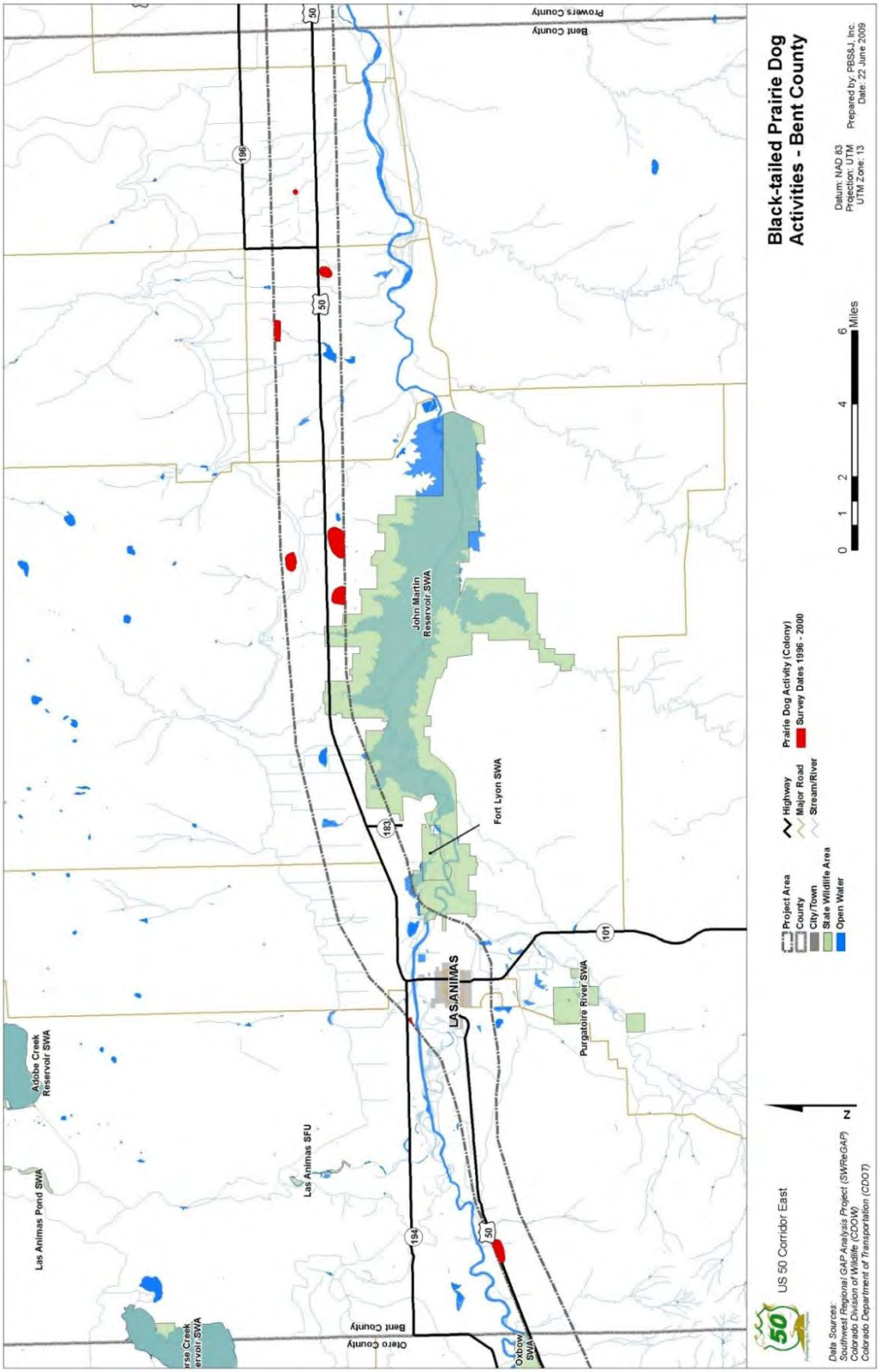


Figure J-12. Black-tailed Prairie Dog Activities—Prowers County

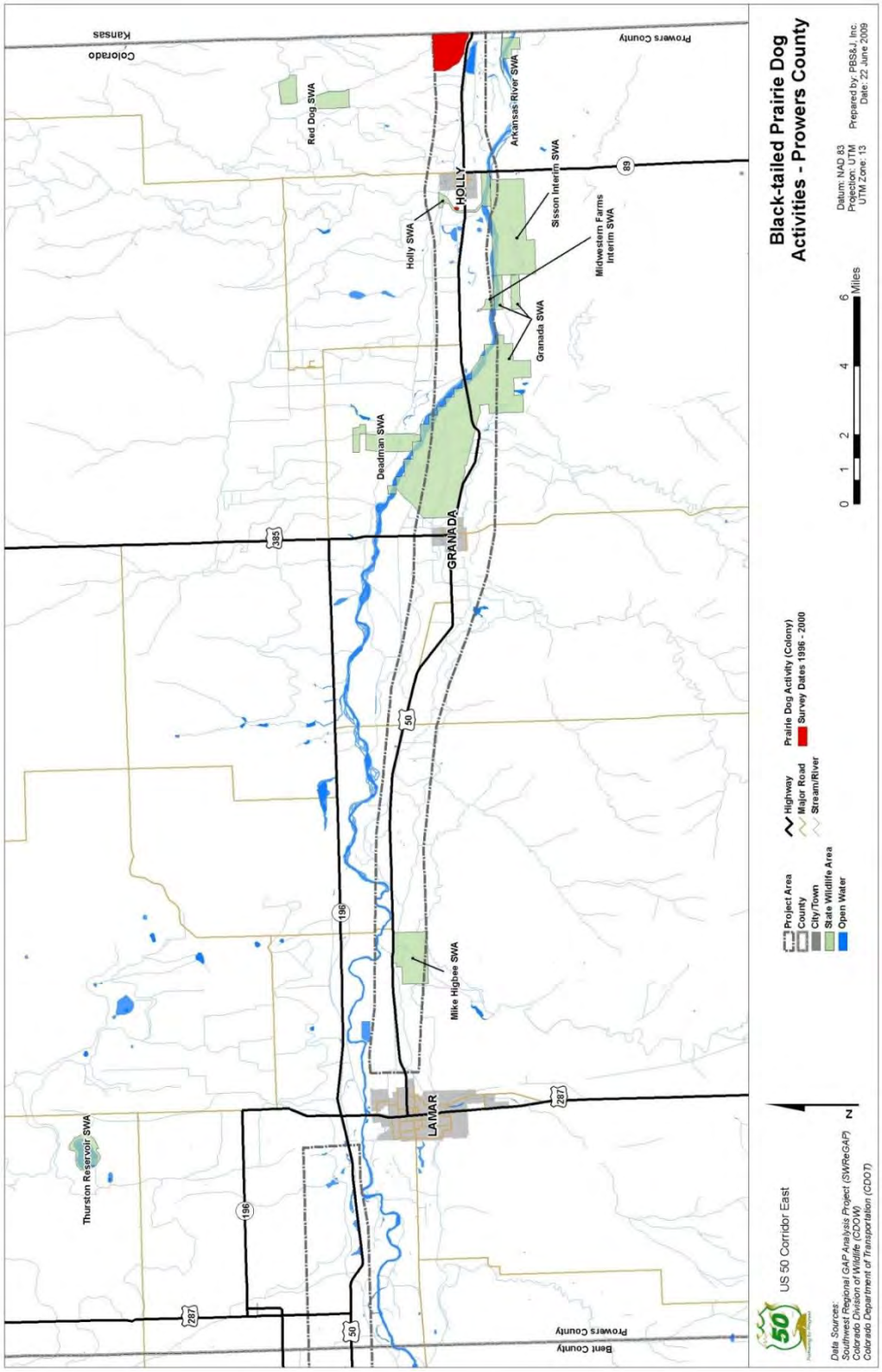


Figure J-13. Wildlife Crossings Relative Priority—Pueblo County

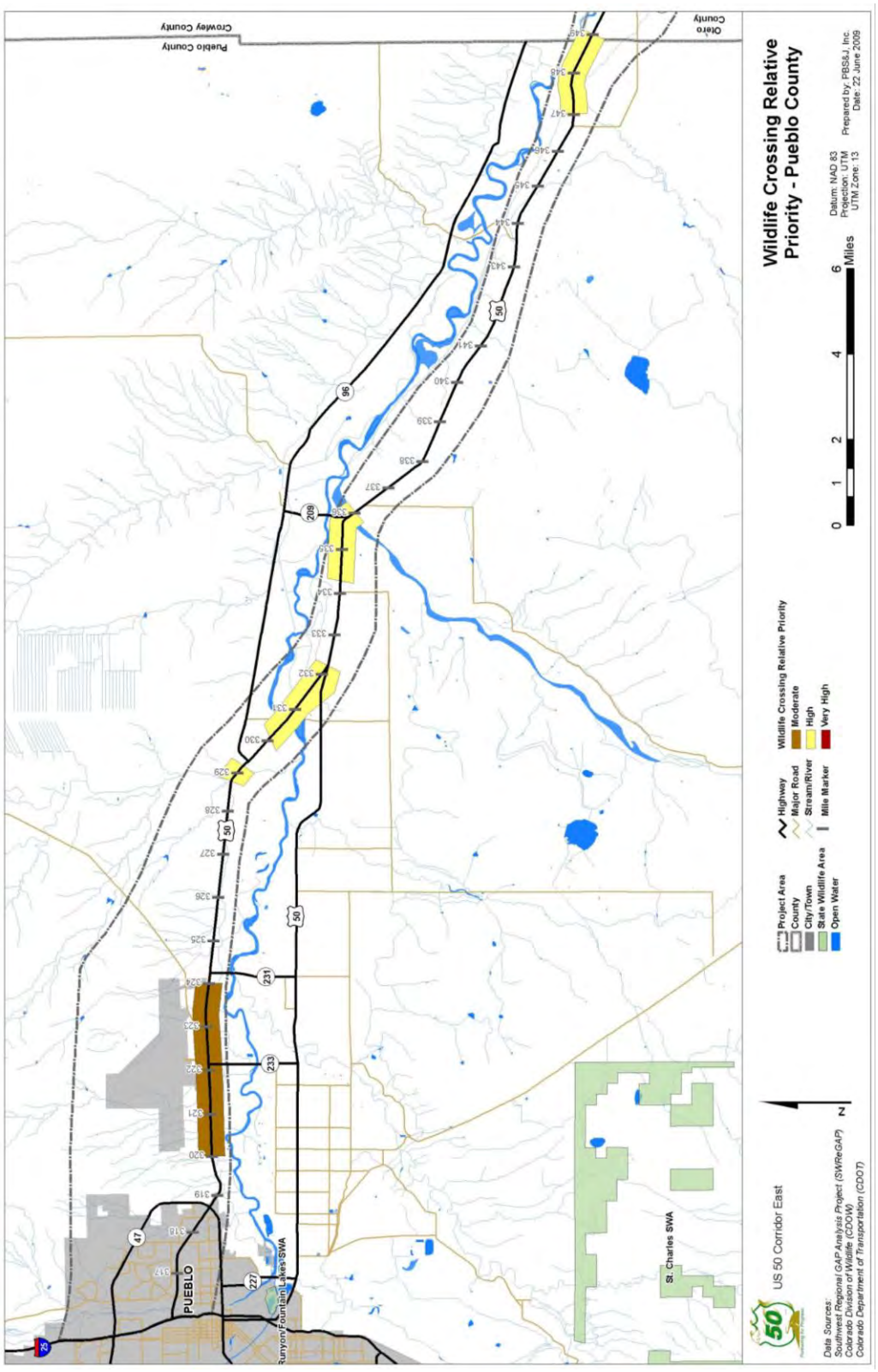


Figure J-14. Wildlife Crossings Relative Priority—Otero County

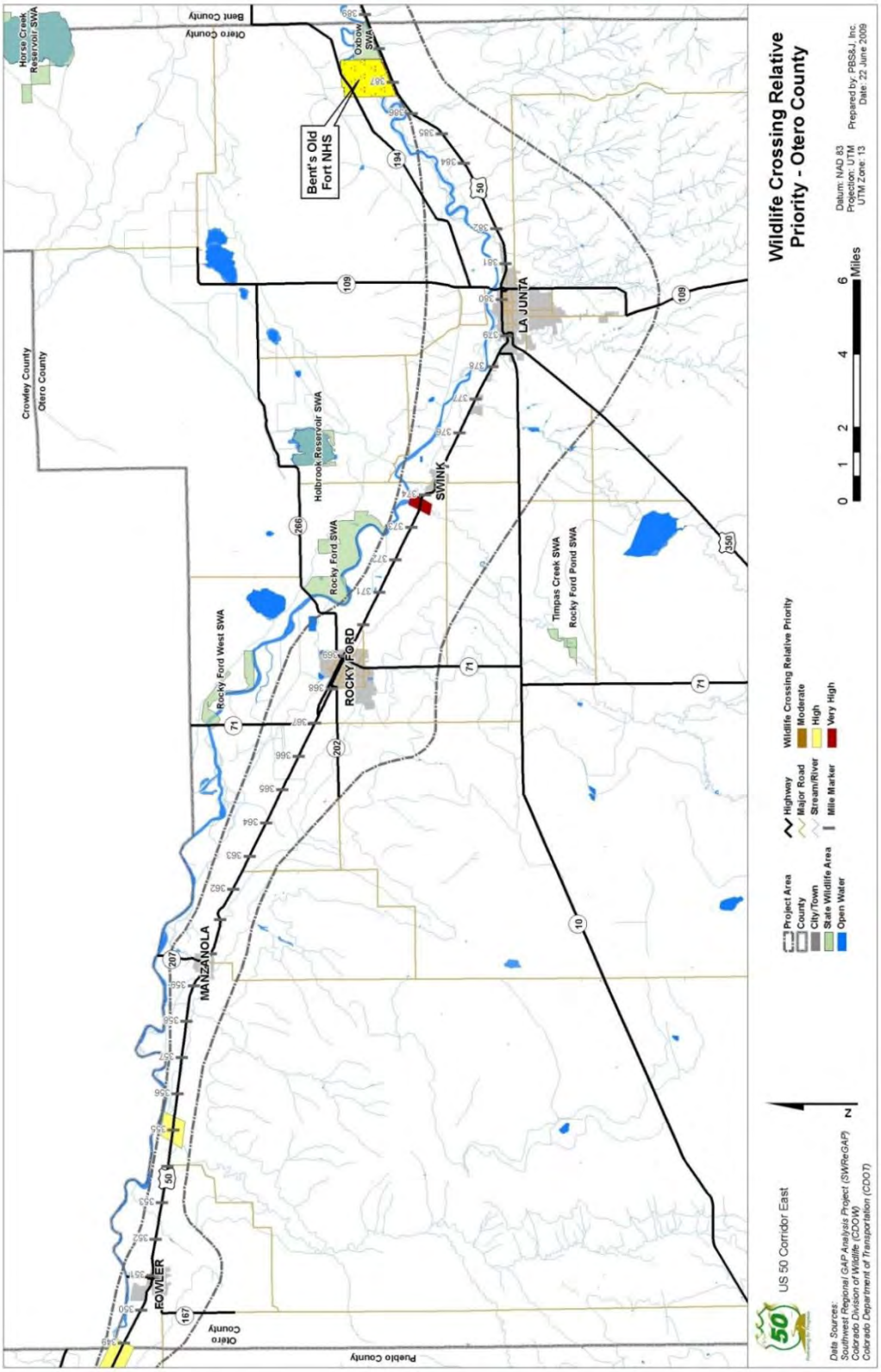


Figure J-15. Wildlife Crossings Relative Priority—Bent County

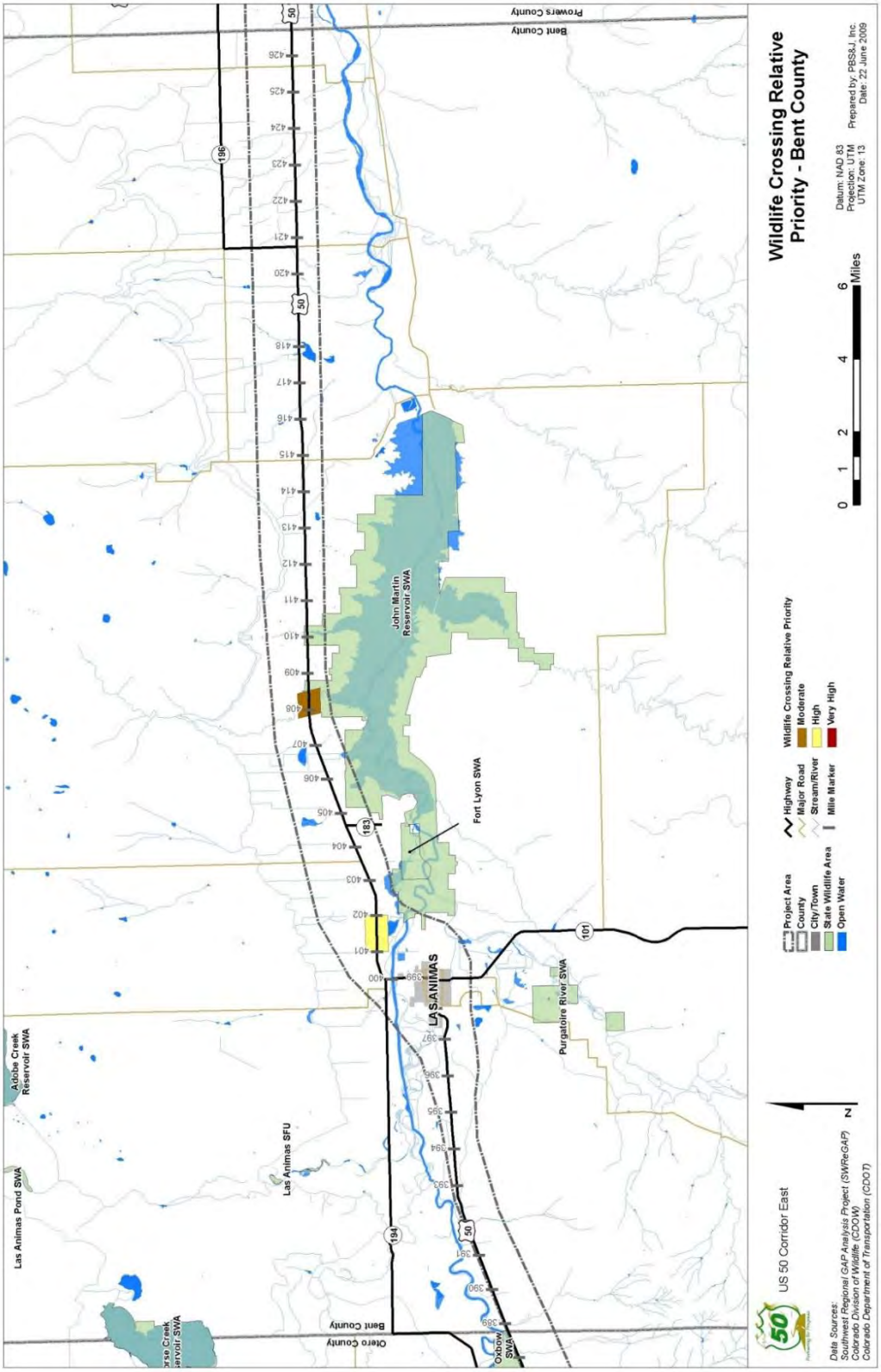


Figure J-16. Wildlife Crossings Relative Priority—Prowers County

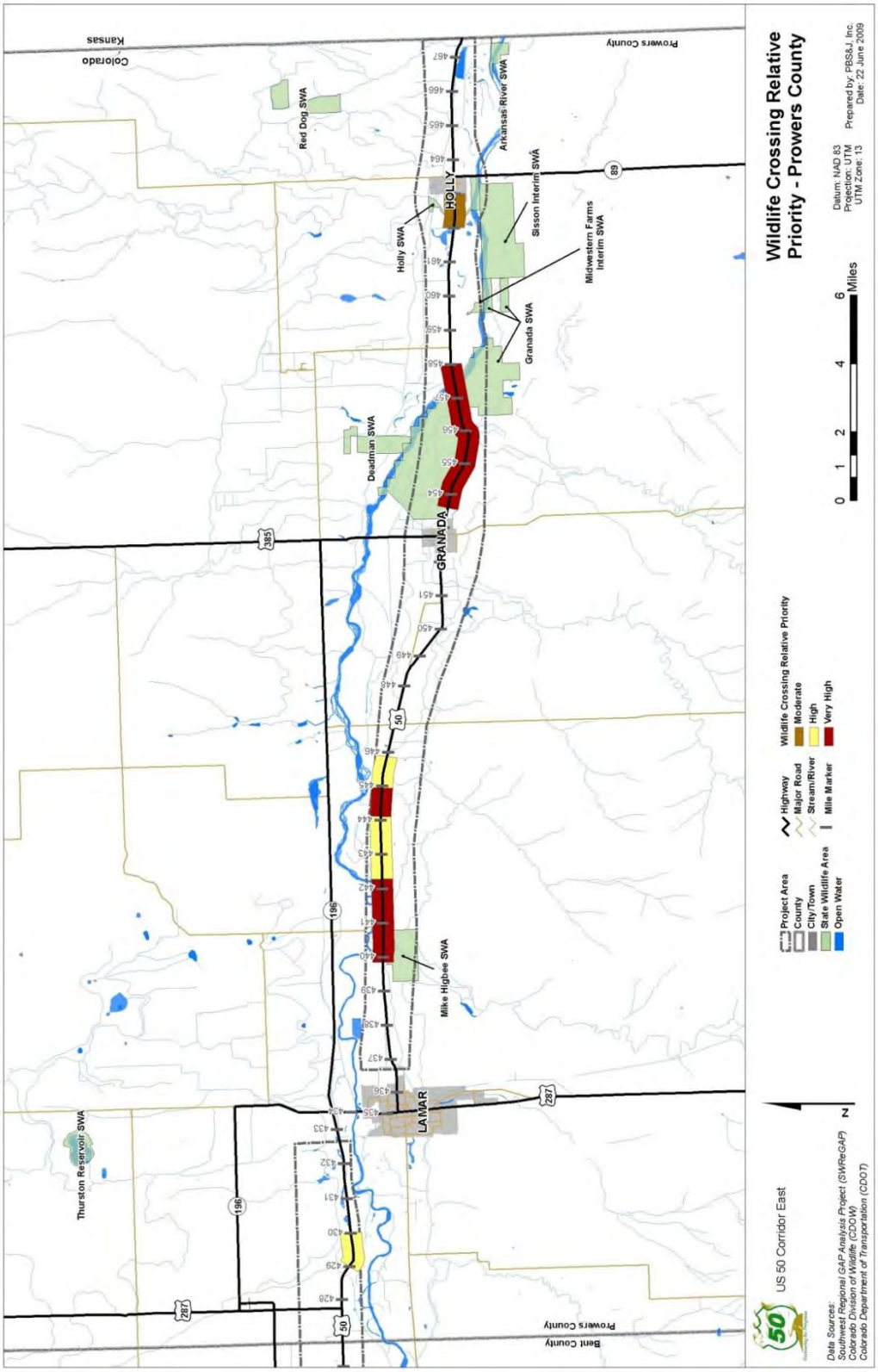


Figure J-17. Land Use and Land Cover Effects—Pueblo

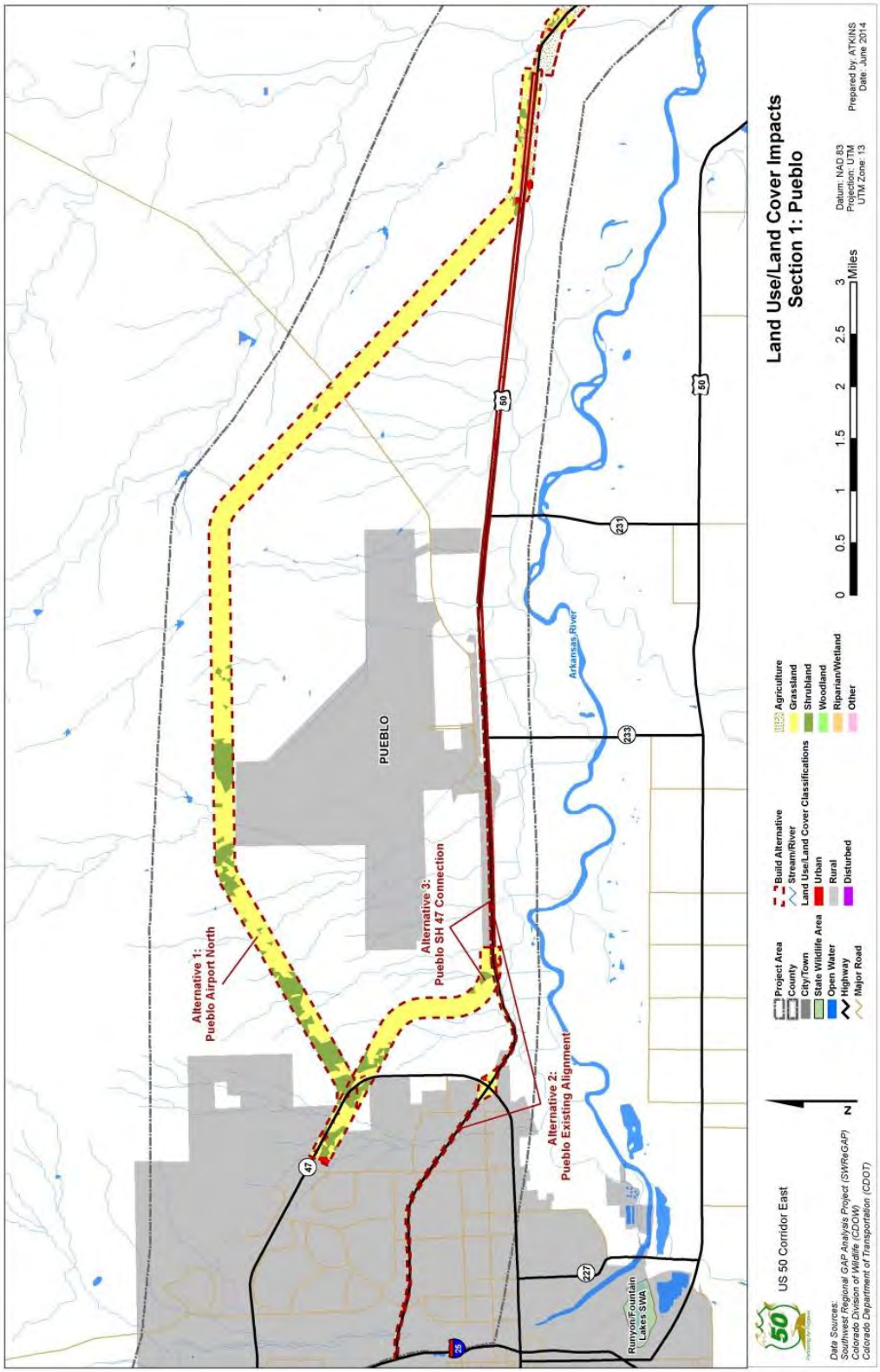


Figure J-18. Land Use and Land Cover Impacts—Pueblo to Fowler (west)

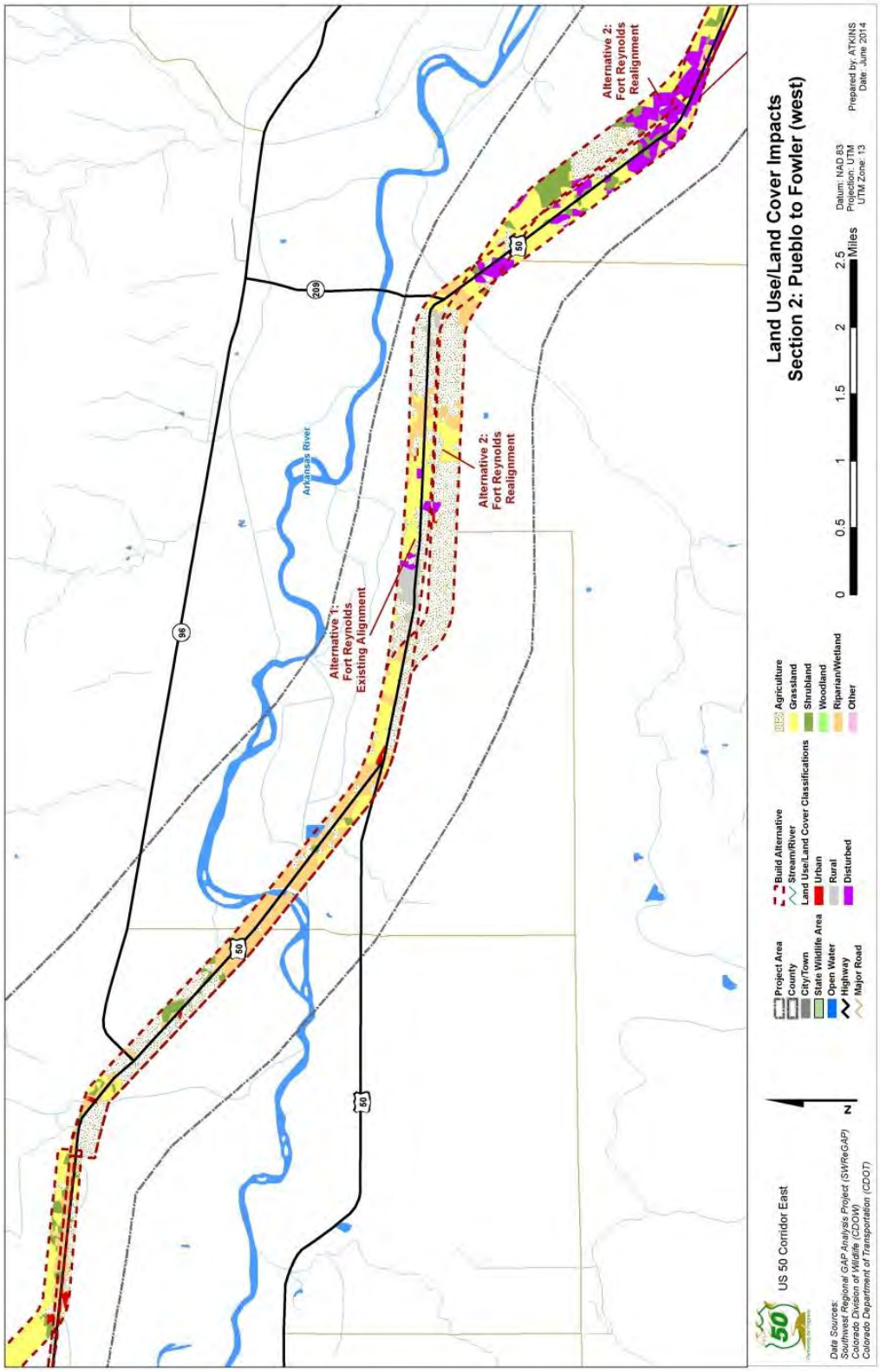


Figure J-19. Land Use and Land Cover Impacts—Fowler North Option and Fowler South Option

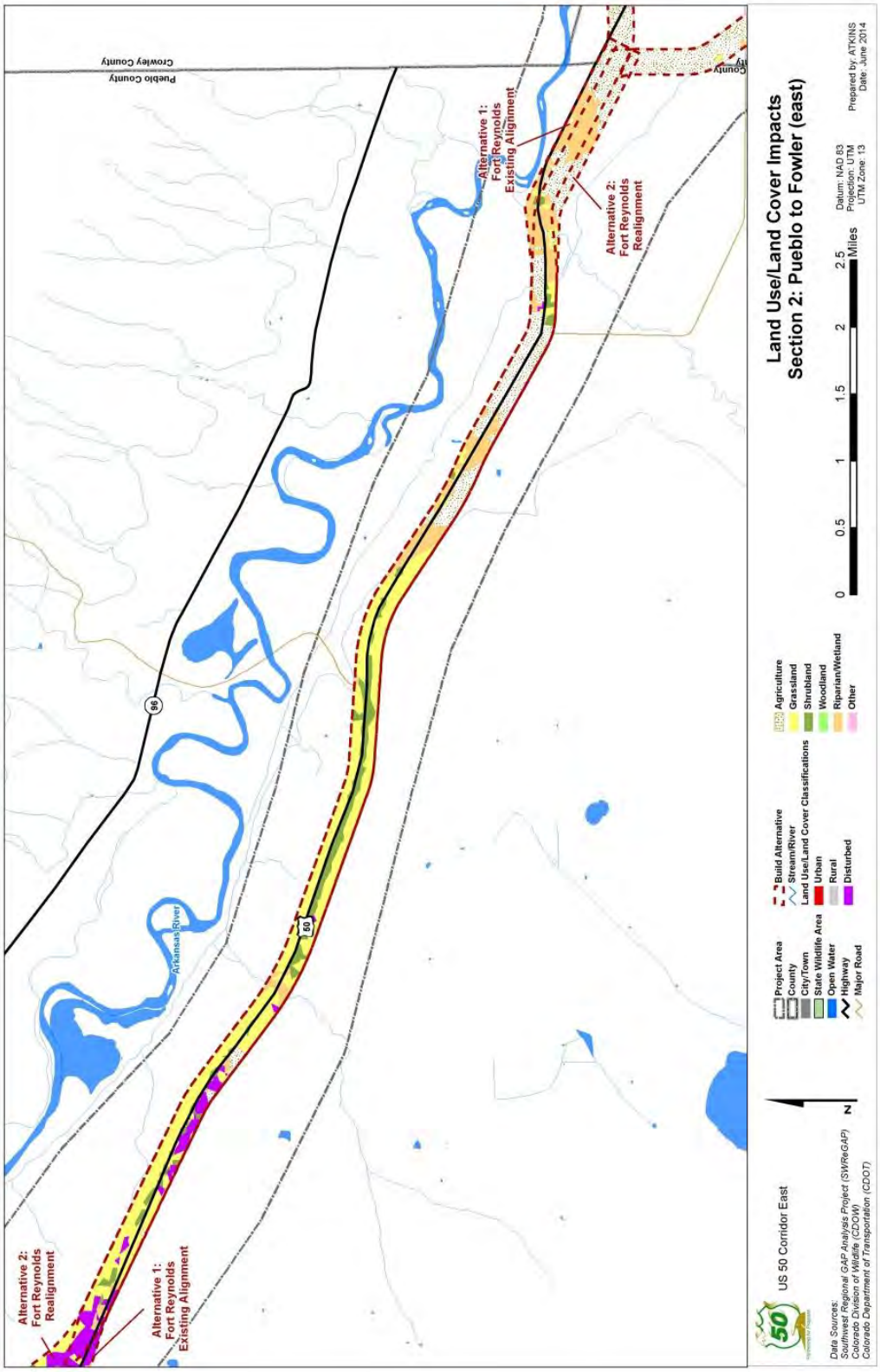


Figure J-20. Land Use and Land Cover Impacts—Fowler North Alternative and Fowler South Alternative

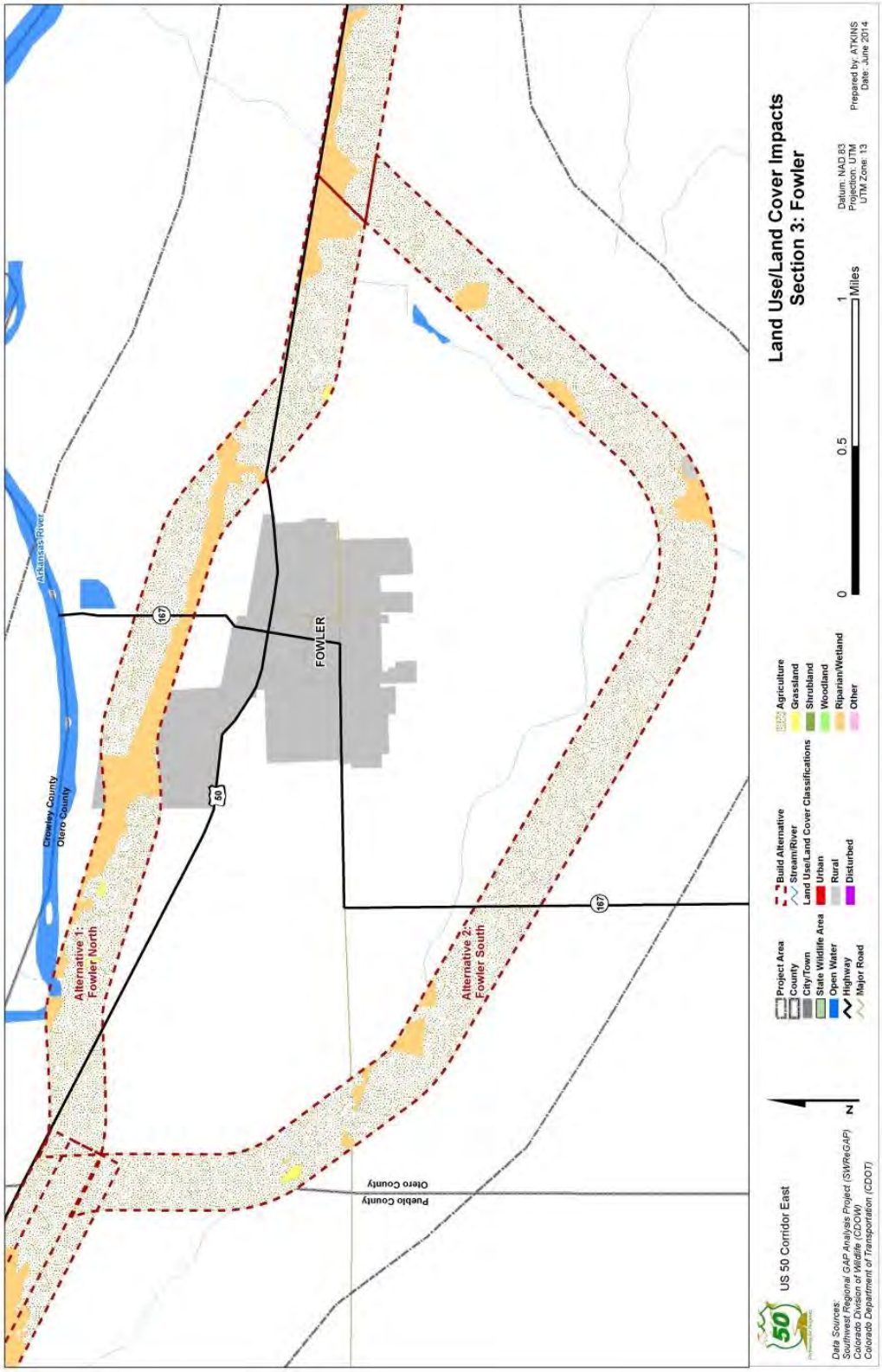


Figure J-21. Land Use and Land Cover Impacts—Fowler to Manzanola

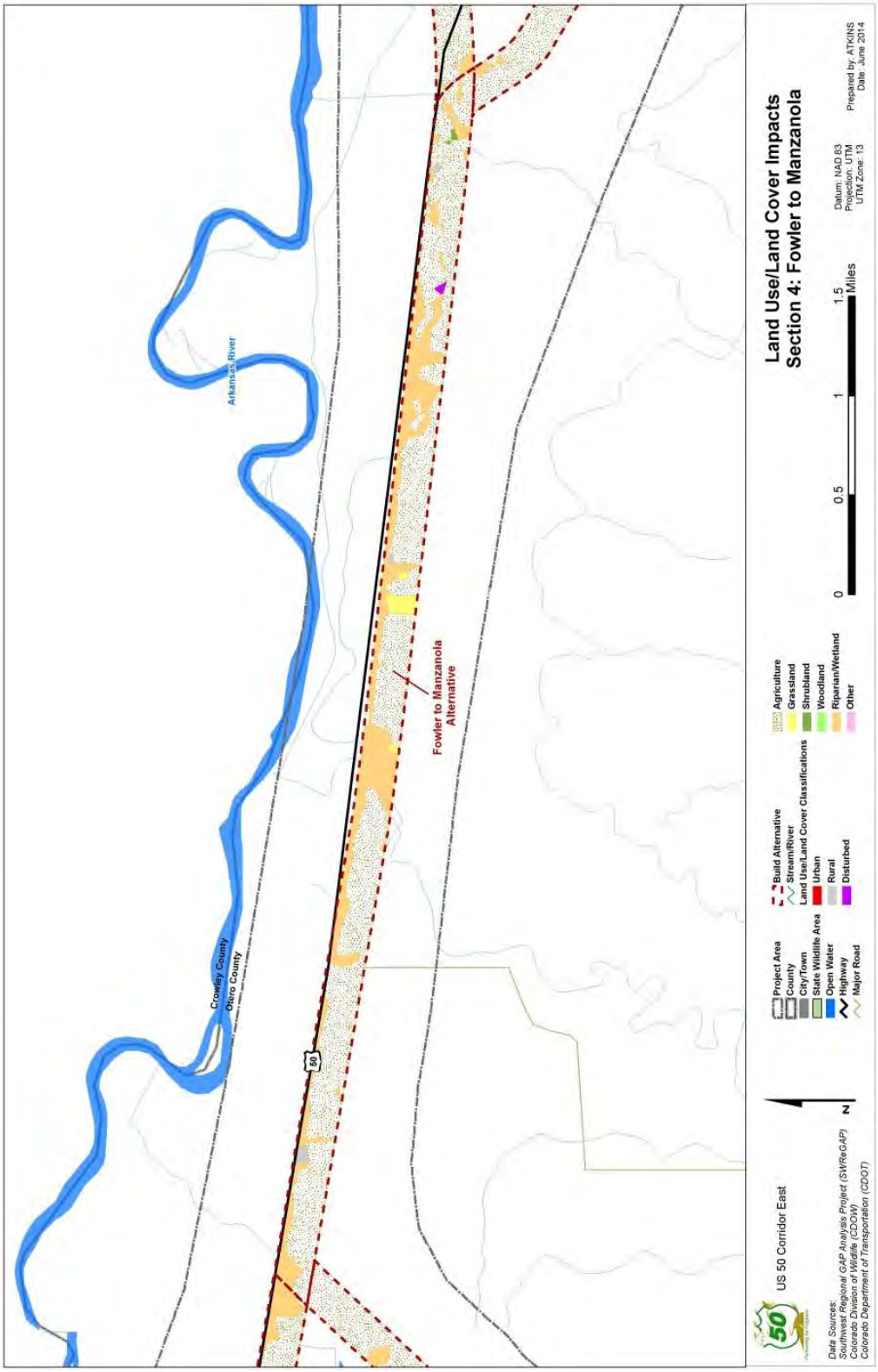


Figure J-22. Land Use and Land Cover Impacts—Manzanola

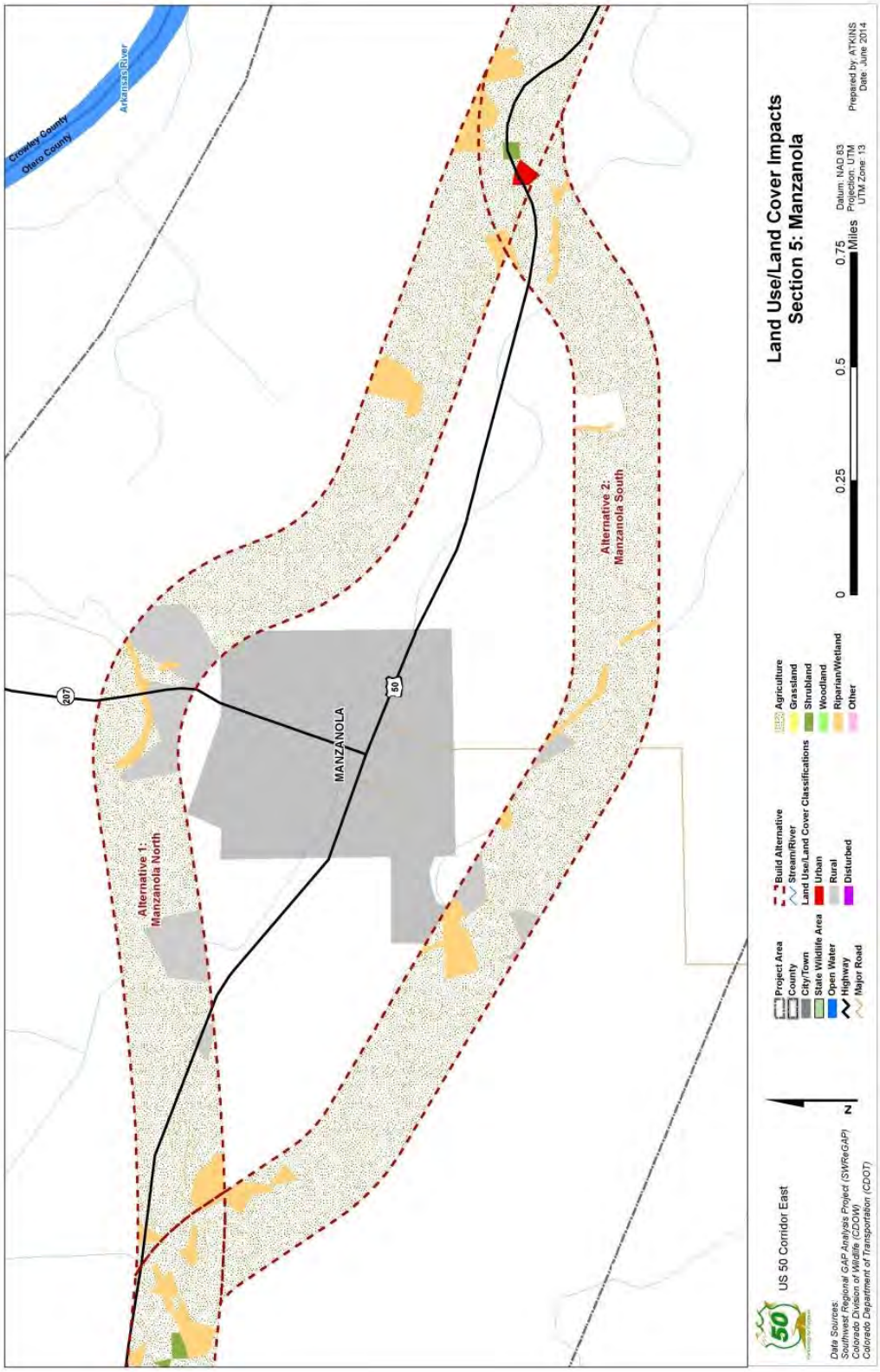


Figure J-23. Land Use and Land Cover Impacts—Manzanola to Rocky Ford

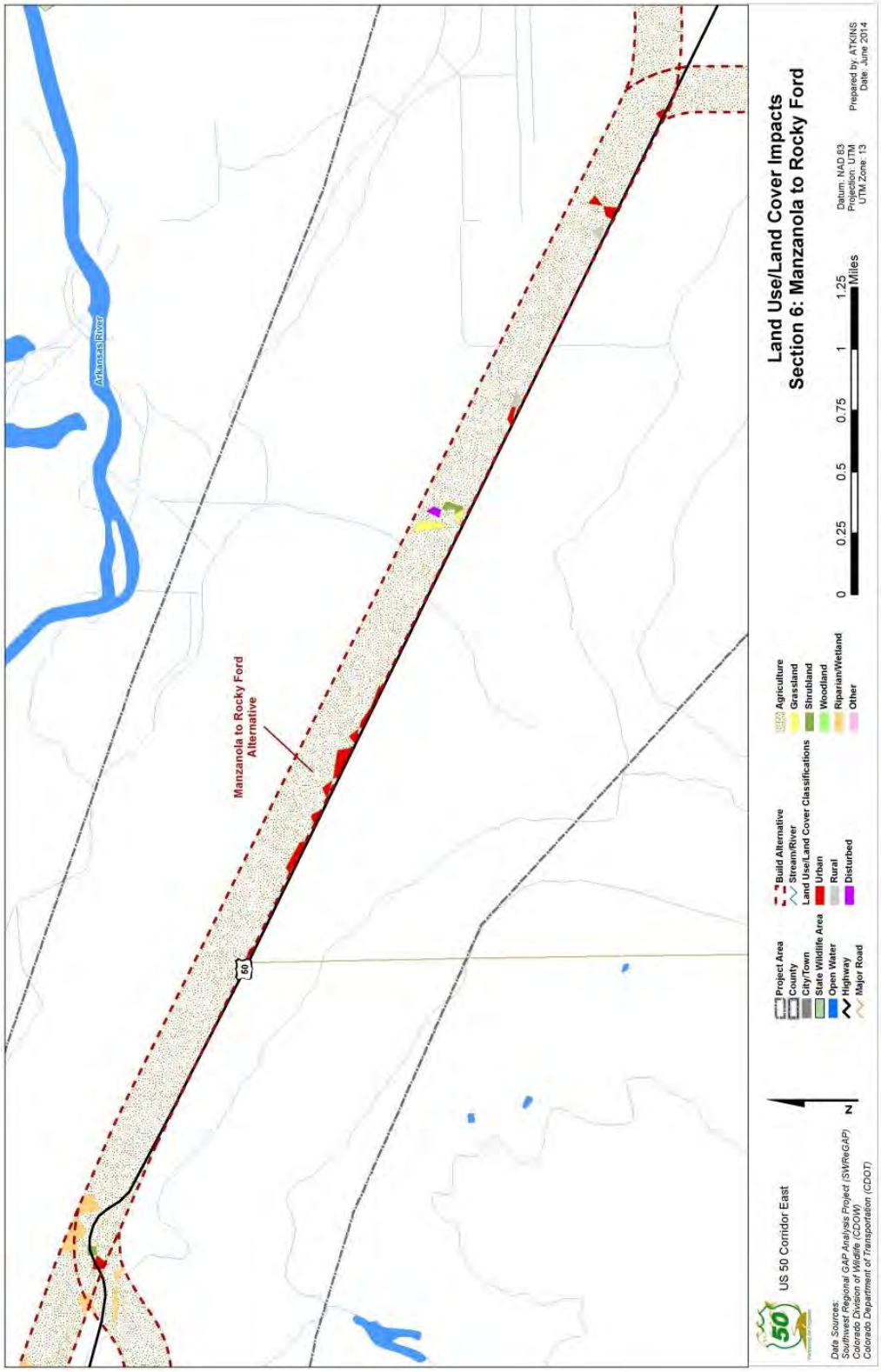


Figure J-24. Land Use and Land Cover Impacts—Rocky Ford

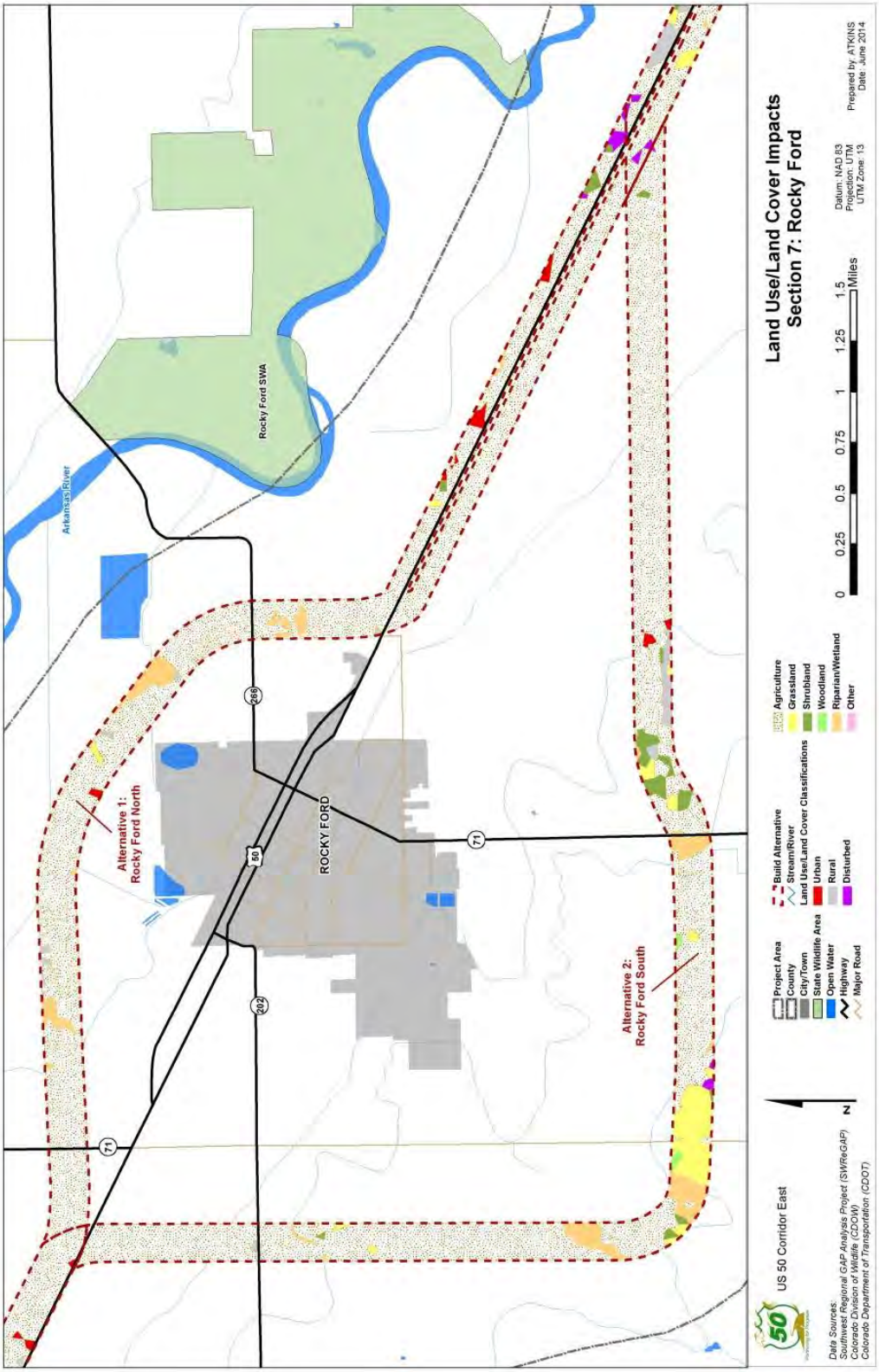


Figure J-25. Land Use and Land Cover Impacts—Rocky Ford to Swink, Swink North Alternative and Swink South Alternative

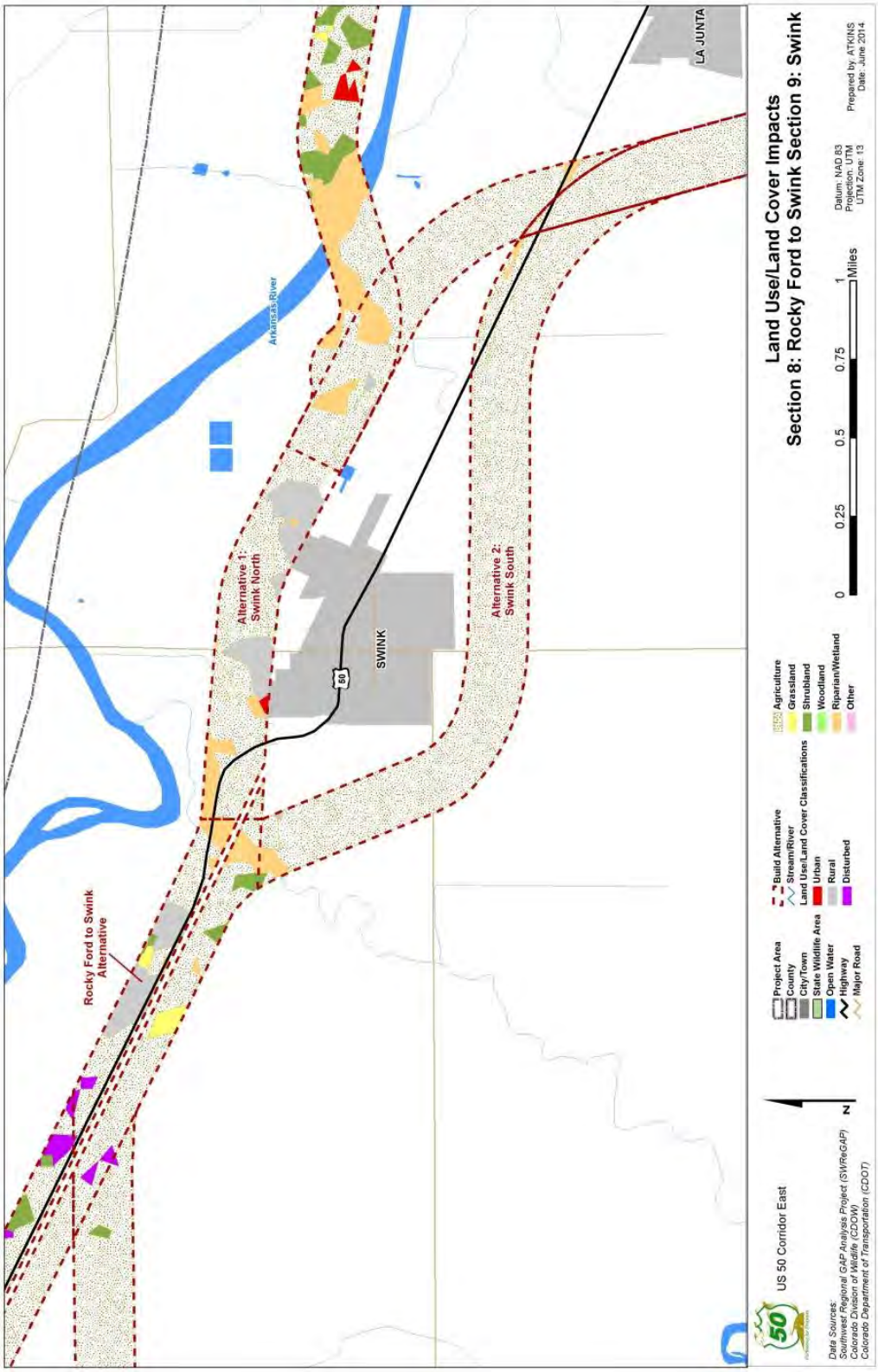


Figure J-26. Land Use and Land Cover Impacts—La Junta South 1 Alternative and La Junta South 2 Alternative

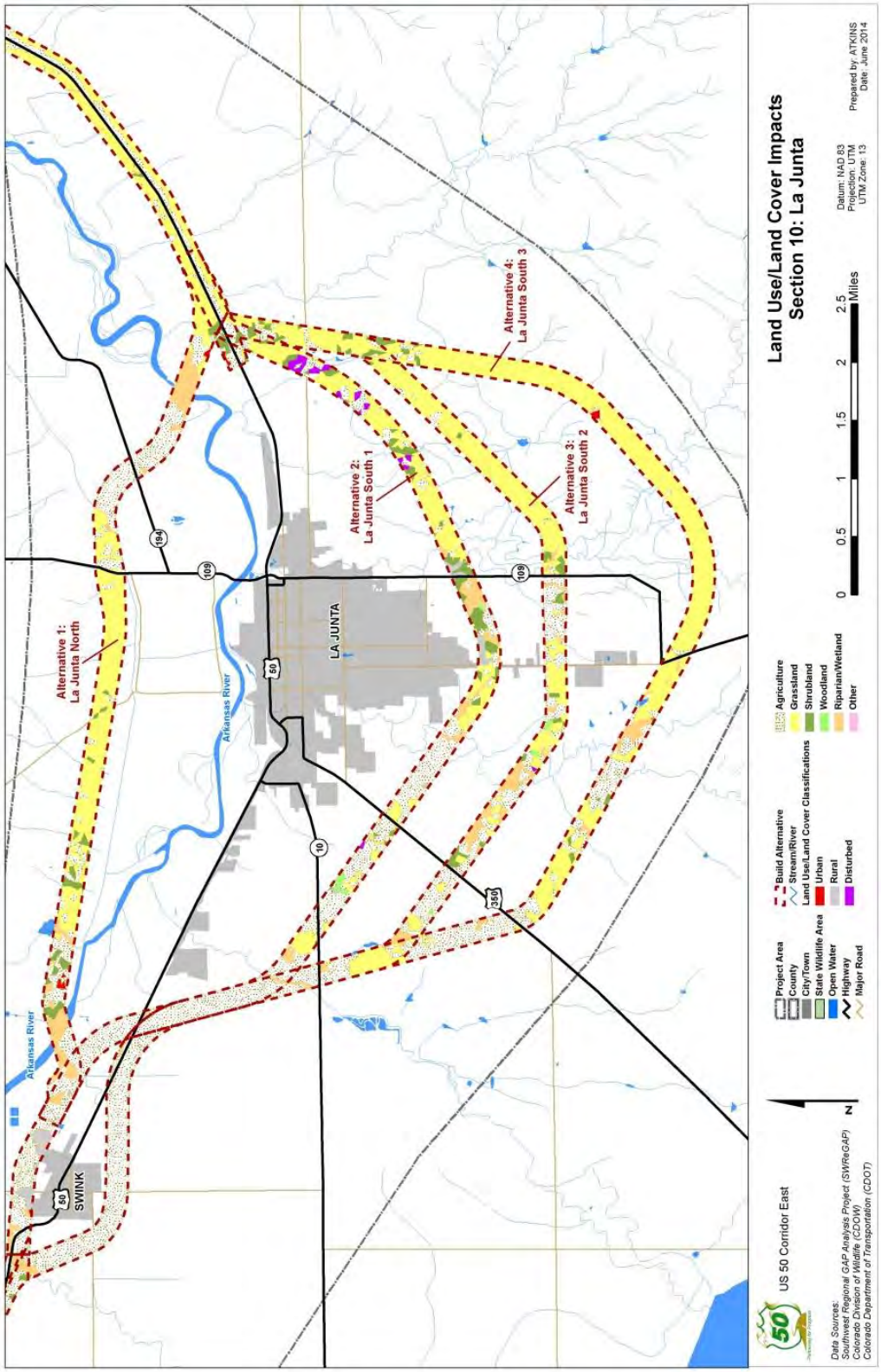


Figure J-27. Land Use and Land Cover Impacts—La Junta to Las Animas

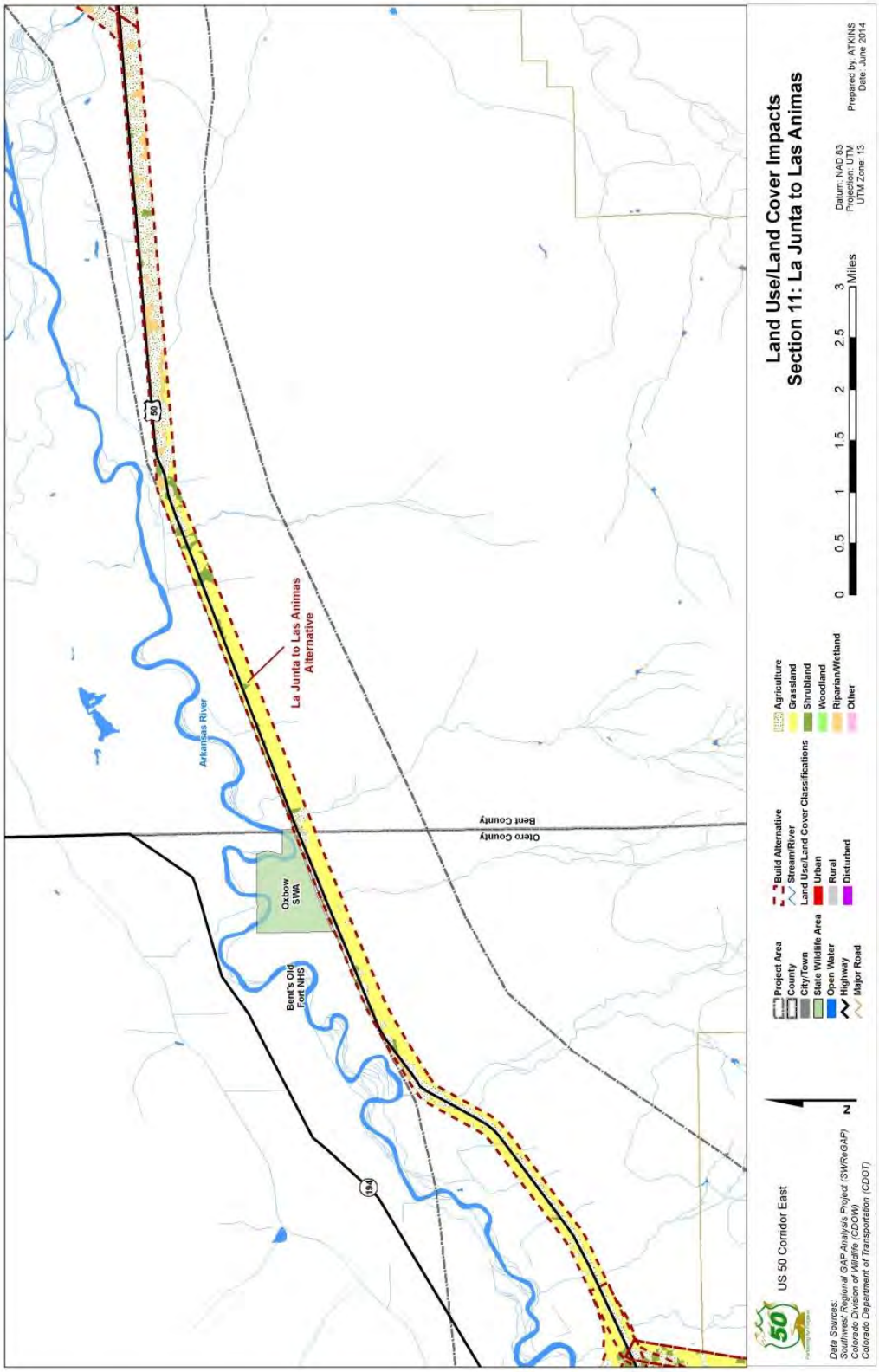


Figure J-28. Land Use and Land Cover Impacts—Las Animas

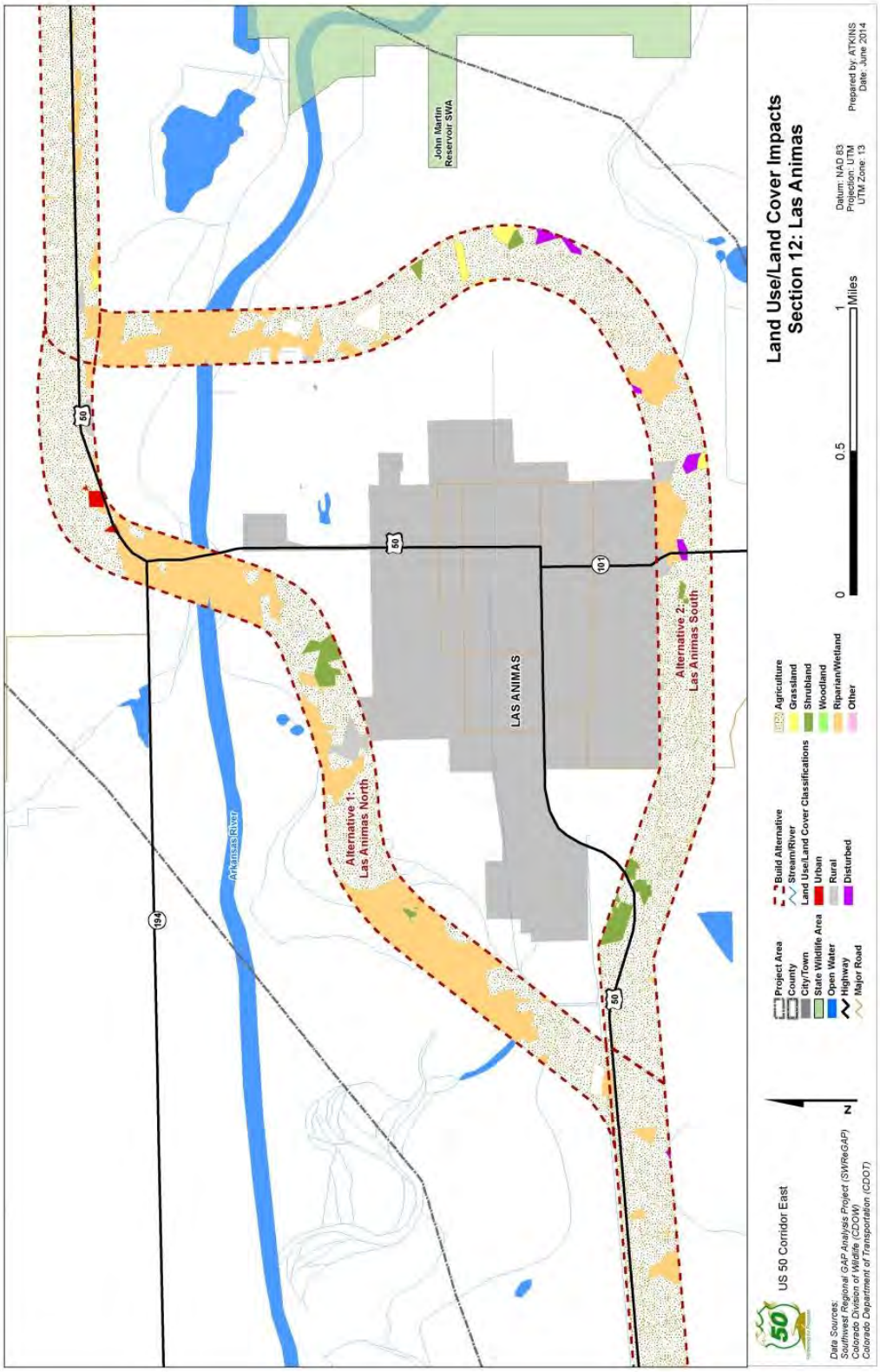


Figure J-29. Land Use and Land Cover Impacts—Las Animas to Lamar (west)

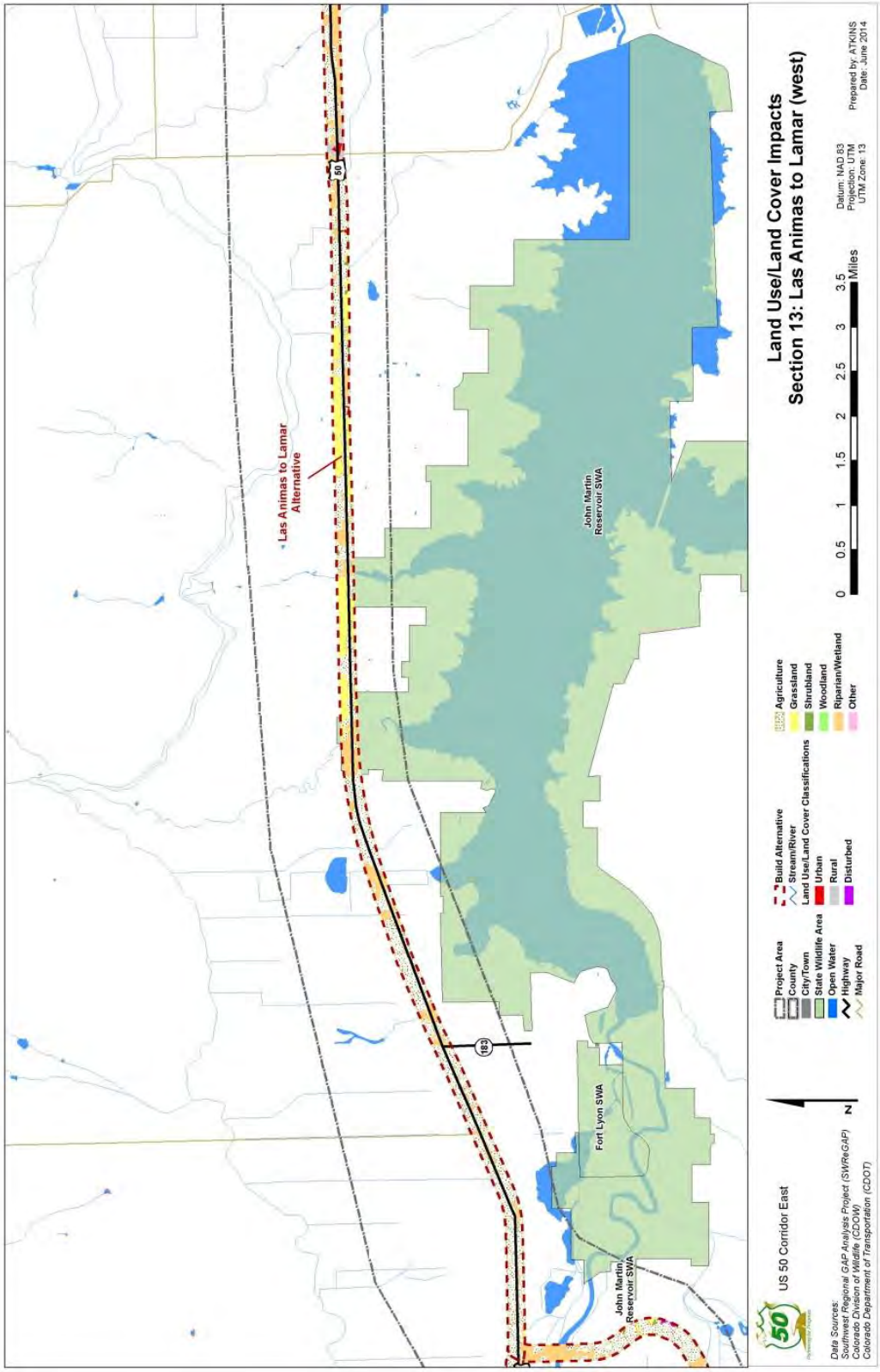


Figure J-30. Land Use and Land Cover Impacts—Las Animas to Lamar (east)

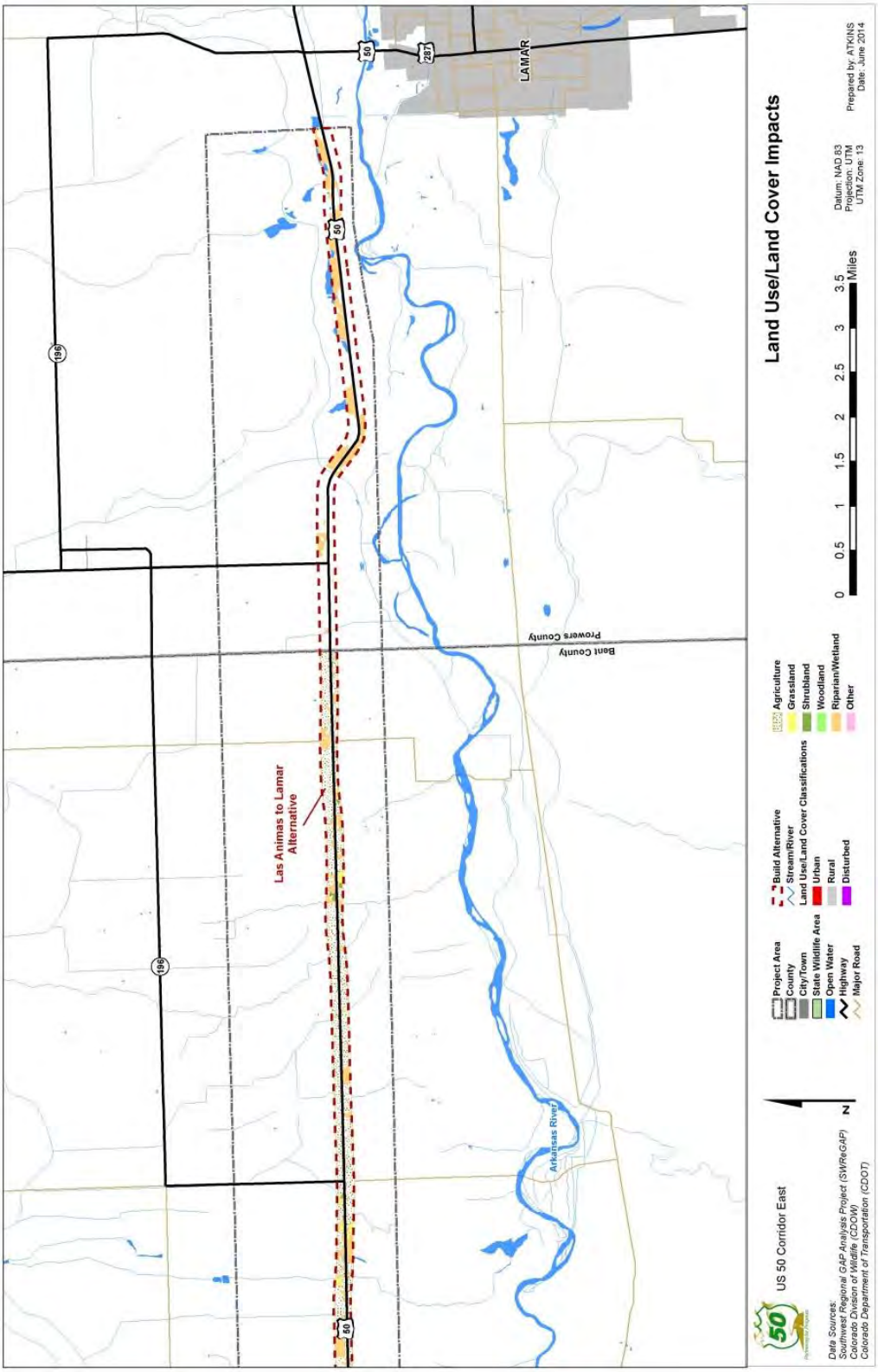


Figure J-31. Bald Eagle Habitat Impacts—Las Animas to Lamar (east)

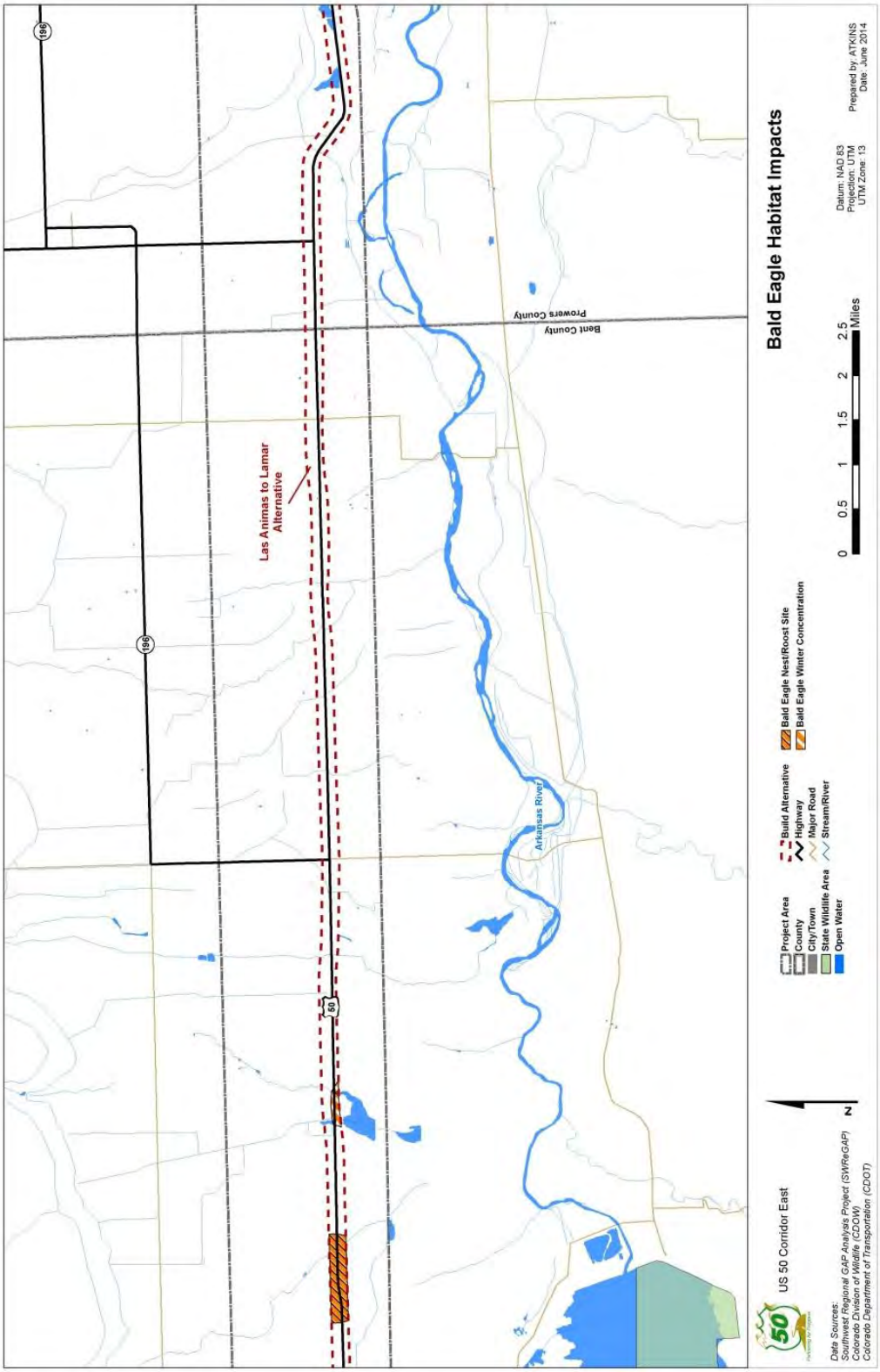


Figure J-32. Land Use and Land Cover Impacts—Lamar to Granada

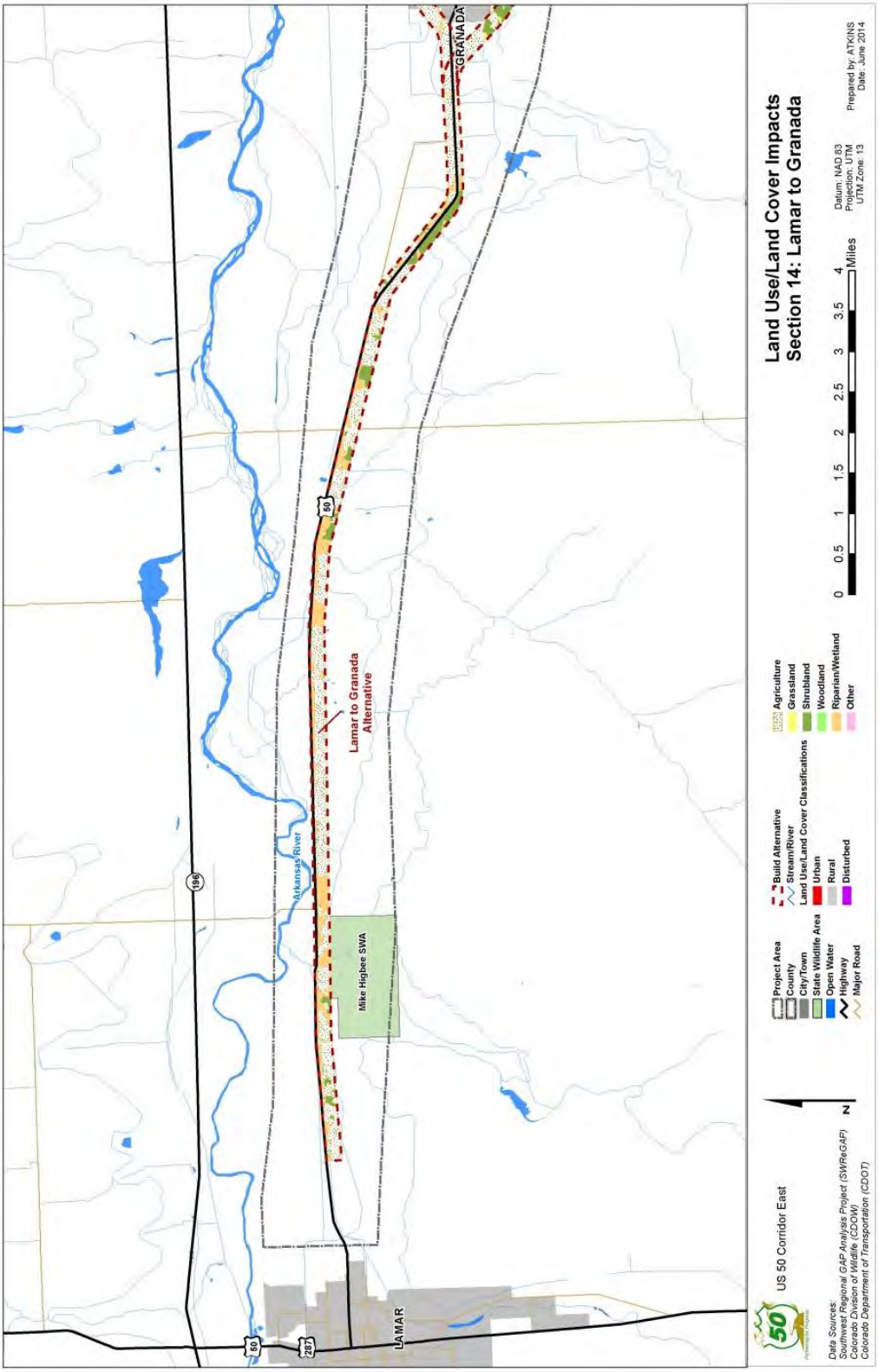


Figure J-33. Bald Eagle Habitat Impacts—Lamar to Granada

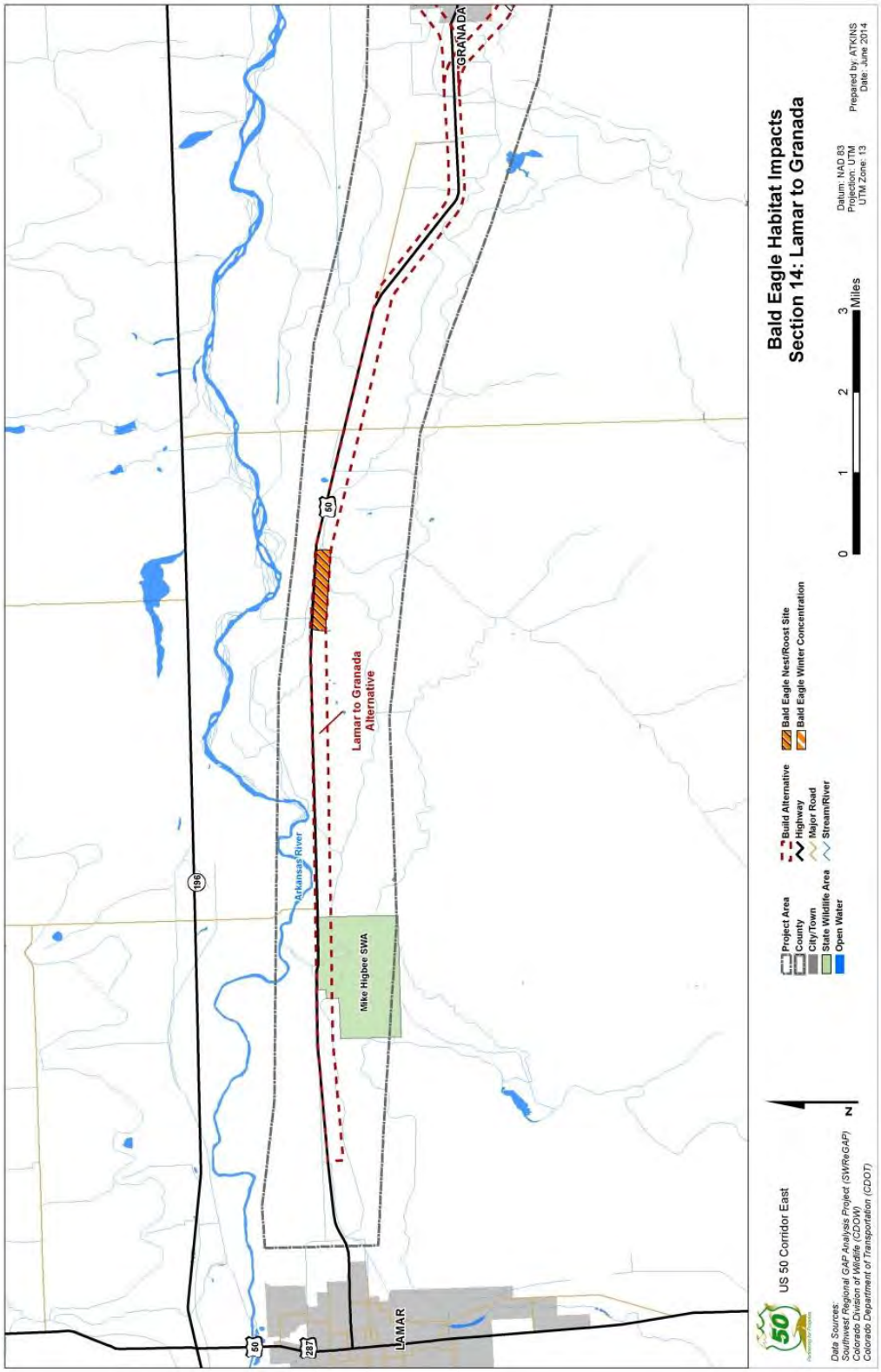


Figure J-34. Land Use and Land Cover Impacts—Granada

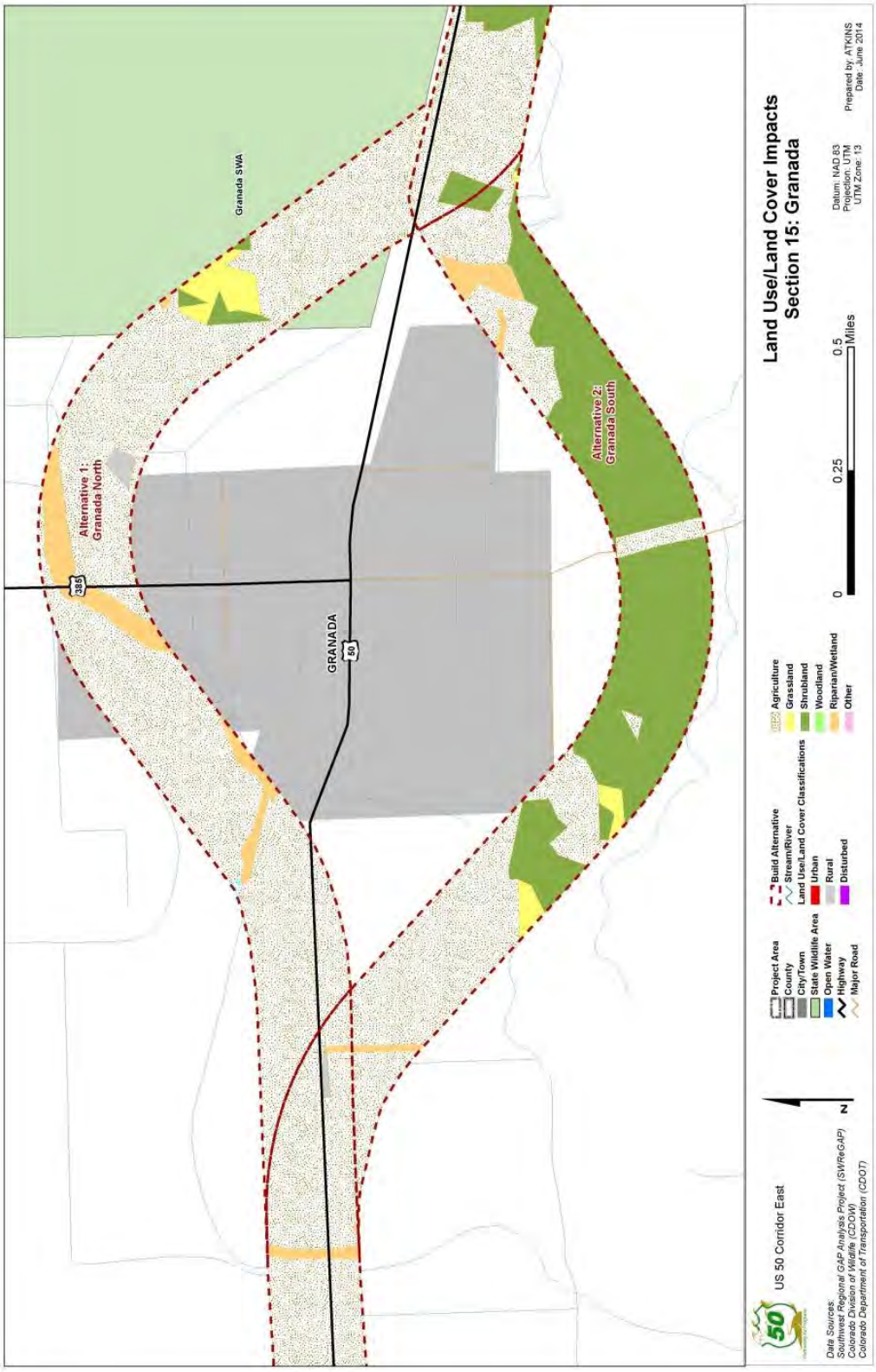


Figure J-35. Lesser Prairie Chicken Habitat Impacts—Granada

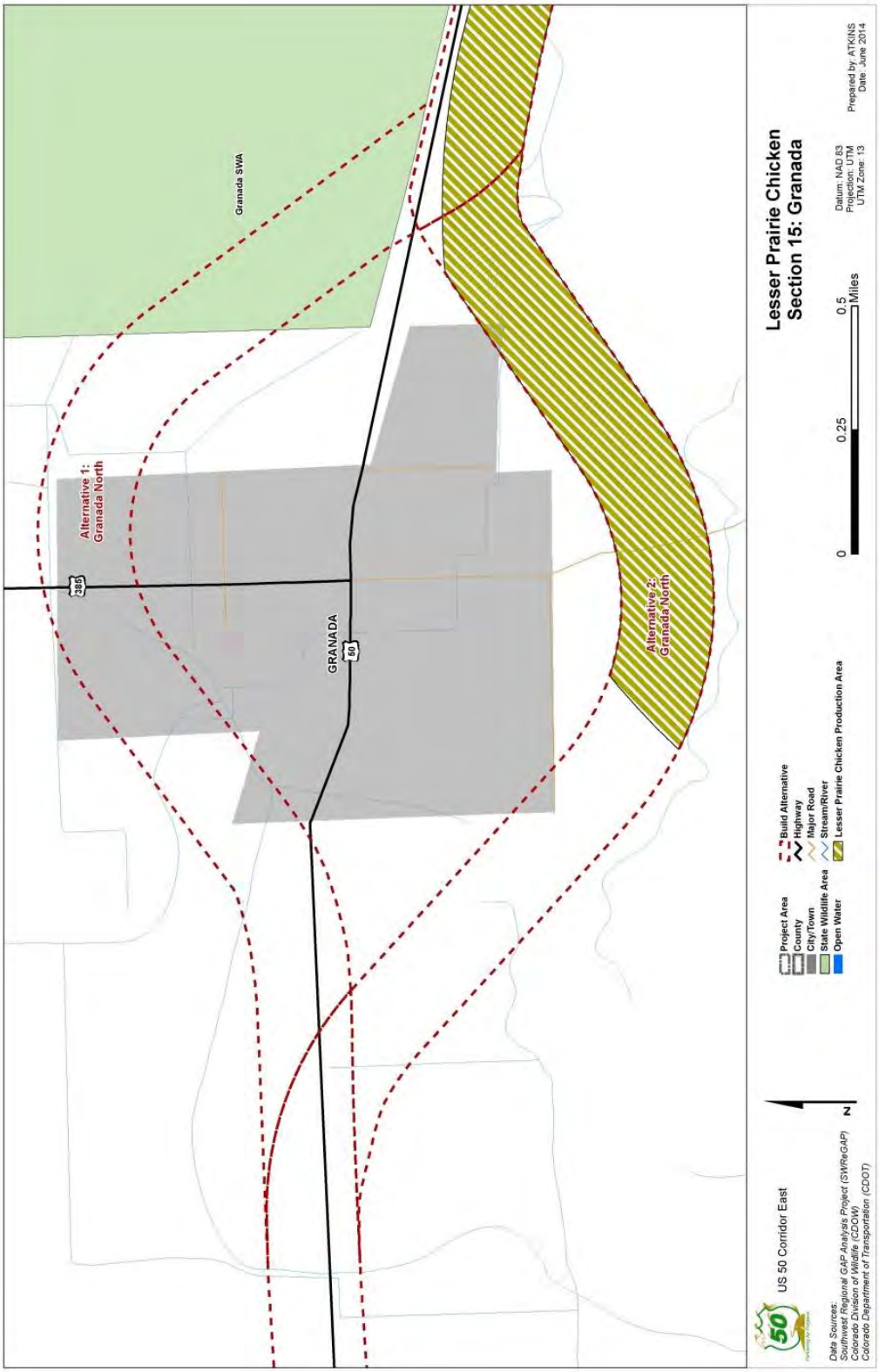


Figure J-36. Land Use and Land Cover Impacts—Granada to Holly

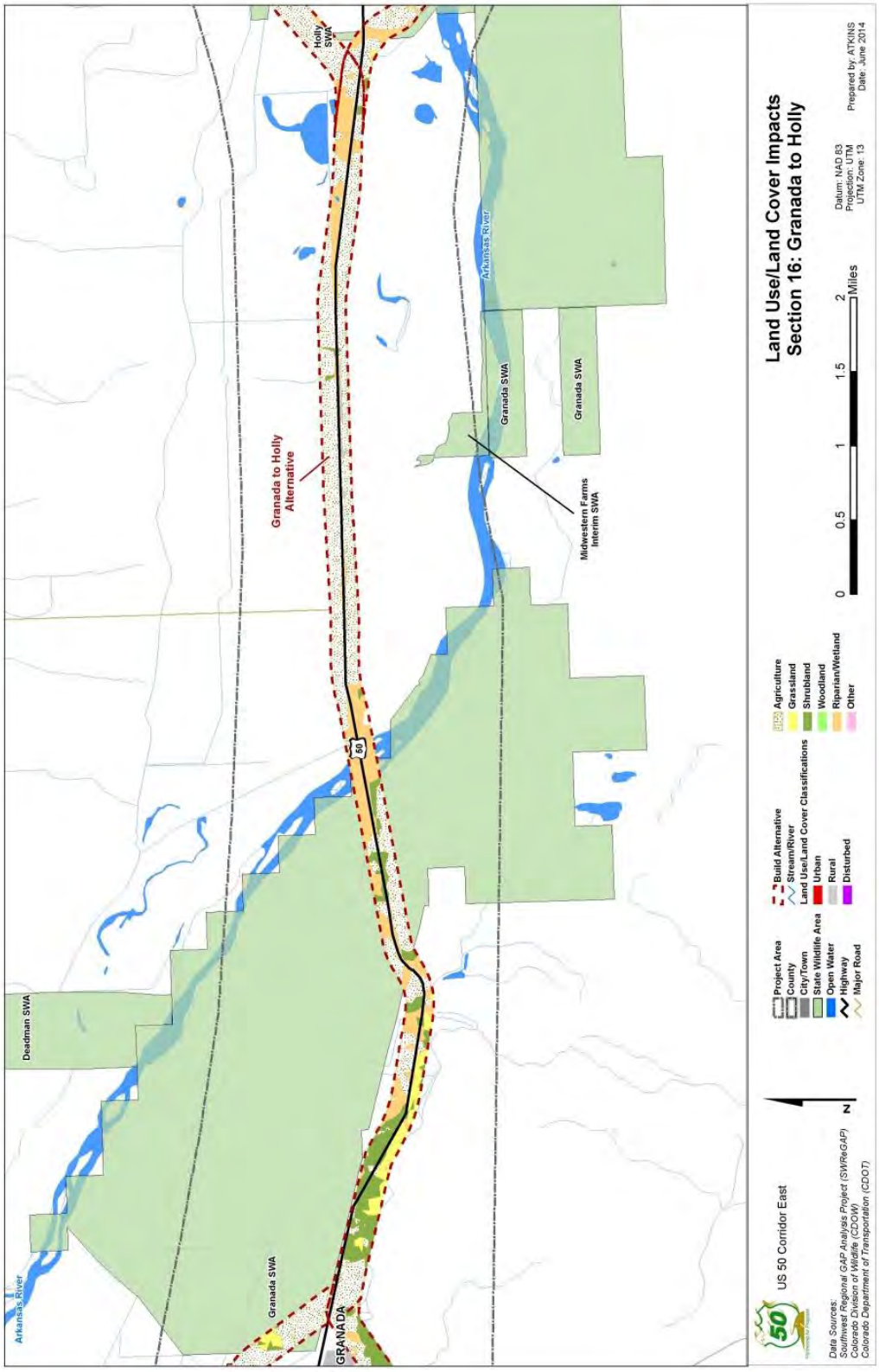


Figure J-37. Lesser Prairie Chicken Habitat Impacts—Granada to Holly

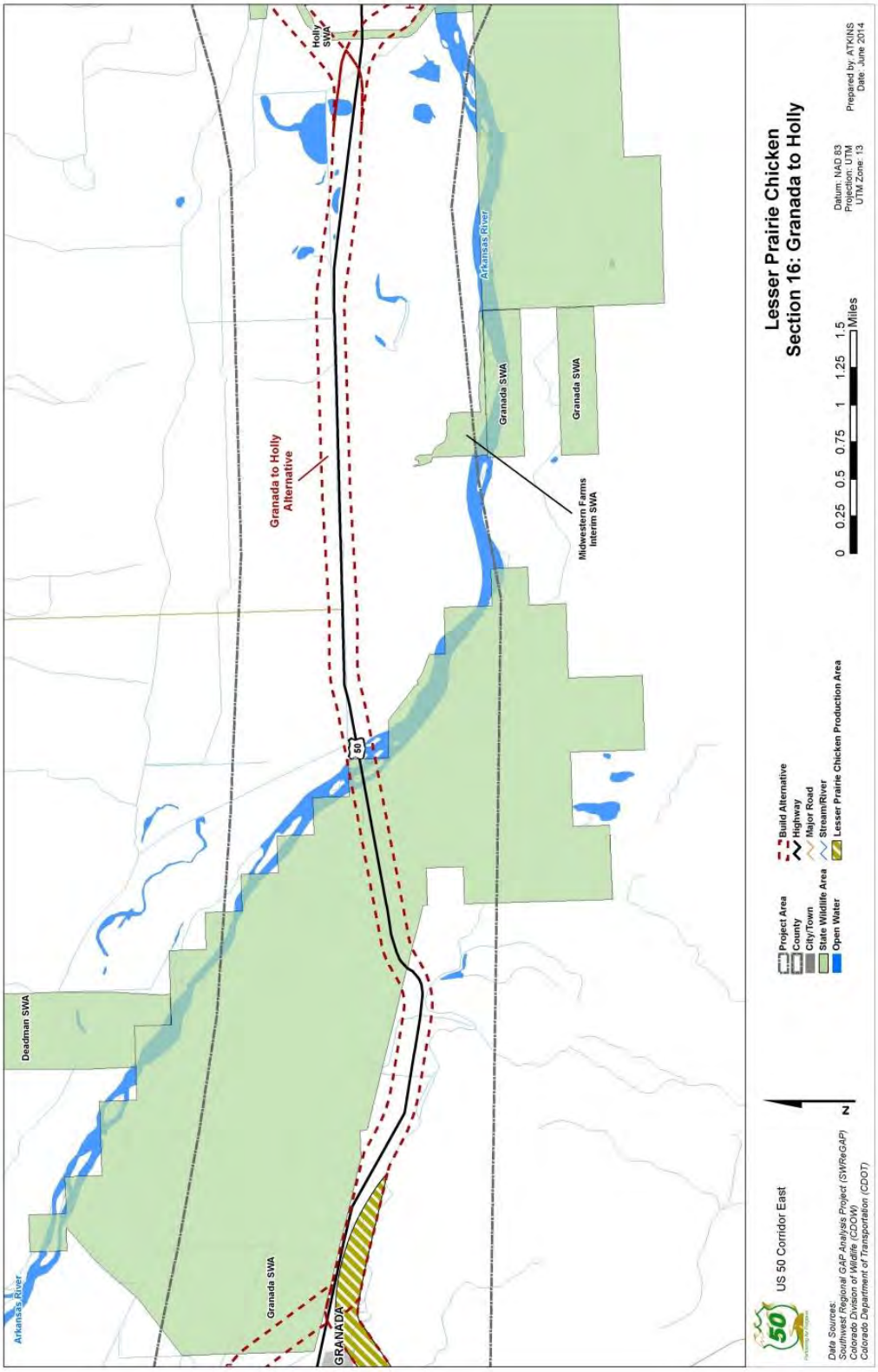


Figure J-38. Land Use and Land Cover Impacts—Holly

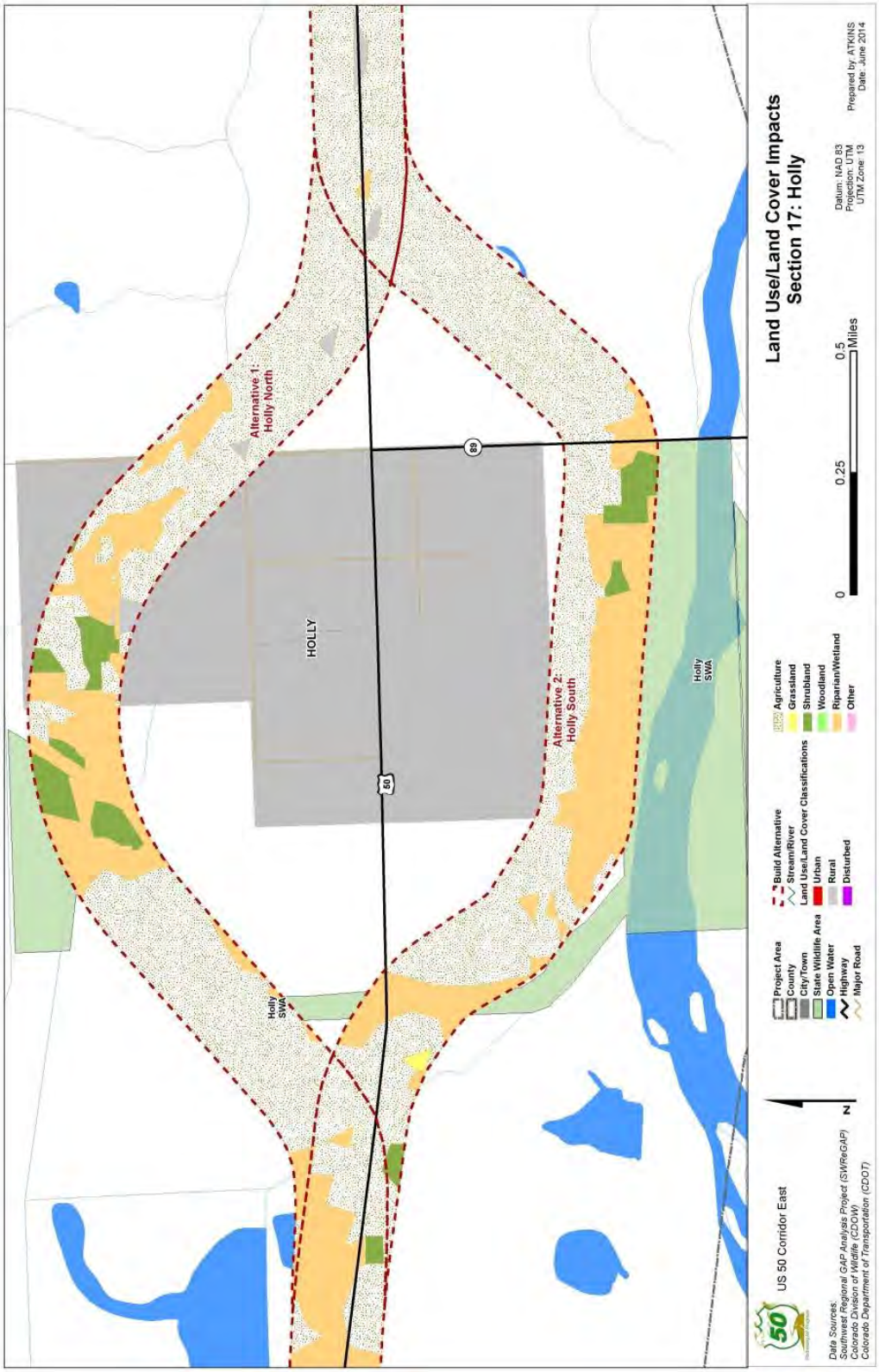
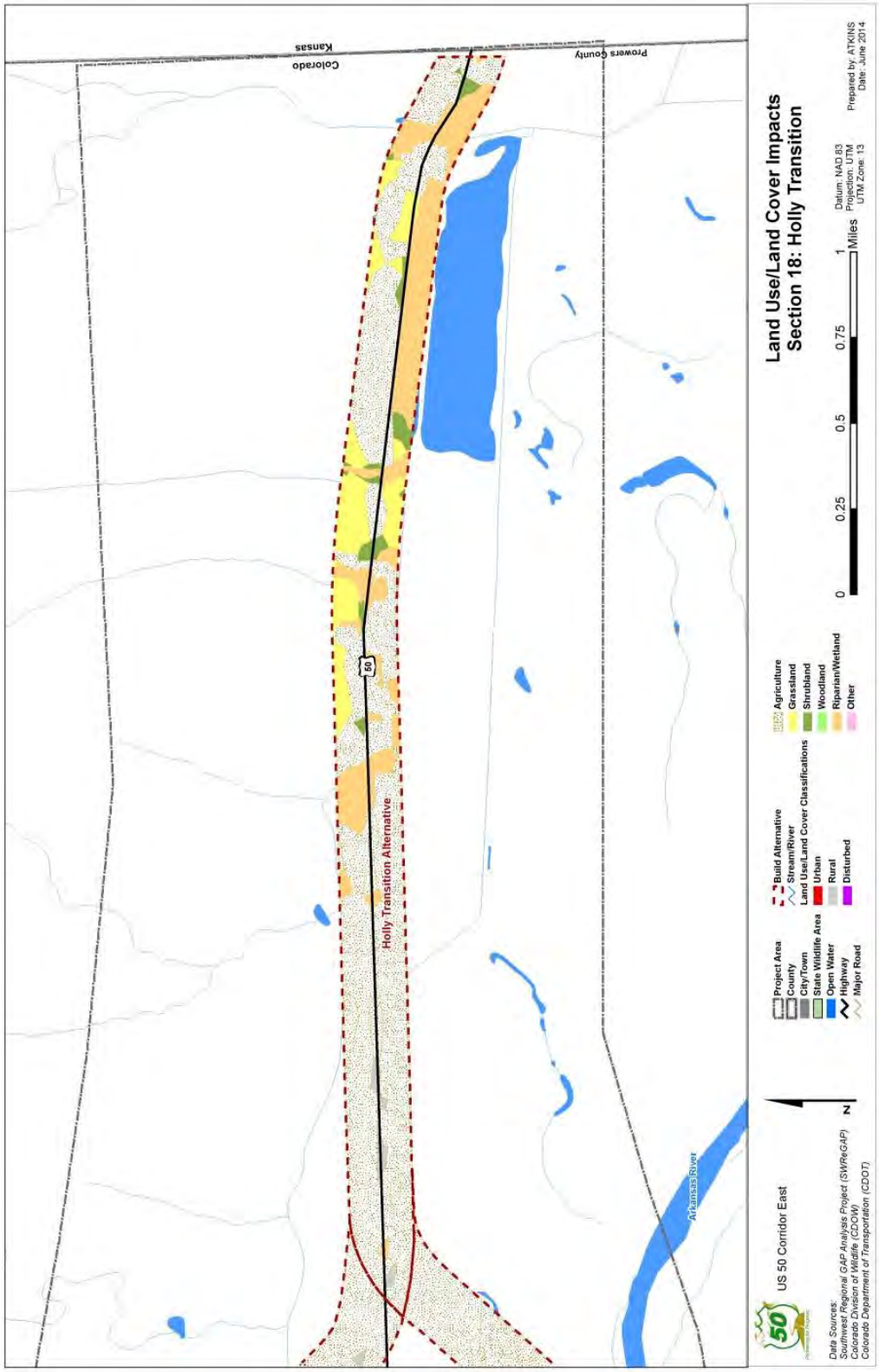


Figure J-39. Land Use and Land Cover Impacts—Holly Transition



This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East
Tier 1 Draft Environmental Impact Statement

Cumulative Effects Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... 1
2. Resource Definition ... 2
3. Applicable Laws, Regulations, and Guidance ... 3
4. Methodology ... 4
4.1. Relevant Data or Information Sources ... 4
4.2. Data Collection and Analysis Methodology ... 5
4.3. Project Area ... 5
4.4. Effects ... 5
4.5. Definition of Reasonably Foreseeable Actions ... 6
4.6. Mitigation Options ... 6
4.7. Deliverables ... 6
5. Existing Conditions and Trends ... 7
5.1. Socioeconomic Conditions and Trends ... 7
5.2. Natural Environment Conditions and Trends ... 11
5.3. Transportation-Related Conditions and Trends ... 12
6. Reasonably Foreseeable Actions ... 15
6.1. Projects ... 15
6.2. Environmental Protection and Regional Transportation Policy ... 16
7. Effects ... 17
7.1. No-Build Alternative ... 17
7.2. Build Alternatives ... 17
8. Mitigation Strategies ... 26
9. References ... 27
Appendices ... 31
Appendix A. Resource Methodology Overview for Cumulative Effects ... 33
Appendix B. Abbreviations and Acronyms ... 37

Tables

Table 5-1. Historic Population Trends within the Project Area 8
Table 5-2. Recent Population Change 8
Table 5-3. Forecasted Population Change in Project Area Counties 9

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 7-1. Build Alternatives Overview 18

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment,* includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency… or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects for the U.S. 50 Tier 1 EIS involve resources that are directly or indirectly affected by the Build Alternatives. If the alternatives have no direct or indirect effect on a resource, then it would not contribute to cumulative effects upon the resource.

The term “project counties” refers to the counties located partially within the U.S. 50 project area. These counties include Pueblo, Otero, Bent, and Prowers counties.

3. Applicable Laws, Regulations, and Guidance

This analysis adheres to 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). No other laws, regulations, and guidance were used.

4. Methodology

The U.S. 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 activities 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 U.S. 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 cumulative effects has been 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

Multiple sources of information and data were used to evaluate cumulative effects. Some of those sources are listed in the reference section of this document. Resource-specific sources are listed in the corresponding technical memorandum for that resource. All of these technical memoranda have been attached to the U.S. 50 Tier 1 EIS as appendixes.

These sources were used to identify:

- Resources that have the potential to be affected by the Build Alternatives
- Effects from the Build Alternatives on those resources
- Past, present, and reasonably foreseeable future actions that have affected or could affect resources in the project area
- General trends in the project area that have affected or could affect resources

4.2. Data Collection and Analysis Methodology

This analysis compared potential effects resulting from the Build Alternatives to potential effects resulting from general trends and other actions occurring in the Lower Arkansas Valley (i.e., past, present, and reasonably foreseeable future actions). The general scale of each effect was determined to compare whether the Build Alternatives would substantially contribute to the cumulative effect on the resource. If a cumulative effect is expected, then the nature and size of that effect was identified. Where there was a relationship between effects, the cumulative results of those effects were discussed.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

Effects to resources by the Build Alternatives were identified either quantitatively or qualitatively, depending on the nature of the resource. Because of the length of the project corridor, effects include considerations for human and natural systems that are complex and far-reaching; a comprehensive understanding of effects at the Tier 1 level of analysis is limited to overarching trends and assumptions. Additionally, this cumulative effects analysis is based upon impacts to key resources, rather than effects to specific resources. Key resources are those that are critical to the sustainability of the project area and potentially to the Lower Arkansas Valley as a whole. These include:

- Socioeconomic conditions—Settlement patterns and population change are related to the local farming industries of the area. Agriculture has been the primary economic generator for the communities of the region, and much of the culture of the area is based upon this characteristically rural livelihood. Other economic resources include sand and gravel mining and wind energy development. The area has potential for new economic resources in the way of industrial manufacturing and distribution.

- Natural environment conditions—The semi-arid climate of south-eastern Colorado increases the importance of water resources and wetland and riparian habitats. Cumulative impacts on these limited resources are potentially significant for the area.

- Transportation-related conditions—The transportation system within the Lower Arkansas Valley is particularly important for delivering agricultural products to market, providing safe and efficient travel for local motorists, and providing access to tourist destinations. The transportation system has other local and regional effects that include impacts to air quality, noise, and aesthetic conditions of the area.

4.5. Definition of Reasonably Foreseeable Actions

The analysis of cumulative impacts for U.S. 50 considered actions not directly related to project alternatives considered within the Tier 1 EIS. This included actions of other major federal, state, and private actions in the study area. Instead of including every possible foreseeable action within the study area, “reasonably foreseeable actions” have been limited to those actions that have an effect on key resources. Additionally, projects considered typically have received preliminary approvals or have advanced in project development. Other foreseeable actions include programmatic efforts by public or advocacy groups that affect key resources along the corridor (e.g., ongoing tamarisk reduction efforts to improve water quality and mitigate flooding). The full list of actions considered is included in Section 6, Reasonably Foreseeable Actions. Generally these include:

- Roadway improvement projects
- Major water projects within the Lower Arkansas Valley
- Freight plans and priority freight route designation for truck or rail traffic
- Regional Transportation Plans (RTPs)
- Major efforts to reduce or mitigate poor environmental conditions

4.6. Mitigation Options

Mitigation strategies for individual resources have been identified in the technical memoranda completed for each resource, which are attached to the U.S. 50 Tier 1 EIS as appendices. They also are documented by resource in Chapter 4 of the EIS.

4.7. Deliverables

This Cumulative Effects Technical Memorandum is the primary deliverable related to cumulative effects for the U.S. 50 Tier 1 EIS.

5. Existing Conditions and Trends

The existing condition of the project area is directly related to past human activities in the area and the ongoing impacts of those activities on the ecological systems of the Lower Arkansas Valley. Trends in the demographics and socioeconomics of the project area and quality of the natural environment are impacted by transportation activities that occur in the Lower Arkansas Valley, just as transportation activities in the region relate to the ecological and economic sustainability of those resources for the people that live and travel through the area. The following discussions identify broad-scale trends related to these resources in the project area.

Socioeconomic conditions include settlement patterns and population change as related to the local farming industries of the area. It also includes a discussion of other built environment trends, including trends impacting historic resources, archaeological resources, and land use. Natural environment conditions include trends related to water resources, wetlands, and riparian habitats. Transportation-related conditions include trends related to the transportation system and related resources, such as air quality and aesthetic conditions of the area.

5.1. Socioeconomic Conditions and Trends

The Homestead Act of 1862 had a substantial effect on the Great Plains—including the Lower Arkansas Valley. The Act gave willing settlers 160 acres of land for free, but in return settlers were required to make improvements to the land (i.e., build a house) and live there for at least five years. No single act had a greater effect on the Great Plains. It brought tens of thousands of settlers to the region. Settlers subsequently introduced farming and ranching as the region's primary economic activity.

The arrival of the railroad in the 1870s accelerated human settlement in the Lower Arkansas Valley and, along with it, accelerated land conversion activities. The railroad enabled more settlers to reach the region, and towns quickly sprang up along its route. As transportation systems modernized, and travel via automobile increased, the roadway between the largest communities of the Lower Arkansas Valley was established. U.S. 50 was among the first cross-country routes established within the National Highway System in 1926. These original settlement patterns established trends for future population and economic growth.

5.1.1. Population Trends

With the exception of Pueblo, the communities in the Lower Arkansas Valley generally are small, rural, and agricultural in nature. As mentioned above, the Homestead Act had significant effects on population and settlement in the Great Plains. Since construction of U.S. 50 in 1926, population growth in the project area has remained fairly stagnant—with a 21.1 percent increase in population between 1930 and 1990 (from 20,656 to 26,188 individuals, respectively) and, in some instances, actual decreases in population, as shown in Table 5-1.

Table 5-1. Historic Population Trends within the Project Area

Census Geography	1930	1940	1950	1960	1970	1980	1990	Percent Change	
								Overall	Annualized
Pueblo County	66,038	68,870	90,188	118,707	118,238	125,972	123,051	86.3%	1.4%
Pueblo	50,096	52,162	63,685	91,181	97,774	101,686	98,640	96.9%	1.6%
Otero County	24,390	23,571	25,275	24,128	23,523	22,567	20,185	-17.2%	-0.3%
Fowler	968	922	1,025	1,240	1,241	1,227	1,154	19.2%	0.3%
Manzanola	578	531	543	562	451	459	437	-24.4%	-0.4%
Rocky Ford	3,426	3,494	4,087	4,929	4,859	4,804	4,162	21.5%	0.4%
Swink	418	374	336	348	381	668	584	39.7%	0.7%
La Junta	7,193	7,040	7,712	8,026	7,938	8,338	7,637	6.2%	0.1%
Bent County	9,134	9,653	8,775	7,419	6,493	5,945	5,048	-44.7%	-0.7%
Las Animas	2,517	3,232	3,223	3,402	3,148	2,818	2,481	-1.4%	-0.02%
Prowers County	14,762	12,304	14,836	13,296	13,298	13,070	13,347	-9.6%	-0.2%
Granada	352	342	551	593	551	557	513	45.7%	0.8%
Holly	971	864	1,236	1,108	993	969	877	-9.7%	-0.2%

Between 2000 and 2010, the City and County of Pueblo had a growing population of more than 100,000 people and a diversified economy beyond agricultural activities. In contrast, populations in the communities east of Pueblo range from approximately 400 people to 7,800 people (2010 Census). These communities are not growing significantly, and between 2000 and 2010, the communities east of Pueblo actually experienced an average decline in population of 12.5 percent (2010 Census; Table 5-2).

Table 5-2. Recent Population Change

2010 Census Geography	2000 Population	2010 Population	Difference	Percent Change 2000–2010	
				Overall	Annualized
Pueblo County	141,472	159,063	17,591	12.4%	1.2%
Pueblo	102,121	106,595	4,474	4.4%	0.4%
Otero County	20,311	18,831	-1,480	-7.3%	-0.8%
Fowler	1,206	1,182	-24	-2.0%	-0.2%
Manzanola	525	434	-91	-17.3%	-1.9%
Rocky Ford	4,286	3,957	-329	-7.7%	-0.8%
Swink	696	617	-79	-11.4%	-1.2%
La Junta	7,568	7,077	-491	-6.5%	-0.7%
Bent County	5,998	6,499	501	8.4%	0.8%
Las Animas	2,758	2,410	-348	-12.6%	-1.3%
Prowers County	14,483	12,551	-1,932	-13.3%	-1.4%
Granada	640	517	-123	-19.2%	-2.1%
Holly	1,048	802	-246	-23.5%	-2.6%

Source: U.S. Census Bureau, Census 2010, Tables P001 (2000), P1 (2010), "Total Population"

Although in recent years the majority of the project area has seen a decrease in population, the Colorado State Demography Office projects some growth over the next 30 years within the project counties. Table 5-3 summarizes the 2040 forecasted population and the overall population change for the project counties.

Table 5-3. Forecasted Population Change in Project Area Counties

Census Geography	2010 Population	2040 Forecast Population	Percent Change 2010–2040	
			Overall	Annualized
Pueblo County	159,063	228,300	43.5%	1.5%
Otero County	18,831	21,821	15.9%	0.5%
Bent County	6,499	6,644	2.2%	<0.1%
Prowers County	12,551	15,102	20.3%	0.7%

Source: State Demography Office, Population Projections, 2010 to 2040 (2014)

5.1.2. Agricultural Resources and the Project Area Economy

The Lower Arkansas Valley has a long history of farming and ranching that dates back to the late 1800s. In fact, agriculture has been the foundation of the region's economy for more than a century. Approximately 3.5 million acres of the land in the project counties is used for agricultural activities (Census of Agriculture 2007b), and 11 percent of employment in Otero, Bent, and Prowers Counties is provided by the agricultural sector (DOLA 2007). The most productive farming was, and continues to be, made possible by water sourced from the Arkansas River watershed. Approximately 200 miles of canals and ditches within the project area serve as man-made water sources for farming activity. These sources are viable due in part to major water management projects of the Fryingpan-Arkansas water project. Authorized in 1962, the Fryingpan-Arkansas water project resulted in the construction of reservoirs, pumping stations, and pipelines that divert water from Colorado's Western Slope to the Arkansas River basin.

From approximately 1950 to 2007, there was a gradual decline in the amount of agricultural lands within the project counties. Some of this loss was the result of the transfers of water rights from the Lower Arkansas Valley to fast-growing municipalities along Colorado's Front Range. Water sales can reduce the amount of irrigated farmland, since the water being sold can no longer be used to irrigate fields. Between 1950 and 2007, the project counties experienced a 0.5 million acre (or roughly 13 percent) decrease in farmland and ranch lands (Census of Agriculture 2007b).

Continuing recent trends, it is likely that the agricultural industry in the Lower Arkansas Valley will continue to decline. This situation is, in part, due to increasing demand for water supplies in Colorado metropolitan areas, as previously mentioned. Additional transfers of water rights will likely occur as metropolitan areas along Colorado's Front Range search for water supplies, and farmers find it more profitable to sell their water than to plant crops. Additionally, a study by the Environment Colorado Research and Policy Center predicts that 484,000 acres of farm and ranch lands in the project counties will be converted to other uses by 2022. This figure represents a decline of 46 percent in Pueblo County, 3 percent in Bent County, 13 percent in Otero County, and 2 percent in Prowers County. In Pueblo, the losses are expected to result, in part, from urban development; however, development is not expected to cause substantial losses in the other project counties.The report also indicates that agricultural decline is not limited to the Lower Arkansas Valley, but is a statewide trend. These trends have the potential to reduce agricultural output in the region.

Even with this decline in agricultural activity, the Lower Arkansas Valley's agricultural output remains substantial. In 2007, the total market value of agricultural production in the four project counties was approximately $506 million. This is equivalent to 9 percent of the value of the state's total agricultural production (CO AgInsights 2007). Some of the agricultural acreage was used to graze cattle and facilitated the sale of approximately 323,000 cattle and calves in 2007. This figure represented about 10 percent of all such animals sold in the state (Census of Agriculture 2007a).

Despite the project counties' agricultural contribution to the state, these counties lag behind most other Colorado counties in economic activity. This has resulted in all four counties being located within Colorado Enterprise Zones (OEDIT 2009b). The State established these zones in 1986 to encourage job creation and capital investment in economically depressed areas (i.e., areas with high unemployment rates, low per

capita income, and slower population growth than the state average). Three of the counties (Otero, Bent, and Prowers) also were designated as Colorado Enhanced Rural Enterprise Zones for the 2009–2010 fiscal year (OEDIT 2009a)—a state-run program intended to support job creation in economically lagging rural counties.

The counties east of Pueblo County recognize the need to diversify their economies, as Pueblo County has already done. However, recent economic trends in those counties reflect minimal growth or economic diversification. Some new businesses have established themselves in the Lower Arkansas Valley in recent years, including a private prison in Las Animas and a wind farm south of Lamar. Also, the Fort Lyon Veteran's Administration medical facility (located east of Las Animas near the John Martin Reservoir) was converted into a state correctional facility in 2002. However, two major employers went out of business in 2006, including a transit bus manufacturing plant in Lamar (Neoplan USA) and a food processing plant in La Junta (Bay Valley Foods).

Surface mining is another source of economic development in the Lower Arkansas Valley. There are 19 active mines, and all but one extracts gravel, sand, or both (Colorado Division of Reclamation, Mining, and Safety (CDRMS) 2009). These facilities are located throughout the project area, including eight mines in Pueblo County, six mines in Otero County, two mines in Bent County, and three mines in Prowers County.

The size of the communities east of Pueblo does not support the types of economic development activities found in more highly populated areas (e.g., big-box stores, commercial airports, etc.). Also, the current condition of U.S. 50 (having only two lanes in certain locations) makes the highway unattractive to businesses that require a fast, efficient transportation system to move goods from their locations to and from regional or long-distance destinations.

Residents and economic development agencies in the Lower Arkansas Valley have begun efforts to increase tourism to the region as a way to diversify local economies. Given that Colorado's population grew by 727,935 residents between 2000 and 2010, and it continues to grow, there is a large market of potential tourists who could visit the Lower Arkansas Valley if interesting attractions were made known (2010 Census). Different types of tourism are being considered in the Lower Arkansas Valley, including heritage tourism, ecotourism, and agritourism. Heritage tourism focuses on historic resources, while ecotourism focuses on natural resources (landscapes and wildlife), and agritourism focuses on agricultural activities.

5.1.3. Other Built Environment Trends

Because the construction of I-70 reduced the importance of U.S. 50 as a coast-to-coast highway, the resulting slower economic growth in these communities (when compared to fast-growing communities on the Front Range) has affected historic resources in two ways. First, it limits the amount of money available for preservation efforts. However, at the same time, this slower growth has required communities to continue to use older buildings, which often serves to maintain their historic characteristics.

Trends in the Lower Arkansas Valley have served to both preserve and destroy archaeological resources. Permanent settlement of the region resulted in development that has likely destroyed some of the archaeological resources located there. Examples of that development occurring after 1960 include new and expanded farming and ranching operations and construction of U.S. 50 itself. Additional resources may have been destroyed by periodic river flooding and by the creation of the John Martin Reservoir (near Las Animas).

More recently, that trend has reversed. The construction of I-70 reduced the importance of U.S. 50 as a coast-to-coast highway. Today, traffic volumes on U.S. 50 are much lower than on I-70. This condition has contributed to slower economic growth in these communities when compared with the fast-growing communities of the Colorado Front Range (those having at least one interstate highway running through them). This slower economic growth has helped preserve archaeological resources by reducing the rate of development and, therefore, the potential to impact buried cultural remains.

Most of the communities in the project area have not adopted comprehensive (land use) plans. Only five local governments have prepared planning documents that include portions of the project area: the City of

Pueblo, Pueblo County, Bent County, the Town of Fowler, and the City of Las Animas. Most of the municipalities do have zoning ordinances, and a few have additional plans focused on transportation or recreational trails. However, the low level of development that has occurred east of Pueblo in recent decades has not provided communities a reason to increase their planning activities. Additionally, all the municipalities in the project area identified future growth areas for their city or town. However, due to the existing trend toward slow growth in these communities, it is unclear when, or if, that development would occur.

5.2. Natural Environment Conditions and Trends

Human settlement of the region has resulted in substantial modifications to the natural environment within the project area. This has included the conversion of native grassland and wetland and riparian resources into farms, ranches, roads, cities, and towns. Human settlement also has resulted in the consumption and degradation of water resources. These modifications have affected the types of wildlife and plants that occupy the project area.

The settlement of the region into an agricultural-based economy drastically altered the native wildlife and plants in the Lower Arkansas Valley. Modern ecologists have identified an area of roughly 90,700 square miles in portions of seven contiguous midwestern and western states that is known as the central shortgrass prairie ecoregion (TNC 1998). This includes all of Colorado's eastern plains, encompassing more than 42,700 square miles, or about one third of the state. It also includes portions of Wyoming, Nebraska, Kansas, Oklahoma, Texas, and New Mexico. According to The Nature Conservancy, the majority of this ecoregion has been cultivated, with only 40 percent remaining in large, untilled landscapes (TNC 1998). The Nature Conservancy notes that "[g]rasslands are considered to be one of the most imperiled ecosystem types in North America and worldwide" (TNC 1998). The report states that the primary threats to the ecoregion are altered disturbance regimes (e.g., fire, grazing), agricultural conversion, residential development, water pollution, and groundwater withdrawal. To help stem further decline of more than 100 wildlife and plant species in this ecosystem, CDOT entered into a Memorandum of Agreement with The Nature Conservancy, the FHWA, the U.S. Fish and Wildlife Service (USFWS), and Colorado Parks and Wildlife (formerly the Colorado Division of Wildlife) in 2001. This agreement describes how the parties will work together for habitat conservation and how CDOT will use best management practices to avoid, minimize, and mitigate the impacts of highway maintenance and improvements within this ecoregion.

First delivered in 1975, diversion of waters from Colorado's western slope to support agricultural uses and other development also drastically changed the water quality, quantity, and seasonal flow patterns of the lower Arkansas River basin, resulting in changes to associated riparian habitat. These habitat changes occurred because the water diversion brought more water to the area than would naturally occur in this semi-arid region. Additionally, the use of dams allowed peak flows to be controlled, enabling the release of stored water during dry spells, which provided a more stable flow over time. This altered the natural flood-based scouring for which native riparian vegetation was adapted. About two million acre-feet of river water were diverted from the Arkansas River for irrigation in 1998 (CWCB 2002). The gross demand for water from the Lower Arkansas River is expected to increase by 800 acre-feet by 2030 (CWCB 2006).

Currently, U.S. 50 communities get roughly 75 percent of their drinking water from alluvial aquifer shallow wells, 11 percent from deep aquifer wells, and 14 percent from surface water resources (Black & Veatch et. al 2010). The water from the Arkansas River is considered suitable for agricultural use and drinking water, but the lower portion of the river (from Pueblo to the Colorado-Kansas state line) is officially listed by the Colorado Department of Public Health and the Environment as being impaired primarily due to high concentrations of selenium (CDPHE 2010). Selenium naturally occurs in shale formations, and water flow from surface runoff or irrigation return flows across shale causes selenium to leach out into creeks and rivers. Salinity is also a major impairment in the lower Arkansas River, and irrigation activities are a substantial contributor to that impairment.

In addition, settlers introduced noxious weeds to the region, which affected native plant species and water quality in the valley. Tamarisk generally was planted to serve as a wind break, create shade, or stabilize eroding stream beds. It also was planted as an ornamental shrub. However, planted tamarisk overwhelmed

native plant species, spreading quickly and extensively after its introduction to the region and reducing the availability of habitat for wildlife in the area.

Tamarisk is also a substantial contributor to poor water quality in the lower Arkansas River by consuming far more water than native species of the area. The higher water consumption results in substantial water loss within the basin and, in turn, increases the concentration of pollutants within it. Approximately 11,300 acres of tamarisk occurs throughout the project area, primarily near the Arkansas and Huerfano rivers (CDOW 2004, SWReGAP 2006). It has been estimated that tamarisk along the Arkansas River consumes 53,800 acre-feet of water per year (CWCB 2006b). Its ability to reproduce and grow quickly has enabled tamarisk to spread quickly and extensively along the Arkansas River and cause substantial harm to the quality of water resources in the basin.

Urban stormwater runoff also will increase with continued rapid growth in the Colorado Springs and Pueblo metropolitan areas, bringing increased sedimentation and other pollutants into the Arkansas River. Stormwater regulations are in place for both communities to minimize adverse stormwater effects associated with new development.

Lastly, the construction of U.S. 50 in 1926, and subsequent improvements on the roadway, has impacted the wildlife and habitat native to the Lower Arkansas Valley. The highway creates a substantial obstacle for wildlife to cross when accessing areas they use for feeding, getting water, sleeping, and other needs. Available data show that more than 40 animals, primarily deer, were reported killed or injured by vehicles on U.S. 50 in the project area in 2009 (CDOT 2009b). The locations wildlife select as crossings generally are determined by the habitat types (i.e., the environments they use for food and cover) and surface water that exists on either side of the road, as well as travel routes (e.g., stream corridors). Most crossings on U.S. 50 are found in areas where the highway crosses a water resource, such as the Arkansas River, or is adjacent to a state wildlife area. A total of 16 priority wildlife crossing locations were identified along U.S. 50 in the Lower Arkansas Valley.

5.3. Transportation-Related Conditions and Trends

As previously discussed, U.S. 50 was among the first cross-country routes established within the National Highway System. U.S. 50 is a coast-to-coast element of the National Highway System, extending from Ocean City, Maryland, to Sacramento, California. Construction of the interstate highway system, more specifically I-70 in northern Colorado, increased the emphasis on cross-country travel via this roadway, diminishing the attractiveness of U.S. 50 for this purpose. Thus, traffic volumes on U.S. 50 today are relatively low compared with those on roadways in the more urbanized portions of Colorado. However, because U.S. 50 is connected to multiple truck routes (i.e., primarily I-25 and U.S. 287) and continues to support a large amount of agricultural activities, this traffic is extremely diverse. It typically includes passenger vehicles, farm vehicles and equipment, recreational vehicles, and trucks hauling cargo (box trucks and 18-wheel vehicles). In many locations, U.S. 50 also serves as Main Street in the communities through which it passes and is the backbone of the local street system.

Over time, national roadway design standards have evolved to make roads safer and more efficient. Each time changes were made to U.S. 50, design standards current at that time were used. Over many decades, this has resulted in a mixture of different roadway characteristics. Today, as a result, there are more than 170 roadway changes within the 150-mile U.S. 50 corridor (CDOT 2003b). These changes include posted speed limits changing by 10 mph or more in 28 instances and 60 road width changes due to variations in shoulder width, median width, and number of lanes. These frequent changes in the roadway's design reduce safety on U.S. 50. Drivers expect the design of a roadway to be relatively consistent over a reasonable distance (known as driver expectancy). National safety studies have shown that roads with frequent design changes, or a lack of driver expectancy, increase the risk of crashes (McGee et al. 1986, Ogden 1990).

Frequent changes in roadway design are of greatest concern to long-distance users, who pass through infrequently and are likely to be unfamiliar with the road. Regional and intercity users, who make frequent, moderate-length trips on the corridor, also may be affected. For these users, the problem is not their own driver expectancy but their greater frequency of being in harm's way when long-distance users encounter the

design changes. U.S. 50 serves long-distance, regional, and local transportation needs and accommodates a number of diverse users with different—and sometimes conflicting—travel needs. The conflicts created by the different types of users and their different needs hinder mobility and create safety issues along U.S. 50.

Mobility needs are different for the different users of U.S. 50. Inadequate mobility on U.S. 50 in the Lower Arkansas Valley has been cited as a factor that limits economic development in the area. According to City Manager Rick Klein of La Junta, poor mobility on U.S. 50 limits the area's ability to retain and attract transportation-dependent businesses. In 2006, two major employers along the corridor ceased their operations: the Neoplan bus manufacturing facility in Lamar and the Bay Valley Foods plant in La Junta. Transportation concerns were cited as one of the issues making these operations noncompetitive. Similarly, local efforts to attract a Wal-Mart distribution warehouse reportedly were rebuffed because U.S. 50 is not a four-lane highway. With agriculture in the Lower Arkansas Valley in a continuing decline, all communities along the corridor are seeking to diversify their economies. This will be difficult to accomplish with inadequate mobility on U.S. 50.

A study conducted near milepost 339 (west of Fowler) in November 2006 found that, on average, one out of every 20 vehicles on the road was traveling at a speed of 15 mph or slower (CDOT 2007b). During the active farming season, the percentage would likely be much higher. U.S. 50 is a two-lane highway in this area, with more miles of no-passing zones than miles where passing is allowed.

The safety and mobility issues, along with the user conflicts on U.S. 50, are expected to be compounded by increased traffic volumes in the future. While the overall population of the corridor east of Pueblo has generally decreased since 2000, traffic on this portion of U.S. 50 nevertheless has experienced modest growth (a 2.8 percent increase from 1995 to 2000) (CDOT 2007a). The population of Colorado as a whole has been growing rapidly and is expected to continue to do so. Even with minimal population growth in the Lower Arkansas Valley itself, the expected addition of nearly three million new residents in the state by 2040 will likely increase traffic on the U.S. 50 corridor (CDOT 2008a).

Based on projections of increased traffic over the next 25 years, the 2003 CDOT Safety Assessment Report for U.S. 50 estimated that the total crash frequency for the two- and four-lane segments is expected to increase by 81 percent and 50 percent, respectively, if the highway is not substantially improved (CDOT 2003c). Proposed improvements to U.S. 50 will allow the corridor to accommodate the varied needs of existing and future users.

Since designation of the Clean Air Act in 1970, and mandated continuous monitoring of air quality, there is no history of vehicle-related violations of air quality standards in the project counties. However, in Lamar, particulate matter was monitored at levels that violated pollutant standards in the 1980s, due to exceptional dust events. The most recent violations occurred in 2008, 2009, and 2011. The Attainment/Maintenance Plan for Lamar documents all the recorded exceedances of the EPA standards as Exceptional Events caused by high wind. Windblown particulate matter from agricultural fields generally is linked to disturbed soils. Future vehicular volumes are not expected to cause a violation in pollution standards in any of the communities along the U.S. 50 corridor despite increases in traffic.

Prior to construction of U.S. 50, views and viewsheds were increasingly affected by the growth of rural towns, expansion of rail lines throughout the Lower Arkansas Valley, and growing agricultural activity. The most significant aesthetic changes would have been natural prairie lands transitioning into cultivated farmland. Most views from U.S. 50 (of surrounding areas) and of U.S. 50 (from surrounding areas) have not changed dramatically since the highway was built. The exception is in the city of Pueblo where the pace of development has been greater than in the communities to the east.

Over time, views from U.S. 50 in Pueblo have become more urban, replacing views of ranch land and native vegetative cover with residential, commercial, and industrial development. Today, these views are dominated by this type of development. Closer to I-25, this development is relatively dense. Traveling east, it becomes less dense. Also, U.S. 50 has been improved in this area since it was built. Therefore, views of the highway include more pavement area (i.e., more travel lanes and other elements, such as turn lanes) than in the past.

East of Pueblo, the communities in the Lower Arkansas Valley have maintained their small, rural, and agricultural nature. Also, populations in these communities have been decreasing in recent decades (2010 Census). For these reasons, views from U.S. 50 in the Lower Arkansas Valley east of Pueblo have not changed substantially over the years. Views typically include agricultural or small town elements, such as farmland, ranch land, rural residences, and small town urban development. Because of the proximity of the Arkansas River, views from the highway often include the river as well as irrigation canals and ditches that carry its water to nearby farmland. The BNSF Railway also has tracks that generally run parallel to U.S. 50 through the Lower Arkansas Valley; therefore, views commonly include tracks and trains as well. U.S. 50 has not been substantially improved east of Pueblo since it was built. Therefore, views of the highway have remained relatively consistent over the years.

6. Reasonably Foreseeable Actions

The analysis of cumulative impacts for the U.S. 50 corridor considered direct and indirect impacts of the proposed Build Alternatives, as well as existing conditions and the actions of other major federal, state, and private agencies. Those projects considered to be “reasonably foreseeable actions” have typically received preliminary approvals, or are included in local or regional plans.

6.1. Projects

6.1.1. Southern Delivery System (SDS)

The SDS is a project to supplement existing municipal drinking water supplies in the communities of Colorado Springs, Fountain, Security, and Pueblo West by moving water from the Pueblo Reservoir through a pipeline to those communities. The environmental study evaluating proposed routes for the pipeline has already been completed. Construction began in 2011 and is ongoing.

6.1.2. Arkansas Valley Conduit (AVC)

The Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract FEIS was published in August 2013. The purpose of the AVC is to deliver clean water from the Pueblo Reservoir to the communities between Pueblo and Lamar in southeastern Colorado. The communities intend to use this water to supplement or replace existing drinking water sources. Even though it was authorized nearly 50 years ago, the conduit was never built due primarily to the federal requirement that local communities and water districts repay 100 percent of the cost of the conduit (Black & Veatch et. al 2010). The AVC is projected to increase water delivery by 10,000 acre-feet by 2070 for the entire Arkansas Valley and will account for more than 80 percent of the future demand.

The preferred alternative identified in the FEIS would include updates to municipal water treatment systems and construct new pumping systems to maintain system pressure. Piping is planned to remain on the north side of the river for the majority of the route, minimizing impacts to the same areas as the existing U.S. 50 alignment, as well as the project area, at most locations along the corridor. According to the FEIS, east of Pueblo, the preferred alternative would have short-term negligible to minor impacts on the human environment [BOR 2013].

6.1.3. New Pueblo Freeway

The FEIS for the New Pueblo Freeway was published in September 2013 and the ROD was published in April 2014. In general, the New Pueblo Freeway is intended to improve I-25 through Pueblo. The preferred alternative widens and realigns sections of I-25 through Pueblo. The first phase of the project is anticipated to begin construction in the summer of 2014. This project will have impacts associated with its urban context, including socioeconomic and transportation effects as well as environmental effects, namely, moderate impacts to wetland/riparian areas and impacts to wildlife. The preferred alternative would impact 0.02 acre of open water, 2.54 acres of riparian habitat, 0.93 acre of wetland, and 9.49 acres of wooded upland habitat. (CDOT 2013a). As reported in the FEIS, CDOT will prioritize the replacement of wetland on a one-to-one basis within the project area, but the exact determination of locations for replacement wetland are not know at this time.

6.1.4. U.S. 287 at Lamar Reliever Route

Projects related to a planned alignment for U.S. 287 around Lamar will remove heavy truck traffic from the city’s downtown streets, improving local operations and access to businesses and services in the downtown business district on U.S. 287 Main Street, and accommodating future growth of freight traffic. Additionally, the project will address a range of safety issues, including improving traffic and pedestrian safety in downtown Lamar and rerouting large freight and hazardous materials away from the downtown business district and the at-grade crossing of the BNSF Railway route through downtown Lamar. The U.S. 287 at

Lamar Reliever Route Project is a realignment of the highway approximately one mile east of U.S. 50 that would remain contiguous with U.S 287 along the new route around Lamar.

6.1.5. Wind Power Projects

Wind projects in the Lower Arkansas Valley include the 162-Megawatt-generating Colorado Green Wind Power Project 30 miles south of Lamar and the 75-Megawatt Twin Buttes Wind Project in south Bent County. Although the actual land use impacts of these projects is minimal, continued maintenance of wind farms occasionally requires transportation access for oversized loads.

6.2. Environmental Protection and Regional Transportation Policy

In addition to major projects anticipated to have direct and indirect effects to key resources in the study area, several plans and programs provide policies and guidance for regional transportation improvement and environmental mitigation. These plans and programs may not be considered to be “reasonably foreseeable actions,” but are included as a reference to the cumulative effects discussion.

6.2.1. Pueblo Area Council of Governments (PACOG), 2040 Long-Range Transportation Plan

The vision for U.S. 50 identified in the 2040 PACOG Long-Range Transportation Plan describes needs for the corridor that include mobility, safety, and system quality (PACOG 2015). This document recommends that U.S. 50 be made a statewide priority.

6.2.2. Southeast Transportation Planning Region, 2040 Regional Transportation Plan

The 2040 plan identifies U.S. 50 as a priority corridor for the region. Planning goals for the corridor include accommodating increases in freight and tourist/recreation traffic, increasing safety and local mobility, and supporting economic development while maintaining environmental quality.

6.2.3. Arkansas River Watershed Invasive Plants Plan (ARKWIPP)

This overarching plan for future riparian restoration efforts in the Arkansas Valley includes guidance for education, funding identification, and information sharing among agencies for the purpose of reducing invasive species, specifically tamarisk and Russian olive. Roadway design and mitigation efforts for projects on U.S. 50 will impact wetland and riparian areas where tamarisk thrives.

6.2.4. R2C2 Rail Relocation Implementation Study

In 2007, CDOT initiated a study to determine the feasibility of relocating existing freight rail lines along Colorado’s Front Range to locations on the eastern plains—the Rail Relocation Implementation Study (R2C2). Both alternatives studied would remove freight traffic from rail lines west of Las Animas and would take more direct routes northward. Passenger rail benefits were not included in the study. Ultimately, the study recommended more detailed engineering and additional environmental analysis be conducted in the future for both of the study’s alignments. To date, no additional studies have been initiated.

7. Effects

The following sections describe cumulative effects that may be caused by the No-Build Alternative and the Build Alternatives.

7.1. 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 U.S. 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. Because the No-Build Alternative only includes minor and isolated construction, any cumulative effects that may result from the alternative are expected to be discountable; therefore, cumulative effects as a result of this alternative are not discussed further in this section.

7.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 50 from its current through-town route at Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. Figure 7-1 provides an overview of the Build Alternatives as proposed.

The remainder of this section discusses the potential for cumulative effects from the Build Alternatives to socioeconomic conditions (agricultural resources, diversification of local economies, land use conversion, parklands and recreational resources, historic resources, and archaeological resources), natural environment conditions (include water resources, wetlands, and riparian habitats), transportation related conditions (includes the transportation system, aesthetic conditions of the area, noise, and energy), and global climate change. At the Tier 1 level of analysis, cumulative effects are not discussed for geologic and paleontological resources, environmental justice, air quality, hazardous materials, or Section 6(f) resources.

7.2.1. Socioeconomic Conditions Cumulative Effects

Cumulative impacts to socioeconomic conditions include effects to resources that are important for the economic vitality and character of communities along the U.S. 50 corridor. Since agricultural activities make up the primary economic sector for the project area, the cumulative impacts of U.S. 50 and other projects in the Lower Arkansas Valley are significant. Reviewing the cumulative effects of economic diversification, land use conversion, and impacts to other cultural resources—including historic, archaeological, and aesthetic resources—is essential to maintain the character and legacy of people in the area.

Because the specific effects to environmental justice populations have not been identified, it is not possible to identify cumulative effects to that resource. Effects to environmental populations will be identified during Tier 2 projects.
First

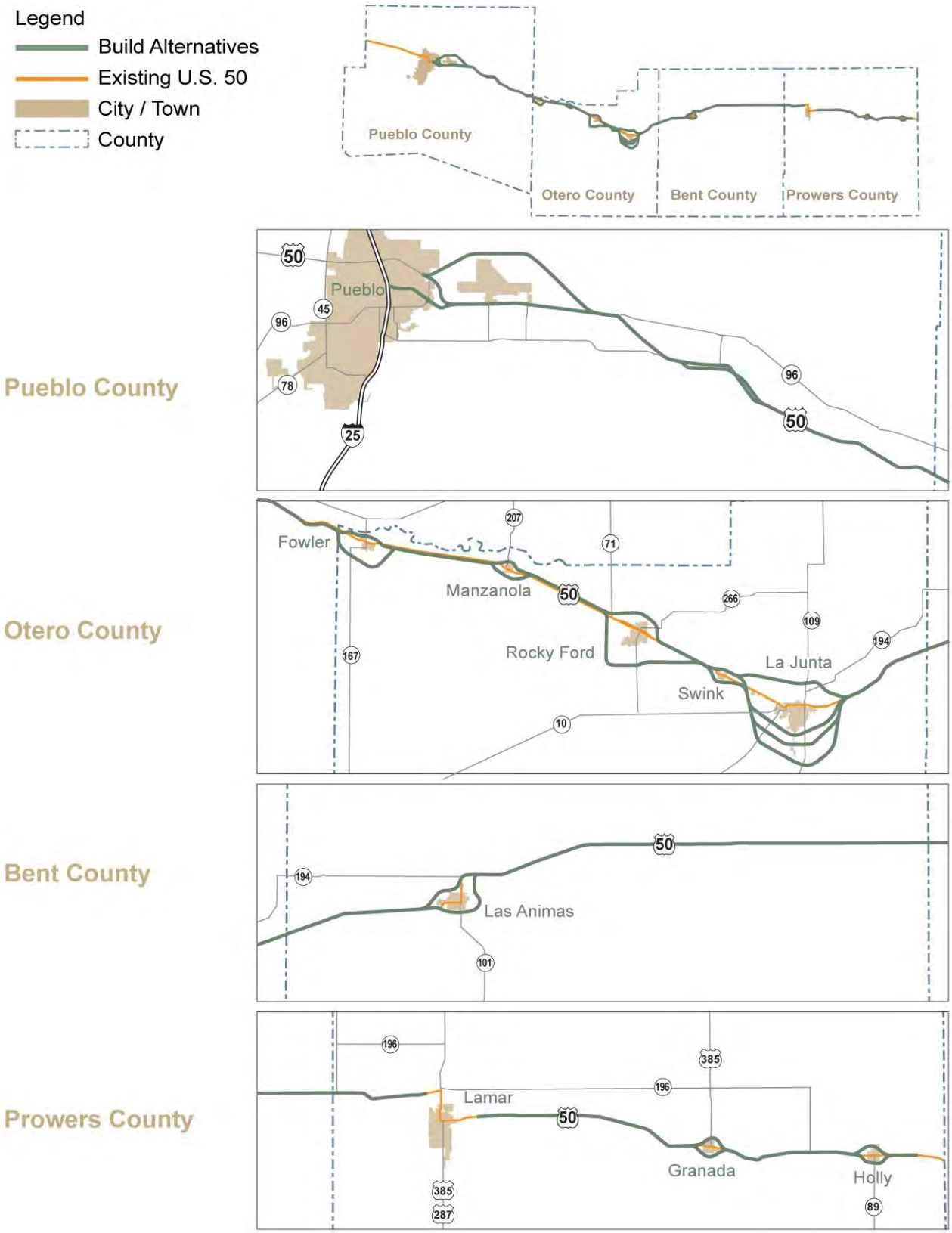


Figure 7-1. Build Alternatives Overview

Agricultural Resources

In addition to the direct effects of U.S. 50 on agricultural resources mentioned in Section 4.1 of the U.S. 50 Tier 1 EIS, the U.S. 287 at Lamar Reliever Route Project is expected to impact agricultural resources in the Lower Arkansas Valley. The proposed route is expected to impact approximately 365 acres of farmland of statewide importance and farmland considered prime under certain conditions. The U.S. 50 Build Alternatives would impact between 2,866 acres to 3,047 acres of farmland of statewide importance and farmland considered prime under certain conditions. The cumulative effect of this impact amounts to about 1 percent of the loss already predicted in the four project counties over the next two decades and 0.5 percent of the total value of agricultural goods produced by the four project counties in 2007, which was $506 million. Although this loss is significant for the economic vitality of the communities along the U.S. 50 corridor, it is not anticipated to affect the general trend of decreasing agricultural activity in the Lower Arkansas Valley.

Water projects, such as the Arkansas Valley Conduit and Southern Delivery System, have the potential to reduce water available for agricultural activities (i.e., irrigation). These impacts are only anticipated to be noticeable during drought years and during the winter season. With less predictability, there is the chance of this resulting in more land being removed from productive agricultural use.

Build Alternatives and other reasonably foreseeable actions have the potential to provide increased mobility for farm-to-market activities, making it easier for farmers and ranchers to get their products to market. For example, if the railroads decide to choose an alternative as proposed by the R2C2 Rail Relocation Implementation Study, this would increase access to reliable transportation of goods from farm producers in the Lower Arkansas Valley, particularly east of Las Animas. Despite the trend toward decline, agricultural activities are expected to remain an integral part of the economy of the region. Therefore, reducing farm-to-market transportation costs could enable farmers and ranchers to spend those dollars on new equipment or other technologies that could increase the productivity of their operations.

Diversification of Local Economies

The counties east of Pueblo County recognize the need to diversify their economies. Recent economic trends in those counties, however, reflect minimal growth or diversification. This may be due to the continuing productivity of farming and ranching in the area and the lack of petroleum resources that are present in other rural areas of Colorado. Nonetheless, some new businesses have relocated to the Lower Arkansas Valley, including a private prison in Las Animas and a wind farm south of Lamar. The Fort Lyon Veteran's Administration medical facility (located east of Las Animas near the John Martin Reservoir) was converted to a state correctional facility in 2002. The correctional facility closed in 2011 and, in September 2013, the facility opened as a rehabilitation center for homeless people. Two major employers went out of business in 2006: a transit bus manufacturing plant in Lamar (Neoplan USA) and a food processing plant in La Junta (Bay Valley Foods).

Residents and economic development agencies along U.S. 50 have begun efforts to increase tourism to the region as a way to diversify local economies. Given that Colorado's population grew by 16.9 percent from 2000 to 2010 and it continues to grow, there is a large market of potential tourists who could visit the Lower Arkansas Valley if interesting attractions were made known (Census 2010). Different types of tourism are being considered in the area, including heritage tourism, ecotourism, and agritourism. Heritage tourism focuses on historic resources, ecotourism focuses on natural resources (landscapes and wildlife), and agritourism focuses on agricultural activities.

The following reasonably foreseeable future actions would support tourism efforts in the Lower Arkansas Valley, which residents hope will increase economic activity in the area:

- FHWA is proposing a new access point to the Bent's Old Fort National Historic Site that would allow tourists to access the site directly from U.S. 50. Today, drivers must use either SH 109 in La Junta or SH 194 north of Las Animas to reach the site.
- The federal government has authorized $38 million for the preservation of World War II relocation centers. Currently, the Granada Relocation Center National Historic Landmark is open to visitors, but there is minimal interpretive infrastructure on the site. Plans exist for a visitor's center, parking lot, and other infrastructure to educate visitors about the site.

- In 2005 and 2006, the Colorado Historical Society awarded grant monies to communities along U.S. 50 to preserve particular resources and promote heritage tourism along the highway. Grant recipients in 2006 included the Bent County Courthouse and Jail in Las Animas.
- Southeastern Colorado is part of North America's western Central Flyway. Therefore, it is home to the annual migration of snow geese and many other bird species in abundant numbers. Colorado Parks and Wildlife has developed birding trails that include segments of the flyway in the Lower Arkansas Valley. The division is constructing four kiosks related to the trail along U.S. 50 (in Fowler, La Junta, Lamar, and Holly).
- Farmers in the region are using agritourism activities, such as roadside produce markets and pick-your-own produce activities, to expand their businesses and profitability.
- The new around-town routes would reduce traffic in existing downtown areas. This could make these areas more pedestrian friendly. Since most of the identified historic resources (those known to be historic and potentially historic) are located within these downtowns, this type of change could help communities encourage heritage tourism within their jurisdictions.

The U.S. 50 Tier 1 EIS project has already made a contribution to the Lower Arkansas Valley's heritage tourism efforts by releasing a summary of the historic resources identified along U.S. 50, as well as a historic context overview to Section 106 consulting parties. This research may help residents and economic development agencies identify resources worthy of preservation and promotion.

When added to past, present, and reasonably foreseeable actions, the Build Alternatives' benefit of improved safety and reliability has the potential to have a cumulative benefit to the social and economic conditions in the project area by assisting in the diversification of the corridor economy. Further analysis will be conducted during Tier 2 studies.

Land Use Conversion

As discussed in other sections, through the 1950s, historic settlement patterns caused much of the change in landscape from natural prairie and wetland of the Arkansas River floodplain to agricultural and urban uses. With this general trend in urban development came the identification of private property, public lands, parks, open space, and transportation uses. Within the 150-mile-long project area, a total of 36 public lands and 27 conservation easements were identified (either in whole or in part). As development pressure slowed within communities, the conversion of farmland and ranch lands has diminished. Including U.S. 50, other forseeable future projects in the Lower Arkansas Valley will transfer the land to a transportation use from some other use (primarily agricultural). This conversion of land use is significant for the area, but the cumulative effect is minimal considering the relative impacts of individual resources as identified in the U.S. 50 Tier 1 EIS.

Parklands and Recreational Resources

The Build Alternatives could affect up to 13 parkland or recreational resources over its 150-mile length. However, direct effects to these resources are localized. Reasonably foreseeable future actions are not anticipated to have a significant cumulative impact on these same resources, nor are the general effects to parkland and recreational resources of concern for the Lower Arkansas Valley. It should be noted that with improved mobility throughout the U. S. 50 corridor due to the Build Alternatives, the New Pueblo Freeway, and the U.S. 287 at Lamar Reliever Route, there are better opportunities for visitors to travel to and from parklands and recreational sites.

Historic Resources

Historic resources include homestead sites and transportation and irrigation infrastructure. Several of the reasonably foreseeable future actions discussed in Section 6.0 have the potential to affect historic resources. These include the AVC, the U.S. 287 at Lamar Reliever Route, and the New Pueblo Freeway (by acquiring the properties) or indirectly (by causing noise, visual, or other affects). The cumulative impacts to historic resources of the Lower Arkansas Valley are expected to be greatest where direct and indirect impacts of other urban activities are anticipated. The New Pueblo Freeway would have an adverse effect on 40 historic resources (CDOT 2013a). These impacts combined with the potential for induced growth could cause increasing development pressure on historic properties along U. S. 50 near to Pueblo. Impacts to

historic properties are likely to be less substantial east of Pueblo. The U.S. 287 at Lamar Reliever Route is not expected to have an adverse effect on historic properties (CDOT 2013b). Most of the direct effects to historic properties identified in the AVC FEIS are located near the Pueblo Reservoir, outside of the project area. However, it is likely that cultural deposits will be impacted along the route.

While the U. S. 50 Build Alternatives would not have a direct effect on Bent's Old Fort National Historic Site or the Granada Relocation Center National Historic Landmark, it may have indirect effects on these properties. These effects would be identified during Tier 2 studies when the roadway footprint (i.e., alignment) in these areas is determined.

The cumulative effect on historic properties in the Lower Arkansas Valley is minor. Because of the large scale and linear nature of foreseeable projects in the area, there are few opportunities for avoiding resources in certain circumstances. It is not anticipated, however, that U.S. 50 will impact the overall trend of ongoing minimal disturbances of historic resources in the area.

Archaeological Resources

Historic settlement trends have served to both preserve and destroy archaeological resources. Permanent settlement of the Lower Arkansas Valley resulted in development that likely has destroyed some of the archaeological resources located there. Examples of that development occurring after 1960 include new and expanded farming and ranching operations and construction of U.S. 50 itself. Additional resources may have been destroyed by periodic river flooding and by the creation of the John Martin Reservoir (near Las Animas).

More recently, that trend has reversed. The construction of I-70 reduced the importance of U.S. 50 as a coast-to-coast highway. Today, traffic volumes on U.S. 50 are much lower than on I-70. This condition has contributed to slower economic growth in these communities when compared with the fast-growing communities of the Colorado Front Range (those having at least one interstate highway running through them). This slower economic growth has helped preserve archaeological resources by reducing the rate of development and, therefore, the potential to impact buried cultural remains.

Within the Area of Potential Effects, 17 archaeological resources were identified. Most of these resources have been categorized as "needs data." This means that more information about the resource is needed before a determination of eligibility for the National Register of Historic Places can be made.

However, cumulative effects resulting from the Build Alternatives—when added to other past, present, and reasonably foreseeable future actions—are unlikely to be a significant detriment to the archaeological database of the Lower Arkansas Valley. This is because so few known resources have the potential to be affected by the Build Alternatives, and those resources directly adjacent to U.S. 50 (where most of the improvements would take place) have already been disturbed by human settlement, primarily by farming and ranching activities.

7.2.2. Natural Environment Cumulative Effects

The most significant impacts to resources of the Lower Arkansas Valley include those related to water, wetlands, wildlife, and wildlife habitat. These resources are limited in the region and particularly vulnerable to human activity. Other trends, such as Global Climate Change and meteorological phenomena such as drought, have the potential to compound the cumulative effects of human activity on the environment. Cumulative effects to natural resources are discussed below.

Wetland and Riparian Resources

Historically, the Fryingpan-Arkansas water projects of the 1960s had the most significant impacts to wetland and riparian resources of the Lower Arkansas Valley. However, reasonably foreseeable future actions—including the Arkansas Valley Conduit, Southern Delivery System, and the U.S. 287 at Lamar Reliever Route Project—in addition to impacts of the Build Alternatives, have the potential to temporarily and permanently impact wetland and riparian resources by acquiring land, thereby reducing the quantity and quality of these resources.

Combined with reasonably foreseeable future actions in the Lower Arkansas Valley, the impacts of the U.S. 50 Build Alternatives on wetland resources are moderate. The Build Alternatives would affect between 587 and 711 acres of wetland. The AVC project would have a temporary impact on 29 acres of wetland and four open water sources. (BOR 2013). The Southern Delivery System is expected to have a permanent impact on 13.4 acres of wetland, most of which are Category III (defined as more common than Category I or II wetlands and have less vegetative diversity; see page 4-30 for definitions of each category). The SDS also would impact eight miles of streambed. These are considered to be moderate temporary impacts, but minor effects in the long term.

The greatest threat to wetland and riparian resources in the project area is the invasion of salt cedar, commonly referred to as tamarisk. According to data from the Southwest Regional Gap Analysis Project (2006) and Colorado Division of Wildlife (now Colorado Parks & Wildlife; 2004), approximately 11,300 acres of tamarisk exist within the project area. The largest, contiguous blocks of tamarisk are located along the Arkansas and Huerfano rivers; however, smaller patches occur in other locations as well. This highly invasive, non-native shrub has become a major problem in southeastern Colorado. Tamarisk invades native wetland and riparian resources, reducing their ability to function (or provide benefits to the environment). Additionally, tamarisk also can change the formation of stream channels and thereby prevent native plant species from taking root. Consequently, the tamarisk in the project area is not only degrading existing resources, it also is preventing the creation of new ones. Left unmitigated, the potential is great for tamarisk to have significant negative impacts on wetland and riparian habitats. U.S. 50 Build Alternatives are not anticipated to affect this past trend negatively, and have the potential to support several existing efforts to slow and reverse the invasion of tamarisk to native wetland and riparian resources.

Currently, there are several projects to eradicate tamarisk in the area. The ARKWIPP, an overarching plan for wetland restoration, is working to establish guidelines and policies for eliminating invasive species in the area. If successful, this effort will significantly reduce the effects of tamarisk and will reduce the cumulative effects of projects on water resources. Additionally, the Conservation Reserve Program could help preserve wetland/riparian resources in the region. The program encourages the use of agricultural land for natural purposes instead of development. Because irrigation efforts bring additional water to this land, some of it may serve as wetland or riparian areas when it is not being actively farmed.

The U.S. 50 Tier 1 EIS project has already made a contribution to the conservation of wetland/riparian resources by developing the U.S. 50 Tier 1 EIS Natural Resources Mitigation Strategies Plan (attached as an appendix of the U.S. 50 Tier 1 EIS). 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. Since wetland/riparian resources serve as habitat to certain types of wildlife, they are discussed in this plan. While the mitigation strategies in the plan are tied to the roadway improvements, they also provide a framework for future, collaborative planning efforts by key stakeholders for natural resource related issues in the Lower Arkansas River Valley.

Because U.S. 50 and other reasonably foreseeable projects are implementing the policy of “no net loss” and would mitigate for permanent impacts to wetlands, the proposed project is not expected to have a permanent, negative effect on wetland and riparian resources when added to other past, present, or reasonably foreseeable future actions.

Wildlife and Wildlife Habitat

Approximately 194,700 acres of wildlife habitat were identified in the project area. The Build Alternatives would affect between 4,388 and 4,737 acres of it, which represents slightly more than 2 percent of this total. Also, the Build Alternatives could affect up to 25 special-status species that are either known to be present or are potentially present within the Build Alternatives.

Some of the reasonably foreseeable future actions discussed in Section 6.0 have the potential to affect wildlife and plants (i.e., habitat). These include energy-related activities and the U.S. 287 at Lamar Reliever Route Project. The U.S. 287 at Lamar Reliever Route Project would affect shortgrass prairie and wetland habitat, causing some fragmentation and removal of foraging areas and nesting sites, causing interference with behavioral activities, and increasing animal mortality. Wind energy projects south and east of Lamar

have the potential to increase bird mortality because of bird strikes or expenditure of additional energy to avoid wind farms.

However, these impacts—when combined with the effects of past, present, and reasonably foreseeable future actions—are unlikely to have a substantial cumulative effect on the Lower Arkansas Valley's natural environment or the wildlife or plants found within it for the following reasons:

- The project generally occurs along the existing alignment of U.S. 50 or close to existing urban centers. As a result, any habitat affected by Build Alternatives would be located near areas that have already been disturbed by human settlement.
- Much of the corridor has already been converted from native plant communities into agricultural production, so construction of Build Alternatives is likely to occur on land that has already been disturbed by human settlement.

Water Resources

The Build Alternatives have the potential to adversely affect water quality by increasing the amount of pollutants that are carried from the surface of U.S. 50 along with stormwater into nearby water resources. This increase would occur in the portions of Build Alternatives where the highway is expanded from two lanes to four lanes and to a lesser extent in the areas where other improvements are added to the highway (i.e., wider shoulders, turn lanes, etc.). Also, additional crossings of water resources by U.S. 50 would be required, primarily over irrigation canals and ditches. These new crossings have the potential to increase the amount of pollutants that reach the surface water resource being crossed and eventually ground water resources. Some of the reasonably foreseeable future actions discussed in Section 6.0 have the potential to affect water resources. These include the Arkansas Valley Conduit, Southern Delivery System, New Pueblo Freeway Project, and the U.S. 287 at Lamar Reliever Route Project.

The preferred alternative identified in the Arkansas Valley Conduit EIS calls for water to be removed from the Arkansas River at the Pueblo Reservoir, reducing the amount of water flowing in the river downstream of that location. As a result, less water may be left in the river to dilute salt, selenium, and other pollutants. This may diminish water quality in the river. However, it is likely that the sponsor of the project, the Southeastern Colorado Water Conservancy District, will commit to mitigating any significant adverse water quality effects resulting from the construction or operation of the conduit. Those commitments would be outlined in an environmental study that evaluates proposed routes for the conduit. That National Environmental Policy Act study is just now beginning.

Similar to the conduit, the Southern Delivery System would remove water from the Arkansas River at the Pueblo Reservoir, reducing water flows downstream, which could negatively affect water quality in the river. However, the participating municipalities (i.e., those receiving the water) have made commitments to ensure that significant adverse water quality effects are mitigated. They have agreed that if the operation of the pipeline causes such effects, whether directly or by diminishing water levels, the municipalities would coordinate with appropriate federal and state agencies to evaluate and select measures to mitigate these effects (BOR 2009).

Three highway improvement projects have the potential to increase the amount of transportation-related pollutants that flow into the river at their locations. The New Pueblo Freeway Project, slated to make improvements to I-25 through Pueblo, includes expansion of the portion of U.S. 50 that crosses Fountain Creek. Additionally, the U. S. 287 at Lamar Reliever Route Project would reroute U.S. 287, which is also U.S. 50 in this area, around that city. The new alignment would require a new crossing of the Arkansas River by U.S. 287-U.S. 50 east of Lamar.

The water quality of the Arkansas River and its tributaries is largely attributable to agricultural practices and upstream development. Stormwater runoff from U.S. 50 contributes minimally to these conditions. Even with runoff from metropolitan areas, the water quality impairment in the lower portion of the Arkansas River is primarily due to selenium and salinity, which are not vehicle-related pollutants. The low traffic volumes on U.S. 50 (on average about 5,500 vehicles per day in 2011) are much less than the volumes found on even a single arterial street in the cities upstream (CDOT 2012). Therefore, while water quality issues are critical

concerns in the region, and it is important to understand how the Build Alternatives could affect them. The effect of the project when added to past, present, and reasonably foreseeable future actions is expected to be minimal.

7.2.3. Transportation Cumulative Effects

Several future actions would contribute to the cumulative impacts of transportation in the study area. These include the New Pueblo Freeway Project and the U.S. 287 at Lamar Reliever Route Project. Additionally, a potential shift of rail traffic as proposed in the R2C2 Plan would allow for rail traffic to serve more local constituents and transport freight.

Transportation

No negative cumulative effects related to transportation issues are expected from the Build Alternatives when added to other past, present, or reasonably foreseeable future actions. However, a cumulative benefit to transportation could occur along the corridor when the Build Alternatives are added to improvements related to the U.S. 287 at Lamar Reliever Route Project. The result could be a cumulative improvement to safety and mobility along the corridor.

Aesthetics and Visual Resources

Views from U.S. 50 (of surrounding areas) would be affected in different ways depending on the location of the traveler. Generally, in Pueblo and between communities, the Build Alternatives would improve U.S. 50 on its existing alignment. Therefore, the character of the views would not change, resulting in no effect. Moving the highway to around-town locations at eight communities would result in drivers who currently see views of urban development on both sides of the highway (driving through a city or town) would see urban development on one side (looking toward town) and rural views on the other (looking away from town) from the new around-town route. However, this change would only mean exchanging in-town views for more of the same views drivers already see between towns. Since the overall character of the new views would be consistent with what drivers see today on other portions of the highway, the result would be no effect to these views.

Some of the reasonably foreseeable future actions discussed in Section 6.0 have the potential to affect what drivers see while traveling on U.S. 50 (i.e., views of surrounding areas). For example, if energy transmission corridors are developed, these projects could add power lines to views from U.S. 50 at some locations. Additionally, large energy-producing projects (i.e., power plants, wind farms, etc.) would add elements associated with those facilities to views at those locations.

Changes to U.S. 50 could alter how residents view the highway (from surrounding areas). Especially where the existing two-lane sections of the highway would be expanded to four lanes, views of U.S. 50 would include more pavement area. This would result from the addition of new lanes, turn lanes, or other improvements.

While these actions would add new elements to views seen from U.S. 50 and views of the highway from surrounding areas, they would not change the rural character of those views substantially. The cumulative effects of these and other reasonably foreseeable future actions within the Lower Arkansas Valley are not expected to impact existing visual resources.

Traffic Noise

U.S. 50 is the primary east-west route through the communities in the Lower Arkansas Valley. Within these communities, many homes, businesses, and public facilities are located immediately adjacent to U.S. 50, and are, therefore, exposed to noise from U.S. 50 traffic today. The average traffic volume on the U.S. 50 corridor was approximately 5,500 vehicles per day in 2011 (CDOT 2012). This is a relatively low volume compared to other, more populated, highways along Colorado's Front Range. On average, traffic volumes are expected to rise by approximately 52 percent by 2040 along the U.S. 50 corridor.

Traffic volumes on U.S. 50 are relatively low today, and they are projected to remain that way into the future (at least until 2040). Both existing volumes and projected volumes are not sufficient to result in a level of

urban traffic noise where abatement measures are considered. Additionally, options that reroute traffic around communities will have the beneficial impact of reducing traffic noise in town, where there is the highest concentration of urban development and people (i.e., where most people hear it). A small number of homes and other noise receptors in the vicinity of the new around-town routes would experience increased noise levels. However, these volumes would not be significantly different than noise levels that are experienced in the portions of the corridor between communities today. For these reasons, the Build Alternative, when added to past, present, or reasonably foreseeable future actions, is expected to have a negligible cumulative effect on traffic noise. Without further analysis, it cannot be determined if that effect would be positive or negative, and that determination is likely to vary at each section of the corridor.

Energy Consumption due to Transportation

The average traffic volume on U.S. 50 in the project area was approximately 5,500 vehicles per day in 2011 (CDOT 2012). In comparison, the average traffic volume on I-25 through Pueblo was 47,846 vehicles per day in 2012 (CDOT 2012). In other words, traffic volumes on U.S. 50 in the region are roughly 12 percent of the volumes on I-25 though Pueblo. By the year 2040, traffic volumes are expected to increase by about 52 percent on U.S. 50 (CDOT 2012). The increase in energy consumption simply due to this increase in traffic is equal to an additional 27,000 gallons of gasoline used per day. U.S. 50 drivers are expected to consume more than 73,000 gallons of gasoline traveling through the Lower Arkansas Valley on an average day in 2040.

U.S. 50 drivers are expected to consume almost 71,500 gallons of gasoline traveling through the Lower Arkansas Valley on an average day in 2040. The additional distance added by the Build Alternatives (i.e., the new around-town routes) would increase this consumption by 3 percent to 6 percent (or 2,200 to 4,100 gallons of gasoline). However, this effect is minimal compared to other factors that are expected to affect energy consumption on U.S. 50 in the future. For example, increases in traffic volumes on the highway through 2040 are projected to increase energy consumption by 46 percent. This translates into an additional 22,500 gallons of gasoline used per day (DOE 2009, EIA 2007). As a result, no cumulative effects related to energy are expected from the Build Alternatives.

8. Mitigation Strategies

Mitigation strategies for individual resources have been identified in the technical memoranda completed for each resource, which are attached to the U.S. 50 Tier 1 EIS as appendices. They also are documented, by resource, in Chapter 4 of the EIS.

Additionally, the U.S. 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 (i.e., plants). The Natural Resources Mitigation Strategies Plan has been attached as an appendix to the 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.

9. References

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2010 Census.* Washington, D.C. 2010. Web. 30 Aug. 2013. <http://www.census.gov/ 2010census/data/>.

Black & Veatch, CDM, Farnsworth Group, Merrick & Company, MWH. *Arkansas Valley Conduit Pre-National Environmental Policy Act State and Tribal Assistance Grant Report.* Southeastern Colorado Water Conservancy District, May 2010. PrintBoczkiewcz, R. "Army's Plans for Piñon Site Blocked." *The Pueblo Chieftain*. 9 Sep. 2009. Print.

Colorado Department of Agriculture. Ag Facts (CO Ag Facts). *Value of Agricultural Products Sold by County.* 2007. Web. Feb. 2014. <http:// www.colorado.gov/cs/Satellite/ag_Markets/CBON/ 1251624534238>.

Colorado Department of Local Affairs (DOLA). *Population Estimates by County and Municipality (2000-2008).* Web. Feb. 2010. <http://www.dola.state.co.us/dlg/demog/pop_totals.html>.

Colorado Department of Public Health and Environment (CDPHE). Water Quality Control Commission. *Section 303(d) List: Water-Quality-Limited Segments Requiring Total Daily Maximum Loads (Regulation #93).* Denver, CO: CDPHE, 9 Mar. 2010. Web. Apr. 2010. <http://www.cdphe.state.co.us/regulations/wqccregs/>.

Colorado Department of Transportation (CDOT). *Final Environmental Impact Statement and Section 4(f) Evaluation for Interstate 25 Improvements through Pueblo.* Denver, CO: CDOT, Sep. 2013. <http://www.coloradodot.info/library/studies/i25puebloeis>. [CDOT 2013a]

Colorado Department of Transportation (CDOT). *U.S. 287 at Lamar Reliever Route Environmental Assessment*. Denver, CO: CDOT. Sep. 2013. <http://www.coloradodot.info/projects/us287lamar>. [CDOT 2013b]

Colorado Department of Transportation (CDOT). *Online Transportation Information System (OTIS) Data for SH050B, 2012*. 2012. Web. Mar. 2014. <http://dtdapps.coloradodot.info/otis>. [CDOT 2012a]

Colorado Department of Transportation (CDOT). *Online Transportation Information System (OTIS) data for Interstate 25 in Pueblo, 2012.* 2012. Web. Mar. 2014. <http://dtdapps.coloradodot.info/otis>. [CDOT 2012b]

Colorado Department of Transportation (CDOT). *Letter from Executive Director Russell George Notifying Interested Parties of the Suspension of the Rail Relocation for Colorado Communities Project, Dated May 24, 2010*. Denver, CO: CDOT, 2010.

Colorado Department of Transportation (CDOT). *Roadkill Database.* 2009. Provided by Jeff Peterson, Colorado Department of Transportation (CDOT) Wildlife Program Manager, Apr. 2010.

Colorado Department of Transportation (CDOT). *The Official Guide to the Scenic and Historical Byways*. Denver, CO: CDOT, 2007. Print.

Colorado Division of Wildlife (CDOW). Consultation with CDOW staff [T. Black, M. Smith, and B. Will] regarding state wildlife areas in the project area, including purpose(s), use(s), funding, and other information relevant to a Section 4(f) analysis of these properties. 5 Nov. 2007.

Colorado Division of Wildlife (CDOW). *Riparian Mapping Methodology.* 2004. Web. Jan. 2007. <http://ndis1.nrel.colostate.edu/riparian/Methods.htm>.

Colorado Office of Economic Development and International Trade (OEDIT). *Colorado Enhanced Rural Enterprise Zone Program Fact Sheet*. Web. 12 Jul. 2009. <http://www.colorado.gov/cs/Satellite /OEDIT/OEDIT/1167928191402>. [OEDIT 2009a]

Colorado Office of Economic Development and International Trade (OEDIT). *Colorado Enterprise Zone Program Fact Sheet.* Web. 12 Jul. 2009. <http://www.colorado.gov/cs/Satellite/OEDIT/OEDIT/1167928191402>. [OEDIT 2009b]

Colorado Springs Utilities (CSU). *Southern Delivery System Project.* 2010. Web. 3 Apr. 2010. <http://www.sdswater.org/default.asp>.

Colorado Water Conservation Board (CWCB). *Arkansas River Basin Facts.* Denver, CO: Colorado Water Conservation Board, Mar. 2002. Web. 2007. <http://cwcb.state.co.us/Board/Fact_Sheets/Arkansas_fs.pdf>.

Colorado Water Conservation Board (CWCB). *Arkansas River Basin Statewide Water Supply Initiative Fact Sheet*. Denver, CO: Colorado Water Conservation Board, Feb. 2006. <http://cwcb.state.co.us/Home/RiverBasinFacts/>. [CWCB 2006a]

Colorado Water Conservation Board (CWCB). *Tamarisk Inventory for the Colorado, Arkansas, and Purgatoire Rivers*. Presented by the Tamarisk Coalition, 25 Jan. 2006. [CWCB 2006b]

Council on Environmental Quality (CEQ). Executive Office of the President. *Considering Cumulative Effects under the National Environmental Policy Act.* Jan 1997. Web. Feb. 2007 <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA*. 40 CFR Parts 1500-1508. Washington, D.C.: GPO, 1978. Print.

Darrow, D. “Pueblo Visit Energizes Prospective Developer.” *The Pueblo Chieftain*. 18 Oct. 2009. Print.

Energy Information Administration (EIA). *International Energy Outlook*. May 2007. Web. Jul. 2009. <http://tonto.eia.doe.gov/ftproot/forecasting/0484(2007).pdf>.

Environment Colorado Research and Policy Center. *Losing Ground: Colorado’s Vanishing Agricultural Landscape.* Denver, CO: Environment Colorado, Mar. 2006. Web. 2008. <http://www.environmentcolorado.org/uploads/Ch/IV/ChIVMUHVcqkMltQLgaPg5g/Losing_Ground.pdf>.

Federal Highway Administration (FHWA). *Bent’s Old Fort Access Road Draft Environmental Assessment and Section 4(F) Evaluation.* Washington, D.C.: Federal Highway Administration. 17 Sep. 2007. Print.

Finau, K. “Six Counties to Benefit from Development of a Southeast Colorado Heritage Tourism Marketing and Capacity Building Campaign.” Las Animas, CO: Southeast Colorado Regional Tourism Group. Press Release. 28 Aug. 2006. Print.

Historical Census Browser. *Agricultural Data from 1900 to 1974.* Charlottesville, VA: University of Virginia Library. Web. Feb. 2007. <http://fisher.lib.virginia.edu/collections/stats/histcensus/>.

Mestas, A. “Power Companies Planning New Lines across Region.” *The Pueblo Chieftain*. 24 Oct. 2008. Print.

National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987.

National Park Service (NPS). *Draft Amache National Historic Landmark Site Development Concept.* Obtained from the Town of Granada on 18 Jul. 2007. Print.

National Park Service (NPS). *U.S. 50 Tier 1 EIS National Park Service Consultation Meeting Minutes*. Denver, CO: Colorado Department of Transportation (CDOT) Region 2, 15 Feb. 2008. Print.

Natural Resources Conservation Service (NRCS). *Conservation Reserve Program Description.* 23 Jun. 2009. Web. 20 May 2010. <http://www.nrcs.usda.gov/programs/crp/>.

The Nature Conservancy (TNC). *Ecoystems-Based Conservation in the Central Shortgrass Prairie.* 10 Apr. 1998. Web. 2007. <http://www.conserveonline.org/docs/2000/11/CSPPLAN.pdf>.

Pueblo Area Council of Governments (PACOG 2015). *2040 Long-Range Transportation Plan*. Pueblo, CO: PACOG, 2Nov. 2015. Web.http://www.pacog.net/

Ports-to-Plains Trade Corridor Coalition. *General Information about the Corridor.* 2008. Web. 20 May 2010. <http://www.portstoplains.com/Mission.aspx>.

Preservation of Japanese-American Confinement Sites. PL 109-441. 21 Dec. 2006.

Roper, P. "Piñon Canyon Ban Stays in 2010 Budget Bill." *The Pueblo Chieftain*. 10 Dec. 2009. Print.

Southeastern Colorado Water Conservancy District (SECWCD). *Arkansas River Watershed Invasive Plant Plan: Why is Tamarisk a Problem?* 2008. Web. May 2010. <http://arkwipp.org/why-problem.asp>.

Southeastern Colorado Water Conservation District (SECWCD). *Arkansas Valley Conduit.* Web. 2007. <http://secwcd.org/arkansas_valley_conduit.htm>.

Southern Delivery System (SDS). *Fact Sheet.* 24 Aug. 2009. Web. May 2010. <http://www.sdswater.org/docs/newsroom/related_docs/FactSheet_general_8-24-09.pdf>.

Southwest Regional Gap Analysis Project (SWReGAP). *Land Cover Datasets*. 2006. Web. Jan. 2007. <http://fws-nmcfwru.nmsu.edu/swregap/>.

State Demography Office. *Demography Dashboard.* 2014. Web. 15 Jun. 2014. <http://www.colorado.gov/cs/Satellite/DOLA-Main/CBON/1251590805419>.

U.S. Army. *Letter from P. Geren, Acting Secretary, U.S. Army, to U.S. Senators Ken Salazar and Wayne Allard Regarding the Army's Proposed Expansion of the Piñon Canyon Maneuver Site in Southeastern Colorado*. 19 Jul. 2007. Web. 2007. <http://media.graytvinc.com/documents/Letter+to+Senator+Salazar.pdf>.

U.S. Bureau of Reclamation (BOR). *Fryingpan-Arkansas Project.* Web. May 2010. <http://www.usbr.gov/projects/Project.jsp?proj_Name=Fryingpan-Arkansas+Project>.

U.S. Bureau of Reclamation (BOR). *Record of Decision for the Southern Delivery System Final Environmental Impact Statement.* Billings, MT: BOR Great Plains Region, 20 Mar. 2009. Web. May 2010. <http://www.sdseis.com/ROD.html>.

U.S. Bureau of Reclamation (BOR). *Arkansas Valley Conduit and Long-Term Excess Capacity Master Contract, Final Environmental Impact Statement.* Bismarck, ND: BOR Great Plains Region, Eastern Colorado Area Office. Web. Aug. 2013. <http://www.usbr.gov/avceis/avc_final_eis.pdf.> [BOR 2013]

Woodka, C. "After the Sale: Hidden Cost, Water Purchases have Big Impacts on Communities." *The Pueblo Chieftain.* 14 Feb. 2005. Print.

Woodka, C. "Area Farmland Vanishing at Steady Rate." *The Pueblo Chieftain*. 11 Mar. 2007. Print.

Woodka, C. “Conduit: Now the Real Work Begins.” *The Pueblo Chieftain*. 4 Apr. 2009. Print.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Cumulative Effects

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 50 Tier 1 EIS (i.e., 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 Cumulative Effects

Methodology Overview	Cumulative Effects	
	Tier 1	**Tier 2**
Relevant Data/ Information Sources	• Past, present, and foreseeable future actions • Potentially affected resources, as concurred on by EPA • Land use/community-based factors, including neighborhoods, recreational facilities, socioeconomic resources, and potential impacts to low-income and/or minority populations • Historic and cultural resources, including historic buildings, districts, and archaeological sites • Ecological/natural resources, including wetlands, farmland, floodplains, streams, and wildlife habitat	Review Tier 1 data for significant changes and collect additional data required to complete the appropriate Tier 2 analysis
Collection and/or Analysis Methodology	• Issues of concern established and available information identified through coordination with federal, state, and local resource agencies • Action and impact compilation created through review of NEPA; federal, state, and local land use and development plans; and other relevant documents • Resources characterized and baseline conditions determined through past evaluations, current studies, and new analysis as needed • Data evaluated through the use of analytical tools, including tables, matrices and system diagrams, trends analysis, maps and overlays, and GIS • Direct impacts of current project (potential order of magnitude) determined through NEPA process analysis for all alternatives • Environmental consequences of cumulative impacts determined on a preliminary basis • Field surveys are not proposed unless limited to the proposed corridors identified through the alternative screening process • Narrative on the past context of the Lower Arkansas Valley	Same as Tier 1, except that Tier 2 will develop and assess project-specific impacts based on project conceptual design. The cumulative effects analysis will utilize more detailed information collected in Tier 2 (see other methodology write-ups for the affected resources listed above). Also, if separated in time from the completion of Tier 1, the Tier 2 documentation will update any important information that may have changed during the interim.
Project Area	• The initial records search will include the Tier 1 project area limits. • Boundaries will be coordinated with EPA to ensure acceptable limits beyond project area for certain resources.	• Study area boundaries for Tier 2 sections of independent utility projects will be based on the area of direct and indirect effects (i.e., a 10-mile project will not have a 150-mile study area). Each project will develop the

Methodology Overview	Cumulative Effects	
	Tier 1	**Tier 2**
	• Temporal scope includes looking back to approximately 1960, examining current time, and looking forward to the year 2050.	appropriate spatial scale for each affected resource. • The time frame for examining other past and future actions in Tier 2 will be the same as in Tier 1.
Impacts	• Direct and indirect impacts will be identified only as a potential range or order of magnitude. • Each resource specialist will provide input in regard to their area of expertise.	Cumulative effects will be assessed based on project-specific information developed about individual Tier 2 studies in the context of overall trends developed in Tier 1.
Mitigation Options	Potential mitigation strategies will be identified in terms of the types of CDOT/FHWA actions appropriate at the Tier 2 project level and at the policy level (e.g., actions outside of CDOT authority). The degree to which project-level mitigation will be needed will be order-of-magnitude commensurate with the Tier 1 understanding of potential impacts.	Mitigation commitments for specific Tier 2 studies will be selected from the mitigation strategies identified in Tier 1 to ensure project-level mitigation efforts, for all resources, are integrated to achieve maximum benefit for the affected resource.
Deliverables	A Cumulative Effects Technical Memorandum will include all present available information and provide full disclosure of available data on baseline levels and cumulative impact, direct and indirect impacts from past, present and foreseeable future, compared to total accumulated action on each resource.	A Cumulative Effects Technical Report, as appropriate for Tier 2 sections of independent utility level of NEPA documentation, will reference the Tier 1 documentation and therefore need not explain again the entire corridor context. Tier 2 documentation will identify project-specific impacts, and mitigation that were not known during Tier 1 as well as compliance with strategies developed during Tier 1.
Regulatory Guidance/ Requirements	• Council on Environmental Quality Cumulative Effects Handbook, January 1997	

This page left intentionally blank.

Appendix B. Abbreviations and Acronyms

CDOT	Colorado Department of Transportation
CDOW	Colorado Department of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CDRMS	Colorado Division of Reclamation, Mining, and Safety
CFR	Code of Federal Regulations
CPW	Colorado Parks and Wildlife
CR	County Road
CWCB	Colorado Water Conservation Board
DOLA	Department of Local Affairs
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
I-25	Interstate 25
NEPA	National Environmental Policy Act
OEDIT	Colorado Office of Economic Development and International Trade
RTP	Regional Transportation Plan
SDS	Southern Delivery System
SECWCD	Southeastern Colorado Water Conservancy District
SWReGAP	Southwest Regional Gap Analysis Project
SH	State Highway
SIU	Section of independent utility
TNC	The Nature Conservancy
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. Highway 50 Tier 1 Environmental Impact Statement

This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Economics Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview 1
2. Resource Definition 2
3. Applicable Laws, Regulations, and Guidance 3
4. Methodology 4
4.1. Data Collection and Analysis Methodology 4
4.2. Project Area 5
4.3. Effects 6
4.4. Mitigation Options 6
4.5. Deliverables 6
5. Existing Conditions 7
5.1. General Economic Conditions 7
5.2. Conclusions from the Literature 12
5.3. Conditions in Individual Project Municipalities 13
6. Effects 16
6.1. No-Build Alternative 16
6.2. Build Alternatives 16
7. Mitigation Strategies 22
8. References 23
Appendices 27
Appendix A. Resource Methodology Overview for Economics 29
Appendix B. Abbreviations and Acronyms 31
Appendix C. Economic Literature Review 33

Tables

Table 2-1. Terminology Used in this Economics Technical Memorandum 2
Table 5-1. Population Change 7
Table 5-2. Median Household Income 8
Table 5-3. Employed Civilian Labor Force by Industry Sector 9
Table 5-4. County Retail Sales (1992–2002) 11
Table 5-5. Per Capita Retail Sales by County (1992–2002) 11
Table 5-6. Economic Conditions in the Project Municipalities 14
Table 6-1. Potential Loss in Productive Value of Agricultural Lands by Build Alternatives 19

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 5-1. Unemployment Rates in the Project Counties and the State 10
Figure 5-2. Overall Economic Effect of an Around-Town Route 12
Figure 5-3. Effect of Around-Town Routes on Travel-Serving Businesses 13
Figure 6-1. Build Alternatives Overview 17

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* , includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Economics for the U.S. 50 Tier 1 EIS is defined as future levels of economic activity for local businesses. The types of businesses evaluated are chosen based on their connection to and reliance on U.S. 50. They include businesses along the existing U.S. 50 corridor, traveler-oriented businesses, and highway-dependent businesses. Because of the importance of the agricultural industry in the Lower Arkansas Valley and because U.S. 50 is the primary farm-to-market route, effects to agricultural operations (i.e., farms and ranches) also are evaluated. Definitions of terminology used in this technical memorandum are presented in Table 2-1.

Table 2-1. Terminology Used in this Economics Technical Memorandum

Term	Definition
Highway-dependent business	Businesses that rely on a fast, efficient transportation system that can move goods between their locations and regional or long-distance destinations
Project communities	The nine project municipalities, as well as Pueblo, Otero, Bent, and Prowers counties
Project counties	Pueblo, Otero, Bent, and Prowers counties
Project municipalities	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
Traveler-oriented business	Businesses that are particularly dependent on through-traffic; they include gas stations, restaurants, lodging, convenience stores, and other related services

3. Applicable Laws, Regulations, and Guidance

This analysis adheres to the National Environmental Policy Act of 1969 and its regulations (23 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 (MAP-21). No other laws, regulations, and guidance are used.

4. Methodology

The U.S. 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 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 that 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 U.S. 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 are used by the project’s resource specialists as guidelines to ensure that their activities are 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 economics has been 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. Data Collection and Analysis Methodology

The primary tools used to complete this review of economics for the U.S. 50 Tier 1 EIS are described below. They include a literature review and an analysis of local businesses that are either connected to or reliant on U.S. 50.

4.1.1. Literature Review

Because there is an extensive amount of research on this subject conducted over several decades, a select group of studies were reviewed that focus on the effects of transportation improvements on rural communities. These studies were chosen for their applicability to the communities along U.S. 50 in the project area.

The studies reviewed were all conducted during the 1990s and early 2000s and focused on effects in small towns and rural communities. One of the studies was especially comprehensive in providing an overview of rural communities and small urban areas where new around-town routes were implemented. This overview documented studies in 47 U.S. states and six Canadian provinces. The other studies focused on rural areas in Kansas, Wisconsin, Iowa, Texas, North Carolina, and Oklahoma.

Methodologies used in these studies varied and include literature reviews, econometric studies, trend analysis, surveys, and interviews. In general, effects of the implemented around-town routes were examined at three levels, including effects on overall economy, effects on businesses that were on the original roadway, and effects on traveler-oriented businesses. Traveler-oriented businesses are those that are particularly dependent on through-traffic, including gas stations, restaurants, lodging, convenience stores, and other related services.

A more detailed summary of the literature reviewed is presented in Appendix C.

4.1.2. Local Businesses Analysis

Types of local businesses that are either connected to or reliant on U.S. 50 are identified to determine how they could be affected if the Build Alternatives are built. The types of businesses identified include agricultural operations, businesses located along the existing U.S. 50 corridor, traveler-oriented businesses, and highway-dependent businesses. Each of these categories is described in more detail below.

- Agricultural operations are considered because local economies in the Lower Arkansas Valley depend heavily on the agricultural industry. At this Tier 1 (broad scale) analysis, it is not feasible to identify the boundaries of individual farms or ranches within the 150-mile-long project area. However, farmland and ranch lands are identified, and any effect to these lands is assumed to be an effect on agricultural operations.
- Businesses located along the existing U.S. 50 facility are identified because of their obvious relationship via proximity to the highway. This analysis focuses on farmer's markets and businesses located in the downtown areas of the project municipalities. Farmer's markets were included because they rely heavily on pass-by traffic as their customer base. Downtown areas are a focus because most (but admittedly not all) businesses in the Lower Arkansas Valley (with the exception of farms and ranches) are located within these areas.
- Traveler-oriented businesses are identified because they are more reliant on travelers passing through the area.
- Highway-dependent businesses are those that rely on a fast, efficient transportation system that can move goods between their locations and regional or long-distance destinations. Farms and ranches also were included in this category, since most of what they produce is consumed outside the Lower Arkansas Valley, and U.S. 50 is the primary farm-to-market route in the area.

4.2. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.3. Effects

This review results in a determination of how the Build Alternatives could affect certain types of local businesses (i.e., businesses either connected to or reliant on U.S. 50).

4.4. Mitigation Options

Specific mitigation activities will be identified during Tier 2 studies (when the roadway footprint, or alignment, is identified). These activities may include avoidance, minimization, or both.

4.5. Deliverables

This Economics Technical Memorandum is the primary deliverable being produced related to economics for the U.S. 50 Tier 1 EIS.

5. Existing Conditions

Existing economic conditions in the project area are described in this section. This discussion has been divided into general economic conditions, conclusions from the literature, and conditions in individual project municipalities.

5.1. General Economic Conditions

The following sections discuss general economic conditions in the project area. This discussion focuses on population, income, employment, the agricultural economy, enterprise zones, and downtown retail areas.

5.1.1. Population, Income, and Employment

The project area includes nine municipalities and portions of four counties. The city of Pueblo is the largest community, and it is one of four major urban centers along Colorado's Front Range. Pueblo is an urban community of just over 105,000 residents (2010 Census). It serves as a regional center for goods and services for all of southern Colorado, including the communities east of it along U.S. 50. Trends in Pueblo show that the city has steadily gained population since its incorporation in 1885. It also has diversified its economy away from agricultural activities in recent decades.

In contrast, the eight communities east of Pueblo are small, rural towns and cities. They developed as stops along the railroad constructed through southeastern Colorado in the late 1800s. The first residents of these localities relied on agricultural activities, which remain a central focus of economic development in the Lower Arkansas Valley. Populations in these communities range from approximately 400 people to 7,800 people (2010 Census). The population of each individual community is shown in Table 5-1.

Table 5-1. Population Change

2010 Census Geography	2000 Population	2010 Population	Difference	Percent Change 2000–2010	
				Overall	Annualized
Pueblo County	141,472	159,063	17,591	12.4%	1.2%
Pueblo	102,121	106,595	4,474	4.4%	0.4%
Otero County	20,311	18,831	-1,480	-7.3%	-0.8%
Fowler	1,206	1,182	-24	-2.0%	-0.2%
Manzanola	525	434	-91	-17.3%	-1.9%
Rocky Ford	4,286	3,957	-329	-7.7%	-0.8%
Swink	696	617	-79	-11.4%	-1.2%
La Junta	7,568	7,077	-491	-6.5%	-0.7%
Bent County	5,998	6,499	501	8.4%	0.8%
Las Animas	2,758	2,410	-348	-12.6%	-1.3%
Prowers County	14,483	12,551	-1,932	-13.3%	-1.4%
Granada	640	517	-123	-19.2%	-2.1%
Holly	1,048	802	-246	-23.5%	-2.6%
Colorado	4,301,261	5,029,196	727,935	16.9%	1.6%

Source: U.S. Census Bureau, Census 2010, Tables P001 (2000), P1 (2010): "Total Population"

Median household income data obtained from the American Community Survey (ACS) shows that household incomes in the project counties and communities are not as high as the state median income. Median

household incomes range from approximately $20,833 (Holly) to $41,273 (Pueblo County), which is lower than the state median income of $57,685 (see Table 5-2).

Table 5-2. Median Household Income

2010 Census Geography	Median Household Income in the Past 12 Months (dollars)[a]
Pueblo County	$41,273
Pueblo	$34,750
Otero County	$31,246
Fowler	$31,625
Manzanola	$21,346
Rocky Ford	$24,520
Swink	$40,694
La Junta	$31,024
Bent County	$35,667
Las Animas	$31,446
Prowers County	$34,513
Granada	$33,882
Holly	$20,833
Colorado	$57,685

Source: U.S. Census Bureau, American Community Survey, 5-Year Estimates (2007–2011), Table B19013
[a]In 2011 inflation-adjusted dollars

In the communities east of Pueblo, employment figures also indicate how important agricultural activities are to the Lower Arkansas Valley. The agricultural industry provides approximately 8 percent or more of all jobs in Otero, Bent, and Prowers counties, which include both farming and ranching activities. Government is the largest employer in these three counties, followed by retail trade, and then agriculture, as shown in Table 5-3. The size of these communities does not support the types of economic development activities that require large populations (e.g., big-box stores, commercial airports, etc.). Also, the current condition of U.S. 50 (having only two lanes in certain locations) makes the highway unattractive to businesses that require a fast, efficient transportation system to move goods from their locations to regional or long-distance destinations.

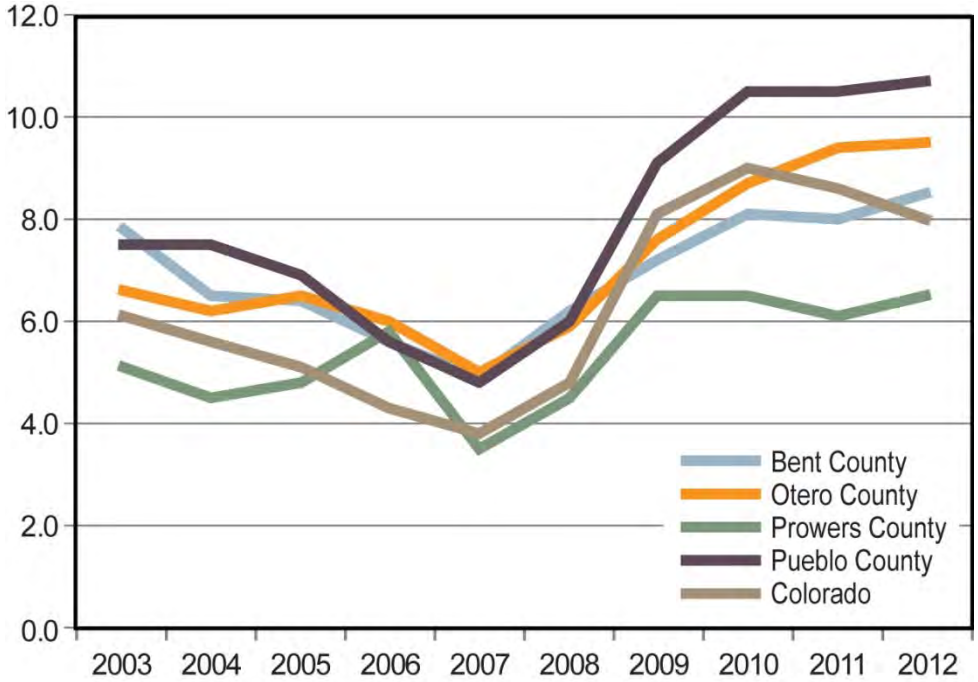
Table 5-3. Employed Civilian Labor Force by Industry Sector

Industry	Colorado	Bent County, Colorado	Otero County, Colorado	Prowers County, Colorado	Pueblo County, Colorado
Agriculture, Forestry, Fishing and Hunting, and Mining	2.3%	**16.3%**	**7.8%**	**12.7%**	1.5%
Construction	8.3%	12.0%	6.8%	7.1%	8.8%
Manufacturing	7.2%	2.2%	5.4%	4.6%	7.1%
Wholesale Trade	2.8%	0.0%	2.8%	1.3%	2.2%
Retail Trade	11.3%	6.2%	11.3%	13.0%	14.7%
Transportation and Warehousing, Utilities	4.7%	4.7%	6.2%	6.1%	3.9%
Information	3.2%	1.0%	2.1%	1.1%	2.1%
Finance and Insurance, Real Estate, Rental and Leasing	7.4%	3.4%	4.9%	5.2%	4.6%
Professional, Scientific, Management, Administrative, and Waste Management	13.0%	4.6%	3.4%	6.6%	7.7%
Educational Services and Health Care, Social Assistance	19.6%	23.2%	25.0%	20.4%	26.8%
Arts, Entertainment, and Recreation; Accommodation and Food Services	10.2%	5.2%	9.8%	8.7%	10.4%
Other Services Except Public Administration	5.1%	4.1%	6.1%	5.6%	4.0%
Public Administration	4.8%	**17.0%**	8.4%	7.8%	6.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: US Census Bureau, American Community Survey 5-Year Estimates (2007-2011), Table DP03, "Selected Economic Characteristics"

Pueblo County's more urbanized employment base is seen in the industry breakdown of jobs (see Table 5-3). Education/Health Services and Retail Trade are the top employers, with nearly 40 percent of all jobs. The fact that these figures show a higher percentage of employment in health services could be because the city of Pueblo is considered a regional center for health care services and, therefore, has more facilities than any of the other counties. The higher percentage of jobs in traveler-oriented services (i.e., accommodation and food) is likely to be the result of Pueblo's location along I-25. Agriculture comprises less than two percent of jobs in Pueblo County, reflecting that the county is less dependent on this industry than are the counties to the east.

Unemployment rates in Pueblo, Otero, and Bent counties are consistently higher than the statewide average, as shown in Figure 5-1. Fluctuations in the rates mirror changes occurring in the other portions of the project area and in the state overall.



Source: Bureau of Labor Statistics, http://data.bls.gov/timeseries/LASST08000003

Figure 5-1. Unemployment Rates in the Project Counties and the State

Area economic development officials are working to attract new businesses to the project communities. These efforts include energy-related companies, such as biodiesel and wind producers. Regional cooperative efforts among the communities also are ongoing to encourage heritage tourism along U.S. 50 in the Lower Arkansas Valley. The area is home to several regionally significant historic sites, including Bent's Old Fort National Historic Site (northeast of La Junta), the Boggsville Historic Site (south of Las Animas), the Koshare Indian museum (in La Junta), and the Granada Relocation Center National Historic Landmark (a.k.a., Camp Amache) (west of Granada).

5.1.2. Agricultural Economy

The presence of the Arkansas River—and the man-made irrigation canals running from it—allowed the residents in the Lower Arkansas Valley to build a strong agricultural industry early in its history, and the industry has been an important part of the economy in the area for more than 100 years. These activities have provided jobs to local residents and have contributed to both the local and statewide economies.

Since 1982, farming activities along the Arkansas River have decreased due to urban demand for water, pressure from communities downstream (i.e., the state of Kansas), and shifting of water supplies to electric generation (*Pueblo Chieftain* 2007). However, even with this decline, agricultural activities remain the economic foundation of the region. According to the 2007 Census of Agriculture, farmland and ranch lands in the four project counties totalled nearly 3.5 million acres in that year (Agricultural Census 2007b). That same year, the total market value of agricultural production in the four project counties was approximately $506 million. This figure represented roughly nine percent of the value of all agricultural products produced in the state of Colorado (CO AgInsights 2007). Some of these acres also were used to graze cattle and facilitated the sale of approximately 323,000 cattle and calves in 2007. This figure represented roughly 10 percent of all the cattle and calves sold in the state of Colorado (Agricultural Census 2007a).

5.1.3. Enterprise Zones

Despite this agricultural contribution, the project counties lag behind most other Colorado counties in economic activity. Because of this condition, they are all located within Colorado Enterprise Zones (OEDIT 2009b). The state established enterprise zones in 1986 to encourage job creation and capital investment in economically depressed areas. To be designated as a Colorado Enterprise Zone, areas must have high

unemployment rates, low per capita income, and slower population growth than the state average. Additionally, three of the counties (Otero, Bent, and Prowers) also were designated as Colorado Enhanced Rural Enterprise Zones for the 2009–2010 fiscal year (OEDIT 2009a). This is a state-run program intended to support job creation in economically lagging rural counties.

5.1.4. Downtown Retail Areas

All of the project municipalities east of Pueblo have downtown areas that are directly adjacent to U.S. 50. These areas serve as the civic, social, and commercial hubs of these municipalities. However, like many rural communities throughout the United States, these downtown areas have undergone significant changes in recent decades.

This analysis compared growth in retail sales in the project counties to the state of Colorado as a whole to determine the relative retail health of the project communities. Table 5-4 shows that between 1992 and 1997, statewide retail sales grew at an average annual growth rate of seven percent (unadjusted for inflation). The rate in Pueblo and Prowers counties grew at an average annual rate of six percent, while it grew in Otero and Bent counties at an average annual rate of five percent. Between 1997 and 2002, statewide retail sales growth slowed to five percent. During this time, Bent and Prowers counties had very little sales growth, while sales increases in Pueblo and Otero counties were slightly below that of the state at four percent.

Table 5-4. County Retail Sales (1992–2002)

Jurisdiction	Retail Sales ($000s)[a]			Average Annual Growth Rate	
	1992	1997	2002	1992–1997	1997–2002
Pueblo County	$893,566	$1,180,702	$1,430,646	6%	4%
Otero County	$108,750	$141,222	$170,666	5%	4%
Bent County	$9,030	$11,610	$11,743	5%	0%
Prowers County	$84,475	$112,850	$120,249	6%	1%
State of Colorado	$28,532,646	$40,536,034	$52,226,983	7%	5%

Sources: 1992 Economic Census, 1997 Economic Census, 2002 Economic Census
[a]Represents sales unadjusted for inflation

Growth in per capita retail sales also provides an indication of the relative health of an area's retail economy. Table 5-5 shows that between 1997 and 2002, statewide per capita sales growth had slowed. Bent County sales decreased during this time period, while Otero County per capita sales increased at a rate much higher than the other communities and the state.

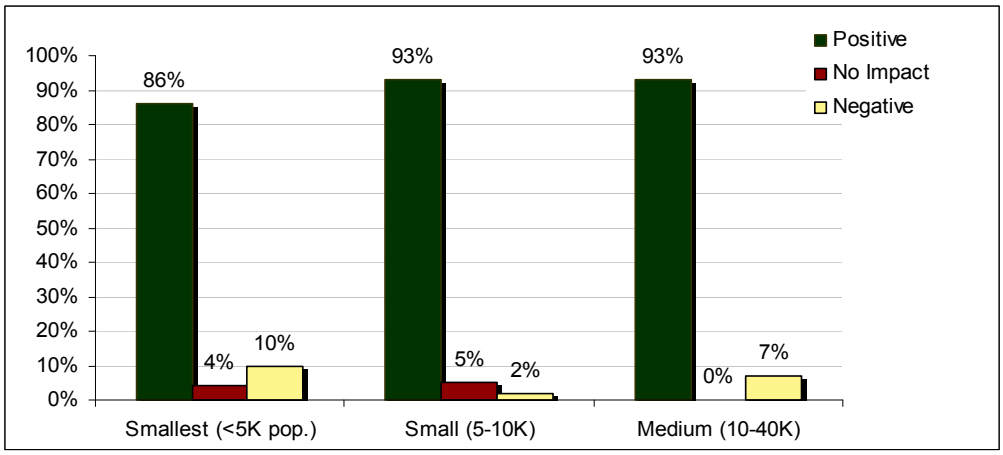
Table 5-5. Per Capita Retail Sales by County (1992–2002)

Jurisdiction	Per Capita Retail Sales			Average Annual Growth Rate	
	1992	1997	2002	1992–1997	1997–2002
Pueblo County	$7,184	$8,884	$9,729	4%	2%
Otero County	$5,423	$6,771	$8,656	5%	5%
Bent County	$1,810	$2,119	$1,934	3%	-2%
Prowers County	$6,344	$8,266	$8,480	5%	1%
State of Colorado	$8,162	$10,413	$11,550	5%	2%

Sources: 2000 Census, Department of Local Affairs (DOLA) 2007, 1992 Economic Census, 1997 Economic Census, 2002 Economic Census

5.2. Conclusions from the Literature

The literature showed that the overall economic effect of an around-town route was either positive or neutral in most of the communities included in the studies. Figure 5-2 shows the percentage of communities that experienced a positive, negative, or neutral overall economic effect from the around-town route.



Source: Liff 1996

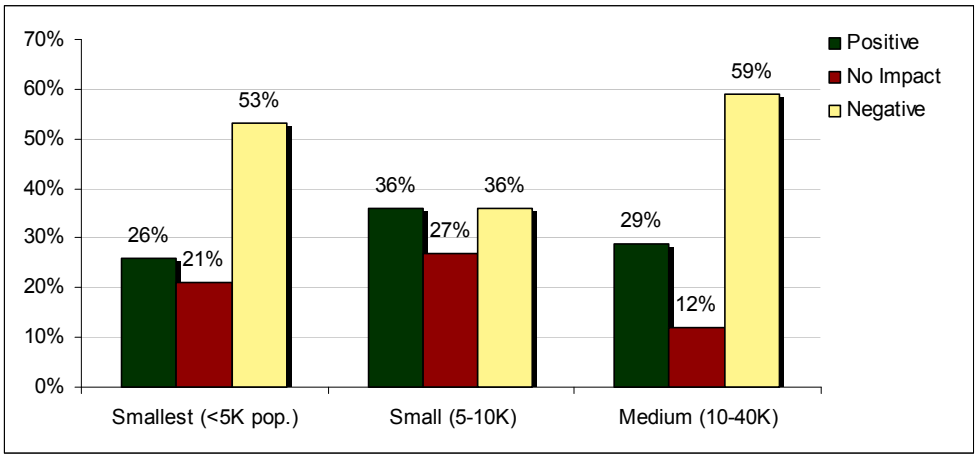
Figure 5-2. Overall Economic Effect of an Around-Town Route

Several of the studies divided up communities by size and determined that any negative business effects were seen primarily in smaller towns with populations of fewer than 5,000 people. Those studies also concluded that ongoing general economic trends were intensified by the implementation of around-town routes, meaning that around-town routes themselves did not change existing economic trends associated with a business district.

The studies concluded the following about an around-town route's effect on the businesses located on the original roadway.

- Visitor and shopping destinations tended to benefit from reduced traffic delays.
- For individual businesses, effects evened out over time.
- Older and smaller businesses often could not move, and the owners retired.
- Small local businesses were more likely to be replaced by chains.
- Communities that planned for changes weathered the change better than those communities that did not plan.

The studies also found that traveler-oriented businesses tend to be most affected, particularly in smaller towns. Figure 5-3 shows the percentage of communities that experienced a positive, negative, or neutral effect to their traveler-oriented businesses from the around-town route. Some studies showed that such businesses may lose up to 50 percent of sales initially following construction of around-town routes. Additionally, there is a perception, which is stronger among these business owners, that a new around-town route will have a negative effect on their businesses.



Source: Liff 1996

Figure 5-3. Effect of Around-Town Routes on Travel-Serving Businesses

Businesses that can be seen from the original roadway are the least likely to feel the effects of an around-town route. In general, an area along the new route competes with the downtown or commercial area on the original roadway if it is:

- Within three miles of the area
- Equipped with water and sewer
- More than five miles from the next nearest service exits

An area on the original roadway can be integrated with the downtown if it is less than two miles away and has supporting water and sewer services. An interchange from the around-town route that is close to a downtown area increases the chance of potential customers stopping at the current service areas. The connection between the two should include proper lighting and quality road surfaces. Negative effects of new around-town routes on downtown can be minimized by facilitating linkages through enhanced physical access and signage.

5.3. Conditions in Individual Project Municipalities

Economic conditions in the project municipalities are not exactly the same from one project municipality to the next. Therefore, this analysis describes the economic conditions that exist in each municipality. Because the majority of the economic activity (with the exception of farming and ranching activities) occurs within or near the municipalities along the highway, this analysis focuses on these areas. Also, because businesses that provide traveler services are more likely to be affected by the Build Alternatives, this analysis identifies these businesses in each municipality.

Because of Pueblo's status as a regional center for goods and services, economic activity in the city is more diverse than in the communities to the east. Additionally, the smaller municipalities and unincorporated areas surrounding the city (in Pueblo County) are increasingly becoming suburban communities to Pueblo. There may be some goods and services available in these communities for local residents. However, economic changes in these areas are more likely to be a result of larger changes occurring within the Pueblo regional economy.

The municipalities east of Pueblo are smaller and more rural in nature. Economic conditions in these municipalities are shown in Table 5-6.

- **Las Animas**—The city serves as the Bent County seat and is the primary commercial center for the county. The majority of businesses in the city are associated with the retail trade (12), accommodation and food services (10), and other services (9) sectors. The primary customer base for these businesses is local; however, they also are used by customers from the surrounding areas. The traveler-oriented businesses include six restaurants, three retail establishments, two lodging establishments, and a gas station with a convenience store.
- **Granada**—Two of these businesses were related to retail trade, and the town was home to one business in each of the following categories: utilities, wholesale trade, finance and insurance, other services, and accommodations and food services. The traveler-oriented businesses include a gas station and a restaurant.
- **Holly**—The majority of businesses in the town are associated with the retail trade (9), wholesale trade (7), and construction (4) sectors. The traveler-oriented businesses include three retail establishments, two gas stations (with convenience stores), and two restaurants.

6. Effects

The following sections discuss the potential of the No-Build Alternative and Build Alternatives to result in economic effects to local businesses in the subject area.

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 U.S. 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.

No effects to local businesses in the project area are expected. However, communities also would not have the opportunity to make improvements to their city or town. For example, widening the existing two-lane sections to four lanes and eliminating existing safety issues could attract highway-dependent businesses to the region. This could bring employers to the Lower Arkansas Valley who would not consider moving their businesses there today (due to the increased transportation costs because of the condition of the existing highway).

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

Table 5-6. Economic Conditions in the Project Municipalities

Municipality	Population (2000)	Median Household Income[a] (2000)	Percent of State's Median Income[b] (2000)	Number of Businesses (2005)	Number of Traveler-Oriented Businesses[c] (2005)	Annual Retail Sales[d] (2002–2006)
Fowler	1,206	$25,800	55%	54	11	$12 million
Manzanola	525	$19,200	40%	13	2	$2 million
Rocky Ford	4,286	$23,400	50%	133	24	$46 million
Swink	696	$36,000	77%	15	2	$3 million
La Junta	7,568	$29,000	60%	304	20	$280 million
Las Animas	2,758	$26,000	55%	60	12	$27 million
Granada	640	$26,000	55%	7	2	$2.6 million
Holly	1,048	$25,000	53%	37	7	$15.6 million

Sources: 2000 Census, 2005 zip code business patterns data, CO DOR 2007
[a]Rounded to the nearest $100
[b]The state's median household income was roughly $47,200 in 2000
[c]Businesses that are particularly dependent on through-traffic; they include gas stations, restaurants, lodging, convenience stores, and other related services
[d]The highest retail sales figure documented between 2002 and 2006 is shown

Other conditions are listed by community.

- **Fowler**—The majority of businesses in the town are associated with the retail trade (12), construction (6), health care and social assistance (6), accommodation and food services (6), and other services (6) sectors. The traveler-oriented businesses include three gas stations, four restaurants, a lodging establishment, and three retail establishments.
- **Manzanola**—The majority of businesses in the town are associated with the retail trade (3), utilities (2), manufacturing (2), and health care and social assistance (2) sectors. The traveler-oriented businesses include a gas station and a restaurant.
- **Rocky Ford**—The majority of businesses in the city are associated with the retail trade (23), accommodations and food services (15), other services (15), wholesale trade (14), and health care and social assistance (14) sectors. Rocky Ford's downtown not only serves the local community, it also serves the surrounding towns. The downtown is home to several furniture stores, a car dealer, clothing and sporting goods stores, supermarkets, and pharmacies. The traveler-oriented businesses include six gas stations, 11 restaurants, one lodging business, and six retail businesses.
- **Swink**—Due to its proximity to La Junta, it can be considered a bedroom community to that municipality. The majority of businesses in the town are associated with the retail trade (3), accommodation and food service (3), and wholesale trade (2) sectors. The traveler-oriented businesses include a gas station and a restaurant.
- **La Junta**—The city is the county seat of Otero County and serves as a local and regional center for employment, commerce, medical services, and educational opportunities. The majority of businesses in the city are associated with the retail trade (56), other services (42), health care and social assistance (39), accommodation and food services (31), and professional, scientific, and technical services (25) sectors. La Junta is home to a Wal-Mart Supercenter, which is the only one between Pueblo and Lamar. Despite Wal-Mart's entry into the marketplace, interviews indicate that the retail establishments have learned to coexist and even thrive alongside the establishment (Klein 2007, Snider 2007, Freidenberger 2007). The Wal-Mart attracts shoppers from a wide area, including the communities along U.S. 50 and the surrounding areas. The traveler-oriented businesses include nine gas stations (with convenience stores), six restaurants, and five lodging establishments.

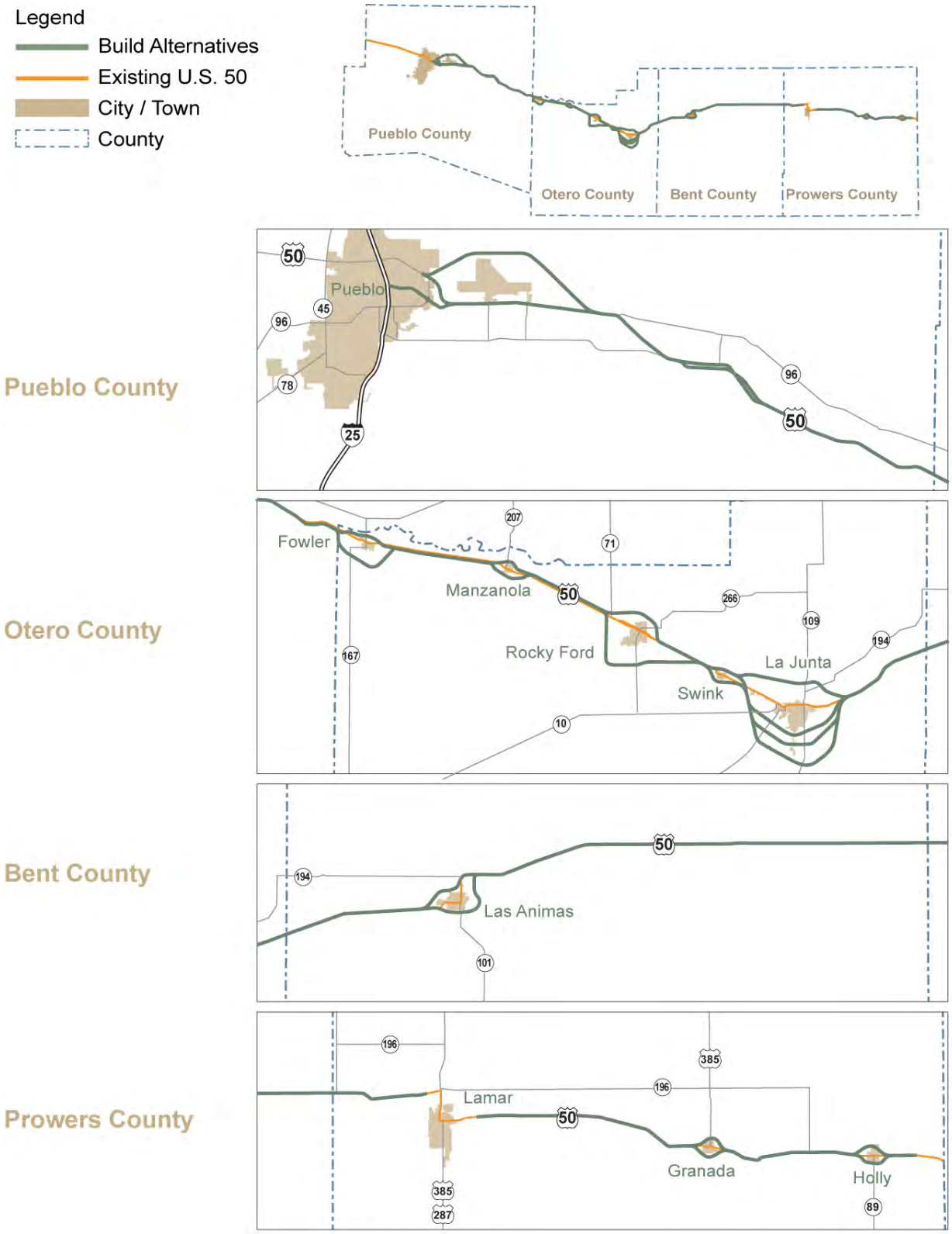


Figure 6-1. Build Alternatives Overview

6.2.1. Local Economies

Several of the studies reviewed for this analysis determined that any negative business effects were seen primarily in smaller towns with populations of fewer than 5,000 people. Those studies also concluded that ongoing general economic trends were intensified by the implementation of around-town routes, meaning that around-town routes themselves did not change existing economic trends associated with a business district. Since all the municipalities in the project area have fewer than 4,000 residents with the exception of La Junta and Pueblo (2010 Census), the Build Alternatives have the potential to cause negative effects to some businesses. However, those effects are unlikely to alter general economic trends in any particular municipality.

Rerouting a state highway from a through-town location to an around-town alignment usually would create the potential for new development, such as gas stations or other commercial activities, along the new around-town route. This is often referred to as induced growth. However, for the communities along U.S. 50 in the Lower Arkansas Valley, this may not be the case. With the exception of Pueblo, these communities have not experienced significant economic growth in several decades. Some key factors limiting potential growth along the new around-town routes are population, traffic volumes, and development infrastructure. The reasons why these factors would limit the possibility of induced growth are discussed below.

- **Population**—While the population of the state of Colorado grew by nearly 65 percent between 1960 and 2010, the population of the communities east of Pueblo declined by 0.1 percent during that same time frame (2010 Census, Historical Census Browser 2007). The small size of the communities east of Pueblo limits the economic viability of commercial activities that rely on a large customer base, such as big-box stores, commercial airports, and other activities.
- **Traffic volumes**—Traffic volumes on U.S. 50 east of Pueblo are relatively low (ranging from 1,700 vpd east of Holly, Colorado, to just over 10,000 vpd in La Junta, Colorado), and they are expected to remain that way well into the future (2,500 vpd east of Holly to nearly 17,000 vpd in La Junta) (Swenka 2014). This limits the amount of pass-by traffic that could support new traveler-oriented businesses, such as gas stations, restaurants, and hotels.
- **Development infrastructure**—The new around-town routes are located in areas outside the developed portions of the communities. To move from the downtown area to the new around-town route, communities would first have to extend services (water, power, etc.) to those locations. Communities along U.S. 50 also could restrict development in the areas of the around-town alternatives by refusing to extend services or using zoning or other land use tools.

Because of these factors, the communities along U.S. 50 are not likely to see the type of induced growth that sometimes accompanies roadway improvements in larger urban areas.

6.2.2. Agricultural Operations

Eighteen of the Build Alternatives move U.S. 50 to around-town locations that are primarily used for farming or ranching today. Replacing agricultural land with a new around-town route for U.S. 50 would eliminate the value of those acres for producing agricultural products. To calculate this loss, different productive values were used depending on the historic best agricultural use of the land (i.e., most productive). The analysis revealed that $1.9 million to $2.5 million in productive value (annually) could be lost, depending on which alternatives are constructed (Tranel 2008a, Tranel 2008b). Table 6-1 shows the difference in productive value that could be lost with each alternative. To put these figures into perspective, an overall loss of $2.6 million represents less than one percent of the $506 million in agricultural goods produced by the project counties in 2007 (CO AgInsights 2007).

Table 6-1. Potential Loss in Productive Value of Agricultural Lands by Build Alternatives

Section	Build Alternatives (if more than one)	Potential Loss in Productive Value (2007 dollars)
Section 1: Pueblo	Alternative 1: Pueblo Airport North	$3,208
	Alternative 2: Pueblo Existing Alignment	$1,209
	Alternative 3: Pueblo SH 47 Connection	$796
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	$38,145
	Alternative 2: Fort Reynolds Realignment	$50,345
Section 3: Fowler	Alternative 1: Fowler North	$21,037
	Alternative 2: Fowler South	$57,775
Section 4: Fowler to Manzanola	—	$82,432
Section 5: Manzanola	Alternative 1: Manzanola North	$22,395
	Alternative 2: Manzanola South	$85,512
Section 6: Manzanola to Rocky Ford	—	$262,348
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	$764,894
	Alternative 2: Rocky Ford South	$761,857
Section 8: Rocky Ford to Swink	—	$112,333
Section 9: Swink	Alternative 1: Swink North	$107,164
	Alternative 2: Swink South	$333,210
Section 10: La Junta	Alternative 1: La Junta North	$38,196
	Alternative 2: La Junta South	$177,896
	Alternative 3: La Junta South	$215,803
	Alternative 4: La Junta South	$222,850
Section 11: La Junta to Las Animas	—	$20,456
Section 12: Las Animas	Alternative 1: Las Animas North	$13,617
	Alternative 2: Las Animas South	$14,983

Section	Build Alternatives (if more than one)	Potential Loss in Productive Value (2007 dollars)
Section 13: Las Animas to Lamar	—	$196,835
Section 14: Lamar to Granada	—	$138,161
Section 15: Granada	Alternative 1: Granada North	$33,145
	Alternative 2: Granada South	$67,513
Section 16: Granada to Holly	—	$60,037
Section 17: Holly	Alternative 1: Holly North	$12,496
	Alternative 2: Holly South	$8,256
Section 18: Holly Transition	—	$17,857
Total		**$1.9 million to $2.6 million**

Sources: Tranel 2008a, Tranel 2008b

6.2.3. Businesses Along the Existing U.S. 50

The Build Alternatives at communities east of Pueblo would relocate U.S. 50 from downtown areas where most of the communities' economic activity takes place to new around-town locations. While this may be detrimental to traveler-oriented businesses (such as gas stations) in the old downtown areas, it provides communities with an opportunity to improve conditions for many downtown establishments. With less traffic on downtown streets, communities would be able to return the existing U.S. 50 to its original Main-Street-district status—creating a more pedestrian-friendly commercial area. During workshops organized and facilitated by the project in August 2006, many of the communities along U.S. 50 expressed their desire to make this change (CDOT 2006).

Effects to individual businesses will likely depend on the type of business and its location in relation to U.S. 50. One group of businesses located directly adjacent to the existing highway are roadside produce markets. Farmers use these markets to sell their products directly to consumers. They are important businesses in the Lower Arkansas Valley because they not only add to the local economy, but many communities have expressed their desire to use them as a way to attract tourists to the region (i.e., agritourism). As their name implies, roadside produce markets depend heavily on passing travelers for their customer base. Therefore, it is essential that drivers are able to see the markets from the road and access them at the time they are spotted. Effects to these markets could be direct (taking the property) or indirect (reducing access to them by limiting access on and off U.S. 50 at their location). Also, markets located within project municipalities may be affected by a reduction in pass-by traffic after the new around-town routes are constructed.

6.2.4. Traveler-Oriented Businesses

The analysis concluded that the following factors would influence the effects the Build Alternatives could have on traveler-oriented businesses.

- Traveler-oriented businesses tend to be impacted more than other types of businesses, particularly in smaller towns; however, the businesses that can be seen from the existing roadway are the least likely to feel the effects of a new around-town route.

- In general, the area adjacent to the new around-town route competes with the existing area if it is within three miles of the area, has water and sewer services, and is more than five miles from the next nearest service exits.
- The area adjacent to the new around-town route can be integrated with the downtown if it is less than two miles away and has supporting water and sewer services.
- An interchange from the new around-town route that is close to a downtown area increases the chance of potential customers stopping at the current service areas. Negative impacts of the new route on downtown can be minimized by connecting the two areas with access and signage.

Of all the businesses in the project area, traveler-oriented companies have the potential to be the most impacted by the Build Alternatives. In most communities, the new around-town route would be close enough to town that many existing businesses would remain visible from the new route. This could serve to lessen the effect of the new route by maintaining the businesses' pass-by customers. Also, the areas where the new around-town routes are proposed generally support agricultural activities today. Therefore, they generally lack the water and sewer services required for businesses to move into the area. This lack of services is likely to limit development in these areas, reducing the possibility of competition with the existing downtown areas. Individual businesses could experience fluctuations in activity. However, these fluctuations are likely to depend on the distance, access, and visibility of the business from the new around-town route.

6.2.5. Highway-Dependent Businesses

Officials from several communities along U.S. 50 in the Lower Arkansas Valley have reported that current conditions on the highway hinder their efforts to retain or attract highway-dependent businesses. An example of this occurred in 2006, when the region lost two of its largest employers. In January, the Neoplan USA transit bus manufacturing plant in Lamar closed its doors, eliminating 300 jobs. Later that year, the Bay Valley Foods plant in La Junta closed, leaving nearly 150 people out of work. Local officials have stated that high transportation costs were cited by both companies as a reason for their closures. Both of these operations relied heavily on U.S. 50 for transporting raw materials and manufactured goods into and out of the area. Improving U.S. 50 is likely to help communities attract and retain these types of employers, providing much needed jobs in the Lower Arkansas Valley.

Additionally, the Build Alternatives recommend that U.S. 50 be a high-speed (65 miles per hour minimum), limited-access roadway. This configuration would help farmers and ranchers along the U.S. 50 corridor by making farm-to-market travel faster.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify specific effects to social and economic conditions by the Build Alternatives. However, the following mitigation strategies have been developed to ensure that negative effects to these conditions are minimized during Tier 2 studies.

- CDOT would assist communities with their efforts to preserve right of way around their communities for a preferred alternative (once selected).
- CDOT should work with communities to ensure that travelers on U.S. 50 are advised of the services and other amenities available in communities along the highway.
- To minimize negative effects to permanent roadside produce markets (i.e., markets housed in permanent structures), Tier 2 highway footprints should be routed in a manner that avoids acquisition of those properties or disruption of their access to U.S. 50 where possible. If the routing of the Tier 2 alignment cannot avoid the acquisition of a market, the owners will receive reasonable compensation under state and federal law.
- Agricultural activities require the ability to move goods to market. Since U.S. 50 is the primary east-west route through the Lower Arkansas Valley, the highway is frequently used for this purpose. Construction activities should, when possible, be scheduled to minimize disruptions (including closures) to key portions of U.S. 50 that are heavily used for farm-to-market travel activities, especially during harvest times.
- Continue public involvement activities and community outreach during all phases of the tiered EIS process.

8. References

2005 Zip Code Business Patterns Data. Washington, D.C. 2005. Web. 2007. <http://www.censtats.census.gov/cbpnaic/cbpnaic.shtml>.

"Agricultural Decline to Continue in Arkansas River Valley." *Pueblo Chieftain.* 11 Mar. 2007. Web. 11 Mar. 2007. <http://www.chieftain.com>.

Babcock, M., and J. Davalos. "Case Studies of the Economic Impact of Highway Bypasses in Kansas." *Journal of the Transportation Research Forum* 43.1 (Spring 2004) Print.

California Department of Transportation (CalTrans). *California Bypass Study: The Economic Impacts of Bypasses.* Madera, CA: CalTrans. May 2006. Print.

Colorado Department of Agriculture. *CO Ag Facts 2002*. *Value of Agricultural Products Sold by County*. 2002. Web. 2006. <http://www.ag.state.co.us/mkt/AgStatsMap.pdf>. (CO Ag Facts 2002).

Colorado Department of Agriculture. *CO AgInsights 2007. Value of Agricultural Products Sold by County*. 2007. Web. 2014. <http://www.colorado.gov/cs/Satellite/ag_Markets/CBON/1251630750490>. Click on Colorado Agriculture Statistics Map. (CO AgInsights 2007)

Colorado Department of Labor and Employment (CDLE). *Colorado Labor Market Information (Unemployment Statistics)*. Denver, CO: CDLE. Web. 2007. <http://www.lmigateway.coworkforce.com/lmigateway/analyze/mappages/map.asp?paramx=&blnFirstGeog=True&mapcode=04>.

Colorado Department of Local Affairs (DOLA). *Jobs Information*. Denver, CO: DOLA. Web. 2007. <http://www.dola.colorado.gov/demog_webapps/jobs_sector_naics>.

Colorado Department of Local Affairs (DOLA). *Population Estimates by County and Municipality (2000-2008).* Denver, CO: DOLA. 2008. Web. Feb. 2010. <http://www.dola.state.co.us/dlg/demog/pop_totals.html>.

Colorado Department of Revenue (CO DOR). *Retail Sales Information Between 2002 and 2006*. Denver, CO: CO DOR. 2006. Web. 2007. <http://www.revenue.state.co.us/Stats_dir/wrap.asp?incl=salesrpts>.

Colorado Department of Transportation (CDOT). *Future Traffic Volumes of SH050B from MP 315 to MP 467.* Web. Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010a]

Colorado Department of Transportation (CDOT). *Traffic Information for SH050B from MP 315 to MP 467.* Web. Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010b]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Community Workshops Report.* Colorado Springs, CO: Colorado Department of Transportation (CDOT), Region 2. Aug 2006. Print.

Colorado Office of Economic Development and International Trade (OEDIT). *Colorado Enhanced Rural Enterprise Zone Program Fact Sheet.* Web. 12 Jul. 2009. <http://www.colorado.gov/cs/Satellite/OEDIT/OEDIT/1167928191402.> [CDOT 2009a]

Colorado Office of Economic Development and International Trade (OEDIT). *Colorado Enterprise Zone Program Fact Sheet.* Web. 12 Jul. 2009. <http://www.colorado.gov/cs/Satellite/OEDIT/OEDIT/1167928191402>. [CDOT 2009b]

Comer, J., and G. Finchum. *Business Impacts of Highway Bypasses*. Stillwater, OK: Oklahoma State University, Department of Geography. 2001. Print.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. Washington, D.C. 1978. Print.

Freidenberger, B. (La Junta City Council) Mar 7, 2007. Economic development issues.

Garcia, K. (Action 22) Apr 11, 2007. Economic development issues.

Handy, S., K. Kockelman, S. Kubly, S. Srinivasan, J. Jarrett, M. Oden, and H. Mahmassani. *The Impacts of Highway Relief Routes on Small Towns in Texas.* Austin, TX: University of Texas at Austin, Center for Transportation Research. Oct. 2001. Report #1843-S. Print.

Handy, S., A. Kubly, and M. Oden. "Economic Impacts of Highway Relief Routes on Small Communities." *Transportation Research Record*. Austin, TX: University of Texas at Austin. Report #1792. Print.

Historical Census Browser. *Population Data.* Charlottesville, VA: University of Virginia Library. Web. Feb. 2007. <http://fisher.lib.virginia.edu/collections/stats/histcensus/>.

Iowa Department of Transportation (IowaDOT). *Primary Road Bypass Study Literature Review of Selected Iowa Communities*. Ames, IA: Iowa Department of Transportation (IowaDOT). 1999. Print.

Jones, R. (Prowers County Development, Inc.) Mar 8, 2007. Economic development issues.

Kansas Department of Transportation (K-TRAN). *Impacts of Highway Bypasses on Kansas Towns.* Lawrence, KS: University of Kansas. Oct 1996. Report #226. Print.

Klein, R. (City of La Junta) Mar 7, 2007. Economic development issues.

Liff, S. *Effects of Highway Bypasses on Rural Communities and Small Urban Areas.* Washington, D.C.: Transportation Research Board. May 1996. Print.

Mestas, A. "Neoplan Closing to Cost 300 Jobs." *Pueblo Chieftain* 16 Nov 2005. Print.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987. Print.

Parish, T. (Bent County Development Foundation) Mar 8, 2007. Economic development issues.

Snider, W. (La Junta Economic Development Alliance) Mar 7, 2007. Economic development issues.

Srinivasan, S., and K. Kockelman. *The Impacts of Bypasses on Small and Medium-Sized Communities: An Econometric Analysis.* Austin, TX: University of Texas at Austin, Bureau of Transportation Statistics. 1992. Print.

Swenka, David, PE, PTOE. Colorado Department of Transportation (CDOT) HQ Safety and Traffic Engineering Branch. "Re: 2008-2012 Crash Summary and 2011 AADTs and LOSS Data for U.S. 50." Feb. 2014. Email. [Swenka 2014]

Tranel. J. *Identification of Highest and Best Agricultural Use of Non-Urbanized Land in the Project Area.* Lafayette, CO: WYCO Associates, LLC. 24 Apr. 2008. Print. [Tranel 2008a]

Tranel. J. *Enterprise Budget Information for Certain Groups of Crops Grown in the Lower Arkansas Valley.* Lafayette, CO: WYCO Associates, LLC. 13 Aug. 2008. Print. [Tranel 2008b]

Tucker, J. "La Junta Pickle Plant to Shut Down." *Pueblo Chieftain*. 17 Nov. 2005. Print.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969. Print.

U.S. Department of Agriculture. *2007 Census of Agriculture. Volume 1, U.S. Summary and State Reports.* Washington, D.C. 2007. Web. 24 Oct. 2013. <http://www.agcensus.usda.gov/Publications/2007/Full_Report/>. (Agricultural Census 2007a)

U.S. Department of Agriculture. *2007 Census of Agriculture. County Profiles for Pueblo, Otero, Bent, and Prowers Counties.* Washington, D.C. 2007. Web. 22 Oct. 2013. <http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Colorado/>. (Agricultural Census 2007b)

U.S. Department of Commerce, Economics, and Administration. Bureau of Economic Analysis. *Jobs Information.* Washington, D.C. Web. 2007. <http://www.bea.gov/regional/reis/default.cfm#step3>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *American Community Survey 5-Year Estimates (2007-2011).* Washington, D.C. Print.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *1992 Economic Census. Retail Trade Geographic Area Series Colorado*. Washington, D.C. 1992. Web. 2007. <http://www.census.gov/prod/1/bus/retail/92area/rca06.pdf>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *1997 Economic Census. Retail Trade Geographic Area Series Colorado.* Washington, D.C. 1997. Web. 2007. <http://www.census.gov/epcd/ec97/co/CO000_44.htm>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2002 Economic Census. Retail Trade Geographic Area Series Colorado.* Washington, D.C. 2002. Web. 2007. <http://www.census.gov/econ/census02/data/co/CO000_44.htm>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2000 United States Census.* Washington, D.C. 2000. Web. 12 Dec. 2006. <http://www.dola.colorado.gov/dlg/demog/pop_totals.html>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2010 United States Census.* Washington, D.C. Web. 30 Aug. 2013. <http:// www.census.gov/ 2010census/data/>. [Census 2011a]

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *State and County QuickFacts: Land Area Data for Pueblo, Otero, Bent, and Prowers Counties.* 2000. Web. 4 Dec. 2006. <http://quickfacts.census.gov/qfd/index.html>.

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *State and County QuickFacts: Population Estimates.* 2006. Web. Jul. 2009. <http://quickfacts.census.gov/qfd/states/>.

Wisconsin Department of Transportation (WisDOT). *Economic Impacts of Highway Bypasses on Wisconsin Communities.* Madison, WI: Wisconsin Department of Transportation (WisDOT). Jan. 1998. Print.

Wisconsin Department of Transportation (WisDOT) and Economic Development Research Group. *Summary of Highway Bypass Studies.* Boston, MA; Wisconsin Department of Transportation (WisDOT) and Economic Development Research Group. Dec. 2000. Print. .

This page left intentionally blank.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Economics

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 (corridor location) decision.

Table A-1. Resource Methodology Overview for Economics

Methodology Overview	Economics	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Current economic information/data obtained from community records • DOLA • U.S. Census Bureau • Studies developed by departments of transportation and other organizations that have studied impacts of transportation improvements including bypasses	• Review and update Tier 1 data • Search for and collect additional data required to complete the appropriate Tier 2 analysis
Collection and/or Analysis Methodology	• Collect and characterize applicable highway-related economic studies detailing economic effects that have previously occurred in small, medium, or large communities elsewhere in the United States. • Perform a DOLA Base Industry Analysis. This analysis is an integral part of DOLA's economic forecasting for Colorado counties and identifies economic functions and services that are "basic" to a county's economy. • Identify broad ongoing economic trends and influences (i.e., presence of large retail stores) within each community, taking into account community size. • Use 2030 county population and employment projections as a baseline to determine indirect impacts on growth and economics from project alternatives. • Determine if effects described in literature are likely to occur to study area communities. • Because of the vast numbers of comparable economic studies of post transportation improvements, specific economic modeling is not proposed.	Update Tier 1 analysis sufficiently for standard NEPA documentation.

Methodology Overview	Economics	
	Tier 1	Tier 2
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Communities adjacent to Tier 2 specific sections SIU corridor boundaries
Impacts	Estimated range or order of magnitude of potential short- and long-term economic effects to each study area community focusing on: • Impacts to traveler services and related businesses, such as gasoline stations, motels and restaurants/bars • Potential effects of relief routes on downtown businesses, including construction • Effects of a safer facility and reduced travel time	Update Tier 1 impact analysis as appropriate for specific Tier 2 SIUs level of NEPA documentation
Mitigation Options	Identify potential mitigation strategies in terms of the types of CDOT/FHWA actions appropriate at the Tier 2 study level and at the policy level (e.g., actions outside of CDOT authority) to maximize potential benefits and minimize negative impacts of transportation improvements	Revise and implement Tier 1 strategies where applicable
Deliverables	Economics Technical Memorandum, including Tier 2 strategies	Economic Assessment Report documenting data and implementation of identified strategies as appropriate for Tier 2 SIUs level of NEPA documentation
Regulatory Guidance/ Requirements	FHWA Technical Advisory 6640.84	

Appendix B. Abbreviations and Acronyms

ACS	American Community Survey
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Equality
CFR	Code of Federal Regulations
CR	County Road
DOLA	Department of Local Affairs
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act
NEPA	National Environmental Policy Act of 1969
SH	State Highway
SIU	Section of independent utility
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. Highway 50 Tier 1 Environmental Impact Statement
USC	United States Code

This page left intentionally blank.

Appendix C. Economic Literature Review

There is an extensive body of literature examining and analyzing the economic effects of implementing new around-town routes on communities. A review of this literature was conducted as part of the U.S. 50 Tier 1 EIS economic analysis to examine the long-term effects of new around-town routes on similar communities and to ascertain whether these effects could be expected in the communities along U.S. 50. Some of the studies examined communities over several decades, which is helpful in analyzing the long-term effect of transportation changes on businesses, as well as on larger economies.

Ten studies were selected for review. They were all conducted in the 1990s and early 2000s. The studies selected focus primarily on small towns and rural communities in Kansas, Wisconsin, Iowa, Texas, North Carolina, and Oklahoma. One of the studies, focusing on rural communities and small urban areas, was especially comprehensive in providing an overview of studies conducted in 47 U.S. states and 6 Canadian provinces where new around-town routes were implemented. The studies reviewed are listed below in the order in which they are summarized.

1. Wisconsin Department of Transportation (WisDOT). Economic impacts of highway bypasses on Wisconsin communities. Madison, WI: Wisconsin Department of Transportation (WisDOT); Jan 1998.
2. Wisconsin Department of Transportation (WisDOT) and Economic Development Research Group. Summary of highway bypass studies. Boston, MA; Wisconsin Department of Transportation (WisDOT) and Economic Development Research Group; Dec 2000.
3. Liff, S. Transportation Research Board (TRB). Effects of highway bypasses on rural communities and small urban areas. Washington, D.C.: TRB; May 1996.
4. Kansas Department of Transportation (K-TRAN). Impacts of highway bypasses on Kansas towns. University of Kansas: Kansas Department of Transportation (K-TRAN); Oct 1996. Report #226.
5. Babcock, M., Davalos, J. Case studies of the economic impact of highway bypasses in Kansas. *Journal of the Transportation Research Forum.* Spring 2004; 43(1).
6. Handy, S., Kubly, A., Oden, M. Economic impacts of highway relief routes on small communities. University of Texas at Austin: *Transportation Research Record*; 2002. Report #1792.
7. Srinivasan, S., Kockelman, K. The impacts of bypasses on small and medium-sized communities: An econometric analysis. University of Texas at Austin: Bureau of Transportation Statistics; 1992.
8. Handy, S., Kockelman, K., Kubly, S., Srinivasan, S., Jarrett, J., Oden, M., Mahmassani, H. The impacts of highway relief routes on small towns in Texas. University of Texas at Austin: Center for Transportation Research; Oct 2001. Report #1843-S.
9. Iowa Department of Transportation (IowaDOT). Primary road bypass study literature review of selected Iowa communities. Iowa Department of Transportation (IowaDOT); 1999.
10. Comer, J., Finchum, G. Business impacts of highway bypasses. Oklahoma State University: Department of Geography; 2001.

The following review summarizes the purposes, scopes, methodologies, and conclusions of the studies listed above (in the order in which they are listed).

1. Wisconsin Department of Transportation (WisDOT). Economic impacts of highway bypasses on Wisconsin communities. Madison, WI: Wisconsin Department of Transportation (WisDOT); Jan 1998.

<u>Purpose</u>

The purpose of this study was to help the Wisconsin Department of Transportation realize the full benefit of future new around-town routes while minimizing the potential for adverse effects.

Scope and Methodology

Seventeen communities with new around-town routes were compared to 14 control communities (i.e., without new around-town routes). All of the communities were located in Wisconsin. Communities were grouped into three sizes, including:

- Small communities—less than 2,000 people
- Medium communities—2,000 to 5,000 people
- Large communities—more than 5,000 people

New around-town routes were built in the 17 communities between 1983 and 1995. The study included data collection and interviews, focus groups, site visits, and origin-destination surveys on the original highways in the communities where new routes were implemented.

It is important to note that some of the communities involved in this study made planning and zoning decisions that enabled them to control development near the interchanges of the new around-town routes. Additionally, the Wisconsin Department of Transportation imposed access restrictions on the new routes and on other related routes, which limited opportunity for new development. Also, most of the communities where new routes were implemented had significant economic growth occurring before the new routes were constructed.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- The new around-town routes had little adverse effects on the overall economic activity of the communities.
- The economies of the small communities had greater potential to be adversely affected.
- Over the long term, average traffic levels on the old routes in the medium and large communities were close to, or higher than, levels before the new around-town route was opened.
- No significant change occurred in population, employment, or retail trade trends in most of the communities after a new around-town route was opened.
- Economic growth generally exceeded trends in the control communities.
- Traffic levels on some new around-town routes were not high enough to support many businesses.
- The cost and feasibility for some communities to provide municipal services to the areas near the new around-town route interchanges outweighed the potential revenues of new development.
- Very little retail flight occurred.
- Medium and large communities already represented “destinations” for the region; thus, they continued to grow.
- Many new traffic-oriented businesses were not built in close proximity to the new around-town routes.
- Markets for retail were primarily local with a majority of customers coming from local areas.
- The new around-town routes were not seen as different from any other market changes that affected businesses in the communities.

2. Wisconsin Department of Transportation (WisDOT) and Economic Development Research Group. Summary of highway bypass studies. Boston, MA; Wisconsin Department of Transportation (WisDOT) and Economic Development Research Group; Dec 2000.

Purpose, Scope, and Methodology

This study summarizes existing literature on the economic development effect of new around-town highway routes in Wisconsin, Kansas, Iowa, Texas, and North Carolina.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- Businesses serving the local trade area and those dependent on repeat customers are likely to benefit from an improved downtown shopping environment.
- New around-town routes are seldom either economically devastating or the savior of a community business district. The locational shift in traffic can cause existing businesses to turn over or relocate, but net effects usually are relatively small.
- The way in which a community responds to a new around-town route is complex and involves the interaction of several factors.
- New around-town routes probably did not have transitory negative effects on all travel-related businesses, including restaurants, bars, motels and service stations. However, individual companies were affected in different ways.
- Econometric models showed that a new around-town route generally brought a small but statistically significant decrease in business volume in the circumvented city.
- While some companies may choose to go out of business rather than adjust to changing circumstances, those companies often were replaced by others.
- Benefits of an improved traffic flow from new around-town routes do not appear to be offset by losses of retail sales.
- Communities and business districts that have strong identities as visitor or shopping destinations are more likely to be strengthened due to reduction in traffic delays through their centers.

3. Liff, S. Transportation Research Board (TRB). Effects of highway bypasses on rural communities and small urban areas. Washington, D.C.: TRB; May 1996.

Purpose

The purpose of this study was to review the state of knowledge about effects of new around-town highway routes on communities of less than 50,000 in population.

Scope and Methodology

A survey questionnaire was sent to 47 U.S. state departments of transportation, and 6 Canadian provincial departments of transportation. The survey asked questions regarding the effects of new around-town highway routes on communities of less than 50,000 people. Additionally, 190 previous studies on this subject were reviewed. In these studies, methods used to study effects ranged from interviews to sophisticated statistical analysis.

The average length of new around-town routes for which case study information was available from this information was nearly six miles. The average distance between the old and new routes was about 1.3 miles. Additionally, most of the old through-town routes were two-lane roads while the new around-town routes were four lanes. Additionally, impact mitigation measures taken by the communities discussed in the studies included signage, access improvements, and planning activities.

Synopsis of Conclusions

This study found the following related to the overall economic climate of communities and small urban areas where new around-town routes were implemented:

- When new around-town routes were opened, average daily traffic levels on the older routes had declined, on average, by approximately 50 percent to 70 percent.

- Population change is not a good indicator of a community's susceptibility to effect from construction of a new around-town route.
- A community's overall business activity, as measured by gross annual sales, grows more rapidly where new around-town routes have been constructed.
- The amount of land in commercial or industrial use areas generally increased and land values increased after new around-town routes were constructed.
- Many of the cases where areas experienced declining sales or other indicators of adverse effects are attributable to broad demographic and economic trends, not the new around-town route itself.
- Adverse effects on businesses on the original roadway appeared to be largely recouped by improved ambiance for patrons and residents, although the effects to individual businesses vary. In some instances, the combined effect of lost sales by several businesses in a community where new around-town routes are implemented may signal a broader decline in the older "main street" business district. In such cases, competition from other communities and general changes in economic conditions make it difficult to identify the new route as the sole cause of the decline.
- Generally, the top five effects are improved traffic circulation, traffic safety, increased access to the town, new investment and development, and new home construction.

4. Kansas Department of Transportation (K-TRAN). Impacts of highway bypasses on Kansas towns. University of Kansas: Kansas Department of Transportation (K-TRAN); Oct 1996. Report #226.

Purpose

The purpose of this study is to provide a description of effects in certain Kansas towns where new around-town routes were implemented, and to develop a guide regarding what is likely to happen in the future to those communities.

Scope and Methodology

This study involved a literature review of previous studies, a detailed origin-destination model of Kansas, and multiple regression models focusing on retail sales taking into account population, income, and the presence or absence of a new around-town route.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- The effect of the new around-town route on sales is so small that it is not an important concern.
- New around-town routes have small positive effects in larger counties and small negative effects in smaller counties.
- New around-town routes in Kansas typically have not had significant negative effects on the local economy. In fact, many counties and towns have enjoyed some long-term benefits from the construction of such routes.
- During and shortly after (i.e., two to three years) the new around-town route is constructed, Kansas communities generally did not see negative effects from the route.
- Average effects of new around-town routes are small, but variation is large, implying that many factors other than the routes affect the economy of small towns as well as individual companies.
- Routes around small towns in Kansas have been highly beneficial to through-traffic.
- New around-town routes did not have an appreciable effect on aggregate employment and payrolls of small towns in Kansas.
- A typical new around-town route in Kansas does not cause substantial harm to the aggregate work force of towns where such routes were implemented. For non-retail companies, the new route is probably helpful, and in the short and long term, it is helpful for the non-retail economic base.

- New around-town routes have had transitory negative effects on selected companies, which tend to be travel-oriented businesses, including restaurants, bars, motels, and service stations. However, not all travel-oriented companies were negatively affected.

5. Babcock, M., Davalos, J. Case Studies of the economic impact of highway bypasses in Kansas. Journal of the Transportation Research Forum. Spring 2004; 43(1).

Purpose

The purpose of this study was to determine the effects on towns after new around-town routes had been constructed.

Scope and Methodology

Regression analysis was applied to employment in areas where new around-town routes were implemented to determine the relationship between the new route and employment. A literature review was also conducted. Also, restaurants, convenience stores, auto and truck repair shops, and motels were surveyed to collect information about the economic effects of the new routes.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- A majority of the businesses reported that there was no effect on their employment, and a large majority of company representatives thought the new around-town route had no major effect on labor cost per employee.
- Of those individuals surveyed, 55 percent said their sales decreased, 26 percent said they had increased, and 19 percent said there was no change after the new around-town route was implemented.

6. Handy, S., Kubly, A., Oden, M. Economic impacts of highway relief routes on small communities. University of Texas at Austin: Transportation Research Record; 2002. Report #1792.

Purpose

The purpose of this study was for the Texas Department of Transportation to identify and understand the various factors that influence the economic effects of new around-town routes on small communities.

Scope and Methodology

Fourteen case studies of communities in Texas were reviewed. Ten of these communities had new around-town routes implemented, and four had not. The cases included communities with geographic diversity (i.e., they were located across the state) and a range of sizes (from 5,000 to 50,000 residents). The communities were either rural or exurban. Econometric modeling techniques were used to estimate the effects of the new around-town route on sales and establishments in the communities. Additionally, interviews were conducted to obtain information regarding the effects of the new around-town routes.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- Four of the communities experienced a net decline in highway-related businesses after construction of the new around-town routes, but the other communities (where around-town routes were not implemented) experienced similar declines.
- The greater the shift in traffic from the old route to the new (around-town) route, the greater the negative effect on the local economy, all else being equal.
- The smaller the city, the larger the effect.
- A new around-town route is one of many factors influencing the economic climate of a community.
- New development was primarily concentrated at interchanges and was typically in the form of businesses new to the community (i.e., chains).
- Downtown effects were not straightforward. Retail businesses either declined or shifted to a service orientation. Businesses targeting tourists (rather than locals) moved to the downtown area. These changes would have occurred without the new around-town route being implemented, but the new route magnified the changes.
- Location is a factor regardless of the new around-town route.

The broader factors that affect communities are:

- structural trends (i.e., trends in the national economy and demographic patterns)
- technical innovations that reduce the number of employees needed for certain jobs
- retail changes (i.e., a Wal-Mart moving to town)
- local factors (i.e., the geography of the community and its proximity to larger communities)

7. Srinivasan, S., Kockelman, K. The impacts of bypasses on small and medium-sized communities: An econometric analysis. University of Texas at Austin: Bureau of Transportation Statistics; 1992.

Purpose

The purpose of this study was to obtain information about how new around-town routes affect small and medium-sized communities.

Scope and Methodology

The study reviewed 23 Texas cities where new around-town routes were implemented and that ranged in size from 2,500 to 50,000 people, and another 19 cities that did not have new around-town routes implemented (i.e., control cities). Data between 1954 and 1992 were collected related to these communities. Per capita sales in four different industrial sectors were identified as indicators of the local economy in these cities, including retail, gas service stations, eating and drinking establishments, and service industries.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- Higher traffic levels can sustain the local economy, even if a fraction of traffic is removed from the old route.
- Proximity of a new around-town route to a large city offers conflicting effects. It increases sales, but it also increases traffic.
- The longer the city has had an around-town route, the greater the estimated traffic split between the old and new routes. However, the positive effect of increased traffic tapers with time.
- Where traffic diversion exceeds a critical value, the overall effect is negative.
- The effect of a new around-town route is most negative on the per capita sales in gasoline service stations and the least negative on service industries.
- The greater amount of traffic diverted, the greater the effect.

8. Handy, S., Kockelman, K., Kubly, S., Srinivasan, S., Jarrett, J., Oden, M., Mahmassani, H. The impacts of highway relief routes on small towns in Texas. University of Texas at Austin: Center for Transportation Research; Oct 2001. Report #1843-S.

Purpose

The purpose of the study was to identify and understand the various factors that influence the economic effects of new around-town routes on small- and medium-sized communities.

Scope and Methodology

This study reviewed 23 small- or medium-sized communities in Texas with new around-town routes, plus a sample of 19 cities without such routes. The study involved a literature review, identification of issues, econometric models, case studies, and an overview of strategies to maximize the potential positive effects and minimize the potential negative effects of the new routes on communities.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- Effects of new around-town routes depend on community characteristics, the new route, and larger economic and industry trends.
- New around-town routes tend to amplify trends.
- New around-town routes have both positive and negative effects.
- The net result is not an increase in retail activity but a shift of activity from downtown (i.e., along the old route) to the new route, as well as a shift from local businesses to chains.
- Geographic factors have the most significant effect.

9. Iowa Department of Transportation (IowaDOT). Primary road bypass study literature review of selected Iowa communities. Iowa Department of Transportation (IowaDOT); 1999.

Purpose

The purpose of this study, which was commissioned by the Iowa Department of Transportation, was to review the effect of new around-town routes on communities in their state.

Scope and Methodology

The study included a literature review and case studies of communities where new around-town routes have been implemented and communities that were programmed for such routes. Effects were compared across community types.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes were implemented:

- Every community reviewed thought a new around-town route had been beneficial, especially for removing trucks and other through-traffic and for improving the safety and quality of the roadway.
- Population is not negatively affected.
- Retail sales are not generally affected, although individual businesses may experience positive or negative effects.

- The cities that benefited the most had planned for the changes.
- Working with the Iowa Department of Transportation regarding the facility orientation was beneficial to the communities that did so.
- Traffic on the old route increased.
- Retail sales and city valuations were not generally negatively affected.
- Safety and noise-related issues improved.
- New around-town routes play a small role in overall economic vitality, but other factors are a bigger influence, such as the regional economy, community characteristics, urbanization, and access.
- There was no indication that new around-town routes cause population loss or decrease in economic activity.
- Larger communities were able to draw outside employees to industrial jobs, taking advantage of improved travel times.
- Residents of smaller communities were better able to commute to these communities.
- New around-town routes have had transitory negative effects on selected companies, such as restaurants, bars, motels, and service stations. However, there is variation across towns and companies regarding effects.

10. Comer, J., Finchum, G. Business impacts of highway bypasses. Oklahoma State University: Department of Geography; 2001.

Purpose

The purpose of this study was to analyze changes that had occurred in small Oklahoma communities as a result of past around-town routes to anticipate changes with new around-town routes in other communities.

Scope and Methodology

This study involved a literature review, case studies, and analysis of effects to businesses (by type) and sales tax revenue. The effects discussed in the literature focused on permanent effects to businesses and industries, tax revenues, and the regional economic climate. The case studies involved a comparison of 14 communities where new around-town routes had been implemented and eight “target” communities where such routes were being planned. These communities were divided into three categories, including:

- Small communities—less than 2,500 people
- Medium communities—2,500 to 7,500 people
- Large communities—more than 7,500 people

The business analysis made predictions about effects by business type for the target communities based on the experiences of the communities where new around-town routes had been implemented. Additionally, the analysis reviewed overall sales tax collections five years before the new around-town route opened and five years after (standardized to 1998 dollars) to identify effects.

Synopsis of Conclusions

This study found the following related to the overall economic climate of the communities where new around-town routes had been implemented:

- Most of the communities surveyed stated that the overall business climate improved by alleviating traffic congestion.
- Many downtown businesses were able to restructure or repackage their merchandise and services for a new customer base.
- New around-town routes speed up the decline in some communities, although they are not the sole cause of the decline.

- Medium-sized communities grew robustly before and immediately after the new around-town routes were opened, although the average increase in growth dropped after the new routes were implemented.
- Fieldwork indicated that older residents of the small communities keep the local economy alive by frequenting businesses that cater largely to local clientele.

This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Hazardous Materials Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... 1
2. Resource Definition ... 2
3. Applicable Laws, Regulations, and Guidance ... 3
3.1. Resource Conservation and Recovery Act ... 3
3.2. Comprehensive Environmental Response, Compensation, and Liability Act ... 3
3.3. FHWA Technical Advisory T6640.8A ... 3
3.4. Colorado Voluntary Clean-Up and Redevelopment Act ... 3
4. Methodology ... 4
4.1. Relevant Data or Information Sources ... 4
4.2. Data Collection and Analysis Methodology ... 5
4.3. Project Area ... 5
4.4. Effects ... 6
4.5. Mitigation Options ... 6
4.6. Deliverables ... 6
5. Existing Conditions ... 7
6. Effects ... 8
6.1. No-Build Alternative ... 8
6.2. Build Alternatives ... 8
7. Mitigation Strategies ... 13
8. References ... 14
Appendices ... 15
Appendix A. Resource Methodology Overview for Hazardous Materials ... 17
Appendix B. Abbreviations and Acronyms ... 19
Appendix C. Hazardous Material Sites in the Project Area ... 21

Tables

Table 5-1. Identified Hazardous Material Sites in the Project Area by County 7
Table 6-1. Hazardous Material Sites Potentially Affected by the Build Alternatives by Site Type and Location[a] 11

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 4-1. Example of Effects to Hazardous Materials 6
Figure 6-1. Build Alternatives Overview 9

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 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 (U.S. 50) from Pueblo to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right-of-way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Hazardous materials are substances known to be harmful to human health and the environment when not managed properly. This analysis identified locations where large quantities of hazardous materials are known to exist and where incidents involving hazardous materials have occurred and have been documented.

It is important to acknowledge that additional sites that have not been documented as of this time could exist. Also, existing sites could be cleaned up before Tier 2 studies begin. During Tier 2 studies, this list of hazardous materials sites will be updated to ensure that CDOT is working with the most recent data available. These sites were considered because additional precautions or clean-up activities may be necessary during Tier 2 studies if the sites are encountered.

Additionally, this analysis also identified whether U.S. 50 is used for transporting hazardous materials. Since the highway is the primary east-west route through the communities in the Lower Arkansas Valley, it means that hazardous materials currently are being transported through the downtown areas of these communities. Since more people live and work in these downtown areas than in other parts of the communities, there would be more risk to human health if an accident occurred.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 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 also were followed during this analysis of hazardous materials. They are described in more detail below.

- Resource Conservation and Recovery Act of 1976 (RCRA)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)
- FHWA Technical Advisory T6640.8A
- Colorado Voluntary Clean-Up and Redevelopment Act

3.1. Resource Conservation and Recovery Act

The RCRA establishes a framework for protecting human health and the environment through a series of regulations (40 CFR 260-271) that:

- Prohibit open dumping
- Require management of solid waste
- Regulate the treatment, storage, transportation, and disposal of hazardous wastes

In 1986, the Act was amended to regulate underground storage tanks and other leaking waste storage facilities.

3.2. Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA is primarily concerned with providing liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. The law and its associated regulations (40 CFR 300 and 43 CFR 11) also are concerned with the cleanup of inactive hazardous waste disposal sites (i.e., Superfund Sites). The Superfund Amendments and Reauthorization Act (SARA) amended this Act, making several important changes and additions to the program.

3.3. FHWA Technical Advisory T6640.8A

This technical advisory includes guidance related to identifying, locating, and mitigating hazardous material sites.

3.4. Colorado Voluntary Clean-Up and Redevelopment Act

This Act is intended to encourage voluntary cleanup of sites contaminated by hazardous materials not included in other regulatory programs.

4. Methodology

The U.S. 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 that 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 U.S. 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to the Colorado-Kansas state line (resources will be reviewed within this area, 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 hazardous materials has been 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

Geographic information system (GIS) data provided by CDOT was used to identify and locate hazardous material sites in the project area. Additionally, information from CDOT was used to determine the status of U.S. 50 as a hazardous materials route.

4.2. Data Collection and Analysis Methodology

The following tasks were completed during the U.S. 50 Tier 1 EIS's review of hazardous materials within the project area:

- Identify all known hazardous materials sites or where incidents (i.e., leaks or spills) involving hazardous materials have occurred and are documented within the project area, and classify those sites by type
- Identify whether U.S. 50 is classified as a hazardous materials route

GIS data identifying the locations of hazardous material sites in the project area was obtained from CDOT in October 2009. This data included all known sites of the following types:

- Superfund sites—sites designated for cleanup by the federal government under the CERCLA Information System (includes National Priority List sites)
- Delisted Superfund sites—Superfund sites that have been cleaned up (i.e., where no additional remedial action is planned)
- Landfills—waste storage sites (includes both active and abandoned landfills)
- Corrective action sites—sites where hazardous materials were released into soil, groundwater, surface water, or air that have been cleaned up under the RCRA Corrective Action Program
- State cleanup list sites—sites that may be designated for cleanup by the state of Colorado
- Tanks—storage tanks used to hold hazardous materials (includes both above ground and underground storage tanks)
- Tank leaks—sites where storage tanks have leaked into the environment
- Spills—sites where hazardous materials have been spilled

This analysis identified the location of documented hazardous materials sites within the project area. However, not all of these sites would be encountered by the Build Alternatives. To identify which sites could be encountered, the locations of the identified sites were compared to the boundaries of the Build Alternatives. Sites were considered affected if they were located within the Build Alternatives or within standard search distances from it. For example, a search distance of a half mile means that this analysis considered all sites located within the Build Alternatives and within a half mile of the Build Alternatives. Standard search distances were used because hazardous materials can affect areas beyond the original location of the contaminants. The standard search distance used for most of the hazardous materials types evaluated was a half mile. However, for corrective action sites, a one-mile search distance was used (U.S. Environmental Protection Agency [EPA] 2009, American Society for Testing and Materials [ASTM] International 2009).

Additionally, a state map showing official hazardous materials routes (including nuclear materials routes) in Colorado was used to determine whether U.S. 50 can be used to transport these materials.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

This analysis used a GIS application to overlay the data described in Section 4.2 onto the Build Alternatives within the study area limits. This process was used to identify affected hazardous material sites. A site was considered affected if it was located, in whole or in part, within the boundaries of a Build Alternative or within the standard search distances applied to each category of sites. More information about the standard search distances used can be found in Section 4.2.

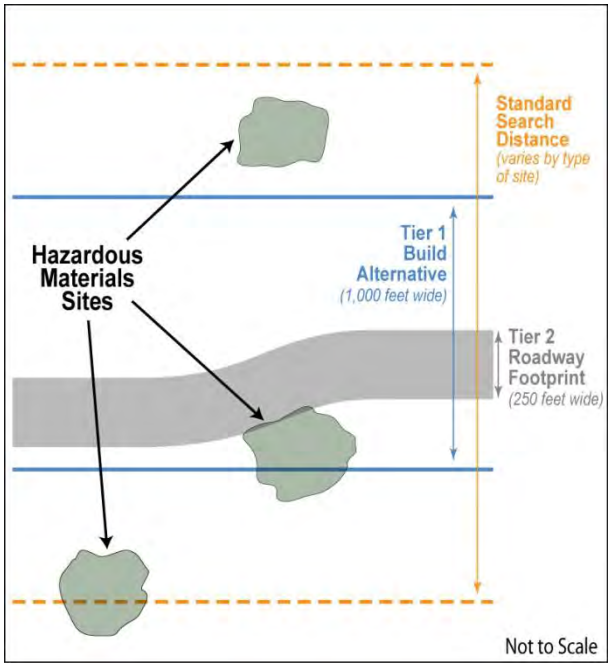


Figure 4-1. Example of Effects to Hazardous Materials

This analysis identified the location of documented hazardous materials sites within the 1,000-foot-wide Build Alternatives and within standard search distances from the Build Alternatives. For example, a search distance of a half mile means that this analysis considered all sites located within a Build Alternative and within a half mile of that Build Alternative. Standard search distances were used because hazardous materials can affect areas beyond the original location of the contaminants. The standard search distance used for most of the hazardous materials types evaluated was a half mile. However, for corrective action sites, a one-mile search distance was used (EPA 2009, ASTM International 2005). Therefore, the evaluation of effects included in this analysis uses the worst-case scenario (i.e., the largest number of sites that could possibly be encountered). It should be noted that many of the sites identified within or near the Tier 1 (i.e., 1,000-foot-wide) Build Alternatives could be avoided during future Tier 2 studies (see Figure 4-1).

4.5. Mitigation Options

Avoidance and minimization are the primary strategies employed by the U.S. 50 Tier 1 EIS for effects to hazardous material sites. During Tier 2 studies, specific mitigation activities will be developed related to the type of hazardous material site that could be encountered by the roadway alignment chosen.

4.6. Deliverables

This Hazardous Materials Technical Memorandum is the primary deliverable being produced for the U.S. 50 Tier 1 EIS related to hazardous materials. CDOT Initial Site Assessment Forms and Phase I reports will be completed during Tier 2 studies.

5. Existing Conditions

A total of 380 hazardous material sites were identified within the 150-mile-long project area. The following types of hazardous material sites were identified.

- 3 Superfund sites
- 6 delisted Superfund sites
- 7 landfills
- 7 corrective action sites
- 3 state cleanup list sites
- 227 tanks
- 110 tank leaks
- 17 spills

Table 5-1 identifies the number of hazardous material sites located in the project area by county. More detail about each site is presented in Table C-1, located in Appendix C.

Table 5-1. Identified Hazardous Material Sites in the Project Area by County

Site Type	Pueblo County	Otero County	Bent County	Prowers County	Project Area Total
Superfund sites	3	0	0	0	**3**
Delisted Superfund sites	2	3	0	1	**6**
Landfills	5	1	0	1	**7**
Corrective action sites	6	0	0	1	**7**
State cleanup list sites	3	0	0	0	**3**
Tanks	101	92	19	15	**227**
Tank leaks	54	38	11	7	**110**
Spills	9	4	2	2	**17**
Total	**183**	**138**	**32**	**27**	**380**

Source: CDOT 2009

U.S. 50 is designated as a hazardous materials route, which means the highway carries vehicles hauling these contaminants. Currently, the highway serves as the primary east-west route within and through the nine cities and towns in the study area. This poses a risk to human health if an accident were to occur involving these vehicles. The risk involves the hazardous substances leaking or spilling from these vehicles and contaminating the surrounding environment. The highway is not designated as a nuclear materials route.

6. Effects

The following sections discuss the potential of the No-Build Alternative and Build Alternatives to encounter identified hazardous materials sites.

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 U.S. 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.

Since routine maintenance and repairs are conducted on the existing highway, no known and documented hazardous materials sites would be disturbed by these activities. Smaller scale improvements have the potential to disturb sites located directly adjacent to the existing highway; however, few sites are located in these areas. Also, U.S. 50 would continue to be used as a hazardous materials route, and vehicles carrying hazardous substances would continue to travel through the downtown areas of the communities along the highway.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

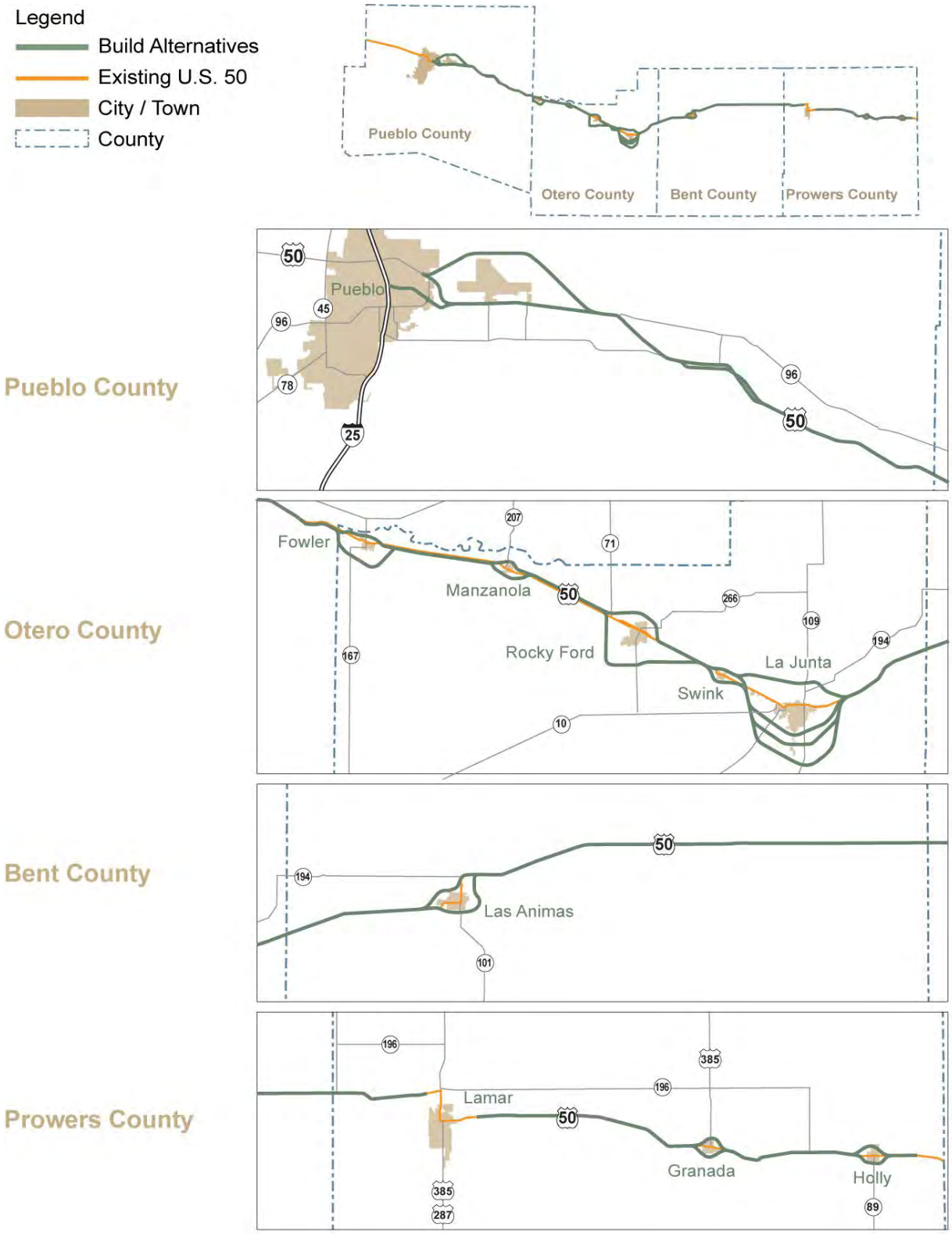


Figure 6-1. Build Alternatives Overview

Up to 162 hazardous material sites could be affected by the Build Alternatives. These sites are listed in Table 6-1 by site type and location. The majority of the sites potentially affected are located in or near Section 1: Pueblo of the project corridor (51 percent). If CDOT identifies hazardous materials sites during Tier 2 studies, they can be avoided (by moving the Tier 2 roadway alignment), or CDOT will remove and safely dispose of the hazardous substances.

The Build Alternatives would not change the status of U.S. 50 as a hazardous materials route. However, 18 of the Build Alternatives would move the highway from its existing through-town location to a new around-town location in Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. This change would move traffic, including vehicles carrying hazardous materials, out of the communities' existing downtown areas, where most residents live and work. Implementation of the Build Alternatives along the corridor would also improve the highway, making it safer to transport these types of materials through southeastern Colorado.

Table 6-1. Hazardous Material Sites Potentially Affected by the Build Alternatives by Site Type and Location[a]

Section	Build Alternatives (if more than one)	State Cleanup List	Delisted Superfund	Superfund	Landfill	Corrective Action	Tank	Tank Leak	Tank Spill	Total Sites[b]
Section 1: Pueblo	Alternative 1: Pueblo Airport North	—	—	—	—	3	3	4	—	10
	Alternative 2: Pueblo Existing Alignment	5	3	—	2	3	26	28	8	75
	Alternative 3: Pueblo SH 47 Connection	1	1	—	1	3	18	12	2	38
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	—	—	—	—	—	2	2	—	4
	Alternative 2: Fort Reynolds Realignment	—	—	—	—	—	2	2	—	4
Section 3: Fowler	Alternative 1: Fowler North	—	—	—	—	—	6	—	—	6
	Alternative 2: Fowler South	—	—	1	—	—	—	—	—	1
Section 4: Fowler to Manzanola	—	—	—	—	—	—	2	1	—	3
Section 5: Manzanola	Alternative 1: Manzanola North	—	—	—	—	—	1	3	—	4
	Alternative 2: Manzanola South	—	—	—	—	—	1	4	—	5
Section 6: Manzanola to Rocky Ford	—	—	—	—	—	—	1	—	1	2
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	—	—	—	1	—	5	1	2	9
	Alternative 2: Rocky Ford South	—	—	—	—	—	2	1	—	3
Section 8: Rocky Ford to Swink	—	—	—	—	—	—	—	—	—	0

Section	Build Alternatives (if more than one)	State Cleanup List	Delisted Superfund	Superfund	Landfill	Corrective Action	Tank	Tank Leak	Tank Spill	Total Sites[b]
Section 9: Swink	Alternative 1: Swink North	—	—	—	—	—	6	3	—	9
	Alternative 2: Swink South	—	—	—	—	—	5	2	—	7
Section 10: La Junta	Alternative 1: La Junta North	—	—	—	—	—	2	2	—	4
	Alternative 2: La Junta South	—	—	—	—	—	3	3	—	6
	Alternative 3: La Junta South	—	—	—	—	—	3	2	—	5
	Alternative 4: La Junta South	—	—	—	—	—	3	—	—	3
Section 11: La Junta to Las Animas	—	—	—	—	—	—	1	—	—	1
Section 12: Las Animas	Alternative 1: Las Animas North	—	—	—	—	—	6	7	1	14
	Alternative 2: Las Animas South	—	—	—	—	—	2	1	—	3
Section 13: Las Animas to Lamar	—	—	—	—	—	—	2	1	1	4
Section 14: Lamar to Granada	—	—	—	—	—	—	—	—	—	0
Section 15: Granada	Alternative 1: Granada North	—	—	—	—	—	2	3	—	5
	Alternative 2: Granada South	—	—	—	—	—	1	2	—	3
Section 16: Granada to Holly	—	—	—	—	—	—	—	—	—	0
Section 17: Holly	Alternative 1: Holly North	—	1	—	—	1	4	5	2	13
	Alternative 2: Holly South	—	1	—	—	1	3	3	1	9
Section 18: Holly Transition	—	—	1	—	—	1		3	1	6

[a]*Some sites could be encountered by more than one Build Alternative in multiple sections of the corridor.*

[b]*The ultimate effect of the Build Alternatives will depend on which alternatives are chosen within each section.*

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific hazardous materials sites would be encountered by the Build Alternatives. However, appropriate mitigation measures should be taken during Tier 2 studies to ensure that encountered sites do not cause harm to human health or the environment. CDOT or the party responsible for the contamination will safely remove and dispose of any hazardous materials encountered during Tier 2 construction activities.

8. References

ASTM International. *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* West Conshohocken, Pennsylvania: ASTM International, 2005. E 1527-05. p 35. Print.

Colorado Department of Transportation (CDOT). *Colorado Hazardous and Nuclear Materials Route Restrictions*. 2007. Web. 7 Aug. 2009. <http://www.dot.state.co.us/App_DTD_DataAccess/Downloads/StatewideMaps/HazMatFront.pdf>.

Colorado Department of Transportation (CDOT). *Documented Hazardous Material Sites in Colorado.* 2009. Acquired from the Colorado Department of Transportation (CDOT), Craig Clark, Hazardous Materials Specialist, on 29 Oct. 2009.

Colorado Voluntary Clean-Up and Redevelopment Act. 25 CRS 16-301 et seq. 1994.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Regulations. 40 CFR 300 and 43 CFR 11. 1980.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA*. 40 CFR Parts 1500-1508. 1978.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Technical Advisory T6640.8A. Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* 30 Oct. 1987. Web. 13 Oct. 2005. <http://www.fhwa.dot.gov/legsreqs/directives/techadvs/t664008a.htm>.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987.

Resource Conservation and Recovery Act (RCRA) Regulations. 40 CFR 260-271. 1976.

U.S. Congress. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. 42 USC 9601-9657. 1980.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Congress. Resource Conservation and Recovery Act (RCRA), as amended. 42 USC 6901 et seq. 1976.

U.S. Congress. Superfund Amendments and Reauthorization Act (SARA). 42 USC 103. 1986.

U.S. Environmental Protection Agency (EPA). *Hazardous Waste Types.* Web. 4 Sep. 2009. <http://www.epa.gov/waste/hazard/index.htm>.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Hazardous Materials

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 used subsequently by the project's resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 (corridor location) decision.

Table A-1. Resource Methodology Overview for Hazardous Materials

Methodology Overview	Hazardous Materials	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Environmental Data Resources (EDR) database • Records kept by EPA, CDOT, or Colorado Department of Public Health and Environment relating to: petroleum, hazardous substances, hazardous waste sites and spills (including violations and citations), site investigations, feasibility studies, landfills, remediation plans, Records of Decision, five-year reviews, and site monitoring • Location of wells from Colorado State Engineer's Office • Pertinent records maintained by CDOT or any other participating agencies such as the Colorado Department of Labor & Employment • Interviews with property owners/operators and federal, state, regional and/or local agency personnel as appropriate	Review and update Tier 1 data search and conduct Phase 1 Report, if needed, to gain additional knowledge of potential contamination within study area.
Collection and/or Analysis Methodology	Using the EDR database, all hazardous waste sites (including underground storage tanks) will be mapped using GIS overlay methodology	Follow through with Tier 1 analysis and determine if alternatives considered in Tier 2 will impact existing hazardous waste or underground storage tanks. If impacted, further analysis may be required, such as soil testing, etc.
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Tier 2 specific SIU corridor boundaries
Impacts	None expected	Potential contamination sites will be identified
Mitigation Options	None expected	To be determined based on Tier 2 studies
Deliverables	GIS mapping	• CDOT Initial Site Assessment Form • Phase 1 Report as appropriate for specific Tier 2 SIU project
Regulatory Guidance/ Requirements	• FHWA Technical Advisory T6640.8a • RCRA • CERCLA	

Appendix B. Abbreviations and Acronyms

ASTM	American Society for Testing and Materials
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CR	County Road
EA	Environmental Assessment
EDR	Environmental Data Resources
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GIS	Geographic information systems
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act
NEPA	National Environmental Policy Act of 1969
RCRA	Resource Conservation and Recovery Act of 1976
SARA	Superfund Amendments and Reauthorization Act
SH	State Highway
SIU	Section of independent utility
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. 50 Tier 1 Environmental Impact Statement
USC	United States Code

This page left intentionally blank.

Appendix C. Hazardous Material Sites in the Project Area

Table C-1 provides information about the 380 hazardous material sites identified within the 150-mile-long U.S. 50 project area. These sites are listed below, occurring from west to east.

Table C-1. Hazardous Material Sites in the Project Area

Type	Site Record Identification Number	Site Name	Street Address	City	County
Superfund	00121-0000192	Colorado Bumper Exchange	4804 Dillon Dr.	Pueblo	Pueblo
Superfund	00121-0000191	Pueblo 4-F Drum	68700 Dodson Rd.		Pueblo
Superfund		Pueblo Libby Sister	944 46 Ln.		Pueblo
Delisted Superfund	00124-0000544	Cliff's Shamrock Service	301 E. Colorado Ave.	Holly	Prowers
Delisted Superfund	00124-0000549	La Junta Town Gas Site	705 W. 5th St.	La Junta	Otero
Delisted Superfund	00124-0000467	Pueblo Concrete	37400 Hwy. 96 East		Pueblo
Delisted Superfund		Rocky Ford Power Plant and Service Area	14th and Walnut St.	Rocky Ford	Otero
Delisted Superfund	00124-0000357	Rocky Ford Power Plant and Service Area	101 S. 12th St.	Rocky Ford	Otero
Delisted Superfund	00124-0000515	Safety-Kleen Corp. (06-052-04)	2841 E. 4th St.	Pueblo	Pueblo
Landfill (abandoned)	00070-0001909	Frozen Foods	North of U.S. 50 west of CR 20.5	Rocky Ford	Otero
Landfill (abandoned)	00070-0000499	North City Landfill	Eagleridge Blvd. east of I-25	Pueblo	Pueblo
Landfill (abandoned)		Unknown	3800 E. 4th St.		Pueblo
Landfill (active)		Granada SWDS	1.5 miles west of Granada		Prowers
Landfill (active)	00125-0000259	Pueblo Memorial Airport SW Disposal	31476 Bryan Cir.	Pueblo	Pueblo
Landfill (active)	00125-0000401	Swift Transportation Terminal	4 Doone Pl.	Pueblo	Pueblo
Landfill (active)	00125-0000436	Tom's Towing	300 N. Vision Ln.	Pueblo	Pueblo
Corrective action		ALM Aviation of Colorado Blitz Facility	32451 Walt Bassett Ave.	Pueblo	Pueblo
Corrective action		Cliff's Shamrock	301 E. Colorado	Holly	Prowers

Type	Site Record Identification Number	Site Name	Street Address	City	County
Corrective action		Colorado Bumper Exchange Inc.	4804 Dillon Dr.	Pueblo	Pueblo
Corrective action		CDOT, Region 2	905 Erie Ave.	Pueblo	Pueblo
Corrective action		Jim's Formalwear	3124 N. Freeway	Pueblo	Pueblo
Corrective action		Safety-Kleen Systems Inc.	2841 E. 4th St.	Pueblo	Pueblo
Corrective action		Tuboscope Inc., Site C	28900 U.S. Hwy. 50 E.	Pueblo	Pueblo
State cleanup list	00115-0000291, 00115-0000384, 00115-0000210	Belmont Shopping Center	1002-1028 Constitution Rd. and 1106A-1204 Bonforte Blvd.	Pueblo	Pueblo
State cleanup list	00115-0000244	Kurt Manufacturing	350 Keeler Pkwy.	Pueblo	Pueblo
State cleanup list	00115-0000385	Standard Sales Co., LP	1601 N. Erie Ave.	Pueblo	Pueblo
Tank	00122-0030657	1st Stop (#3109)	2102 Norwood Ave.	Pueblo	Pueblo
Tank	00122-0027513	7-Eleven (# unknown)	1834 E. 8th St.	Pueblo	Pueblo
Tank	00122-0036141	7-Eleven (#13116)	1150 Elm Ave.	Rocky Ford	Otero
Tank	00122-0032782	A 1 Auto Sales	1001 Bonforte Blvd.	Pueblo	Pueblo
Tank	00122-0036003	Acorn Food Store	108 Baxter Rd.	Pueblo	Pueblo
Tank	00122-0037901, 00122-0032291	AFAM Lodge/King Solomon Lodge (#36)	401 Bent Ave.	Las Animas	Bent
Tank	00122-0039635	All Rite Paving and Redi Mix	30783 U.S. Hwy. 50	La Junta	Otero
Tank	00122-0031008	American Fertilizer Co.	35641 Hwy. 50 East	Pueblo	Pueblo
Tank	00122-0039361	Arkansas River Power Authority Unit, North Substation	714 Pine St.	Holly	Prowers
Tank	00122-0027706	Arkansas Valley Co-op	112 N. Park St.	Manzanola	Otero
Tank		Arkansas Valley Diesel	6002 U.S. Hwy. 50-U.S. Hwy. 287 W.		Prowers
Tank	00122-0034138	Arkansas Valley Medical Center	1100 Carson Ave.	La Junta	Otero
Tank	00122-0039036	Auto and Truck Body	511 N. Main St.	Rocky Ford	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0032945	Auto Tron	803 W. 3rd St.	La Junta	Otero
Tank	00122-0030110, 00122-0036635	Ballantyne Property	3030 E. 4th St.	Pueblo	Pueblo
Tank	00122-0031567	Barker Service	35859 Hwy. 50 East	Pueblo	Pueblo
Tank	00122-0025585	Bauserman Market	11786 U.S. Hwy. 50	Manzanola	Otero
Tank	00122-0030983	Belmont Conoco	2016 N. Hudson Ave.	Pueblo	Pueblo
Tank	00122-0042177	Belmont Pump Station	2000 Bonforte Blvd.	Pueblo	Pueblo
Tank	00122-0030565	Bender Oil Co.	102 Elm Ave.	Rocky Ford	Otero
Tank	00122-0034353	Benfattis Inc.	3110 N. Freeway Rd., Mel Harmon Dr. and E. Frontage Rd.	Pueblo	Pueblo
Tank	00122-0039488	Bent County Property	148 Bent Ave.	Las Animas	Bent
Tank	00122-0025887	Bent County Rd. and Bridge	203 9th St.	Las Animas	Bent
Tank	00122-0040939	Bent Farms	344 W. 6th St.	Las Animas	Bent
Tank	00122-0040334	Big R Store	1050 Bonforte Blvd.	Pueblo	Pueblo
Tank		BNSF Railway	1 W. 1st St.	La Junta	Otero
Tank	00122-0030092	Bob's Generator Service	601 E. 8th St.	Pueblo	Pueblo
Tank	00122-0028276	Bonforte 66	1201 Bonforte Blvd.	Pueblo	Pueblo
Tank	00122-0038814	Boone Junction	56200 Hwy. 50 East	Boone	Pueblo
Tank	00122-0029682	Bunny's	601 E. 1st St.	La Junta	Otero
Tank	00122-0035308	Bus Garage	100 W. Washington Ave.	Rocky Ford	Otero
Tank	00122-0042095	Car Care Center	301 E. 3rd St.	La Junta	Otero
Tank	00122-0035471	Carl Wills Beverage Co.	2200 N. Freeway Rd., U.S. Hwy. 50 East and I-25	Pueblo	Pueblo
Tank	00122-0029882	Carolyn Hill	224 Main St.	Fowler	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0032477	Case Power and Equipment	30450 Hwy. 96 East	Pueblo	Pueblo
Tank	00122-0028530	Catlin Gas Co.	11235 U.S. Hwy. 50	Manzanola	Otero
Tank	00122-0036896	CDOT, Region 2	905 Erie Ave.	Pueblo	Pueblo
Tank	00122-0032594	CDOT, Region 2	Pueblo Main	Pueblo	Pueblo
Tank	00122-0028242	CDOT, Region 2	209 S. Main St.	Granada	Prowers
Tank	00122-0032568	CDOT, Region 2	401 E. Cheyenne St.	Holly	Prowers
Tank	00122-0032227	CDOT, Region 2	28201 U.S. Hwy. 50		Otero
Tank	00122-0032230	CDOT, Region 2	52 Bent Ave.	Las Animas	Bent
Tank	00122-0025194	Centel Rocky Ford Service Center	101 S. 12th St.	Rocky Ford	Otero
Tank	00122-0034396	Century Tel—La Junta Central Office	610 Colorado Ave.	La Junta	Otero
Tank	00122-0034480	Chester Bay Trucking	31166 U.S. Hwy. 50		Otero
Tank	00122-0025636	Citizens Utilities Co.	705 W. 5th St.	La Junta	Otero
Tank	00122-0028797	City of La Junta	409 Lacey Ave.	La Junta	Otero
Tank	00122-0028796	City of La Junta	600 W. 5th St.	La Junta	Otero
Tank	00122-0031350	City of Las Animas	555 Cottonwood Ave.	Las Animas	Bent
Tank	00122-0034746	Cliff's Shamrock	301 E. Colorado St.	Holly	Prowers
Tank		Coastal Mart (#2051)	45461 U.S. Hwy. 50 E.		Pueblo
Tank	00122-0041992	Colorado Moving and Storage	3001 N. Freeway Rd., east of I-25 north of 29th St.	Pueblo	Pueblo
Tank	00122-0034415	Conoco (# unknown)	1000 Elm Ave.	Rocky Ford	Otero
Tank		Conoco (#06436)	3700 N. Freeway	Pueblo	Pueblo
Tank		Cornelius Transfer and Storage	6th St. and Kennelworth	La Junta	Otero
Tank	00122-0035896	CSU Arkansas Valley Research	27901 Rd. 21		Otero
Tank		Donna Jeans Country Store	2290 U.S. Hwy. 50 E.		Pueblo
Tank	00122-0029278	East District Rd. and Bridge	P.O. Box 668, 520 N. 8th St.	Holly	Prowers

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0032973	East Otero School District R-1	301 Hayes Ave.	La Junta	Otero
Tank	00122-0030865	Economy Building Material Center	2700 E. 4th St.	Pueblo	Pueblo
Tank	00122-0025696	Eligio Camacho Jr.	607 S. 2nd St.	Rocky Ford	Otero
Tank	00122-0027829	Ellis Standard	402 Bent Ave.	Las Animas	Bent
Tank	00122-0032384	Farmers Co-op	312 E. 1st St.	Manzanola	Otero
Tank	00122-0027409	Faus Conoco (Ronald G. Faus)	460 Bent Ave.	Las Animas	Bent
Tank	00122-0042058	Flexible Foams	33625 United Ave.	Pueblo	Pueblo
Tank	00122-0026086	Fort Lyon Canal Co.	749 Vigil Ave.	Las Animas	Bent
Tank	00122-0030299	Fowler School District R-4J	600 W. Eugene Ave.	Fowler	Otero
Tank	00122-0033371	Fowler Shop	101 6th St.	Fowler	Otero
Tank	00122-0038858	Foxhoven Tire Center	4841 Dillon Dr.	Pueblo	Pueblo
Tank	00122-0025054	Frank Rocha Property	421 W. 3rd St.	La Junta	Otero
Tank	00122-0037091	Frozen Food Inc.	U.S. Hwy. 50	Rocky Ford	Otero
Tank		Gary's Sales and Service	4th and Elm St.	Rocky Ford	Otero
Tank	00122-0035464	Gasamat (#226)	1101 E. 3rd St.	La Junta	Otero
Tank	00122-0025692	Glen Grimsley	17037 U.S. Hwy. 50	Rocky Ford	Otero
Tank	00122-0031593	Glenn Co. Produce Dist. Inc.	32251 United Ave.	Pueblo	Pueblo
Tank		Goodrich Corp.	50 William White Blvd	Pueblo	Pueblo
Tank	00122-0028233	Granada 66 Service	300 E. Goff Ave.	Granada	Prowers
Tank	00122-0034580	Granada Bulk Plant	300 S. Inge St.	Granada	Prowers
Tank	00122-0032914	Granada Station	206 W. Goff Ave.	Granada	Prowers
Tank	00122-0031488	Granada Stop 2 Shop	105 E. Goff Ave.	Granada	Prowers
Tank	00122-0025131	Green Bay Food Co.	26510 Otero CR BB	La Junta	Otero
Tank	00122-0025187	H.E. Whitlock	4808 Warehouse Dr.	Pueblo	Pueblo

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0031289	Holly School District RE-3	3rd and Buffalo St.	Holly	Prowers
Tank	00122-0035261	Hutchison Pest Control	2662 N. Freeway Rd., I-25 at 26th St.	Pueblo	Pueblo
Tank	00122-0037713	J.C. Penney Co.—Pueblo Mall	3429 Dillon Dr., 3301 Dillon Dr.	Pueblo	Pueblo
Tank	00122-0027022	J.C. Penney Co. (#644-5)	3301 Dillon Dr.	Pueblo	Pueblo
Tank	00122-0028376	James Norman	303 Hwy. 50 East		Pueblo
Tank	00122-0036150	Jerald D. Steir	U.S. Hwy. 50 and Norwood Ave.	Pueblo	Pueblo
Tank	00122-0039714	Jim Shafstein	116 32nd Ln.	Pueblo	Pueblo
Tank	00122-0025697	JL's Auto Service	301 Carson Ave.	La Junta	Otero
Tank	00122-0039420	John Garcia	2011 E. 4th St.	Pueblo	Pueblo
Tank	00122-0035685	John Laiola	515 Elm Ave.	Rocky Ford	Otero
Tank	00122-0025611	Jones Oil Co.	2186 U.S. Hwy. 50		Otero
Tank	00122-0035160	Jones Oil Co.	34365 Hwy. 167	Fowler	Otero
Tank	00122-0031520	Joslin Dry Goods	3601 Dillon Dr.	Pueblo	Pueblo
Tank		JR's Country Store	25100 U.S. Hwy. 50 E.	Pueblo	Pueblo
Tank	00122-0028955	JRS Country Peddler	118 E. Colorado St.	Holly	Prowers
Tank	00122-0035020	Juan 66 Service	1840 E. 4th St.	Pueblo	Pueblo
Tank	00122-0040914	Kanox Inc.	29550 Hwy. 96 East	Pueblo	Pueblo
Tank	00122-0037219	KG Store	1207 N. 12th St.	Rocky Ford	Otero
Tank	00122-0027137	Konvenience Korner (#2)	1720 Constitution Rd.	Pueblo	Pueblo
Tank	00122-0033813	Kum and Go (#905)	204 E. Cranston Ave.	Fowler	Otero
Tank	00122-0033781	Kum and Go (#914)	517 Colorado Ave.	La Junta	Otero
Tank	00122-0026832	Kwik Way Store (#21)	2529 E. 8th St.	Pueblo	Pueblo
Tank	00122-0028258	La Junta Conoco	406 W. 1st St.	La Junta	Otero
Tank	00122-0037698	La Junta Power Plant	215 W. 1st St.	La Junta	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0033380	La Junta Shop	802 W. 3rd St.	La Junta	Otero
Tank	00122-0035224	La Junta Valley Oil Co.	1010 W. 3rd St.	La Junta	Otero
Tank	00122-0034611	La Junta Valley Tire Co.	1000 W. 3rd St.	La Junta	Otero
Tank	00122-0038369	Lamar Building Material	27580 U.S. Hwy. 50	La Junta	Otero
Tank	00122-0026243	Las Animas 66 Service	206 Bent Ave.	Las Animas	Bent
Tank	00122-0027370	Las Animas Oil Co. Inc.	P.O. Box 207, 119 N. Bent Ave.	Las Animas	Bent
Tank	00122-0034513, 00122-0033294	Las Animas Transfer	242 Bent Ave.	Las Animas	Bent
Tank	00122-0031251	Law Truck Plaza	1800 E. Elm St.	Rocky Ford	Otero
Tank	00122-0036792, 00122-0029513	Lincoln-Devore Inc.	602 E. 8th St.	Pueblo	Pueblo
Tank	00122-0038843	Lloyd's Liquors	1200 Elm Ave.	Rocky Ford	Otero
Tank	00122-0029726	Loaf N Jug (# unknown)	442 Keeler Pkwy.	Pueblo	Pueblo
Tank	00122-0027539	Loaf N Jug (#13)	918 W. 3rd St.	La Junta	Otero
Tank	00122-0027163	Loaf N Jug (#15)	243 Hwy. 50 East		Pueblo
Tank	00122-0027159	Loaf N Jug (#16)	101 N. Main St.	La Junta	Otero
Tank	00122-0027154	Loaf N Jug (#17)	1502 Troy Ave.	Pueblo	Pueblo
Tank	00122-0028967	Loaf N Jug (#31)	2222 San Juan Ave.	La Junta	Otero
Tank	00122-0028978	Loaf N Jug (#34)	33 Montebello Rd.	Pueblo	Pueblo
Tank		Loaf N Jug (#35)	36031 U.S. Hwy. 50	Pueblo	Pueblo
Tank	00122-0028985	Loaf N Jug (#38)	1002 Bonforte Blvd.	Pueblo	Pueblo
Tank	00122-0029010	Loaf N Jug (#49)	305 N. 10th St.	Rocky Ford	Otero
Tank		Loaf N Jug (#59)	415 Ambassador Thompson Blvd.	Las Animas	Bent
Tank	00122-0029011	Loaf N Jug (#65)	2119 E. 4th St.	Pueblo	Pueblo

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0034826	Loaf N Jug (#70)	4001 Jerry Murphy Rd.	Pueblo	Pueblo
Tank	00122-0026878	Loaf N Jug (#74)	31918 Hwy. 96 East	Pueblo	Pueblo
Tank	00122-0031546	Loaf N Jug (#78)	2120 Oakshire Ln.	Pueblo	Pueblo
Tank	00122-0031516	Loaf N Jug (#86)	2810 Troy Ave.	Pueblo	Pueblo
Tank		Loaf N Jug (#204)	24920 U.S. Hwy. 50 E.	Pueblo	Pueblo
Tank	00122-0028801	Lova M. Nordyke	844 W. Colorado	Holly	Prowers
Tank	00122-0039516, 00122-0030633	Love's Country Store (#12)	308 E. 1st St.	La Junta	Otero
Tank	00122-0030629	Love's Country Store (#14)	601 Elm St.	Rocky Ford	Otero
Tank	00122-0025070	Lusk Produce	21501 U.S. Hwy. 50	Rocky Ford	Otero
Tank	00122-0035475	Main Electric Ltd.	1115 Erie Ave.	Pueblo	Pueblo
Tank		Maintenance Transportation Shop	3rd St. and Hayes	La Junta	Otero
Tank	00122-0031788	Marvin E. Clark	26680 U.S. Hwy. 50	La Junta	Otero
Tank	00122-0033562	McKamey's 66	513 U.S. Hwy. 50	Fowler	Otero
Tank	00122-0035276	McRinney Concrete	2700 N. Freeway Rd., east of I-25 at 26th St.	Pueblo	Pueblo
Tank	00122-0027271	Mechanic's Shop	801 Beech Ave.	Rocky Ford	Otero
Tank	00122-0025138	Mike West Property	800 Elm Ave.	Rocky Ford	Otero
Tank	00122-0029825	Monis Marina and Mini Mart	107 Bowker Ave.	Hasty	Bent
Tank	00122-0028561	Montgomery Ward (#1647)	3201 Dillon Dr.	Pueblo	Pueblo
Tank	00122-0036131, 00122-0036255	Mountain States Sheet Metal Co.	126 S. 27 ¼ Ln., 126 S. 27 ½ Ln.	Pueblo	Pueblo
Tank	00122-0038262, 00122-0038256, 00122-0029740	Mueller Auto Repair	1516 E. Hwy. 50 Bypass	Pueblo	Pueblo

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0030563	Norton's Standard	102 E. 1st St.	La Junta	Otero
Tank	00122-0026279	OMS (#6)	720 N. Main St.	Rocky Ford	Otero
Tank	00122-0032662	Otero County Rd. and Bridge	814 W. 3rd St.	La Junta	Otero
Tank		Otero County Shop	6th and Santa Fe	Fowler	Otero
Tank	00122-0025608	Park It Gas	27650 U.S. Hwy. 50	La Junta	Otero
Tank		Parker Ag Services LLC	31005 CR 19		Prowers
Tank		Peppe Gourmet Food	28570 U.S. Hwy. 50 E.	Pueblo	Pueblo
Tank	00122-0027131	Peerless Tyre (#929)	2906 N. Freeway Rd., I-25 and 29th St.	Pueblo	Pueblo
Tank	00122-0031138	Pepsi-Cola Bottling Group	24839 Cuchara St.	La Junta	Otero
Tank	00122-0026908	Pete's Service	310 Hwy. 50 East		Pueblo
Tank	00122-0025885	Petro Mark Corp.	1013 Bonforte Blvd.	Pueblo	Pueblo
Tank		Pueblo ASR	Pueblo Memorial Airport	Pueblo	Pueblo
Tank		Pueblo ATBM	Pueblo Memorial Airport	Pueblo	Pueblo
Tank	00122-0029653	Pueblo County Public Works	33601 United Ave.	Pueblo	Pueblo
Tank	00122-0031660	Pueblo Disposal Services	28900 E. Hwy. 96	Pueblo	Pueblo
Tank	00122-0031234	Pueblo Distribution	34800 United Ave.	Pueblo	Pueblo
Tank		Pueblo LOC	Pueblo Memorial Airport	Pueblo	Pueblo
Tank	00122-0029199, 00122-0032717, 00122-0032678	Pueblo Memorial Airport	31201 Bryan Cir.	Pueblo	Pueblo
Tank		Pueblo School Service	24951 U.S. Hwy. 50	Pueblo	Pueblo
Tank		Quick Car	Pueblo Memorial Airport Industrial Park	Pueblo	Pueblo
Tank		Quickees (# unknown)	1207 Elm St.	Rocky Ford	Otero
Tank		Quickees (#1)	205 Columbia	Swink	Otero
Tank		Quickees (#2)	1033 Ambassador Thompson Blvd.	Las Animas	Bent
Tank		Quickees (#7)	601 W. 1st St.	La Junta	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0025153	Quickee Food (#1)	712 E. 3rd St.	La Junta	Otero
Tank	00122-0036216	Quickee Food (#2)	7th St. and Grove Ave.	Las Animas	Bent
Tank		Ralf Maler's Property	3rd St. and Daniel	La Junta	Otero
Tank		Ratzlaff Welding	909 Ambassador Thompson Blvd.	Las Animas	Bent
Tank	00122-0035287	Red's 66 Service	572 E. 8th St., 809 Erie Ave.	Pueblo	Pueblo
Tank	00122-0036979	Richlawn Turf Farm	U.S. Hwy. 50 and Nyberg Rd.		Pueblo
Tank		Rocky Ford Bulk Plant	202 S. 2nd Ave.	Rocky Ford	Otero
Tank	00122-0035591	Rocky Ford Mini Mart	1356 Swink St.	Rocky Ford	Otero
Tank		Rocky Ford Pet Foods	26242 U.S. Hwy. 71 S.		Otero
Tank	00122-0032793	Roto-Rooter	1115 Fountain Ave.	Pueblo	Pueblo
Tank		Rusler Produce	47762 E. U.S. Hwy. 96		Pueblo
Tank	00122-0027675	Safety Kleen Corp. (6-052-04)	2841 E. 4th St.	Pueblo	Pueblo
Tank	00122-0039767	Sam's Club (#6549)	412 Eagleridge Blvd.	Pueblo	Pueblo
Tank	00122-0037636, 00122-0030410	Shorty's Deli	615 W. 1st St.	La Junta	Otero
Tank	00122-0036980	Showaler	1710 Elm St.	Rocky Ford	Otero
Tank	00122-0039760	Showalter Inc.	501 Wiley Ave.	Swink	Otero
Tank	00122-0039958	Sibran Properties LLC	545 Skyway Dr.	Pueblo	Pueblo
Tank		Sibran Properties LLC/Doss Aviation	1 William White Dr.	Pueblo	Pueblo
Tank	00122-0033156	Silo Oil Co.	3130 N. Freeway Rd., Mel Harmon Dr. and E. Frontage Rd.	Pueblo	Pueblo
Tank	00122-0034808	Southeast Colorado Power Assoc.	100 Dalton Ave.	La Junta	Otero
Tank	00122-0025631	Southeastern Colorado Co-op	408 S. 1st St.	Holly	Prowers
Tank	00122-0025050	Spradley Motor Co.	26730 U.S. Hwy. 50	La Junta	Otero
Tank	00122-0034460	Steir Oil Co.	100 S. 12th St.	Rocky Ford	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0027190	Summit Brick and Tile Co.	13th St. and Erie Ave.	Pueblo	Pueblo
Tank	00122-0033205	Swedes Service	1127 Swink Ave.	Rocky Ford	Otero
Tank	00122-0040153	Swift Transportation	4 Doane Pl.	Pueblo	Pueblo
Tank	00122-0035691	Swink School District 33	611 Columbia Ave.	Swink	Otero
Tank	00122-0034952	Tallman Oil Co.	809 Erie Ave.	Pueblo	Pueblo
Tank	00122-0035285	Tallman Oil Co.	527 E. 8th St.	Pueblo	Pueblo
Tank		Target Stores	Pueblo Memorial Airport	Pueblo	Pueblo
Tank	00122-0027576	Thaxton's Market	105 Bent Ave.	Las Animas	Bent
Tank	00122-0028468	Thunderbird Car Wash	2038 Oakshire Ln.	Pueblo	Pueblo
Tank	00122-0034298	Tom's Service Center	1930 Norwood Ave.	Pueblo	Pueblo
Tank	00122-0025686	Town of Swink	321 Columbia Ave.	Swink	Otero
Tank	00122-0040098	Trane Co.	101 William White Blvd.	Pueblo	Pueblo
Tank	00122-0039716	Transit Mix Concrete East	2596 E. Hwy. 96	Pueblo	Pueblo
Tank		U-Haul (# unknown)	4030 N. Freeway Rd.	Pueblo	Pueblo
Tank	00122-0025387	U.S. Postal Service	1025 Hwy. 50 Bypass	Pueblo	Pueblo
Tank	00122-0034313	U.S. West Eagle Ridge Garage	315 Eagle Ridge Blvd.	Pueblo	Pueblo
Tank	00122-0038300	University of Southern Colorado	2200 Bonforte Blvd.	Pueblo	Pueblo
Tank	00122-0031037	University Park Care Center	945 Desert Flower Blvd.	Pueblo	Pueblo
Tank	00122-0026397	USA Petroleum	175 W. 29th St.	Pueblo	Pueblo
Tank	00122-0034896	Valco Rocky Ford Concrete Division	21485 U.S. Hwy. 50	Rocky Ford	Otero
Tank	00122-0034989	Vineland Service	35098 Hwy. 50 East	Pueblo	Pueblo
Tank		Wallace Oil Co.	1st and Lewis St.	La Junta	Otero
Tank	00122-0041706	Wal-Mart	4200 Dillon Dr.	Pueblo	Pueblo
Tank	00122-0041712	Wal-Mart	6 Conley Rd.	La Junta	Otero
Tank	00122-0027005	Ward Transport Terminal	618 Main St.		Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank	00122-0034061	Wayne's Towing Inc.	2516 N. Freeway Rd., east of I-25 at 26th St.	Pueblo	Pueblo
Tank		West Plains Energy, Rocky Ford Plant	14th and Walnut	Rocky Ford	Otero
Tank	00122-0033787	Western Convenience Stores Inc. (#121)	356 Bent Ave.	Las Animas	Bent
Tank		Western Gas and Convenience	123 W. Cranston	Fowler	Otero
Tank	00122-0034106	Whatley's 66 Service	3rd St. and Raton Ave.	La Junta	Otero
Tank	00122-0038284, 00122-0029840	Yellow Freight Systems Inc./Yellow Transportation System Inc.	131 E. 40th St.	Pueblo	Pueblo
Tank	00122-0027766	Zim's Auto Sales	10 Robertson Rd.	Pueblo	Pueblo
Tank leak		7-Eleven (#1812-13114)	25100 U.S. Hwy. 50 E.		Pueblo
Tank leak	00123-0002824	7-Eleven (#1812-16032)	517 Colorado Ave.	La Junta	Otero
Tank leak	00123-0007879	7-Eleven (#23524)	1150 Elm Ave.	Rocky Ford	Otero
Tank leak	00123-0006223	A1 Auto Sales	1001 Bonforte Blvd.	Pueblo	Pueblo
Tank leak	00123-0005798, 00123-0008452	Acorn Food Store/Gasrite (#340)	108 Baxter Rd.	Pueblo	Pueblo
Tank leak	00123-0002338	AFAM Lodge	401 Bent Ave.	Las Animas	Bent
Tank leak	00123-0006117	Arkansas Valley Co-op	112 N. Park St.	Manzanola	Otero
Tank leak	00123-0008402	Arkansas Valley Medical Center	1100 Carson Ave.	La Junta	Otero
Tank leak	00123-0000750	Ballantyne Property	3030 E. 4th St.	Pueblo	Pueblo
Tank leak	00123-0006651	Bauserman Market	11786 U.S. Hwy. 50	Manzanola	Otero
Tank leak	00123-0007400, 00123-0008368	Belmont Conoco	2016 N. Hudson Ave.	Pueblo	Pueblo
Tank leak	00123-0005621	Bender Oil (Amoco)	102 Elm Ave.	Rocky Ford	Otero
Tank leak	00123-0006097, 00123-0001806	Bender Oil Bulk Plant	202 S. 2nd Ave.	Rocky Ford	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank leak	00123-0007986	Bender Oil Co.	103 Raton Ave.	La Junta	Otero
Tank leak	00023-0000036	Bent Avenue	Bent Ave.	Las Animas	Bent
Tank leak	00123-0001601	Big Valley Ford L-M Inc.	26730 U.S. Hwy. 50	La Junta	Otero
Tank leak	00123-0002166	Bob's Generator Service	601 E. 8th St.	Pueblo	Pueblo
Tank leak	00123-0006818	Boone Jct.	56200 U.S. Hwy. 50	Boone	Pueblo
Tank leak	00123-0007522	Burkhalter Property	148 Bent Ave.	Las Animas	Bent
Tank leak	00123-0001905	Bus Garage, Rocky Ford High School	100 W. Washington Ave.	Rocky Ford	Otero
Tank leak	00123-0008828	Car Care Center	301 E. 3rd St.	La Junta	Otero
Tank leak	00123-0004278	Carl Wills Beverage Co.	2200 N. Freeway Rd., I-25 and U.S. Hwy. 50	Pueblo	Pueblo
Tank leak	00123-0001489	CDMA Rocky Ford OMS (#6)	720 N. Main St.	Rocky Ford	Otero
Tank leak	00123-0006200	CDOT, Region 2	905 Erie Ave.	Pueblo	Pueblo
Tank leak	00123-0004203	CDOT, Region 2	209 S. Main St.	Granada	Prowers
Tank leak	00123-0003174	CDOT, Region 2	401 E. Cheyenne St.	Holly	Prowers
Tank leak	00123-0005013	CDOT, Region 2	28201 U.S. Hwy. 50	La Junta	Otero
Tank leak	00123-0000074	CDOT, Region 2	52 Bent Ave.	Las Animas	Bent
Tank leak	00123-0003425	CDOT, Region 2	Pueblo Main	Pueblo	Pueblo
Tank leak	00123-0008029	City of La Junta	600 W. 5th St.	La Junta	Otero
Tank leak	00123-0008417, 00123-0006027	Cliff's Shamrock	301 E. Colorado St.	Holly	Prowers
Tank leak		Coastal Mart (#2051)	45461 U.S. Hwy. 50 E.		Pueblo
Tank leak	00123-0008733	Colorado Moving and Storage	3001 N. Freeway Rd., I-25 and 29th St.	Pueblo	Pueblo
Tank leak	00123-0000916	Conoco	406 W. 1st St.	La Junta	Otero
Tank leak	00123-0008046, 00123-0004092	Convenience Plus (#43)/Kum and Go (#912)	356 Bent Ave.	Las Animas	Bent

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank leak	00123-0005210	County Rd. and Bridge Shop	520 N. 8th St.	Holly	Prowers
Tank leak	00123-0000166	Diamond Shamrock (#684)	1305 Swink Ave.	Rocky Ford	Otero
Tank leak	00123-0008195	Ellis Standard	402 Bent Ave.	Las Animas	Bent
Tank leak		Exxon Co. USA RAS (#62403)	3700 N. Freeway	Pueblo	Pueblo
Tank leak	00123-0002975	Exxon Co. USA RAS (#63142)	1201 Bonforte Blvd.	Pueblo	Pueblo
Tank leak	00123-0006073	Farmer's Co-op	312 E. 1st St.	Manzanola	Otero
Tank leak	00123-0005232	Faus Conoco (Ronald G. Faus)	460 Bent Ave.	Las Animas	Bent
Tank leak	00123-0004176	Fort Lyon Canal Co.	750 Bent Ave.	Las Animas	Bent
Tank leak	00123-0006456	Foxhoven Tire Center	4841 Dillon Dr.	Pueblo	Pueblo
Tank leak	00123-0003371	Gasamat (#226)	1101 E. 3rd St.	La Junta	Otero
Tank leak	00123-0006880	GNL Auto and Truck Body	511 N. Main St.	Rocky Ford	Otero
Tank leak	00123-0008174	Granada Bulk Plant	300 S. Inge St.	Granada	Prowers
Tank leak	00123-0007169	Granada Station	206 W. Goff Ave.	Granada	Prowers
Tank leak	00123-0001114	J.C. Penney Co.—Pueblo Mall	3429 Dillon Dr., 3301 Dillon Dr.	Pueblo	Pueblo
Tank leak	00123-0007437	J.G. Auto Sales	2011 E. 4th St.	Pueblo	Pueblo
Tank leak	00123-0007721	Jim Shafstein	116 32nd Ln.	Pueblo	Pueblo
Tank leak	00123-0005331	Juan 66 Service	1840 E. 4th St.	Pueblo	Pueblo
Tank leak	00123-0002680	KG Store	1207 N. 12th St.	Rocky Ford	Otero
Tank leak	00123-0001655	La Junta Power Plant	215 W. 1st St.	La Junta	Otero
Tank leak	00123-0004643	Lamar Building Material	27580 U.S. Hwy. 50	La Junta	Otero
Tank leak	00123-0005946, 00123-0005947	Las Animas Oil Co.	119 N. Bent Ave.	Las Animas	Bent
Tank leak	00123-0000350	Lincoln-Devore	602 E. 8th St.	Pueblo	Pueblo
Tank leak	00123-0006664	Lloyd's Liquors	1200 Elm Ave.	Rocky Ford	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank leak	00123-0000223	Loaf N Jug (# unknown)	1720 Constitution Rd.	Pueblo	Pueblo
Tank leak	00123-0006843	Loaf N Jug (# unknown)	2222 San Juan Ave.	La Junta	Otero
Tank leak	00123-0005339	Loaf N Jug (#15)	243 U.S.Hwy. 50	Avondale	Pueblo
Tank leak		Loaf N Jug (#16)	101 N. Main St.	La Junta	Otero
Tank leak	00123-0004546	Loaf N Jug (#17)	1502 Troy Ave.	Pueblo	Pueblo
Tank leak	00123-0008761	Loaf N Jug (#70)	4001 Jerry Murphy Rd.	Pueblo	Pueblo
Tank leak	00123-0007773	Loaf N Jug (#74)	31918 Hwy. 96 East	Pueblo	Pueblo
Tank leak		Loaf N Jug (#204)	24920 U.S. Hwy. 50	Pueblo	Pueblo
Tank leak	00123-0007542	Love's Country Store (#12)	308 E. 1st St.	La Junta	Otero
Tank leak	00123-0003229	Love's Country Store (#14)	601 Elm St.	Rocky Ford	Otero
Tank leak		Lusk Produce	21501 U.S. Hwy. 50		Otero
Tank leak	00123-0004786	Main Electric Ltd.	1115 Erie Ave.	Pueblo	Pueblo
Tank leak	00123-0004306	Montgomery Ward	3201 Dillon Dr.	Pueblo	Pueblo
Tank leak	00123-0000950	Mueller Auto Repair	1516 E. Hwy. 50 Bypass	Pueblo	Pueblo
Tank leak	00123-0007573	Otero County Rd. and Bridge	814 W. 3rd St.	La Junta	Otero
Tank leak	00123-0005867	Park It Gas	27650 Frontage Rd.	La Junta	Otero
Tank leak	00123-0001971	Peerless Tyre Co. (#929)	2906 N. Freeway Rd., I-25 and 29th St.	Pueblo	Pueblo
Tank leak	00123-0006280	Petro Mark Corp.	1013 Bonforte Blvd.	Pueblo	Pueblo
Tank leak	00123-0005073	Pueblo County Rd. and Bridge	33601 United Ave.	Pueblo	Pueblo
Tank leak		Pueblo FAA - ATCT	13201 Bryan Cr.	Pueblo	Pueblo
Tank leak		Pueblo FAA RCAG Facility	Pueblo Memorial Airport	Pueblo	Pueblo
Tank leak	00123-0004339, 00123-0005614, 00123-0004343	Pueblo Memorial Airport	31201 Bryan Cir., 31475 Bryan Cir.	Pueblo	Pueblo
Tank leak	00123-0005612	Pueblo RTR	31475 Bryan Cir.	Pueblo	Pueblo

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank leak		Quick Car	Pueblo Memorial Airport Industrial Park	Pueblo	Pueblo
Tank leak	00123-0004322	Quickee Foods (#2)	7th St. and Grove Ave.	Las Animas	Bent
Tank leak	00123-0004174	Richlawn Turf Farm	U.S. Hwy. 50 and Nyberg Rd.		Pueblo
Tank leak	00123-0004436	Rocky Ford Service Center	101 S. 12th St.	Rocky Ford	Otero
Tank leak	00123-0000546	Safety Kleen Corp. (6-052-04)	2841 E. 4th St.	Pueblo	Pueblo
Tank leak	00123-0001691	Shorty's Deli	615 W. 1st St.	La Junta	Otero
Tank leak	00123-0003692	Showaler	1710 Elm St.	Rocky Ford	Otero
Tank leak	00123-0004117	Silo Building	3130 N. Freeway Rd., Mel Harmon Dr. and E. Frontage Rd.	Pueblo	Pueblo
Tank leak		Southeastern Colorado Co-op	408 S. 1st St.	Holly	Prowers
Tank leak	00123-0007350	Steir Oil Co.	1000 Elm St.	Rocky Ford	Otero
Tank leak	00123-0005317	Swede's Service	1127 Swink Ave.	Rocky Ford	Otero
Tank leak	00123-0008100, 00123-0008587	Swift Leasing or Swift Transportation	4 Doane Pl.	Pueblo	Pueblo
Tank leak		Tallman Oil Co.	527 E. 8th St.	Pueblo	Pueblo
Tank leak		Tallman Oil Co.	809 Erie St.	Pueblo	Pueblo
Tank leak	00123-0005873	Target	34800 United Ave.	Pueblo	Pueblo
Tank leak	00123-0007063	Thaxton's Market	105 Bent Ave.	Las Animas	Bent
Tank leak	00123-0004308	The Joslin Dry Goods Co.	3601 Dillon Dr.	Pueblo	Pueblo
Tank leak	00123-0006654	Thunderbird Car Wash	2038 Oakshire Ln.	Pueblo	Pueblo
Tank leak	00123-0003505	Tom's Service Center	1930 Norwood St.	Pueblo	Pueblo
Tank leak		TTCI	55500 DOT Rd.	Pueblo	Pueblo
Tank leak		U-Haul (#72229)	4030 N. Freeway Rd.	Pueblo	Pueblo
Tank leak	00123-0001406	U.S. Postal Service	1025 Hwy. 50 Bypass	Pueblo	Pueblo
Tank leak	00123-0006758	U.S. West Eagle Ridge Garage	315 Eagle Ridge Dr.	Pueblo	Pueblo
Tank leak	00123-0000063	U.S. West La Junta Central Office	610 Colorado Ave.	La Junta	Otero

Type	Site Record Identification Number	Site Name	Street Address	City	County
Tank leak	00123-0005097	University of Southern Colorado	2200 Bonforte Blvd.	Pueblo	Pueblo
Tank leak	00123-0003843	University Park Center	945 Desert Flower Blvd.	Pueblo	Pueblo
Tank leak	00123-0004158	Ward Transport Terminal	618 Main St.		Otero
Tank leak	00123-0002663	Western Foods	26510 Otero CR BB	La Junta	Otero
Tank leak	00123-0004682	Yellow Freight Systems Inc.	131 E. 40th St.	Pueblo	Pueblo
Spill	00105-0000330	Incident	2011 E. 13th St.	Pueblo	Pueblo
Spill	00105-0001193	Incident #153858	300 S. 14th St.	Rocky Ford	Otero
Spill	00105-0001513	Incident #219948	1016 E. 13th St.	Pueblo	Pueblo
Spill	00105-0001230	Incident #235602	520 N. 8th St.	Holly	Prowers
Spill	00105-0000415	Incident #257212	902 Erie Ave.	Pueblo	Pueblo
Spill	00105-0001880	Incident #392609	20094 U.S. Hwy. 50	Rocky Ford	Otero
Spill	00105-0001919	Incident #413978	2207 E. 12th St.	Pueblo	Pueblo
Spill	00105-0002618	Incident #482317	501 E. 1st St.	La Junta	Otero
Spill	00105-0002539	Incident #530525	1302 Gary Ave.	Pueblo	Pueblo
Spill	00105-0003037	Incident #571666	14919 U.S. Hwy. 50		Otero
Spill	00105-0003565	Incident #638656	1300 E. Hwy. 50 Bypass	Pueblo	Pueblo
Spill	00105-0003874	Incident #716087	250 William White Blvd.	Pueblo	Pueblo
Spill	00105-0003656	Incident #731376	408 S. 1st St.	Holly	Prowers
Spill	00105-0004131	Incident #764817	55500 DOT Rd.	Pueblo	Pueblo
Spill	00105-0001217	Las Animas Oil Co.	119 N. Bent Ave.	Las Animas	Bent
Spill	00105-0002752	Motorcycle Shop	1910 E. 4th St.	Pueblo	Pueblo
Spill	00105-0003334	Weigh station	14265 E. U.S. Hwy. 50		Bent

Source: CDOT 2009

This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Historic and Archaeological Resources Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... 1
2. Resource Definition ... 2
3. Applicable Laws, Regulations, and Guidance ... 4
3.1. Antiquities Act of 1906 ... 4
3.2. Historic Sites Act of 1935 ... 4
3.3. National Historic Preservation Act of 1966 ... 4
3.4. Archaeological and Historic Preservation Act of 1974 ... 4
3.5. American Indian Religious Freedom Act of 1978 ... 5
3.6. Archaeological Resource Protection Act of 1979 ... 5
3.7. Native American Graves Protection and Repatriation Act of 1990 ... 5
3.8. U.S. Department of Transportation Act of 1966, Section 4(f) ... 5
3.9. Colorado Register of Historic Places Act ... 5
3.10. Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973 ... 5
3.11. Certified Local Government Program ... 5
4. Methodology ... 6
4.1. Relevant Data or Information Sources ... 6
4.2. Data Collection and Analysis Methodology ... 7
4.3. Project Area ... 9
4.4. Effects ... 9
4.5. Mitigation Options ... 10
4.6. Deliverables ... 10
5. Existing Conditions ... 11
5.1. Setting ... 11
5.2. Prehistoric/Protohistoric Archaeological Background ... 11
5.3. Historic Background ... 16
5.4. Historic Properties Identified ... 19
6. Effects ... 27
6.1. No-Build Alternative ... 27
6.2. Build Alternatives ... 27
7. Mitigation Strategies ... 36
8. References ... 37
Appendices ... 41
Appendix A. Resource Methodology Overview for Historic and Archaeological Resources ... 43
Appendix B. Abbreviations and Acronyms ... 47

Appendix C. NRHP Eligibility Criteria 49
Appendix D. U.S. 50 Tier 1 Section 106 Programmatic Agreement (PA) 51
Appendix E. Historic Properties by Location 61
Appendix F. Figures (F-1 through F-4) 85

Tables

Table 2-1. Terminology Used in the Historic and Archaeological Resources Technical Memorandum 3
Table 5-1. Prehistoric and Protohistoric Groups that Utilized or Occupied Southeastern Colorado.....14
Table 6-1. Direct Effects to Historic Properties and Linear Resources by Location 29

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 6-1. Build Alternatives Overview 28

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Under 36 Code of Federal Regulations (CFR) 800.16, historic properties are defined as any prehistoric or historic district, site, building, structure, or object eligible for inclusion in the National Register of Historic Places (National Register). Therefore, for the purposes of the U.S. 50 Tier 1 EIS, historic properties, both historic and archaeological, are defined as properties eligible or likely to be eligible for listing on the National Register.

The term “historic property” will be used when discussing both archaeological and historic resources. When discussing either archaeological or historic resources, the terms “archaeological resource” or “historic resource” will be used. The period of significance for this analysis has been identified as those properties that are 45 years old or older.

In identifying and assessing the significance of existing and potential historic properties, all properties in urban areas were evaluated for integrity, significance, or both, as well as for eligibility, using the National Register Bulletin: How to Apply the National Register Criteria for Evaluation (National Register Bulletin 15) and the State Register Bulletin: How to Apply the Nomination Criteria for the Colorado State Register of Historic Properties (State Register Bulletin 960). Criteria related to National Register Bulletin 15 are presented in Appendix C. However, properties in rural areas were identified and assessed based on a sampling of existing and potential historic properties observed during field reconnaissance surveys conducted along U.S. 50. A sampling was used to identify these resources due to the extent of the area surveyed (i.e., approximately 150 miles long by one to four miles wide) and the lack of access to some resources.

An *eligible* resource is one that has met the criteria for listing in the National Register. This is a *known* historic resource, or a resource that has been determined to be eligible for or has been listed in the National Register or the State Register of Historic Properties. Since new resources are identified all the time, these lists are constantly being updated. Therefore, it is likely that there are historically significant resources that have not yet been identified as eligible or listed.

While known historic resources are based on their existing *eligibility*, other resources were identified during a field reconnaissance. These resources were considered *field eligible*, which means that based on the data collected during the field reconnaissance effort, they may be eligible for listing in the National Register. These properties were evaluated based on eligibility criteria such as age, integrity, and significance. Although all resources that may be historic were evaluated based on age, in accordance with an agreement among the lead agencies and the State Historic Preservation Office, only a portion of the resources were evaluated for integrity, significance, or both. These determinations of National Register eligibility are preliminary; final determinations will occur during Tier 2 studies (U.S. 50 Tier 1 Section 106 PA 2007).

The resources identified for the U.S. 50 Tier 1 EIS (i.e., listed in this document) include both known historic resources and those that are field eligible (i.e., resources that may be eligible for listing in the National Register).

Definitions of terminology used in this technical memorandum are presented in Table 2-1. These definitions were developed in consultation with the lead agencies (CDOT and FHWA) and the State Historic Preservation Officer as part of the U.S. 50 Tier 1 Section 106 Programmatic Agreement (PA). The agreement was signed by the lead agencies, the State Historic Preservation Officer, and the consulting parties. A signed copy of the agreement is presented in Appendix D.

Table 2-1. Terminology Used in the Historic and Archaeological Resources Technical Memorandum

Term	Definition
Area of potential effects for the U.S. 50 project area	Generally, the area within 1,000 feet of the existing U.S. 50 facility or within 1,000 feet of the Build Alternatives. The area of potential effects is divided into archaeological, urban, and rural areas of concern, with the archaeological area of concern encompassing the whole area of potential effects, the urban areas (generally including those areas within city or town limits or unincorporated community boundaries), and rural areas (including those areas outside these urban areas).
Area of concern	A focus area within an area of potential effects that looks at and evaluates historic resource types associated with a specific context of the area. The project's areas of concern are urban, rural, and archaeological.
Context study area	An area of appropriate size to establish a basic understanding of the historic built environment and its development. The context study area for the U.S. 50 Tier 1 EIS is defined as generally within one mile, but no more than five miles, on either side of the Arkansas River between the western and eastern boundaries of the project area.
Historic context	Describes the importance of a historic resource, its relationship through time with the events, people, and development of an area, and its relationship to other historic properties.
Historic contexts document	A summary of historic contexts found in the U.S. 50 project area.
Project communities	The following 13 jurisdictions within, in whole or in part, the project area: Pueblo County, Otero County, Bent County, Prowers County, the city of Pueblo, the town of Fowler, the town of Manzanola, the city of Rocky Ford, the town of Swink, the city of La Junta, the city of Las Animas, the town of Granada, and the town of Holly.
Project counties	The four counties crossed by the project area, including Pueblo County, Otero County, Bent County and Prowers County.
Project municipalities	The nine cities and towns within, in whole or in part, the project area, including the city of Pueblo, the town of Fowler, the town of Manzanola, the city of Rocky Ford, the town of Swink, the city of La Junta, the city of Las Animas, the town of Granada, and the town of Holly.
Rural historic built environment	With respect to the U.S. 50 project area, those historic buildings, structures, historic sites, objects, and districts located outside city boundaries.
Urban historic built environment	With respect to the U.S. 50 project area, those historic buildings, structures, historic sites, objects, and districts located within city boundaries.
Windshield reconnaissance survey	A field survey that is a reconnaissance-level sample survey to assess the general presence or absence and likely presence or distribution of known historic-period built environment resources and of historic resource types. The windshield survey was completed in two parts, as follows: • An "urban windshield reconnaissance survey" conducted in the urban area of concern within the area of potential effects • A "rural windshield reconnaissance survey" conducted in the rural area of concern within the area of potential effects

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 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 historic and archaeological resources. They are described in more detail below.

- Antiquities Act of 1906
- Historic Sites Act of 1935
- National Historic Preservation Act of 1966
- Archaeological and Historic Preservation Act of 1974
- American Indian Religious Freedom Act of 1978
- Archaeological Resource Protection Act of 1979
- Native American Graves Protection and Repatriation Act of 1990
- U.S. Department of Transportation Act of 1966, Section 4(f)
- Colorado Register of Historic Places Act
- Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973
- Certified Local Government program

3.1. Antiquities Act of 1906

This Act enables the setting aside and protection of “historic landmarks, historic and prehistoric structures and other objects of historic or scientific interest” (Antiquities 1906, sect 2).

3.2. Historic Sites Act of 1935

This Act expanded the role of the U.S. Department of the Interior in determining and protecting “historic and archaeological sites, buildings and objects” (Historic 1935, sect 1). A policy to protect nationally significant properties also was initiated, which included the National Historic Landmark program. The National Historic Landmark program recognizes the importance of sites and areas across the country, such as battlefields and mining districts, associated with our nation’s heritage.

3.3. National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966 mandates that all federal agencies must consider the effects of their projects and programs on historic properties listed or eligible for inclusion in the National Register. Section 106 of the Act requires federal agencies to take into consideration any effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. Section 110 of the Act protects National Historic Landmarks. Provisions of the Act are implemented through its associated regulations (36 CFR 800).

3.4. Archaeological and Historic Preservation Act of 1974

The Archaeological and Historic Preservation Act of 1974 requires the preservation of significant historical and archaeological data from loss or destruction. The Act also requires that the Secretary of the Interior be notified of any adverse effect on historic properties, and it requires a data recovery or mitigation program to be implemented as appropriate.

3.5. American Indian Religious Freedom Act of 1978

This Act requires federal agencies to evaluate their policies and procedures, in consultation with Native American traditional religious leaders, and make necessary changes to ensure that they protect and preserve Native American cultural and religious practices.

3.6. Archaeological Resource Protection Act of 1979

This Act supersedes the 1906 Antiquities Act. It requires that permits for archaeological investigations be obtained before excavating federal or Native American lands.

3.7. Native American Graves Protection and Repatriation Act of 1990

The Act requires consultation with appropriate Native American tribes for activities on federal lands before excavating or removing cultural items. Additionally, the Act provides for the repatriation of Native American remains and objects from federal agencies, federally assisted museums, and other repositories.

3.8. U.S. Department of Transportation Act of 1966, Section 4(f)

This Act protects historic properties from activities associated with transportation projects in certain circumstances.

3.9. Colorado Register of Historic Places Act

This Act mirrors the federal process related to the National Register and established a state interest in that federal process. It also encourages local governments to protect historic properties.

3.10. Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973

Under this Act, “the state of Colorado reserves to itself title to all historical, prehistorical, and archaeological resources in all lands, rivers, lakes, reservoirs, and other areas owned by [political subdivisions] of the state” (Historical 1963, part 401(1)). The Act also defines what resources are covered under this law.

3.11. Certified Local Government Program

The Certified Local Government program is the result of the federal-state relationship mandated by the National Historic Preservation Act, which is designed to strengthen existing preservation programs and encourage development of new ones. Decision-making guidance at the local level is initiated with the Certified Local Government program.

4. Methodology

The U.S. 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. The NEPA process will include in-depth project-level data collection and documentation. Tier 2 studies will provide project-specific impacts, mitigation, and agency concurrence 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 U.S. 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to the Colorado-Kansas state line (resources will be reviewed within this area, 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 historic properties (i.e., historic and archaeological resources) has been 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 sources of data and information were used to identify historic properties for the U.S. 50 Tier 1 EIS:

- National Register database
- Colorado State Register of Historic Properties (State Register) database

- Colorado Office of Archaeology and Historic Preservation Compass database
- Colorado Historical Society Stephen Hart Library online catalog and databases
- Colorado Historic Bridge Inventory
- Historical maps from the *Historical Atlas of Colorado*
- Sanborn Fire Insurance maps for the period between 1867 and 1970
- Denver Public Library online catalog and Western History Department holdings
- Prospector online catalog
- County offices and historical societies in the project area
- Relevant county tax assessor databases
- Rocky Ford Carnegie Library holdings
- Local historic publications from museums and libraries in the project area
- Websites with information about historic resources in the project area
- Urban windshield reconnaissance survey photographs and documentation
- Rural windshield reconnaissance survey photographs and documentation
- U.S. Department of Agriculture aerial photography covering at least the project area
- Prehistoric summaries from existing historic contexts

Interviews also were conducted with local residents knowledgeable about area history. The following local individuals and staff members were interviewed or used as sources of information during this effort:

- Don Lowman—Otero County Museum employee
- Donna Abert—Rocky Ford resident and Otero County historian
- William Hodges—Rocky Ford Museum curator
- Charmaine Tripp—Las Animas city clerk
- Ron Davis—Arkansas Valley Community Center director and retired La Junta Middle School principal
- Max Smith—Big Timbers Museum staff
- Rick Kline—La Junta city manager
- Bub Miller—Otero County rancher
- Lee Handcock—Otero County rancher
- Norma Cannon—Otero County rancher
- Gary Hanagan—Otero County rancher
- Pat Campbell—Holly area local historian
- Crowley Museum staff
- Fowler Museum staff
- Otero County tax assessor’s office staff

4.2. Data Collection and Analysis Methodology

This analysis of historic properties was conducted using a phased approach, as permitted under National Historic Preservation Act regulations (36 CFR 800) and as dictated by the U.S. 50 Tier 1 Section 106 Programmatic Agreement. Thus, this analysis is focused on “... establishing the likely presence of historic properties within the area of potential effects for each alternative” (NHPA 1966b, sect 800.4(b)(2)). The section below describes the tasks associated with this Tier 1 analysis. These discussions have been divided into the following categories because the data collection and analysis for each of these groups of resources was conducted differently.

- Urban area historic resources
- Rural area historic resources
- Archaeological resources
- Historic bridges

4.2.1. Urban Area Historic Resource Identification

Information about historic resources in the urban areas of concern within the area of potential effects was collected from the sources listed in Section 4.1. The list of resources that resulted from this effort was used

as the basis for an urban windshield reconnaissance survey. The survey was conducted in June 2006, September 2006, February 2007, and February 2008. It covered areas near the existing U.S. 50 facility in, or in close proximity to, the cities and towns located along the roadway (i.e., the urban area of concern). It includes all or part of the following project municipalities: Pueblo, Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. In addition, the unincorporated community of Hasty also was surveyed. The urban windshield reconnaissance survey was conducted by driving easily accessible public roadways to view representative resources that previous research suggested may be present.

During the urban windshield reconnaissance survey, all previously identified historic resources were re-evaluated, photographed, and documented, as appropriate. Also, additional resources that had not been previously identified were photographed and documented, as appropriate. The resources were photographed from the best vantage point publicly accessible at the time.

The resources documented during the urban windshield reconnaissance survey were evaluated for historic and architectural integrity, significance, or both. They also were evaluated for National Register eligibility (determined based on the National Register Bulletin 15). Field determinations of eligibility were made, and this information was documented, as well. The identified historic resources were located and mapped using a geographic information system (GIS) application.

4.2.2. Rural Area Historic Resource Identification

Information was collected from the sources listed in Section 4.1 regarding historic resources in the rural area of concern within the area of potential effects. The list of resources that resulted from this effort was used as the basis for a rural windshield reconnaissance survey. The survey was conducted in February and July of 2006, and covered areas within the area of potential effects not included in the urban windshield reconnaissance survey along U.S. 50.

The primary tool used to identify existing resource types was a field reconnaissance survey (i.e., rural windshield reconnaissance survey). During this survey, several previously recorded historic resources were observed and recorded for the project. Additionally, other rural area historic resource types were identified and documented.

This analysis does not include a comprehensive list of all the specific historic resources in the rural area of concern because:

- The area covered by the survey encompasses a 150-mile-long corridor, which makes a detailed summary of all existing historic resources extremely time-consuming and inefficient during Tier 1.
- Access to many portions of the rural area of concern within the area of potential effects is limited by a roadway system that is particularly incomplete and dispersed in the rural areas, making documentation of certain historic resources difficult or impossible without right-of-entry authorization.
- Farms and ranches typically consist of many acres of land, and some of the associated buildings or features are not always visible from U.S. 50 or connecting roads.
- The estimated build-out period for Tier 2 studies is decades—not months or years—which means that a detailed summary of all existing resources developed today would not be relevant for the majority of these Tier 2 studies.

This evaluation methodology was agreed to by the lead agencies and the State Historic Preservation Officer and is documented in the U.S. 50 Tier 1 Section 106 Programmatic Agreement. In accordance with this agreement, the rural windshield reconnaissance survey identified:

- Historic resource types within the rural area of concern within the area of potential effects
- The likelihood for the presence of potential historic properties within the rural area of concern within the area of potential effects
- Representative examples of the resource types located within the rural areas of concern within the area of potential effects

During the rural area windshield reconnaissance survey, a representative sample of potentially historic farm buildings, ranch buildings, outbuildings, canal sections, and roadside architecture was reviewed for National Register eligibility (determined based on the National Register Bulletin 15). The survey involved driving easily accessible public roadways to provide visual access to representative resources that research suggested may be present. The project area was surveyed as thoroughly as possible. However, not all areas were accessible.

The identified representative sample resources were documented appropriately. The locations of the representative resources were mapped using GIS technology and street addresses when available.

4.2.3. Archaeological Resource Identification

The following methodology was used to identify archaeological resources in the area of potential effects. The tools used to identify these resources were existing databases. A full list of sources is included in Section 4.1.

Prehistoric summaries were used to identify the prehistoric and ethnographic background existing within the archaeological area of concern. Additionally, the Colorado Office of Archaeology and Historic Preservation Compass database was searched for existing resources. A total of 1,663 sites, as well as their National Register eligibility status, were identified.

This analysis separates the identified resources into those that the State Historic Preservation Officer has determined are eligible for the National Register and those that need further review to determine their eligibility. The locations of all of the archaeological resources identified by this analysis were mapped using a GIS application, but these locations are not presented on the figures in Appendix F due to their sensitive nature.

4.2.4. Historic Bridge Identification

Historic bridges were identified using the most recent version of CDOT's Historic Bridge Inventory, which was completed in 2004.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

The evaluation of effects will be conducted using a tiered approach, as allowed under National Historic Preservation Act regulations (36 CFR 800) and as dictated by the U.S. 50 Tier 1 Section 106 Programmatic Agreement. During this Tier 1 analysis, effects to historic and archaeological resources (as defined in Section 2.0) will be identified within the urban, rural, and archaeological areas of concern only (i.e., within the area of potential affects). Formal findings of effect for individual resources will not be made during Tier 1. These activities will occur during Tier 2 studies (U.S. 50 Tier 1 Section 106 PA).

This Tier 1 EIS identifies a 1,000-foot-wide corridor location within which a 250-foot (maximum) roadway footprint would be identified during Tier 2 studies. Therefore, the evaluation of effects included in this analysis uses the worst-case scenario (i.e., the largest number of properties that could possibly be affected). It should be noted that many of the properties identified within the Tier 1 Build Alternatives could be avoided

during future Tier 2 studies. Also, if the Build Alternatives are constructed, the portions of the existing highway that go through communities would remain in place to serve local needs even though they would no longer serve as U.S. 50.

Additionally, alternatives were developed for in-town and around-town areas. The in-town alternatives were developed to minimize corridor width and, therefore, effects to urban areas. This was done by establishing the width of the in-town alternatives as the same width needed for the roadway footprint. Therefore, for the in-town alternatives, avoidance of historic properties would not be possible. However, the around-town alternatives and between-town alternatives were developed to be 1,000 feet wide. Because the roadway footprint would only require roughly 250 feet (and possibly less), it is presumed that avoidance of historic properties could reasonably be achieved in the areas of the around-town and between-town alternatives during Tier 2 studies, when these footprints would be identified.

Effects have been assessed using a GIS application that shows the location of identified historic properties. Other historic properties may be identified during Tier 2 intensive-level surveys.

4.5. Mitigation Options

During consultations related to the U.S. 50 Tier 1 Section 106 Programmatic Agreement, CDOT and FHWA have committed to making “a good faith and reasonable effort to avoid, minimize, or mitigate effects to National Register listed, eligible, and likely eligible historic properties during all phases of planning and alternative screening at Tier 1” (U.S. 50 Tier 1 Section 106 PA, p. 5).

4.6. Deliverables

The following deliverables were produced for this review of historic properties:

- Historic and Archaeological Resources Technical Memorandum
- Historic Context Overview—This document provides an understanding of historic properties’ relationships through time in relationship to events, people, and developments and between each other. Information from this context document has been incorporated into this technical memorandum.
- Cultural Resources Reconnaissance Survey Report—This document provides a summary of the historic properties and resource types identified by the urban and rural windshield reconnaissance surveys. Information from this report also has been incorporated into this technical memorandum.

5. Existing Conditions

The existing conditions discussion for historic properties includes the area's general setting, archaeological background, historical background, and existing resources (i.e., historic and archaeological resources identified).

5.1. Setting

Southeast Colorado is in the geographic region called the High Plains, a sub-region of the Great Plains in the central United States. The High Plains region includes eastern Colorado, western Kansas, western Nebraska, central and eastern Montana, eastern New Mexico, western Oklahoma, northwestern Texas, and southeastern Wyoming. From east to west, the High Plains rises in elevation from around 2,500 feet to more than 6,000 feet.

The plains are characterized by gently rolling hills to flat terrain, with occasional buttes or other rocky outcrops, wide variations in temperature, low variable precipitation (10-20 inches), low humidity, and considerable wind. Most of the area is located at an elevation of about 3,500 feet with an average of 315 days of sunshine.

The project area begins in the transition zone between the High Plains and the Rocky Mountain environment in Pueblo County and extends east to Otero, Bent, and Prowers counties in the south-central High Plains portion of the Great Plains in the Arkansas River Valley.

5.2. Prehistoric/Protohistoric Archaeological Background

Throughout the history of the southeastern plains of Colorado, the changes in the environment were a primary reason for the variation in adaptations by cultural groups living in the area. The changes in the environment are primarily a result of variation in temperature and rainfall within the region. These changes affect the extent of grass and browse vegetation that would occur and thus what species and populations of game animals would inhabit the region. Within the southeastern area of Colorado, environmental reconstruction, based on pollen analysis and geological evidence, has been done on a site-specific basis. At present, there has been little effort to develop a state-wide synthesis. However, Greiser (1980) and Wood (1972) have summarized and adapted the work of Bryson et al. (1970) for the Northwestern Plains (see Roper et al. 1983). Their work can serve as a rough approximation of the changes that have taken place in the climate of the area beginning in the terminal Pleistocene and extending into the present.

Cultural chronologies correspond to changes in the environment through the subsequent adaption of cultural groups. These adaptations resulted in changes to tool assemblages and projectile morphology. Projectile points and tool assemblages are the primary temporal indicators at pre-ceramics sites and offer a relative dating technique. These particular tools change with the adaptations of cultural groups to available resources that varied according to environmental conditions. In addition, water is a critical resource and its prevalence and availability would also vary with environmental changes. Wetter periods may have also meant greater availability of water and increased usage of the area by the prehistoric groups. Awareness of the environmental changes and corresponding cultural chronologies of the area helps in predicting what prehistoric cultural resources may be encountered.

5.2.1. Paleo-indian Period

The earliest known period of culture history within southeastern Colorado is that of Paleo-indian, which has come to signify hunting and gathering adaptations of the late Pleistocene and early Holocene. Dates of this period are generally accepted to be 11,500 before present (B.P.) to approximately 9,000 B.P. The hunting and gathering of megafaunal animals such as mammoths and bison (*Bison bison occidentalis* – northern bison variant) have come to characterize this period. This big-game hunting adaptation is evident in the archeological record and consists largely of kill or butchering sites (Frison 1991). Large lanceolate projectile

points are often found at these sites in association with the skeletal remains of now-extinct megafauna. Whether this is evidence of active hunting or the butchering of already wounded or dead animals is open for debate (Rowe 2002).

Because every group of hunter-gatherers known to cultural anthropologists makes use of at least some small game and plants, archeologists assume that the Paleo-indians must have done the same (Chartkoff and Chartkoff 1994; Rowe 2002). They may have made some use of certain widespread species of small game, rabbits, lizards, and tortoises, for example, and probably made use of widespread plant species that did not require specialized technology for harvesting or processing. However, there is little evidence of small game or plant use among Paleo-indians, which is why most archeologists believe they were primarily big-game hunters (Chartkoff and Chartkoff 1994).

Environmentally, the Paleo-indian period corresponds to the Late Glacial, Pre-Boreal, and Boreal climatic episodes. Overall, this period is marked by warming and cooling trends associated with the continental and mountain glaciers. These episodes mark the end of the Pleistocene and the beginning of the Holocene. Pollen data suggest an abrupt change in climate occurred, marked by a decline of effective moisture and greater seasonal variability (Greiser 1980). This resulted in drastic alterations of plains vegetative patterns and the loss of the last browse vegetation. Extinction of the Pleistocene megafauna, which was well underway during the Late Glacial, was accelerated and species diversity was greatly reduced.

5.2.2. Archaic Period

Paleo-indians gradually shifted into the Archaic period around 9000 B.P. (years before present). The Archaic is characterized by small bands of people employing a variety of hunting and gathering activities. The change from the Paleo-indian lanceolate and stemmed points to the Archaic side-notched types appears to have been abrupt and easily detectable in the archeological record (Frison 1991). In the southeastern area of Colorado, recent investigations reveal a subsistence system with an emphasis on plant processing and small game. The Early Archaic period dates from about 7000–9000 B.P. With the extinction of numerous large mammal species and the possible reduction in population size of others, human groups during this time frame were forced to adopt a more varied hunting and gathering subsistence pattern to survive. With the collapse of the large mammal species, there is an apparent reduction of human occupation of southeastern Colorado (Lutz and Hunt 1979).

The hallmark of the Middle Archaic period is a hunting lithic tool kit consisting of numerous manos, mortars, and other grinding tools. There is evidence that there is an increased reliance on wild plant foods during the Middle Archaic. This is evident by an increase in ground stone artifacts and the occurrence of rock-filled hearths or roasting pits, which may have served to cook either vegetal or animal materials (Frison 1991). Most sites along the Arkansas and Cimarron Rivers are open encampments in areas with a great variety of vegetation. The taking of larger animals for subsistence increased during this time period as the number of larger prey animals, including bison, rebounded on the plains as the grasslands recovered from the drought conditions of earlier periods. Southwest of the project area, on the Chaquaqua Plateau, diagnostic dart points include Abasolo, Trinity, Pandale, and Travis forms (Eighmy 1984). Observed sites that are located between the Purgatoire and Apishapa Rivers include point assemblages such as the lanceolate McKean point style and the related Duncan, Hanna, and Mallory point types (Frison 1991).

By about 3000 B.P., the Late Archaic is marked by new cultural manifestations that replaced the Middle Archaic complex. The first of these manifestations is a series of dart points resembling Yarborough, Ellis, Edgewood, Palmillas, Shumla, and Marcos styles that are relatively common during the Late Archaic (Eighmy 1984). Another manifestation is an increasing abundance of ground stone implements. The emergence of ground stones, combined with site location data, imply extensive foraging activity orientated more toward the canyons. However, the subsistence economy remained much as it had been during the middle Archaic period with generalized large to small mammal and rodent hunting. In the Purgatoire/Apishapa area, sites continue to be found in a variety of environmental zones.

The Archaic period corresponds to the Altithermal climatic episode (Antevs 1948, 1955), which is described as spring dominant storms, as well as the decline in the water table and plant cover. Consequently, a significant increase in erosion and arroyo cutting occurred in the Altithermal climatic episode (Albanese

1980, 1982). By 7000 B.P., the short-grass prairie plains appear to have reached their eastern maximum due to lower effective moisture. This lower effective moisture allowed a xerophytic desert community dominated by sage brush, juniper, and the occasional mesquite to invade the area. Faunal remains recovered from archeological contexts on the plains seem to indicate a general reduction in animal populations and the intrusion of desert-adapted species. By 4700 B.P., during the Sub-Boreal phase, the dry conditions that prevailed during the Atlantic phase of the Altithermal appear to have moderated. A southerly shift in winter and summer frontal zones at about 3500 B.P. resulted in a general cooling trend on the plains. This was followed by another warming trend, which produced climatic conditions similar to those of the present (Greiser 1980). As a result, the area distribution of grasslands assumed their modern configuration and fauna present on the plains was composed of modern species.

5.2.3. Late Prehistoric Period

The Late Prehistoric period is marked by the wide spread adoption of the bow and arrow and the appearance of ceramics. During this period, communal hunting techniques such as game drives and arroyo traps seem to have increased in number. Dietary protein from meat consumption appears to have risen due to these communal hunts. However, there was little change in the lifeways of these people from the preceding Archaic period; both followed a traditional hunting and gathering subsistence strategy. Unlike many other areas of the Southwest cultural area, southeastern Colorado never developed a truly sedentary lifestyle based on horticulture (Krieger 1946). This may have been a result of unpredictable rainfall within this area of the Great Plains.

The Late Prehistoric period is also marked by the emergence of ceramic usage. The type and style of ceramics is an indicator that the peoples of the area were trading with the Pueblo cultures of the southwest for food, i.e., maize. Maize was probably transported in ceramic vessels into southeastern Colorado, which was then planted. As a result, a semisedentary/seminomadic lifestyle developed to adapt to trade with the Pueblo culture and maintain seasonal crops during the year. Two phases of ceramic usage in this area have been proposed: the Early Ceramic and Middle Ceramic (Campbell 1976).

The Early Ceramic (2000–1000 B.P.) is indicated by the use of cordmarked, conoidal-shaped ceramic vessels (Cassels 1983). However, many of the dart types of the Late Archaic are still used in the Early Ceramic to continue hunting large or small mammals and rodent game (Cassels 1983). Scallorn, Alba, Young, Fresno, and Huffacker are dart points that can be associated with the correlative Early Ceramic phase around 500 B.P. (Eighmy 1984). The appearance of an increased number of ground stones also parallels the emergence of ceramics during this period. Observed from site assemblages, the use of ground stone technology greatly increase, which may indicate the introduction of maize horticulture. Maize was probably introduced into the region by way of long range trade with the Ancestral Pueblos of the southwest (LeBlanc 1999).

During the Middle Ceramic phase (1000–450 B.P.), the use of ceramics continue to spread into the plains area, evidence of which is found in ceramic artifacts discovered along the Arkansas and Cimarron Rivers. The correlative projectile points that are characteristic of this phase are Washita and Reed (Eighmy 1984; LeBlanc 1999). Campbell (1976) and others related this material to an Apishapa Focus/Phase within a larger unit called the Panhandle Aspect. The Apishapa Focus was thought to be an outgrowth of the Graneros and the ancestors of the Antelope Creek Complex. However, studies suggest that the Apishapa and Antelope Creek complexes were actually contemporaries (Lintz 1978). These blended cultures appear to have adopted characteristics of the Pueblo to the southwest with aspects of the Great Plains.

By 500 B.P., this area of Colorado, Oklahoma, and Texas was basically abandoned as local peoples migrated into different areas (Brooks 2004; Winship 1904). The reason for this abandonment of the area is still subject to debate. Several causes have been theorized by archaeologists. The theories range from human-created environmental degradation, drought conditions causing agriculture to become increasingly infeasible, to new migratory tribes exerting stress on already fragile local cultures (Brooks 2004).

Table 5-1 provides a basic context for the cultural history of the array of prehistoric and protohistoric groups that used or occupied the region. This information also describes the general characteristics of their cultural traits.

Table 5-1. Prehistoric and Protohistoric Groups that Utilized or Occupied Southeastern Colorado

Period/ Group(s)	Approximate Time Span	Traits
Comancheros/ Ciboleros (Hispanic traders and buffalo hunters)	A.D. 1780s–A.D. 1870s	The lives of the Hispanic settlers in New Mexico have been considered only recently in the history and ethnohistory of the southern High Plains. Archaeologically, even less consideration has been given to this group. These individuals did, however, play an important part in the Plains economy before the arrival of the Anglo American in the 1820s. This role continued through the American occupation and into the 1870s.
Cheyenne/ Arapaho	A.D. 1810–A.D. 1870	New groups moving into the Colorado High Plains and Front Range country were the Cheyenne and Arapaho. Although the early history of these two tribes is not well detailed, these Algonquian-speaking groups are known to be previously horticultural village people who entered the Plains from the shores of the Great Lakes and the upper Mississippi Valley. The Arapaho came from the valley of the Red River and entered the Plains before the Cheyenne, who arrived later and entered from somewhat farther south.
Ute	A.D. 1750–A.D. 1868	The Ute were of Shoshonean linguistic stock. Their home range was located immediately to the south of the Comanche in the area that extended from the Colorado Front Range on the east to Utah's Oquirrh Mountains on the west. They traditionally held areas west of the Front Range, but their hunting range extended well onto the Plains, depending in large part on their relationship with the group(s) currently inhabiting that area. Before 1700, the Ute hunted the eastern Colorado plains with the Jicarilla Apaches and they hunted as far south as the Texas panhandle.
Comanche	A.D. 1720s–A.D. 1870s	In the early years of the 18th century, the Apache populations of the Colorado and Kansas Plains gave way to the invading Comanche. The Comanche, of Shoshonean linguistic stock, were first documented in 1705 when the Spanish reported them trading in Taos.
Historic Native American Groups	A.D. 1720s–A.D. 1870s	Cheyenne, Arapahoe, Ute, Comanche, and other historic Native American groups used and occupied the Plains during this period.
Late Prehistoric Stage 1,850–225 B.P. (A.D. 100–A.D. 1050)	Protohistoric Period 500–225 B.P. (A.D. 1450–A.D. 1725)	Apachean groups span the time from the initial contact between the Spanish and the Plains Indians to the initiation of regular contact between the Native Americans of the Arkansas Valley and the Spanish colonies in New Mexico, ca.[b] 1750. The Dismal River economy was based primarily on bison, deer, and beaver hunting and secondarily on the cultivation of corn and squash. This period includes Dismal River aspect pottery, trade wares from northeastern New Mexico and Euro-American trade goods, which includes iron, brass and glass beads, iron axes and scrapers, and copper and brass conical tubular objects.
	Diversification Period 900–500 B.P. (A.D. 1050–A.D. 1450)	The Plains Village pattern developed during the Middle Ceramic period, predominantly on the prairie-plains of eastern North Dakota through central Oklahoma and into the Texas Panhandle. Material traits of the Middle Ceramic period include globular cordmarked pottery, diamond-shaped alternately beveled knives, small side-notched and unnotched projectile points, drills, scapulae hoes, bone awls, beads, and stone elbow pipes.

Period/ Group(s)	Approximate Time Span	Traits
	Developmental Period (A.D. 100–A.D. 1050)	Mountain glaciation resumed and major alluviation occurred on the plains. Although a hunting-foraging lifestyle persisted throughout the region, distinctive traits developed and/or adopted from other cultural groups mark the appearance of the Early Ceramic period. Traits associated with the Early Ceramic period include the appearance of cordmarked pottery and small, corner-notched arrow points, the widespread appearance of architecture, and perhaps incipient agriculture.
Archaic Stage (7,800–1,850 B.P.) (A.D. 100)	Late Archaic Period (3,000–1,850 B.P.) (A.D. 100)	Groups during this period continued to practice a subsistence strategy based on both hunting and foraging. A noticeable increase in the amount of ground and pecked-stone artifacts in Late Archaic period sites, when compared to the amounts in earlier periods, suggests a rise in the importance of vegetal food processing. In hunting, small mammals such as jackrabbits, cottontail rabbits, and prairie dogs also appear to have increased in importance compared to large mammals.
	Middle Archaic Period (5,000–3,000 B.P.)	This period represents continued changes with groups moving onto the Plains and the interior montane basins.
	Early Archaic Period (7,800–5,000 B.P.)	This stage marks the beginning of the Altithermal drought. Large shallow side-notched and some large corner-notched projectile point types are characteristic of the known Early Archaic sites located in mountain-foothill areas and along mountain slopes.
Paleo-indian Stage (11,500 B.P.-7800 B.P.)	Pre-Clovis Period (11,500 B.P.)	Relatively large, occasionally fluted, lanceolate projectile points are found in association with large extinct Pleistocene animals, including mammoth, bison, and camel, as well as some extant species, such as elk, deer, and bear.
	Clovis Period (11,500–10,950 B.P.)	
	Folsom Period (10,950–10,250 B.P.)	
	Plano Period (10,250–7,800 B.P.)	

B.P.=before present (i.e., before 1950)
Ca.=circa
Sources: Carrillo 2004, Carrillo 2006, Church 2007, Carter and Mehls 2006, Kenner 1969, Zier and Kalasz 1999

Similar to the limited information available about known ethnohistoric and archaeological records associated with Hispanic peoples in the area, southeastern Colorado's historic-period archaeological record is also not completely known. However, due to the presence of several recorded historic-period archaeological sites, and documentation of rural and urban occupancy patterns and lifeways, such an undocumented record undoubtedly exists in many areas. This record may include

- Santa Fe Trail-related artifacts or remnant features,
- Artifact scatters associated with temporary camps created by people engaged in the cattle industry,
- Railroad or canal construction camps,
- remnants of military activities (such as those present at Bent's Old Fort and Fort Reynolds) through to the Korean War era, and

- Deposits within current cities that reflect residential, commercial, public, and industrial urbanization patterns and lifeways.

These known and undiscovered historic-period archaeological resources may complement the documentary record and contribute important information that will enhance our understanding of the area's cultural history.

5.3. Historic Background

The Arkansas River Valley was first explored by the Spanish and the French in the 17th and 18th centuries. In 1803, the area became part of the Louisiana Purchase and soon thereafter, in 1806, Lieutenant Zebulon Pike was sent to the area to explore the United States' new land purchase. In 1820, the region was visited by a second group of Americans as part of the "Yellowstone Expedition" lead by Major Stephen H. Long, who labeled the Great Plains as the Great American Desert. Resource types associated with this time period would include forts, trails, and outpost locations. While there are no known historic properties associated with Spanish settlements in the project area, these types of sites have been identified as a data gap in the Colorado southern frontier historic context (Carter and Mehls, 2006). Thus, if they are found, these resources would be considered important.

A portion of the Santa Fe Trail, a transportation route most heavily used between the 1820s and 1870s, is located in the project area. It generally follows the Arkansas River in Colorado and crosses what is now southeast Colorado, connecting Missouri with Santa Fe, New Mexico. When it was established, it was an international trade route between the United States and Mexico, and then served as an invasion route in 1846 during the Mexican-American War. It has been designated the Santa Fe National Historic Trail by the National Park Service and as a National Scenic Highway by the U.S. Department of Transportation because of its archaeological, historic, natural, recreational, and scenic qualities. In 2009, Colorado Preservation, Inc., identified the trail as one of the state's most endangered places (Colorado Preservation, Inc. 2009). In the project area it roughly follows the route of U.S. 50 from La Junta to the Kansas border. Resource types related to the trail would include ruts and markers.

During the period from 1832 to 1856, a number of trading and trapping posts and small settlements were established along the Arkansas River. At the time, Bent's Fort (Fort William) was the most prominent trading post in the project area. It was strategically located between fur trappers in the Rockies, traders on their way to Santa Fe, and the Cheyenne, Arapaho, and Kiowa Indians who hunted in the area. Other important historic sites dating to the settlement period of the 1860s are the Boggsville Historic Site (1850s to 1870s) and the archaeological sites of Las Animas City (ca. 1869 to 1876) and early Granada. Historic archaeological sites from this period include the site of Fort Reynolds (ca. 1867 to 1868), located between Pueblo and Fowler. The early fort—one of a chain of military installations to protect the frontier and provide provisions—no longer exists, but it is of archaeological interest for the historic information it could provide.

The region was not settled during the initial westward migration, in part because of the designation of the area as a "desert." Early immigrants did not settle in this area, but headed instead to the Oregon Territory and California to what was referred to as the "promised land." However, by the late 1850s, after travelers along the Oregon and Santa Fe trails and the building of the transcontinental railroad had increased knowledge of the area, emigrants began to look at this area for open-range ranching.

As the gold booms failed between 1860 and 1880, an agricultural regional community developed in southeastern Colorado. Towns like Pueblo, Lamar, La Junta, and Las Animas were established as agricultural service centers. Ranching and farming sustained the economy of the region. General William Jackson Palmer's Denver and Rio Grande Railroad competed against the Atchison, Topeka and Santa Fe and Kansas Pacific railroads to lay lines through southeastern Colorado, thereby connecting it with New Mexico and the Midwestern states. The Atchison, Topeka and Santa Fe reached Pueblo in 1876, following the Arkansas River from Dodge City, Kansas, and passing through and increasing the regional significance of La Junta and Las Animas. Today, the BNSF Railway operates on this route.

Colorado became a territory on February 28, 1861, but not with the boundary lines it has today. Much of the eastern plains were in the Kansas Territory, while the southern plains were in the New Mexico Territory. On

September 9, 1861, laws were enacted creating the 17 original counties of Colorado. Four counties, not all of them part of this original 17, cross the project area, including Pueblo, Otero, Bent, and Prowers.

Open-range ranching was one of the earliest styles of ranching in the area. It was made possible by the millions of acres of pasture in southeastern Colorado that produced food for livestock. Herds of cattle were brought to Colorado on a number of different trails (i.e., the Goodnight-Loving and Dawson trails). John Wesley Prowers brought 600 head of cattle from Missouri in 1863. His operation was the first to house resident range cattle in the region, but by the mid-1860s, there were more than 100,000 head of cattle in the area concentrated along the Arkansas River (Carter, 2006 p 63). The Prowers Homestead, located approximately two miles south of U.S. 50 near Lamar, is an example of an early settlement ranch site.

The Homestead Act of 1862 required a maximum filing fee of $16 on 160 acres of land and proof of living on the land and making substantial improvements for a minimum of five years. This act resulted in the introduction of farming to the region. Prior to the Homestead Act, some property (e.g., Boggsvillle, Bent Ranch, and others) located on the south side of the Arkansas River was obtained through the four-million-acre Vigil-St. Vrain Mexican Land Claim of 1843. Land claims approximating 200,000 acres were granted to petitioners through the U.S. courts, and the remaining property was integrated into the Homestead Act. No single act had more effect on the Great Plains than the Homestead Act of 1862. It brought tens of thousands of settlers to the region, which replaced the prairie grasses with grain and built homes. Soon after, barbed wire, windmills, dryland farming methods, and irrigation led to the spread of agriculture on the plains. Ranching and agriculture became the economic mainstays of the region and this continues to the present.

The arrival of rail service, along with the Homestead Act, encouraged agricultural activity in the area. Smaller towns like Holly, Granada, Swink, Rocky Ford, Manzanola, and Fowler owe their existence to the arrival of the railroad at the end of the 19th century. Urban settlement expanded as towns incorporated, and served the growing agricultural industry as irrigable lands became available through the use of canals and irrigation systems. Rural agricultural crop production and related urban processing industries (onions, melons, sugar beets, and seed propagation), along with other urban manufacturing industries, soon followed, encouraging an influx of immigrants to work the fields and manufacturing plants. Railroad historic resource types—including depots, warehouses, lumberyards, and railroad-related hotels—are found in several communities along the corridor.

In 1909, an expanded Homestead Act was passed, which allotted 320 acres in the areas with little rainfall and less irrigation, generally referred to as dryland areas. Claims were allowed for 640 acres in stock range country through the Stock Raising Act of 1916. This second wave of homesteaders led to an era of modern technology and agri-business. Some farm and ranch buildings survive in the project area dating from claims that resulted from the Homestead and Stock Raising Acts, such as the farmhouse at 2050 U.S. 50, near Rocky Ford.

By 1932, the land on the Great Plains had been over-tilled, and droughts and hot winds hit the region, resulting in devastating dust storms. The effect of the droughts, combined with the effects of the Great Depression, forced many farmers in the area off the land. Franklin D. Roosevelt's New Deal recovery programs to preserve family farms helped restore southeastern Colorado and encouraged a slow recovery through direct relief. Numerous examples of these New-Deal-era historic resource types are found along the U.S. 50 corridor, including improvements to cemeteries in La Junta and Hasty, gymnasiums in Holly and Granada, parks such as the La Junta City Park, and recreational facilities such as the Fowler Community Pool.

With the advent of automobiles and trucks at the turn of the 20th Century, regional rail routes lost popularity to move goods, people, and services. The Good Roads Movement rallied for legislation to improve state and county roads across the nation. With an improved highway system, not only was the movement of goods and services improved by a transportation system that allowed more flexibility in responding to regional industrial and commercial needs, but a new industry was born—auto tourism. Gas stations, roadside cafes, and hotels popped up along a newly improved U.S. 50 roadway through southeastern Colorado. Although tourism and recreational activity are increasing along the corridor, the main economic activity of southeastern Colorado continues to be agriculture and light manufacturing.

World War II (1939-1945) brought an end to New Deal programs, but the region's economy was boosted with the influx of military training camps, airfields, and related jobs. From 1942 to 1946, the Granada Relocation Center (also known as Camp Amache), a wartime relocation center for Japanese-Americans, was established near Granada in the project area. After the war, some industries were established in the corridor, leading to new employment opportunities and helping to strengthen the economy of the area. However, in late 2005, Neoplan USA closed its bus manufacturing plant in Lamar, and in February 2006, La Junta's Bay Valley Foods, formerly the Dean Pickle plant, shut down. World War II property types have been found along the corridor from Pueblo to Holly, including, but not limited to, military barracks from relocated bases in Pueblo and La Junta that were reused as warehouses, or even homes. Remnants of a German and Italian prisoner-of-war camp exist in Las Animas. Buildings moved from Camp Amache have been found in Holly, Granada, and La Junta.

The history of water and its use and need in the Arkansas Valley has been a defining issue since the area was opened for settlement. All canals and their associated features are considered eligible for the National Register. There are 27 ditches and canals in the project area.

Today, U.S. 50 serves as the major east-west transportation corridor in southeastern Colorado. The facility links 10 municipalities and four counties, and serves as the main route for moving goods, services, and people in the region.

The city of Pueblo is the largest municipality in the project area and serves as the Pueblo County seat. Most of the municipalities in the project area are located in Otero County, including Fowler, Manzanola, Rocky Ford, Swink, and La Junta. La Junta is the second largest city in the project area and serves as the Otero County seat. It also serves as a regional center for retail, agricultural activities, and manufacturing. Las Animas is another regional center along the corridor and serves as the Bent County seat. The easternmost county in the project area is Prowers County, which is home to Granada and Holly. Population figures for each municipality have been presented in this analysis (see Table 5-2). Since 2000, populations in the communities east of Pueblo have actually declined (2010 Census).

Table 5-2. Populations of the Project Municipalities

Jurisdiction	County	Population (2010)
Pueblo	Pueblo	106,595
Fowler	Otero	1,182
Manzanola		434
Rocky Ford		3,957
Swink		617
La Junta		7,077
Las Animas	Bent	2,410
Granada	Prowers	517
Holly		802

Source: 2010 Census

Along the U.S. 50 corridor, residential and commercial development occurred largely before 1960. Current statistics show that 56 percent of the development in Pueblo County occurred before 1960; in Otero County, 71 percent; in Bent County, 70 percent; and in Prowers County, 63 percent (Pueblo County Assessor 2006, Otero County Assessor 2006, Bent County Assessor 2006, Prowers County Assessor 2006). The historic integrity of the Main Street district in the nine towns has been impacted by late-1960s and 1970s application of aluminum siding and other alterations, although most of the commercial buildings are in good condition. Residential development generally spread south from the commercial district areas. Industrial and manufacturing buildings generally are found along the railroad or on the outskirts of towns, nearby to U.S. 50. Limited labor housing is located in and around the industrial and manufacturing areas. Historic buildings and structures found in the corridor are representative of each community's development and its past and present economic activity, including the now-dormant sugar beet factories and food manufacturing plants (e.g., Dean Pickle plant, Oliver Manufacturing plant, Hollar Seeds building, and Griffin-Holder wholesale warehouse).

5.4. Historic Properties Identified

For the purpose of the U.S. 50 Tier 1 EIS, historic resources are considered either linear or non-linear. Linear resources are those that are typically long and narrow. Some examples of linear historic resources in the area of potential effects are the BNSF Railway, Santa Fe National Historic Trail, and irrigation canals and ditches. Non-linear resources are historic properties (or historic resources) located at a specific site or place, such as a public building or house, bridge, or historic district. (Historic properties include both historic and archaeological sites, and historic resources only include historic sites.)

This analysis identified a total of 423 historic properties and 30 linear resources in the area of potential effects. Details about these resources are presented in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E.

Key Definitions

"Historic property" is used when discussing both historic and archaeological resources.

"Historic resource" is used when the discussion only includes historic resources (not archaeological).

"Archaeological resource" is used when the discussion only includes archaeological resources (not historic).

Due to the nature of linear resources, each one was only counted as one resource regardless of the length of the resource. All of the linear resources were treated as field eligible (for the National Register) for the purposes of the U.S. 50 Tier 1 EIS. During Tier 2 studies, these resources will be surveyed and evaluated for National Register eligibility.

The identified historic properties were divided into National Register categories, including:

- National Historic Landmark
- National Register listed
- State Register listed
- Determined officially eligible by the keeper of the National Register
- Determined field eligible by the surveyor or through prior surveys
- Needs data as identified by the state of Colorado's Compass database
- Nationally recognized trail (National Trail)

The 423 historic properties identified by this analysis break out into the following categories:

- 20 were identified as National Historic Landmark, National Register, or State Register listed
- Seven were identified as officially eligible
- 384 were identified as field eligible
- 12 were identified as needing data

The following sections discuss by location the historic properties (i.e., historic resources and archaeological resources) and linear historic resources identified by this analysis, including their National Register eligibility. The locations of the historic resources (linear and non-linear) are presented on maps located in Appendix F. Archaeological resources are not shown on these maps to protect their locations and safeguard these fragile resources from potential harm.

5.4.1. Section 1: Pueblo

This analysis identified 45 historic resources and two linear resources located in this portion of the area of potential effects, which includes portions of both the city of Pueblo and Pueblo County. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figures F-1 through F-3, located in Appendix F.

The historic resources identified include a potential post-World War II subdivision, residences representing a number of architectural styles, churches, a movie theater, commercial and light industrial businesses, among others. All of these historic properties are located along or near U.S. 50 between I-25 and milepost 322.

All of the 45 historic resources identified have a National Register eligibility status of field eligible.

Linear resources identified in this portion of the area of potential effects include a railroad and a ditch.

5.4.2. Section 2: Pueblo to Fowler

The area between Pueblo and Fowler can be considered primarily rural. Most of the historic resource types are related to farming. This analysis identified 18 historic properties (seven archaeological and 11 historic resources) and three linear resources in this portion of the area of potential effects. Details about these resources are presented in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each historic resource is shown in Figure F-4, located in Appendix F.

The 11 historic resources identified are located in three groupings. The resources located near milepost 329 include three bridges—the U.S. 50 bridges over Chico Creek (eastbound and westbound spans) and the Ordnance Depot Road interchange over U.S. 50. Another group of resources located between milepost 332 and milepost 335 includes two farms and a bridge. The resources located between milepost 344 and milepost 346 include six buildings associated with farms, one ranch, and the U.S. 50 bridge over the Rocky Ford Highline Canal.

Seven archaeological resources were identified. One of them is a district that is the site of Fort Reynolds, a late 19th-century military fort associated with the Santa Fe National Historic Trail. Another site is the Huerfano Colony (5PE.814).

National Register eligibility status for the properties identified in this area is as follows: National Register (1), officially eligible (1), field eligible (10), and needs data (6). The National Register listed resource is the U.S. 50 bridge over the Huerfano River (5PE.302). The U.S. 50 bridge over the Rocky Ford Highline Canal has been officially determined eligible for the National Register (i.e., officially eligible).

Linear resources identified in this portion of the area of potential effects include a railroad, a ditch, and a canal.

5.4.3. Section 3: Fowler

This analysis identified 43 historic resources and four linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figures F-5 and F-6, located in Appendix F.

The 43 historic resources identified include businesses (11), residences (22), a potential historic district (1), churches (3), the Fowler Santa Fe railroad depot (5OT.292), buildings owned or operated by the town

government (4), and a cemetery (1). One of the businesses is a 1950s-style restaurant that relates to U.S. 50's development. Government resources include the municipal pool, administration office building (housing the fire department, town hall, and public library), Fowler City Park (and water tower), and Fowler High School.

National Register eligibility status for the historic resources identified in this area is as follows: officially eligible (1) and field eligible (42). The Fowler Santa Fe train depot (5OT.292) has been officially determined eligible for the National Register.

Linear resources identified in this portion of the area of potential effects include a railroad, a ditch, and two canals.

5.4.4. Section 4: Fowler to Manzanola

The area between Fowler and Manzanola is predominantly agricultural and ranch lands. Thus, most of the historic resource types in this area are related to farming. This analysis identified two historic resources and four linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figure F-7, located in Appendix F.

The historic resources identified are the U.S. 50 bridge over the Otero Canal and the Kuhn site. The Kuhn site includes a house and agricultural outbuildings. Both of these resources are field eligible.

Linear resources identified in this portion of the area of potential effects include a railroad and an associated trestle and two canals.

5.4.5. Section 5: Manzanola

This analysis identified 27 historic resources and four linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figure F-8 through Figure F-9, located in Appendix F.

The 27 historic resources identified include businesses (9), residences (13), churches (2), the Manzanola Santa Fe railroad depot (5OT.421), and buildings owned or operated by the town government (2). The government resources include an armory (designed by noted Colorado architect John James Huddart) and Manzanola High School (and public library). One of the businesses is an early railroad-related hotel, which has now been converted into a church. A residence near the hotel was built by the railroad to house the district railroad superintendent. These resources are related to the early railroad building era. Another identified historic resource is a seed company building (now abandoned), which is representative of the early 19th-century seed propagation industry. This type of facility is still important to the corridor's agricultural-based economy.

National Register eligibility status for the historic resources identified in this area is as follows: National Register (1) and field eligible (26). The National Register resource is the Manzanola Santa Fe train depot (5OT.421).

Linear resources identified in this portion of the area of potential effects include a railroad and an associated trestle and two canals.

5.4.6. Section 6: Manzanola to Rocky Ford

The area between Manzanola and Rocky Ford is predominantly agricultural and ranch lands. Thus, most of the historic resource types in this area are related to farming. This analysis identified two historic resources and three linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1

(Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figure F-10, located in Appendix F.

One of the identified historic resources is a building ruin located near milepost 363, where the community known as Vroman was once located. The other historic resource is an abandoned residence located south of U.S. 50 between milepost 363 and milepost 364. Both of these historic resources are field eligible.

Linear resources identified in this portion of the area of potential effects include a railroad and two canals.

5.4.7. Section 7: Rocky Ford

This analysis identified 70 historic properties (one archaeological and 69 historic resources) and two linear resources located in this portion of the area of potential effects. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each historic resource is shown in Figures F-11 through F-12, located in Appendix F.

The 69 historic resources identified include businesses (28), historic districts (2), residences (30), buildings or facilities owned or operated by the town government (3), the Rocky Ford Santa Fe railroad depot (1), a church (1), the U.S. 50 bridge over the Rocky Ford Canal (1), and rural resources (3). The Western Sugar Company complex has been identified as a potential historic district. The following government resources were identified:

- Welcome Center Park—This park, and the obelisk located in it, is associated with the early automobile travel industry.
- Post office—This building includes a Works Progress Administration-era mural.
- Carnegie Public Library (5OT.193)—This building was constructed with a grant from philanthropist Andrew Carnegie.
- Arkansas Valley Fairgrounds—This is one of the oldest fairgrounds in Colorado.

A number of the identified resources are related to the early seed propagation and sugar beet industries. Rocky Ford has long played an important agri-business role in the region, state, and nation. Other resources are representative of the early railroad and early automobile travel industry eras. One of the best examples of barn architecture is located in this area just east of milepost 366. The two historic districts are associated with the sugar beet factory and the fairgrounds.

The archaeological resource is located on the property of a residence in downtown Rocky Ford.

National Register eligibility status for the properties identified in this area is as follows: National Register (5), State Register (1), officially eligible (1), needs data (1), and field eligible (62). The National Register properties are the J.H. Price House (5OT.112), the First Baptist Church, the Carnegie Public Library (5OT.193), and the Arkansas Valley Fair Grounds historic district (5OT.457). The SR property is the Grand Theater (5OT.577). The Rocky Ford Santa Fe depot has been officially determined eligible by the National Register.

Linear resources identified in this portion of the area of potential effects include a railroad and a canal.

5.4.8. Section 8: Rocky Ford to Swink

This analysis identified one historic resource located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. This resource is the U.S. 50 bridge over Timpas Creek. More detail about it can be found in Table E-1 (Historic Properties), located in Appendix E. The location of this resource is shown in Figure F-13, located in Appendix F.

5.4.9. Section 9: Swink

This analysis identified 15 historic resources and one linear resource located within this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these

resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figures F-13 and F-14, located in Appendix F.

The 15 historic resources identified include a business that is currently vacant (1), residences (6), buildings owned or operated by the town government (4), a rural resource (1), a U.S. 50 CDOT pump house (1), the BNSF Railway overpass (over U.S. 50) (1), and a migrant housing complex(1). The defunct business was the former sugar beet processing plant for the Holly Sugar Company. It was important for its role in the region's and state's sugar beet industry. This company has a strong history of operation in many of the communities along U.S. 50. The government resources include the town hall, post office, municipal water tower, and a New Deal school gym. Other resources of interest include the Mary Yagamis farmstead (located near County Road 24 in the southern portion of the rural area of concern within the area of potential effects), Mary's Fruit Stand (located at the intersection of County Road 24 and U.S. 50), and a migrant workers' housing complex (located at the intersection of County Road 24 and the railroad tracks). All 15 historic resources identified in this area are field eligible.

A railroad is the only linear resource identified in this portion of the area of potential effects.

5.4.10. Section 10: La Junta

This analysis identified 84 historic resources and five linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figures F-15 through F-17, located in Appendix F.

The 84 historic resources identified include businesses (23), residences (53), churches (3), buildings owned or operated by the town government (2), a canal tunnel (1), bridges (1), and a cemetery (1). One of the business sites, the former Dean Pickle plant, has been identified as a potential historic district. The government resources include the post office (5OT.94) and the municipal water plant. In the rural area south of La Junta, there is a stone house.

As an agricultural and railroad center, La Junta has numerous resources related to this history. Residential styles represent the various decades of construction and economic development in the city. Works Progress Administration-era property types can be found at the municipal pool, cemetery, City Park, and the Otero Junior College. Only remnants of the railroad hub's rail yard remain, although related industry types still exist, such as feed and supply companies and mill and elevator companies. The largest variety of commercial property types can be found in La Junta, including adobe construction in east La Junta.

The bridge identified is the U.S. 50 bridge over the Otero Canal.

National Register eligibility status for the historic resources identified in this area is as follows: National Register (1), State Register (1), and field eligible (84). The National Register resource is the La Junta Post Office (5OT.94) and the State Register resource is the Kit Carson Lounge (5OT.468).

Linear resources identified in this portion of the area of potential effects include a railroad and an associated resource, the Santa Fe Trail and an associated resource, and a canal.

5.4.11. Section 11: La Junta to Las Animas

The area between La Junta and Las Animas is predominantly agricultural and ranch lands. This analysis identified eight historic properties (five archaeological resources and three historic resources) and five linear resources located in this portion of the area of potential effects. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each historic resource is shown in Figure F-18, located in Appendix F.

The historic resources include a district encompassing Bent's Old Fort National Historic Site (5OT.149) and the bridges (eastbound and westbound) over the Thompson Arroyo. The archaeological sites include the Sandhill site (5OT.141) and the Prairie Dog site (5OT.534).

National Register eligibility status for the historic properties identified in this area is as follows: officially eligible (1), needs data (2), and field eligible (5). The resource that has been officially determined eligible for the National Register is the Bent's Old Fort National Historic Site district (5OT.149).

Linear resources identified in this portion of the area of potential effects include a railroad, the Santa Fe Trail, a canal, and two ditches.

5.4.12. Section 12: Las Animas

This analysis identified 50 historic resources and five linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each resource is shown in Figures F-19 through F-21, located in Appendix F.

The historic resources identified include businesses (12), residences (27), churches (4), buildings owned or operated by the town government (4), the Las Animas Santa Fe railroad depot (5BN.415), a historic district (1), and a segment of the old U.S. 50 roadway (1). The government resources include the post office, the Bent County Fairgrounds, the Bent County Courthouse and Jail (5BN.99), and the Bent County High School grounds and cottages (5BN.382). The city contains an important historic district (5BN.544) in the downtown area. Other resources of interest include Jenkins Auto, an Art Moderne stucco building (one of the best examples of auto-related buildings in the project corridor), and a portion of the old U.S. 50. The Kit Carson Museum (5BN.475) is also located in the city, part of which is housed in a World War II prisoner-of-war barracks. Property types in Las Animas represent early fraternal organizations, mid-20th-century auto sales businesses, varying church architectural styles, and a variety of residential architectural styles.

The Columbian Elementary School (5BN.381) was recently razed to make way for a new elementary school. The school was listed on the National Register. Since it was razed, it is not included in the total resource count above.

National Register eligibility status for the historic resources identified in this area is as follows: National Register (3), State Register (3), officially eligible (2), and field eligible (42). The National Register resources are the Las Animas Christian Church (5BN.449), the Bent County Courthouse and Jail (5BN.99), and the Las Animas post office. The State Register resources are the Graham House (5BN.453), the King Solomon Lodge (5BN.452), and the Las Animas Santa Fe train depot (5BN.415). The Las Animas downtown historic district (5BN.544) and the Bent County High School and cottages (5BN.382) have been officially determined eligible for the National Register.

Linear resources identified in this portion of the area of potential effects include a railroad, the Santa Fe Trail, the Arkansas River levee, and two ditches.

5.4.13. Section 13: Las Animas to Lamar

The area between Las Animas and Lamar can be considered primarily rural. This analysis identified 16 historic properties (one archaeological and 15 historic resources) and nine linear resources located in this portion of the area of potential effects. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each historic resource is shown in Figures F-22 and F-23, located in Appendix F.

The 15 historic resources identified include the Hasty post office (5BN.389), farmsteads and barns (8), bridges (3), and other buildings (3). The bridges are the U.S. 50 crossings over the McCrae Arroyo, Limestone Creek, and an unnamed draw. The archaeological resource is a segment of the Santa Fe National Historic Trail (5BN.391).

All of the 16 historic properties identified have a National Register eligibility status of field eligible.

Linear resources identified in this portion of the area of potential effects include the Santa Fe Trail, six ditches, an element associated with one of the ditches, and a canal.

5.4.14. Section 14: Lamar to Granada

The area between Lamar and Granada is predominantly a ranching and dryland farming area. This analysis identified four historic properties (one archaeological and three historic resources) and three linear resources located in this portion of the area of potential effects. Details about these resources can be found in Table E-1 (Historic Properties) and Table E-2 (Linear Resources), located in Appendix E. The location of each historic resource is shown in Figure F-24, located in Appendix F.

The three historic resources identified include the Roosevelt School, a farmstead, and the U.S. 50 bridge over Willow Creek. These resources are located on or near U.S. 50. The archaeological resource is the Carlton town site (5PW.47).

National Register eligibility status for the properties identified in this area is as follows: needs data (1) and field eligible (3).

Linear resources identified in this portion of the area of potential effects include a railroad and two canals.

5.4.15. Section 15: Granada

This analysis identified nine historic properties (one archaeological and eight historic resources) and three linear resources located in this portion of the area of potential effects. Details about these resources can be found in Table E-1 (historic properties) and Table E-2 (linear resources), located in Appendix E. The location of each historic resource is shown in Figures F-25 and F-26, located in Appendix F.

Significant historic resources identified include the XY Ranch headquarters and Camp Amache (5PW.48). Camp Amache is located southwest of the town and served as a Japanese internment camp during World War II. The camp is representative of World War II-era and military property types. Other historic resources identified include a mill and an elevator, which constitute an agricultural property type. The archaeological resource identified is the Granada town site (5PW.49).

National Register eligibility status for the properties identified in this area is as follows: National Historic Landmark (1), needs data (1), and field eligible (7). The National Historic Landmark property is Camp Amache (5PW.48). The site includes a contributing archaeological resource, which is a water storage site (5PW.103) associated with the camp. Camp Amache and this contributing archaeological resource have been counted in this analysis as one historic property.

Linear resources identified in this portion of the area of potential effects include a railroad and two canals.

5.4.16. Section 16: Granada to Holly

The area between Granada and Holly is predominantly a ranching and dryland farming area. This analysis identified four historic resources and three linear resources within this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these resources can be found in Table E-1 (historic properties) and Table E-2 (linear resources), located in Appendix E. The location of each resource is shown in Figure F-27, located in Appendix F.

The four historic resources identified include a residence, Gateway Downs, and two bridges. The bridges are the U.S. 50 bridge over Granada Creek and the BNSF Railway overpass of U.S. 50.

All four historic resources identified have a National Register eligibility status of field eligible.

Linear resources identified in this portion of the area of potential effects include a railroad, a ditch, and a canal.

5.4.17. Section 17: Holly

This analysis identified 21 historic resources and three linear resources located in this portion of the area of potential effects. There are no known identified archaeological resources in this area. Details about these

resources can be found in Table E-1 (historic properties) and Table E-2 (linear resources), located in Appendix E. The location of each resource is shown in Figure F-28, located in Appendix F.

The 21 historic resources identified include businesses (5), residences (6), churches (2), buildings owned or operated by the town government (3), the Holly Santa Fe railroad depot (5PW.73), and rural resources (4). The government resources include Shanner Elementary School, the town hall (and public library) (5PW.175), and the Holly Gymnasium, which is a Works Progress Administration-era gymnasium. Two of the identified resources are the town's mill and grain elevators, which are agricultural property types. The Holly barn located south of the railroad line near Vinson Street is one of the best examples of a historic barn in the area of potential effects.

National Register eligibility status for the historic resources identified in this area is as follows: National Register (3), officially eligible (1), and field eligible (17). The National Register resources are the Holly Santa Fe railroad depot (5PW.73), the Holly Gymnasium, and the Holly City Hall and Library (5PW.175). The Holly barn has been officially determined eligible for the National Register.

Linear resources identified in this portion of the area of potential effects include a railroad, a ditch, and the Santa Fe Trail.

5.4.18. Section 18: Holly Transition

The area between Holly and the Kansas state line is predominantly a ranching and dryland farming area. This analysis identified two historic properties (one archaeological and one historic resource) and four linear resources in this portion of the area of potential effects. Details about these resources can be found in Table E-1 (historic properties) and Table E-2 (linear resources), located in Appendix E. The location of each historic resource is shown in Figure F-29, located in Appendix F.

The historic resource is the Hadley rest area, which is associated with the automobile travel industry and CDOT. The archaeological resource identified is the Trail City town site (5PW.53).

The Hadley rest area has been identified field eligible to the National Register, and the Trail City town site has a National Register eligibility status of "needs data."

Linear resources identified in this portion of the area of potential effects include a railroad, a ditch, a canal, and the Santa Fe Trail.

6. Effects

The following sections discuss the potential of the No-Build Alternative and Build Alternatives to effect historic properties or linear historic 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 U.S. 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.

Since routine maintenance and repairs are conducted on the existing highway, these activities would not directly affect historic properties or linear historic resources. Smaller-scale improvements have the potential to affect resources located directly adjacent to the highway; however, few resources are located in these areas.

Historic properties and linear historic resources currently experience indirect effects from U.S. 50, including traffic noise, visual intrusion, and other proximity effects. These indirect effects will continue to affect these resources in the future.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

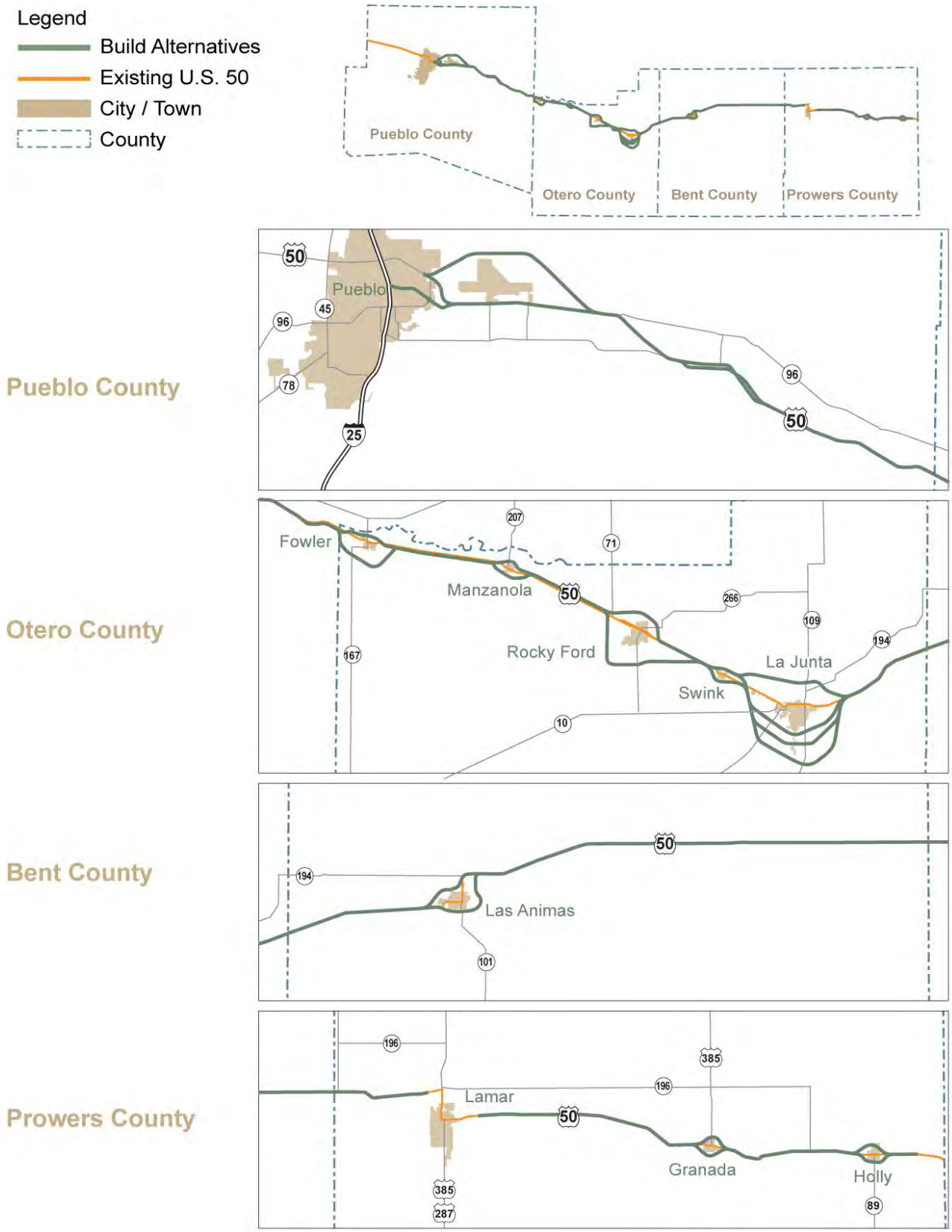


Figure 6-1. Build Alternatives Overview

Direct and indirect effects resulting from the Build Alternatives are discussed below.

6.2.1. Direct Effects

An identified resource was considered directly affected if any part of the feature (for linear resources) or property (for non-linear resources) was located within the 1,000-foot wide alternative. Efforts will be made to avoid these resources during Tier 2 studies when the location of the 250-foot-wide roadway footprint is determined. It should be noted that effects to historic properties (i.e., non-linear resources) will be easier to avoid than effects to linear resources.

A summary of direct effects to identified historic properties and linear resources is presented in Table 6-1. The locations of the properties and resources relative to the U.S. 50 Tier 1 EIS Build Alternatives are presented in Figure F-1 through Figure F-29, located in Appendix F.

Table 6-1. Direct Effects to Historic Properties and Linear Resources by Location

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
Section 1: Pueblo	Alternative 1: Pueblo Airport North	Linear	BNSF Railway	Historic	FE
		Linear	Excelsior Ditch	Historic	FE
	Alternative 2: Pueblo Existing Alignment	Linear	BNSF Railway	Historic	FE
		District	Belmont Post-WWII subdivision	Historic	FE
		a-22	U.S. 50 bridge over Dry Creek (eastbound)	Historic	FE
		a-23	U.S. 50 bridge over Dry Creek (westbound)	Historic	FE
	Alternative 3: Pueblo SH47 Connection	Linear	BNSF Railway	Historic	FE
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	c-10	U.S. 50 bridge over Huerfano River	Historic	NR
		c-6, c-7, c-14, c-15, c-16, c-17	(6) Farms/Ranches	Historic	FE
		c-13	Rocky Ford Highline Canal Bridge	Historic	OE
		c-2	U.S. 50 bridge over Chico Creek (westbound)	Historic	FE
		c-3	U.S. 50 bridge over Chico Creek (eastbound)	Historic	FE
		c-4	U.S. 50 underpass, Ordnance Depot Road interchange	Historic	FE

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
		District	Fort Reynolds District	Historic/ Archaeological	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Excelsior Ditch	Historic	FE
		Linear	Rocky Ford Highline Canal	Historic	FE
		Linear	Oxford Farmers Ditch	Historic	FE
		c-11, c-5, c-8, c-9	(4) Archaeological Sites	Archaeological	(4) ND
	Alternative 2: Fort Reynolds Realignment	c-13	U.S. 50 bridge over Rocky Ford Highline Canal	Historic	OE
		c-2	U.S. 50 bridge over Chico Creek (westbound)	Historic	FE
		c-3	U.S. 50 bridge over Chico Creek (eastbound)	Historic	FE
		c-4	U.S. 50 underpass, Ordnance Depot Road interchange	Historic	FE
		c-6, c-14, c-15, c-16, c-17	(5) Farms/Ranches	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Excelsior Ditch	Historic	FE
		Linear	Rocky Ford Highline Canal	Historic	FE
		Linear	Oxford Farmers Ditch	Historic	FE
		c-11, c-5, c-8, c-9	(4) Archaeological Sites	Archaeological	(4) ND
Section 3: Fowler	Alternative 1: Fowler North	d-33	Two-story foursquare house	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Otero Canal	Historic	FE
	Alternative 2: Fowler South	Linear	Rocky Ford Highline Canal	Historic	FE
		Linear	Oxford Farmers Ditch	Historic	FE

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
Section 4: Fowler to Manzanola	---	Linear	BNSF Railway	Historic	FE
		e-1	U.S. 50 Bridge over Otero Canal	Historic	FE
		Linear	Catlin Canal	Historic	FE
		Linear	Otero Canal	Historic	FE
Section 5: Manzanola	Alternative 1: Manzanola North	Linear	BNSF Railway	Historic	FE
		Linear	Catlin Canal	Historic	FE
		Linear	Otero Canal	Historic	FE
	Alternative 2: Manzanola South	Linear	Catlin Canal	Historic	FE
		Linear	Otero Canal	Historic	FE
Section 6: Manzanola to Rocky Ford	---	Linear	BNSF Railway	Historic	FE
		Linear	Main Leach Canal	Historic	FE
		g-1	Residence	Historic	FE
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	Linear	BNSF Railway	Historic	FE
		Linear	Main Leach Canal	Historic	FE
		Linear	Rocky Ford Canal	Historic	FE
	Alternative 2: Rocky Ford South	h-2	Canal (Structure)	Historic	FE
		h-1	Barn	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Catlin Canal	Historic	FE
		Linear	Otero Canal	Historic	FE
		Linear	Rocky Ford Canal	Historic	FE
		Linear	Rocky Ford Highline Canal	Historic	FE
Section 8: Rocky Ford to Swink	---	j-1	U.S. 50 bridge over Timpas Creek	Historic	FE
		Linear	BNSF Railway	Historic	FE
Section 9: Swink	Alternative 1: Swink North	j-2	Migrant workers housing	Historic	FE
		j-4	Mary's Fruit Stand	Historic	FE
		Linear	BNSF Railway	Historic	FE
	Alternative 2: Swink South	j-3	Building	Historic	FE
		Linear	BNSF Railway	Historic	FE

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
Section 10: La Junta	Alternative 1: La Junta North	Linear	BNSF Railway	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
		Linear	Fort Lyon Canal	Historic	FE
	Alternative 2: La Junta South	Linear	BNSF Railway	Historic	FE
		Linear	Otero Canal	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
	Alternative 3: La Junta South	k-83	Otero Ditch tunnel	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Otero Canal	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
	Alternative 4: La Junta South	Linear	BNSF Railway	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
		Linear	Otero Canal	Historic	FE
Section 11: La Junta to Las Animas	---	I-1	U.S. 50 bridge over Thompson Arroyo (westbound)	Historic	FE
		I-2	U.S. 50 bridge over Thompson Arroyo (eastbound)	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Consolidated Ditch	Historic	FE
		Linear	Jones Ditch	Historic	FE
		I-3, I-5, I-6, I-7	(4) Archaeological sites	Archaeological	(1) ND, (3) FE

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
Section 12: Las Animas	Alternative 1: Las Animas North	Linear	BNSF Railway	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
		Linear	Arkansas River Levee at Las Animas	Historic	FE
		Linear	Consolidated Ditch	Historic	FE
		Linear	Las Animas Town Ditch	Historic	FE
	Alternative 2: Las Animas South	Linear	BNSF Railway	Historic	FE
		Linear	Consolidated Ditch	Historic	FE
		Linear	Arkansas River Levee at Las Animas	Historic	FE
		m-1	Old U.S. 50 Segment	Historic	FE
		m-40	Residence	Historic	FE
Section 13: Las Animas to Lamar	---	n-5	U.S. 50 bridge over McCrae Arroyo	Historic	FE
		n-10	U.S. 50 bridge over a draw	Historic	FE
		n-12	U.S. 50 bridge over Limestone Creek	Historic	FE
		n-4	Residence	Historic	FE
		n-6	Higley Gems	Historic	FE
		n-8	Hasty post office/mercantile	Historic	FE
		n-1, n-9, n-11, n-14, n-15, n-16	(6) Barns	Historic	FE
		n-2, n-7, n-13	(3) Farmsteads	Historic	FE
		Linear	Millers Ditch	Historic	FE
		Linear	Lubers Drainage Ditch	Historic	FE
		Linear	McClave Drainage Ditch	Historic	FE
		Linear	Sunflower Ditch	Historic	FE
		Linear	Riverview Ditch	Historic	FE
		Linear	Amity Canal	Historic	FE
		Linear	Vista Del Rio Ditch	Historic	FE

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
Section 14: Lamar to Granada	---	o-1	U.S. 50 bridge over Willow Creek overflow	Historic	FE
		o-2	Farmhouse	Historic	FE
		Linear	Manvel Canal	Historic	FE
		Linear	Lamar Canal	Historic	FE
Section 15: Granada	Alternative 1: Granada North		Residence	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	Granada Ditch	Historic	FE
		Linear	X-Y Canal	Historic	FE
	Alternative 2: Granada South	Linear	X-Y Canal	Historic	FE
Section 16: Granada to Holly	---	q-1	Residence	Historic	FE
		q-2	U.S. 50 bridge over Granada Creek	Historic	FE
		q-3	U.S. 50 overpass, BNSF railroad separation	Historic	FE
		q-4	Gateway Downs (former horseracing track)	Historic	FE
		Linear	BNSF Railway	Historic	FE
		Linear	X-Y Canal	Historic	FE
		Linear	Granada Ditch	Historic	FE
Section 17: Holly	Alternative 1: Holly North	r-21	Residence	Historic	FE
		r-19	Farm or Ranch	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail
		Linear	Holly Ditch	Historic	FE
		Linear	Buffalo Canal	Historic	FE
	Alternative 2: Holly South	Linear	BNSF Railway	Historic	FE

Section	Build Alternatives (if more than one)	Site Number[a]	Description	Type of Resource	National Register Eligibility[b]
Section 18: Holly Transition	---	s-1	Holly rest area	Historic	FE
		Linear	Holly Ditch	Historic	FE
		Linear	Buffalo Canal	Historic	FE
		Linear	Santa Fe National Historic Trail	Historic	Natl. Trail

[a]Site number of the resource on the figures presented in Appendix F
[b]National Register eligibility: NHL=National Historic Landmark, NR=National Register, SR=State Register, OE=Officially Determined Eligible, FE=Field Eligible, ND=Needs Data, and Natl. Trail=Nationally Recognized Trail

6.2.2. Indirect Effects

Indirect effects are those effects that have the potential to change the qualities for which historic properties are listed or considered eligible for the National Register, but are not direct effects to the resource. Indirect effects may include visual, air quality, noise, traffic, economic, social, or land use effects that could cause changes to the historic setting or use of historic properties. For example, the Belmont Neighborhood is a post-World War II subdivision located in Pueblo. If Alternative 2: Pueblo Existing Alignment is constructed, U.S. 50 would not be significantly altered in this area since the highway is currently configured as a four-lane expressway. However, a traffic noise analysis (to be conducted during Tier 2 studies) could determine that noise walls are recommended under CDOT guidelines. If these walls were constructed, they would visually intrude upon the original post-World War II setting of this neighborhood. This would result in an indirect effect to this resource.

The U.S. 50 Tier 1 EIS will only identify general corridor locations, not specific alignments. Therefore, this analysis does not include estimates of indirect effects since it is impossible to know which resources would be indirectly affected. A more detailed analysis of potential indirect effects will be completed during Tier 2 studies.

7. Mitigation Strategies

The following mitigation strategies were agreed to as part of the U.S. 50 Tier 1 Section 106 Programmatic Agreement. This agreement outlines how historic resources will be identified and evaluated in the U.S. 50 Tier 1 EIS. It was developed and signed by representatives from the lead agencies (CDOT and FHWA) and the State Historic Preservation Office.

- When a preferred alternative is chosen, the lead agencies will meet with the Colorado State Historic Preservation Office "to discuss appropriate mechanisms for avoiding, minimizing and mitigating adverse effects" to historic resources (U.S. 50 Tier 1 Section 106 PA, Sect III(B)(3)).
- "Resolution of adverse effects for individual properties will occur… during Tier 2 studies when more detailed engineering plans are developed. During Tier 2 adverse effects will be addressed in accordance with standard Section 106 process" (U.S. 50 Tier 1 Section 106 PA, Sect III(A)(5)).

Additional mitigation strategies include the following:

- To assist local communities with their heritage tourism efforts, CDOT has shared the information obtained for this project related to historic resources with the communities in the Lower Arkansas Valley. This includes information associated with specific resources, as well as the historic context of the region.
- To the extent feasible, CDOT should support communities' efforts related to heritage tourism along U.S. 50 in southeastern Colorado.

8. References

U.S. Department of Commerce, Economics, and Statistics Administration. U.S. Census Bureau. *2000 Census.* Washington, D.C. Web. 12 Dec. 2006 and Mar. 2007. <http://dola.colorado.gov/dlg/demog/pop_totals.html>.

Albanese, J.P and E. Antevs. "Geologic-Climatic Dating in the West." *American Antiquity* 20:317–335. 1955. Print.

Antevs, E. "Climatic Change and Pre-White Man." *University of Utah Bulletin* 38:168–191. 1948. Print.

Autobee, R., and D. Dobson-Brown. *National Register of Historic Places Multiple Property Documentation Form (Colorado State Roads and Highway)*. Office of Archaeology and Historic Preservation, Colorado Historical Society. 2003. Print.

Bent County Assessor. Property records for buildings within the boundaries of Las Animas that are 45 years of age or older. Bent County, CO: Bent County Assessor. File search completed Nov. 2006.

Brooks, P.C. *Diplomacy and the Borderlands: The Adams-Onís Treaty of 1819*. Los Angeles: University of California Press, 1939. Print.

Bryson, R.A., D.A. Baerreis, and W.M. Wendland. "The Character of Late Glacial and Post-glacial Climatic Changes." *Pleistocene and Recent Environments of the Central Great Plains,* edited by W. Dort, Jr., and J.K. Jones, Jr. Lawrence, KS: University of Kansas Press, 1970. pp. 53–73. Print.

Campbell, R.G. *The Panhandle Aspect of the Chaquaqua Plateau*. Lubbock, TX: Texas Tech University Press, 1976. Print.

Carrillo, R.F., D. Killam, W. Broadhead, and M. Slaughter. *Camp Amache: A Class III Intensive Field Survey of the Granada Relocation Center, Prowers County, Colorado, Volume 1.* Denver, CO: Town of Granada, Denver Optimist Club, and Colorado Historical Society (CHS), 2004. Print.

Carrillo, R.F. *Cultural Overview of Southeastern Colorado.* La Junta, CO: OJC Summer Academy. Jun. 2006. Print.

Carter, C., and S. Mehls. *Colorado Southern Frontier Historic Context.* Office of Archaeology and Historic Preservation, Colorado Historic Society. 1984. Facsimile Print Edition 2006.

Cassels, E.S. *The Archaeology of Colorado.* Boulder, CO: Johnson Books, 1983. Print.

Chartkoff, J.L, and K.K. Chartkoff. *The Archaeology of California, Reprinted.* Redwood City, CA: Stanford University Press, originally published 1984, reprinted 1994. Print.

Church, M., S.G. Balker, B.J. Clark, R.F. Carrillo, R.F., J.C. Horn, C.D. Spath, D.R. Gilfoyle, and E.S. Cassels. *Colorado History: A Context for Historical Archaeology.* Denver, CO: Colorado Council of Professional Archaeologists. 2007. Print.

Colorado Department of Local Affairs (DOLA). *Population Estimates by County and Municipality (2000-2008).* Web. Feb. 2010. <http://www.dola.state.co.us/dlg/demog/pop_totals.html>.

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Historic Context Overview.* Denver, CO: Colorado Department of Transportation (CDOT) Region 2, 22 Jul. 2009. Print. [CDOT 2009a]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Historic Reconnaissance Survey Report.* Denver, CO: Colorado Department of Transportation (CDOT) Region 2, 31 Jul. 2009. Print. [CDOT 2009b]

Colorado Department of Transportation (CDOT). *Colorado Historic Bridge Inventory.* Denver, CO: Colorado Department of Transportation, 2004. Print.

Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973. §CRS 24-80-401. 1963.

Colorado Historical Society (CHS), Office of Archaeology and Historic Preservation (OAHP). *State Register Bulletin: How to Apply the Nomination Criteria for the Colorado State Register of Historic Properties (State Register Bulletin 960).* Denver, CO: Colorado Historical Society, 2000. Print.

Colorado Preservation, Inc. *Colorado's Most Endangered Places Program: Summary of 2009 Endangered Places.* Denver, CO: Colorado Preservation, Inc. 2009. Print.

Colorado Register of Historic Places Act. §CRS 24-80.1.

Colorado State Register of Historic Properties (CO Register). *Properties Currently on the State Register of Historic Properties (Publication 1503).* Denver, CO: Colorado Office of Archaeology and Historic Preservation (OAHP). File search completed in Sept 2005. Print.

Compass Database. Database search. Denver, CO: Colorado Office of Archaeology and Historic Preservation (OAHP). File search completed in Sept 2005. [Compass 2005a]

Compass Database. Research of the farms, ranches, and associated resource types in Pueblo, Otero, Bent and Prowers Counties, as well as historic properties associated with U.S. 50. Denver, CO: Colorado Office of Archaeology and Historic Preservation (OAHP). File search completed in Sept 2005. [Compass 2005b]

Compass Database. Database search for archaeological records for Pueblo, Otero, Bent, and Prowers Counties. Denver, CO: Colorado Office of Archaeology and Historic Preservation (OAHP). File search completed in 2006.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. 1978. Print.

Cunningham, D. "Post Office Added to Historical Register." *Bent County Democrat*. 13 Mar. 2008. Print.

Eighmy, J.L. *Colorado Plains Prehistoric Context.* Denver, CO: Colorado Historical Society, 1984. Print.

Frison, G.C. *Prehistoric Hunters of the High Plains*. 2nd ed. New York: Academic Press, 1991. Print.

Greiser, S.T. *Predictive Models of Hunter-Gather Subsistence and Settlement on the Central High Plains.* Diss. University of Colorado, Boulder. 1980. Print.

Holleran, M. *Historic Context for Irrigation and Water Supply, Ditches and Canals in Colorado.* Denver, CO: University of Colorado, Denver and CU Health Science Center, 2005. Print.

Keck, F. *Conquistadors to the 21st Century: A History of Otero and Crowley Counties, Colorado.* La Junta, CO: Otero Press, 1999. Print.

Kenner, C.L. *A History of New Mexican-Plains Indian Relations.* Norman, OK: University of Oklahoma Press, 1969. Print.

Krieger, A.D. *Cultural Complexes and Chronology of Northern Texas*. Austin, TX: The University of Texas at Austin, 1946. Print.

LeBlanc, S.A. *Prehistoric Warfare in the American Southwest*. Salt Lake City, UT: University of Utah Press, 1999. Print.

Lintz, C.R. "Architecture and Radiocarbon Dating on the Antelope Creek Focus: A Test of Campbell's Model." *Plains Archaeologist* 23 (82, Part 1): 319–328. 1978. Print.

Lutz, B.J., and W.J. Hunt, Jr. *Models for Patterns and Change in Prehistoric Settlement-Subsistence Systems of the Purgatoire and Apishapa Highlands.* Manuscript on file at the Colorado Office of Archaeology and Historic Preservation, Denver. 1979. Print.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987. Print.

National Historic Preservation Act (NHPA) Regulations. 36 CFR 800. 1966. [NHPA 1966b]

National Historic Preservation Act (NHPA) Regulations. 36 CFR 60. 1981.

National Register of Historic Places (NRHP). *Properties Currently on the NRHP.* U.S. Department of the Interior (DOI), National Park Service (NPS). File search completed Sept 2005.

National Park Service (NPS). *National Register Bulletin: How to Apply the National Register Criteria for Evaluation (National Register Bulletin 15).* 1990. Web. 2006. <http://www.cr.nps.gov/nr/publications/bulletins/nrb15/>.

Otero County Assessor. Property records for buildings within the boundaries of Fowler, Manzanola, Rocky Ford, Swink and La Junta that are 45 years or older. Otero County, CO: Otero County Assessor. File search completed Nov 2006.

Programmatic Agreement among the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA), and the State Historic Preservation Officer (SHPO) regarding implementation of the U.S. Highway 50 Corridor East Project (U.S. 50 Tier 1 Section 106 PA). 25 Jun. 2007.

Pueblo County Assessor. Property records for buildings within the boundaries of Pueblo that are 45 years or older. Pueblo County, CO: Pueblo County Assessor. File search completed Nov 2006.

Prowers County Assessor. Property records for buildings within the boundaries of Granada and Holly that are 45 years or older. Prowers County, CO: Prowers County Assessor. File search completed Nov 2006.

Roper, D.C., D.J. Weir, and T.R. Farmer. *Class III Archaeological Survey for the Proposed Frontier Pipeline: Uinta, Sweetwater, Fremont, and Natrona Counties, Wyoming*. Englewood, CO: Commonwealth Associates Inc., 1983. Print.

Rowe, R.A. *Kennedy Oil Company Northern and Central Sweetwater Federal Coal Bed Methane Wells, Access Roads, and Utility Corridors, A Class III Cultural Resource Inventory Sweetwater County, Wyoming*. Greenwood Village, CO: Greystone, 2002. Print.

Sanborn Fire Insurance Maps for Colorado, 1876-1970. Denver, CO: Denver Public Library. Accessed 2006.

Southern Colorado Economic Development District. *Member County Demographics.* Web. Apr. 2007. <http://www.scedd.com/demographics.htm>.

U.S. Congress. American Indian Religious Freedom Act of 1978. 42 USC 1996 and 1996(a). 1978.

U.S. Congress. Antiquities Act of 1906. 16 USC 431-433. 1906.

U.S. Congress. Archaeological and Historic Preservation Act of 1974. 16 USC 469-469l. 1974.

U.S. Congress. Archaeological Resource Protection Act of 1979. 16 USC 470(a). 1979.

U.S. Congress. Historic Sites Act of 1935. 16 USC 461-471. 1935.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Congress. National Historic Preservation Act of 1966. 16 USC 470. 1966. [NHPA 1966a]

U.S. Congress. Native American Graves Protection and Repatriation Act of 1990. 25 USC 3001 et seq. 1990.

U.S. Department of Agriculture (USDA) Aerials. Aerial Photography Field Office. Flown Jun 2004.

U.S. Department of Transportation Act of 1966, Section 4(f). 49 USC 303l. 1968.

Winship, G.P. *The Journey of Coronado, 1540–1542, from the City of Mexico to the Grand Canyon of the Colorado and the Buffalo Plains of Texas, Kansas and Nebraska, As Told by Himself and His Followers*. New York: A.S. Barnes & Co., 1904. Print.

Wood, W.R. *Archaeological Interpretive Report: Pueblo Reservoir, Eastern Colorado.* Columbia, MO: University of Missouri, Archeological Research Division, 1972. Print.

Zier, C.J., and S.M. Kalasz. *Colorado Prehistory: A Context for the Arkansas River Basin.* Denver, CO: Colorado Council of Professional Archaeologists, 1999. Print.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Historic and Archaeological Resources

These resource methodology overviews are attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 Historic Resources

Methodology Overview	Historic Resources	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Existing documentation/records (e.g., SHPO and Tribal Historic Preservation Officers), comparable historic context statements/nomination coversheets • Local, state, and federal agencies, quasi-governmental organizations, and historic society contacts • State Historic Bridge Report (Clay Frasier) • Aerial photographs	• Data sources sufficient for standard NEPA documentation • Location of recorded or reported historic properties • Historic Properties Context Statement • Consulting parties input

Collection and/or Analysis Methodology	• Submit data requests and research documentary/archives
	• Conduct desktop and preliminary windshield review of study area
	• Coordinate with key historic resources stakeholders to:
	  • Identify planning level study area for Historic Resources Context Overview
	  • Confirm outline for Historic Resources Context Overview
	  • Collect input on historic properties
	  • Develop a Historic Resource Context Overview
	• Refine study area for Tier 1 Draft EIS studies & analysis
	• Review aerial photos, conduct windshield reconnaissance of recorded districts or properties, collect baseline data along alternative corridor locations
	• Assess potential for eligibility for the purposes of systems-level planning effort only using Criterion C
		• Desktop study, which includes: review of section of independent utility limits and updating historic property maps
		• Standard field survey of proposed corridor alignments
		• If analysis determines potential direct or indirect impact on historic properties, Determinations of Eligibility and Findings of Effect prepared
		• Coordination with affected agencies and stakeholders

Methodology Overview	Historic Resources	
	Tier 1	**Tier 2**
Project Area	• Planning level study area for Historic Resource Context Overview • Refine study area after screening of alternatives	Tier 2 specific section of independent utility corridor boundaries
Impacts	• GIS analysis of the proposed alternative corridors • Relative importance of potentially affected properties qualitatively assessed considering the historic context overview, focusing on types and concentrations of properties or particularly sensitive properties • Quantitative assessment of relative impacts between alternatives based on agreed-upon formula	Standard impact analysis in compliance with Section 106, NEPA, and other regulatory guidance

Mitigation Options	• Tier 1 primary approach—Impact avoidance of important resources
	• A corridor-wide Programmatic Agreement (PA) including:
	  • Documentation of resources where "avoidance" has been completed
	  • Strategies to minimize/mitigate unavoidable adverse impacts
	  • Subset agreements for methodologies for near-term Tier 2 studies
		• To be determined, as defined by the corridor-wide PA
		• With minor exceptions, "avoidance" will have been addressed under Tier 1, and Tier 2 will focus on minimization and include a Memorandum of Agreement for unavoidable effects

Deliverables	• Corridor-wide PA • Historic Resources Context Overview • Historic resources GIS database • Historic Resources Relative Impacts Assessment Technical Memorandum, which would include study area, methods, resource inventory, relative impact assessment, avoidance, minimization, and mitigation options	• Standard intensive level Historic Properties Survey Report • Historic resources maps • Determinations of Eligibility and Findings of Effect prepared as needed
Regulatory Guidance/ Requirements	• Guidelines established by Office of Archaeology and Historic Preservation • Executive Order 11593: Protection and Enhancement of the Cultural Environment • Protection of Historic and Cultural Properties 1999 (36 CFR 800) • National Register of Historic Places (NRHP) (36 CFR 60) • Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68) • National Historic Preservation Act of 1966, Section 106 as amended (NHPA) (16 USC 470f) • National Historic Preservation Act of 1966, Section 110 as amended (NHPA) (16 USC 470H-2) • Executive Order 13287 Preserve America 2003 • Executive Order 13175 Consultation and Coordination with Indian Tribal Governments • Executive Order 13007 Indian Sacred Sites • Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Act (2005)	

Table A-2. Resource Methodology Overview for Archaeology

Methodology Overview	Archaeology	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Previously recorded historic and prehistoric archaeological resources and localities, and areas where there are strong indicators of potential site presence • Geologic maps • Existing reports, management plans, technical literature, and museum records	• Data sources sufficient for standard NEPA documentation • Location of recorded historic and prehistoric archaeological resources and localities, and areas where there are strong indicators of potential site presence • Consulting parties input

Methodology Overview	Archaeology	
	Tier 1	**Tier 2**
Collection and/or Analysis Methodology	• Conduct literature survey to determine if area was utilized prehistorically/historically and may contain important sites/features. • Consult with SHPO and CDOT archaeologist. This will serve as an exercise to determine if there are any strong indicators of site presence, and is not intended to serve as a sensitivity/probability model • Data compilation of archaeological resources	• Sufficient for standard NEPA documentation • Archaeological field survey (probing when necessary) to determine presence or absence • Site-specific test excavations, as appropriate, to determine NRHP eligibility, following consultation with CDOT archaeologists • Laboratory analysis of sites, located artifacts, and specimens to determine scientific significance
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas line	Tier 2 specific section of independent utility corridor boundaries
Impacts	Potential presence of sites or indicators per alternative	Standard impact analysis in compliance with Section 106, NEPA, and other regulatory guidance
Mitigation Options	Avoid known archaeological sites/locations, and if anyone or combination of environmental factors appear as a potential indicator, highlight such areas as locations to minimize corridor encroachment	Same as Tier 1, plus: • Coordination of activities with appropriate agencies • Conduct data recovery excavations at any site that cannot be avoided during construction
Deliverables	• Archaeological Assessment Technical Memorandum, which would include study area, methods, resource inventory, relative impact assessment, avoidance, minimization, and mitigation options • GIS layers with the identification of known archaeological sites, indicators of archaeological site presence.	Standard intensive-level Archaeology Survey Report
Regulatory Guidance/ Requirements	• Guidelines established by OAHP • Protection of Historic and Cultural Properties (36 CFR 800) • Executive Order 11593 Protection and Enhancement of the Cultural Environment • Natural Historic Preservation Act of 1966, Section 106 (16 USC 470) • Archaeological and Historic Preservation Act (16 USC 469-469C) • Archaeological Resources Protection Act (16 USC 470aa-11) • Act for the Preservation of American Antiquities (16 USC 431-433) • Native American Graves Protection and Repatriation Act • Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Act (2005)	

Appendix B. Abbreviations and Acronyms

A.D.	Anno Domini
B.P.	Before Present
Ca.	Circa
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CR	County Road
EA	Environmental Assessment
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
PA	Programmatic Agreement
SH	State Highway
SHPO	State Historic Preservation Office
SIU	Section of independent utility
State Register	Colorado State Register of Historic Properties
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. 50 Tier 1 Environmental Impact Statement

This page left intentionally blank.

Appendix C. NRHP Eligibility Criteria

Historic properties for the U.S. 50 Tier 1 EIS are defined as properties eligible or “likely eligible” for listing on the National Register of Historic Places (National Register) and that are 45 years old or older, and all sites evaluated as “field eligible” or “field not eligible” in the database maintained by the State Historic Preservation Officer. The following section summarizes the criteria used to determine National Register eligibility.

National Register criteria address different types of values embodied in potential historic properties. The criteria are categorized for their associated value (Criterion A and Criterion B), design or construction value (Criterion C), or information value (Criterion D). The regulations state that “the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- That are associated with events that have made a significant contribution to the broad patterns of our history [Criterion A]; or
- That are associated with the lives of persons significant in our past [Criterion B]; or
- That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction [Criterion C]; or
- That have yielded or may be likely to yield, information important in prehistory or history [Criterion D]” (NHPA 1981, sect 60.4).

To be listed in the National Register, a property must not only be shown to be significant under the National Register criteria described above, but it also must have integrity. The evaluation of integrity is a subjective judgment that must be grounded in an understanding of a property’s physical features and how they relate to its significance. Historic properties either retain integrity (i.e., convey their significance) or they do not. Within the concept of integrity, the National Register criteria recognize seven aspects (i.e., qualities) that, in various combinations, define integrity. The seven aspects include:

1. “Location—the place where the historic property was constructed or the place where the historic event occurred,
2. Design—the combination of elements that create the form, plan, space, structure, and style of a property,
3. Setting—the physical environment of a historic property,
4. Materials—the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property,
5. Workmanship—the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory,
6. Feeling—a property’s expression of the aesthetic or historic sense of a particular period of time, and
7. Association—the direct link between an important historic event or person and a historic property” (NPS 1990).

To retain historic integrity a property will always possess several, and usually most, of these aspects. If a historic resource meets one or more of the National Register criteria and retains a level of integrity that conveys its history, then it is considered National Register eligible.

This page left intentionally blank.

Appendix D. U.S. 50 Tier 1 Section 106 Programmatic Agreement (PA)

PROGRAMMATIC AGREEMENT

Among

The Federal Highway Administration
The Colorado Department of Transportation
and
The Colorado State Historic Preservation Officer

Regarding

Implementation of
The US Highway 50 Corridor East Project

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the Colorado Department of Transportation (CDOT), has determined that improvements to US Highway 50 between Pueblo, Colorado and the Kansas state line (referred to as the US 50 Corridor East project) will be needed over the next several decades in order to improve safety and mobility; and

WHEREAS, FHWA is preparing a Tier 1 Environmental Impact Statement (EIS) for the US 50 Corridor East project to address mobility and safety needs through a collaborative community-based approach, and will examine the relative effects of the proposed corridor alternatives on known historic properties within the Area of Potential Effect (APE) established for the undertaking; and

WHEREAS, FHWA has consulted with the Colorado State Historic Preservation Officer (SHPO) to develop this Programmatic Agreement pursuant to 36 CFR 800.14(b)(3), the regulations implementing Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470f) and Section 110(f) of the same Act (16 USC 470h-2(f)); and

WHEREAS, FHWA has determined that a phased process for compliance with Section 106 of NHPA, as codified at 36 CFR 800.4(b)(2) and 36 CFR 800.5(a)(3), is appropriate for the US 50 Corridor East project, and execution of this agreement constitutes compliance with the Section 106 regulations; and

WHEREAS, the signatories to this agreement acknowledge that the level of detail for the Tier 1 EIS will be consistent with corridor-level decision making such that FHWA will have the basis for making an informed decision on the general location and facility type for future improvements, but will not be able to identify specific project impacts; and

WHEREAS, FHWA will prepare site-specific Tier 2 National Environmental Policy Act (NEPA) documentation presenting environmental analyses and more detailed design information for site-specific project level decision making; and

WHEREAS, the Amache Preservation Society, Bent County Development Foundation, Colorado Preservation, Inc., Fowler Historical Society, Friends of Amache, Granada City Council, Otero County Historical Council, Pioneer Historical Society of Bent County, Prowers County Development, Inc., Santa Fe Trail Scenic and Historic Byway – Mountain Branch, and Southeast Colorado Regional Tourism Group participated in consultations leading to the development of this document and have been invited and agree to concur in the agreement; and

1

WHEREAS, FHWA has notified the Advisory Council on Historic Preservation (ACHP) of its intention to develop a Programmatic Agreement and invited the Council to participate as a signatory to the agreement, which the Council has declined;

NOW, THEREFORE, FHWA, CDOT and SHPO agree that the Tier 1 US 50 Corridor East undertaking shall be administered in accordance with the following principles and stipulations to satisfy FHWA's Section 106 responsibilities for Tier 1.

PRINCIPLES

FHWA and CDOT shall adhere to the following principles in complying with Section 106 of the NHPA for the US 50 Corridor:

1. The project shall use a two-phased approach in which Phase 1 will involve initiating the Section 106 process at the Tier 1 stage, and Phase 2 will involve refining alternatives and concluding Section 106 consultation during Tier 2 for individual projects.
    a. Phase 1 will entail identification of consulting parties, establishment of an Area of Potential Effects (APE), conducting a reconnaissance (windshield) survey to establish the known or likely presence of historic properties within the APE; documenting these elements in a Reconnaissance Survey Report; assessing relative effects on properties eligible or likely eligible for listing on the National Register of Historic Places (NRHP); documenting those effects in a Relative Effects Report; and developing one or more historic context(s) for the corridor in order to place historic properties into the proper research framework. The agencies will consult with the SHPO and other consulting parties in completing these tasks.

    b. Phase 2, which is expected to include an undetermined number of site-specific Tier 2 projects, will include development of APE's for individual projects, determinations of eligibility and effects for historic properties, and resolution of effects as outlined in 36 CFR 800.4(b)(1) and 800.6, all in coordination with SHPO and the consulting parties identified during Tier 1.

2. FHWA and CDOT will seek, discuss and consider the views of the consulting parties, and where feasible, will seek agreement with them (36 CFR 800.16[f]) when making Tier 1 planning decisions under the stipulations of this PA.

STIPULATIONS

FHWA shall ensure throughout Tier 1 that the following measures are carried out:

I. Consultation and Consulting Parties

A. Delegation of Consultation Authority

1. FHWA authorizes CDOT to conduct consultation with the SHPO and other consulting parties on its behalf, and to make recommendations regarding the identification of consulting parties, and determinations on the level of effort for identification of historic properties, the known or likely presence of historic properties within the APE, and relative effects on those properties.

2. FHWA will remain involved with and ultimately responsible for all findings and determinations, and retains responsibility for complying with all federal requirements pertaining to direct government-to-government consultation with consulting Indian tribes.

2

FHWA has delegated development and facilitation of day-to-day tribal consultation tasks to CDOT, but retains ultimate authority over that program. Six Native American tribes with an established interest in southeastern Colorado were provided the opportunity to participate in the undertaking as consulting tribes under the auspices of the Section 106 regulations. Only the Comanche Tribe of Oklahoma accepted the invitation and is considered a consulting tribe. However, the Comanche Tribe elected not to participate as a signatory to this PA.

B. Consultation with Other Federal Agencies

1. FHWA and the consulting parties may seek advice, guidance, and assistance from the ACHP on the application of the Programmatic Agreement to Tier 2 undertakings, including the resolution of disagreements, whether or not the ACHP is formally involved in the review of a specific undertaking.

2. FHWA shall notify the National Park Service (NPS), Intermountain Region of any potential direct or indirect effects to NPS facilities (Camp Amache National Historic Landmark, Bent's Old Fort and Sand Creek Massacre National Historic Sites, and Santa Fe National Historic Trail) identified in the Tier 1 study, and invite NPS to participate in developing methods to minimize and/or mitigate those effects.

II. Level of Effort to Identify and Evaluate Historic Properties

A. Area of Potential Effects

1. In consultation with SHPO and the other consulting parties, during Tier 1 CDOT will develop an APE of sufficient size and configuration to incorporate each proposed corridor alternative such that relative direct and indirect effects to historic properties can be appropriately analyzed. The APE may be modified and/or refined during the Tier 1 process as each corridor is further developed.

B. Archival Research and Reconnaissance Survey

1. The identification and evaluation of historic properties at Tier 1 will focus on the "likely presence" of historic resources, and as appropriate, historic and prehistoric archaeological resources, including all sites previously listed on or determined eligible for listing on the NRHP, as well as those evaluated as "Field Eligible" and "Field Not Eligible" in the SHPO database.
    a. CDOT will plan and coordinate archival research of the APE using all reasonable and accessible resources.

    b. CDOT will plan and facilitate completion of a reconnaissance (windshield) survey of the APE. The Reconnaissance Survey Report will include, at a minimum, a list of known or likely historic properties, including historic districts, within the APE; baseline data regarding each property (i.e., address, date of construction); representative digital photographs of the different property types present in the APE, including NRHP eligible and likely eligible historic districts; and maps showing the location of NRHP listed and eligible properties (as previously determined), as well as those properties newly identified during the windshield survey.

    c. The Reconnaissance Survey Report will be submitted to SHPO and the consulting parties for review and comment as part of the inventory and assessment of historic properties in the study corridor. However, the report will not constitute an official concurrence point in the Tier 1 Section 106 process, and

CDOT will therefore not request SHPO concurrence on this report. Upon transmittal of the document by CDOT, SHPO and the other consulting parties will have 45 calendar days to review the report and submit comments.

d. For those properties identified during the reconnaissance but not previously documented, NRHP eligibility determinations will take the form of "likely eligible" and "likely not eligible." These preliminary designations will be utilized to standardize the documentation process and make consistent evaluations throughout the Tier 1 survey phase. Final determinations of NRHP eligibility and thorough recordation of historic properties will occur during Tier 2.

e. CDOT will coordinate with the consulting parties to identify potential historic properties not otherwise known or identified during the reconnaissance survey.

f. CDOT will use data collected during the archival research and reconnaissance survey to develop and assess preliminary corridor alternatives.

C. Historic Context Development

1. To facilitate planning at Tier 1 and streamline development of Tier 2 undertakings, CDOT shall, in consultation with SHPO and the other consulting parties, develop a historic context or contexts for the US 50 Corridor.

2. Historic contexts contain information about historical trends and properties grouped by an important theme and a particular period of time. These documents link historic properties to important historical trends, and as such the US 50 context(s) will focus on historical documentation relevant to US Highway 50 in relation to the economic and social development of southeastern Colorado.

3. The historic context(s) will include an assessment of existing site records and known or likely eligibility determinations. Upon transmittal of the document by CDOT, SHPO and the other consulting parties will have 45 calendar days to review the report and submit comments.

III. Evaluation of Relative Effects on Historic Properties

A. Determinations of Relative Effect

1. As noted above, the purpose of the Tier 1 EIS is to take a broad view of the transportation issues in the US 50 Corridor and identify the general location(s) for improvements without the benefit of specific design data. Therefore, it is not possible to evaluate specific effects on individual historic properties at this stage in the Section 106 process.

2. CDOT will determine the relative level of effect (impact) on historic properties during Tier 1 based on preliminary alternative development, and quantify those effects to the extent possible.

3. The evaluation of effects at Tier 1 will consist of an analysis of the relative, or approximate, direct (physical destruction or damage) and indirect (noise, visual and cumulative) effects of alternatives on known and likely historic properties within the APE. Impacts will be assessed using a broad-based corridor vision instead of the more focused, property-specific effects evaluation to be conducted at Tier 2.

4. CDOT will prepare a draft Relative Effects Report and coordinate review of and revisions to that document with SHPO and the consulting parties. A final report will be produced and submitted to SHPO and the consulting parties for comment and filing. CDOT will not request SHPO concurrence on this report, as it does not constitute a concurrence point in the Tier 1 Section 106 process.

5. Resolution of adverse effects for individual properties will occur for site-specific projects during Tier 2 studies when more detailed engineering plans are developed. During Tier 2 adverse effects will be addressed in accordance with the standard Section 106 process.

B. Mitigation Strategies

1. FHWA and CDOT commit to make a good faith and reasonable effort to avoid, minimize or mitigate effects to National Register listed, eligible, and likely eligible historic properties during all phases of planning and alternative screening at Tier 1.

2. The agencies will implement the Tier 1 process in accordance with the principles of Context-Sensitive Solutions (CSS). CSS seeks transportation solutions that improve mobility and safety while complementing and enhancing community values and objectives. Context sensitive solutions are achieved through joint effort involving all stakeholders.

3. When a Preferred Alternative is selected CDOT shall meet with the consulting parties to discuss appropriate mechanisms for avoiding, minimizing and mitigating adverse effects.

IV. Dispute Resolution

A. Should any party to this agreement object in writing to FHWA or CDOT regarding any action carried out or proposed with respect to the undertaking or implementation of this agreement, FHWA and CDOT will consult with the objecting party to resolve the objection.

B. If after initiating such consultation FHWA or CDOT determines that the objection cannot be resolved through consultation, FHWA shall forward all documentation relevant to the objection to the ACHP, including the agency's proposed response to the objection, and request a response within 30 days.

C. Within 30 days after receipt of all pertinent documentation, the ACHP may exercise one of the following options:

1. Advise the agency that the ACHP concurs in the agency's proposed response to the objection, whereupon the agency will respond to the objection accordingly;

2. Provide the agency with recommendations, which the agency shall take into account in reaching a final decision regarding its response to the objection; or

3. Notify the agency that the objection will be referred for comment pursuant to 36 CFR 800.7(a)(4), and proceed to refer the objection and comment. The agency shall take the resulting comment into account in accordance with 36 CFR 800.7(c)(4).

V. Amendment and Termination

A. Any signatory to this agreement may request that it be amended, whereupon the parties will consult to reach a consensus on the proposed amendment. Where no consensus can be reached, the agreement will not be amended.

B. In the event that Congress amends Section 106 of the National Historic Preservation Act or in the case of substantial changes to 36 CFR 800, the parties to this agreement will meet to consider whether it would be appropriate to amend the agreement.

C. Any signatory to this agreement may terminate it by providing thirty (30) days notice to the other parties, provided that the signatories and concurring parties will consult during the period prior to termination or seek agreement on amendments or other actions that would avoid termination.

D. In the event of termination, FHWA shall comply with 36 CFR 800 for all remaining Tier 2 undertakings of the US 50 Corridor East project.

Execution and implementation of this agreement and any amendments to this agreement evidence that FHWA and CDOT have taken into account the relative effects of the US 50 Corridor East project on historic properties and, as appropriate at future Tier 2 levels of analyses, afforded the Advisory Council on Historic Preservation an opportunity to comment on those effects.

Signatories:

Federal Highway Administration

By: Michael E Vanderhoof Date: 6/25/07

for David Nicol, P.E., Division Administrator

Colorado Department of Transportation

By: Jennifer Finch Date: 6/07/07

for Russell George, Executive Director

Colorado State Historic Preservation Officer

By: Mark Wolfe Date: 6/12/07

for Georgianna Contiguglia, SHPO

7

Concurring Parties:

Bent County Development Foundation

By: _____ Date: 7-11-07
Tandy Parrish, Executive Director

Colorado Preservation, Inc.

By: _____ Date: 10/15/07
Mark Rodman, Executive Director

Otero County Historical Council

By: _____ Date: 7-11-07
Donna Rohde, County Administrator

Pioneer Historical Society of Bent County

By: _____ Date: 7-11-07
Tom Pointon, President

Prowers County Development, Inc.

By: _____ Date: 8-20-07
Roger Jones, Economic Development Director

Santa Fe Trail Scenic and Historic Byway – Mountain Branch

By: _____ Date: 8-7-07
Wyvonne Phillips Graham, Executive Director

Southeast Colorado Regional Tourism Group

By: _____ Date: 9-12-2007
~~Janet Frederick, Chairperson~~
Sandra Gerler Bemiss
Exec. Committee Representative

8

Amache Preservation Society

By: John Hopper Date: 8/13/07
John Hopper

Fowler Historical Society

By: Barbaralu H. Smith Date: 8/21/07
Barbaralu H. Smith, Co-Chair

Friends of Amache

By: John Hopper Date: 8/13/07
John Hopper

Granada Town Council

By: Glenda Tyree, Mayor Date: July 18, 2007
Glenda Tyree, Mayor

This page left intentionally blank.

Appendix E. Historic Properties by Location

The following tables show the historic properties (Table E-1) and linear historic resources (Table E-2) identified by this analysis by location.

Table E-1. Historic Properties by Location

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Pueblo	F-1	a-1	1906 N. Hudson Ave.	Movie theater		NA	FE
Pueblo	F-1	a-2	1901 N. Hudson Ave.	Community Corrections Services		1962	FE
Pueblo	F-1	a-3	Hudson Ave. and Ruppel St.	Central Christian Church		NA	FE
Pueblo	F-1	district	Bounded (generally) by Bonforte Blvd. on the north and west, Macalester Rd. on the east, and Constitution Rd. and Ruppel St. on the south	Belmont Post-WWII subdivision		1952	FE
Pueblo	F-1	a-4	1301 Anita St.	American International Res		1964	FE
Pueblo	F-1	a-5	1436 E. 19th St.	Residence		1951	FE
Pueblo	F-1	a-6	1401 Anita St.	Dentist's office		1968	FE
Pueblo	F-1	a-7	2104 N. Norwood Ave.	Commercial building		NA	FE
Pueblo	F-1	a-8	1376 Anita St.	Immaculate Heart of Mary Chapel		NA	FE
Pueblo	F-1	a-9	1827 Ogden	Minimal traditional ranch		1946	FE
Pueblo	F-1	a-10	2002 E. 16th St.	Minimal traditional ranch		1951	FE
Pueblo	F-1	a-11	2002 E. 15th St.	Pueblo Revival		1939	FE
Pueblo	F-1	a-12	2004 E. 16th St.	Minimal traditional ranch		1951	FE
Pueblo	F-1	a-13	2005 E. 16th St.	Residence		1955	FE
Pueblo	F-1	a-14	2006 E. 16th St.	Minimal traditional ranch		1951	FE
Pueblo	F-1	a-15	2011 E. 15th St.	Hipped box residence		1951	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Pueblo	F-1	a-16	2015 E. 15th St.	Hipped box residence		1951	FE
Pueblo	F-1	a-17	2030 E. 15th St.	Residence		1945	FE
Pueblo	F-1	a-18	2125 E. 13th St.	Residence		1955	FE
Pueblo	F-1	a-19	2134 E. 15th St.	Classic cottage		1924	FE
Pueblo	F-1	a-20	2130 E. 15th St.	Ranch-style residence		1924	FE
Pueblo	F-1	a-21	2300 Vanita Ave.	Spann Elementary School		NA	FE
Pueblo	F-1	a-22	Milepost 318.1	U.S. 50 bridge over Dry Creek (eastbound) (K-18-BZ)		1958	FE
Pueblo	F-1	a-23	Milepost 318.1	U.S. 50 bridge over Dry Creek (westbound) (K-18-BY)		1958	FE
Pueblo	F-1	a-24	2506 E. 11th St.	Residence		1954	FE
Pueblo	F-1	a-25	2510 E. 11th St.	Residence		1952	FE
Pueblo	F-1	a-26	2602 E. 7th St.	Residence		1952	FE
Pueblo	F-1	a-27	2608 E. 12th St.	Apostolic Assembly of the Faith Church		1958	FE
Pueblo	F-1	a-28	2613 E. 7th St.	Residence		1948	FE
Pueblo	F-1	a-29	701 Beaumont Ave.	Garage (brick)		NA	FE
Pueblo	F-1	a-30	729 Beaumont Ave.	Small agriculture property		1951	FE
Pueblo	F-1	a-31	2701 E. 12th St.	St. Anne's Catholic Church		1955-1956	FE
Pueblo	F-1	a-32	2711 E. 7th St.	Raised cottage		1954	FE
Pueblo	F-1	a-33	2801 E. 11th St.	Apodaca basement residence		1956	FE
Pueblo	F-1	a-34	2801 E. 10th St.	Residence		1954	FE
Pueblo	F-1	a-35	2802 Juan Madrid	Residence		NA	FE
Pueblo	F-1	a-36	2802 E. 10th St.	Residence		NA	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Pueblo	F-1	b-1	2700 E. 4th St.	BMC West Building Materials		NA	FE
Pueblo	F-1	b-2	204 Mead	Adobe residence		NA	FE
Pueblo	F-1	b-3	723 Kennie Rd.	Adobe Commercial and warehouses		NA	FE
Pueblo	F-1	b-4	813 Kennie Rd.	Ortiz Farm Equipment warehouse		1957	FE
Pueblo	F-1	b-5	519 Kennie Rd.	Vigil residence		1954	FE
Pueblo	F-1	b-6	1000 Kennie Rd.	Don's Sportcar Salvage Frame warehouse		1946	FE
Pueblo	F-1	b-7	301 25th Lane	Zitnik farm		1900 (barn)	FE
Pueblo	F-1	b-8	28900 E. SH 96	Turner Bros Trucking Co. (Pueblo Disposal)		1958	FE
Pueblo to Fowler	Not shown (archaeo)	c-1		Archaeo	5PE.4300		ND
Pueblo to Fowler	F-1	c-2	Milepost 328.9	U.S. 50 bridge over Chico Creek (westbound) (K-19-Q)		1953	FE
Pueblo to Fowler	F-1	c-3	Milepost 328.9	U.S. 50 bridge over Chico Creek (eastbound) (K-19-U)		1953	FE
Pueblo to Fowler	F-1	c-4	Milepost 329.1	U.S. 50 underpass, Ordnance Depot Road interchange (K-19-V)		1953	FE
Pueblo to Fowler	Not shown (archaeo)	c-5		Archaeo	5PE.70		ND
Pueblo to Fowler	F-1	c-6	U.S. 50	Farm		1920	FE
Pueblo to Fowler	F-1	c-7	U.S. 50	Farm		1900, 1950	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Pueblo to Fowler	Not shown (archaeo)	district		Fort Reynolds (archaeo)		1868	FE
Pueblo to Fowler	Not shown (archaeo)	c-8		Huerfano Colony (archaeo)	5PE.814		ND
Pueblo to Fowler	Not shown (archaeo)	c-9		Archaeo	5PE.813		ND
Pueblo to Fowler	F-1	c-10	Milepost 335.9	U.S. 50 bridge over the Huerfano River (L-19-B)	5PE.302	1921, 1948	NR
Pueblo to Fowler	Not shown (archaeo)	c-11		Archaeo	5PE.69		ND
Pueblo to Fowler	Not shown (archaeo)	c-12		Archaeo	5PE.5873		ND
Pueblo to Fowler	F-1	c-13	Milepost 344.6	U.S. 50 bridge over the Rocky Ford Highline Canal (L-20-B)		1932	OE
Pueblo to Fowler	F-1	c-14	U.S. 50	Ranch		1900	FE
Pueblo to Fowler	F-1	c-15	U.S. 50	Farm		1900	FE
Pueblo to Fowler	F-1	c-16	U.S. 50	Farm		1900	FE
Pueblo to Fowler	F-1	c-17	U.S. 50	Farm		1900	FE
Fowler	F-2	d-1	610 W. Grant St.	Fowler Modern High School		1954, 1964	FE
Fowler	F-2	d-2	601 W. Grant Ave.	Early high school/ Assembly of God Church	5OT.864	1917	FE
Fowler	F-2	d-3	302 10th St.	Montoya residence		1905	FE
Fowler	F-2	d-4	212 10th St.	Nesbit residence		1900	FE
Fowler	F-2	d-5	304 10th St.	Butterfield residence		1900	FE
Fowler	F-2	d-6	312 10th St.	Roe residence		1910	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Fowler	F-2	d-7	308 10th St.	Fellhauer residence		1908	FE
Fowler	F-2	d-8	301 10th St.	Snodgrass residence		1904	FE
Fowler	F-2	d-9	401 W. Cranston Ave.	Sunset West Apartments		1934, 1946	FE
Fowler	F-2	d-10	312 9th St.	Vulgamore residence		1910	FE
Fowler	F-2	d-11	420 W. Santa Fe Ave.	Mora residence		1906	FE
Fowler	F-2	d-12	510 W. U.S. 50 (9th and Cranston Ave.)	Phat Willy's Diner		1930	FE
Fowler	F-2	d-13	324 W. Santa Fe Ave.	Maestas residence	5OT.911	1918	FE
Fowler	F-2	d-14	311 8th St.	Hobby residence		1900	FE
Fowler	F-2	d-15	208 8th St.	Wooters residence	5OT.904	1908	FE
Fowler	F-2	d-16	206 8th St.	Barela residence	5OT.906	1937, 1946	FE
Fowler	F-2	d-17	Cottonwood Lane and Railroad	Diven Packing Co. site		1910-1986	FE
Fowler	F-2	d-18	111 8th St.	Vulgamore residence	5OT.910	1901	FE
Fowler	F-2	d-19	109 8th St.	McCleary residence	5OT.908	1900	FE
Fowler	F-2	d-20	402 7th St.	Jensen residence		1904	FE
Fowler	F-2	d-21	208 7th St.	McKown residence		1903	FE
Fowler	F-2	d-22	202 7th St.	Griffy Family Funeral Home		1919	FE
Fowler	F-2	d-23	107 W. Florence	Fowler Christian Church		1912	FE
Fowler	F-2	d-24	310 Main St.	First Methodist Church		1920	FE
Fowler	F-2	d-25	308 Main St.	Bungalow-Rectory 1st Methodist Church		1920	FE
Fowler	F-2	d-26	210 Main St.	Valley Theater		1899	FE
Fowler	F-2	d-27	201 Main St.	Fowler State Bank		1908	FE
Fowler	F-2	d-28	112 E. Cranston Ave.	Fowler Tribune (newspaper)		1928	FE
Fowler	F-2	d-29	Between Main St. and 6th St., Park Ave. and Grant	Fowler City Park and water tower			FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Fowler	F-2	d-30	114 E. Cranston Ave.	Fire department, city hall and library		1925	FE
Fowler	F-2	d-31	101 Main St.	Corner Gas Station		1925	FE
Fowler	F-2	d-32	Railroad tracks and SH 167	Fowler Grain			FE
Fowler	F-2	d-33	34633 SH 167	Two-story foursquare house		1894	FE
Fowler	F-2	d-34	101 E. Santa Fe Ave.	Fowler Santa Fe depot	5OT.292	1913	OE
Fowler	F-2	d-35	34413 SH 167	Edwardian house		1900	FE
Fowler	F-2	d-36	34431 SH 167	Colonial Revival house		1910	FE
Fowler	F-2	d-37	Corner of Cranston and 6th St.	Automotive service center		1947	FE
Fowler	F-2	d-38	206 E. Cranston Ave. (U.S. 50)	Cross & Son's Auto Parts		1945	FE
Fowler	F-2	d-39	208 E. Santa Fe Ave.	Jensen's Processing Co.		1948	FE
Fowler	F-2	d-40	104 5th St.	Herring residence	5OT.945	1931	FE
Fowler	F-2	d-41	307 E. Cranston Ave.	Fowler Pool (WPA bath house)		1938, 1974	FE
Fowler	F-2	district	Florence between 2nd and 4th Sts.	Bungalow		1950s-1960s	FE
Fowler	F-2	d-42	U.S. 50	Fowler Cemetery			FE
Fowler to Manzanola	F-2	e-1	Milepost 354.4	U.S. 50 bridge over the Otero Canal (L-21-A)		1947	FE
Fowler to Manzanola	F-2	e-2	KK Road	Kuhn site (agricultural)		1900	FE
Manzanola	F-2	f-1	U.S. 50	Grouping of commercial buildings		1920s	FE
Manzanola	F-2	f-2	115 S. Railroad St.	Holland residence		1890	FE
Manzanola	F-2	f-3	402 W. 1st St.	D&D Starter Repair		1948	FE
Manzanola	F-2	f-4	319 W. 2nd St.	Lopez residence		1937	FE
Manzanola	F-2	f-5	109 Canal St.	Residence		1918	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Manzanola	F-2	f-6	Grand Ave. and 1st St.	Armory		1921	FE
Manzanola	F-2	f-7	121 Grand Ave. (and S. Railroad St. by Canal)	Abandoned commercial site		1920	FE
Manzanola	F-2	f-8	209 S. Park St.	1st Christian Church		1900	FE
Manzanola	F-2	f-9	114 Park St.	Clancy/ Megosa residence		1930	FE
Manzanola	F-2	f-10	101 1st St.	Commercial garage			FE
Manzanola	F-2	f-11	Canal and Washington (521 N. Canal)	Building with Greek Revival elements		1914	FE
Manzanola	F-2	f-12	212 N. Grand Ave.	Manzanola Santa Fe depot	5OT.421	1913	NR
Manzanola	F-2	f-13	Park and 1st Sts.	General Merchandise & Lumber			FE
Manzanola	F-2	f-14	113 N. Park St.	Beauty shop		1906	FE
Manzanola	F-2	f-15	CR 11.5	Manzanola High School and Library		1921	FE
Manzanola	F-2	f-16	131 N. Park	Railway Hotel/ Manzanola Nazarene Church		1910	FE
Manzanola	F-2	f-17	300 N. Park St.	Colorado Food and Plant Co.			FE
Manzanola	F-2	f-18	Railroad and North Park, between Manzanola Trade Co. and canal	Seed company site			FE
Manzanola	F-2	f-19	405 N. Park St.	Lopez residence		1905	FE
Manzanola	F-2	f-20	North Park and Railroad Sts. (east of Park St.)	Manzanola Trading Co.		1904, 1953,	FE
Manzanola	F-2	f-21	501 N. Park St.	Wilson residence		1890	FE
Manzanola	F-2	f-22	201 E. 1st St.	Vallejos residence			FE
Manzanola	F-2	f-23	204 Beaty Ave.	Bruno residence		1910	FE
Manzanola	F-2	f-24	SH 207	Miller site (ranch)		1915	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Manzanola	F-2	f-25	120 S. Railroad St.	Zamora residence		1904	FE
Manzanola	F-2	f-26	East of 11201	Motor Company and cabins			FE
Manzanola	F-2	f-27	Walnut and Railroad (east end of Manzanola)	Adobe migrant housing		1930	FE
Manzanola to Rocky Ford	F-2	g-1	Vroman	Building ruin		1905	FE
Manzanola to Rocky Ford	F-2	g-2	CR 15	Residence (abandoned)		1900	FE
Rocky Ford	F-2	h-1	CR 17.5	Barn		1900	FE
Rocky Ford	F-2	h-2	CR 17.5	Canal (structure)			FE
Rocky Ford	F-2	h-3	CR 17.5	Canal (structure)			FE
Rocky Ford	F-2	h-4	U.S. 50	House		1900	FE
Rocky Ford	F-2	h-5	18911 W. U.S. 50	Rusler Implement Co.		1939	FE
Rocky Ford	F-2	h-6	102 Elm Ave.	Gas station		1947	FE
Rocky Ford	F-2	h-7	1st and Elm Ave., next to Smith's Corner	Merlino's Corner		1946	FE
Rocky Ford	F-2	h-8	1st and Elm Ave.	Smith's Corner		1946	FE
Rocky Ford	F-2	h-9	2nd and Railroad Sts.	Rocky Ford growers			FE
Rocky Ford	F-2	h-10	214 Elm Ave.	Residence		1947	FE
Rocky Ford	F-2	h-11	Elm and 2nd St.	Welcome Center Park and obelisk			FE
Rocky Ford	F-2	district	Chestnut	Western Sugar Co. (American Sugar)		1900/ 1961/ 1992	FE
Rocky Ford	F-2	h-12	405 3rd St.	Dierks residence		1913	FE
Rocky Ford	F-2	h-13	404 3rd St.	Sanchez residence		1916	FE
Rocky Ford	F-2	h-14	410 3rd St.	Gomez residence		1920	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Rocky Ford	F-2	h-15	405 Elm Ave.	McKeefe residence		1944	FE
Rocky Ford	F-2	h-16	4th and Elm Ave.	Gary's Auto Sales & Services			FE
Rocky Ford	Not shown (archaeo)	h-17	402 N. 4th St.	Residence (archaeo)	5OT.960		ND
Rocky Ford	F-2	h-18	415 Elm Ave.	Montoya residence		1937	FE
Rocky Ford	F-2	h-19	5th St. and Railroad Ave.	Rounded roof warehouse			FE
Rocky Ford	F-2	h-20	208 5th St. (corner of Elm and 2nd)	Bender residence		1903	FE
Rocky Ford	F-2	h-21	503 Elm Ave.	Head residence		1920	FE
Rocky Ford	F-2	h-22	200 N. 6th St.	Sadler residence		1910	FE
Rocky Ford	F-2	h-23	204 N. 6th St.	Sadler residence		1910	FE
Rocky Ford	F-2	h-24	206 N. 6th St.	Sadler residence		1910	FE
Rocky Ford	F-2	h-25	303 S. 8th St.	Pickrel residence		1936	FE
Rocky Ford	F-2	h-26	510 N. 6th St.	Ruiz residence		1900	FE
Rocky Ford	F-2	h-27	708 Railroad Ave.	Hollar and Company Inc.		1925, 1948,	FE
Rocky Ford	F-2	h-28	521 N. 6th St.	Lathrum residence		1900	FE
Rocky Ford	F-2	h-29	702 Elm Ave.	Rocky Ford Cooperative Creamery	5OT.863	1914	FE
Rocky Ford	F-2	h-30	207 S. 8th St.	Sinding house	5OT.111	1898	FE
Rocky Ford	F-2	h-31	Milepost 355.2	U.S. 50 bridge over the Rocky Ford Canal (L-22-I)		1934	FE
Rocky Ford	F-2	h-32	8th St. and Elm Ave. (801 or 807)	Residence			FE
Rocky Ford	F-2	h-33	S. 8th and Railroad Sts.	Hollar and Company Inc.		1925	FE
Rocky Ford	F-2	h-34	305-307 N. 8th St.	Ustick Funeral Home		1900, 1934,	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Rocky Ford	F-2	h-35	201 and 203 N. 9th St.	Commercial duplex		1900	FE
Rocky Ford	F-2	h-36	800 Elm Ave.	Auto clinic		1928	FE
Rocky Ford	F-2	h-37	411 N. 8th St.	Williams residence		1906	FE
Rocky Ford	F-2	h-38	405 S. Main St.	Grand Theatre	5OT.577	1935	SR
Rocky Ford	F-2	h-39	501 N. 8th St.	Holt residence		1898	FE
Rocky Ford	F-2	h-40	503 N. 8th St.	J.H. Price house	5OT.112	1900	NR
Rocky Ford	F-2	h-41	101 N. 9th St.	Glazed tile building			FE
Rocky Ford	F-2	h-42	505 N. 8th St.	Residence		1898	FE
Rocky Ford	F-2	h-43	507 N. 8th St.	Clifford residence		1906	FE
Rocky Ford	F-2	h-44	307 N. 9th St. (phone book 301 N. 9th St.)	BPOE #1147		1913	FE
Rocky Ford	F-2	h-45	Railroad and Main	Rocky Ford Santa Fe depot		1906	OE
Rocky Ford	F-2	h-46	401 9th St.	Rocky Ford Post Office		1933-1941	NR
Rocky Ford	F-2	h-47	202 S. Main St.	Boys and Girls Club of the Lower Arkansas Valley		1892	FE
Rocky Ford	F-2	h-48	200 S. Main St.	I.O.O.F. Hall		1901-1902	FE
Rocky Ford	F-2	h-49	405 S. 10th St.	First Baptist Church		1900, 1916	NR
Rocky Ford	F-2	h-50	110 N. Main St.	First Prize Food Processing		1902-1957	FE
Rocky Ford	F-2	h-51	1005 Sycamore St.	Carnegie Public Library	5OT.193	1908	NR
Rocky Ford	F-2	h-52	10th St. and Railroad Ave.	RR Express building		1907	FE
Rocky Ford	F-2	h-53	501 N. Main St.	El Capitan Lounge	5OT.208	1894	FE
Rocky Ford	F-2	h-54	West corner of 10th St. and Elm Ave.	Heil Bean Inc.		Early 1900	FE
Rocky Ford	F-2	h-55	1011 Elm Ave.	Rocky Ford NAPA Auto Parts		1928	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Rocky Ford	F-2	h-56	501 N. 10th St.	Residence		1908	FE
Rocky Ford	F-2	h-57	206 N. 12th St.	Vigil residence		1900	FE
Rocky Ford	F-2	h-58	204 N. 12th St.	Steir residence		1898	FE
Rocky Ford	F-2	h-59	Railroad and 12th Sts.	Arkansas Valley Seeds		1920	FE
Rocky Ford	F-2	district	Bounded (generally) by Oak Ave. to the north, 8th St. to the west, 10th St. to the east, and Beech St. to the south	Arkansas Valley Fairgrounds	5OT.457	1880s-1901	NR
Rocky Ford	F-2	h-60	407 N. 12th St.	Valley Wide Health Services, migrant center		1900	FE
Rocky Ford	F-2	h-61	NE corner of 13th St. and (300 blk.) Elm Ave.	Porcelain tile industrial building		1950s-1960s	FE
Rocky Ford	F-2	h-62	1300 or 1310 Elm Ave. (Cappuccino Coffee)	Commercial building with false front		1940	FE
Rocky Ford	F-2	h-63	1315 Elm Ave.	EDCO Metal Works		1940	FE
Rocky Ford	F-2	h-64	1500 Elm Ave.	Curve Court motel and neon sign		1940S	FE
Rocky Ford	F-2	h-65	20443 CR EE.25	Residence		1900	FE
Rocky Ford	F-2	h-66	20475 U.S. 50	Griffin-Holder Co. house		1908	FE
Rocky Ford	F-2	h-67	2050 U.S. 50	Residence		1905	FE
Rocky Ford	F-2	h-68	CR 20.5 and CR EE.25	Residence		1910	FE
Rocky Ford to Swink	F-2	j-1	Milepost 373.6	U.S. 50 bridge over Timpas Creek (L-22-AL)		1958	FE
Swink	F-2	j-2	U.S. 50 at railroad tracks	Migrant worker housing		1930	FE
Swink	F-2	j-3	CR 24 and CR CC	Residence		1900	FE
Swink	F-2	j-4	CR 24 and U.S. 50	Mary's Fruit Stand		1950	FE
Swink	F-2	j-5	Milepost 374.1	U.S. 50 underpass, BNSF Railway separation (L-22-H)		1928	FE
Swink	F-2	j-6	U.S. 50 and railroad tracks	U.S. 50 pump house		1946	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Swink	F-2	j-7	323 Holly Ave.	Thompson residence		1934	FE
Swink	F-2	j-8	321 Holly Ave.	Andress residence		1906	FE
Swink	F-2	j-9	316 Columbia Ave.	Residence		1926	FE
Swink	F-2	j-10	302 Columbia Ave.	Post office		1947	FE
Swink	F-2	j-11	301 Columbia Ave.	Town hall		1910	FE
Swink	F-2	j-12	307 Columbia Ave.	Estrada-Martinez residence		1945	FE
Swink	F-2	j-13	309 Columbia Ave.	Boley residence		1950-1957	FE
Swink	F-2	j-14	Columbia Ave. and 4th St.	Water tower		N.D.	FE
Swink	F-2	j-15	6th St. and Powers Ave.	School and New Deal gym		1954	FE
Swink	F-2	j-16	East of town	Holly Sugar			FE
La Junta	F-2	k-1	Milepost 376.9	U.S. 50 bridge over the Crooked Arroyo (westbound) (M-22-A)		1947	FE
La Junta	F-2	k-2	Milepost 376.9	U.S. 50 bridge over the Crooked Arroyo (eastbound) (M-22-K)		1955	FE
La Junta	F-2	k-3	Bounded by U.S. 50 to the north, SH 10 and Dalton Ave. to the west, and Potter Dr. to the south and east	Fairview Cemetery			FE
La Junta	F-2	district	U.S. 50 and Grant Ave.	Dean Pickle Food Co. Plant		1930/ 1949	FE
La Junta	F-2	k-4	901 W. 3rd St.	Southeast Colorado Power Assn.			FE
La Junta	F-2	k-5	814 W. 3rd St.	Industrial building			FE
La Junta	F-2	k-6	716 W. 2nd St.	Carrillo residence		1896	FE
La Junta	F-2	k-7	714 W. 2nd St.	Duplex		1922	FE
La Junta	F-2	k-8	302 Maple Ave.	Mt. Zion Baptist Church		1919	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
La Junta	F-2	k-9	202 Lincoln Ave. 3rd and Maple (Tax Assessor)	Our Lady of Guadalupe Roman Catholic Church		1923, 1926,	FE
La Junta	F-2	k-10	502 W. 5th St.	Whitfield residence		1897	FE
La Junta	F-2	k-11	317 Lincoln Ave.	Rangel residence		1900	FE
La Junta	F-2	k-12	309 Lincoln Ave.	Rosales residence		1900	FE
La Junta	F-2	k-13	321 Lincoln Ave.	Trantham residence		1900	FE
La Junta	F-2	k-14	416 2nd St.	Ly 2-story apartment building		1900	FE
La Junta	F-2	k-15	403 W. 3rd St.	Star Drive-In Cleaners		1936	FE
La Junta	F-2	k-16	210 Carson Ave. (West side)	Norton apartment house		1900	FE
La Junta	F-2	k-17	122 Carson Ave. (West side)	Aragon residence	5OT.115	1906	FE
La Junta	F-2	k-18	324 Carson Ave.	Simpson residence		1900	FE
La Junta	F-2	k-19	314 4th St. W.	Jackson residence		1902	FE
La Junta	F-2	k-20	303 W. 1st St.	WWF Feed & Supply/Atchison, Topeka and Santa Fe freight depot		1880	FE
La Junta	F-2	k-21	318 Belleview Ave.	Cardenas residence		1900	FE
La Junta	F-2	k-22	217 Belleview Ave.	Dubois residence		1900	FE
La Junta	F-2	k-23	315 Belleview Ave.	Daves residence		1897	FE
La Junta	F-2	k-24	1st and Belleview	Power plant			FE
La Junta	F-2	k-25	401 Belleview Ave.	Carr residence		1897	FE
La Junta	F-2	k-26	214 W. 3rd St.	Adobe building		1898	FE
La Junta	F-2	k-27	213 W. 3rd St.	Ruby's Auto Body		1927/ 1950	FE
La Junta	F-2	k-28	221 W. 4th St.	Rosa residence		1904	FE
La Junta	F-2	k-29	306 San Juan Ave.	Colosimo residence		1900	FE
La Junta	F-2	k-30	421/427 San Juan Ave.	Hibbs apartment house		1910	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
La Junta	F-2	k-31	122 San Juan Ave.	Old auto body shop		1940-1958	FE
La Junta	F-2	k-32	121 W. 2nd St.	R&J's Auto Body		1910	FE
La Junta	F-2	k-33	117 W. 2nd St.	Ron's Sign Shop		1900	FE
La Junta	F-2	k-34	W 1st St.	Railroad office		1880-1910	FE
La Junta	F-2	k-35	4th and Colorado Ave.	La Junta post office	5OT.94	1916	NR
La Junta	F-2	k-36	1 W. 1st St.	Railroad office		1880-1910	FE
La Junta	F-2	k-37	123 Colorado Ave.	Kit Carson Lounge	5OT.468	1901	SR
La Junta	F-2	k-38	17 E. 3rd St.	Service station/retail store		1934	FE
La Junta	F-2	k-39	309 Raton Ave.	Gonzales residence		1928	FE
La Junta	F-2	k-40	311 Raton Ave.	Gonzales residence		1915	FE
La Junta	F-2	k-41	315 Raton Ave.	Johnston residence		1900	FE
La Junta	F-2	k-42	317 and 319 Raton Ave.	Fraley bungalow duplex		1905	FE
La Junta	F-2	k-43	321 Raton Ave.	Nesselhuf residence		1905	FE
La Junta	F-2	k-44	424 Raton Ave. (lots 1-5)	U-shaped community (multiple owners)		1936	FE
La Junta	F-2	k-45	111 E. 4th St.	Parker residence		1900	FE
La Junta	F-2	k-46	114 Cimarron Ave.	Sno White Linen and Uniform		1915	FE
La Junta	F-2	k-47	306 Cimarron Ave.	Collier residence		1900	FE
La Junta	F-2	k-48	312 Cimarron Ave.	Marquez residence		1904	FE
La Junta	F-2	k-49	313 Cimarron Ave.	Pan residence		1897	FE
La Junta	F-2	k-50	301 Cimarron Ave.	Lane residence		1918	FE
La Junta	F-2	k-51	221 Cimarron Ave.	Freidenberger residence		1894	FE
La Junta	F-2	k-52	213 Cimarron Ave.	Brindle residence		1888	FE
La Junta	F-2	k-53	1st and Smithland Ave.	La Junta Mill and Elevator Co.		1889, 1929	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
La Junta	F-2	k-54	402 Smithland Ave.	Rosales residence		1897	FE
La Junta	F-2	k-55	412 Smithland Ave.	Residence Housing Authority		1900	FE
La Junta	F-2	k-56	306 Smithland Ave.	Residence		1920-1923	FE
La Junta	F-2	k-57	418 Smithland Ave.	Apodaca-Martinez residence		1887	FE
La Junta	F-2	k-58	302 Smithland Ave.	Guerrero residence		1909, 1920	FE
La Junta	F-2	k-59	422 Smithland Ave.	Campbell-Maraleta residence		1920	FE
La Junta	F-2	k-60	205 Smithland Ave.	Victory Chapel		1950	FE
La Junta	F-2	k-61	301 3rd St. and Smithland Ave.	Car care center		1928	FE
La Junta	F-2	k-62	305 E. 2nd St.	Martinez residence		1898	FE
La Junta	F-2	k-63	308 E. 2nd St.	Rivera residence		1918	FE
La Junta	F-2	k-64	403 E. 3rd St.	Commercial and apartments		1903	FE
La Junta	F-2	k-65	222 Steen Ave.	2-story apartment house		1892	FE
La Junta	F-2	k-66	214 and 214 ½ Steen Ave.	Residence		1908-1928	FE
La Junta	F-2	k-67	411 E. 3rd St.	Storage business with false front		1936	FE
La Junta	F-2	k-68	205 Lewis Ave.	Residence		1898	FE
La Junta	F-2	k-69	201 Lewis Ave.	El Rincon		1918	FE
La Junta	F-2	k-70	211 Lewis Ave.	Residence		1900	FE
La Junta	F-2	k-71	607 E. 2nd St.	Bogie Farm Golf Shop (commercial/ residential)		1948	FE
La Junta	F-2	k-72	208 Harriet Ave.	Jimenez residence		1913	FE
La Junta	F-2	k-73	216 Harriet Ave.	Diaz residence		1929	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
La Junta	F-2	k-74	218 Harriet Ave.	Duran residence		1910	FE
La Junta	F-2	k-75	302 Harriet Ave.	Guerrero residence		1908	FE
La Junta	F-2	k-76	716 E. 2nd St.	Residence		1896	FE
La Junta	F-2	k-77	714 E. 2nd St.	Residence		1922	FE
La Junta	F-2	k-78	717 E. 2nd St.	Jack's Body Shop		1934	FE
La Junta	F-2	k-79	202 Bradish Ave.	Giltner residence		1946	FE
La Junta	F-2	k-80	121 Bradish Ave.	R & M Enterprise		1949	FE
La Junta	F-2	k-81	1021 E. 3rd St.	Water plant			FE
La Junta	F-2	k-82	1202 E. 3rd St.	The Old Volks Home		1947	FE
La Junta	F-2	k-83	East of SH 109	Otero Ditch tunnel			FE
La Junta	F-2	k-84	30245 U.S. 50	Winter Livestock Co. and feed lots		1960	FE
La Junta	F-2	k-85	Milepost 381.9	U.S. 50 bridge over the Otero Canal (M-23-J)		1957	FE
La Junta to Las Animas	F-2	l-1	Milepost 382.8	U.S. 50 bridge over the Thompson Arroyo (westbound) (M-23-A)		1931	FE
La Junta to Las Animas	F-2	l-2	Milepost 382.8	U.S. 50 bridge over the Thompson Arroyo (eastbound) (M-23-E)		1957	FE
La Junta to Las Animas	Not shown (archaeo)	l-3		Archaeo	5OT.2		ND
La Junta to Las Animas	Not shown (archaeo)	l-4		Archaeo	5OT.3		ND
La Junta to Las Animas	F-2	district	Milepost 387.0 on the north side of U.S. 50	Bent's Old Fort National Historic Site	5OT.149		OE
La Junta to Las Animas	Not shown (archaeo)	l-5	Sandhill site	Archaeo	5OT.141		FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
La Junta to Las Animas	Not shown (archaeo)	I-6	Prairie Dog site	Archaeo	5OT.534		FE
La Junta to Las Animas	Not shown (archaeo)	I-7		Archaeo	5OT.536		FE
Las Animas	F-3	m-1	U.S. 50	Old U.S. 50 segment		1950	FE
Las Animas	F-3	m-2	U.S. 50	Las Animas/ Bent County Fairgrounds			FE
Las Animas	F-3	m-3	1436 6th St.	Residence			FE
Las Animas	F-3	m-4	655 Cottonwood	Moore residence	5BN.511	1922	FE
Las Animas	F-3	m-5	1214 Ambassador Thompson Blvd.	Bent County High School and cottages	5BN.382	1913	OE
Las Animas	F-3	m-6	1215 6th St.	Residence			FE
Las Animas	F-3	m-7	511 Ambassador Thompson Blvd.	Jenkins Auto			FE
Las Animas	F-3	m-8	Ash Ave. and Ambassador Thompson Blvd.	St. Paul Lutheran Church			FE
Las Animas	F-3	m-9	944 6th St.	Residence			FE
Las Animas	F-3	m-10	939 6th St.	Samuelson residence		1900	FE
Las Animas	F-3	m-11	924 6th St.	Residence			FE
Las Animas	F-3	m-12	919 6th St.	Vandiver residence		1900	FE
Las Animas	F-3	m-13	628 Vine Ave.	Residence			FE
Las Animas	F-3	m-14	616 Vine Ave.	Residence			FE
Las Animas	F-3	m-15	904 6th St.	Residence			FE
Las Animas	F-3	m-16	802 Ambassador Thompson Blvd.	Residence			FE
Las Animas	F-3	m-17	828 6th St.	Rhodes residence		1908	FE
Las Animas	F-3	m-18	821 6th St.	Residence			FE
Las Animas	F-3	m-19	805 5th St.	Residence			FE
Las Animas	F-3	m-20	624 Maple Ave.	Residence			FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Las Animas	F-3	m-21	648 Maple Ave.	Residence			FE
Las Animas	F-3	m-22	634 Maple Ave.	Residence			FE
Las Animas	F-3	m-23	625 Maple Ave.	Abensham residence		1904	FE
Las Animas	F-3	m-24	629 Maple Ave.	Residence			FE
Las Animas	F-3	m-25	627 Maple Ave.	Residence			FE
Las Animas	F-3	m-26	660 Maple Ave.	Residence			FE
Las Animas	F-3	m-27	746 5th St.	Bingham Dean residence		1898	FE
Las Animas	F-3	m-28	704 5th St.	Residence			FE
Las Animas	F-3	m-29	505 Locust Ave.	Graham house	5BN.453	1900	SR
Las Animas	F-3	m-30	6th and Locust Ave.	Former Episcopal church (Victory Outreach)			FE
Las Animas	F-3	m-31	502 Locust Ave.	Las Animas Christian Church	5BN.449	1920	NR
Las Animas	F-3	m-32	546 5th St.	B.T. Clough residence		1900	FE
Las Animas	F-3	m-33	513 6th St.	Las Animas post office			NR
Las Animas	F-3	m-34	653 Elm Ave.	Residence			FE
Las Animas	F-3	m-35	638 Elm Ave.	St. Mary's Church complex		1950-1960	FE
Las Animas	F-3	m-36	801 Carson Ave.	Atchison, Topeka and Santa Fe freight depot	5BN.480	1900-1920s	FE
Las Animas	F-3	m-37	510 Carson Ave.	Weber Chevrolet Company	5BN.489	1926	FE
Las Animas	F-3	m-38	506 Carson Ave.	King Solomon Lodge	5BN.452	1909-1918	SR
Las Animas	F-3	district	6th St. odd and even sides	Las Animas downtown	5BN.544	1900s	OE
Las Animas	F-3	m-39	725 Carson Ave.	Bent County Courthouse and Jail	5BN.99	1886-1989	NR
Las Animas	F-3	m-40	SH 101	D-Arcangelis house		1915	FE
Las Animas	F-3	m-41	300 block of 3rd St. (3rd St. and Bent Ave.)	VFW Hall		1938-1939	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Las Animas	F-3	m-42	221 U.S. 50	Liquor store			FE
Las Animas	F-3	m-43	333 8th St. and Railroad	Las Animas Santa Fe depot	5BN.415	1908	SR
Las Animas	F-3	m-44	316 Bent Ave.	Commercial front	5BN.472		FE
Las Animas	F-3	m-45	104 Bent Ave.	Freedom Bail Bonds/gas station		1955	FE
Las Animas	F-3	m-46	560 Bent Ave.	I.O.O.F. Hall, Lodge No. 11	5BN.466	1889	FE
Las Animas	F-3	m-47	Corner of 3rd and U.S. 50	Auto dealership			FE
Las Animas	F-3	m-48	8th and Carson	Fort Lyon Canal Company building		1950	FE
Las Animas	F-3	m-49	Bet Vigil Ave. and Bent Ave. on 9th St.	Kit Carson Museum	5BN.475		FE
Las Animas to Lamar	F-3	n-1	U.S. 50	Barn		1905	FE
Las Animas to Lamar	F-3	n-2	U.S. 50	Farmstead		1920s	FE
Las Animas to Lamar	Not shown (archaeo)	n-3		Santa Fe Trail segment (archaeo)	5BN.391		FE
Las Animas to Lamar	F-3	n-4	U.S. 50	Residence		1900	FE
Las Animas to Lamar	F-3	n-5	Milepost 410.1	U.S. 50 bridge over the McCrae Arroyo (L-24-L)		1937	FE
Las Animas to Lamar	F-3	n-6	Town limits	Higley Gems			FE
Las Animas to Lamar	F-3	n-7	CR 24	Clave Farmstead		1900	FE
Las Animas to Lamar	F-3	n-8	101 Main St.	Hasty post office/ Mercantile	5BN.389	1900-1909	FE
Las Animas to Lamar	F-3	n-9	U.S. 50 and CR 26	Farmstead			FE
Las Animas to Lamar	F-3	n-10	Milepost 418.1	U.S. 50 bridge over a draw		1937	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
				(L-25-E)			
Las Animas to Lamar	F-3	n-11	U.S. 50	Barn		1900	FE
Las Animas to Lamar	F-3	n-12	Milepost 419.7	U.S. 50 bridge over Limestone Creek (L-25-N)		1937	FE
Las Animas to Lamar	F-3	n-13	U.S. 50	Farmstead			FE
Las Animas to Lamar	F-3	n-14	U.S. 50	Barn		1900	FE
Las Animas to Lamar	F-3	n-15	U.S. 50	Farmstead		1920	FE
Las Animas to Lamar	F-3	n-16	U.S. 50 and CR 33.5	Building		1890	FE
Lamar to Granada	F-4	o-1	Milepost 439.8	U.S. 50 bridge over the Willow Creek overflow (L-26-X)		1936	FE
Lamar to Granada	F-4	o-2	U.S. 50	Farmhouse		1900	FE
Lamar to Granada	F-4	o-3	CR 16	Roosevelt School		1923	FE
Lamar to Granada	Not shown (archaeo)	o-4		Carlton town site (archaeo)	5PW.47		ND
Granada	F-4	district	West Amache Road/CR FF and CR 23.5	Granada Relocation Center National Historic Landmark (a.k.a., Camp Amache) [water storage structure (archaeo)][d]	5PW.48 [5PW.103][d]	1942	NHL
Granada	F-4	p-1	Off U.S. 50	Residence		1905	FE
Granada	F-4	p-2	U.S. 50	Cabins		1925	FE
Granada	F-4	p-3	U.S. 50	Gas station		1940	FE
Granada	F-4	p-4	104 Main St.	Granada Masonic Lodge		1889	FE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Granada	F-4	p-5	106 Goff Ave. (U.S. 50)	McMillan Barbershop		1930	FE
Granada	Not shown (archaeo)	p-6		Old Granada Site (archaeo)	5PW.49		ND
Granada	F-4	p-7	U.S. 50 east of town	Southeastern Colorado Cooperative			FE
Granada	F-4	p-8		X-Y Ranch Headquarters			FE
Granada to Holly	F-4	q-1	U.S. 50	Residence		1910	FE
Granada to Holly	F-4	q-2	Milepost 455.6	U.S. 50 bridge over Granada Creek (L-27-M)		1933	FE
Granada to Holly	F-4	q-3	Milepost 456.0	U.S. 50 overpass, BNSF Railway separation (L-28-C)		1933	FE
Granada to Holly	F-4	q-4	U.S. 50	Gateway Downs (horseracing track, not in use)			FE
Holly	F-4	r-1	CR 34	Residence		1905	FE
Holly	F-4	r-2	107-109 N. 5th St.	Entz residence		1926	FE
Holly	F-4	r-3	105 N. 5th St.	Holly Christian Church			FE
Holly	F-4	r-4	205 5th St.	I.O.O.F. Hall		1949	FE
Holly	F-4	r-5	411 W. Colorado	Holly United Methodist Church		1929	FE
Holly	F-4	r-6	504 W. Buffalo St.	Sitts residence		1910	FE
Holly	F-4	r-7	201 N. Main St.	Shanner Elementary		1920-1922	FE
Holly	F-4	r-8	508 W. Buffalo St.	Golden residence		1948	FE
Holly	F-4	r-9	302 S. Main St.	Holly Santa Fe depot	5PW.73	1912	NR
Holly	F-4	r-10	South of the intersection of Vinson St. and Main St.	Holly Barn			OE

Property Location	Figure Location[a]	Figure Site Number[b]	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[c]
Holly	F-4	r-11	115 S. Main St. (west side)	Holly Theatre		1908	FE
Holly	F-4	r-12	Across from 201 N. Main St.	Holly Gymnasium		1937	NR
Holly	F-4	r-13	130 S. Main St. (eastside)	L-M Healthmart & Variety		1900	FE
Holly	F-4	r-14	Santa Fe (2nd building east of Main St.)	Leiker Mercantile		Early 1900	FE
Holly	F-4	r-15	119 E. Cheyenne Ave.	Holly City Hall and Library	5PW.175	1938	NR
Holly	F-4	r-16	105 S. 2nd St.	Harrington residence		1918	FE
Holly	F-4	r-17		Grain complex		1910	FE
Holly	F-4	r-18	109 S. 1st St.	Residence			FE
Holly	F-4	r-19		Horse ranch complex		1900	FE
Holly	F-4	r-20	SH 89 and railroad	Southeast Colorado Cooperative		1950-1951	FE
Holly	F-4	r-21	U.S. 50	Willett's house		1950	FE
Holly Transition	F-4	s-1	Near milepost 467	Hadley rest area		1960	FE
Holly Transition	Not shown (archaeo)	s-2		Trail City town site (archaeo)	5PW.53		ND

[a]Figure in Appendix F where the location of the historic resource is presented – the location of archaeological resources have not been shown on these maps to protect these resources
[b]Site number of the resource on the figures presented in Appendix F
[c]National Register eligibility: NHL=National Historic Landmark, NR=National Register, SR=State Register, OE=Officially Determined Eligible, FE=Field Eligible, ND=Needs Data, and Natl. Trail=Nationally Recognized Trail
[d]Contributing element to the resource listed

Table E-2. Linear Resources by Location

Resource Location (County)	Figure Location[a]	Resource Name	Smithsonian Number	Canal Decree	National Register Eligibility[b]
Pueblo	F-1	Excelsior Ditch		12/31/1861	FE
Pueblo and Otero	F-1, F-2	Rocky Ford Highline Canal		1/06/1890	FE
Pueblo and Otero	F-1	Oxford Farmers Ditch		Pre-1884	FE
Otero	F-2	Otero Canal		3/03/1890	FE
Otero	F-2	Catlin Canal	5OT120, 5OT120.1	12/03/1884, 4/10/1875	FE
Otero	F-2	Main Leach Canal		NA	FE
Otero	F-2	Rocky Ford Canal		5/15/1874	FE
Bent	F-3	Jones Ditch		Ca. 1896	FE
Bent	F-3	Consolidated Ditch		Ca. 1884	FE
Bent	F-3	Las Animas Town Ditch		3/07/1884	FE
Otero, Bent and Prowers	F-2, F-3, F-4	Fort Lyon Canal		4/15/1884	FE
Bent	F-3	McClave Ditch		Ca. 1884	Cont.
Bent	F-3	Sunflower Ditch		Ca. 1884	Cont.
Bent and Prowers	F-4	Riverview Ditch		Ca. 1884	Cont.
Bent	F-3	Lubers Drainage Ditch		NA	FE
Bent	F-3	Miller's Ditch [ditch feature][c]		NA	FE
Bent	F-3	Arkansas River Levee at Las Animas		NA	FE
Bent and Prowers	F-4	Amity Canal		2/21/1887	FE
Prowers	F-4	Vista Del Rio Ditch		Ca. 1884	FE
Prowers	F-4	Lamar Canal		11/30/1875	FE
Prowers	F-4	Manvel Canal		10/14/1890	FE
Prowers	F-4	X-Y Canal		7/22/1889	FE
Prowers	F-4	Granada Ditch		7/22/1889	Cont.
Prowers	F-4	Buffalo Canal		1/29/1885	FE
Prowers	F-4	Holly Ditch		Ca. 1885	Cont.
Otero, Bent and Prowers	F-2, F-3, F-4	Santa Fe National Historic Trail [trail segment][c]	5BN.391 (segment)		Natl. Trail

Resource Location (County)	Figure Location[a]	Resource Name	Smithsonian Number	Canal Decree	National Register Eligibility[b]
Pueblo, Otero, Bent and Prowers	All Figures	Atchison, Topeka and Santa Fe railroad (currently BNSF Railway) [trestle, trestle, other railroad resource][c]	5PW152, 5PW152.1, 5PW152.2, 5PW152.3 (ONE), 5PW152.4		OE

Ca.=Circa
[a]Figure in Appendix F where the location of the property is presented
[b]National Register eligibility: NHL=National Historic Landmark, NR=National Register, SR=State Register, OE=officially determined eligible, FE=field eligible, ND=needs data, Cont.=contributing archaeological resource, and Natl. Trail=Nationally Recognized Trail. Some canals were found to be officially not eligible as archaeological sites during the mid-20th century. However, these properties should be reevaluated as historic built environment resources during Tier 2 studies.
[c]Contributing element to the resource listed

Appendix F. Figures (F-1 through F-4)

The following maps show direct effects (i.e., impacts) to historic and linear resources by county. Archaeological resources are not shown on the maps to protect their locations.

- Figure F-1. Historic Resources—Pueblo County
- Figure F-2. Historic Resources—Otero County
- Figure F-3. Historic Resources—Bent County
- Figure F-4. Historic Resources— Prowers County

This page left intentionally blank.

Figure F-1. Historic Resources—Pueblo County

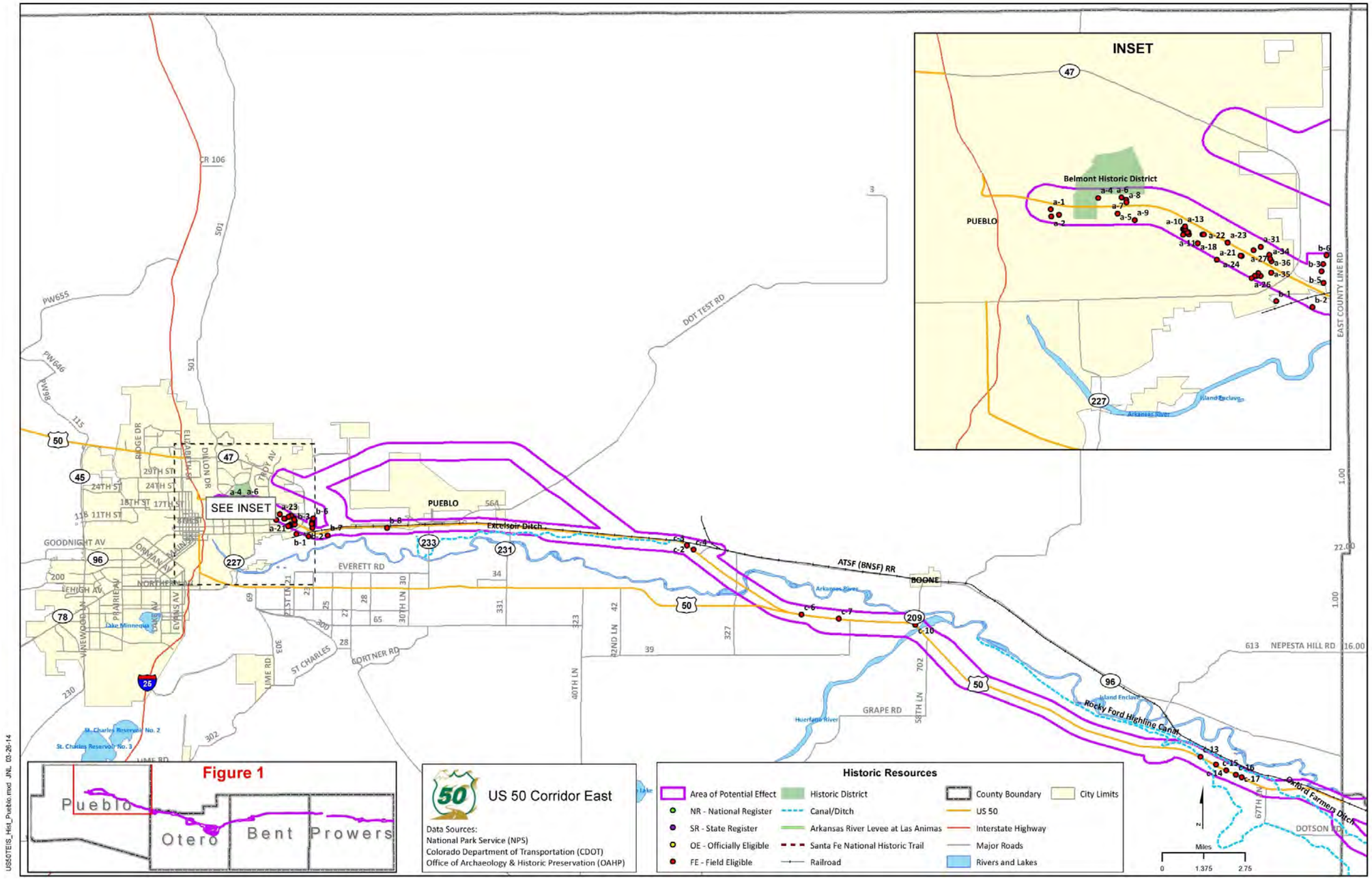


Figure F-2. Historic Resources—Otero County

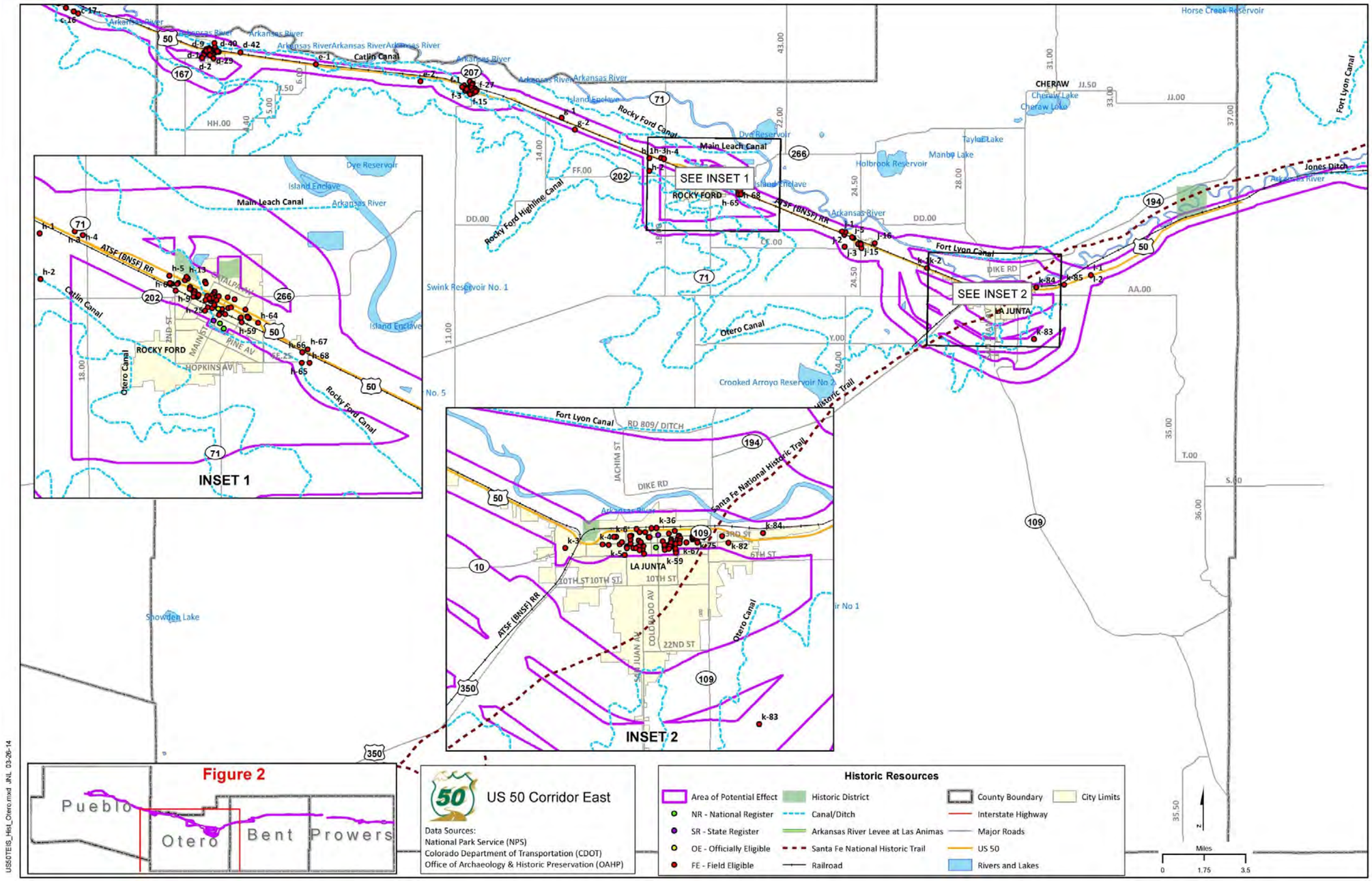


Figure F-3. Historic Resources—Bent County

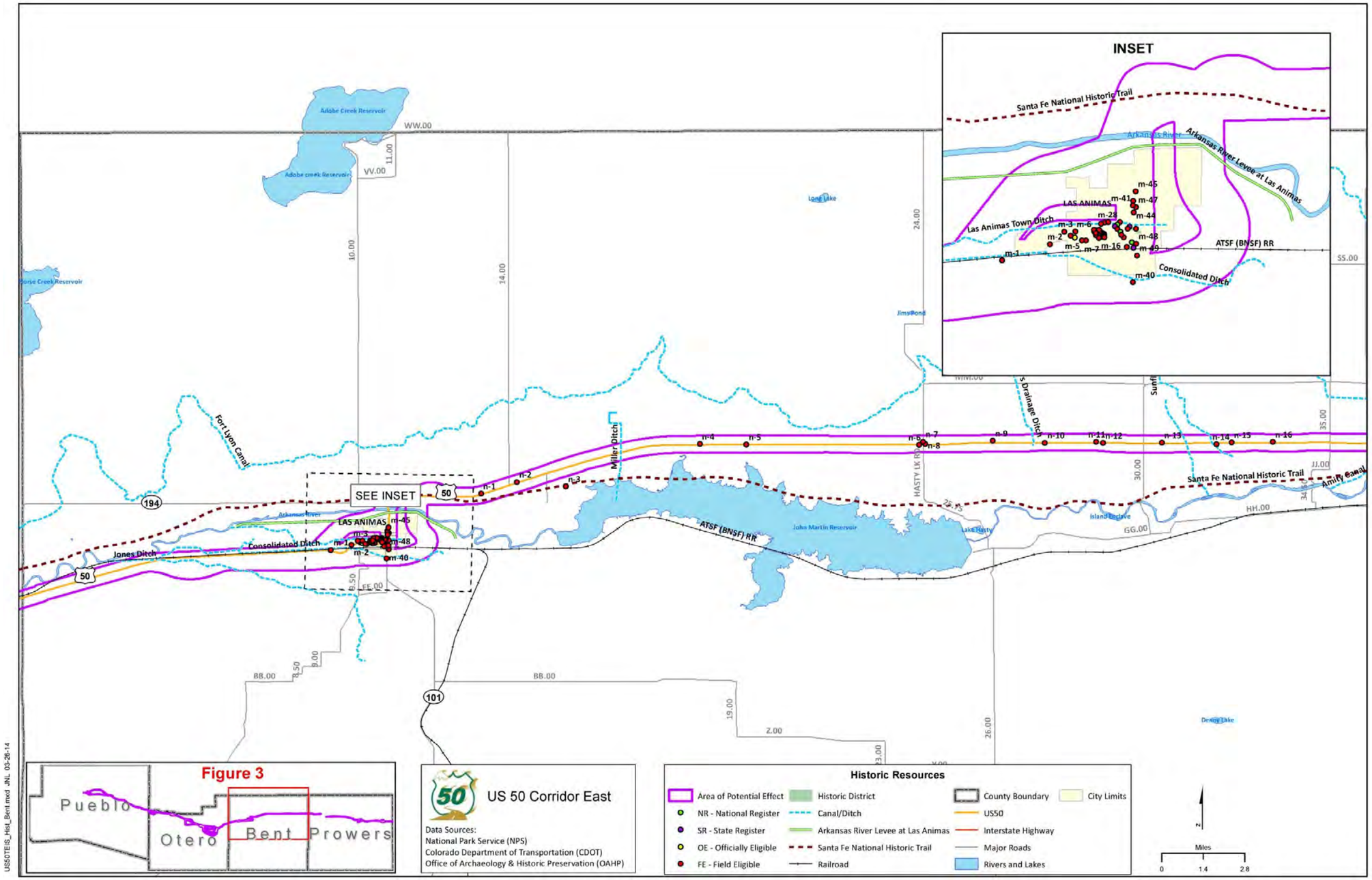
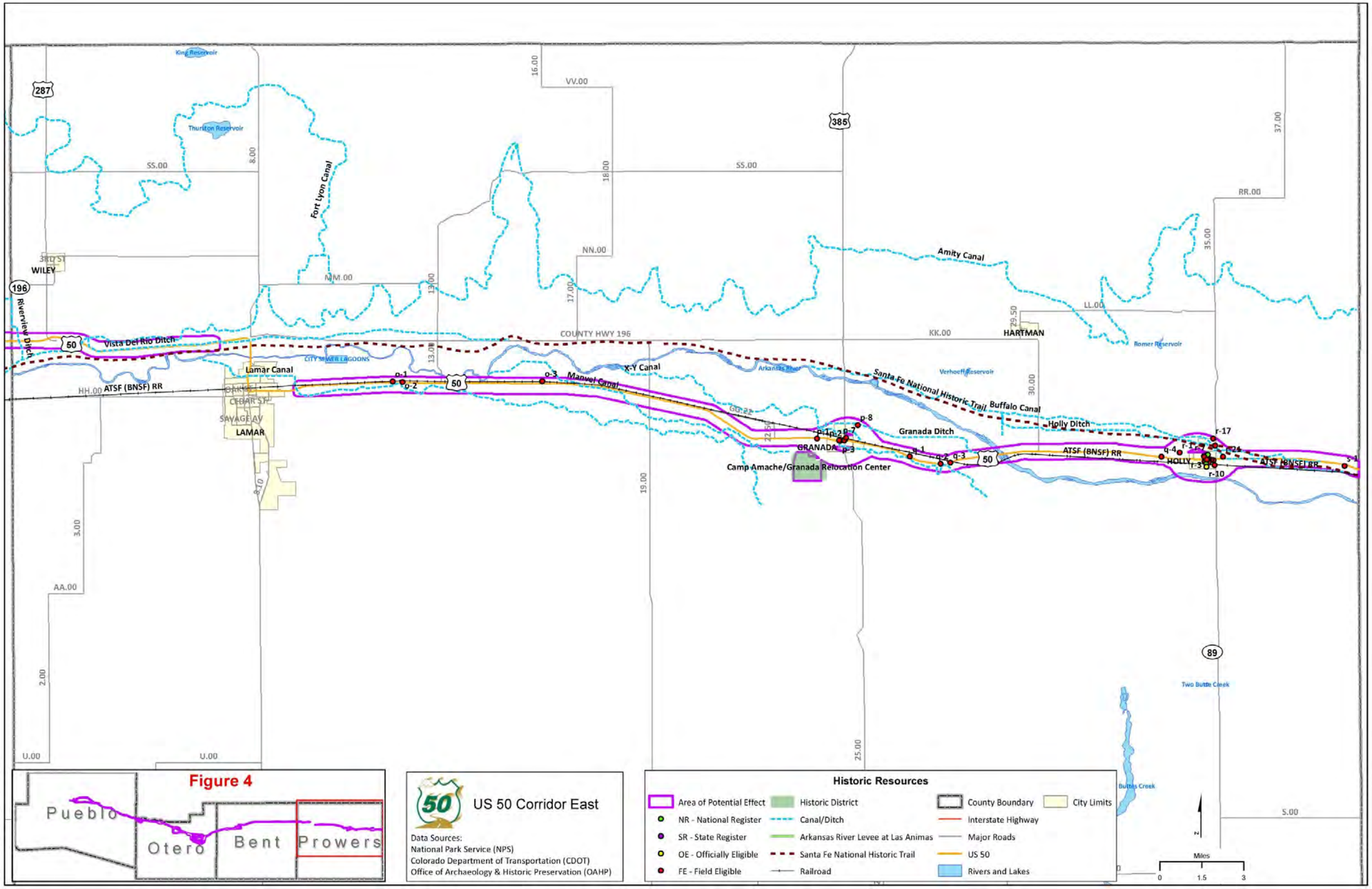


Figure F-4. Historic Resources—Prowers County



U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Land Use and Social Considerations Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... 1
2. Resource Definition ... 2
3. Applicable Laws, Regulations, and Guidance ... 4
3.1. FHWA Technical Advisory T6640.8A ... 4
3.2. Areas and Activities of State Interest Act of 1974 ... 4
4. Methodology ... 5
4.1. Data Collection and Analysis Methodology ... 5
4.2. Project Area ... 9
4.3. Effects ... 9
4.4. Mitigation Options ... 10
4.5. Deliverables ... 10
5. Existing Conditions ... 11
5.1. Compatibility with Planning Documents ... 12
5.2. Compatibility with Future Development Areas ... 14
5.3. Conservation Easements ... 15
5.4. Public Lands ... 15
5.5. Floodplains ... 17
5.6. Potential for Property Acquisition ... 17
5.7. Residents' Ability to Travel within Each Community ... 17
5.8. Residents' Ability to Access Important Community Facilities and Services ... 17
6. Effects ... 19
6.1. No-Build Alternative ... 19
6.2. Build Alternatives ... 19
7. Mitigation Strategies ... 35
8. References ... 36
Appendices ... 43
Appendix A. Resource Methodology Overviews for Land Use and Social Considerations ... 45
Appendix B. Abbreviations and Acronyms ... 49
Appendix C. Important Community Facilities and Services ... 51

Tables

Table 2-1. Terminology Used in the Land Use and Social Considerations Technical Memorandum 3
Table 5-1. Population Change 11
Table 5-2. Conservation Easements in the Project Area 15
Table 5-3. Public Lands in the Project Area by Manager and County 16
Table 5-4. Summary of Important Community Facilities and Services 18
Table 6-1. Comparison of Acres to be Converted to a Transportation Use in Section 1 22
Table 6-2. Comparison of Acres to be Converted to a Transportation Use in Section 2 23
Table 6-3. Comparison of Acres to be Converted to a Transportation Use in Section 3 24
Table 6-4. Comparison of Acres to be Converted to a Transportation Use in Section 5 25
Table 6-5. Comparison of Acres to be Converted to a Transportation Use in Section 9 27
Table 6-6. Comparison of Acres to be Converted to a Transportation Use in Section 10 28
Table 6-7. Comparison of Acres to be Converted to a Transportation Use in Section 12 30
Table 6-8. Comparison of Acres to be Converted to a Transportation Use in Section 15 32
Table 6-9. Comparison of Acres to be Converted to a Transportation Use in Section 17 33

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 4-1. Land Use Classifications (Zoning) in Las Animas 8
Figure 4-2. Tier 1 vs. Tier 2 Decision 10
Figure 6-1. Build Alternatives Overview 20
Figure 6-2. Planned (Future) Route for U.S. 50 as Envisioned in the 2040 Long-Range Transportation Plan for the Pueblo Region 21
Figure 6-3. City-Planned (Future) Route for U.S. 50 in La Junta 28
Figure 6-4. County-Planned (Future) Trails in Granada 32
Figure 6-5. County-Planned (Future) Trails in Holly 34

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Land use considerations for the U.S. 50 Tier 1 EIS were defined as:

- Compatibility with planning documents and future development areas
- Effects to conservation easements, public lands, and floodplains
- Potential for property acquisition

Social considerations for the U.S. 50 Tier 1 EIS were defined as residents' ability to:

- Travel within their community
- Access important community facilities and services, including emergency services, medical facilities, government facilities, public schools, airports, and public recreational facilities

Definitions of terminology used in this technical memorandum are presented in Table 2-1.

Table 2-1. Terminology Used in the Land Use and Social Considerations Technical Memorandum

Term	Definition
Airport	Includes only public airports, not private facilities.
Conservation easement	A "restriction placed on a piece of property to protect its associated resources" (Nature Conservancy 2007, p 1).
Emergency services	Includes police, fire, and ambulance services.
Floodplain	The low areas adjacent to a water resource, such as a river or creek. The purpose of a floodplain is to contain floodwater during a storm event. The floodplain is the area that will be under water during such an event. This analysis used 100-year floodplains, which include all areas that would be under water during a flood event that has a one percent chance of occurring in any given year.
Future development area	Areas where communities expect future development (i.e., growth) to occur.
Government facility	Includes city, town, and county administration offices, post offices, public libraries, community centers, and senior citizens centers.
Important community facilities and services	Includes emergency services, medical facilities, government facilities, public schools, airports, and public recreational facilities.
Medical facilities	Includes hospitals and clinics only (not smaller facilities, such as doctor's offices or pharmacies).
Planning documents	Documents adopted by communities to manage how redevelopment and new growth occurs within their borders. They generally include information about land use, transportation systems, and other topics.
Project communities	The nine project municipalities of Pueblo, Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly, as well as Pueblo, Otero, Bent, and Prowers counties.
Project counties	Pueblo, Otero, Bent, and Prowers counties.
Project municipalities	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.
Public land	Land owned by the federal government or the state of Colorado.
Public school	Includes public elementary and secondary schools only (i.e., facilities offering kindergarten through 12th grade).
Recreational facility	Local recreational facilities that are open to the public, including fairgrounds; golf courses; parks and recreational facilities operated by city, town, or county government entities; and parks or recreation areas associated with school districts. Regional sites, such as state wildlife areas, state parks, and state birding trails, are not included.
Transportation use	Land used for a highway (in this case, for U.S. 50).

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 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 land use and social considerations. They are described in more detail below.

- FHWA Technical Advisory T6640.8A
- Areas and Activities of State Interest Act of 1974

3.1. FHWA Technical Advisory T6640.8A

The purpose of this FHWA technical advisory is to "... provide guidance to FHWA field offices and to project applicants on the preparation and processing of environmental ... documents" (FHWA 1987, p 1). The advisory states that an environmental impact statement "... should identify the current development trends and the State and/or local government plans and policies on land use and growth in the area which will be impacted by the proposed project" (FHWA 1987, Section V, G, 2). The advisory also notes that "... the land use discussion should assess the consistency of the alternatives with the comprehensive development plans adopted for the area" (FHWA 1987, Section V, G, 2).

3.2. Areas and Activities of State Interest Act of 1974

This portion of the Colorado Revised Statutes (CRS) outlines the means by which planning activities are designated and administered by state and local governments in Colorado.

4. Methodology

The U.S. 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 U.S. 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 overviews for land use and social considerations are 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. Data Collection and Analysis Methodology

This section details the data collection and analysis methodologies used to conduct this review of land use and social considerations for the U.S. 50 Tier 1 EIS.

4.1.1. Land Use Considerations

Land use considerations for the U.S. 50 Tier 1 EIS include compatibility with planning documents and future development areas; effects to conservation easements, public lands, and floodplains; and potential for property acquisition. The methodologies used to obtain data about and evaluate these considerations are discussed in more detail below.

Compatibility with Planning Documents

Planning documents (adopted by the project communities) are evaluated to determine whether the Build Alternatives would be compatible or incompatible with those plans. All of the plans except Fowler's were obtained between June and August 2006. All 13 communities were contacted during this effort; however, not every community had adopted such documents. Fowler's plan was obtained at a later date since the town did not adopt its comprehensive land use plan until March 2009. CDOT participated in the effort to develop this plan by providing town officials with data and information about resources located in and around Fowler.

Additionally, Colorado communities can request technical assistance from the state to help them with their land use and economic development planning activities. Assistance with land use planning activities is provided by the Colorado Department of Local Affairs, and assistance with economic development activities is provided by the Colorado Office of Economic Development and International Trade (OEDIT). In June 2006, representatives of these agencies were contacted to determine if the agencies had provided technical assistance to any of the project communities and to obtain summaries of any sessions that had taken place. The purpose of this effort was to better understand the status of land use planning in each community and to ensure that this analysis incorporates these planning efforts.

Compatibility with Future Development Areas

Future development areas in and surrounding project municipalities are evaluated to determine whether the Build Alternatives would be compatible or incompatible with this expected development. Future development areas in the communities east of Pueblo were identified by residents during community workshops organized and facilitated by the project in August 2006. Workshops were held in eight of the project municipalities, including Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. (A workshop scheduled for the city of Pueblo was cancelled on the day of the meeting due to lack of public attendance.) At these workshops, project team members with expertise facilitating land use planning meetings asked community participants where their communities expect future growth to occur. Future development areas in Pueblo were identified using the most recent version of the city and county (combined) comprehensive plan.

Conservation Easements

This analysis identified existing conservation easements in the project area because it is likely that these lands will have legal barriers associated with developing or acquiring them for transportation purposes. Between April and August 2006, the following organizations were contacted and asked to identify known conservation easements in the project area. They were chosen because of their involvement in land conservation activities in the state of Colorado or because they are the repository for recording such easements (i.e., county clerks' offices):

- American Farmland Trust
- Arkansas Valley Preservation Land Trust
- Bent County Clerk's Office
- Colorado Cattlemen's Agricultural Land Trust
- Colorado Coalition of Land Trusts
- Colorado Conservation Trust
- Colorado Open Lands
- Lower Arkansas Valley Water Conservancy District
- Otero County Clerk's Office
- Otero County Land Trust
- Palmer Land Trust
- Pueblo County Clerk's Office
- Prowers County Clerk's Office
- Southern Plains Land Trust

- Southern Rockies Ecosystem Project
- The Greenlands Reserve
- The Nature Conservancy (TNC)
- Trust for Public Land

A map or general description of the project area was provided to each organization during these consultations. The conservation easements identified by this effort were located using a geographic information system application. The best location information available was used to determine the boundaries of the identified easements.

Public Lands

Public land in the project area is identified primarily using geographic information system data obtained from CDOT. These data include public land holdings as of December 31, 2004. Due to the slow rates of growth and development experienced by southeastern Colorado in recent decades, this information was assumed to be adequate for this Tier 1 broad scale evaluation. Additional data and information were obtained through consultations with staff at the Colorado Parks and Wildlife about existing state wildlife areas in the project area.

Floodplains

U.S. 50 follows a route generally parallel to the Arkansas River from Pueblo to the Kansas-Colorado state line. Along this route, U.S. 50 crosses the river, and its associated floodplain, several times. As a result, this analysis includes an evaluation of how the Build Alternatives could affect the Arkansas River floodplain. Floodplains associated with other major rivers, streams, or creeks in the project area also are considered. The most recent Federal Emergency Management Agency flood insurance rate maps were obtained for specific portions of the project area where the floodplain could influence the location of alternatives recommended by the U.S. 50 Tier 1 EIS. These areas are primarily in and adjacent to the project municipalities. The flood insurance rate maps evaluated date from 1977 to 1989.

Potential for Property Acquisition

Potential for the Build Alternatives to result in property acquisition was evaluated based on whether the alternative would require new lanes or improvements that could require additional property (i.e., shoulders, turn lanes, etc.) in each location.

4.1.2. Social Considerations

Social considerations for the U.S. 50 Tier 1 EIS are defined as the ability of residents to travel within their community and access important community facilities and services. The methodologies used to obtain data about and evaluate these considerations are discussed in more detail below.

Ability to Travel within Each Community

The ability of residents to travel within their community is evaluated based on the *barrier effect* caused by the highway. U.S. 50 is the primary east-west route into, out of, and through the project municipalities. Although traffic levels on the highway are relatively low, U.S. 50 sometimes creates a barrier for residents traveling within town. An example of this effect occurs in Fowler where the highway lies between the public swimming pool and the town's residential area. During the summer months when the pool is open, residents must cross the highway to get to it. This is done primarily on foot due to the relatively small size of the town and the limited amount of parking near the pool facility. This creates a safety issue for Fowler residents who have to cross the highway on foot to access the pool, which is one of only four public recreation areas in town.

To evaluate how the Build Alternatives could alter the highway's existing barrier effect, planning documents were acquired and reviewed. These documents show what land in each community is zoned for residential, commercial, industrial, or other uses. Figure 4-1 shows the classifications used in Las Animas and the locations covered by each classification. This information was used to evaluate whether the Build Alternatives would decrease, increase, or cause no change in the highway's barrier effect in each community. For example, if the alternative moves the highway to a location between residential and commercial uses, then it would be considered an increase in the barrier effect of the highway. This is because it would make it more difficult for residents to move between these uses.

Access to Important Community Facilities

A vital function of any community is to provide for the needs of its residents. Therefore, facilities and services that fill those needs are important to a community. The operation of these facilities and services must be maintained, and residents must have access to them. The facilities and services considered by this analysis are listed below.

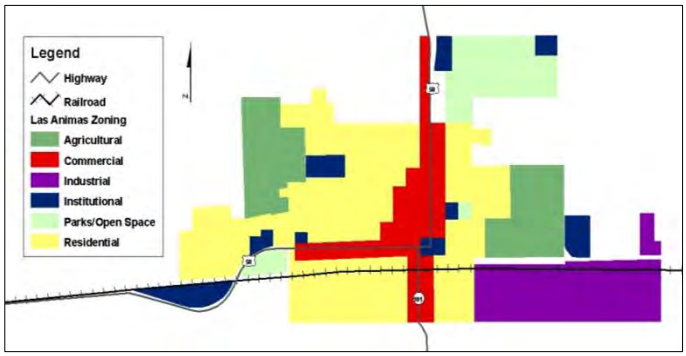


Figure 4-1. Land Use Classifications (Zoning) in Las Animas

- Emergency services—fire, police, and ambulance services
- Medical facilities—hospitals and clinics
- Government facilities—places where town meetings are held or government services are provided
- Public schools—public elementary and secondary schools
- Public airports
- Public recreational facilities—local parks, ball fields, and similar facilities open to the public

Some important community facilities and services were identified based on comments heard by local residents at workshops organized and facilitated by the U.S. 50 Tier 1 EIS project in 2006. At these workshops, residents were asked to list their community's assets (i.e., important locations, buildings, or other features within their community).

Emergency services agencies were identified to consider how the Build Alternatives might affect their ability to serve their jurisdictions. The majority of the agencies were identified using a State of Colorado Emergency Resource Inventory Report from 2006, supplemented by a publicly available online directory service. Information for Swink, Rocky Ford, and Granada was further supplemented through interviews with personnel from those municipalities conducted in May 2007.

Major medical facilities, including hospitals and clinics, were identified to assess how the Build Alternatives might affect client access to them. Major medical facilities are included because they are not likely to close or move in the future (unlike a doctor's office or pharmacy that may be more susceptible to changing demand and could more easily change locations). Licensure databases maintained by the Colorado Department of Public Health and Environment were searched for these facility types to identify facilities operating as of 2006.

For this analysis, government facilities include city, town, and county administration offices, post offices, public libraries, community centers, and senior citizens centers operating as of 2007. These facilities were identified to determine how the Build Alternatives may affect citizens' ability to access them. Information about the county offices was found on the Colorado Counties, Inc. website. The post offices were located using the U.S. Postal Service branch locator website. Public libraries were located using the PublicLibraries.com website. Community and senior citizens centers were identified using a publicly available online directory service.

Public schools in the project municipalities were identified to determine how the Build Alternatives might affect student access to them. These schools were identified using the U.S. Department of Education's National Center for Education Statistics database. At the time the database was accessed, it included all schools operating during the 2003-2004 school year. Because the project communities have not grown significantly in population over the past decade (2000 Census, 2010 Census), it was assumed that the same schools identified during this effort would still be operating.

Public airports in or near the project municipalities were identified using geographic information system data obtained from CDOT that included all airports operational as of December 2004. These facilities were identified to determine how the Build Alternatives might affect access to them by potential users.

Public recreational facilities within the project municipalities were identified for all project municipalities, except the city of Pueblo, in the Section 4(f) resources evaluation data collection effort. Facilities in Pueblo were identified using geographic information system data from the previous U.S. 50 planning study (CDOT 2003). This analysis focused on local facilities—not regional facilities such as state wildlife areas or state parks—for two primary reasons: (1) the regional recreational facilities in southeastern Colorado are generally public lands, so they are included in the discussion of public lands in the land use section above; and (2) this analysis of social considerations is intended to evaluate existing conditions in, and effects to, local communities. The Colorado Department of Natural Resources 2008 Statewide Comprehensive Outdoor Recreation Plan notes that "[m]ore than 45 percent of respondents travel fewer than four miles from home to recreate during the week (Monday through Thursday), and two-thirds stay within 10 miles of home" (DNR 2008, executive summary: p 6). For this reason, effects to local recreational facilities (that are open to the public) were considered by this analysis while effects to regional public facilities were not.

4.2. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to the Colorado-Kansas state line (see 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.3. Effects

Effects to land use and social considerations by the Build Alternatives are evaluated based on each consideration, as indicated below.

4.3.1. Land Use Considerations

Effects to land use considerations are detailed below by consideration.

Compatibility with Planning Documents

Planning documents were reviewed to determine whether the Build Alternatives would be compatible with them. For comprehensive (land use) plans and Pueblo's long-range transportation plan, this review focused on whether the Build Alternatives and the plans recommended the same future route for U.S. 50. If they did, then the Build Alternatives were considered to be compatible. In the case of the Prowers County trails plan, the review focused on how the Build Alternatives could affect the future use of the planned trails. Any trails that intersect with the Build Alternatives were considered to be affected. Zoning ordinances, which regulate land use within a community, were used to determine how land use could change due to the Build Alternatives. For example, building a new around-town route in an area currently zoned for agricultural use would change that use from agricultural to transportation (i.e., for the highway). This would make the Build Alternatives incompatible with that planning document. Compatibility with state assistance efforts is determined based on whether the Build Alternatives would enable recommendations resulting from those efforts to be implemented.

Compatibility with Future Development Areas

Whether the Build Alternatives would be compatible with future development areas is measured by how they could affect those areas. If the effects would likely be positive or neutral, then the Build Alternatives are considered to be compatible. If they would likely be negative, then the Build Alternatives are considered to be incompatible with that future growth. The following guidelines are used to determine this compatibility.

- Residential areas generally value quiet surroundings, and roadways are not considered a quiet use. Therefore, if the Build Alternatives would move U.S. 50 closer to potential residential growth areas, then they were considered to be incompatible with that growth. Conversely, if the Build Alternatives would move U.S. 50 farther away from these areas, then they were considered to be compatible with the growth.

- Some recreational areas, such as parks and golf courses, also generally value quiet surroundings. So the compatibility would be the same as with residential growth areas.
- Commercial or industrial areas generally value good connections to regional, statewide, and interstate transportation facilities. These connections facilitate delivery of raw materials into these areas and delivery of finished products out to regional markets and beyond. For the communities east of Pueblo, U.S. 50 is their primary connection to major transportation facilities outside the Lower Arkansas Valley. The farther away the highway is located from commercial and industrial areas, the weaker their connection to needed transportation systems is. If the Build Alternatives would move U.S. 50 farther from future commercial or industrial development areas, they are considered incompatible with that growth. In contrast, it is considered compatible if they would move the highway closer to these growth areas.

Conservation Easements and Public Lands

Conservation easements and public lands are considered to be potentially affected if any portion of the property is located within the Build Alternatives. This analysis identifies all conservation easements and public lands within the Build Alternatives. However, the purpose of the U.S. 50 Tier 1 EIS is to determine the location of a 1,000-foot-wide Build Alternative within which a 250-foot-wide (maximum) roadway footprint would be identified during Tier 2 studies (see Figure 4-2). Because the location of U.S. 50 within the Build Alternatives will not be determined until Tier 2, not all of the identified easements or lands would be affected.

Also, effects to individual conservation easements may or may not prevent the remainder of the property from functioning as an easement. Decisions about which easements could retain their designation will be made during Tier 2 studies, when the roadway alignment is identified (and when more specific effects to the easements can be determined).

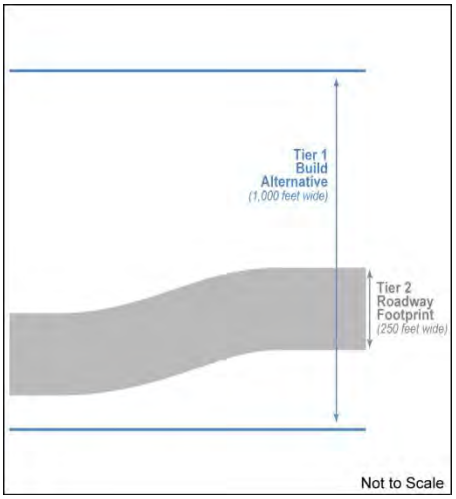


Figure 4-2. Tier 1 vs. Tier 2 Decision

Floodplains

Floodplains are considered to be potentially affected if any portion of the floodplain was located within the Build Alternatives.

Property Acquisition

Property acquisition would be required to construct the Build Alternatives. Because the Build Alternatives only identify a general location for the highway, not a specific roadway footprint, it is not possible to identify specific properties that would need to be acquired. Therefore, this evaluation identifies general locations where property acquisition is likely. Decisions about specific parcels will be made during Tier 2 studies after specific roadway footprints are identified.

Social Considerations

Effects to social conditions are based on whether the Build Alternatives would make it more or less difficult for residents to travel within their community and access important community facilities and services.

4.4. Mitigation Options

Avoidance or minimization will be the primary mitigation options for handling land use and social considerations.

4.5. Deliverables

This Land Use and Social Considerations Technical Memorandum is the primary deliverable being produced for the U.S. 50 Tier 1 EIS related to land use and social considerations.

5. Existing Conditions

U.S. 50 is the primary east-west route through the project communities, which includes nine municipalities and portions of four counties. The city of Pueblo is the largest community, and it is one of four major urban centers along Colorado's Front Range. Pueblo is an urban community of just over 105,000 residents (2010 Census). It serves as a regional center for goods and services for all of southern Colorado, including the communities east of it along U.S. 50. Trends in Pueblo show that the city has steadily gained population since its incorporation in 1885. It also has diversified its economy away from agricultural activities in recent decades.

In contrast, the eight communities east of Pueblo are small, rural communities. They developed as stops along the railroad constructed through southeastern Colorado in the late 1800s. The first residents of these communities relied on agricultural activities for their livelihood, and they remain a central focus of economic activities in the Lower Arkansas Valley. Populations in these communities range from approximately 400 to 7,800 people (2010 Census). The population of each individual community is shown in Table 5-1. From 2000 to 2010, the population of the communities east of Pueblo declined.

Table 5-1. Population Change

2010 Census Geography	2000 Population	2010 Population	Difference	Percent Change 2000–2010	
				Overall	Annualized
Pueblo County	141,472	159,063	17,591	12.4%	1.2%
Pueblo	102,121	106,595	4,474	4.4%	0.4%
Otero County	20,311	18,831	-1,480	-7.3%	-0.8%
Fowler	1,206	1,182	-24	-2.0%	-0.2%
Manzanola	525	434	-91	-17.3%	-1.9%
Rocky Ford	4,286	3,957	-329	-7.7%	-0.8%
Swink	696	617	-79	-11.4%	-1.2%
La Junta	7,568	7,077	-491	-6.5%	-0.7%
Bent County	5,998	6,499	501	8.4%	0.8%
Las Animas	2,758	2,410	-348	-12.6%	-1.3%
Prowers County	14,483	12,551	-1,932	-13.3%	-1.4%
Granada	640	517	-123	-19.2%	-2.1%
Holly	1,048	802	-246	-23.5%	-2.6%
Colorado	4,301,261	5,029,196	727,935	16.9%	1.6%

Source: US Census Bureau, Census 2000 and 2010, Tables P001 (2000), P1 (2010), "Total Population"

The remainder of this section details the existing conditions associated with land use and social considerations listed below.

- Compatibility with planning documents
- Compatibility with future development areas
- Conservation easements
- Public lands
- Floodplains
- Potential for property acquisition
- Residents' ability to travel within each community
- Residents' ability to access important community facilities and services

5.1. Compatibility with Planning Documents

The planning documents identified by this analysis varied by project community, as discussed below.

5.1.1. Pueblo (City and County)

Planning activities for both Pueblo County and the city of Pueblo are largely completed by the Pueblo Area Council of Governments (PACOG), which is the transportation planning and metropolitan planning organization for the Pueblo region. These jurisdictions have a combined comprehensive land use plan and long-range transportation plan. They have also adopted zoning ordinances.

Land within these jurisdictions that also is located within the project area is zoned as agricultural, commercial, floodplain, industrial, mixed use, parking, public use, or residential classifications. Land that could be affected by the Build Alternatives in these areas is currently zoned for public use (i.e., for the highway) west of the airport and primarily as agricultural use east of the airport.

PACOG's 2040 Long Range Transportation Plan envisions U.S. 50 as a freeway. It also outlines a new alignment for U.S. 50 between approximately Troy Avenue and milepost 329 that would place the highway north of the airport (PACOG 2015). (The existing U.S. 50 facility is located south of the airport.) The jurisdictions' most recent comprehensive land use plan also shows U.S. 50 at this new location.

5.1.2. Fowler

Planning documents identified for Fowler include a zoning ordinance and comprehensive land use plan. Fowler's zoning ordinance includes commercial, industrial, mobile home, and residential classifications. Land that could be affected by the Build Alternatives is located primarily in Otero County (surrounding the town) and is zoned for agricultural use by that jurisdiction.

The town's land use plan includes a "Highway 50 corridor planning area" that consists of U.S. 50 through Fowler and the land immediately surrounding this portion of the highway. According to the plan, this area "... serves as the primary entrance to the Town at the eastern and western incorporated boundaries" and "... [f]uture land uses should be reflective of "gateway" features" (Town of Fowler 2009, p 24). The plan also describes realignment of U.S. 50 as part of its discussion on transportation and mobility, as follows.

- The existing U.S. 50 is identified as an area of concern for pedestrian safety, and the plan expresses "preference for future realignment, if any, to the north of Town" (Town of Fowler 2009, p 39).
- The plan notes that to ensure future redevelopment is consistent with the town's objectives, "... no realignment [should] occur to the south of Town" (Town of Fowler 2009, p 41).
- The plan includes a section about the U.S. 50 Tier 1 EIS project. A map presents the U.S. 50 realignment alternatives (shown at the project's August 2007 public meetings), and the associated text states that the "... [t]own of Fowler is more supportive of the northern alignment" (Town of Fowler 2009, p 71).

5.1.3. Rocky Ford

Rocky Ford has adopted a zoning ordinance that includes commercial, industrial, and residential classifications. Land that could be affected by the Build Alternatives is located primarily in Otero County (surrounding the city) and is zoned for agricultural use by that jurisdiction. Additionally, city residents participated in a program offered by the Colorado OEDIT that helped citizens perform an analysis from an economic perspective by reviewing the community's strengths, weaknesses, opportunities, and threats (SWOT). A summary of this effort, completed in 2005, noted the following recommendations that may have an effect on the city's land use if they are implemented (OEDIT 2005, p 10):

- Continue to develop and expand uses for the Grand Theater
- Continue to collaborate on restoration and reuse of historic buildings
- Develop additional senior-friendly amenities based on an inventory and needs analysis
- Develop an industrial park with buildings, infrastructure, and incentives for companies to relocate to the site
- Develop a multi-use trail

5.1.4. La Junta

La Junta has adopted a zoning ordinance that includes commercial, floodplain, highway service district, industrial, planned unit development, and residential classifications. Land that could be affected by the Build Alternatives is located primarily in Otero County (surrounding the city), and some of this land is zoned for agricultural use by that jurisdiction. On January 16, 2007, the La Junta City Council adopted a resolution endorsing a realignment of U.S. 50 (City of La Junta 2007). Additionally, the Colorado OEDIT provided assistance to La Junta in 2006 to help perform a SWOT analysis from an economic perspective to review the community's strengths, weaknesses, opportunities, and threats. A summary of this effort noted the following recommendations that may have effects on the city's land use if they are implemented (OEDIT 2006b, p 11, 12):

- Pursue outdoor recreation
- Continue to work on heritage tourism and birding opportunities
- Partner with CDOT and the railroad to develop pedestrian trails along the railroad tracks
- Apply for state historic grant funds to restore the Masonic Temple in downtown La Junta
- Utilize tools and resources to develop the downtown area
- Explore different services and businesses for downtown development
- Develop potential residential units in the downtown area

5.1.5. Bent County and the City of Las Animas

Bent County combined its planning efforts with the city of Las Animas to develop the *Bent County/City of Las Animas Comprehensive Plan*. This document establishes plan directives for Las Animas, for rural character areas within Bent County, and for cooperative planning areas within the county. Plan directives for each are listed below (Bent County/City of Las Animas 2002).

- Las Animas—land within the city
    - Retain residential neighborhood character
    - Preserve residential and commercial historic structures
    - Improve sidewalks
    - Improve recreational facilities and grounds
    - Redevelop the downtown area
    - Improve U.S. 50 through town
- Bent County rural character areas—the bulk of the county outside of its municipalities
    - Retain agricultural, rural residential, and recreational land uses
    - Attract agricultural and energy industry activities
    - Attract recreational and cultural tourism
    - Preserve historic and archaeological sites
    - Improve U.S. 50 along the existing corridor
- Bent County cooperative planning areas—areas within three miles surrounding Las Animas
    - Retain urban, rural, and institutional land uses
    - Attract residential and commercial land uses
    - Encourage urban growth
    - Create an airport influence area to address appropriate land uses surrounding the Las Animas city and county airport
    - Develop a multi-purpose indoor arena
    - Improve U.S. 50

Additionally, the Colorado OEDIT provided assistance to Bent County in 2006 to help perform a SWOT analysis from an economic perspective to review the community's strengths, weaknesses, opportunities, and threats. A summary of this effort noted the following recommendations that may have an effect on the county's land use if they are implemented (OEDIT 2006a, p 10):

- Develop regional walking and hiking trails on the Arkansas River
- Designate a commercial district downtown
- Develop regional heritage tourism opportunities

The Colorado Department of Local Affairs provided assistance to Las Animas through its Community Revitalization Partnership program in 2005. The focus of this effort was to develop design plans for the city's downtown area. The majority of this document discusses aesthetic issues. However, the overall theme of the document encourages Las Animas to use these aesthetic changes to create a more pedestrian-friendly downtown.

Additionally, a small area of land that could be affected by the Build Alternatives on the north side of Las Animas is currently zoned for residential and agricultural use.

5.1.6. Prowers County

The *Prowers County Master Plan* describes currently zoned areas and future land use objectives for the county. The zoned areas include agriculture/rural, commercial, floodplain, industrial, and residential classifications. Land that could be affected by the Build Alternatives is used currently for agricultural activities. Future land use objectives in the plan include (Prowers County 2003, p 4-3, 4-4):

- Promoting the development of consistent and compatible land uses
- Limiting the intrusion of non-agricultural businesses into rural areas
- Discouraging premature development at state highway intersections where major road improvements or realignment is projected or identified
- Encouraging the protection of open lands and rural character by promoting higher densities within and adjacent to existing communities

In addition to the master (land use) plan, Prowers County has developed a long-range trails plan. The trails are planned within the communities of Granada, Holly, Lamar, and Wiley. Since only Granada and Holly are located within the project area, only these trails were considered by this analysis. Planned trails in Granada would follow U.S. 385 and Amache Road. Trailheads are planned at the intersection of U.S. 385 and the railroad and at the Granada Relocation Center National Historic Landmark (a.k.a., Camp Amache). Planned trails in Holly would follow the Arkansas River, CR FF, the periphery of Holly Gateway Park, SH 89, and some local roads on the south side of town. Trailheads are planned at the junction of CR FF and the Arkansas River and at the railroad depot located south of town on Main Street.

5.1.7. Other Project Communities

Other communities in the project area have adopted zoning ordinances, but no other planning documents. These include Otero County, Manzanola, and Swink. All of these ordinances include residential, industrial, and commercial classifications. Additional classifications included in some ordinances are agricultural, mixed residential, and highway right-of-way, among others.

Granada and Holly have not adopted any planning documents. However, these jurisdictions are discussed in the *Prowers County Master Plan*. Additionally, the Colorado Department of Local Affairs provided assistance to Holly through its Rural Technical Assistance Program in 2004. The focus of this effort was to develop a streetscape design plan for downtown Holly.

5.2. Compatibility with Future Development Areas

The following potential future development areas were identified by this analysis (CDOT 2006a):

- Pueblo—residential and commercial growth north, northwest, and southwest of the city; commercial and industrial growth east of the city (south of the airport); and residential, commercial, and institutional growth south of the city
- Fowler—residential growth south of town
- Manzanola—unspecified growth south of town
- Rocky Ford—residential or recreational growth (a golf course) south of the city and industrial growth north of the city
- Swink—unspecified growth to the west of town, to the south of town, and to the east of town (north of U.S. 50 only) and recreational growth (a park) south of town
- La Junta—residential growth west of the city and unspecified growth southwest and south of the city

- Las Animas—unspecified growth to the north and west of the city and recreational growth along U.S. 50 east of the city (a recreational trail to John Martin Reservoir State Park)
- Granada—unspecified growth south or southeast of town
- Holly—commercial growth west of town (near U.S. 50), residential growth northeast of town, and industrial growth (a coal refinery) northwest of town

5.3. Conservation Easements

A conservation easement is "... a restriction placed on a piece of property to protect its associated resources" (TNC 2007, p 1). When property is designated as a conservation easement, property owners retain their ownership, but they give up the right to develop the property in the future in exchange for monetary compensation. These properties were important to consider for a number of reasons. They are important assets to the communities in the Lower Arkansas Valley. They preserve the natural resources that draw visitors to the region, and they provide an economic boost to individual property owners through the state-run Colorado conservation easement tax credit program. Also, because development could not occur on the property unless the easement is removed, acquisition of this property (to construct the Build Alternatives) would likely require additional coordination with property owners.

This analysis identified 27 conservation easements located, in whole or in part, within the project area. Table 5-2 shows the number and acreage of easements present in each project county. These easements include approximately 6,600 acres of land, constituting slightly more than 3 percent of the project area. They are managed by either the Otero County Land Trust or The Greenlands Reserve. The easements are located throughout Pueblo, Otero, and Prowers counties.

Table 5-2. Conservation Easements in the Project Area

County	Number of Conservation Easements[a]	Acres of Conservation Easements[b]
Pueblo	3	1,700
Otero	15	2,200
Bent	0	0
Prowers	9	2,700
Total	27	6,600

[a]Easements located, in whole or in part, inside the project area
[b]Acres located within the project area only (for those easements located both inside and outside of the project area); rounded to the nearest 100 acres
Sources: Hallman 2006, Otero County Clerk 2006, Prowers County Clerk 2006, Pueblo County Clerk 2006

5.4. Public Lands

Public land was defined as land owned by a state or federal government agency. These properties were considered because they are important assets to the communities in the Lower Arkansas Valley. They provide recreational opportunities for hunting, fishing, camping, and other activities. They also bring visitors (and their money) to the area. These properties also were considered because additional coordination may be necessary with the government agency that owns them, manages them, or both to acquire them (for use to construct the Build Alternatives).

Roughly 5.6 percent of the total project area is public land (CDOT 2004a, CPW 2003). Agencies that manage this land include the Bureau of Land Management (BLM), U.S. Army Corps of Engineers (USACE), Colorado Parks and Wildlife (CPW), and Colorado State Land Board. Table 5-3 shows the number of properties managed by each of these government entities by county.

Table 5-3. Public Lands in the Project Area by Manager and County

Owner	Manager (if not the owner)	Number of Properties				
		Pueblo County	Otero County	Bent County	Prowers County	Total in the Project Area
BLM		1	5	1	4	11
State of Colorado	CPW	—	1	—	5	6
	SLB	8	—	6	2	16
	Unknown[a]	—	2	—	—	2
USACE		—	—	1[b]	—	1

BLM = Bureau of Land Management
CPW = Colorado Parks and Wildlife
USACE = U.S. Army Corps of Engineers
SLB = Colorado State Land Board
[a]This property is owned by the state of Colorado; however the management agency is not known
[b]This property is the John Martin Reservoir; it is managed by USACE, and the property also includes a state wildlife area managed by CPW and a state park operated by Colorado State Parks
Sources: CDOT 2004a, CPW 2003, Black 2009, Black et. al 2007, USACE 2010

Properties counted in Table 5-3 are summarized below.

- John Martin Reservoir (Bent County)—This property is managed by the USACE as a water storage facility but also includes a state park managed by Colorado State Parks and a state wildlife area managed by the Colorado Parks and Wildlife.
- Five state wildlife areas, including Karney Ranch (Bent County), John Martin Reservoir (Bent County), Mike Higbee (Prowers County), Granada (Prowers County),), and Holly (Prowers County). These areas are open to the public and are managed primarily for recreational uses such as hunting, camping, and hiking.
- Sixteen properties managed by the Colorado State Land Board. The Land Board was established in 1876 to manage the land (and associated mineral rights) that the federal government gave to the state of Colorado when it was settled. Today, the purpose of the Land Board is to raise revenue from these properties to fund public education and certain state institutions (Colorado State Land Board 2010).
- Eleven properties managed by the BLM, which is a division of the U.S. Department of the Interior.
- Two other properties owned by the State of Colorado where the management authority is unknown.

There also are public properties in the Lower Arkansas Valley that are outside the project area that could be indirectly affected by the Build Alternatives. The issue is how the Build Alternatives could affect visitors' access to these sites, which include the Comanche National Grassland and Bent's Old Fort National Historic Site.

The Comanche National Grassland, a 400,000-acre U.S. Forest Service property, is located about 60 miles south of the project area. Comanche is divided into two separate units. The Timpas Unit is closest to the project area, located several miles south of the project area generally between Fowler and La Junta. The Comanche National Grassland district ranger confirmed that 90 percent to 95 percent of the Timpas Unit's visitors access the site from U.S. 50 by U.S. 350 or SH 109 south from La Junta (Peters 2007). Therefore, changes to the junctions of U.S. 50 and U.S. 350 or U.S. 50 and SH 109 should be evaluated during Tier 2 studies in this area to determine how they might affect travelers going to, or coming from, the Comanche National Grassland Timpas Unit.

Bent's Old Fort National Historic Site is a National Park Service property located just north of the project area between La Junta and Las Animas on SH 194. The park superintendent confirmed that the majority of the Fort's visitors access the site from two routes that both originate on U.S. 50 (Ott-Jones 2007). The first route takes visitors from U.S. 50 to SH 109 (in La Junta), and then to SH 194. The second route allows visitors to connect directly from U.S. 50 to SH 194 north of Las Animas. The National Park Service is working with the FHWA to develop an access to the Fort directly from U.S. 50 between milepost 389 and

milepost 390 just east of the county line between Otero and Bent counties. Therefore, changes to the junctions of U.S. 50 and SH 109 or U.S. 50 and SH 194 should be evaluated during Tier 2 studies in this area to determine how they might affect travelers going to, or coming from, Bent's Old Fort National Historic Site.

5.5. Floodplains

The floodplain associated with the Arkansas River lies south of the project area in and surrounding Pueblo. It turns north and crosses through the project area between milepost 330 and milepost 332 in Pueblo County (east of the city). The floodplain remains north of the municipalities of Fowler, Manzanola, and Rocky Ford (in Otero County). However, it crosses into the community of Swink, where substantial floodplain areas exist in and surrounding the town. Some of the land in the extreme north portion of La Junta is also covered by the Arkansas River floodplain. It remains north of the project area between La Junta and Las Animas. However, the floodplain crosses through the project area just north of Las Animas. It remains south of the project area from just east of Las Animas to Lamar, where it crosses the project area again (just north of Lamar). It remains north of the project area until just east of Granada, where it turns south and crosses the project area. As a result of this crossing, large areas of floodplain exist in and surrounding Granada, encompassing much of the town's land. Because of the proximity of the river, floodplain areas also cover most of the land in Holly as well. As the river travels toward the Colorado-Kansas border, it is located south of the project area. Floodplains for other substantial rivers, streams, and creeks also were considered by this analysis.

5.6. Potential for Property Acquisition

Property acquired by CDOT to construct the Build Alternatives will comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act), as amended.

5.7. Residents' Ability to Travel within Each Community

U.S. 50 is the primary east-west route through southeastern Colorado. It also serves as the main route into, out of, and through the communities in the project area. As a result, the highway can have a *barrier effect* within communities, making travel from one side of the highway to the other within town difficult. For example, in many communities the highway lies between schools and residential areas. Since walking or biking to school is a common occurrence in many of the communities (due to their small size), U.S. 50 creates a safety issue for students who have to cross the highway on their way to school. Additionally, most of the school districts in the project area have reported altering bus routes to avoid crossing or stopping (i.e., picking up students) on U.S. 50. A concern commonly cited by school district officials is that vehicles driving on the highway frequently pass the buses while they are stopped. This makes it unsafe for the buses to pick up students. As traffic levels on U.S. 50 rise in the future, problems associated with situations like these are likely to worsen. Traffic is projected to increase by approximately 47 percent by the year 2040. This is expected to add just over 9,300 vehicles per day to U.S. 50 in Pueblo and nearly 1,100 vehicles per day to the portion of the highway between Holly and the Colorado-Kansas state line (CDOT 2010a, CDOT 2010b).

5.8. Residents' Ability to Access Important Community Facilities and Services

The analysis identified 189 important community facilities and services. Nearly all of them are located within the project municipalities. Table 5-4 shows the number of facilities, by type, in each community. The facilities and services shown for Pueblo, Otero, Bent, and Prowers counties are located in the areas controlled by the county, not in the cities and towns within that county. A list of these facilities and services is presented in Appendix C.

Table 5-4. Summary of Important Community Facilities and Services

Project Community	Emergency Services Agencies[b]	Government Facilities[c]	Medical Facilities[d]	Public Airports	Public Schools	Public Recreational Facilities[e]	Total
Pueblo County[a]	0	2	1	0	2	0	5
Pueblo	4	2	3	1	10	22	42
Otero County[a]	0	0	0	0	0	0	0
Fowler	3	4	0	0	3	4	14
Manzanola	3	4	0	0	2	5	14
Rocky Ford	2	4	2	0	4	11	23
Swink	0	4	0	0	2	3	9
La Junta	5	5	2	1	5	12	30
Bent County[a]	0	1	0	0	0	1	2
Las Animas	3	7	2	1	4	11	28
Prowers County[a]	0	0	0	0	0	0	0
Granada	2	2	0	0	2	2	8
Holly	3	4	0	1	2	4	14
Total	**25**	**39**	**10**	**4**	**36**	**75**	**189**

[a]County land only (i.e., does not include areas within municipalities)
[b]Fire, police, and ambulance services
[c]City, town, and county administration offices, post offices, public libraries, community centers, and senior citizens centers
[d]Hospitals and clinics only
[e]Local recreational facilities accessible by the general public
Sources: CERMPWG 2006, Yahoo 2007, Colorado Counties, Inc. 2007, USPS 2007, PublicLibraries.com 2007, CDPHE 2006a, CDPHE 2006b, CDPHE 2006c, CDPHE 2006d, CDOT 2004b, NCES 2006, CDOT 2006a, CDOT 2006b

These facilities and services are not located uniformly across all the communities in the project area. Within Pueblo, 42 of them were identified. Because Pueblo is not entirely contained within the project area, it is important to note that this analysis describes only those facilities and services located within the portion of the city that lies inside the project area (i.e., the eastern portion of the city). There are additional community facilities located in the remainder of the city.

In contrast, each of the communities east of Pueblo has far fewer of these facilities and services. The fact that there are so few of them within each community makes them extremely important to local residents. Many of these facilities have been identified as community gathering places by city or town leaders (i.e., places where community-wide events are held) (CDOT 2006a). Additionally, many serve multiple functions. Two examples of this multi-use function are located in Fowler. The first is the administration building, which is home to the town hall, fire department, and public library. The other is the clubhouse at the Cottonwood Links Golf Course. It not only serves the golfers using the course, but it is also frequently used for town meetings and other community-wide events.

U.S. 50 also is used by residents to access facilities and services in neighboring communities when those types of facilities do not exist in their own communities. For example, Swink does not have its own emergency services; they are provided by neighboring jurisdictions. Only two communities have hospitals (Pueblo and La Junta). Therefore, residents from the other communities must go to one of these cities for that level of health care. Since U.S. 50 is the primary east-west route between these communities, the highway is critical to the residents' ability to access those facilities and services.

6. Effects

The following sections discuss the potential of the No-Build Alternative and the Build Alternatives to effect land use and social considerations.

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 U.S. 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.

No effects to land use or social considerations are expected. However, communities also would not have the opportunity to make certain improvements to their city or town. For example, moving long-distance and regional traffic out of downtown areas would enable communities to make these areas more pedestrian-friendly. In community workshops held in 2006, leaders from many communities expressed their desire to do this (CDOT 2006a). Moving traffic out of town also would reduce the highway's existing barrier effect, which would improve residents' ability to travel within their communities.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

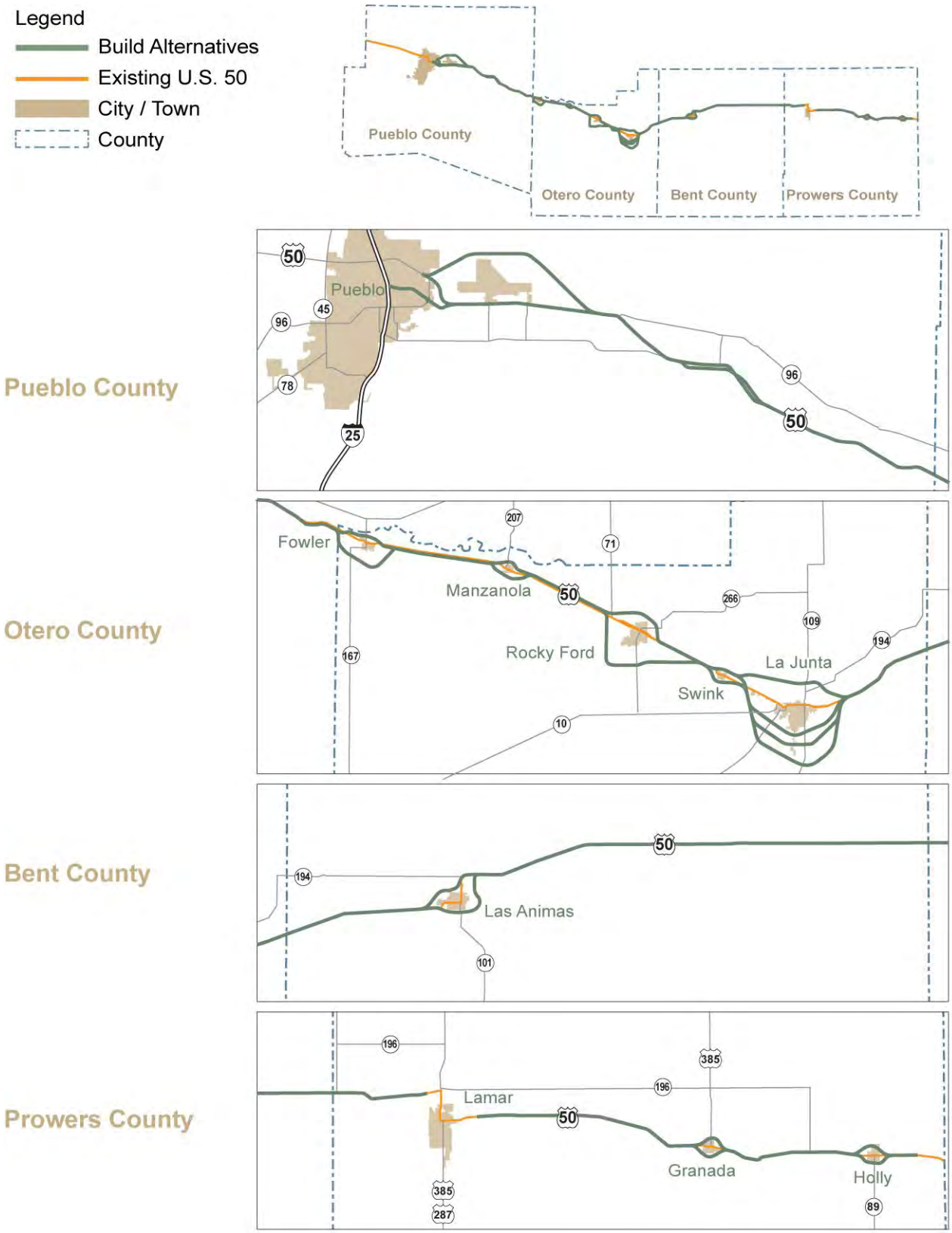
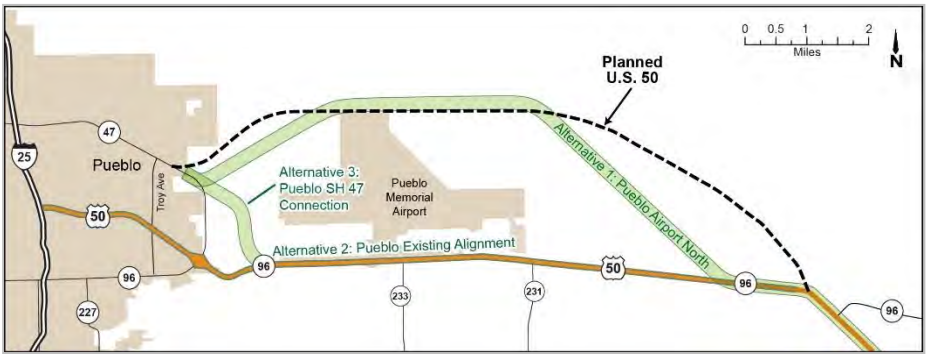


Figure 6-1. Build Alternatives Overview

Effects to land use and social considerations that could result from the Build Alternatives are discussed below by location (from west to east). Some of the considerations are not relevant to all locations because they do not exist there.

6.2.1. Section 1: Pueblo

U.S. 50 connects to I-25 within Pueblo near the western terminus of the project (the Hudson Avenue and U.S. 50 intersection). Two local corridor proposals are considered, resulting in three alternatives considered in Section 1 of the project corridor, as shown in Figure 6-2.



Source: PACOG 2010 (planned U.S. 50 only)

Figure 6-2. Planned (Future) Route for U.S. 50 as Envisioned in the 2040 Long-Range Transportation Plan for the Pueblo Region

The Build Alternatives would not affect the following land use and social considerations in Pueblo:

- Compatibility with future development areas—because it cannot be determined; the most recent comprehensive plan for this area shows multiple types of development, including residential and commercial, among others, occurring within each growth area; until the specific type of development is known, compatibility with the Build Alternatives cannot be determined
- Conservation easements—because no easements are identified
- Public lands—because the Build Alternatives do not cross onto any of the identified properties
- Floodplains—because the Build Alternatives do not cross into the Arkansas River floodplain
- Residents' access to important community facilities and services—because the Build Alternatives would not change how residents currently access these facilities or services

The primary land use issue is the compatibility of the Build Alternatives with local planning documents covering the area. Future development areas in Pueblo are located north, northwest, southwest, south, and east of the city. Most of these areas are expected to contain multiple types of development, primarily residential and commercial. Industrial and institutional (public use) development also is expected in some locations. Table 6-1 identifies the estimated acres of existing land use to be converted to a transportation use in Section 1 of the project corridor.

Table 6-1. Comparison of Acres to be Converted to a Transportation Use in Section 1

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Pueblo Airport North	Commercial	1	368
	Industrial	0	
	Public Use	5	
	Residential	10	
	Agriculture/Rural	352	
Alternative 2: Pueblo Existing Alignment	Roadway already configured to Build Alternative recommendation		
Alternative 3: Pueblo SH47 Connection	Commercial	1	91
	Industrial	22	
	Public Use	7	
	Residential	10	
	Agriculture/Rural	51	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Pueblo Airport North. The 2040 long-range transportation plan prepared for the Pueblo region envisions U.S. 50 as a freeway following a different route than it does today (PACOG 2015). As shown in Figure 6-2, this planned route would relocate the highway north of the Pueblo Memorial Airport between approximately Troy Avenue and SH 96. This alternative would require the greatest amount of change to existing land use in the study area. Approximately 1,200 acres of agricultural and grazing land would be converted to a transportation use with this alternative. The Airport North Alternative is the "Preferred" Plan in the 2040 Regional Transportation Plan, but is not funded.

Alternative 2: Pueblo Existing Alignment. U.S. 50 already is configured in the manner recommended by the Build Alternatives in this area. No substantial property acquisition is anticipated; however, property could be needed to build frontage roads if existing accesses to U.S. 50 are eliminated. The Existing Alignment Alternative is consistent with the region's adopted 2040 Regional Transportation Plan.

Alternative 3: Pueblo SH 47 Connection. This alternative is a local proposal considered in the CDOT 2003 planning study for U.S. 50. The alternative includes approximately two miles of new roadway alignment to connect existing U.S. 50 to SH 47 west of the airport. Approximately 130 acres of existing agricultural and grazing land would be converted to a transportation use with this alternative. This alternative is not consistent with the adopted 2040 Regional Transportation Plan.

6.2.2. Section 2: Pueblo to Fowler

Two alternatives are considered in this section of the project corridor. The Build Alternatives could affect the use of conservation easements and public lands. Close to Pueblo in this section, U.S. 50 is already four lanes and is configured in the manner recommended by the Build Alternatives (between approximately milepost 327 and milepost 332), so property acquisition would be minimal. Property could be needed to build frontage roads if existing accesses to U.S. 50 are eliminated. Property acquisition would be required to expand U.S. 50 to four lanes near Fowler.

The Build Alternatives would not affect residents' ability to access important community facilities and services between Pueblo and Fowler. This is because the Build Alternatives would not change how residents currently access these facilities or services.

The Arkansas River floodplain would be affected by the Build Alternatives near Avondale (at milepost 331) because U.S. 50 currently crosses the Huerfano River at this location. Additionally, the Build Alternatives recommend that U.S. 50 be four lanes. Therefore, in the locations where the highway is currently two lanes, property acquisition would occur adjacent to U.S. 50 to build the additional two lanes. The decision about whether to build the new lanes north or south of the existing lanes would be made during Tier 2 studies when the roadway alignment is identified. However, in areas where the BNSF Railway is located immediately adjacent to the highway today, it is likely that the new lanes would be located on the opposite side of the highway (i.e., not on the land currently occupied by the railroad). In areas where the highway is already four lanes, property acquisition could occur immediately adjacent to these existing lanes only if certain improvements are needed, such as wider shoulders, turn lanes, or other improvements.

From Pueblo to Fowler, land on either side of U.S. 50 is zoned for agricultural use (primarily for ranching). Therefore, any land acquired for the Build Alternatives would shift from agricultural use to a transportation use. Table 6-2 identifies the estimated acres of existing land use to be converted to a transportation use in Section 2 of the project corridor.

Table 6-2. Comparison of Acres to be Converted to a Transportation Use in Section 2

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Ft Reynolds Existing	Agriculture/Rural	619	622
	Commercial	1	
	Public Use	2	
Ft Reynolds Realignment	Agriculture/Rural	616	619
	Commercial	2	
	Public Use	1	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Fort Reynolds Existing Alignment. U.S. 50 between Pueblo and Fowler is two lanes (between approximately milepost 332 and milepost 349). Additional property adjacent to the highway (either north or south of the existing lanes) would be needed to build the additional two lanes.

This alternative could affect up to three conservation easements. The two easements managed by The Greenlands Reserve are located between milepost 335 and milepost 343. The other easement is managed by the Otero County Land Trust and is located near milepost 349 on the west side of Fowler. In addition, this alternative would affect three public properties, all managed by the Colorado State Land Board. All of these properties are located between milepost 335 and milepost 343. This alternative would require approximately 619 acres of agricultural land to be converted to a transportation use.

Alternative 2: Fort Reynolds Realignment. Similar to Alternative 1: Fort Reynolds Existing Alignment, additional property adjacent to the highway (either north or south of the existing lanes) would be needed to build the other two lanes along the existing U.S. 50 alignment. This alternative also realigns the highway at the intersection of U.S. 50 and SH 209, and shifts the highway south to avoid acquisition of homes in the area of Fort Reynolds.

6.2.3. Section 3: Fowler

Two alternatives are considered in this section. Both the Fowler North and Fowler South Alternatives would potentially affect the use of a conservation easement managed by the Otero County Land Trust (located near milepost 349 on the west side of Fowler), and would require acquisition of additional property for the new around-town route (either north or south of town). Both alternatives could have the following effects:

- Conservation easements—one conservation easement would be affected, which is owned by the Otero County Land Trust and located west of town near milepost 349
- Public lands—no public lands would be affected
- Potential for property acquisition—building either alternative would require CDOT to acquire property around the periphery of the community (either north or south, but not both)
- Residents' ability to travel within the community—since U.S. 50 would be moved to the periphery of town (and so would a portion of the traffic using it), these alternatives have the potential to reduce the highway's barrier effect, making it easier for residents to travel within the community

Table 6-3 identifies the estimated acres of existing land use to be converted to a transportation use in Section 3 of the project corridor.

Table 6-3. Comparison of Acres to be Converted to a Transportation Use in Section 3

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Fowler North	Public Use	13	104
	Agriculture/Rural	91	
Fowler South	Public Use	0	149
	Agriculture/Rural	149	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Fowler North. The Fowler North Alternative could have the following effects:

- Compatibility with planning documents—the town's comprehensive plan calls for any realignment of U.S. 50 to occur north of town, which would be compatible with this alternative; however, if the alternative is built, land currently zoned for agricultural use would be shifted to a transportation use
- Compatibility with future development areas—because this alternative would move U.S. 50 farther from residential development expected south of town, the alternative would be compatible with it
- Floodplains—this alternative would affect the Arkansas River floodplain
- Residents' ability to access important community facilities and services—this alternative could affect the Cottonwood Links Golf Course by using some land currently used for holes on the course for the alternative if it is built

Alternative 2: Fowler South. The south-of-town alternative could have the following effects:

- Compatibility with planning documents—the town's comprehensive plan calls for any realignment of U.S. 50 to occur north of town, which would not be compatible with this alternative; also, if this alternative is constructed, land currently zoned for agricultural use would be shifted to a transportation use
- Compatibility with future development areas—because this alternative would move U.S. 50 closer to residential development expected south of town, this alternative would not be compatible with it
- Floodplains—this alternative would not affect the Arkansas River floodplain
- Residents' ability to access important community facilities and services—this alternative would not change how residents currently access these facilities or services

The Fowler North Alternative would negatively affect floodplains and access to an important community facility, while the Fowler South Alternative would be incompatible with the town's planning documents and future development areas. Both alternatives would shift land currently zoned for agricultural use to a transportation use.

6.2.4. Section 4: Fowler to Manzanola

From Fowler to Manzanola, the Build Alternative could affect the use of a conservation easement managed by the Otero County Land Trust (located between milepost 353 and milepost 354). In addition, property acquisition would be needed to expand this two-lane section of U.S. 50 to four lanes. Property would be acquired south of the existing lanes because the railroad, located on the north side of U.S. 50, creates a barrier to expanding the highway in that direction. Currently, land south of the highway is zoned for agricultural use, so the Build Alternative would convert some property in this area from agricultural to transportation use, so the Build Alternative would convert up to 186 acres in this area from agricultural to transportation use.

The Build Alternative would not affect the following land use and social considerations between Fowler and Manzanola:

- Public lands—because no public lands were identified
- Floodplains—because the Build Alternative does not cross into the Arkansas River floodplain
- Residents' ability to access important community facilities and services—because none were identified

6.2.5. Section 5: Manzanola

There are two alternatives in this section. The primary land use issues in Manzanola involve whether the Build Alternatives are compatible with future development areas and acquisition of additional property for a new around-town route. The town does not have an adopted land use plan. A community workshop held with Manzanola residents identified that future development in Manzanola is likely to occur south of town.

Alternative 1: Manzanola North. This alternative would convert some residential land (less than one acre) and approximately 77 acres of agricultural land to a transportation use. However, this agricultural land is not recognized as being as valuable as the agricultural land south of the town. Development potential north of the town is limited by floodplains.

Alternative 2: Manzanola South. This alternative would convert approximately 77 acres of agricultural land to a transportation use. This land includes higher quality vegetable farmland. Land south of town has better development potential, as identified by local residents.

The Build Alternatives would not affect the following land use and social considerations in Manzanola:

- Conservation easements—because no easements were identified
- Public lands—because no public lands were identified
- Residents' ability to access important community facilities and services—because the Build Alternatives would not change how residents currently access these facilities or services

Table 6-4 identifies the estimated acres of existing land use to be converted to a transportation use in Section 5 of the project corridor.

Table 6-4. Comparison of Acres to be Converted to a Transportation Use in Section 5

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Manzanola North	Residential	< 1	78
	Agriculture/Rural	77	
Manzanola South	Residential	0	77
	Agriculture/Rural	77	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

6.2.6. Section 6: Manzanola to Rocky Ford

U.S. 50 is already four lanes in this section. Property acquisition would occur immediately adjacent to the highway only if certain improvements are needed, such as wider shoulders, turn lanes, or other changes. The land immediately adjacent to the highway is zoned for agricultural use. The Build Alternative would convert a minimal amount of agricultural land to a transportation use.

The Build Alternative would not affect the following land use and social considerations between Manzanola and Rocky Ford:

- Conservation easements—because no easements were identified
- Public lands—because the Build Alternative does not cross onto any of the identified properties
- Floodplains—because the Build Alternative does not cross into the Arkansas River floodplain
- Residents' ability to access important community facilities and services—because none were identified

6.2.7. Section 7: Rocky Ford

There are two alternatives in the section. The Build Alternatives in Rocky Ford could affect future development and conservation easements. The Build Alternatives also would require the acquisition of additional property for a new around-town route. Future development in Rocky Ford could include a golf course or residential development south of the city and an industrial park north of the city.

Two conservation easements could be affected by this section of the Build Alternatives. The easements are both managed by the Otero County Land Trust and are located near SH 71 and CR GG on the west side of Rocky Ford.

Alternative 1: Rocky Ford North. The Rocky Ford North Alternative would require the conversion of approximately 246 acres of agricultural land to a transportation use. The Rocky Ford North Alternative would pass through fewer acres of agricultural land than the Rocky Ford South Alternative. This alternative would be compatible with potential growth because it would move the highway closer to a proposed industrial growth area and farther away from the potential residential and recreational growth area.

Alternative 2: Rocky Ford South. The Rocky Ford South Alternative would require the conversion of approximately 248 acres of agricultural land to a transportation use.

The Build Alternatives would not affect the following land use and social considerations in Rocky Ford:

- Public lands—because the Build Alternatives do not cross onto any of the identified properties
- Residents' ability to access important community facilities and services—because the Build Alternatives would not change how residents currently access these facilities or services

The Build Alternatives cross into the Arkansas River floodplain in two locations: northeast of the city and along U.S. 50 east of the city between milepost 370 and milepost 371.

6.2.8. Section 8: Rocky Ford to Swink

This section of U.S. 50 is already four lanes, so minimal property acquisition would occur immediately adjacent to the highway (either north or south) only if certain improvements are needed, such as wider shoulders, turn lanes, or other changes. This land is currently zoned for agricultural use; the Rocky Ford to Swink Build Alternative would change this agricultural use to a transportation use.

The Build Alternative would not affect the following land use and social considerations between Rocky Ford and Swink:

- Conservation easements—because the Build Alternative does not cross onto any of the identified easements
- Public lands—because the Build Alternative does not cross onto any of the identified properties
- Residents' ability to access important community facilities and services—because none were identified

The Build Alternative crosses into the Arkansas River floodplain just west of Swink, near milepost 374.

6.2.9. Section 9: Swink

There are two design alternatives in this section. Both alternatives could affect future development areas and conservation easements. They also would require the acquisition of additional property for a new around-town route. Recent growth in Swink has occurred west of town, and future development areas exist south and northeast of town, but the type of development that could take place in these areas is unknown. Swink residents also indicated that they would like to locate a park in the southern development area. Whether the alternatives are consistent with this growth would depend on what type of development (residential, industrial, etc.) is expected to occur there in the future. Since that question remains, it is not clear whether either alternative would be compatible with Swink's future development areas. Both the North and South Alternatives would require additional property acquisition for the new around-town route, and land would be acquired in areas currently zoned for agricultural use. The Build Alternatives, therefore, would shift some land use from agricultural to transportation, no matter which alternative is chosen in Swink. Table 6-5 identifies the estimated acres of existing land use to be converted to a transportation use in Section 9 of the project corridor.

Table 6-5. Comparison of Acres to be Converted to a Transportation Use in Section 9

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Swink North	Residential	1	62
	Agriculture/Rural	61	
Swink South	Residential	1	77
	Agriculture/Rural	76	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Swink North. The Swink North Alternative would convert approximately 61 acres of agricultural land to a transportation use. This land has limited development potential due to adjacent floodplains.

The Swink North Alternative would affect a conservation easement (that would not be affected by the Swink South Alternative). This conservation easement is managed by the Otero County Land Trust and is located northeast of the town boundaries.

Alternative 2: Swink South. The Swink South Alternative would convert approximately 77 acres of agricultural land to a transportation use. This alternative would place U.S. 50 near the town's school, which may affect existing and future land use near the school.

The Build Alternatives would not affect the following land use and social considerations in Swink:

- Public lands—no public lands would be affected
- Residents' ability to travel within the community—since U.S. 50 would be moved to the periphery of town (and so would a portion of the traffic using it), these alternatives have the potential to reduce the highway's barrier effect, making it easier for residents to travel within the community
- Residents' ability to access important community facilities and services—neither alternative would change how residents currently access these facilities or services

6.2.10. Section 10: La Junta

There are four design alternatives around La Junta in this section. One alternative goes around the town to the north and three alternatives go around the town to the south, as shown in Figure 6-3. The La Junta City Council adopted a resolution endorsing the relocation of U.S. 50 to the extreme southern portion of the city

(City of La Junta 2007). Future development areas are located southwest and west of the city, and the western growth is likely to be residential.

Even though the exact location of the southern alternatives differs, all three would alter land use in the same way. Each would move U.S. 50 traffic to a new route south of town, removing it from the downtown area, and each would provide the city with a sizable area for future development to the south. Because the southern Build Alternatives would move U.S. 50 closer to future development areas, no matter which alternative is chosen, the Build Alternatives would seem to be incompatible with growth in future development areas; however, the city's resolution calls for the highway to be relocated closer to these growth areas. Therefore, the Build Alternatives were considered to be consistent with the resolution adopted by the La Junta City Council. All four of the design alternatives would require property acquisition resulting in a change from existing use to a transportation use. Table 6-6 identifies the estimated acres of existing land use to be converted to a transportation use in Section 10 of the project corridor.

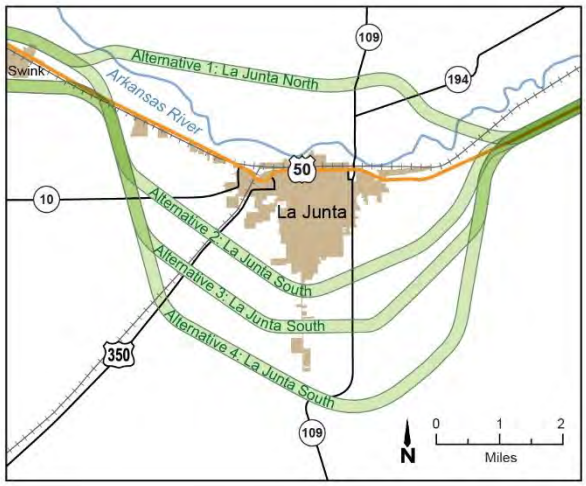
Table 6-6. Comparison of Acres to be Converted to a Transportation Use in Section 10

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: La Junta North	Residential	0	262
	Agriculture/Rural	262	
Alternative 2: La Junta South	Residential	2	255
	Agriculture/Rural	253	
Alternative 3: La Junta South	Residential	1	295
	Agriculture/Rural	294	
Alternative 4: La Junta South	Residential	0	358
	Agriculture/Rural	358	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: La Junta North. Only rural land (262 acres) would be converted to a transportation use by the La Junta North Alternative. No agricultural land would be converted. This design alternative is located outside of the city's planning area. This alternative is not consistent with the city's adopted resolution to relocate U.S. 50 to the south of the city.

Alternative 2: La Junta South. Approximately 253 acres of agricultural land would be converted to a transportation use by Alternative 2. This is consistent with the city's adopted resolution to relocate the highway south of the city. However, the alternative could affect potential future development areas to the southwest and west of the city.



Source: City of La Junta 2007 (city-planned U.S. 50 only)

Figure 6-3. City-Planned (Future) Route for U.S. 50 in La Junta

Alternative 3: La Junta South. Alternative 3 was developed during public involvement efforts for this Tier 1 EIS, as a requested compromise between the other two southern alternatives, which had been identified in the 2003 U.S. 50 planning study. Similar to Alternative 2, this alternative is consistent with the city's adopted resolution to relocate the highway south of the city. However, it could affect potential future development areas to the southwest and west of the city. Approximately 294 acres of agricultural land would be converted to a transportation use by Alternative 3.

Alternative 4: La Junta South. This design alternative is reflected in the city's adopted resolution. Approximately 358 acres of agricultural land would be converted to a transportation use by Alternative 4—the greatest amount of agricultural land.

The Build Alternatives would not affect the following land use and social considerations in La Junta:

- Conservation easements—no conservation easements would be affected
- Public lands—no public lands would be affected
- Residents' ability to travel within the community—since U.S. 50 would be moved to the periphery of town (and so would a portion of the traffic using it), these alternatives have the potential to reduce the highway's barrier effect, making it easier for residents to travel within the community
- Residents' ability to access important community facilities and services—neither alternative would change how residents currently access these facilities or services

6.2.11. Section 11: La Junta to Las Animas

From La Junta to Las Animas, the Build Alternative would require some property acquisition from one public property, which is managed by the Colorado State Land Board (located between milepost 391 and milepost 392 immediately adjacent to U.S. 50 on the south side of the highway). Close to La Junta in this section, U.S. 50 is already four lanes (between approximately milepost 382 and milepost 386), so minimal property acquisition would occur. Property could be needed to build frontage roads if existing accesses to U.S. 50 are eliminated in any locations along this portion of the highway. The remainder of U.S. 50 between La Junta and Las Animas is two lanes (between approximately milepost 386 and milepost 397). Additional property adjacent to the highway (either north or south of the existing lanes) would be needed to build the additional two lanes. Up to 431 acres of agriculture/rural land would be converted to a transportation use in this section.

The Build Alternative would not affect the following land use and social considerations between La Junta and Las Animas:

- Compatibility with planning documents—because the planning document applicable to this area recommends U.S. 50 be improved along its existing alignment, and planning assistance received by Bent County from the Colorado OEDIT includes recommendations that also are compatible with U.S. 50 remaining on its current alignment in this area
- Conservation easements—no conservation easements would be affected
- Residents' ability to access important community facilities and services—because none were identified

6.2.12. Section 12: Las Animas

There are two design alternatives in this section of the corridor. Neither alternative is consistent with the Bent County/City of Las Animas comprehensive plan, which calls for the improvement of U.S. 50 along its existing alignment (through town). Future development areas in Las Animas are likely to occur north and west of the city. Land CDOT would have to acquire for the Build Alternatives would shift a small area from residential or agricultural uses to a transportation use. Table 6-7 identifies the estimated acres of existing land use to be converted to a transportation use in Section 12 of the project corridor.

Table 6-7. Comparison of Acres to be Converted to a Transportation Use in Section 12

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Las Animas North	Commercial	< 1	108
	Residential	7	
	Industrial	0	
	Institutional	0	
	Parks/Open Space	0	
	Agriculture/Rural	101	
Alternative 2: Las Animas South	Commercial	0	162
	Residential	0	
	Industrial	15	
	Institutional	5	
	Parks/Open Space	2	
	Agriculture/Rural	140	

**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Las Animas North. This design alternative would convert approximately 101 acres of agricultural land to a transportation use. This alternative would impact existing land use that already has some utility infrastructure.

Alternative 2: Las Animas South. This design alternative would convert approximately 140 acres of agricultural land to a transportation use. Additional land uses that may be affected by this alternative include industrial, institutional, and parks/open space.

The Build Alternatives would not affect the following land use and social considerations in Las Animas:

- Compatibility with future development areas—because the type of development expected to the north and west of the city is unknown; also, the recreational development along U.S. 50 (a trail) would be compatible
- Conservation easements—because no easements were identified
- Public lands—because the Build Alternatives do not cross onto any of the identified properties
- Residents' ability to access important community facilities and services—because the Build Alternatives would not change how residents currently access these facilities or services

This section of the Build Alternatives is not compatible with planning documents. The Build Alternatives could also affect floodplains and residents' ability to travel within the community, and it has the potential for property acquisition. Planning documents applicable to this area recommend that U.S. 50 be improved through town (i.e., on its existing alignment through the city), which is not compatible with the Build Alternatives. However, planning assistance received by Bent County from the Colorado OEDIT includes recommendations that are compatible with the Build Alternatives. If the Build Alternatives are built, a small area of land (located on the northwest side of the city) currently zoned for residential or agricultural use could be shifted to a transportation use.

The Build Alternatives could cross the Arkansas River floodplain in the same general vicinity that U.S. 50 crosses the river today (just north of the city), although a new U.S. 50 bridge over the river could be required for the Build Alternatives (this would be decided during Tier 2 studies). Additionally, constructing the Build Alternatives would require CDOT to acquire property around the northern periphery of the community. Since U.S. 50 would be moved to the periphery of town (and so would a portion of the traffic using it), the Build Alternatives have the potential to reduce the highway's barrier effect, making it easier for residents to travel within the community.

6.2.13. Section 13: Las Animas to Lamar

From Las Animas to Lamar, the Build Alternative could affect the use of conservation easements and public lands. Portions of U.S. 50 in this section are two lanes and portions are four lanes. The four-lane segments occur near Las Animas and near Lamar, with a two-lane segment in between. In the two-lane portion, additional property adjacent to the highway (either north or south of the existing lanes) would be needed for the additional lanes of the Build Alternative. Up to 737 acres of agriculture/rural land could be converted to a transportation use. In the four-lane segments, property acquisition would occur immediately adjacent to the highway only if certain improvements are needed, such as wider shoulders or turn lanes.

Up to two conservation easements could be affected. Both are managed by The Greenlands Reserve and they are located directly adjacent to U.S. 50 (and to one another) between milepost 429 and milepost 431.

Additionally, up to four public properties could be affected. These properties include two managed by the Colorado State Land Board, which are located along U.S. 50 near milepost 406 and milepost 420. The other properties are the Kearney Ranch State Wildlife Area and John Martin Reservoir, which includes a water storage and flood control facility, State Park, and State Wildlife Area. No portion of the reservoir would be affected by the Build Alternative. Only a small amount of State Wildlife Areas (two sections) immediately adjacent to U.S. 50 (between milepost 408 and milepost 411) would be affected.

The Build Alternative would not affect the following land use and social considerations between Las Animas and Lamar:

- Compatibility with planning documents—because the planning document applicable to this area recommends U.S. 50 be improved along its existing alignment, and planning assistance received by Bent County from the Colorado OEDIT includes recommendations that are also compatible with U.S. 50 remaining on its current alignment in this area
- Floodplains—because the Build Alternative does not cross into the Arkansas River floodplain

6.2.14. Section 14: Lamar to Granada

From Lamar to Granada, the Build Alternative could affect conservation easements and public lands. U.S. 50 is only two lanes between Lamar and Granada, so additional property adjacent to the highway (either north or south of the existing lanes) would be needed to construct the Build Alternatives. Up to 422 acres of agriculture/rural land could be converted to a transportation use.

Three conservation easements would be affected by the Build Alternative in this section. They are all managed by The Greenlands Reserve and are located near milepost 441, milepost 442, and milepost 448. This portion of the Build Alternative also could affect the Mike Higbee State Wildlife Area, which is managed by Colorado Parks and Wildlife (CPW).

The Build Alternative would not affect the following land use and social considerations between Lamar and Granada:

- Compatibility with planning documents—because the planning document applicable to this area shows U.S. 50 at its existing location
- Residents' ability to access important community facilities and services—because none were identified

The Build Alternatives would affect the Arkansas River floodplain just west of Granada (between milepost 451 and milepost 452).

6.2.15. Section 15: Granada

There are two design alternatives in this section of the corridor. Potential effects from the Build Alternatives in this section include compatibility with the Prowers County trails plan, affects to future development areas, and property acquisition. The Prowers County trails plan identifies future routes for pedestrian trails within the county, including trails in Granada, as shown on Figure 6-4. Future development areas in Granada are located southeast or south of town. Compatibility with the Build Alternatives cannot be determined because the type of growth expected in this area is unknown. Both design alternatives would require property

acquisition resulting in a change from existing use to a transportation use. Table 6-8 identifies the estimated acres of existing land use to be converted to a transportation use in Section 15 of the project corridor.

Table 6-8. Comparison of Acres to be Converted to a Transportation Use in Section 15

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Granada North	Residential	17	66
	Public/Semi-Public	0	
	Agriculture/Rural	49	
Alternative 2: Granada South	Residential	0	63
	Public/Semi-Public	1	
	Agriculture/Rural	63	

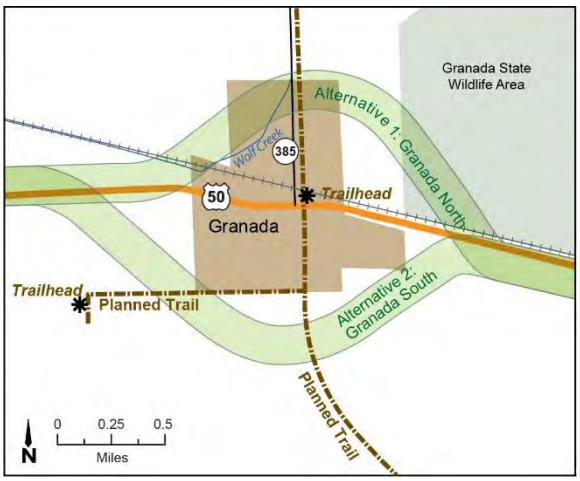
**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Granada North. This design alternative would convert approximately 17 acres of residential land and approximately 49 acres of agricultural land to a transportation use. However, this agricultural land has limited development potential due to adjacent floodplains. This alternative includes one crossing of a planned trail and would affect the southwest corner of the Granada State Wildlife Area, which currently lies to the northeast of Granada and north of the existing U.S. 50 alignment

Alternative 2: Granada South. This design alternative would convert approximately 62 acres of agricultural land to a transportation use.

The Build Alternatives would not affect the following land use and social considerations in Granada:

- Compatibility with future development areas—since unspecified growth is expected to occur to the south and southeast of town, compatibility with the Build Alternatives cannot be determined
- Conservation easements—because no easements were identified
- Public lands—because the Build Alternatives do not cross onto any of the identified properties



Source: Prowers County 2006 (county-planned trails only)

Figure 6-4. County-Planned (Future) Trails in Granada

The planning document applicable to the town is a (recreational) trails plan. The Build Alternatives are located in areas where these trails are planned; therefore it is not compatible with this plan. The Build Alternatives cross into the Arkansas River floodplain at its extreme western and eastern ends (near milepost 452 and near milepost 454). Since U.S. 50 would be moved to the periphery of town (and so would a portion of the traffic using it), the Build Alternatives have the potential to reduce the highway's barrier effect, making it easier for residents to travel within the community. The Build Alternatives also would affect the extreme southeastern corner of the Granada School District Property—an important community facility.

6.2.16. Section 16: Granada to Holly

From Granada to Holly, the Build Alternative could affect a conservation easement managed by The Greenlands Reserve land trust (located adjacent to U.S. 50 near milepost 462). The Build Alternative also would affect the Granada State Wildlife Area in the same location that U.S. 50 crosses this facility today. Up to 254 acres of agriculture/rural property acquisition would be needed to expand this two-lane section of U.S.

50 to four lanes. Property would be acquired adjacent to the existing lanes (either north or south of the highway).

The Build Alternative would not affect the following land use and social considerations between Granada and Holly:

- Compatibility with planning documents—because the planning document applicable to this area shows U.S. 50 at its existing location
- Residents' ability to access important community facilities and services—because none were identified

The Build Alternative would affect the Arkansas River floodplain between milepost 457 and milepost 462 (i.e., throughout most of its area).

6.2.17. Section 17: Holly

There are two design alternatives in this section of the corridor. The Build Alternatives in this section would affect one conservation easement, which is managed by The Greenlands Reserve. The easement is located on the west side of Holly near milepost 462. The Prowers County trails plan identified future routes for pedestrian trails within the county, including trails in Holly. The planned trails could be affected by the Build Alternatives, as shown in Figure 6-5.

Future development areas are identified west of town (commercial land use), northeast of town (residential land use), and to the northwest (industrial land use). Construction of the Build Alternatives would change existing land uses to a transportation use. Table 6-9 identifies the estimated acres of existing land use to be converted to a transportation use in Section 17 of the project corridor.

Table 6-9. Comparison of Acres to be Converted to a Transportation Use in Section 17

Alternative	Land Use	Acres Converted to Transportation*	Total Acres Converted by Alternative
Alternative 1: Holly North	Public/Semi-Public	< 1	51
	Residential	< 1	
	Agriculture/Rural	51	
Alternative 2: Holly South	Public/Semi-Public	0	63
	Residential	0	
	Agriculture/Rural	63	

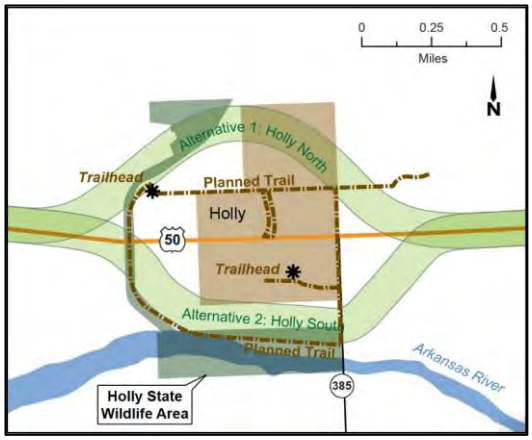
**Acreage estimates are based on a 1,000 foot wide corridor multiplied by a conversion factor of 0.25 for new location portions. These conservative acreage estimates are anticipated to be reduced during Tier 2 studies.*

Alternative 1: Holly North. This alternative would convert approximately 52 acres of agricultural land to a transportation use. This alternative could affect future development areas identified north of town and includes one crossing of a planned trail. Additionally, the alternative would affect the northern section of the Holly State Wildlife Area.

Alternative 2: Holly South. This alternative would convert approximately 63 acres of agricultural land to a transportation use. However, this land has limited development potential due to adjacent floodplains. This alternative also would cross planned trails shown in
Figure 6-5. Additionally, the alternative would affect the northern section of the Holly State Wildlife Area.

The Build Alternatives would not affect residents' ability to access important community facilities and services in Holly. This is because the alternative would not change how residents currently access these facilities or services.

The Build Alternatives are not compatible with planning documents or future development areas. The planning document applicable to the town is a (recreational) trails plan. The Build Alternatives are located in areas where these trails are planned; therefore, it is not compatible with this plan. Future development areas are expected to occur west of town near U.S. 50 (commercial), northeast of town (residential), and northwest of town (industrial). The Build Alternatives would be compatible with the commercial and residential development because it could move U.S. 50 closer to the commercial development and farther away from the residential development. However, it is not compatible with the industrial development area because U.S. 50 would be moved away from this area.



Source: Prowers County 2006 (county-planned trails only)

Figure 6-5. County-Planned (Future) Trails in Holly

The Build Alternatives cross into the Arkansas River floodplain throughout its entire length (i.e., the entire town is located within the floodplain). Since U.S. 50 would be moved to the periphery of town (and so would a portion of the traffic using it), the Build Alternative has the potential to reduce the highway's barrier effect, making it easier for residents to travel within the community.

6.2.18. Section 18: Holly Transition

U.S. 50 is only two lanes in this section; therefore, additional property adjacent to the highway (either north or south of the existing lanes) would be needed to construct the Build Alternative. This land is currently being used for agricultural activities; therefore the Build Alternative would change this agricultural use (up to 110 acres) to a transportation use.

The Build Alternative would not affect the following land use and social considerations in the Holly Transition between Holly and the Colorado-Kansas border:

- Compatibility with planning documents—because the planning document applicable to this area shows U.S. 50 at its existing location
- Conservation easements—because no easements were identified
- Public lands—because the Build Alternative does not cross onto any of the identified properties
- Residents' ability to access important community facilities and services—because none were identified

The Build Alternative in this area would affect the Arkansas River floodplain in several locations.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify specific effects to land use and social considerations by the Build Alternatives. However, the following mitigation strategies have been developed to ensure that negative effects to these considerations are minimized during Tier 2 studies.

- CDOT should assist communities with their efforts to preserve the Preferred Alternative right of way around their communities. This assistance could include helping them draft zoning ordinances or buy development rights for the property. In 2005, all 13 communities (nine municipalities and four counties) participating in the U.S. 50 Tier 1 EIS project passed resolutions of support for the project. Those resolutions stated that the jurisdictions will "work with the Colorado Department of Transportation to develop and implement corridor preservation strategies for the route selected as the preferred corridor…" (PACOG 2005, Otero County 2005, Bent County 2005, Prowers County 2005, Town of Fowler 2005, Town of Manzanola 2005, City of Rocky Ford 2005, Town of Swink 2005, City of La Junta 2005, City of Las Animas 2005, Town of Granada 2005, Town of Holly 2005).
- All reasonable efforts should be made to maintain the functionality of existing pedestrian trails during and after construction.
- Federal regulations require that construction within a floodplain does not significantly alter the floodplain. Therefore, efforts will be made during Tier 2 studies to ensure that the design of the highway follows this requirement.
- If Tier 2 actions result in effects to the Cottonwood Links Golf Course, Fowler officials have indicated in the past that they would be amenable to altering the course layout (CDOT 2002). To minimize disruption and loss of revenue to the facility, new holes should be constructed prior to affecting the existing holes, and changes to the course should be made during the course's low-use season (the course is open year-round).
- If Tier 2 actions result in a direct effect to the Granada School District Property, CDOT will undertake its property acquisition process. Also, CDOT should evaluate possible increases in traffic noise that could result from this impact during Tier 2 studies.
- All acquisitions and relocations (i.e., property acquisition) will comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

8. References

Aangeenbrug, L. (Colorado Conservation Trust) Apr 7, 2006. Existing conservation easements in the project area.

Areas and Activities of State Interest Act of 1974. CRS 24-65.1-101, et seq. 1974.

Bent County. Resolution 2005-14. Jun 20, 2005.

Bent County, City of Las Animas. Bent County/City of Las Animas comprehensive plan. 2002. [Bent County/City of Las Animas 2002]

Bent County Clerk. Jun 26, 2006. Existing conservation easements in the project area.

Black, T. (Lamar area wildlife manager, Colorado Parks and Wildlife (CPW)). Apr 20, 2009. State wildlife areas in the project area.

Black, T. (Lamar area wildlife manager), Smith, M. (conservation biologist), Will, B. (Colorado Parks and Wildlife (CPW)). Nov 5, 2007. State wildlife areas in the project area.

Chavez, K. (Lower Arkansas Valley Water Conservation District) kchavez@centurytel.net. Jun 7, 2006. Existing conservation easements in the project area.

City of La Junta. Resolution R-7-2007. Jan 16, 2007.

City of La Junta. Resolution R-14-2005. May 16, 2005.

City of La Junta. Zoning ordinance. 2006.

City of La Junta Planning Commission. Minutes from planning commission proceedings. Dec 21, 2006.

City of Las Animas. Resolution 14-05. Jul 12, 2005.

City of Pueblo. Zoning ordinance. Available from: http://pueblo.us/cgi-bin/gt/tpl_page.html,template=1&content=282&nav1=1&. Site accessed Jun 19, 2006.

City of Rocky Ford. Resolution 11 (2005 series). Jun 14, 2005.

City of Rocky Ford. Zoning ordinance. 2006.

Colorado Counties, Inc. Colorado counties map and information. County office locations in Colorado. Available from: http://www.ccionline.org/counties.htm. Site accessed Apr 30, 2007.

Colorado Department of Local Affairs (DOLA). Las Animas Community Revitalization Partnership team visit. Denver, CO: Colorado Community Revitalization Association; Jul 13-14, 2006. p 18.

Colorado Department of Local Affairs (DOLA). Population estimates by county and municipality (2000-2008). Available from: http://www.dola.state.co.us/dlg/demog/pop_totals.html. Site accessed Feb 2010.

Colorado Department of Local Affairs (DOLA), Colorado State University (CSU) Cooperative Extension. 2004 DOLA/CSU Rural Technical Assistance Program annual report. Denver, CO: DOLA and CSU; 2004. p 45.

Colorado Department of Natural Resources, Colorado State Parks (DNR). Colorado statewide comprehensive outdoor recreation plan. Denver, CO: Colorado State Parks; 2008. Available from: http://parks.state.co.us/Trails/LWCF/SCORPplan/. Site accessed Dec 2009.

Colorado Department of Public Health and Environment (CDPHE). Ambulatory surgical centers in Colorado. Available from: http://www.cdphe.state.co.us/hf/static/asc.htm. Site accessed Oct 10, 2006. [CDPHE 2006a]

Colorado Department of Public Health and Environment (CDPHE). Community clinics in Colorado. Available from: http://www.cdphe.state.co.us/hf/static/ccec.htm. Site accessed Oct 10, 2006. [CDPHE 2006b]

Colorado Department of Public Health and Environment (CDPHE). Hospitals in Colorado. Available from: http://www.cdphe.state.co.us/hf/static/hospital.htm. Site accessed Oct 10, 2006. [CDPHE 2006c]

Colorado Department of Public Health and Environment (CDPHE). Rural health clinics in Colorado. Available from: http://www.cdphe.state.co.us/hf/static/rhc.htm. Site accessed Oct 10, 2006. [CDPHE 2006d]

Colorado Department of Transportation (CDOT). A corridor selection study: A plan for U.S. 50. Colorado Springs, CO: Colorado Department of Transportation (CDOT), Region 2; Sept 2003.

Colorado Department of Transportation (CDOT). Future traffic volumes of SH050B from MP 315 to MP 467. Available from: http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic. Site accessed Feb 2, 2010. [CDOT 2010a]

Colorado Department of Transportation (CDOT). Land ownership in Colorado (geographic information system data). Dec 31, 2004. Available from: http://www.dot.state.co.us/App_DTD_DataAccess/GeoData/index.cfm?fuseaction=GeoDataMain&MenuType=GeoData. Site accessed Sept 20, 2005. [CDOT 2004a]

Colorado Department of Transportation (CDOT). Notes from bus tour conducted in Fowler, Colorado, as part of A corridor selection study: A plan for U.S. 50. Colorado Department of Transportation (CDOT), Region 2; May 2, 2002.

Colorado Department of Transportation (CDOT). Public airports in Colorado (geographic information system data). Dec 31, 2004. Available from: http://www.dot.state.co.us/App_DTD_DataAccess/GeoData/index.cfm?fuseaction=GeoDataMain&MenuType=GeoData. Site accessed Sept 20, 2005. [CDOT 2004b]

Colorado Department of Transportation (CDOT). Traffic information for SH050B from MP 315 to MP 467. Available from: http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic. Site accessed Feb 2, 2010. [CDOT 2010b]

Colorado Department of Transportation (CDOT). U.S. 50 Tier 1 EIS community workshops report. Colorado Springs, CO: Colorado Department of Transportation (CDOT), Region 2; Aug 2006. [CDOT 2006a]

Colorado Department of Transportation (CDOT). U.S. 50 Tier 1 EIS Section 4(f) resources evaluation data collection summary. Colorado Springs, CO: Colorado Department of Transportation (CDOT), Region 2; Sept and Oct 2006. [CDOT 2006b]

Colorado Parks and Wildlife (CPW). State wildlife area boundaries (geographic information system data). ESRI ArcGIS 9.0. Published Apr 17, 2003.

Colorado Emergency Resource Mobilization Plan Working Group (CERMPWG). Colorado emergency resource inventory report. Emergency resources agencies in Colorado. Colorado Department of Public Safety. Available from: http://dfs.state.co.us/FireDeptInfo.htm. Site accessed Oct 11, 2006.

Colorado Office of Economic Development and International Trade (OEDIT). Bent County community assessment: Final SWOT analysis assessment report. Denver, CO: OEDIT; Feb 2, 2006. p 14. [OEDIT 2006a]

Colorado Office of Economic Development and International Trade (OEDIT). City of La Junta community assessment: Final SWOT analysis assessment report. Denver, CO: OEDIT; Apr 3, 2006. p 16. [OEDIT 2006b]

Colorado Office of Economic Development and International Trade (OEDIT). Rocky Ford community assessment: Final SWOT analysis assessment report. Denver, CO: OEDIT; May 31, 2005. p 14.

Council on Environmental Quality (CEQ) regulations for implementing NEPA. 40 CFR Parts 1500-1508. 1978.

Dearcos, L. (Transportation Director, Rocky Ford R-2 School System). Oct 13, 2006 and Nov 7, 2006. School bus stop and route information.

DiGiorgio, M. (Southern Rockies Ecosystem Project) Apr 24, 2006. Existing conservation easements in the project area.

Ewing, M. (Colorado Open Lands) mewing@coloradoopenlands.org. Jun 9 and 12, 2006. Existing conservation easements in the project area.

Federal Emergency Management Agency (FEMA). Flood insurance rate map: Bent County (unincorporated area). U.S. Department of Housing and Urban Development, Federal Insurance Administration; Nov 15, 1977.

Federal Emergency Management Agency (FEMA). Flood insurance rate map: City of La Junta, Colorado. Federal Emergency Management Agency (FEMA); Dec 1, 1982.

Federal Emergency Management Agency (FEMA). Flood insurance rate map: City of Pueblo, Colorado. Federal Emergency Management Agency (FEMA); Sept 29, 1986.

Federal Emergency Management Agency (FEMA). Flood insurance rate map: Otero County, Colorado (unincorporated area). Federal Emergency Management Agency (FEMA); Aug 19, 1985.

Federal Emergency Management Agency (FEMA). Flood insurance rate map: Prowers County, Colorado (unincorporated area). U.S. Department of Housing and Urban Development, Federal Insurance Administration; Jul 12, 1977.

Federal Emergency Management Agency (FEMA). Flood insurance rate map: Pueblo County, Colorado (unincorporated area). Federal Emergency Management Agency (FEMA); Sept 29, 1989.

Federal Highway Administration (FHWA) Technical Advisory T6640.8A. Guidance for preparing and processing environmental and Section 4(f) documents. Oct 30, 1987. Available from: http://www.fhwa.dot.gov/legsregs/directives/techadvs/t664008a.htm. Site accessed Oct 13, 2005.

Hallman, H. (The Greenlands Reserve) May 10, 2006 and Jul 12 and 14, 2006. Existing conservation easements in the project area.

Hartless, T. (Transportation Director, Fowler R-4J School District). Oct 13, 2006. School bus stop and route information.

Historical Census Browser. Population data. Charlottesville, VA: University of Virginia Library. Available from: http://fisher.lib.virginia.edu/collections/stats/histcensus/. Site accessed Feb 2007.

Larson, K. (Colorado Coalition of Land Trusts) Apr 11, 2006. Existing conservation easements in the project area.

Malone, J. (Granada town clerk) May 30, 2007. Ambulance service in the town of Granada.

McElroy, N. (Transportation Director, Swink 33 School District). Oct 17, 2006. School bus stop and route information.

Melon, B. (Director of Transportation, Pueblo County School District 70). Oct 13, 2006. School bus stop and route information.

Moore, J. (Colorado Open Lands) Apr 28, 2006. Existing conservation easements in the project area.

National Center for Education Statistics (NCES). Public school districts. 2003-2004 school year. Available from: http://nces.ed.gov/ccd/districtsearch/. Site accessed Oct 11, 2006.

National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

National Environmental Policy Act (NEPA) Regulations. 23 CFR 771. 1987.

National Park Service (NPS). Amache National Historic Landmark draft site development concept. Obtained from the Town of Granada Clerk on Jul 18, 2007.

The Nature Conservancy (TNC). Conservation easements: What are conservation easements?. Available from: http://www.nature.org/aboutus/howwework/conservationmethods/privatelands/conservationeasements/about/art14925.html. Site accessed May 10, 2007.

Otero County. Resolution 2005-010. May 16, 2005.

Otero County. Zoning ordinance. 2006.

Otero County Clerk. Jun 27, 2006 and Jul 13, 2006. Existing conservation easements in the project area.

Ott-Jones, C. (Park Superintendent, Bent's Old Fort National Historic Site (NHS)) Apr 18, 2007. Routes used by visitors to access Bent's Old Fort National Historic Site (NHS).

Prowers County. Resolution 2005-11. Jun 20, 2005.

Pryor, J. (Transportation Director, Las Animas Re-1 School District). Oct 16, 2006. School bus stop and route information.

Pueblo Area Council of Governments (PACOG). 2030 Comprehensive Plan.

Pueblo Area Council of Governments (PACOG 2015). *2040 Long-Range Transportation Plan*. Pueblo, CO: PACOG, 2Nov. 2015. Web.http://www.pacog.net/

Pueblo Area Council of Governments (PACOG). Resolution 2005-022. Jun 30, 2005.

Peters, T. (district ranger, Comanche National Grassland) Apr 20, 2007. Routes used by visitors to access the Comanche National Grassland.

Prowers County. Arkansas River Trails Plan. 2006.

Prowers County. Prowers County Master Plan. 2003.

Prowers County Clerk. Jun 26, 2006. Existing conservation easements in the project area.

PublicLibraries.com. Public libraries in Colorado. Available from: http://www.publiclibraries.com/colorado.htm. Site accessed Apr 30, 2007.

Pueblo County. Zoning ordinance. Available from: http://pueblo.us/cgi-bin/gt/tpl_page.html,template=1&content=282&nav1=1&. Site accessed Jun 19, 2006.

Pueblo County Clerk. Jul 13, 2006. Existing conservation easements in the project area.

Rose, J. (Arkansas Valley Preservation Land Trust and Otero County Land Trust). Apr 11, 2006. Existing conservation easements in the project area.

Rosmarino, N. (Southern Plains Land Trust) Apr 10, 2006. Existing conservation easements in the project area.

Smith, N. (The Nature Conservancy) Apr 11, 2006. Existing conservation easements in the project area.

Spring, J. (Trust for Public Land) Apr 13, 2006. Existing conservation easements in the project area.

Town of Fowler. 2040 comprehensive plan. Feb 2009.

Town of Fowler. Resolution 682-05. Jun 14, 2005.

Town of Fowler. Zoning ordinance. 2006.

Town of Granada. Resolution 2-2005. Jul 13, 2005.

Town of Holly. Resolution 2005-4. Jul 6, 2005.

Town of Manzanola. Resolution 05-03. Jun 16, 2005.

Town of Manzanola. Zoning ordinance. 2006.

Town of Swink. Resolution 2005-7. Jun 13, 2005.

Town of Swink. Zoning ordinance. 2006.

Town of Swink Clerk. May 30, 2007. Emergency services in the town of Swink.

Transportation Director (Holly RE-3 School District). Oct 27, 2006. School bus stop and route information.

Transportation Director (Manzanola 3J School District). Nov 3, 2006. School bus stop and route information.

Transportation Staff (East Otero R-1 School District). Oct 13, 2006. School bus stop and route information.

Transportation Staff (Granada RE-1 School District). Oct 13, 2006. School bus stop and route information.

U.S. Department of Agriculture (USDA) Aerials. USDA Aerial Photography Field Office. Flown Jun. 2004.

U.S. Department of Commerce, Economics, and Statistics Administration, U.S. Census Bureau. *State and County QuickFacts: Population Estimates.* 2006. Web. Jul. 2009. <http://quickfacts.census.gov/qfd/states/>.

U.S. Department of Commerce, Economics, and Statistics Administration, U.S. Census Bureau. *1960 United States Census.* Washington, D.C. 1960. Web. 12 Dec. 2006. <http://dola.colorado.gov/dlg/demog/pop_totals.html>.

U.S. Department of Commerce, Economics, and Statistics Administration, U.S. Census Bureau. *2000 United States Census.* Washington, D.C. 2000. Web. 12 Dec. 2006. <http://dola.colorado.gov/dlg/demog/pop_totals.html>.

U.S. Postal Service (USPS). USPS locator. Available from: http://www.switchboard.com/usps.1355/dir/6_0/index.htm?mem=1355. Site accessed Apr 30, 2007.

Vanderway, D. (Palmer Land Trust) Apr 11, 2006. Existing conservation easements in the project area.

Wagner, B. (American Farmland Trust) Apr 13, 2006. Existing conservation easements in the project area.

West, C. (Colorado Cattleman's Agricultural Land Trust) Jul 7, 2006. Existing conservation easements in the project area.

Winner, J. (Lower Arkansas Valley Water Conservancy District) Apr 18, 2006. Existing conservation easements in the project area.

Worley, J. (Rocky Ford Economic Development office) May 30, 2007. Ambulance service in the city of Rocky Ford.

Yahoo!, Inc. Local Yellow Pages. Yahoo, Inc. Available from: http://yp.yahoo.com/. Site accessed Apr 30, 2007.

This page left intentionally blank.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overviews for Land Use and Social Considerations

These resource methodology overviews are attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 (corridor location) decision.

Table A-1. Resource Methodology for Land Use

Methodology Overview	Land Use	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Current land use information/data obtained from community records and/or community leaders • Right-of-way information obtained from community records (where available) • Aerial photography • Discussions with community leaders and other residents • DOLA • Land use, planning, and mitigation documents/plans of governmental and quasi-governmental organizations (i.e., Lower Arkansas and Southeastern Colorado water conservancy districts) • State roadway network	Review and update Tier 1 data search and collect additional data required to complete the appropriate Tier 2 analysis
Collection and/or Analysis Methodology	• In communities without long-range land use planning, the project will assist the communities in the identification of community-specific priorities, values, quality of life issues, economic development opportunities, development constraints, and other factors necessary to develop a long-range vision for land use in the jurisdiction • The project will evaluate decisions related to transportation and subsequent mitigation strategies within the context of the communities' goals • Additional land use information will be gathered through discussions with community leaders, residents, and agencies • Existing land use plans will be used in the development of potential interchange locations	Update Tier 1 analysis sufficient for standard NEPA documentation

Methodology Overview	Land Use	
	Tier 1	**Tier 2**
	• Evaluation of existing state roadways within the specific jurisdictional boundaries appropriate for exchange with locals as a trade-off for new U.S. 50 facility and the associated impacts • Additional impacts to farmland will be reviewed for remaining or adjacent parcels in which the function will be impaired (access, irrigation changes, etc.) or that farmable acreage is reduced to a size that is impractical	
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo, Colorado to the Colorado-Kansas state line	Land use activities located in or adjacent to the Tier 2 SIU boundaries
Impacts	A GIS overlay process will be used to identify impacts on currently developed and undeveloped lands	A GIS overlay process will be used to identify impacts on developed and undeveloped lands where alternative footprint and construction disturbance zones extend into parcels adjacent to U.S. 50
Mitigation Options	Potential mitigation strategies will be identified in terms of the types of CDOT/FHWA actions appropriate at the Tier 2 studies level and at the policy level (e.g., actions outside of CDOT authority). Strategies will take into account community-specific priorities, values, quality of life concerns, economic development, sustainability goals and opportunities, desire for growth, and other factors.	Update and implement agreements developed during Tier 1
Deliverables	• Land Use Technical Memorandum identifying the influence of transportation investments on the growth and distribution of development, including strategies such as zoning ordinances to be adopted by corridor communities for the purpose of implementing corridor preservation and land use control • Development of corridor preservation, access and roadway exchange guidelines, and agreements with local jurisdictions that compliment local visions	Land Use Report, including compliance with applicable agreements as appropriate for Tier 2 SIU-level NEPA documentation
Guidance/ Requirements	• Colorado Planning Law (§24-65.1, CRS) • Oregon Department of Transportation Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements (2001)	

Table A-2. Resource Methodology Overview for Social Considerations

Methodology Overview	Social Considerations	
	Tier 1	Tier 2
Subject Areas	Community cohesion/division, neighborhood impacts, accessibility of facilities and services, consistency with adopted land use plans and policies	
Relevant Data/ Information Sources	• Demographic information obtained primarily from the Demography Section of DOLA • Information obtained from the corridor counties, communities, and planning agencies	Review and update Tier 1 data search and collect additional data required to complete the appropriate Tier 2 analysis
Collection and/or Analysis Methodology	• Comments collected from individuals and groups within the project area • Data on businesses/schools/public facilities used by residents • Selected data will be entered into a GIS database to create maps demonstrating social and mobility patterns of the communities, as well as the impacts of alternatives on community cohesion and other relevant issues • GIS maps demonstrating the boundaries of community residential areas, community economic and travel boundaries, routes and methods of travel within and leaving the community, and historical impacts on communities and individuals	Review Tier 1 analysis and collect additional data required to complete the appropriate Tier 2 analysis
Project Area	Tier 1 project study area limits	Tier 2 specific SIU community(ies)
Impacts	Qualitative assessment of impacts to community function	Qualitative assessment of impacts to community function
Mitigation Options	Location decisions developed to minimize disruption to community function	To be determined during Tier 2 SIU projects
Deliverables	Social Considerations Technical Memorandum detailing data collected and recommendations	Social Considerations Technical Report, documenting implementation of strategies to minimize disruption as appropriate for Tier 2 SIU-level NEPA documentation
Regulatory Guidance/ Requirements	Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21)	

This page left intentionally blank.

Appendix B. Abbreviations and Acronyms

BLM	Bureau of Land Management
CDOT	Colorado Department of Transportation
CPW	Colorado Department of Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPW	Colorado Parks and Wildlife
CR	County Road
CRS	Colorado Revised Statutes
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
NEPA	National Environmental Policy Act of 1969
OEDIT	Office of Economic Development and International Trade
PACOG	Pueblo Area Council of Governments
SH	State Highway
SIU	Section of independent utility
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TNC	The Nature Conservancy
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. 50 Tier 1 Environmental Impact Statement
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
USACE	U.S. Army Corps of Engineers

This page left intentionally blank.

Appendix C. Important Community Facilities and Services

Table C-1 lists the important community facilities and services identified for this analysis. More information about how these items were identified can be found in Section 4.3.

Table C-1. Important Community Facilities and Services Identified

Type of Facility or Service	Site Type	Site Name
Pueblo County		
Government facility	Post office	U.S. Postal Service facility
Government facility	Community center	McHarg Community Center
Medical facility	Community clinic	Pueblo Community Health Center
Public school	Elementary school	Avondale Elementary School
Public school	Junior-senior high school	Futures Academy
Public recreational facility	Park	Andres Galarraga Park (baseball field)
Pueblo		
Emergency services agency	Fire	Pueblo Fire Department
Emergency services agency	Fire	Pueblo Rural Fire District
Emergency services agency	Police	Colorado State Patrol
Emergency services agency	Police	Colorado State Patrol
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Pueblo City-County Library District, Barkman Branch
Medical facility	Ambulatory surgical center	Doctors Surgery Center, Inc.
Medical facility	Ambulatory surgical center	HealthSouth Pueblo Surgery Center
Medical facility	Community clinic	Pueblo Community Health Center
Public airport	Airport	Pueblo Memorial Airport
Public school	Elementary school	Belmont Elementary School
Public school	Elementary school	Benjamin Franklin Elementary School
Public school	Elementary school	Bradford Elementary School
Public school	Elementary school	Eva R. Baca Elementary School
Public school	Elementary school	Haaff Elementary School
Public school	Elementary school	Park View Elementary School
Public school	Elementary school	Spann Elementary School
Public school	High school	East High School
Public school	Junior high school	James H. Risley Middle School
Public school	Junior high school	W.H. Heaton Middle School
Public recreational facility	Golf course	Walking Stick Golf Course
Public recreational facility	Park	University Park (Colorado State University–Pueblo campus)
Public recreational facility	Park	Drew Dix Park
Public recreational facility	Park	Belmont 35th Filing Park

Type of Facility or Service	Site Type	Site Name
Public recreational facility	Park	Belmont Park
Public recreational facility	Park	Portland Park
Public recreational facility	Park	Eastwood Park
Public recreational facility	Park	St. Anne's Park
Public recreational facility	Park	Mitchell Park
Public recreational facility	Park	Trailhead Park
Public recreational facility	Park	El Centro de Quinto Sol
Public recreational facility	Park	Andres Galarraga Park (baseball field)
Public recreational facility	School recreational facility	Heaton School Park
Public recreational facility	School recreational facility	Belmont School Playground
Public recreational facility	School recreational facility	Haaff School Park
Public recreational facility	School recreational facility	East High School recreational facilities
Public recreational facility	School recreational facility	Franklin School Park
Public recreational facility	School recreational facility	Eastwood School Park
Public recreational facility	School recreational facility	Spann School Park
Public recreational facility	School recreational facility	Fountain School Park
Public recreational facility	School recreational facility	Park View School playground
Public recreational facility	School recreational facility	Risley School Park
Otero County		
None	None	None
Fowler		
Emergency services agency	Ambulance	Fowler City Ambulance
Emergency services agency	Fire	Fowler Rural Fire Protection District
Emergency services agency	Police	Fowler Police Department
Government facility	City/town hall	Fowler town hall
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Fowler Public Library
Government facility	Senior citizens center	Fowler Senior Center
Public school	Elementary school	Fowler Elementary School
Public school	High school	Fowler High School
Public school	Junior high school	Fowler Junior High School
Public recreational facility	Golf course	Cottonwood Links Golf Course
Public recreational facility	Park	Fowler city park
Public recreational facility	Pool	Fowler city pool
Public recreational facility	School recreational facility	Fowler School District
Manzanola		
Emergency services agency	Ambulance	Manzanola Emergency Medical Service
Emergency services agency	Fire	Manzanola Rural Fire Protection District
Emergency services agency	Police	Manzanola Police Department and Marshal's Office
Government facility	City/town hall	Manzanola Town Hall

Type of Facility or Service	Site Type	Site Name
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Manzanola School and Public Library
Government facility	Senior citizens center	Manzanola Senior Citizens Center
Public school	Elementary school	Manzanola Elementary School
Public school	Junior-senior high school	Manzanola Junior-Senior High School
Public recreational facility	Park	Depot Park (planned facility)
Public recreational facility	Park	Manzanola town park
Public recreational facility	Park	Miller Park
Public recreational facility	School recreational facility	Manzanola Elementary School
Public recreational facility	School recreational facility	Manzanola Junior-Senior High School
Rocky Ford		
Emergency services agency	Fire	Rocky Ford Fire Department
Emergency services agency	Police	Rocky Ford Police Department
Government facility	City/town hall	Rocky Ford City Building
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Rocky Ford Public Library
Government facility	Senior citizens center	Rocky Ford Senior Citizens Center
Medical facility	Community clinic	Rocky Ford Clinic
Medical facility	Rural health clinic	Rocky Ford Family Health Center
Public school	Elementary school	Liberty Elementary School
Public school	Elementary school	Washington Primary School
Public school	High school	Rocky Ford High School
Public school	Junior high school	Jefferson Middle School
Public recreational facility	Fairgrounds	Arkansas Valley Fairgrounds
Public recreational facility	Golf course	Rocky Ford Golf Course
Public recreational facility	Park	Crystal Lake Park
Public recreational facility	Park	Depot Park
Public recreational facility	Park	Library Park
Public recreational facility	Park	Open space median
Public recreational facility	Park	Memorial Park
Public recreational facility	Park	Railroad Park
Public recreational facility	Park	Welcome Center Park
Public recreational facility	Park	Babcock Park
Public recreational facility	School recreational facility	Liberty Elementary School
Swink		
Government facility	City/town hall	Swink town hall
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Swink School and Public Library
Government facility	Senior citizens center	Swink Senior Citizens Center
Public school	Elementary school	Swink Elementary School
Public school	Junior-senior high school	Swink Junior-Senior High School

Type of Facility or Service	Site Type	Site Name
Public recreational facility	Park	Swink town park
Public recreational facility	School recreational facility	Swink Elementary School
Public recreational facility	School recreational facility	Swink Junior-Senior High School
La Junta		
Emergency services agency	Ambulance	La Junta Ambulance
Emergency services agency	Fire	La Junta Rural Fire Protection District
Emergency services agency	Police	Colorado State Patrol
Emergency services agency	Police	La Junta Police Department
Emergency services agency	Police	Otero County Sheriff's Office
Government facility	City/town hall	La Junta city building
Government facility	County facility/services	Otero County government building
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	La Junta Woodruff Memorial Library
Government facility	Senior citizens center	La Junta Senior Citizens Center
Medical facility	Community clinic	La Junta Clinic
Medical facility	Hospital (level IV trauma center)	Arkansas Valley Regional Medical Center
Public airport	Airport	La Junta Municipal Airport
Public school	Elementary school	La Junta Primary School
Public school	High school	La Junta High School
Public school	High school	Tiger Learning Center
Public school	Junior high school	La Junta Intermediate School
Public school	Junior high school	La Junta Middle School
Public recreational facility	Park	King Arroyo Mini Park
Public recreational facility	Park	Potter Park
Public recreational facility	Park	Santa Fe Park
Public recreational facility	Park	Veteran's Park
Public recreational facility	Park	Edison Park
Public recreational facility	Park	C.L. Red Crane Tot Park
Public recreational facility	Park	City Park
Public recreational facility	Park	Prairie View Heights Development
Public recreational facility	School recreational facility	La Junta Intermediate School
Public recreational facility	School recreational facility	Xeriscape Park
Public recreational facility	School recreational facility	College Overlook (Martinez) (Otero Junior College)
Public recreational facility	School recreational facility	Sports and Recreation Complex (Otero Junior College)
Bent County		
Government facility	Post office	U.S. Postal Service facility
Public recreational facility	Park	Hasty Community Park

Type of Facility or Service	Site Type	Site Name
Las Animas		
Emergency services agency	Ambulance	Bent County Ambulance Service
Emergency services agency	Fire	Las Animas-Bent County Fire Department
Emergency services agency	Police	Las Animas Police Department
Government facility	City/town hall	Las Animas City Building
Government facility	Community center	Bent County Community Center
Government facility	Community center	Arkansas Valley Community Center
Government facility	County facility/services	Bent County Government Building
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Bent County Library District
Government facility	Senior citizens center	Bent County Senior Center
Medical facility	Community clinic	Las Animas Clinic
Medical facility	Rural health clinic	Bent County Nursing Service Authority
Public airport	Airport	Las Animas City and County Airport
Public school	Elementary school	Columbian Elementary School
Public school	High school	Las Animas High School
Public school	Junior high school	Las Animas Middle School
Public school	Junior-senior high school	Las Animas Alternative School
Public recreational facility	Fairgrounds	Fairgrounds
Public recreational facility	Golf course	Las Animas Golf Course
Public recreational facility	Park	Leonard Hudnall Park
Public recreational facility	Park	Las Animas City Park
Public recreational facility	Park and swimming pool	Park/pool
Public recreational facility	Recreational facility	City baseball field
Public recreational facility	Recreational facility	County baseball fields
Public recreational facility	School recreational facility	Columbian Elementary School
Public recreational facility	School recreational facility	Las Animas Middle School
Public recreational facility	School recreational facility	Las Animas School District
Public recreational facility	School recreational facility	Memorial School (Jump Start Learning Center)
Prowers County		
None	None	None
Granada		
Emergency services agency	Fire	Granada Volunteer Fire Department
Emergency services agency	Police	Granada Police Department
Government facility	City/town hall	Granada Town Hall
Government facility	Post office	U.S. Postal Service facility
Public school	Elementary school	Granada Elementary School
Public school	High school	Granada Undivided High School
Public recreational facility	Park	Park
Public recreational facility	School recreational facility	Granada School District

Type of Facility or Service	Site Type	Site Name
Holly		
Emergency services agency	Ambulance	Holly Volunteer Ambulance Service
Emergency services agency	Fire	Holly Fire Department
Emergency services agency	Police	Holly Police Department
Government facility	City/town hall	Holly town hall
Government facility	Community center/senior citizens center	Holly Senior-Community Center
Government facility	Post office	U.S. Postal Service facility
Government facility	Public library	Holly Public Library
Public airport	Airport	Holly Airport
Public school	Elementary school	Shanner Elementary School
Public school	Jr./high school	Holly Junior-Senior High School
Public recreational facility	Park	Baseball fields
Public recreational facility	Park	Holly Gateway Park
Public recreational facility	School recreational facility	Holly Elementary School
Public recreational facility	School recreational facility	Holly School District

Sources: CDOT 2006a, CERMPWG 2006, Yahoo 2007, Yahoo 2007, Colorado Counties, Inc. 2007, USPS 2007, PublicLibraries.com 2007, CDPHE 2006a, CDPHE 2006b, CDPHE 2006c, CDPHE 2006d, CDOT 2004b, NCES 2006, CDOT 2006a, CDOT 2006b

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Minority and Low-Income Populations Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... ii
2. Resource Definitions ... 2
2.1. Minority and Low-Income Populations ... 2
2.2. Limited English Proficiency Populations ... 3
2.3. Migrant Worker Housing ... 3
3. Applicable Laws, Regulations, and Guidance ... 4
4. Methodology ... 5
4.1. Relevant Data or Information Sources ... 5
4.2. Data Collection and Analysis Methodology ... 6
4.3. Project Area ... 7
4.4. Effects ... 7
4.5. Mitigation Options ... 8
4.6. Deliverables ... 8
5. Existing Conditions ... 9
5.1. Minority Populations ... 9
5.2. Limited English Proficiency ... 11
5.3. Low-Income Populations ... 14
5.4. Migrant Housing Complexes ... 15
6. Effects ... 16
6.1. No-Build Alternative ... 16
6.2. Build Alternatives ... 16
7. Mitigation Strategies ... 19
8. References ... 20
Appendices ... 21
Appendix A. Resource Methodology Overview for Minority and Low-Income Populations ... 23
Appendix B. Abbreviations and Acronyms ... 25
Appendix C. Tables (C-1 through C-6) ... 27

Tables

Table 4-1. Number of Census Block Groups by Project County 6
Table 5-1. Racial Composition for the Study Area, State, and Counties 10
Table 5-2. Hispanic or Latino Population 11
Table 5-3. Limited English Proficiency of Project Area Census Block Groups 12
Table 5-4. Low-Income Households by County and Study Area Block Groups within County 15

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 6-1. Build Alternatives Overview 17

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 287) in its project area, since they share the same alignment. The Finding of No Significant Impact (FONSI) for the project was signed on November 10, 2014. The EA/FONSI identified a proposed action that bypasses the city of Lamar to the east. The proposed action of the *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definitions

The information in this technical memorandum identifies minority and low-income populations, also referred to as environmental justice populations. Environmental justice is closely related to Title VI of the Civil Rights Act of 1964.This Title protects individuals from discrimination on the grounds of race, age, color, religion, disability, sex, and national origin. In accordance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," federal agencies are mandated to identify and address any disproportionately high and adverse effects on minority and/or low-income populations. The Order also directs federal agencies to provide access for minority and low-income communities to public information and meaningful public participation. The three environmental justice principles are:

1. To ensure the full and fair participation of all potentially affected communities in the transportation decision-making process;
2. To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority or low-income populations; and
3. To fully evaluate the benefits and burdens of transportation programs, policies, and activities upon low-income and minority populations.

A disproportionately high and adverse effect on minority and low-income populations means an adverse effect that:

1. Is predominately borne by a minority population and/or a low-income population; or
2. Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non low-income population.

To ensure that potential project impacts would not result in a disproportionately high and adverse impact to minority and low-income populations, this technical memorandum identifies minority and low-income populations, Limited English Proficiency (LEP) populations, and migrant worker housing in the project area.

Outreach strategies used to communicate with minority and low-income populations are not discussed in this technical memorandum. They are described in the U.S. 50 Tier 1 EIS document, in Chapter 6, Community Outreach and Agency Involvement.

2.1. Minority and Low-Income Populations

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (February 11, 1994), directs all federal agencies to determine whether a proposed action would have a disproportionately high and adverse impact on minority and/or low-income populations. The USDOT Order 5610.2(a), *Final DOT Environmental Justice Order,* defines minority persons as the following groups from the U.S. Census:

- Black or African American (persons having origins in any of the black racial groups of Africa)
- Hispanic (persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race)
- Asian (persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands)
- American Indian and Alaskan Native (persons having origins in any of the original people of North America and who maintain tribal affiliation or community attachment)
- Native Hawaiian or Other Pacific Islander (persons having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands)

Low-income is defined in the USDOT Order as a person of any race whose household income (or median household income in the case of a community or group) is at or below the U.S. Department of Health and Human Services' poverty guidelines.

2.2. Limited English Proficiency Populations

Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency," requires all federal fund recipients to provide meaningful access to persons who are limited in their English proficiency. The U.S. Department of Justice defines LEP individuals as those "who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English" (67 Federal Register [FR] 41459).

2.3. Migrant Worker Housing

Migrant workers are those individuals who frequently change residences for the purposes of employment. In the Lower Arkansas Valley, most migrant workers are involved in agricultural activities, such as harvesting crops. Migrant worker housing complexes are identified because residents of these housing complexes are more likely to have lower incomes than other residents.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 CFR 771), the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500–1508), Executive Order 12898, USDOT Order 5610.2(a), and the Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21), the following regulations, guidance, and orders mandate that decision makers consider environmental justice in the context of certain federal actions:

- Title VI of the Civil Rights Act of 1964, as amended
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency
- Federal-Aid Highway Act of 1970
- Americans with Disabilities Act of 1990
- Uniform Act of 1970, as amended
- Title VI Regulations, 49 Code of Federal Regulations (CFR) §21 and 23 CFR §200
- Environmental Impact and Related Procedures, 23 CFR §771
- FHWA Order 6640.23A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- FHWA Environmental Policy Statements 1990 and 1994
- Environmental justice section of CDOT NEPA Manual (2013)

4. Methodology

The U.S. 50 Corridor East project is a Tier 1 EIS. “Tiering” for this process means that the NEPA analyses 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 include existing quantitative data, qualitative information, or both. Mitigation strategies (not necessarily specific mitigation activities) and corridor-wide mitigation opportunities are identified. Additionally, the Tier 1 EIS identifies sections of independent utility (SIUs) and provides 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 U.S. 50 facility beginning at Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 are used by the project’s resource specialists as guidelines to ensure that their activities are relevant to the Tier 1 decision (i.e., corridor location). As the resource specialists conduct their work, data sources or analysis factors are added or removed. The final actions of the resource specialists are described in the following sections. The resource methodology overview for minority and low-income populations 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

Data from the 2010 Census and American Community Survey (ACS) 5-Year Estimates (2007–2011) was evaluated at the block group level. The number of census block groups varies by county as shown in Table 4-1.

Table 4-1. Number of Census Block Groups by Project County

County	Number of Census Block Groups
Pueblo	33
Otero	20
Bent	5
Prowers	6
Total	**64**

Source: 2010 Census (a)

In addition to ACS data, data from the U.S. Department of Housing and Urban Development (HUD) was used to identify income thresholds by county for low-income households.

Migrant housing complexes were identified using information provided by local migrant housing agencies in each project county.

4.2. Data Collection and Analysis Methodology

The following data collection and analysis methodologies were used to evaluate minority populations, LEP populations, low-income populations, and migrant housing complexes for the U.S. 50 Tier 1 EIS.

4.2.1. Minority Populations Methodology

To determine if a minority population is present within the project study area, 2010 Census data for race and Hispanic or Latino ethnicity was obtained for each of the 64 block groups, each city or town, each county, and the state of Colorado. If the total percentage of minority residents in a block group is 50 percent or greater, or if the percentage of minority residents is greater than 10 percentage points higher than the county percentage, the block group is considered to have a minority population concentration.

Hispanic or Latino is classified as an ethnicity rather than a race in the U.S. Census, to avoid double counting because a person who self-identifies as Hispanic or Latino may be of any race.

4.2.2. LEP Population Methodology

Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency," requires all federal fund recipients to provide meaningful access to persons who are limited in their English proficiency. The U.S. Department of Justice defines LEP individuals as those "who do not speak English as their primary language and who have a limited ability to read, write, speak, or understand English" (67 Federal Register [FR] 41459).

Transportation projects applying for federal funds must ensure they comply with their obligations to provide written translations in languages other than English. The U.S. Department of Transportation's (USDOT) Policy Guidance Concerning Recipients' Responsibilities to Limited English Proficient Persons (2005b) outlines the circumstances that can provide a "safe harbor" for recipients regarding the requirements for translation of written documents.

This guidance defines the Safe Harbor threshold as either 5 percent of the total adult population in the study area or 1,000 adult persons within a particular language group who speak English less than "Very Well." Data were used from the ACS 5-Year Estimates (2007–2011) to identify adults aged 18 or older who speak English less than "Very Well" by language group. Results of the LEP analysis are shown in Table 5-3. The study area meets the U.S. Department of Justice's Safe Harbor threshold requirement for presence of a Spanish LEP population.

4.2.3. Low-Income Populations Methodology

To identify the low-income population or residents living below the poverty level, the methodology outlined in *CDOT's NEPA Manual* (2013) was followed. This includes a combination of U.S. Census data, ACS data, and HUD data.

The low-income threshold for each county was calculated and is shown in Table 5-4. This income limit was then applied to ACS data to identify the percentage of households considered low-income. The ACS data provides household income in $5,000 increments. If the 30 percent Income Limit is within a $5,000 increment—for example, $15,214 is within the $15,000 to $19,999 increment—all households in that increment and below (regardless of the number of individuals in the household) are considered low income. This methodology is consistent with *CDOT's NEPA Manual* in calculating low-income populations.

The low-income threshold for each county applies to the communities and block groups within that county. The percentage of households considered low-income was calculated for each of the 64 block groups and communities in the study area counties. These values then were compared to their respective county to identify low-income populations in the study area. Detailed tables showing the percentage of households considered low-income by block group are included in Appendix C.

4.2.4. Migrant Housing Complexes Methodology

According to DOT Order 5610.2(a), a minority population means any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

Migrant housing complexes were identified to determine whether the Build Alternatives would affect their inhabitants (i.e., migrant workers) more than other residents. Migrant workers are those individuals who frequently change residences for the purposes of employment. In the Lower Arkansas Valley, most migrant workers are involved in agricultural activities, such as harvesting crops. This issue was evaluated because residents of migrant housing complexes are more likely to have lower incomes than other residents.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS is defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from I-25 in Pueblo, Colorado, to 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 the project would be located. The study area is 1,000 feet wide centered on the corridor alternatives, beginning on or near the existing U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

Effects to minority populations, LEP populations, low-income populations, and migrant housing complexes were assessed using a geographic information system (GIS) application and other information (described in Section 4.2). The locations of environmental justice communities and migrant housing complexes were compared to the location of the Build Alternatives to identify how the Build Alternatives could affect these populations or housing complexes.

4.5. Mitigation Options

Specific mitigation activities will be identified during Tier 2 studies (when the roadway footprint, or alignment, is identified) to ensure participation in Tier 2 decision-making processes by minority and low-income populations. These activities may include avoidance, minimization, or both.

4.6. Deliverables

This Minority and Low-Income Populations Technical Memorandum is the primary deliverable being prepared for the U.S. 50 Tier 1 EIS related to environmental justice populations.

5. Existing Conditions

The following sections document existing conditions within the project area for minority, LEP, and low-income populations and migrant worker housing.

5.1. Minority Populations

Census data from 2010 shows the minority population percentage of the project area is higher in comparison to the state of Colorado and the four counties in the project area (see Table 5-1). The largest census minority group is “Some Other Race”. This is consistent with the percentage of residents who are Hispanic or Latino (see Table 5-2). Hispanic or Latino is an ethnic category and can include persons of any race; as a result, many people of Hispanic or Latino heritage often will identify as “Some Other Race.”

Table 5-1. Racial Composition for the Study Area, State, and Counties

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
Colorado	5,029,196	4,089,202	81.3	201,737	4.0	56,010	1.1	139,028	2.8	6,623	0.1	364,140	7.2	172,456	3.4	939,994	18.7
Pueblo County	159,063	126,229	79.4	3,222	2.0	3,055	1.9	1,258	0.8	160	0.1	19,285	12.1	5,854	3.7	32,834	20.6
Total of Study Area Block Groups in Pueblo County	40,782	30,708	75.3	866	2.1	838	2.1	525	1.3	63	0.2	6,209	15.2	1,573	3.9	10,074	24.7
Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1	2,690	14.3	718	3.8	4,043	21.5
Total of Study Area Block Groups in Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1	2,690	14.3	718	3.8	4,043	21.5
Bent County	6,499	5,149	79.	496	7.6	156	2.4	62	1.0	4	0.1	506	7.8	126	1.9	1,350	20.8
Total of Study Area Block Groups in Bent County	6,499	5,149	79.2	496	7.6	156	2.4	62	1.0	4	0.1	506	7.8	126	1.9	1,350	20.8
Prowers County	12,551	10,165	81.0	64	0.5	112	0.9	38	0.3	2	0.0	1,848	14.7	322	2.6	2,386	19.0
Total of Study Area Block Groups in Prowers County	5,106	4,348	85.2	20	0.4	33	0.6	12	0.2	1	0.0	598	11.7	94	1.8	758	14.8

Source: U.S. Census Bureau, Census 2010, Table P3, "Race"
[1]Study Area is total of 64 Census Block Groups in the Project Area.

Table 5-2. Hispanic or Latino Population

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Study Area[1]	71,218	31,023	43.6
Colorado	5,029,196	1,038,687	20.7
Pueblo County	159,063	65,811	41.4
Total of Study Area Block Groups in Pueblo County	40,782	20,051	49.2
Otero County	18,831	7,596	40.3
Total of Study Area Block Groups in Otero County	18,831	7,596	40.3
Bent County	6,499	1,985	30.5
Total of Study Area Block Groups in Bent County	6,499	1,985	30.5
Prowers County	12,551	4,417	35.2
Total of Study Area Block Groups in Prowers County	5,106	1,391	27.2

Source: U.S. Census Bureau, Census 2010, Table P4, "Hispanic or Latino Origin"
Note: Hispanic or Latino is an ethnic category and can include persons of any race; therefore, the Hispanic or Latino percentages are presented exclusive of race.
[1]Study Area is total of 64 Census Block Groups in the Project Area.

This information is itemized by block group in tabular format in Appendix C.

The percentages of Non-White or total minority populations in individual census block groups range from a low of 4.9 percent (located in Prowers County) to a high of 39.5 percent (located in Otero County). Of the project area's 64 census block groups:

- 40 have minority population percentages higher than the state of Colorado (18.7 percent).
- 35 have minority population percentages higher than the project counties combined (20.6 percent).

The percentage of Hispanic or Latino residents in the study area (43.6 percent) is double the percentage for the state of Colorado (20.7 percent). Several block groups in Pueblo County in the study area are more than 75 percent Hispanic or Latino.

5.2. Limited English Proficiency

As previously stated in the methodology section of this report, transportation projects applying for federal funds must ensure they comply with their obligations to provide written translations in languages other than English. The U.S. Department of Transportation's Policy Guidance Concerning Recipients' Responsibilities to Limited English Proficient Persons (2005b) outlines the circumstances that can provide a "safe harbor" for recipients regarding the requirements for translation of written documents.

This guidance defines the Safe Harbor threshold as either 5 percent of the total adult population in the study area or 1,000 adult persons within a particular language group who speak English less than "Very Well." Data were used from the ACS 5-Year Estimates (2007–2011) to identify adults aged 18 or older who speak English less than "Very Well" by language group. Results of the LEP analysis are shown in Table 5-3. The combined population of the 64 census block groups in the project area meets the U.S. Department of Justice's Safe Harbor threshold requirement for presence of a Spanish LEP population. The presence of a

Spanish LEP population is expected due to the high percentage of Hispanic or Latino residents in the study area.

In accordance with the Safe Harbor provisions, written translations of important documents should be provided for the Spanish LEP language group in addition to other measures assuring meaningful access. These other measures include providing notice of citizens' Right to Language Access for all future project meetings and using interpreters when deemed necessary to help with public participation. Additional detail on outreach to Spanish-speaking residents in the project area will be included in the U.S. 50 Tier 1 EIS.

Table 5-3. Limited English Proficiency of Project Area Census Block Groups

County	2010 Census Geography	Total Adult Population	Primary Language Group of Person Who Speak English Less than Very Well							
			Spanish		Other Indo-Euro		Asian/ Pacific		Other	
			#	%	#	%	#	%	#	%
Pueblo	CT 05, BG 1	769	90	11.7	0	0.0	0	0.0	0	0.0
	CT 08, BG 1	833	49	5.9	0	0.0	0	0.0	0	0.0
	CT 08, BG 2	756	93	12.3	0	0.0	0	0.0	0	0.0
	CT 08, BG 3	838	214	25.5	0	0.0	8	1.0	0	0.0
	CT 09.02, BG 1	743	0	0.0	0	0.0	0	0.0	0	0.0
	CT 09.02, BG 2	1,160	11	0.9	0	0.0	0	0.0	0	0.0
	CT 09.02, BG 3	633	0	0.0	0	0.0	20	3.2	0	0.0
	CT 09.02, BG 4	715	86	12.0	0	0.0	0	0.0	0	0.0
	CT 09.02, BG 5	1,035	10	1.0	0	0.0	0	0.0	0	0.0
	CT 09.03, BG 1	662	0	0.0	15	2.3	0	0.0	0	0.0
	CT 09.04, BG 1	1,028	33	3.2	0	0.0	0	0.0	0	0.0
	CT 09.04, BG 2	836	31	3.7	0	0.0	0	0.0	0	0.0
	CT 09.04, BG 3	1,620	120	7.4	65	4.0	0	0.0	0	0.0
	CT 09.05, BG 1	1,083	0	0.0	12	1.1	0	0.0	0	0.0
	CT 09.05, BG 2	746	43	5.8	0	0.0	4	0.5	0	0.0
	CT 10, BG 1	1,039	177	17.0	0	0.0	0	0.0	0	0.0
	CT 10, BG 2	925	105	11.4	0	0.0	0	0.0	0	0.0
	CT 10, BG 3	644	6	0.9	0	0.0	0	0.0	0	0.0
	CT 10, BG 4	742	47	6.3	0	0.0	0	0.0	0	0.0
	CT 11, BG 1	616	12	1.9	0	0.0	0	0.0	0	0.0
	CT 11, BG 2	536	13	2.4	0	0.0	0	0.0	0	0.0
	CT 11, BG 3	538	82	15.2	0	0.0	0	0.0	17	3.2
	CT 12, BG 2	959	125	13.0	0	0.0	0	0.0	0	0.0
	CT 29.03, BG 1	1,967	0	0.0	0	0.0	0	0.0	0	0.0
	CT 29.03, BG 2	2,835	25	0.9	43	1.5	150	5.3	0	0.0
	CT 30.01, BG 1	1,133	77	6.8	0	0.0	0	0.0	0	0.0
	CT 30.04, BG 1	1,093	4	0.4	4	0.4	0	0.0	0	0.0
	CT 30.04, BG 2	1,098	8	0.7	25	2.3	9	0.8	0	0.0

County	2010 Census Geography	Total Adult Population	Primary Language Group of Person Who Speak English Less than Very Well							
			Spanish		Other Indo-Euro		Asian/ Pacific		Other	
			#	%	#	%	#	%	#	%
	CT 32, BG 2	714	0	0.0	0	0.0	0	0.0	0	0.0
	CT 32, BG 3	770	46	6.0	0	0.0	0	0.0	0	0.0
	CT 35, BG 2	669	104	15.5	0	0.0	0	0.0	15	2.2
	CT 36, BG 1	855	130	15.2	0	0.0	0	0.0	0	0.0
	CT 36, BG 2	453	23	5.1	0	0.0	0	0.0	0	0.0
Otero	CT 9680, BG 1	728	20	2.7	3	0.4	0	0.0	0	0.0
	CT 9680, BG 2	421	0	0.0	0	0.0	0	0.0	0	0.0
	CT 9681, BG 1	570	155	27.2	0	0.0	0	0.0	0	0.0
	CT 9681, BG 2	759	147	19.4	0	0.0	0	0.0	0	0.0
	CT 9681, BG 3	562	39	6.9	0	0.0	0	0.0	0	0.0
	CT 9682, BG 1	809	34	4.2	0	0.0	0	0.0	0	0.0
	CT 9682, BG 2	615	31	5.0	0	0.0	0	0.0	0	0.0
	CT 9682, BG 3	831	54	6.5	0	0.0	0	0.0	0	0.0
	CT 9683, BG 1	538	0	0.0	0	0.0	0	0.0	0	0.0
	CT 9683, BG 2	791	19	2.4	0	0.0	0	0.0	12	1.5
	CT 9683, BG 3	985	10	1.0	7	0.7	0	0.0	0	0.0
	CT 9683, BG 4	583	23	3.9	7	1.2	0	0.0	0	0.0
	CT 9684, BG 1	922	62	6.7	0	0.0	0	0.0	0	0.0
	CT 9685, BG 1	771	26	3.4	0	0.0	0	0.0	0	0.0
	CT 9685, BG 2	449	0	0.0	0	0.0	0	0.0	0	0.0
	CT 9686, BG 1	856	58	6.8	0	0.0	0	0.0	0	0.0
	CT 9686, BG 2	363	14	3.9	0	0.0	0	0.0	0	0.0
	CT 9686, BG 3	890	0	0.0	0	0.0	32	3.6	0	0.0
	CT 9686, BG 4	1,047	0	0.0	0	0.0	0	0.0	0	0.0
	CT 9686, BG 5	614	35	5.7	0	0.0	0	0.0	0	0.0
Bent	CT 9667, BG 1	781	14	1.8	0	0.0	0	0.0	0	0.0
	CT 9667, BG 2	778	42	5.4	0	0.0	0	0.0	0	0.0
	CT 9667, BG 3	907	20	2.2	0	0.0	0	0.0	0	0.0
	CT 9667, BG 4	625	17	2.7	0	0.0	0	0.0	0	0.0
	CT 9667, BG 5	2,004	247	12.3	0	0.0	0	0.0	0	0.0

County	2010 Census Geography	Total Adult Population	Primary Language Group of Person Who Speak English Less than Very Well							
			Spanish		Other Indo-Euro		Asian/ Pacific		Other	
			#	%	#	%	#	%	#	%
Prowers	CT 1, BG 1	528	5	0.9	0	0.0	0	0.0	0	0.0
	CT 1, BG 2	513	18	3.5	0	0.0	3	0.6	0	0.0
	CT 6, BG 1	451	29	6.4	0	0.0	0	0.0	0	0.0
	CT 6, BG 2	532	52	9.8	0	0.0	0	0.0	0	0.0
	CT 7, BG 1	730	168	23.0	0	0.0	0	0.0	0	0.0
	CT 7, BG 2	993	11	1.1	0	0.0	0	0.0	0	0.0
Total		53,989	**3,114**	**5.8**	181	0.3	226	0.4	44	0.1

Source: U.S. Census Bureau, ACS 5-Year Estimates (2007–2011), Table B16004
**Total adult population are persons age 18 and over.*

5.3. Low-Income Populations

The results of the low-income analysis are shown in Table 5-4. The percent of households were calculated by following the methodology in *CDOT's NEPA Manual*. Table 5-4 includes the percentage of low-income households for each county, as well as the total of the block groups within the project area, within each county. This information is itemized by block group in tabular format in Appendix C.

Pueblo, Otero, and Prowers counties each have a notably higher percentage of households that are considered low-income when compared to the state of Colorado. The percentage total of the study area block groups within Pueblo County is higher when compared to Pueblo County, which indicates a low-income concentration around U.S. 50 in Pueblo County.

Due to the geographic size and limited number of block groups in Otero and Bent counties, the percentage of low-income households is the same number for the county and total of block groups within the study area. The percentage total of study area block groups with Prowers County is lower when compared to Prowers County, which indicates the low-income population of Prowers County is not concentrated on U.S. 50.

Table 5-4. Low-Income Households by County and Study Area Block Groups within County

2010 Census Geography	FY 2013 30% AMI[1]	Total HH	Number of Households by Household Income in the Past 12 Months			Low Income Households	
			Less than $10,000	$10,000 to $14,999	$15,000 to $19,999[2]	Subtotal	% of Total
Colorado	$18,375	1,941,193	122,221	88,005	88,479	298,705	15.4
Pueblo County	$15,214	61,858	6,265	4,501	4,196	14,962	24.2
Total of Study Area Block Groups in Pueblo County		15,973	2,208	1,324	1,144	4,676	29.3
Otero County	$15,124	7,453	1,069	742	739	2,550	34.2
Total of Study Area Block Groups in Otero County		7,453	1,069	742	739	2,550	34.2
Bent County	$14,890	1,975	237	80	--	317	16.1
Total of Study Area Block Groups in Bent County		1,975	237	80	--	317	16.1
Prowers County	$15,142	4,996	562	477	376	1,415	28.3
Total of Study Area Block Groups in Prowers County		2045	141	201	162	504	24.6

Source: U.S. Census Bureau, ACS 5-Year Estimates (2007–2011), Table B19001
[1]The 30% Average Median Income (AMI) (low income threshold) was calculated for each county using the method from the CDOT NEPA Manual (March 2013) as applied to HUD FY 2013 Income Limits. County low income threshold applies to all communities within that county.
[2]If a FY2013 30% AMI falls within an income range, all households in that income range are included in the estimate of low-income households.

5.4. Migrant Housing Complexes

Six migrant housing complexes were identified in the project area. Five of the complexes are located within or near cities or towns, including Pueblo, Manzanola, Las Animas, Granada, and Holly. The other complex is located between Las Animas and Lamar (in Bent County near the unincorporated area known as McClave). The complexes primarily consist of apartments and duplexes; however, the McClave site also includes four single-family units.

6. Effects

The following sections discuss the potential of the No-Build Alternative and the Build Alternatives to affect minority and low-income populations.

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 U.S. 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 and repairs conducted on the existing highway are not expected to result in disproportionately high or adverse effects to minority or low-income populations. The lack of improvements will be felt equally across all population groups in the corridor.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

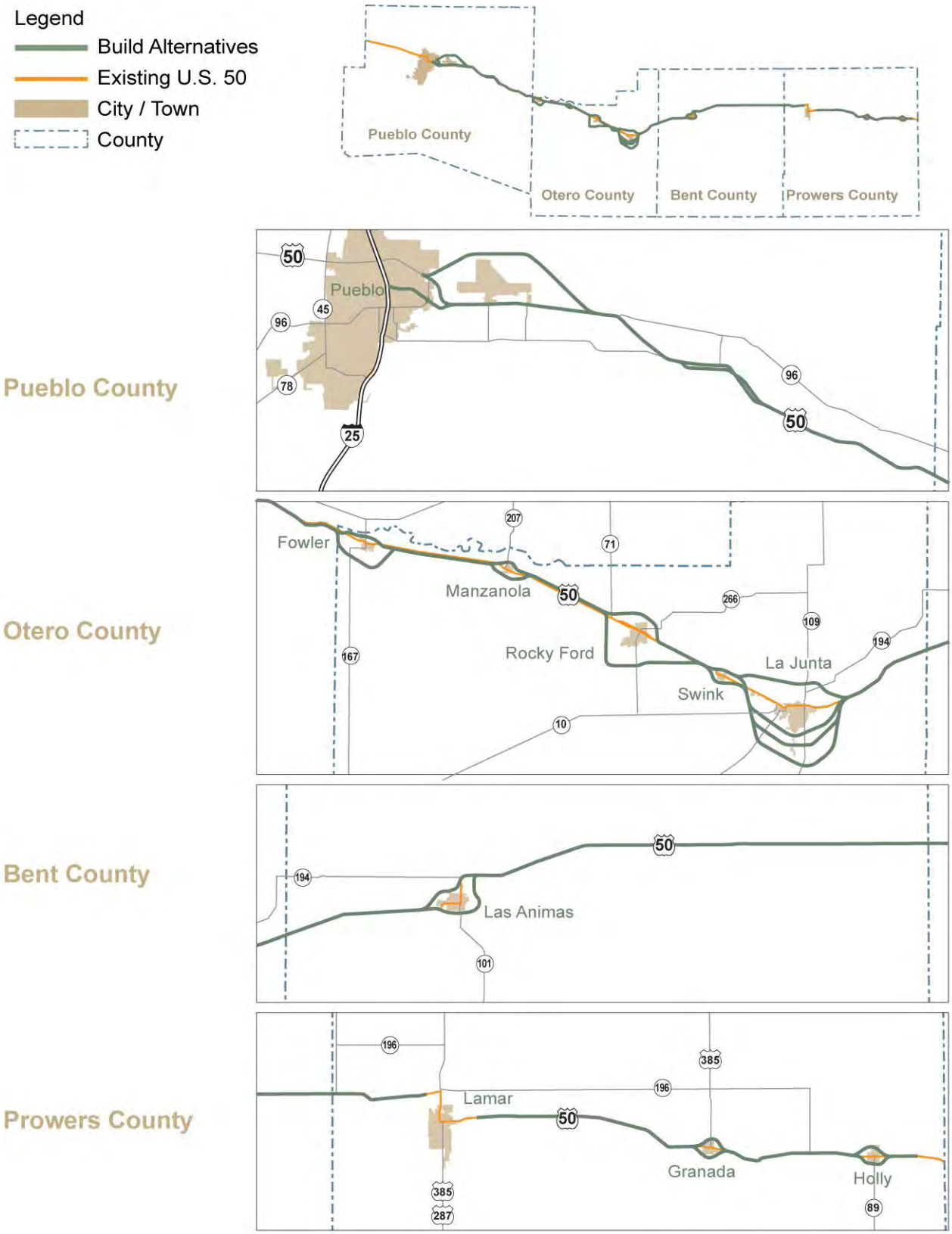


Figure 6-1. Build Alternatives Overview

Hispanic minority and low-income populations exist throughout the study area. Specific impacts to these populations cannot be determined at this time. Additional analysis will be conducted during Tier 2 studies to refine the Build Alternatives. However, during the alternatives development process, CDOT eliminated the alternative of having U.S. 50 go through towns, as it currently does. More households would have been affected by these through-town alternatives, increasing the potential to adversely affect minority or low-income households. As a result, CDOT has reduced the potential to adversely affect minority and/or low-income households. The Build Alternatives do not affect any identified migrant housing complexes in the project area.

Based on the percentage and distribution of minorities and low-income households, none of the alternatives within the Build Alternatives have direct effects on minority or low-income populations that are different (disproportionate) in comparison to the general population on a corridor-wide basis.

The Tier 1 impact analysis for all environmental resources was reviewed to identify the potential for adverse effects and project benefits on all segments of the population, including minority and low-income population groups. Benefits primarily relate to transportation benefits throughout the corridor (improved safety and reliability). Adverse impacts to minority and/or low-income populations are not likely to exceed those of the general population. Assessing the distribution of localized adverse impacts requires more detailed project information (design and construction details) than can be determined at this first tier. The lead agencies recognize this limitation at Tier 1 and commit to conducting more in-depth impact analysis during Tier 2 studies, when more detailed design and construction information has been developed and impacts are evaluated at the local level.

The types of localized impacts that could occur from implementation of the Build Alternatives in Tier 2 studies include property acquisition for right of way; displacements of businesses and residences; changes in access; localized air, noise, or water pollution; localized disturbance of hazardous wastes, including soil or water contamination; effects to historic properties or community facilities; and changes in public services or facilities relied on by minority or low-income populations.

6.2.1. Environmental Justice Concerns to be Addressed in Tier 2 Studies

This document and the associated Minority and Low-Income Populations Technical Memorandum provide an overview of the minority and low-income populations from a corridor perspective. Most, if not all, of the Tier 2 studies can and will reference updated U.S. Census and ACS data.

Tier 2 studies will use the most current data and guidance, including updated data on affordable housing, to analyze impacts on minority and low-income populations. During Tier 2 studies, CDOT will:

- Develop specific and more detailed mitigation strategies and measures
- Develop best management practices specific to each project
- Adhere to any new laws and regulations that may be in place when Tier 2 studies are underway
- Continue to directly coordinate with local government entities and social services to identify low-income populations along the corridor

Tier 2 studies will develop public involvement to ensure full and fair participation by all potentially affected communities in the transportation decision-making process.

In conclusion, while minority and low-income populations are present throughout the study area, no disproportionately high and adverse impacts are anticipated with this phase of the project. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community.

7. Mitigation Strategies

Appropriate mitigation efforts will be defined during Tier 2 studies. All mitigation efforts will be in compliance with the environmental justice policies of the lead agencies commensurate with the level of effect identified.

Mitigation strategies for social and economic resources will apply to all communities along the corridor and also will benefit minority and low-income populations. If Tier 2 studies conclude that disproportionately high or adverse impacts will occur to minority or low-income populations, CDOT will work to avoid, minimize, or mitigate such impacts. Tier 2 studies that occur in populated areas will consider pockets of minority and/or low-income populations that may require additional attention and/or mitigation for such issues as:

- Localized air quality impacts
- Noise impacts
- Residential and business relocations
- Changes in access or travel patterns
- Loss of community cohesion

The lead agencies will consider mitigation, enhancement measures, and offsetting benefits when determining whether there will be disproportionately high and adverse effects on minority and low-income populations. If after considering these factors, a disproportionately high impact to minority or low-income populations is identified, the project “will only be carried out if further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effects are not practicable. In determining whether a mitigation measure or an alternative is ‘practicable,’ the social, economic (including costs) and environmental effects of avoiding or mitigating the adverse effects will be taken into account” (FHWA Order 6640.23A, June 14, 2012).

8. References

Colorado Department of Transportation (CDOT). *Environmental Stewardship Guide v2*. Denver, CO: Colorado Department of Transportation, May 2005. Print.

Council on Environmental Quality (CEQ). *Environmental Justice Guidance Under the National Environmental Policy Act.* Washington, D.C.: CEQ, 10 Dec. 1997. Print.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA*. 40 CFR Parts 1500-1508. 2011. Print.

El Valle Farm Labor Housing. *Location of Migrant Housing Complexes in Otero County, Colorado*. Jun. 2009. Print.

Emerald Homes Farm Labor Housing. *Location of Migrant Housing Complexes in Prowers County, Colorado.* Jun. 2009. Print.

Las Animas/Bent County Farm Labor Housing. *Location of Migrant Housing Complexes in Bent County, Colorado.* Jun. 2009. Print.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987. Print.

Presidential Memorandum accompanying Executive Order 12898. *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* 1994. Print.

Pueblo Farm Labor Housing. *Location of Migrant Housing Complexes in Pueblo County, Colorado*. Jun. 2009. Print.

U.S. Congress. Civil Rights Act of 1964, Title VI. 42 USC 2000d et seq. 1964. Print.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969. Print.

U.S. Department of Agriculture (USDA). *Rural Development: Multi-Family Housing Farm Labor Developments in Colorado*. 2009. Web. Jun. 2009. <http://www.rurdev.usda.gov/CO/mfh-farmlabor-comp.htm>.

U.S. Department of Housing and Urban Development (HUD). *FY 2013 Income Limits*. 2013. Print.

U.S. Department of Justice. Executive Order 12898. *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* Washington, D.C.: GPO, 1994. Print.

U.S. Department of Justice. Executive Order 13166. *Improving Access to Services for Persons with Limited English Proficiency (LEP).* Washington, D.C.: GPO, 2000. Print.

U.S. Department of Transportation (USDOT). Order 5610.2(a). *Final DOT Environmental Justice Order*. Washington, D.C.: May 2, 2012. Print.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Order 6640.23A. Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. Washington, D.C.: 14 Jun. 2012. Print.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Technical Advisory T6640.8A. Guidance for Preparing and Processing Environmental and Section 4(f) Documents.* Washington, D.C.: 30 Oct 30 1987. Print.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Minority and Low-Income Populations

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 Minority and Low-Income Populations

Methodology Overview	Minority and Low-Income Populations	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Primary demographic and income data from the U.S. Census Bureau, including: total population, population by race and ethnicity, and income/poverty. Secondary demographic and housing data, including: age, distribution, population density, housing density, housing value, owner/renter ratio, and language spoken • Previous outreach, public involvement or low income and/or minority population activities, comments, studies, evaluations and collected data • Interdisciplinary environmental information and impact issues obtained from other resources, including, hazardous materials studies, land use maps of sensitive receptors, noise studies, traffic maps, and reports addressing resident mobility, etc.	Review and update Tier 1 data search and collect additional data required to complete the appropriate Tier 2 analysis

Methodology Overview	Minority and Low-Income Populations	
	Tier 1	**Tier 2**
Collection and/or Analysis Methodology	• Identify existing low-income and minority populations, adverse effects, and disproportionately high/adverse effects • Describe how affected populations have been involved with the decision making process related to alternatives selection, impact analysis, and mitigation development • Identify and consider low income and/or minority population concerns raised by affected populations	Update Tier 1 analysis sufficient for standard NEPA documentation
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Communities adjacent to Tier 2 specific section of independent utility corridor boundaries
Impacts	Identify existing low-income and minority populations, adverse effects, and disproportionately high/adverse effects	Identify existing low-income and minority populations, adverse effects, and disproportionately high/adverse effects
Mitigation Options	Potential mitigation strategies will be identified in terms of the types of CDOT/FHWA actions appropriate at the Tier 2 studies level and at the policy level (e.g., actions outside of CDOT authority) to ensure participation in Tier 2 decision-making process. Strategies may include avoidance and/or minimization.	Determined during Tier 2 for each specific section of independent utility project
Deliverables	Low-Income and Minority Populations Technical Memorandum documenting all research and recommended Tier 2 strategies	Low-Income and Minority Populations Technical Report documenting all research, findings, and compliance with strategies as appropriate for Tier 2 section of independent utility level of NEPA documentation
Regulatory Guidance/ Requirements	• FHWA Technical Advisory T6640.8A • 23 USC 109(h) (PL 91-605) and 23 USC 128 • Civil Rights Act of 1964, Title VI • FHWA Order 6640.23, 1998 • USDOT Order 5610.2 on Environmental Justice • CDOT Environmental Justice Guidebook, September 2003 • Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, 1994, and related guidance	

Appendix B. Abbreviations and Acronyms

ACS	American Community Survey
AMI	Average Median Income
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CR	County Road
EA	Environmental Assessment
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FR	Federal Register
HUD	U.S. Department of Housing and Urban Development
I-25	Interstate 25
LEP	Limited English Proficiency
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
NEPA	National Environmental Policy Act of 1969
SH	State Highway
SIU	Section of independent utility
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. 50 Tier 1 Environmental Impact Statement
USDOT	U.S. Department of Transportation

This page left intentionally blank.

Appendix C. Tables (C-1 through C-6)

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

Table C-1. Racial Composition by County and Community

Table C-2. Racial Composition by Block Group

Table C-3. Hispanic or Latino Population by County and Community

Table C-4. Hispanic or Latino Population by Block Group

Table C-5. Low-Income Households by County and Community

Table C-6. Low-Income Households by County and Block Group

Table C-1. Racial Composition by County and Community

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Pueblo County	159,063	126,229	79.4	3,222	2.0	3,055	1.9	1,258	0.8	160	0.1	19,285	12.1	5,854	3.7	32,834	20.6
Pueblo	106,595	80,159	75.2	2,686	2.5	2,381	2.2	890	0.8	112	0.1	16,022	15.0	4,345	4.1	26,436	24.8
Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1	2,690	14.3	718	3.8	4,043	21.5
Fowler	1,182	1,070	90.5	0	0.0	3	0.3	4	0.3	0	0.0	79	6.7	26	2.2	112	9.5
Manzanola	434	321	74.0	3	0.7	9	2.1	2	0.5	0	0.0	81	18.7	18	4.1	113	26.0
Rocky Ford	3,957	2,964	74.9	20	0.5	80	2.0	48	1.2	0	0.0	692	17.5	153	3.9	993	25.1
Swink	617	486	78.8	3	0.5	5	0.8	2	0.3	0	0.0	99	16.0	22	3.6	131	21.2
La Junta	7,077	5,290	74.7	87	1.2	132	1.9	50	0.7	8	0.1	1,169	16.5	341	4.8	1,787	25.3
Bent County	6,499	5,149	79.2	496	7.6	156	2.4	62	1.0	4	0.1	506	7.8	126	1.9	1,350	20.8
Las Animas	2,410	1,932	80.2	18	0.7	67	2.8	21	0.9	0	0.0	301	12.5	71	2.9	478	19.8
Prowers County	12,551	10,165	81.0	64	0.5	112	0.9	38	0.3	2	0.0	1,848	14.7	322	2.6	2,386	19.0
Granada	517	375	72.5	2	0.4	6	1.2	0	0.0	0	0.0	132	25.5	2	0.4	142	27.5
Holly	802	605	75.4	0	0.0	7	0.9	4	0.5	0	0.0	173	21.6	13	1.6	197	24.6
Colorado	5,029,196	4,089,202	81.3	201,737	4.0	56,010	1.1	139,028	2.8	6,623	0.1	364,140	7.2	172,456	3.4	939,994	18.7

Source: U.S. Census Bureau, Census 2010, Table P3, "Race"

Table C-2. Racial Composition by Block Group

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
Pueblo County	159,063	126,229	79.4	3,222	2.0	3,055	1.9	1,258	0.8	160	0.1	19,285	12.1	5,854	3.7	32,834	20.6
CT 05, BG 1	905	644	71.2	21	2.3	28	3.1	5	0.6	4	0.4	148	16.4	55	6.1	261	28.8
CT 08, BG 1	955	688	72.0	55	5.8	22	2.3	1	0.1	0	0.0	159	16.6	30	3.1	267	28.0
CT 08, BG 2	786	530	67.4	7	0.9	28	3.6	10	1.3	5	0.6	183	23.3	23	2.9	256	32.6
CT 08, BG 3	1,290	826	64.0	36	2.8	58	4.5	4	0.3	3	0.2	304	23.6	59	4.6	464	36.0
CT 09.02, BG 1	985	626	63.6	13	1.3	17	1.7	23	2.3	0	0.0	292	29.6	14	1.4	359	36.4
CT 09.02, BG 2	1,606	1,160	72.2	49	3.1	38	2.4	18	1.1	4	0.2	239	14.9	98	6.1	446	27.8
CT 09.02, BG 3	1,060	793	74.8	18	1.7	12	1.1	20	1.9	4	0.4	172	16.2	41	3.9	267	25.2
CT 09.02, BG 4	1,086	745	68.6	52	4.8	36	3.3	0	0.0	0	0.0	157	14.5	96	8.8	341	31.4
CT 09.02, BG 5	1,065	905	85.0	22	2.1	11	1.0	9	0.8	3	0.3	79	7.4	36	3.4	160	15.0
CT 09.03, BG 1	777	552	71.0	86	11.1	6	0.8	31	4.0	4	0.5	41	5.3	57	7.3	225	29.0
CT 09.04, BG 1	1,621	1,339	82.6	16	1.0	13	0.8	28	1.7	0	0.0	164	10.1	61	3.8	282	17.4
CT 09.04, BG 2	965	712	73.8	8	0.8	26	2.7	11	1.1	1	0.1	184	19.1	23	2.4	253	26.2
CT 09.04, BG 3	1,764	1,426	80.8	28	1.6	31	1.8	22	1.2	1	0.1	196	11.1	60	3.4	338	19.2
CT 09.05, BG 1	1,215	974	80.2	33	2.7	26	2.1	22	1.8	1	0.1	118	9.7	41	3.4	241	19.8

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
CT 09.05, BG 2	987	676	68.5	43	4.4	17	1.7	27	2.7	1	0.1	162	16.4	61	6.2	311	31.5
CT 10, BG 1	1,786	1,127	63.1	33	1.8	61	3.4	14	0.8	2	0.1	493	27.6	56	3.1	659	36.9
CT 10, BG 2	1,203	773	64.3	26	2.2	25	2.1	4	0.3	0	0.0	296	24.6	79	6.6	430	35.7
CT 10, BG 3	878	614	69.9	6	0.7	48	5.5	1	0.1	1	0.1	167	19.0	41	4.7	264	30.1
CT 10, BG 4	891	685	76.9	16	1.8	10	1.1	1	0.1	4	0.4	137	15.4	38	4.3	206	23.1
CT 11, BG 1	1,073	702	65.4	10	0.9	17	1.6	3	0.3	2	0.2	288	26.8	51	4.8	371	34.6
CT 11, BG 2	890	586	65.8	4	0.4	34	3.8	1	0.1	0	0.0	252	28.3	13	1.5	304	34.2
CT 11, BG 3	871	559	64.2	11	1.3	42	4.8	3	0.3	1	0.1	222	25.5	33	3.8	312	35.8
CT 12, BG 2	1,079	683	63.3	15	1.4	26	2.4	4	0.4	0	0.0	316	29.3	35	3.2	396	36.7
CT 29.03, BG 1	1,944	1,686	86.7	17	0.9	29	1.5	55	2.8	5	0.3	108	5.6	44	2.3	258	13.3
CT 29.03, BG 2	3,957	2,994	75.7	136	3.4	51	1.3	120	3.0	7	0.2	502	12.7	147	3.7	963	24.3
CT 30.01, BG 1	1,244	977	78.5	11	0.9	24	1.9	3	0.2	3	0.2	166	13.3	60	4.8	267	21.5
CT 30.04, BG 1	1,521	1,381	90.8	23	1.5	7	0.5	35	2.3	2	0.1	35	2.3	38	2.5	140	9.2
CT 30.04, BG 2	1,200	1,094	91.2	17	1.4	12	1.0	24	2.0	0	0.0	34	2.8	19	1.6	106	8.8
CT 32, BG 2	1,024	921	89.9	7	0.7	16	1.6	5	0.5	1	0.1	39	3.8	35	3.4	103	10.1
CT 32, BG 3	1,153	971	84.2	7	0.6	18	1.6	2	0.2	2	0.2	128	11.1	25	2.2	182	15.8
CT 35, BG 2	805	600	74.5	18	2.2	15	1.9	8	1.0	0	0.0	129	16.0	35	4.3	205	25.5
CT 36, BG 1	1,482	1,130	76.2	20	1.3	28	1.9	4	0.3	1	0.1	250	16.9	49	3.3	352	23.8
CT 36, BG 2	714	629	88.1	2	0.3	6	0.8	7	1.0	1	0.1	49	6.9	20	2.8	85	11.9

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
Otero County	18,831	14,788	78.5	143	0.8	338	1.8	143	0.8	11	0.1	2,690	14.3	718	3.8	4,043	21.5
CT 9680, BG 1	1,015	953	93.9	0	0.0	7	0.7	0	0.0	0	0.0	39	3.8	16	1.6	62	6.1
CT 9680, BG 2	602	527	87.5	0	0.0	1	0.2	4	0.7	0	0.0	59	9.8	11	1.8	75	12.5
CT 9681, BG 1	961	642	66.8	1	0.1	25	2.6	1	0.1	0	0.0	253	26.3	39	4.1	319	33.2
CT 9681, BG 2	1,059	702	66.3	11	1.0	21	2.0	15	1.4	0	0.0	262	24.7	48	4.5	357	33.7
CT 9681, BG 3	698	538	77.1	0	0.0	29	4.2	5	0.7	0	0.0	108	15.5	18	2.6	160	22.9
CT 9682, BG 1	852	722	84.7	4	0.5	6	0.7	19	2.2	0	0.0	92	10.8	9	1.1	130	15.3
CT 9682, BG 2	683	553	81.0	2	0.3	13	1.9	14	2.0	0	0.0	72	10.5	29	4.2	130	19.0
CT 9682, BG 3	1,173	959	81.8	5	0.4	14	1.2	14	1.2	0	0.0	126	10.7	55	4.7	214	18.2
CT 9683, BG 1	685	565	82.5	12	1.8	4	0.6	9	1.3	1	0.1	67	9.8	27	3.9	120	17.5
CT 9683, BG 2	1,045	852	81.5	5	0.5	13	1.2	10	1.0	0	0.0	134	12.8	31	3.0	193	18.5
CT 9683, BG 3	1,341	1,081	80.6	12	0.9	15	1.1	10	0.7	0	0.0	193	14.4	30	2.2	260	19.4
CT 9683, BG 4	748	572	76.5	9	1.2	13	1.7	1	0.1	0	0.0	130	17.4	23	3.1	176	23.5
CT 9684, BG 1	1,119	887	79.3	7	0.6	23	2.1	4	0.4	2	0.2	156	13.9	40	3.6	232	20.7

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
CT 9685, BG 1	1,083	972	89.8	7	0.6	16	1.5	6	0.6	0	0.0	58	5.4	24	2.2	111	10.2
CT 9685, BG 2	749	634	84.6	8	1.1	29	3.9	0	0.0	0	0.0	57	7.6	21	2.8	115	15.4
CT 9686, BG 1	1,192	922	77.3	6	0.5	28	2.3	0	0.0	3	0.3	159	13.3	74	6.2	270	22.7
CT 9686, BG 2	778	518	66.6	9	1.2	30	3.9	1	0.1	0	0.0	177	22.8	43	5.5	260	33.4
CT 9686, BG 3	1,163	913	78.5	6	0.5	14	1.2	4	0.3	3	0.3	180	15.5	43	3.7	250	21.5
CT 9686, BG 4	933	564	60.5	7	0.8	30	3.2	11	1.2	0	0.0	253	27.1	68	7.3	369	39.5
CT 9686, BG 5	952	712	74.8	32	3.4	7	0.7	15	1.6	2	0.2	115	12.1	69	7.2	240	25.2
Bent County	6,499	5,149	79.2	496	7.6	156	2.4	62	1.0	4	0.1	506	7.8	126	1.9	1,350	20.8
CT 9667, BG 1	1,036	911	87.9	0	0.0	16	1.5	7	0.7	4	0.4	84	8.1	14	1.4	125	12.1
CT 9667, BG 2	1,052	876	83.3	93	8.8	18	1.7	11	1.0	0	0.0	32	3.0	22	2.1	176	16.7
CT 9667, BG 3	1,090	901	82.7	9	0.8	22	2.0	10	0.9	0	0.0	120	11.0	28	2.6	189	17.3
CT 9667, BG 4	741	606	81.8	4	0.5	19	2.6	9	1.2	0	0.0	75	10.1	28	3.8	135	18.2
CT 9667, BG 5	2,580	1,855	71.9	390	15.1	81	3.1	25	1.0	0	0.0	195	7.6	34	1.3	725	28.1
Prowers County	12,551	10,165	81.0	64	0.5	112	0.9	38	0.3	2	0.0	1,848	14.7	322	2.6	2,386	19.0
CT 1, BG 1	774	736	95.1	3	0.4	5	0.6	0	0.0	0	0.0	13	1.7	17	2.2	38	4.9

2010 Census Geography	Total Population	White		Black or African American		American Indian & Alaska Native		Asian		Native Hawaiian/ Pacific Islander		Some Other Race		Two or More Races		Total-Non-White	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Study Area[1]	71,218	54,993	77.2	1,525	2.1	1,365	1.9	742	1.0	79	0.1	10,003	14.0	2,511	3.5	16,225	22.8
CT 1, BG 2	688	607	88.2	3	0.4	1	0.1	2	0.3	1	0.1	64	9.3	10	1.5	81	11.8
CT 6, BG 1	590	513	86.9	0	0.0	4	0.7	1	0.2	0	0.0	54	9.2	18	3.1	77	13.1
CT 6, BG 2	834	630	75.5	0	0.0	9	1.1	4	0.5	0	0.0	178	21.3	13	1.6	204	24.5
CT 7, BG 1	1,060	819	77.3	2	0.2	11	1.0	3	0.3	0	0.0	202	19.1	23	2.2	241	22.7
CT 7, BG 2	1,160	1,043	89.9	12	1.0	3	0.3	2	0.2	0	0.0	87	7.5	13	1.1	117	10.1

Source: U.S. Census Bureau, Census 2010, Table P3, "Race"
[1]Study Area is total of 64 Block Groups

Table C-3. Hispanic or Latino Population by County and Community

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Pueblo County	159,063	65,811	41.4
Pueblo	106,595	53,098	49.8
Otero County	18,831	7,596	40.3
Fowler	1,182	216	18.3
Manzanola	434	200	46.1
Rocky Ford	3,957	2,338	59.1
Swink	617	171	27.7
La Junta	7,077	3,224	45.6
Bent County	6,499	1,985	30.5
Las Animas	2,410	1,001	41.5
Prowers County	12,551	4,417	35.2
Granada	517	365	70.6
Holly	802	291	36.3
Colorado	5,029,196	1,038,687	20.7

Source: U.S. Census Bureau, Census 2010, Table P4, "Hispanic or Latino Origin"
Note: Hispanic or Latino is an ethnic category and can include persons of any race; therefore, the Hispanic or Latino percentages are presented exclusive of race.

Table C-4. Hispanic or Latino Population by Block Group

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Study Area[1]	71,218	31,023	43.6
Pueblo County	**159,063**	**65,811**	**41.4**
CT 05, BG 1	905	428	47.3
CT 08, BG 1	955	574	60.1
CT 08, BG 2	786	551	70.1
CT 08, BG 3	1,290	892	69.1
CT 09.02, BG 1	985	539	54.7
CT 09.02, BG 2	1,606	900	56.0
CT 09.02, BG 3	1,060	474	44.7
CT 09.02, BG 4	1,086	679	62.5
CT 09.02, BG 5	1,065	405	38.0
CT 09.03, BG 1	777	181	23.3
CT 09.04, BG 1	1,621	565	34.9
CT 09.04, BG 2	965	461	47.8

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Study Area[1]	71,218	31,023	43.6
CT 09.04, BG 3	1,764	662	37.5
CT 09.05, BG 1	1,215	442	36.4
CT 09.05, BG 2	987	479	48.5
CT 10, BG 1	1,786	1,223	68.5
CT 10, BG 2	1,203	921	76.6
CT 10, BG 3	878	563	64.1
CT 10, BG 4	891	623	69.9
CT 11, BG 1	1,073	780	72.7
CT 11, BG 2	890	639	71.8
CT 11, BG 3	871	617	70.8
CT 12, BG 2	1,079	829	76.8
CT 29.03, BG 1	1,944	600	30.9
CT 29.03, BG 2	3,957	1,645	41.6
CT 30.01, BG 1	1,244	488	39.2
CT 30.04, BG 1	1,521	417	27.4
CT 30.04, BG 2	1,200	256	21.3
CT 32, BG 2	1,024	208	20.3
CT 32, BG 3	1,153	527	45.7
CT 35, BG 2	805	356	44.2
CT 36, BG 1	1,482	965	65.1
CT 36, BG 2	714	162	22.7
Otero County	**18,831**	**7,596**	**40.3**
CT 9680, BG 1	1,015	172	16.9
CT 9680, BG 2	602	109	18.1
CT 9681, BG 1	961	712	74.1
CT 9681, BG 2	1,059	695	65.6
CT 9681, BG 3	698	438	62.8
CT 9682, BG 1	852	283	33.2
CT 9682, BG 2	683	169	24.7
CT 9682, BG 3	1,173	512	43.6
CT 9683, BG 1	685	211	30.8
CT 9683, BG 2	1,045	256	24.5
CT 9683, BG 3	1,341	433	32.3
CT 9683, BG 4	748	334	44.7
CT 9684, BG 1	1,119	395	35.3
CT 9685, BG 1	1,083	152	14.0
CT 9685, BG 2	749	191	25.5

2010 Census Geography	Total Population	Hispanic or Latino	
		#	%
Study Area[1]	71,218	31,023	43.6
CT 9686, BG 1	1,192	517	43.4
CT 9686, BG 2	778	509	65.4
CT 9686, BG 3	1,163	573	49.3
CT 9686, BG 4	933	578	62.0
CT 9686, BG 5	952	357	37.5
Bent County	**6,499**	**1,985**	**30.5**
CT 9667, BG 1	1,036	153	14.8
CT 9667, BG 2	1,052	244	23.2
CT 9667, BG 3	1,090	375	34.4
CT 9667, BG 4	741	322	43.5
CT 9667, BG 5	2,580	891	34.5
Prowers County	**12,551**	**4,417**	**35.2**
CT 1, BG 1	774	80	10.3
CT 1, BG 2	688	119	17.3
CT 6, BG 1	590	127	21.5
CT 6, BG 2	834	296	35.5
CT 7, BG 1	1,060	551	52.0
CT 7, BG 2	1,160	218	18.8

Source: U.S. Census Bureau, Census 2010, Table P4, "Hispanic or Latino Origin"
Note: Hispanic or Latino is an ethnic category and can include persons of any race; therefore, the Hispanic or Latino percentages are presented exclusive of race.

Table C-5. Low-Income Households by County and Community

2010 Census Geography	FY 2013 30% AMI[1]	Total HH	Number of Households by Household Income in the Past 12 Months			Low Income Households	
			Less than $10,000	$10,000 to $14,999	$15,000 to $19,999[2]	Subtotal	% of Total
Pueblo County	**$15,214**	**61,858**	**6,265**	**4,501**	**4,196**	**14,962**	**24.2**
Pueblo		43,076	5,491	3,717	3,407	12,615	29.3
Otero County	**$15,124**	**7,453**	**1,069**	**742**	**739**	**2,550**	**34.2**
Fowler		488	51	37	33	121	24.8
Manzanola		172	27	23	29	79	45.9
Rocky Ford		1,588	265	202	173	640	40.3
Swink		219	7	9	29	45	20.5
La Junta		2,823	475	286	353	1,114	39.5
Bent County	**$14,890**	**1,975**	**237**	**80**	**--**	**317**	**16.1**
Las Animas		1,214	211	49	--	260	21.4
Prowers County	**$15,142**	**4,996**	**562**	**477**	**376**	**1,415**	**28.3**
Granada		169	21	16	5	42	24.9
Holly		312	40	66	44	150	48.1
Colorado	**$18,375**	**1,941,193**	**122,221**	**88,005**	**88,479**	**298,705**	**15.4**

Source: U.S. Census Bureau, ACS 5-Year Estimates (2007–2011), Table B19001
[1]The 30% AMI (low income threshold) was calculated for each county using the method from the CDOT NEPA Manual (March 2013) as applied to HUD FY 2013 Income Limits. County low income threshold applies to all communities within that county.
[2]If a FY2013 30% AMI falls within an income range, all households in that income range are included in the estimate of low-income households.

Table C-6. Low-Income Households by County and Block Group

2010 Census Geography	FY 2013 30% AMI[1]	Total HH	Number of Households by Household Income in the Past 12 Months			Low Income Households	
			Less than $10,000	$10,000 to $14,999	$15,000 to $19,999[2]	Subtotal	% of Total
Pueblo County	**$15,214**	**61,858**	**6,265**	**4,501**	**4,196**	**14,962**	**24.2**
CT 05, BG 1		415	8	78	31	117	28.2
CT 08, BG 1		428	64	51	65	180	42.1
CT 08, BG 2		359	53	62	47	162	45.1
CT 08, BG 3		528	77	78	42	197	37.3
CT 09.02, BG 1		397	0	37	56	93	23.4
CT 09.02, BG 2		701	103	31	165	299	42.7
CT 09.02, BG 3		342	20	23	0	43	12.6
CT 09.02, BG 4		451	184	43	24	251	55.7
CT 09.02, BG 5		408	22	0	0	22	5.4
CT 09.03, BG 1		23	0	0	0	0	0.0
CT 09.04, BG 1		576	39	13	10	62	10.8
CT 09.04, BG 2		482	10	64	54	128	26.6
CT 09.04, BG 3		925	215	49	50	314	33.9
CT 09.05, BG 1		655	109	84	0	193	29.5
CT 09.05, BG 2		455	122	20	41	183	40.2
CT 10, BG 1		528	192	39	71	302	57.2
CT 10, BG 2		491	72	34	42	148	30.1
CT 10, BG 3		320	18	26	14	58	18.1
CT 10, BG 4		403	90	63	47	200	49.6
CT 11, BG 1		424	97	39	12	148	34.9
CT 11, BG 2		312	64	11	32	107	34.3
CT 11, BG 3		277	80	11	0	91	32.9
CT 12, BG 2		382	96	37	43	176	46.1
CT 29.03, BG 1		1,028	12	38	73	123	12.0
CT 29.03, BG 2		1,374	45	72	40	157	11.4
CT 30.01, BG 1		537	35	73	71	179	33.3
CT 30.04, BG 1		526	34	11	14	59	11.2
CT 30.04, BG 2		408	17	27	0	44	10.8
CT 32, BG 2		335	14	6	7	27	8.1
CT 32, BG 3		362	43	50	9	102	28.2
CT 35, BG 2		423	124	95	34	253	59.8
CT 36, BG 1		449	129	37	30	196	43.7
CT 36, BG 2		249	20	22	20	62	24.9

2010 Census Geography	FY 2013 30% AMI[1]	Total HH	Number of Households by Household Income in the Past 12 Months			Low Income Households	
			Less than $10,000	$10,000 to $14,999	$15,000 to $19,999[2]	Subtotal	% of Total
Otero County	**$15,124**	**7,453**	**1,069**	**742**	**739**	**2,550**	**34.2**
CT 9680, BG 1		367	32	10	41	83	22.6
CT 9680, BG 2		251	33	27	19	79	31.5
CT 9681, BG 1		375	104	66	36	206	54.9
CT 9681, BG 2		427	96	30	36	162	37.9
CT 9681, BG 3		320	53	39	31	123	38.4
CT 9682, BG 1		464	66	62	0	128	27.6
CT 9682, BG 2		295	0	4	31	35	11.9
CT 9682, BG 3		419	18	102	70	190	45.3
CT 9683, BG 1		295	29	20	0	49	16.6
CT 9683, BG 2		390	30	9	43	82	21.0
CT 9683, BG 3		541	53	54	26	133	24.6
CT 9683, BG 4		287	0	53	38	91	31.7
CT 9684, BG 1		459	52	73	41	166	36.2
CT 9685, BG 1		386	48	12	11	71	18.4
CT 9685, BG 2		229	12	13	7	32	14.0
CT 9686, BG 1		464	158	13	72	243	52.4
CT 9686, BG 2		237	114	43	0	157	66.2
CT 9686, BG 3		465	77	56	52	185	39.8
CT 9686, BG 4		571	94	56	185	335	58.7
CT 9686, BG 5		211	0	0	0	0	0.0
Bent County	**$14,890**	**1,975**	**237**	**80**	**- -**	**317**	**16.1**
CT 9667, BG 1		459	26	31	- -	57	12.4
CT 9667, BG 2		212	0	0	- -	0	0.0
CT 9667, BG 3		525	62	8	- -	70	13.3
CT 9667, BG 4		288	27	34	- -	61	21.2
CT 9667, BG 5		491	122	7	- -	129	26.3
Prowers County	**$15,142**	**4,996**	**562**	**477**	**376**	**1,415**	**28.3**
CT 1, BG 1		300	10	14	2	26	8.7
CT 1, BG 2		261	8	13	8	29	11.1
CT 6, BG 1		233	17	0	9	26	11.2
CT 6, BG 2		312	40	66	44	150	48.1

2010 Census Geography	FY 2013 30% AMI[1]	Total HH	Number of Households by Household Income in the Past 12 Months			Low Income Households	
			Less than $10,000	$10,000 to $14,999	$15,000 to $19,999[2]	Subtotal	% of Total
CT 7, BG 1		389	38	47	27	112	28.8
CT 7, BG 2		550	28	61	72	161	29.3

Source: U.S. Census Bureau, ACS 5-Year Estimates (2007–2011), Table B19001
[1]The 30% AMI (low income threshold) was calculated for each county using the method from the CDOT NEPA Manual (March 2013) as applied to HUD FY 2013 Income Limits. County low income threshold applies to all block groups within that county.
[2]If a FY2013 30% AMI falls within an income range, all households in that income range are included in the estimate of low-income households.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East
Tier 1 Draft Environmental Impact Statement

Section 4(f) and Section 6(f) Resources Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview 1
2. Resource Definition 2
3. Applicable Laws, Regulations, and Guidance 3
3.1. U.S. Department of Transportation Act of 1966, Section 4(f) 3
3.2. Land and Water Conservation Fund Act of 1965, Section 6(f) 3
4. Methodology 4
4.1. Relevant Data or Information Sources 4
4.2. Data Collection and Analysis Methodology 5
4.3. Project Area 7
4.4. Effects 7
4.5. Mitigation Options 8
4.6. Deliverables 8
5. Existing Conditions 9
5.1. Section 4(f) Resources 9
5.2. Section 6(f) Resources 10
6. Effects 11
6.1. No-Build Alternative 11
6.2. Build Alternatives 11
7. Mitigation Strategies 20
7.1. Section 4(f) Historic and Archaeological Resources 20
7.2. Section 4(f) Parklands and Recreational Resources 20
7.3. Section 6(f) Resources 20
8. References 21

Appendices 23
Appendix A. Resource Methodology Overview for Section 4(f) and Section 6(f) Resources 25
Appendix B. Abbreviations and Acronyms 27
Appendix C. Section 4(f) Review Form 29
Appendix D. Historic and Archaeological Resources 31
Appendix E. Parklands and Recreational Resources 49
Appendix F. Section 6(f) Resources 53

Tables

Table 6-1. Potential Use of Section 4(f) Resources for the Build Alternatives by U.S. 50 Corridor Sections 14

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 5-1. Approximate Location of the Santa Fe National Historic Trail, Mountain Branch (portion located within Otero, Bent, and Prowers Counties only) 9
Figure 6-1. Build Alternatives Overview 12

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Section 4(f) of the U.S. Department of Transportation Act of 1966 applies to resources defined by 49 USC 303 as “publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance.” This technical memorandum includes information about the identification of Section 4(f) resources and the potential of the Build Alternatives to use them. The issue of whether the Build Alternatives are the only prudent and feasible ones (in terms of the potential *use* of a resource) is discussed in the Section 4(f) chapter of the U.S. 50 Tier 1 EIS, so it is not examined in this technical memorandum.

The Land and Water Conservation Fund (LWCF) Act of 1965 (Public Law 88-578.78 Stat 897) was enacted with the intent “to assist in preserving, developing, and assuring to all citizens of the United States... such quality and quantity of outdoor recreation resources as may be available and are necessary and desirable for individual active participation.” The LWCF program provides matching grants to state and local governments for the acquisition and development of public outdoor recreation areas and facilities. Properties purchased with these funds are considered Section 6(f) resources.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 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 Section 4(f) and Section 6(f) resources. They are described in more detail below.

- U.S. Department of Transportation Act of 1966, Section 4(f)
- Land and Water Conservation Fund Act of 1965, Section 6(f)

3.1. U.S. Department of Transportation Act of 1966, Section 4(f)

This Act establishes a national policy stating “that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites” (49 USC 303). The use of a Section 4(f) resource cannot be approved unless: (1) there is no prudent and feasible alternative to using the Section 4(f) resource, and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from a use.

3.2. Land and Water Conservation Fund Act of 1965, Section 6(f)

The purpose of this Act is to “assist in preserving, developing, and assuring accessibility to… outdoor recreation resources” (16 USC 460-4). The Act authorizes and provides funds for activities that assist states in planning, acquisition, and development of needed land and water areas and facilities. It also provides funds for federal acquisition and development of certain lands. If LWCF money is or was used to purchase or improve a property, it must be continually maintained as a public recreational use unless the National Park Service (NPS) approves replacement lands of equal value, location, and usefulness.

4. Methodology

The U.S. 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 that 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 U.S. 50 facility beginning in Pueblo, Colorado, at I-25 and extending to 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; in the instance of Section 4(f) this is described as a “use”
- 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 Section 4(f) and Section 6(f) resources has been 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 sources were used to evaluate Section 4(f) and Section 6(f) resources.

4.1.1. Section 4(f) Resources

The primary sources used to identify and evaluate historic and archaeological resources were the Colorado Office of Archaeology and Historic Preservation Compass database and windshield reconnaissance surveys. These sources, as well as the many others used to supplement these sources, are detailed in the U.S. 50

Tier 1 EIS Historic and Archaeological Resources Technical Memorandum, which has been attached to the EIS as an appendix.

Parklands and recreational resources also were identified using multiple sources, which include *A Corridor Selection Study: A Plan for U.S. 50* (CDOT 2003) and a Section 4(f) resource data collection effort conducted for the U.S. 50 Tier 1 EIS. More information about these sources can be found in the U.S. 50 Tier 1 EIS Land Use and Social Considerations Technical Memorandum, which has been attached to the EIS as an appendix.

Wildlife and waterfowl refuges were identified using information from Colorado Parks and Wildlife (CPW; formerly the Colorado Division of Wildlife [CDOW]).

Information about certain resources also was obtained during consultations with the NPS and CPW. Those consultations are detailed in Section 4.3.

4.1.2. Section 6(f) Resources

Data was obtained during consultations with the following state and federal agencies:

- Bureau of Land Management (BLM)
- CPW
- Colorado State Parks (now part of CPW)
- NPS
- United States Fish and Wildlife Service (USFWS)
- United States Forest Service (USFS)

4.2. Data Collection and Analysis Methodology

The following sections describe the resource identification and analysis methodology for Section 4(f) and Section 6(f) resources. There are three important limitations or qualifications regarding the Tier 1 Section 4(f) analysis in this technical memorandum that need to be recognized. These limitations in the analysis pertain to:

- The methodology used to identify resources that are or may be historic
- The degree of confidence that a resource would be affected by a Build Alternative
- The uncertainty that potentially affected land within a publicly owned multiple use area with recreation would be used for recreation

These limitations are discussed in the following subsections. These limitations do not allow for a detailed Section 4(f) evaluation; therefore, FHWA cannot approve the use of Section 4(f) resources at the Tier 1 level. Section 4(f) approvals will be made during subsequent Tier 2 studies.

4.2.1. Section 4(f) Resources

Historic and archaeological resources were identified initially by searching the Colorado Office of Archaeology and Historic Preservation Compass database for resources in the project area. Subsequently, windshield reconnaissance surveys were conducted within the area of potential effects (APE). The APE includes 1,000 feet on the existing U.S. 50 alignment (including through towns) and 1,000 feet centered on corridor alternatives (around-town corridors). More information about the reconnaissance surveys can be found in the U.S. 50 Tier 1 Historic and Archaeological Resources Technical Memorandum, which is attached to the EIS as an appendix.

Parkland and recreational resources were reviewed within the cities and towns along the U.S. 50 corridor and within Build Alternatives under consideration by the U.S. 50 Tier 1 EIS. Several sources were used to assemble a list of parklands and recreational resources in the project area, including a previous U.S. 50 planning study (CDOT 2003). This list of resources was used as the basis for a field review. Accessible public roadways were traveled to conduct the review, and the following areas were surveyed:

- Pueblo—area within and immediately surrounding the alternatives only
- Fowler—area within the town's boundaries
- Manzanola—area within the town's boundaries
- Rocky Ford—areas within the alternatives only
- Swink—area within the town's boundaries
- La Junta—areas within the alternatives only
- Las Animas—areas within the alternatives only
- Hasty—Hasty Park only
- Granada—area within the town's boundaries
- Holly—area within the town's boundaries

The parklands and recreational resources located in these areas were reviewed and documented utilizing the Section 4(f) review form presented in Appendix C. Questions on the form were drafted based on information in the FHWA Section 4(f) Policy Paper regarding what constitutes a Section 4(f) resource. While completing a review form, the boundaries of these resources were drawn on an aerial map of the relevant jurisdiction to document this information. In addition to resources on the initial list, resources discovered in the field also were reviewed. After the field review, appropriate community officials were contacted to obtain more information about certain resources. These communications are documented on the Section 4(f) review forms.

Information about certain Section 4(f) resources was obtained during consultations with the following agencies:

- CPW—to identify boundaries, uses, and potential effects to state wildlife areas
- NPS—to determine potential effects to the Santa Fe National Historic Trail (5BN.391), Bent's Old Fort National Historic Site (5OT.149), and the Granada Relocation Center National Historic Landmark (i.e., Camp Amache)(5PW.48).

Wildlife and waterfowl refuges were reviewed within the entire project area.

4.2.2. Section 6(f) Resources

The NPS submitted written scoping comments to the project team in March 2006 in the form of a letter signed by Cheryl Eckhardt, a NPS NEPA/Section 106 specialist. This letter requested that the project team contact the LWCF administrator for Colorado "to determine any potential conflicts with Section 6(f)(3) of the [LWCF] Act" (Eckhardt 2006). The letter noted that "the administrator for the [LWCF] program in Colorado is Mr. Joe Maurier, Deputy Director, Division of Parks and Outdoor Recreation, Colorado State Parks" (Eckhardt 2006). The resource specialist contacted Colorado State Parks in April 2006 and was told that Joe Maurier was no longer administering the LWCF program, and that this responsibility was currently being filled by Marilyn Minkin, LWCF Program Assistant.

While speaking to Marilyn Minkin, and in subsequent conversations with staff from other agencies, the resource specialist determined that multiple federal and state agencies may have records of Section 6(f) resources. As a result of this information, the following agencies were contacted to identify Section 6(f) resources in the project area:

- BLM
- CPW
- Colorado State Parks (now part of CPW)
- NPS
- USFWS
- USFS

The individual responsible for LWCF projects for each agency was contacted, and they were asked if the agency had records of LWCF properties (i.e., Section 6(f) resources) in the project area. A map or general description of the project area was provided to each representative.

At the project's Agency Scoping Meeting, participants from the USFWS noted that their agency was interested in the project's identification of Section 6(f) resources (CDOT 2006a). Therefore, after a list of Section 6(f) resources had been assembled from the consultations noted above, this list was sent to Connie Young-Dubovsky, a NEPA Coordinator for the USFWS. On June 29, 2006, Susan Linner, Colorado Field Supervisor for the USFWS, replied to this communication noting that "[the USFWS] accepts the attached list of LWCF properties and doesn't have any concerns with the… properties on it" (Linner 2006).

In addition, a comprehensive list of Section 6(f) resources within the state of Colorado was obtained by CDOT from CPW on November 8, 2013. This list was used to identify any additional Section 6(f) resources since initial data collection in 2006. No new resources were identified.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

4.4. Effects

The purpose of the U.S. 50 Tier 1 EIS is to determine the location of a 1,000-foot-wide Build Alternative within which a 250-foot-wide (maximum) roadway footprint would be identified during Tier 2 studies (see Figure 5-1). This analysis identified Section 4(f) and Section 6(f) resources within the APE or project area, as noted in Section 4.2. However, because the location of U.S. 50 within each Build Alternative along the corridor will not be determined until Tier 2, not all of the resources would be affected. Effects for Section 4(f) resources are described as a "use" and effects for Section 6(f) resources are discussed in terms of conversion to a non-recreational use.

A use of a Section 4(f) resource can occur in three ways:

- Land is permanently incorporated into a transportation facility, such as through right-of-way acquisition. This is a **direct use**.
- Land is temporarily occupied by a transportation project, such as by a construction easement, and the occupancy is adverse in terms of the Section 4(f) statute's preservationist purposes. This is a **temporary use**.
- There is no permanent incorporation of land, but the proximity of the transportation project results in adverse effects (such as noise, access, and/or ecological effects) that are so severe that the activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired. These types of effects are considered a **constructive use**.

In addition to these use categories, a *de minimis* finding can be applied if the use is minimal or one with little or no influence to the activities, features, and/or attributes of the Section 4(f) resource. Given the broad level of analysis for this Tier 1 EIS, constructive use and *de minimis* findings are not made for Tier 1. Therefore, uses identified in this Tier 1 Section 4(f) evaluation are considered "potential" uses.

Section 4(f) and Section 6(f) resources were considered to be directly affected, with the potential for a use of the resource under Section 4(f) or a conversion under Section 6(f), if part of the Build Alternatives occupy or overlap the property containing the resource. Additionally, Section 6(f) resources were considered to be indirectly affected if the Build Alternatives impede access to them from U.S. 50 (direct access from U.S. 50 to the property only). Impediment to access or noise and visual effects to resources were considered with regard to Section 4(f) resources in terms of the potential for constructive use.

4.5. Mitigation Options

Resource avoidance will be the primary mitigation strategy for Section 4(f) and Section 6(f) resources.

4.6. Deliverables

This technical memorandum is the primary deliverable related to Section 6(f) resources for the U.S. 50 Tier 1 EIS. In addition to this technical memorandum, the Section 4(f) chapter of the U.S. 50 Tier 1 EIS also contains information related to Section 4(f) resources.

5. Existing Conditions

The following section discusses the Section 4(f) and Section 6(f) resources identified by this analysis.

5.1. Section 4(f) Resources

Identified Section 4(f) resources are discussed below by resource type, including historic and archaeological resources, parklands and recreational resources, and wildlife and waterfowl refuges.

5.1.1. Historic and Archaeological Resources

A total of 423 historic resources (406 non-linear and 30 linear) and 17 archaeological resources were identified within the APE. Non-linear resources are located at a specific site or place, such as a public building, house, bridge, or historic district. Linear resources are those that are typically long and narrow, such as railroads, trails, irrigation canals, and ditches. The historic resources identified are listed in Appendix D. This list includes residences, buildings associated with farms and ranches, commercial properties, churches, bridges, and irrigation canals and ditches, among other types of resources.

Two linear resources of regional importance to the Lower Arkansas Valley are the Santa Fe National Historic Trail (5BN.391) and the Burlington Northern Santa Fe Railway (BNSF) Railway. The Santa Fe Trail was a major trade route across the western frontier from Missouri to Santa Fe, New Mexico, from the 1820s to the 1870s. In Colorado, the Mountain Branch of the trail generally followed the Arkansas River from the modern-day Kansas state line west to present-day La Junta. At La Junta, it turned southwestward, paralleling the present day U.S. 350 toward Trinidad. Figure 5-1 shows the approximate location of the trail (NPS 2008a). Only an approximate location of the trail is known at this time (NPS 2008b). The properties the trail crossed have largely been in private hands for more than 100 years, and extensive portions have been graded and farmed or have become unrecognizable in other ways. U.S. 50 currently crosses the trail's path in three locations within the project area, including near Milepost 380 (in La Junta), Milepost 401 (just north of Las Animas), and Milepost 464 (just east of Holly).

Source: NPS 2008a (Santa Fe Trail location only)

Figure 5-1. Approximate Location of the Santa Fe National Historic Trail, Mountain Branch (portion located within Otero, Bent, and Prowers Counties only)

In the 1870s, the Atchison, Topeka and Santa Fe Railway superseded the Santa Fe Trail as the route connecting the Midwest to other destinations in the west through Colorado. From Pueblo to the Colorado-Kansas state line, the railroad generally parallels the Arkansas River. Many of the communities in the Lower Arkansas Valley sprang up as stops along the railroad. Today, it is owned and operated by BNSF Railway.

U.S. 50 crosses the railroad seven times within the project area. These crossing are located at or near the following U.S. 50 mileposts:

- Milepost 319 in Pueblo County
- Milepost 361 in Otero County (east of Manzanola)
- Milepost 374 in Otero County (west of Swink)
- Milepost 379 in Otero County (west of La Junta)
- Milepost 397 in Bent County (west of Las Animas)
- Milepost 435 in Prowers County (in Lamar)
- Milepost 456 in Prowers County (between Granada and Holly)

5.1.2. Parklands and Recreational Resources

This analysis identified 89 parklands and recreational resources in the project area. These resources are listed in Appendix E. They include two fairgrounds, four golf courses, 40 local parks (i.e., owned by a city, town, or county government), 28 facilities associated with schools, three planned pedestrian trails, five State Wildlife Areas, the John Martin Reservoir State Park and State Wildlife Area, and Camp Amache (a National Historic Landmark). The State Wildlife Areas offer recreational opportunities, such as hunting, bird watching, and target shooting. Additionally, the John Martin Reservoir State Wildlife Area offers fishing, boating, and other recreational opportunities (CDOW 2009).

5.1.3. Wildlife and Waterfowl Refuges

While there are State Wildlife Areas within the project area, there are no wildlife or waterfowl refuges (CDOW 2007). CPW manages State Wildlife Areas in southeast Colorado for hunting and preservation of species; however, since the State Wildlife Areas are not solely managed for preservation, CPW does not consider them a wildlife refuge (Black 2009) It should be noted, however, that even though the John Martin Reservoir State Wildlife Area is not managed primarily as a waterfowl refuge, the southern shoreline of the reservoir is protected seasonally for nesting and brooding by birds that include threatened or endangered species (CDOW 2007). U.S. 50 currently exists north of this location, and the U.S. 50 Tier 1 EIS does not recommend taking any land that is part of the protected southern shoreline.

5.2. Section 6(f) Resources

This analysis identified 36 Section 6(f) resources, including:

- 1 campground
- 18 city or town parks
- 8 parks associated with schools
- 1 swimming pool
- 2 recreation centers
- 3 sports facilities
- 3 segments of the Fountain Creek trail

Most of these resources (22) are located within the city of Pueblo or Pueblo County. The rest are located primarily within the communities east of Pueblo. A list of these resources is located in Appendix F.

6. Effects

The following section details effects to Section 4(f) and Section 6(f) resources by the No-Build Alternative and the Build Alternatives.

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 U.S. 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. None of these activities are expected to substantially affect Section 4(f) or Section 6(f) resources to the extent that they would result in a use of a Section 4(f) resource or a conversion of a Section 6(f) resource to a non-recreational use.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

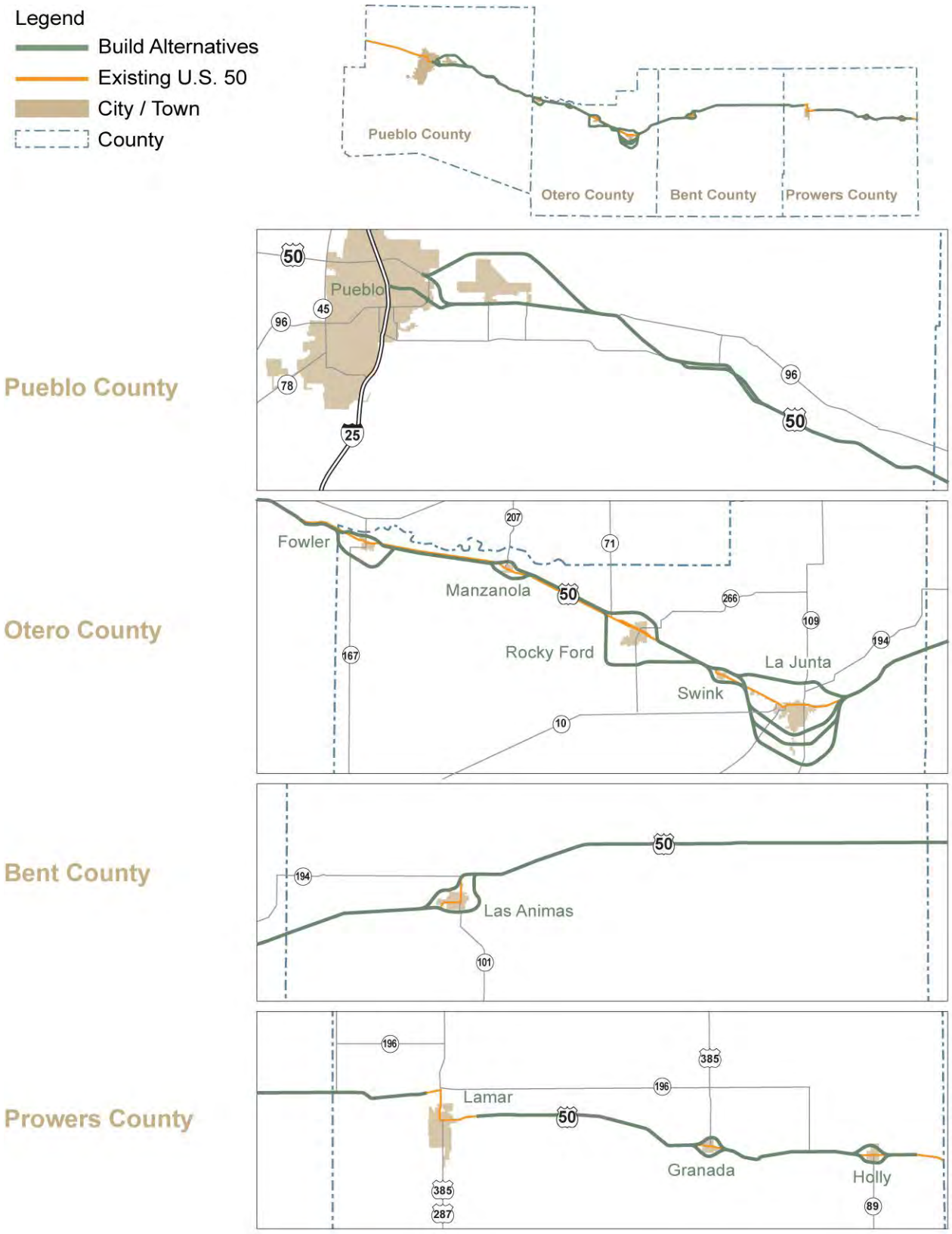


Figure 6-1. Build Alternatives Overview

Potential use of Section 4(f) resources and potential conversion of Section 6(f) resources resulting from the Build Alternatives is discussed below.

6.2.1. Section 4(f) Resources

The Build Alternatives have the potential to affect 64 to 84 historic and archaeological resources, depending on which Build Alternatives are chosen. These resources are listed in Table 6-1. Additional resources may be identified during Tier 2 studies and would be disclosed and analyzed at that time.

The linear resources are all historic (not archaeological) and include the BNSF Railway, Santa Fe National Historic Trail, Arkansas River levee at Las Animas, and irrigation canals and ditches. These resources are located throughout the project corridor, both near communities and in the areas between them. In many instances, U.S. 50 already crosses them, and, in some cases, it crosses them multiple times. For these resources, modifying existing crossings or adding new ones would not typically diminish the historic significance of the resource to any great degree. Also, since these resources could be crossed multiple times by the Build Alternatives, they may be listed more than once in Table 6-1. Each resource is listed at every location where it could be used by a Build Alternative.

The non-linear resources are primarily residences, businesses, and farm and ranch complexes. They also include bridges and irrigation infrastructure, among other types of resources. One of the bridges is the U.S. 50 bridge over the Huerfano River, which is listed in the National Register of Historic Places (NRHP) (5PE.302). Another bridge is the U.S. 50 bridge over the Rocky Ford Highline Canal, which has been determined to be officially eligible for the NRHP. Most of the non-linear resources are located in those areas of the Build Alternatives near or around communities.

The Build Alternatives could result in a potential use of up to 13 parklands or recreational resources, depending on which alternatives are chosen. These resources are listed in Table 6-1 and include two public golf courses, the John Martin Reservoir State Park and State Wildlife Area, three additional State Wildlife Areas (not including the John Martin Reservoir), four existing pedestrian trails, two planned trails, and one school recreational facility. Because some of the trails are regional (i.e., located across multiple jurisdictions), they are listed multiple times. They are listed at every location where the Build Alternatives could result in a use of the resource.

Since no wildlife or waterfowl refuges were identified within the project area, there would be no use of refuges under Section 4(f).

Table 6-1. Potential Use of Section 4(f) Resources for the Build Alternatives by U.S. 50 Corridor Sections

Section	Build Alternatives (if more than one)	Number of Resources	Description	Type of Resource	National Register Eligibility[1]
Section 1: Pueblo	Alternative 1: Pueblo Airport North	2	BNSF Railway	Historic	FE
			Excelsior Ditch	Historic	FE
	Alternative 2: Pueblo Existing Alignment	4	BNSF Railway	Historic	FE
			Belmont Post-WWII subdivision	Historic	FE
			U.S. 50 bridge over Dry Creek (eastbound)	Historic	FE
			U.S. 50 bridge over Dry Creek (westbound)	Historic	FE
	Alternative 3: Pueblo SH47 Connection	1	BNSF Railway	Historic	FE
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	16	Bridge	Historic	FE
			(6) Farms/Ranches	Historic	FE
			Rocky Ford Highline Canal Bridge	Historic	FE
			U.S. 50 bridge over Chico Creek (westbound)	Historic	FE
			U.S. 50 bridge over Chico Creek (eastbound)	Historic	FE
			U.S. 50 underpass, Ordnance Depot Road interchange	Historic	FE
			Fort Reynolds District	Historic/ Archaeological	FE
			BNSF Railway	Historic	FE
			Excelsior Ditch	Historic	FE
			Rocky Ford Highline Canal	Historic	FE
			Oxford Farmers Ditch	Historic	FE
	Alternative 2: Fort Reynolds Realignment	13	U.S 50 bridge over Rocky Ford Highline Canal	Historic	OE
			U.S. 50 bridge over Chico Creek (westbound)	Historic	FE
			U.S. 50 bridge over Chico Creek (eastbound)	Historic	FE

Section	Build Alternatives (if more than one)	Number of Resources	Description	Type of Resource	National Register Eligibility[1]
			U.S. 50 underpass, Ordnance Depot Road interchange	Historic	FE
			(5) Farms/Ranches	Historic	FE
			BNSF Railway	Historic	FE
			Excelsior Ditch	Historic	FE
			Rocky Ford Highline Canal	Historic	FE
			Oxford Farmers Ditch	Historic	FE
Section 3: Fowler	Alternative 1: Fowler North	5	Two-story foursquare house	Historic	FE
			BNSF Railway	Historic	FE
			Otero Canal	Historic	FE
			Cottonwood Links Golf Course	Parklands and recreational	n/a
	Alternative 2: Fowler South	2	Rocky Ford Highline Canal	Historic	FE
			Oxford Farmers Ditch	Historic	FE
Section 4: Fowler to Manzanola	—	5	BNSF Railway	Historic	FE
			US 50 bridge over Otero Canal	Historic	FE
			Catlin Canal	Historic	FE
			Otero Canal	Historic	FE
Section 5: Manzanola	Alternative 1: Manzanola North	4	BNSF Railway	Historic	FE
			Catlin Canal	Historic	FE
			Otero Canal	Historic	FE
	Alternative 2: Manzanola South	3	Catlin Canal	Historic	FE
			Otero Canal	Historic	FE
Section 6: Manzanola to Rocky Ford	—	4	Building ruin	Historic	FE
			BNSF Railway	Historic	FE
			Main Leach Canal	Historic	FE

Section	Build Alternatives (if more than one)	Number of Resources	Description	Type of Resource	National Register Eligibility[1]
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	4	BNSF Railway	Historic	FE
			Main Leach Canal	Historic	FE
			Rocky Ford Canal	Historic	FE
	Alternative 2: Rocky Ford South	8	Canal (Structure)	Historic	FE
			Barn	Historic	FE
			BNSF Railway	Historic	FE
			Catlin Canal	Historic	FE
			Otero Canal	Historic	FE
			Rocky Ford Canal	Historic	FE
			Rocky Ford Highline Canal	Historic	FE
Section 8: Rocky Ford to Swink	—	2	U.S. 50 bridge over Timpas Creek	Historic	FE
			BNSF Railway	Historic	FE
Section 9: Swink	Alternative 1: Swink North	3	Migrant workers housing	Historic	FE
			Mary's Fruit Stand	Historic	FE
			BNSF Railway	Historic	FE
	Alternative 2: Swink South	2	Building	Historic	FE
			BNSF Railway	Historic	FE
Section 10: La Junta	Alternative 1: La Junta North	5	BNSF Railway	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail
			Fort Lyon Canal	Historic	FE
	Alternative 2: La Junta South	5	BNSF Railway	Historic	FE
			Otero Canal	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail
	Alternative 3: La Junta South	6	Otero Ditch tunnel	Historic	FE
			BNSF Railway	Historic	FE
			Otero Canal	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail
	Alternative 4: La Junta South	5	BNSF Railway	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail
			Otero Canal	Historic	FE

Section	Build Alternatives (if more than one)	Number of Resources	Description	Type of Resource	National Register Eligibility[1]
Section 11: La Junta to Las Animas	—	7	U.S. 50 bridge over Thompson Arroyo (westbound)	Historic	FE
			U.S. 50 bridge over Thompson Arroyo (eastbound)	Historic	FE
			BNSF Railway	Historic	FE
			Consolidated Ditch	Historic	FE
			Jones Ditch	Historic	FE
Section 12: Las Animas	Alternative 1: Las Animas North	7	BNSF Railway	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail
			Arkansas River Levee at Las Animas	Historic	FE
			Consolidated Ditch	Historic	FE
			Las Animas Town Ditch	Historic	FE
			Las Animas Golf Course	Parklands and recreational	n/a
	Alternative 2: Las Animas South	5	BNSF Railway	Historic	FE
			Consolidated Ditch	Historic	FE
			Arkansas River Levee at Las Animas	Historic	FE
			Old U.S. 50 Segment	Historic	FE
Section 13: Las Animas to Lamar	—	25	U.S. 50 bridge over McCrae Arroyo	Historic	FE
			U.S. 50 bridge over a draw	Historic	FE
			U.S. 50 bridge over Limestone Creek	Historic	FE
			Residence	Historic	FE
			Higley Gems	Historic	FE
			Hasty post office/mercantile	Historic	FE
			(3) Barns	Historic	FE
			(6) Farmsteads	Historic	FE
			Millers Ditch	Historic	FE
			Lubers Drainage Ditch	Historic	FE
			McClave Drainage Ditch	Historic	FE
			Sunflower Ditch	Historic	FE
			Riverview Ditch	Historic	FE
			Amity Canal	Historic	FE
			Vista Del Rio Ditch	Historic	FE

Section	Build Alternatives (if more than one)	Number of Resources	Description	Type of Resource	National Register Eligibility[1]
			Santa Fe National Historic Trail	Historic	Natl. Trail
			John Martin Reservoir State Park and State Wildlife Area	Parklands and recreational	n/a
Section 14: Lamar to Granada	—	6	U.S. 50 bridge over Willow Creek overflow	Historic	FE
			Farmhouse	Historic	FE
			Manvel Canal	Historic	FE
			Lamar Canal	Historic	FE
			Mike Higbee State Wildlife Area	Parklands and recreational	n/a
Section 15: Granada	Alternative 1: Granada North	5	Residence	Historic	FE
			BNSF Railway	Historic	FE
			Granada Ditch	Historic	FE
			X-Y Canal	Historic	FE
	Alternative 2: Granada South	3	X-Y Canal	Historic	FE
			Granada school District Property	Parklands and recreational	n/a
			Prowers County (planned) trails	Parklands and recreational	n/a
Section 16: Granada to Holly	—	9	Residence	Historic	FE
			U.S. 50 bridge over Granada Creek	Historic	FE
			U.S. 50 overpass, BNSF railroad separation	Historic	FE
			Gateway Downs (former horseracing track)	Historic	FE
			BNSF Railway	Historic	FE
			X-Y Canal	Historic	FE
			Granada Ditch	Historic	FE
			Granada State Wildlife Area	Parklands and recreation	n/a

Section	Build Alternatives (if more than one)	Number of Resources	Description	Type of Resource	National Register Eligibility[1]
Section 17: Holly	Alternative 1: Holly North	8	Residence	Historic	FE
			Farm or Ranch	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail
			Holly Ditch	Historic	FE
			Buffalo Canal	Historic	FE
			Holly State Wildlife Area	Parklands and recreation	n/a
			Prowers County (planned) trails	Parklands and recreational	n/a
	Alternative 2: Holly South	4	BNSF Railway	Historic	FE
			Holly State Wildlife Area	Parklands and recreation	n/a
			Prowers County (planned) trails	Parklands and recreational	n/a
Section 18: Holly Transition	—	4	Holly rest area	Historic	FE
			Holly Ditch	Historic	FE
			Buffalo Canal	Historic	FE
			Santa Fe National Historic Trail	Historic	Natl. Trail

[1]National Register eligibility: NHL = National Historic Landmark, NR = National Register, SR = State Register, OE = Officially Determined Eligible, FE = Field Eligible, ND = Needs Data, and Natl. Trail = Nationally Recognized Trail. More information about NRHP eligibility can be found in the U.S. 50 Tier 1 EIS Historic and Archaeological Resources Technical Memorandum.

6.2.2. Section 6(f) Resources

None of the identified Section 6(f) resources would be directly converted to a non-recreational use by the Build Alternatives because most are located in the communities along U.S. 50, which would be avoided by the Build Alternatives. However, access to one potentially obsolete Section 6(f) resource may be affected. The former Baxter Elementary School is located in Pueblo County and its associated park is identified as a Section 6(f) resource. Access to the park is directly from U.S. 50. However, the school was closed in the 1980s and the park appears to be in disrepair. Whether this access is impeded and/or the property is acquired, which could result in the conversion of a Section 6(f) resource if the park is not determined to be obsolete, will be determined during the Tier 2 study in this area when the roadway footprint is identified. Regardless, it is anticipated that the existing access to the old school could be retained.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific Section 4(f) or Section 6(f) resources would be affected (i.e., used or converted) by the Build Alternatives. However, the following mitigation strategies have been developed to ensure that negative effects to these resources are minimized during Tier 2 studies.

7.1. Section 4(f) Historic and Archaeological Resources

The following mitigation strategies were agreed to as part of the U.S. 50 Tier 1 Section 106 Programmatic Agreement. This agreement outlines how historic resources will be identified and evaluated in the U.S. 50 Tier 1 EIS. It was developed and signed by representatives from the lead agencies (CDOT and FHWA) and the State Historic Preservation Officer.

- When a preferred alternative is chosen, the lead agencies will meet with the Colorado State Historic Preservation Officer and the Section 106 consulting parties "to discuss appropriate mechanisms for avoiding, minimizing and mitigating adverse effects" to historic and archaeological resources (U.S. 50 Tier 1 Section 106 PA, Sect III(B)(3)).
- "Resolution of adverse effects for individual properties will occur… during Tier 2 studies when more detailed engineering plans are developed. During Tier 2, adverse effects will be addressed in accordance with standard Section 106 process" (U.S. 50 Tier 1 Section 106 PA, Sect III(A)(5)).

7.2. Section 4(f) Parklands and Recreational Resources

The following mitigation strategies were developed.

- If Tier 2 studies result in effects to the Cottonwood Links Golf Course in Fowler, town officials have indicated in the past that they would be amenable to altering the course layout (CDOT 2002). To minimize disruption and loss of revenue to the facility, new holes should be constructed prior to affecting the existing ones, and changes to the course should be made during the course's low-use season (the course is open year-round).
- If Tier 2 studies result in a direct effect to State Wildlife Areas, including the John Martin Reservoir State Park and State Wildlife Area, a Section 4(f) analysis will be required. CDOT will coordinate with the manager/owner of the resource to identify mitigation during Tier 2 studies and implement measures to minimize harm.
- If Tier 2 studies result in a direct use of the Granada School District Property, CDOT will undertake its property acquisition process. Also, CDOT should evaluate possible increases in traffic noise that could result from this impact.
- If Tier 2 studies result in effects to trails managed by local government entities or CPW, CDOT should work with these agencies to maintain the operation of the trails. CDOT also should incorporate reasonable measures to enable the continued operation of the trails during construction.

7.3. Section 6(f) Resources

All acquisitions and relocations will comply fully with the required land-for-land mitigation, as described in the LWCF Act of 1965. In addition, there will be compliance with the federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended.

8. References

Black, T. Colorado Division of Wildlife. Consultation about newly established (interim) state wildlife areas. 20 Apr. 2009..

Colorado Department of Transportation (CDOT). *A Corridor Selection Study: A Plan for U.S. 50.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Sep. 2003. Print.

Colorado Department of Transportation (CDOT). Notes from bus tour conducted in Fowler, Colorado, as part of *A Corridor Selection Study: A Plan for U.S. 50*. Colorado Department of Transportation (CDOT) Region 2, 2 May 2002. Print.

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Agency Scoping Report.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, 23 Feb. 2006. Print.[CDOT 2006a]

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Section 4(f) Resources Evaluation Data Collection Summary.* Colorado Springs, CO: Colorado Department of Transportation (CDOT) Region 2, Sep. 2006 and Oct. 2006. Print. [CDOT 2006b]

Colorado Division of Wildlife (CDOW). *Colorado State Wildlife Area (SWA) Boundaries.* ESRI ArcGIS 9.0. Published 17 Apr. 2003.

Colorado Division of Wildlife (CDOW). *Colorado State Wildlife Areas (SWA)*. Web. Jul. 2009. <http://wildlife.state.co.us/LandWater/StateWildlifeAreas/>.

Colorado Division of Wildlife (CDOW). Consultation with CDOW staff [T. Black, M. Smith, and B. Will] regarding state wildlife areas (SWAs) in the project area, including purpose(s), use(s), funding, and other information relevant to a Section 4(f) analysis of these properties. 5 Nov. 2007.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA*. 40 CFR Parts 1500-1508. 1978.

Eckhardt, C. *Scoping Comments from the National Park Service (NPS) for the U.S. 50 Tier 1 Environmental Impact Statement (EIS) Project.* 2 Mar. 2006.

U.S. Department of Transportation. Federal Highway Administration (FHWA). *Section 4(f) Policy Paper.* Washington, D.C. 1 Mar. 2005.

Hallock, D. Consultation regarding Section 6(f) properties recorded by the Bureau of Land Management (BLM). 31 May 2006 and 2 Jun. 2006.

Goes, M. Consultation regarding Section 6(f) properties recorded by the Colorado State Parks. 3 Oct 2006.

Linner, S. Consultation regarding U.S. Fish and Wildlife Service (USFWS) approval of the U.S. 50 Tier 1 EIS's list of 6(f) properties in the project area. 29 Jun. 2006.

Minkin, M. Consultation regarding Section 6(f) properties recorded by the Colorado State Parks. 3 May 2006.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987.

National Park Service (NPS). *Approximate Location of the Santa Fe National Historic Trail.* ESRI ArcGIS 9.2. Obtained from National Park Service staff on 27 Feb. 2008. [NPS 2008a]

National Park Service (NPS). *Land and Water Conservation Fund (LWCF) Projects by County.* Web. 20 May 2006. <http://waso-lwcf.ncrc.nps.gov/public/index.cfm>.

National Park Service (NPS). *U.S. 50 Tier 1 EIS National Park Service Consultation Meeting Minutes.* Denver, CO: Colorado Department of Transportation (CDOT) Region 2, 15 Feb. 2008. Print. [NPS 2008b]

Nicholas, P. Consultation regarding Section 6(f) properties recorded by the Colorado Division of Wildlife (CDOW). 31 May 2006 (phone and email), 9, 21, and 26 Jun. 2006.

Programmatic Agreement among the Colorado Department of Transportation (CDOT), the Federal Highway Administration (FHWA), and the State Historic Preservation Officer (SHPO) regarding implementation of the U.S. Highway 50 Corridor East Project (U.S. 50 Tier 1 Section 106 PA). 25 Jun. 2007.

Rinella, S. Consultation regarding Section 6(f) properties recorded by the U.S. Forest Service (USFS). 31 May 2006.

U.S. Congress. Land and Water Conservation Fund Act of 1965, Section 6(f). 16 USC 460-4 to 460-11.

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Department of Transportation (USDOT) Act of 1966, Section 4(f) Regulations. 23 CFR 771.135.

U.S. Department of Transportation (USDOT) Act of 1966, Section 4(f). 23 USC 303. 1966.

Young-Dubovsky, C. Consultation regarding Section 6(f) properties recorded by the U.S. Fish and Wildlife Service (USFWS). 3, 22, 24, and 30 May 2006.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Section 4(f) and Section 6(f) Resources

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 (corridor location) decision.

Table A-1. Resource Methodology Overview for Section 4(f) and Section 6(f) Resources

Methodology Overview	Section 4(f)/Section 6(f) Resources	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Data from federal land management plans, open space and recreation plans, and GIS databases • Information requests from park and recreation land managers, including use of LWCF grant funds • File searches and coordination with the Colorado Office of Archaeology and Historic Preservation, SHPO, USFS, BLM, USFWS, NPS, CDOW, Colorado State Parks, and county and municipal planners	Data sources sufficient for standard NEPA documentation
Collection and/or Analysis Methodology	• Determine presence and/or absence of Section 4(f)/Section 6(f) properties using basic corridor information • Analyze avoidance, minimization, or mitigation options for direct or indirect impacts, with avoidance being the priority • Analyze potential use of Section 4(f) resources by overlaying the corridor footprint over the inventoried and identified properties; Section 4(f) historic property boundaries will be developed consistent with historic resource methodologies; other Section 4(f) property boundaries will be determined from available mapping consistent with Tier 1 levels of detail • Coordinate avoidance and minimization with the appropriate agencies responsible for the resources	• Confirm Tier 1 assumptions and analysis of eligible Section 4(f)/Section 6(f) properties and identify any new properties that surface during Tier 2 • Determine uses of Section 4(f) properties for each alternative

Methodology Overview	Section 4(f)/Section 6(f) Resources	
	Tier 1	**Tier 2**
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Tier 2 specific SIU corridor boundaries
Impacts	• Determine the presence and/or absence of Section 4(f) and Section 6(f) properties within the preferred corridor • Identify impacts that could prohibit corridor location alternatives • Use all possible planning to minimize harm to Section 4(f) and Section 6(f) resources; ensure opportunities to minimize harm at subsequent stages in the development process have not been precluded by decisions made at Tier 1	Identify direct or indirect impacts to Section 4(f) properties within the Tier 2 SIU
Mitigation Options	Resource avoidance will be the primary mitigation options	Avoidance, minimization, or mitigation options will be determined during Tier 2 studies
Deliverables	Section 4(f) and Section 6(f) Resources Technical Memorandum will include description and boundaries of resource, description of potential use, avoidance alternatives, and possible efforts to minimize harm	Section 4(f) Evaluation, including documentation of avoidance, minimization, and mitigation strategies as appropriate for Tier 2 SIU level of NEPA documentation
Regulatory Guidance/ Requirements	• 23 CFR 771.135 Environmental Impact and Related Procedures • U.S. Department of Transportation Act of 1966, Section 4(f) (49 USC 303) (23 USC 303) • Land and Water Conservation Fund Act of 1965, Section 6(f) (16 USC 460-4 to 460-11) • The Historic Bridge Program (23 USC 144(o)) Programmatic Agreement • Wilderness Act of 1964 (16 USC 1131-1136) • National Trails System Act of 1968 (16 USC 1241-1249) • National Recreational Trails Program (23 USC 206) • FHWA Technical Advisory T6640.8a • FHWA Section 4(f) Policy Paper • CDOT, FHWA, and SHPO Section 106/Tier 1 PA	

Appendix B. Abbreviations and Acronyms

APE	Area of Potential Effect
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railway
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPW	Colorado Parks and Wildlife
CR	County Road
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
LWCF	Land and Water Conservation Fund
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
NEPA	National Environmental Policy Act of 1969
NPS	National Park Service
NRHP	National Register of Historic Places
Section 4(f)	U.S. Department of Transportation Act of 1966, Section 4(f)
Section 6(f)	Land and Water Conservation Fund Act of 1965, Section 6(f)
SH	State Highway
SIU	Section of Independent Utility
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
U.S. 287	United States Highway 287
U.S. 50	United States Highway 50
U.S. 50 Tier 1 EIS	United States Highway 50 Tier 1 Environmental Impact Statement
USC	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

This page left intentionally blank.

Appendix C. Section 4(f) Review Form

4(f) Review Form

Review conducted on:

Review conducted by:

4(f) Resource:

Location (see below)

- Jurisdiction:
- Address:

Owner:

Administrator:

Use, purpose or function (see below)

- Primary:
- Others (secondary):
- Special event use? Yes or No – if yes, explain (include the frequency of the event(s)):

Is noise a factor for any of the above uses? Yes or No (if yes, see below)

- Which portions of the facility are noise sensitive:
- Why are those portions noise sensitive:

Open to the public? Yes or No

Major user groups (kids, seniors, EJ):

Hours of operation:

Is access limited during normal operating hours? Yes or No (if yes, see below)

- By user? Yes or No – if yes, explain:
- Appointment, permit or membership required? Yes or No – if yes, what conditions apply?
- Is a user fee required? Yes or No – if yes, describe the fee structure:

Other relevant information or person(s) spoken to during this review:

This page left intentionally blank.

Appendix D. Historic and Archaeological Resources

The following tables show the non-linear historic and archaeological resources (Table D-1) and linear historic resources (Table D-2) identified for the U.S. 50 Tier 1 EIS project area.

Table D-1. Non-Linear Historic and Archaeological Resources by Location

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Pueblo	1906 N. Hudson Ave.	Movie theater		NA	FE
Pueblo	1901 N. Hudson Ave.	Community Corrections Services		1962	FE
Pueblo	Hudson Ave. and Ruppel St.	Central Christian Church		NA	FE
Pueblo	Bounded (generally) by Bonforte Blvd. on the north and west, Macalester Rd. on the east, and Constitution Rd. and Ruppel St. on the south	Belmont Post-WWII subdivision		1952	FE
Pueblo	1301 Anita St.	American International		1964	FE
Pueblo	1436 E. 19th St.	Residence		1951	FE
Pueblo	1401 Anita St.	Dentist's office		1968	FE
Pueblo	2104 N. Norwood Ave.	Commercial building		NA	FE
Pueblo	1376 Anita St.	Immaculate Heart of Mary Chapel		NA	FE
Pueblo	1827 Ogden	Minimal traditional ranch		1946	FE
Pueblo	2002 E. 16th St.	Minimal traditional ranch		1951	FE
Pueblo	2002 E. 15th St.	Pueblo Revival		1939	FE
Pueblo	2004 E. 16th St.	Minimal traditional ranch		1951	FE
Pueblo	2005 E. 16th St.	Residence		1955	FE
Pueblo	2006 E. 16th St.	Minimal traditional ranch		1951	FE
Pueblo	2011 E. 15th St.	Hipped box residence		1951	FE
Pueblo	2015 E. 15th St.	Hipped box residence		1951	FE
Pueblo	2030 E. 15th St.	Residence		1945	FE
Pueblo	2125 E. 13th St.	Residence		1955	FE
Pueblo	2134 E. 15th St.	Classic cottage		1924	FE
Pueblo	2130 E. 15th St.	Ranch-style residence		1924	FE
Pueblo	2300 Vanita Ave.	Spann Elementary School		NA	FE
Pueblo	Milepost 318.1	U.S. 50 bridge over Dry Creek (eastbound) (K-18-BZ)		1958	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Pueblo	Milepost 318.1	U.S. 50 bridge over Dry Creek (westbound) (K-18-BY)		1958	FE
Pueblo	2506 E. 11th St.	Residence		1954	FE
Pueblo	2510 E. 11th St.	Residence		1952	FE
Pueblo	2602 E. 7th St.	Residence		1952	FE
Pueblo	2608 E. 12th St.	Apostolic Assembly of the Faith Church		1958	FE
Pueblo	2613 E. 7th St.	Residence		1948	FE
Pueblo	701 Beaumont Ave.	Garage (brick)		NA	FE
Pueblo	729 Beaumont Ave.	Small agricultural property		1951	FE
Pueblo	2701 E. 12th St.	St. Anne's Catholic Church		1955-1956	FE
Pueblo	2711 E. 7th St.	Raised cottage		1954	FE
Pueblo	2801 E. 11th St.	Apodaca basement residence		1956	FE
Pueblo	2801 E. 10th St.	Residence		1954	FE
Pueblo	2802 Juan Madrid St.	Residence		NA	FE
Pueblo	2802 E. 10th St.	Residence		NA	FE
Pueblo	2700 E. 4th St.	BMC West Building Materials		NA	FE
Pueblo	204 Mead	Adobe residence		NA	FE
Pueblo	723 Kennie Rd.	Adobe commercial building and warehouses		NA	FE
Pueblo	813 Kennie Rd.	Ortiz Farm Equipment warehouse		1957	FE
Pueblo	519 Kennie Rd.	Vigil residence		1954	FE
Pueblo	1000 Kennie Rd.	Don's Sportscar Salvage frame warehouse		1946	FE
Pueblo	301 25th Lane	Zitnik farm		1900 (barn)	FE
Pueblo	28900 E. SH 96	Turner Bros. Trucking Co. (Pueblo Disposal)		1958	FE
Pueblo to Fowler		Archaeological resource	5PE.4300		ND
Pueblo to Fowler	Milepost 328.9	U.S. 50 bridge over Chico Creek (westbound) (K-19-Q)		1953	FE
Pueblo to Fowler	Milepost 328.9	U.S. 50 bridge over Chico Creek (eastbound) (K-19-U)		1953	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Pueblo to Fowler	Milepost 329.1	U.S. 50 underpass, Ordnance Depot Road interchange (K-19-V)		1953	FE
Pueblo to Fowler		Archaeological resource	5PE.70		ND
Pueblo to Fowler	U.S. 50	Farm		1920	FE
Pueblo to Fowler	U.S. 50	Farm		1900, 1950	FE
Pueblo to Fowler		Fort Reynolds (archaeological resource)		1868	FE
Pueblo to Fowler		Huerfano Colony (archaeological resource)	5PE.814		ND
Pueblo to Fowler		Archaeological resource	5PE.813		ND
Pueblo to Fowler	Milepost 335.9	U.S. 50 bridge over the Huerfano River (L-19-B)	5PE.302	1921, 1948	NR
Pueblo to Fowler		Archaeological resource	5PE.69		ND
Pueblo to Fowler		Archaeological resource	5PE.5873		ND
Pueblo to Fowler	Milepost 344.6	U.S. 50 bridge over the Rocky Ford Highline Canal (L-20-B)		1932	OE
Pueblo to Fowler	U.S. 50	Ranch		1900	FE
Pueblo to Fowler	U.S. 50	Farm		1900	FE
Pueblo to Fowler	U.S. 50	Farm		1900	FE
Pueblo to Fowler	U.S. 50	Farm		1900	FE
Fowler	610 W. Grant St.	Fowler Modern High School		1954, 1964	FE
Fowler	601 W. Grant Ave.	Early high school/ Assembly of God Church	5OT.864	1917	FE
Fowler	302 10th St.	Montoya residence		1905	FE
Fowler	212 10th St.	Nesbit residence		1900	FE
Fowler	304 10th St.	Butterfield residence		1900	FE
Fowler	312 10th St.	Roe residence		1910	FE
Fowler	308 10th St.	Fellhauer residence		1908	FE
Fowler	301 10th St.	Snodgrass residence		1904	FE
Fowler	401 W. Cranston Ave.	Sunset West Apartments		1934, 1946	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Fowler	312 9th St.	Vulgamore residence		1910	FE
Fowler	420 W. Santa Fe Ave.	Mora residence		1906	FE
Fowler	510 W. U.S. 50 (9th St. and Cranston Ave.)	Phat Willy's Diner		1930	FE
Fowler	324 W. Santa Fe Ave.	Maestas residence	5OT.911	1918	FE
Fowler	311 8th St.	Hobby residence		1900	FE
Fowler	208 8th St.	Wooters residence	5OT.904	1908	FE
Fowler	206 8th St.	Barela residence	5OT.906	1937, 1946	FE
Fowler	Cottonwood Lane and Railroad	Diven Packing Co. site		1910-1986	FE
Fowler	111 8th St.	Vulgamore residence	5OT.910	1901	FE
Fowler	109 8th St.	McCleary residence	5OT.908	1900	FE
Fowler	402 7th St.	Jensen residence		1904	FE
Fowler	208 7th St.	McKown residence		1903	FE
Fowler	202 7th St.	Griffy Family Funeral Home		1919	FE
Fowler	107 W. Florence	Fowler Christian Church		1912	FE
Fowler	310 Main St.	First Methodist Church		1920	FE
Fowler	308 Main St.	Bungalow/Rectory for the First Methodist Church		1920	FE
Fowler	210 Main St.	Valley Theater		1899	FE
Fowler	201 Main St.	Fowler State Bank		1908	FE
Fowler	112 E. Cranston Ave.	Fowler Tribune (newspaper)		1928	FE
Fowler	Between Main St. and 6th St., Park Ave. and Grant St.	Fowler City Park and water tower			FE
Fowler	114 E. Cranston Ave.	Fire department, city hall, and library		1925	FE
Fowler	101 Main St.	Corner Gas Station		1925	FE
Fowler	Railroad tracks and SH 167	Fowler Grain			FE
Fowler	34633 SH 167	Two-story foursquare house		1894	FE
Fowler	101 E. Santa Fe Ave.	Fowler Santa Fe depot	5OT.292	1913	OE
Fowler	34413 SH 167	Edwardian house		1900	FE
Fowler	34431 SH 167	Colonial Revival house		1910	FE
Fowler	Corner of Cranston Ave. and 6th St.	Automotive service center		1947	FE
Fowler	206 E. Cranston Ave. (U.S. 50)	Cross & Son's Auto Parts		1945	FE
Fowler	208 E. Santa Fe Ave.	Jensen's Processing Co.		1948	FE
Fowler	104 5th St.	Herring residence	5OT.945	1931	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Fowler	307 E. Cranston Ave.	Fowler Pool (WPA bath house)		1938, 1974	FE
Fowler	Florence Ave. between 2nd and 4th Sts.	Bungalow		1950s - 1960s	FE
Fowler	U.S. 50	Fowler Cemetery			FE
Fowler to Manzanola	Milepost 354.4	U.S. 50 bridge over the Otero Canal (L-21-A)		1947	FE
Fowler to Manzanola	KK Road	Kuhn site (agricultural)		1900	FE
Manzanola	U.S. 50	Grouping of commercial buildings		1920s	FE
Manzanola	115 S. Railroad St.	Holland residence		1890	FE
Manzanola	402 W. 1st St.	D&D Starter Repair		1948	FE
Manzanola	319 W. 2nd St.	Lopez residence		1937	FE
Manzanola	109 Canal St.	Residence		1918	FE
Manzanola	Grand Ave. and 1st St.	Armory		1921	FE
Manzanola	121 Grand Ave. (and S. Railroad St. by the canal)	Abandoned commercial site		1920	FE
Manzanola	209 S. Park St.	First Christian Church		1900	FE
Manzanola	114 Park St.	Clancy/Megosa residence		1930	FE
Manzanola	101 1st St.	Commercial garage			FE
Manzanola	Canal St. and Washington St. (521 N. Canal)	Building with Greek Revival elements		1914	FE
Manzanola	212 N. Grand Ave.	Manzanola Santa Fe depot	5OT.421	1913	NR
Manzanola	Park and 1st Sts.	General Merchandise & Lumber			FE
Manzanola	113 N. Park St.	Beauty shop		1906	FE
Manzanola	CR 11.5	Manzanola High School and Library		1921	FE
Manzanola	131 N. Park St.	Railway Hotel/ Manzanola Nazarene Church		1910	FE
Manzanola	300 N. Park St.	Colorado Food and Plant Co.			FE
Manzanola	Railroad St. and North Park St., between Manzanola Trade Co. and the canal	Seed company site			FE
Manzanola	405 N. Park St.	Lopez residence		1905	FE
Manzanola	North Park St. and Railroad St. (east of Park St.)	Manzanola Trading Co.		1904, 1953,	FE
Manzanola	501 N. Park St.	Wilson residence		1890	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Manzanola	201 E. 1st St.	Vallejos residence			FE
Manzanola	204 Beaty Ave.	Bruno residence		1910	FE
Manzanola	SH 207	Miller site (ranch)		1915	FE
Manzanola	120 S. Railroad St.	Zamora residence		1904	FE
Manzanola	East of 11201	Motor Company and cabins			FE
Manzanola	Walnut St. and Railroad St. (east end of Manzanola)	Adobe migrant housing		1930	FE
Manzanola to Rocky Ford	Vroman	Building ruin		1905	FE
Manzanola to Rocky Ford	CR 15	Residence (abandoned)		1900	FE
Rocky Ford	CR 17.5	Barn		1900	FE
Rocky Ford	CR 17.5	Canal (structure)			FE
Rocky Ford	CR 17.5	Canal (structure)			FE
Rocky Ford	U.S. 50	House		1900	FE
Rocky Ford	18911 W. U.S. 50	Rusler Implement Co.		1939	FE
Rocky Ford	102 Elm Ave.	Gas station		1947	FE
Rocky Ford	1st St. and Elm Ave., next to Smith's Corner	Merlino's Corner		1946	FE
Rocky Ford	1st St. and Elm Ave.	Smith's Corner		1946	FE
Rocky Ford	2nd St. and Railroad St.	Rocky Ford growers			FE
Rocky Ford	214 Elm Ave.	Residence		1947	FE
Rocky Ford	Elm Ave. and 2nd St.	Welcome Center Park and obelisk			FE
Rocky Ford	Chestnut St.	Western Sugar Co. (American Sugar)		1900/ 1961/ 1992	FE
Rocky Ford	405 3rd St.	Dierks residence		1913	FE
Rocky Ford	404 3rd St.	Sanchez residence		1916	FE
Rocky Ford	410 3rd St.	Gomez residence		1920	FE
Rocky Ford	405 Elm Ave.	McKeefe residence		1944	FE
Rocky Ford	4th St. and Elm Ave.	Gary's Auto Sales & Services			FE
Rocky Ford	402 N. 4th St.	Residence (archaeological resource)	5OT.960		ND
Rocky Ford	415 Elm Ave.	Montoya residence		1937	FE
Rocky Ford	5th St. and Railroad Ave.	Rounded roof warehouse			FE
Rocky Ford	208 5th St. (corner of Elm Ave. and 2nd St.)	Bender residence		1903	FE
Rocky Ford	503 Elm Ave.	Head residence		1920	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Rocky Ford	200 N. 6th St.	Sadler residence		1910	FE
Rocky Ford	204 N. 6th St.	Sadler residence		1910	FE
Rocky Ford	206 N. 6th St.	Sadler residence		1910	FE
Rocky Ford	303 S. 8th St.	Pickrel residence		1936	FE
Rocky Ford	510 N. 6th St.	Ruiz residence		1900	FE
Rocky Ford	708 Railroad Ave.	Hollar and Company Inc.		1925, 1948,	FE
Rocky Ford	521 N. 6th St.	Lathrum residence		1900	FE
Rocky Ford	702 Elm Ave.	Rocky Ford Cooperative Creamery	5OT.863	1914	FE
Rocky Ford	207 S. 8th St.	Sinding house	5OT.111	1898	FE
Rocky Ford	Milepost 355.2	U.S. 50 bridge over the Rocky Ford Canal (L-22-I)		1934	FE
Rocky Ford	8th St. and Elm Ave. (801 or 807)	Residence			FE
Rocky Ford	S. 8th and Railroad Sts.	Hollar and Company Inc.		1925	FE
Rocky Ford	305-307 N. 8th St.	Ustick Funeral Home		1900, 1934,	FE
Rocky Ford	201 and 203 N. 9th St.	Commercial duplex		1900	FE
Rocky Ford	800 Elm Ave.	Auto clinic		1928	FE
Rocky Ford	411 N. 8th St.	Williams residence		1906	FE
Rocky Ford	405 S. Main St.	Grand Theatre	5OT.577	1935	SR
Rocky Ford	501 N. 8th St.	Holt residence		1898	FE
Rocky Ford	503 N. 8th St.	J.H. Price house	5OT.112	1900	NR
Rocky Ford	101 N. 9th St.	Glazed tile building			FE
Rocky Ford	505 N. 8th St.	Residence		1898	FE
Rocky Ford	507 N. 8th St.	Clifford residence		1906	FE
Rocky Ford	307 N. 9th St. (phone book 301 N. 9th St.)	BPOE #1147		1913	FE
Rocky Ford	Railroad Ave. and Main St.	Rocky Ford Santa Fe depot		1906	OE
Rocky Ford	401 9th St.	Rocky Ford Post Office		1933-1941	NR
Rocky Ford	202 S. Main St.	Boys and Girls Club of the Lower Arkansas Valley		1892	FE
Rocky Ford	200 S. Main St.	I.O.O.F. Hall		1901-1902	FE
Rocky Ford	405 S. 10th St.	First Baptist Church		1900, 1916	NR
Rocky Ford	110 N. Main St.	First Prize Food Processing		1902-1957	FE
Rocky Ford	1005 Sycamore St.	Carnegie Public Library	5OT.193	1908	NR

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Rocky Ford	10th St. and Railroad Ave.	RR Express building		1907	FE
Rocky Ford	501 N. Main St.	El Capitan Lounge	5OT.208	1894	FE
Rocky Ford	West corner of 10th St. and Elm Ave.	Heil Bean Inc.		Early 1900	FE
Rocky Ford	1011 Elm Ave.	Rocky Ford NAPA Auto Parts		1928	FE
Rocky Ford	501 N. 10th St.	Residence		1908	FE
Rocky Ford	206 N. 12th St.	Vigil residence		1900	FE
Rocky Ford	204 N. 12th St.	Steir residence		1898	FE
Rocky Ford	Railroad and 12th Sts.	Arkansas Valley Seeds		1920	FE
Rocky Ford	Bounded (generally) by Oak Ave. to the north, 8th St. to the west, 10th St. to the east, and Beech St. to the south	Arkansas Valley Fairgrounds	5OT.457	1880s -1901	NR
Rocky Ford	407 N. 12th St.	Valley Wide Health Services, migrant center		1900	FE
Rocky Ford	NE corner of 13th St. and (300 blk.) Elm Ave.	Porcelain tile industrial building		1950s - 1960s	FE
Rocky Ford	1300 or 1310 Elm Ave. (Cappuccino Coffee)	Commercial building with false front		1940	FE
Rocky Ford	1315 Elm Ave.	EDCO Metal Works		1940	FE
Rocky Ford	1500 Elm Ave.	Curve Court motel and neon sign		1940S	FE
Rocky Ford	20443 CR EE.25	Residence		1900	FE
Rocky Ford	20475 U.S. 50	Griffin-Holder Co. house		1908	FE
Rocky Ford	2050 U.S. 50	Residence		1905	FE
Rocky Ford	CR 20.5 and CR EE.25	Residence		1910	FE
Rocky Ford to Swink	Milepost 373.6	U.S. 50 bridge over Timpas Creek (L-22-AL)		1958	FE
Swink	U.S. 50 at railroad tracks	Migrant worker housing		1930	FE
Swink	CR 24 and CR CC	Residence		1900	FE
Swink	CR 24 and U.S. 50	Mary's Fruit Stand		1950	FE
Swink	Milepost 374.1	U.S. 50 underpass, BNSF Railway separation (L-22-H)		1928	FE
Swink	U.S. 50 and railroad tracks	U.S. 50 pump house		1946	FE
Swink	323 Holly Ave.	Thompson residence		1934	FE
Swink	321 Holly Ave.	Andress residence		1906	FE
Swink	316 Columbia Ave.	Residence		1926	FE
Swink	302 Columbia Ave.	Post office		1947	FE
Swink	301 Columbia Ave.	Town hall		1910	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Swink	307 Columbia Ave.	Estrada-Martinez residence		1945	FE
Swink	309 Columbia Ave.	Boley residence		1950-1957	FE
Swink	Columbia Ave. and 4th St.	Water tower		N.D.	FE
Swink	6th St. and Powers Ave.	School and New Deal gym		1954	FE
Swink	East of town	Holly Sugar			FE
La Junta	Milepost 376.9	U.S. 50 bridge over the Crooked Arroyo (westbound) (M-22-A)		1947	FE
La Junta	Milepost 376.9	U.S. 50 bridge over the Crooked Arroyo (eastbound) (M-22-K)		1955	FE
La Junta	Bounded by U.S. 50 to the north, SH 10 and Dalton Ave. to the west, and Potter Dr. to the south and east	Fairview Cemetery			FE
La Junta	U.S. 50 and Grant Ave.	Dean Pickle Food Co. Plant		1930/ 1949	FE
La Junta	901 W. 3rd St.	Southeast Colorado Power Assn.			FE
La Junta	814 W. 3rd St.	Industrial building			FE
La Junta	716 W. 2nd St.	Carrillo residence		1896	FE
La Junta	714 W. 2nd St.	Duplex		1922	FE
La Junta	302 Maple Ave.	Mt. Zion Baptist Church		1919	FE
La Junta	202 Lincoln Ave. (3rd St. and Maple Ave.) (Tax Assessor)	Our Lady of Guadalupe Roman Catholic Church		1923, 1926,	FE
La Junta	502 W. 5th St.	Whitfield residence		1897	FE
La Junta	317 Lincoln Ave.	Rangel residence		1900	FE
La Junta	309 Lincoln Ave.	Rosales residence		1900	FE
La Junta	321 Lincoln Ave.	Trantham residence		1900	FE
La Junta	416 2nd St.	Ly two-story apartment building		1900	FE
La Junta	403 W. 3rd St.	Star Drive-In Cleaners		1936	FE
La Junta	210 Carson Ave. (west side)	Norton apartment house		1900	FE
La Junta	122 Carson Ave. (west side)	Aragon residence	5OT.115	1906	FE
La Junta	324 Carson Ave.	Simpson residence		1900	FE
La Junta	314 4th St. W.	Jackson residence		1902	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
La Junta	303 W. 1st St.	WWF Feed & Supply/Atchison, Topeka and Santa Fe freight depot		1880	FE
La Junta	318 Belleview Ave.	Cardenas residence		1900	FE
La Junta	217 Belleview Ave.	Dubois residence		1900	FE
La Junta	315 Belleview Ave.	Daves residence		1897	FE
La Junta	1st St. and Belleview Ave.	Power plant			FE
La Junta	401 Belleview Ave.	Carr residence		1897	FE
La Junta	214 W. 3rd St.	Adobe building		1898	FE
La Junta	213 W. 3rd St.	Ruby's Auto Body		1927/ 1950	FE
La Junta	221 W. 4th St.	Rosa residence		1904	FE
La Junta	306 San Juan Ave.	Colosimo residence		1900	FE
La Junta	421/427 San Juan Ave.	Hibbs apartment house		1910	FE
La Junta	122 San Juan Ave.	Old auto body shop		1940-1958	FE
La Junta	121 W. 2nd St.	R&J's Auto Body		1910	FE
La Junta	117 W. 2nd St.	Ron's Sign Shop		1900	FE
La Junta	4th St. and Colorado Ave.	La Junta post office	5OT.94	1916	NR
La Junta	1 W. 1st St.	Railroad office		1880-1910	FE
La Junta	123 Colorado Ave.	Kit Carson Lounge	5OT.468	1901	SR
La Junta	17 E. 3rd St.	Service station/retail store		1934	FE
La Junta	309 Raton Ave.	Gonzales residence		1928	FE
La Junta	311 Raton Ave.	Gonzales residence		1915	FE
La Junta	315 Raton Ave.	Johnston residence		1900	FE
La Junta	317 and 319 Raton Ave.	Fraley bungalow duplex		1905	FE
La Junta	321 Raton Ave.	Nesselhuf residence		1905	FE
La Junta	424 Raton Ave. (lots 1-5)	U-shaped community (multiple owners)		1936	FE
La Junta	111 E. 4th St.	Parker residence		1900	FE
La Junta	114 Cimarron Ave.	Sno White Linen and Uniform		1915	FE
La Junta	306 Cimarron Ave.	Collier residence		1900	FE
La Junta	312 Cimarron Ave.	Marquez residence		1904	FE
La Junta	313 Cimarron Ave.	Pan residence		1897	FE
La Junta	301 Cimarron Ave.	Lane residence		1918	FE
La Junta	221 Cimarron Ave.	Freidenberger residence		1894	FE
La Junta	213 Cimarron Ave.	Brindle residence		1888	FE
La Junta	1st St. and Smithland Ave.	La Junta Mill and Elevator Co.		1889, 1929	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
La Junta	402 Smithland Ave.	Rosales residence		1897	FE
La Junta	412 Smithland Ave.	Residence Housing Authority		1900	FE
La Junta	306 Smithland Ave.	Residence		1920-1923	FE
La Junta	418 Smithland Ave.	Apodaca-Martinez residence		1887	FE
La Junta	302 Smithland Ave.	Guerrero residence		1909, 1920	FE
La Junta	422 Smithland Ave.	Campbell-Maraleta residence		1920	FE
La Junta	205 Smithland Ave.	Victory Chapel		1950	FE
La Junta	301 3rd St. and Smithland Ave.	Car care center		1928	FE
La Junta	305 E. 2nd St.	Martinez residence		1898	FE
La Junta	308 E. 2nd St.	Rivera residence		1918	FE
La Junta	403 E. 3rd St.	Commercial and apartments		1903	FE
La Junta	222 Steen Ave.	2-story apartment house		1892	FE
La Junta	214 and 214 ½ Steen Ave.	Residence		1908-1928	FE
La Junta	411 E. 3rd St.	Storage business with false front		1936	FE
La Junta	205 Lewis Ave.	Residence		1898	FE
La Junta	201 Lewis Ave.	El Rincon		1918	FE
La Junta	211 Lewis Ave.	Residence		1900	FE
La Junta	607 E. 2nd St.	Bogie Farm Golf Shop (commercial/residential)		1948	FE
La Junta	208 Harriet Ave.	Jimenez residence		1913	FE
La Junta	216 Harriet Ave.	Diaz residence		1929	FE
La Junta	218 Harriet Ave.	Duran residence		1910	FE
La Junta	302 Harriet Ave.	Guerrero residence		1908	FE
La Junta	716 E. 2nd St.	Residence		1896	FE
La Junta	714 E. 2nd St.	Residence		1922	FE
La Junta	717 E. 2nd St.	Jack's Body Shop		1934	FE
La Junta	202 Bradish Ave.	Giltner residence		1946	FE
La Junta	121 Bradish Ave.	R & M Enterprise		1949	FE
La Junta	1021 E. 3rd St.	Water plant			FE
La Junta	1202 E. 3rd St.	The Old Volks Home		1947	FE
La Junta	East of SH 109	Otero Ditch tunnel			FE
La Junta	30245 U.S. 50	Winter Livestock Co. and feed lots		1960	FE
La Junta	Milepost 381.9	U.S. 50 bridge over the Otero Canal (M-23-J)		1957	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
La Junta to Las Animas	Milepost 382.8	U.S. 50 bridge over the Thompson Arroyo (westbound) (M-23-A)		1931	FE
La Junta to Las Animas	Milepost 382.8	U.S. 50 bridge over the Thompson Arroyo (eastbound) (M-23-E)		1957	FE
La Junta to Las Animas		Archaeological resource	5OT.2		ND
La Junta to Las Animas		Archaeological resource	5OT.3		ND
La Junta to Las Animas	Milepost 387.0 on the north side of U.S. 50	Bent's Old Fort National Historic Site	5OT.149		OE
La Junta to Las Animas	Sandhill site	Archaeological resource	5OT.141		FE
La Junta to Las Animas	Prairie Dog site	Archaeological resource	5OT.534		FE
La Junta to Las Animas		Archaeological resource	5OT.536		FE
Las Animas	U.S. 50	Old U.S. 50 segment		1950	FE
Las Animas	U.S. 50	Las Animas/ Bent County Fairgrounds			FE
Las Animas	1436 6th St.	Residence			FE
Las Animas	655 Cottonwood	Moore residence	5BN.511	1922	FE
Las Animas	1214 Ambassador Thompson Blvd.	Bent County High School and cottages	5BN.382	1913	OE
Las Animas	1215 6th St.	Residence			FE
Las Animas	511 Ambassador Thompson Blvd.	Jenkins Auto			FE
Las Animas	Ash Ave. and Ambassador Thompson Blvd.	St. Paul Lutheran Church			FE
Las Animas	944 6th St.	Residence			FE
Las Animas	939 6th St.	Samuelson residence		1900	FE
Las Animas	924 6th St.	Residence			FE
Las Animas	919 6th St.	Vandiver residence		1900	FE
Las Animas	628 Vine Ave.	Residence			FE
Las Animas	616 Vine Ave.	Residence			FE
Las Animas	904 6th St.	Residence			FE
Las Animas	802 Ambassador Thompson Blvd.	Residence			FE
Las Animas	828 6th St.	Rhodes residence		1908	FE
Las Animas	821 6th St.	Residence			FE
Las Animas	805 5th St.	Residence			FE
Las Animas	624 Maple Ave.	Residence			FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Las Animas	648 Maple Ave.	Residence			FE
Las Animas	634 Maple Ave.	Residence			FE
Las Animas	625 Maple Ave.	Abensham residence		1904	FE
Las Animas	629 Maple Ave.	Residence			FE
Las Animas	627 Maple Ave.	Residence			FE
Las Animas	660 Maple Ave.	Residence			FE
Las Animas	746 5th St.	Bingham Dean residence		1898	FE
Las Animas	704 5th St.	Residence			FE
Las Animas	505 Locust Ave.	Graham house	5BN.453	1900	SR
Las Animas	6th St. and Locust Ave.	Former Episcopal church (Victory Outreach)			FE
Las Animas	502 Locust Ave.	Las Animas Christian Church	5BN.449	1920	NR
Las Animas	546 5th St.	B.T. Clough residence		1900	FE
Las Animas	513 6th St.	Las Animas post office			NR
Las Animas	653 Elm Ave.	Residence			FE
Las Animas	638 Elm Ave.	St. Mary's Church complex		1950-1960	FE
Las Animas	801 Carson Ave.	Atchison, Topeka and Santa Fe freight depot	5BN.480	1900-1920s	FE
Las Animas	510 Carson Ave.	Weber Chevrolet Company	5BN.489	1926	FE
Las Animas	506 Carson Ave.	King Solomon Lodge	5BN.452	1909-1918	SR
Las Animas	6th St. odd and even sides	Las Animas downtown	5BN.544	1900s	OE
Las Animas	725 Carson Ave.	Bent County Courthouse and Jail	5BN.99	1886-1989	NR
Las Animas	SH 101	D-Arcangelis house		1915	FE
Las Animas	300 block of 3rd St. (3rd St. and Bent Ave.)	VFW Hall		1938-1939	FE
Las Animas	221 U.S. 50	Liquor store			FE
Las Animas	333 8th St. and Railroad Ave.	Las Animas Santa Fe depot	5BN.415	1908	SR
Las Animas	316 Bent Ave.	Commercial front	5BN.472		FE
Las Animas	104 Bent Ave.	Freedom Bail Bonds/gas station		1955	FE
Las Animas	560 Bent Ave.	I.O.O.F. Hall, Lodge No. 11	5BN.466	1889	FE
Las Animas	Corner of 3rd St. and U.S. 50	Auto dealership			FE
Las Animas	8th St. and Carson Ave.	Fort Lyon Canal Company building		1950	FE
Las Animas	Between Vigil Ave. and Bent Ave. on 9th St.	Kit Carson Museum	5BN.475		FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Las Animas to Lamar	U.S. 50	Barn		1905	FE
Las Animas to Lamar	U.S. 50	Farmstead		1920s	FE
Las Animas to Lamar		Santa Fe Trail segment (archaeological resource)	5BN.391		FE
Las Animas to Lamar	U.S. 50	Residence		1900	FE
Las Animas to Lamar	Milepost 410.1	U.S. 50 bridge over the McCrae Arroyo (L-24-L)		1937	FE
Las Animas to Lamar	Town limits	Higley Gems			FE
Las Animas to Lamar	CR 24	Clave Farmstead		1900	FE
Las Animas to Lamar	101 Main St.	Hasty post office/ Mercantile	5BN.389	1900-1909	FE
Las Animas to Lamar	U.S. 50 and CR 26	Farmstead			FE
Las Animas to Lamar	Milepost 418.1	U.S. 50 bridge over a draw (L-25-E)		1937	FE
Las Animas to Lamar	U.S. 50	Barn		1900	FE
Las Animas to Lamar	Milepost 419.7	U.S. 50 bridge over Limestone Creek (L-25-N)		1937	FE
Las Animas to Lamar	U.S. 50	Farmstead			FE
Las Animas to Lamar	U.S. 50	Barn		1900	FE
Las Animas to Lamar	U.S. 50	Farmstead		1920	FE
Las Animas to Lamar	U.S. 50 and CR 33.5	Building		1890	FE
Lamar to Granada	Milepost 439.8	U.S. 50 bridge over the Willow Creek overflow (L-26-X)		1936	FE
Lamar to Granada	U.S. 50	Farmhouse		1900	FE
Lamar to Granada	CR 16	Roosevelt School		1923	FE
Lamar to Granada		Carlton town site (archaeological resource)	5PW.47		ND

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Granada	West Amache Road/CR FF and CR 23.5	Granada Relocation Center National Historic Landmark (a.k.a. Camp Amache) [water storage structure (archaeological resource)][2]	5PW.48 [5PW.103][b]	1942	NHL
Granada	Off U.S. 50	Residence		1905	FE
Granada	U.S. 50	Cabins		1925	FE
Granada	U.S. 50	Gas station		1940	FE
Granada	104 Main St.	Granada Masonic Lodge		1889	FE
Granada	106 Goff Ave. (U.S. 50)	McMillan Barbershop		1930	FE
Granada		Old Granada Site (archaeological resource)	5PW.49		ND
Granada	U.S. 50 east of town	Southeastern Colorado Cooperative			FE
Granada		X-Y Ranch Headquarters			FE
Granada to Holly	U.S. 50	Residence		1910	FE
Granada to Holly	Milepost 455.6	U.S. 50 bridge over Granada Creek (L-27-M)		1933	FE
Granada to Holly	Milepost 456.0	U.S. 50 overpass, BNSF Railway separation (L-28-C)		1933	FE
Granada to Holly	U.S. 50	Gateway Downs (horseracing track, not in use currently)			FE
Holly	CR 34	Residence		1905	FE
Holly	107-109 N. 5th St.	Entz residence		1926	FE
Holly	105 N. 5th St.	Holly Christian Church			FE
Holly	205 5th St.	I.O.O.F. Hall		1949	FE
Holly	411 W. Colorado	Holly United Methodist Church		1929	FE
Holly	504 W. Buffalo St.	Sitts residence		1910	FE
Holly	201 N. Main St.	Shanner Elementary School		1920-1922	FE
Holly	508 W. Buffalo St.	Golden residence		1948	FE
Holly	302 S. Main St.	Holly Santa Fe depot	5PW.73	1912	NR
Holly	South of the intersection of Vinson St. and Main St.	Holly Barn			OE
Holly	115 S. Main St. (west side)	Holly Theatre		1908	FE

Location	Address	Property Name	Smithsonian Number	Built Date	National Register Eligibility[1]
Holly	Across from 201 N. Main St.	Holly Gymnasium		1937	NR
Holly	130 S. Main St. (east side)	L-M Healthmart & Variety		1900	FE
Holly	Santa Fe St. (2nd building east of Main St.)	Leiker Mercantile		Early 1900	FE
Holly	119 E. Cheyenne Ave.	Holly City Hall and Library	5PW.175	1938	NR
Holly	105 S. 2nd St.	Harrington residence		1918	FE
Holly		Grain complex		1910	FE
Holly	109 S. 1st St.	Residence			FE
Holly		Horse ranch complex		1900	FE
Holly	SH 89 and railroad	Southeast Colorado Cooperative		1950-1951	FE
Holly	U.S. 50	Willett's house		1950	FE
Holly Transition	Near milepost 467	Hadley rest area		1960	FE
Holly Transition		Trail City town site (archaeological resource)	5PW.53		ND

[1]National Register eligibility: NHL = National Historic Landmark, NR = National Register, SR = State Register, OE = Officially Determined Eligible, FE = Field Eligible, ND = Needs Data, and Natl. Trail = Nationally Recognized Trail. More information about National Register eligibility can be found in the U.S. 50 Tier 1 EIS Historic and Archaeological Resources Technical Memorandum
[2]Contributing element to the resource listed

Table D-2. Linear Historic Resources by Location

Resource Location (County)	Resource Name	Smithsonian Number	Canal Decree	National Register Eligibility[1]
Pueblo	Excelsior Ditch		12/31/1861	FE
Pueblo and Otero	Rocky Ford Highline Canal		1/06/1890	FE
Pueblo and Otero	Oxford Farmers Ditch		Pre-1884	FE
Otero	Otero Canal		3/03/1890	FE
Otero	Catlin Canal	5OT120, 5OT120.1	12/03/1884, 4/10/1875	FE
Otero	Main Leach Canal		NA	FE
Otero	Rocky Ford Canal		5/15/1874	FE
Bent	Jones Ditch		Ca. 1896	FE
Bent	Consolidated Ditch		Ca. 1884	FE
Bent	Las Animas Town Ditch		3/07/1884	FE
Bent and Prowers	Fort Lyon Canal		4/15/1884	FE
Bent	McClave Ditch		Ca. 1884	Cont.
Bent	Sunflower Ditch		Ca. 1884	Cont.
Bent	Riverview Ditch		Ca. 1884	Cont.
Bent	Lubers Drainage Ditch		NA	FE
Bent	Miller's Ditch [ditch feature][2]		NA	FE
Bent	Arkansas River Levee at Las Animas		NA	FE
Bent and Prowers	Amity Canal		2/21/1887	FE
Prowers	Vista Del Rio Ditch		Ca. 1884	FE
Prowers	Lamar Canal		11/30/1875	FE
Prowers	Manvel Canal		10/14/1890	FE
Prowers	X-Y Canal		7/22/1889	FE
Prowers	Granada Ditch		7/22/1889	Cont.
Prowers	Buffalo Canal		1/29/1885	FE
Prowers	Holly Ditch		Ca. 1885	Cont.
Otero, Bent, and Prowers	Santa Fe National Historic Trail [trail segment][2]	5BN.391 (segment)		Natl. Trail
Pueblo, Otero, Bent, and Prowers	Atchison, Topeka and Santa Fe Railway (currently BNSF Railway) [trestle, trestle, other railroad resource][2]	5PW152, 5PW152.1, 5PW152.2, 5PW152.3 (ONE), 5PW152.4		OE

Ca. = Circa
[1]National Register eligibility: NHL = National Historic Landmark, NR = National Register, SR = State Register, OE = officially determined eligible, FE = field eligible, ND = needs data, Cont. = contributing archaeological resource, and Natl. Trail = Nationally Recognized Trail; more information about National Register eligibility can be found in the U.S. 50 Tier 1 EIS Historic and Archaeological Resources Technical Memorandum
[2]Contributing element to the resource listed

This page left intentionally blank.

Appendix E. Parklands and Recreational Resources

Table E-1 lists the parklands and recreational resources identified for the U.S. 50 Tier 1 EIS.

Table E-1. Parklands and Recreational Resources by Location

Site Type	Site Name
Pueblo County	
Park	Galarraga Park (baseball field)
Pueblo	
Golf course	Walking Stick Golf Course
Park	University Park (Colorado State University–Pueblo campus)
Park	Drew Dix Park
Park	Belmont 35th Filing Park
Park	Belmont Park
Park	Portland Park
Park	Eastwood Park
Park	St. Anne's Park
Park	Mitchell Park
Park	Trailhead Park
Park	El Centro de Quinto Sol
School recreational facility	Heaton School Park
School recreational facility	Belmont School Playground
School recreational facility	Haaff School Park
School recreational facility	East High School recreational facilities
School recreational facility	Franklin School Park
School recreational facility	Eastwood School Park
School recreational facility	Spann School Park
School recreational facility	Fountain School Park
School recreational facility	Park View School playground
School recreational facility	Risley School Park
Otero County	
State wildlife area	Rocky Ford State Wildlife Area
Fowler	
Golf course	Cottonwood Links Golf Course
Park	Fowler City Park
Pool	Fowler City Pool
School recreational facility	Fowler School District
Manzanola	
Park	Depot Park (planned facility)
Park	Manzanola Town Park
Park	Miller Park
School recreational facility	Manzanola Elementary School
School recreational facility	Manzanola Junior-Senior High School

Site Type	Site Name
Rocky Ford	
Fairgrounds	Arkansas Valley Fairgrounds
Golf course	Rocky Ford Golf Course
Park	Crystal Lake Park
Park	Depot Park
Park	Library Park
Park	Open space median
Park	Memorial Park
Park	Railroad Park
Park	Welcome Center Park
Park	Babcock Park
School recreational facility	Liberty Elementary School
Swink	
Park	Swink Town Park
School recreational facility	Swink Elementary School
School recreational facility	Swink Junior-Senior High School
La Junta	
Park	King Arroyo Mini Park
Park	Potter Park
Park	Santa Fe Park
Park	Veteran's Park
Park	Edison Park
Park	C.L. Red Crane Tot Park
Park	City Park
Park	Prairie View Heights Development
School recreational facility	La Junta Intermediate School
School recreational facility	Xeriscape Park
School recreational facility	College Overlook (Martinez) (Otero Junior College)
School recreational facility	Sports and Recreation Complex (Otero Junior College)
Bent County	
Park	Hasty Community Park
State park and State Wildlife Area	John Martin Reservoir State Park and State Wildlife Area
Las Animas	
Fairgrounds	Bent County/Las Animas Fairgrounds
Golf course	Las Animas Municipal Golf Course
Park	Leonard Hudnall Park
Park	Las Animas City Park
Park and swimming pool	Park/pool
Recreational facility	City baseball field
Recreational facility	County baseball fields
School recreational facility	Columbian Elementary School
School recreational facility	Las Animas Middle School
School recreational facility	Las Animas School District
School recreational facility	Memorial School (Jump Start Learning Center)

Site Type	Site Name
Prowers County	
Pedestrian trail	Pedestrian trail (surrounding Lamar)
National Historic Landmark	Granada Relocation Center (a.k.a. Camp Amache)
State Wildlife Area	Mike Higbee State Wildlife Area
State Wildlife Area	Granada State Wildlife Area
State Wildlife Area	Holly State Wildlife Area
State Wildlife Area	Midwestern Farms State Wildlife Area (interim site)
State Wildlife Area	Sisson State Wildlife Area (interim site)
Granada	
Park	Park
School recreational facility	Granada School District
Holly	
Park	Baseball fields
Park	Holly Gateway Park
School recreational facility	Holly Elementary School
School recreational facility	Holly School District
Planned trail	Pedestrian trail

This page left intentionally blank.

Appendix F. Section 6(f) Resources

Table F-1 lists the Section 6(f) resources identified for the U.S. 50 Tier 1 EIS.

Table F-1. Section 6(f) Resources Identified

Location	Number of Resources	Section 6(f) Resource	Project Sponsor[1]	Grant ID
Pueblo County	6	Avondale School Park #2	Pueblo School District 70	705
		Avondale School Rec. Area	Pueblo School District 70	418
		Baxter Elementary School Park (Divine School)	Pueblo School District 70	714
		Boone Elementary School Park (Futures Academy)	Pueblo School District 70	713
		McHarg Park Donation/Dev.	Pueblo County	494
		McHarg Park Phase II	Pueblo County	839
Pueblo	14	Portland School Park	City of Pueblo	794
		Drew Dix Neighborhood Park	City of Pueblo	700
		Drew Dix Park Dev. Phase II	City of Pueblo	844
		Eastwood Park Dev. Phase II	Pueblo School District 60	847
		El Centro De Quinto Sol (Recreation Center)	City of Pueblo	603
		Fountain Creek Trail	City of Pueblo	1057
		Fountain Creek Trail #3	City of Pueblo	787
		Fountain Creek Trail #4	City of Pueblo	924
		Haaff Park	Pueblo School District 60	930
		Heaton Neighborhood Park (Heaton School Park)	City of Pueblo	699
		Pueblo Eastwood Hts. School Park (Eastwood Park)	Pueblo School District 60	458
		Pueblo Spann School Park	Pueblo School District 60	472
		Trail Head Park	City of Pueblo	259, 425
		University Park	City of Pueblo	883
Manzanola	1	Manzanola Park-Sprinklers	Town of Manzanola	648
Rocky Ford	5	Babcock Park Dev.	City of Rocky Ford	299
		Play Park Hill Improvements (Rocky Ford Country Club)	City of Rocky Ford	936
		Rocky Ford Golf-Tennis Upgrade	City of Rocky Ford	650
		Rocky Ford Pool	City of Rocky Ford	672
		Rocky Ford Park	City of Rocky Ford	117
La Junta	5	College Overlook Park Dev.	City of La Junta	597
		College Overlook Park #2	City of La Junta	675

Location	Number of Resources	Section 6(f) Resource	Project Sponsor[1]	Grant ID
		Holbrook Rec. Dev. Site (Recreation Center)	Otero County	987
		Otero County Park	Otero County	777
		Otero Jr. College Game Courts	Otero Jr. College	566
Las Animas	1	Bent County/Las Animas Regl Park	Las Animas School District RE-1	860
Las Animas to Lamar	1	Hasty Park (McClave Park)	McClave School District	6
Holly	3	Holly School District RE-3 Support	Holly School District RE-3	631
		Holly Tennis Court	Town of Holly	59
		Holly Trailer Park-Campground	Town of Holly	44

[1]Organization responsible for completing the project and administering the Section 6(f) funds

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East
Tier 1 Draft Environmental Impact Statement

Traffic Noise Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... 1
2. Resource Definition ... 2
3. Applicable Laws, Regulations, and Guidance ... 3
3.1. Procedures for Abatement of Highway Traffic Noise and Construction Noise ... 3
3.2. FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance ... 3
3.3. CDOT Noise Analysis and Abatement Guidelines ... 3
4. Methodology ... 4
4.1. Relevant Data or Information Sources ... 4
4.2. Data Collection and Analysis Methodology ... 5
4.3. Project Area ... 6
5. Existing Conditions ... 7
5.1. U.S. 50 Traffic Volumes ... 7
5.2. Ambient Noise Levels ... 8
5.3. Noise sensitive receptors ... 10
6. Effects ... 11
6.1. No-Build Alternative ... 11
6.2. Build Alternatives ... 11
7. Mitigation Strategies ... 15
8. Avoidance Activities ... 16
9. References ... 17
Appendices ... 19
Appendix A. Resource Methodology Overview for Traffic Noise ... 21
Appendix B. Abbreviations and Acronyms ... 23

Tables

Table 4-1. CDOT Noise Abatement Criteria 5
Table 5-1. Noise Measurement Data 9
Table 5-2. Traffic Volumes during 2014 Measurements 9
Table 5-3. Traffic Volumes during 2002 Measurements 10
Table 6-1. Potential Traffic Noise Effects on Identified Noise Sensitive Receptors by the Build Alternatives 13
Table 6-2. Summary of Potentially Affected Noise Sensitive Receptors by Location 14

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 5-1. Average Annual Daily Traffic for 2011 and 2040 7
Figure 5-2. Noise Measurement Locations 8
Figure 6-1. Build Alternatives Overview 12

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that CDOT and the communities can use to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Noise is generally defined as unwanted or undesirable sound affecting noise sensitive receptors, and, ultimately, people. More specifically, traffic noise is generated by vehicles passing by and includes noise from tires on the pavement, engines, and exhaust. Factors that influence traffic noise include such things as the number of vehicles on the road, the types of vehicles (e.g., cars, trucks, or motorcycles), traffic speed, and the distance between the roadway and the person hearing the noise. Due to the physical properties of noise, it has a highly localized effect. Since sound energy dissipates with distance, people closer to its source experience higher levels of noise than those successively farther away.

Noise typically affects humans in three different ways: noise intensity or level, noise frequency, and noise variation with time. Noise intensity is determined by how sound pressure fluctuates, and it is expressed in decibels (dB). The range of noise normally encountered can be expressed by values between 0 and 120 dB on the dB scale. A 3-dB change in sound level generally represents a barely noticeable change in noise level, whereas a 10-dB change would be perceived as a doubling of loudness. The frequency of noise is related to the tone or pitch of the sound and is expressed in terms of cycles per second, or Hertz. The human ear can detect a wide range of frequencies from approximately 20 Hertz to 17,000 Hertz. Because human sensitivity to sound varies from person to person, the A-weighting system is commonly used when measuring noise to provide a value that represents human response. Noise levels measured using this system are called “A-weighted” levels, and are expressed as dBA.

Because noise fluctuates during the course of a day, it is common practice to condense all of this information into a single number, known as an equivalent sound level (Leq). Leq represents a steady sound level over a specified time period (typically 60 minutes).

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to 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 noise. They are described in more detail below.

- Procedures for Abatement of Highway Traffic Noise and Construction Noise
- FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance
- CDOT Noise Analysis and Abatement Guidelines

3.1. Procedures for Abatement of Highway Traffic Noise and Construction Noise

As part of the Federal-Aid Highway Act of 1970, 23 CFR 772 (Procedures for Abatement of Highway Traffic Noise and Construction Noise) was established to provide procedures for noise studies and noise abatement criteria to help protect public health and welfare. The last amendment for this regulation was published on July 13, 2010.

3.2. FHWA Highway Traffic Noise Analysis and Abatement Policy and Guidance

The purpose of this document is to provide guidance for the analysis and abatement of highway traffic noise. It establishes baseline guidelines for individual state Department of Transportation (DOT) agencies to further address noise analysis and abatement specific to their state. The last version of this document was published in December 2011.

3.3. CDOT Noise Analysis and Abatement Guidelines

These guidelines establish noise abatement criteria, or noise level standards, above which noise-reducing actions should be considered, specifically for the State of Colorado. The most recent version was published on February 8, 2013.

4. Methodology

The U.S. 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 U.S. 50 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 U.S. 50 facility beginning at Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 traffic noise has been 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 identify noise sensitive receptors within the project area. Examples of noise sensitive receptors found in the project area include parks and recreation areas, residences, hotels and motels, schools, libraries, and hospitals. More information about what defines a noise sensitive receptor is located in Section 4.2. The following list identifies categories of noise sensitive receptors and the data and information sources used to identify them within the project area.

- Parklands and recreational areas—These facilities were identified during a field review primarily intended to identify potential Section 4(f) resources for the U.S. 50 Tier 1 EIS project. Parklands and recreational areas in Pueblo also were identified with the help of the City of Pueblo's website.
- Schools—Public elementary and secondary schools (i.e., K–12) were identified using the U.S. Department of Education's National Center for Education Statistics database.
- Libraries—Public libraries were identified using the PublicLibraries.com website.
- Hospitals—Hospitals were identified using information from the Colorado Department of Public Health and Environment, which licenses such facilities in Colorado.
- Aerial photography—Aerial photography was used to identify all other noise sensitive receptors.

Additionally, traffic data from CDOT was used to identify current (2011) traffic volumes on U.S. 50 and forecasted volumes for the year 2040.

4.2. Data Collection and Analysis Methodology

This traffic noise analysis was completed by identifying noise sensitive receptors within a study area defined as 1,000 feet wide and within 300 feet on either side of the Build Alternatives, centered on the Build Alternatives (creating a 1,600-foot-wide study area). Long-established state and federal noise guidelines prescribe how to determine whether a nearby property (i.e., noise receptor) is adversely affected by traffic noise. If traffic noise is expected to approach or exceed those guidelines (see Table 4-1), projects are required to mitigate for noise impacts above the respective Noise Abatement Criteria (NAC) dBA level for each receptor.

Table 4-1. CDOT Noise Abatement Criteria

Activity Category	Activity Leq(h)*	Evaluation Location	Activity Description
NAC A	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
NAC B	66	Exterior	Residential
NAC C	66	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
NAC D	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
NAC E	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
NAC F	NA	NA	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing.
NAC G	NA	NA	Undeveloped lands that are not permitted for development.

** Hourly A-weighted sound level in dBA, reflecting a 1-dBA approach value below 23CFR772 values*

Noise sensitive receptors are categorized by the type of land use activities associated with the receptor (Table 4-1). Some categories are much more sensitive to the effects of traffic noise than others. For example, an outdoor amphitheater would be more affected by traffic noise than areas used occasionally by business customers, such as outdoor waiting areas at restaurants. This is because the purpose of the amphitheater is to hear the performances occurring there.

For the purposes of this U.S. 50 Tier 1 EIS, all noise sensitive receptors that were located, in whole or in part, within the 1,600-foot noise study area were recorded. Existing noise conditions were not collected, nor were any models developed to determine the potential impacts on the various receivers. Existing noise data and noise modeling will be conducted during Tier 2 studies and will be based on identified Tier 2 alignments.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to the Colorado-Kansas state line (as shown in 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 U.S. 50 at 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 U.S. 50 Tier 1 EIS's scoping activities.

5. Existing Conditions

Currently, U.S. 50 is the primary east-west route into, out of, and through the 10 communities along U.S. 50 from I-25 to the vicinity of the Colorado-Kansas state line. These communities include Pueblo, Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Lamar, Granada, and Holly. (It should be noted that Lamar is not included in the U.S. 50 project area because it is being considered in the *U.S. 287 at Lamar Reliever Route Environmental Assessment*; therefore, it has been omitted from this analysis.) Thus, traffic on U.S. 50 currently has a noise effect on these communities. The following section describes traffic conditions on U.S. 50 today (using a date of 2011) and in the future (using a date of 2040) and identifies the noise sensitive receptors used for this analysis.

5.1. U.S. 50 Traffic Volumes

The average annual daily traffic (AADT) volume for a given roadway is the number of vehicles that drive the roadway during an average day. Figure 5-1 shows these traffic volumes for U.S. 50 between Pueblo and the Colorado-Kansas state line. Traffic volumes on U.S. 50 currently decline from a maximum of roughly 13,500 vehicles per day (vpd) within Pueblo city limits to a minimum of about 1,700 vpd east of Holly. The average traffic volume on U.S. 50 is approximately 5,500 vpd. By the year 2040, traffic volumes are expected to increase to 19,000 vpd in Pueblo and 2,500 vpd by Holly (Swenka 2014).

In comparison, the amount of traffic carried on I-25 through Pueblo was, on average, approximately 47,846 (Swenka 2014). In other words, traffic volumes on U.S. 50 are roughly 11 percent of the volumes on I-25 through Pueblo. Thus, traffic noise levels on U.S. 50 are relatively low.

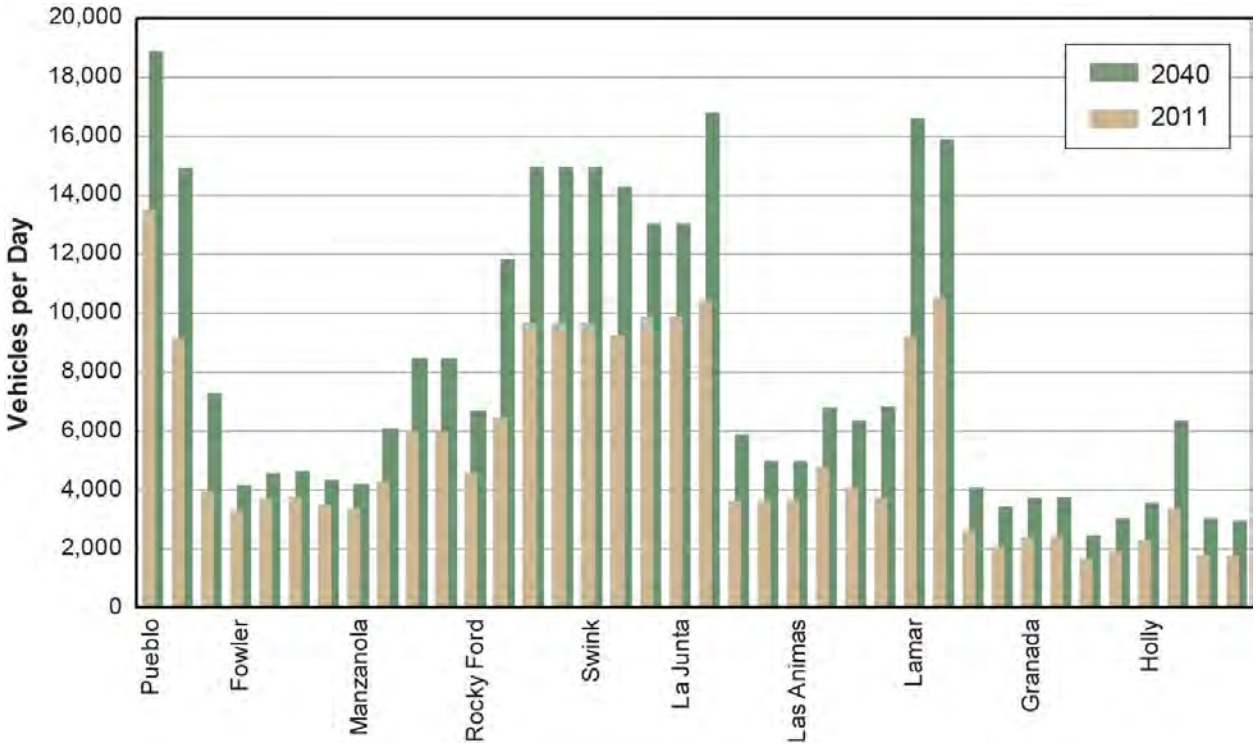


Figure 5-1. Average Annual Daily Traffic for 2011 and 2040

5.2. Ambient Noise Levels

In January 2014, highway traffic noise levels were collected along U.S. 50 in the project area to provide quantitative context to the corridor noise environment. The site selections were based on highway segment AADT volumes serving regional population centers. Additional traffic noise data collection conducted in 2011 for the *U.S. 287 at Lamar Reliever Route Environmental Assessment* also has been used to supplement this document (Hankard 2003, CH2M Hill 2012).

5.2.1. Measurement Locations

Noise measurements were taken at five locations along the U.S. 50 corridor (see Figure 5-2):

- Milepost 334 located just east of Avondale (2014)
- Milepost 365.5 located between Manzanola and Rocky Ford (2014)
- Milepost 384 located between La Junta and Las Animas at Otero CR 33 (2014)
- Milepost 433.5 at the corner of the U.S. 50 and U.S. 287 intersection (2002)
- Milepost 437.5 on U.S. 50 (2002)

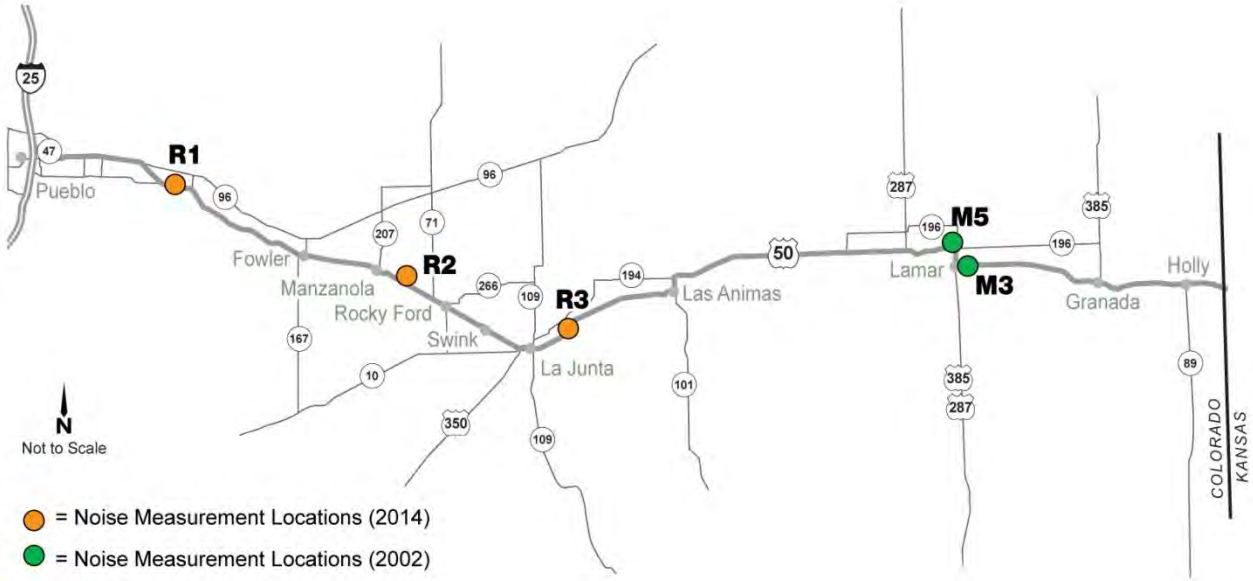


Figure 5-2. Noise Measurement Locations

5.2.2. Measurement Conditions for 2014 Data

All traffic noise measurements were recorded as average hourly equivalent Leq decibels using an A-weighted filter and fast control settings. Prior to each measurement, the Class II Quest 2900 Sound Meter was calibrated using a CE-10 Calibrator.

Stronger-than-desirable wind conditions have factored into the data collection. The Eastern Plains are characterized by pervasive and often gusty westerly wind. Several attempts to measure noise levels along the corridor were aborted due to complications caused by wind conditions and, in one case, extreme cold affecting sound meter operation.

Wind speeds at each site were estimated; no anemometer was deployed. MesoWest Weather real-time reporting from Pueblo and Lamar stations were utilized to estimate wind and gusting speeds, temperatures, and humidity in the morning ahead of field data collection. On-site temperatures were taken from local AccuWeather.com reporting.

5.2.3. Noise Results

The following tables summarize the noise levels, data collection parameters, and traffic volumes recorded at each site. The R2 noise level may be slightly skewed due to a very close diesel truck pass-by on the access road during the measurement.

Table 5-1. Noise Measurement Data

Site	Location/ Description	Date & Start Time	Reading Duration (minutes)	Leq (dBA)	Wind Speed (mph)	Temp (°F)	Relative Humidity (%)
R1	Milepost 334 50 feet south of EOP 2 lanes striped at grade	1/30/2014 9:08 AM	10	64.2	0–5	40	30–40
R2	Milepost 365.5 30 feet south of EOP 4 lanes striped at grade	1/30/2014 10:01 AM	10	66.2	5–10	44	30–40
R3	Milepost 384 35 feet south of EOP 4 lanes with 15-foot grass median, rolling terrain	1/30/2014 10:50 AM	13	58.5	10+	45	30–40
M3[1]	Milepost 437.5 U.S. 50 EB & WB east of the city of Lamar	12/6/2002 9:15 AM	60	60.1	—[2]	—[2]	—[2]
M5[1]	Milepost 433.5 Near the corner of the U.S. 50 and U.S. 287 intersection	12/6/2002 11:15 AM	60	50.4	—[2]	—[2]	—[2]

[1]*Source: Hankard 2003*
[2]*Data not provided in the Noise Analysis Report for the* U.S. 287 at Lamar Reliever Route EA.

Table 5-2. Traffic Volumes during 2014 Measurements

Site	Hourly Traffic Volume (vehicles/hour)								Posted Speed (mph)
	Light		Medium		Heavy		Total		
	EB	WB	EB	WB	EB	WB	EB	WB	
R1	66	222	0	0	24	6	90	228	65
R2	90	108	12	0	18	12	120	120	65
R3	56	69	5	5	9	5	70	79	65

Table 5-3. Traffic Volumes during 2002 Measurements

Site	Hourly Traffic Volume (vehicles/hour)			Speed
	Autos	Medium Trucks	Heavy Trucks	
M3	347	11	23	34
M5	41	1	10	56

Source: Hankard 2003

5.3. Noise sensitive receptors

A total of 1,720 noise sensitive receptors were identified using aerial photography and GIS files within the aforementioned traffic noise study area. Of the 1,720 noise sensitive receptors, 93.4 percent (1,607 noise sensitive receptors) were NAC B, 3.5 percent (60 noise sensitive receptors) were NAC C, and 3.1 percent (53 noise sensitive receptors) were NAC E. In addition, 1,007 noise sensitive receptors (58.5 percent) were identified in the Pueblo area, as this is the most populated section of the study area, and the majority (80 percent) of noise sensitive receptors in the study area are located within the communities rather than in between towns.

There were no NAC A or D noise sensitive receptors identified in the study area. Any NAC F and G noise sensitive receptors that were identified were not counted for this analysis as they do not have a designated NAC Leq(h) criterion. Because of this, they are not considered for any noise abatement measures (i.e., noise walls) that may be applicable based on the results of any future noise analysis done for any Tier 2 studies.

The NAC C noise sensitive receptors include park areas, rest stops, churches, day care centers, schools, and several Colorado Parks and Wildlife recreation trails that cross through the project area. A receptor was placed at each location, and, for recreation areas (parks, sports fields, etc.), a receptor was placed for each individual amenity feature within the recreation area. For example, if a park contained a playground, tennis courts, basketball courts, and open recreation space, a total of four noise sensitive receptors would be placed within the park area to represent each individual function that is available.

CDOT's Noise Abatement Guidelines (2013) do not specify how many noise sensitive receptors should be placed along a trail to represent it appropriately in the noise analysis (i.e., one receptor every 1,000 feet). However, the guidelines do say that usage, stopping sites, rest areas, etc., should be taken into account when deciding on the number of representative receivers. As field visits were not required for this Tier 1 analysis to quantify the usage of the trails in the study area, for the purposes of this analysis, one receptor was placed every time a recreation trail crossed the 1,600-foot study area corridor.

6. Effects

This analysis identified potential noise sensitive receptors within the 1,600-foot-wide traffic noise analysis area, which includes the areas within the Build Alternatives and within 300 feet of it on either side (north and south). An extra 300 feet was added on each side because noise from U.S. 50 traffic is heard on land adjacent to the highway. The extra 600 feet ensures that all potential noise sensitive receptors that could be affected are counted if a new highway segment is built on the edge of the Build Alternatives. The following sections summarize potential effects from U.S. 50 traffic noise by the No-Build Alternative and Build Alternatives.

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 U.S. 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as passing lanes and other minor safety improvements.

Land adjacent to U.S. 50 today would continue to experience traffic noise from the highway. Traffic volumes are expected to increase by approximately 52 percent on U.S. 50 in the Lower Arkansas Valley between 2011 and 2040 (Swenka 2014). In general, traffic would need to double to result in a perceptible noise increase. Therefore, the No-Build Alternative would result in only a slight increase in noise due to expected increases in traffic on U.S. 50 in the future, and this change would likely be imperceptible to the human ear.

6.2. Build Alternatives

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

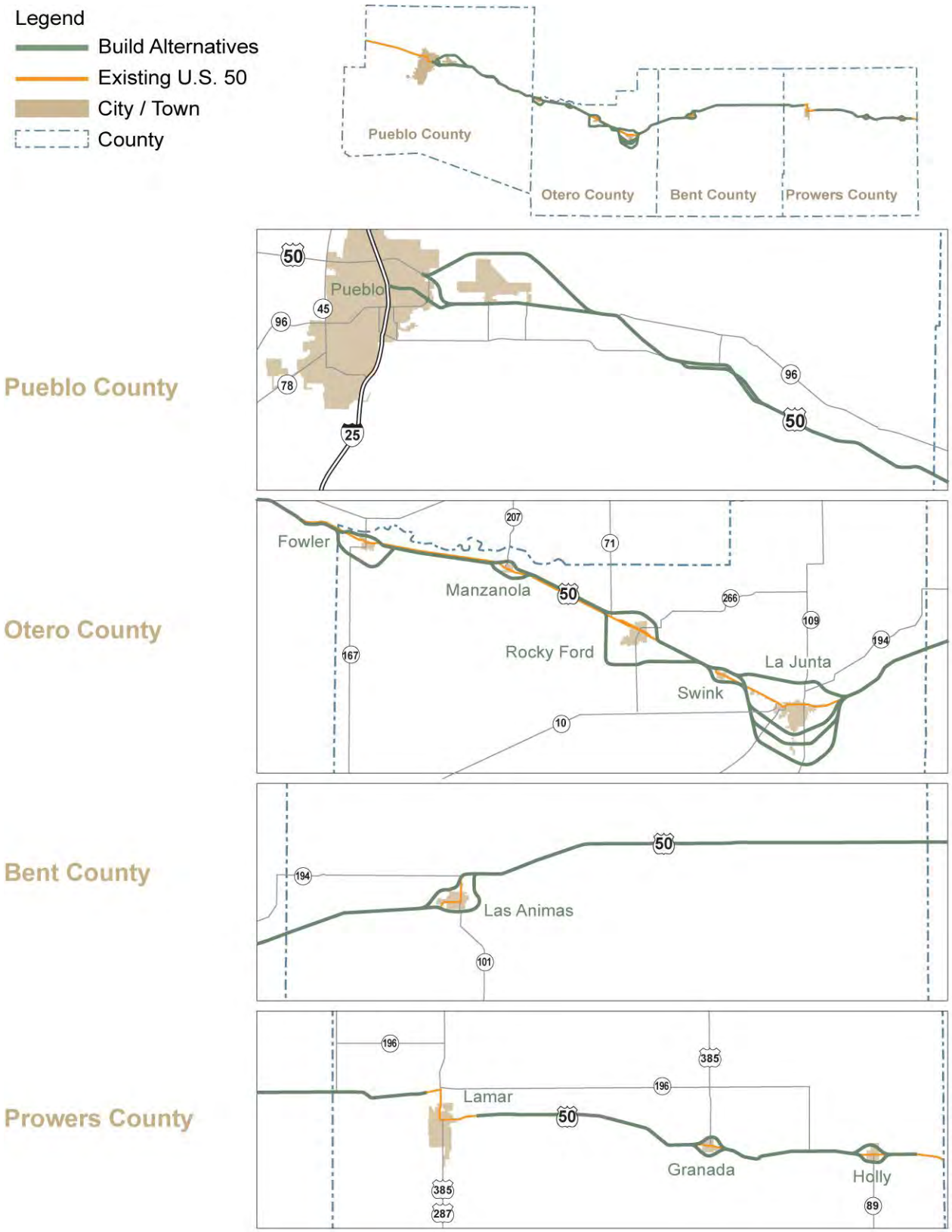


Figure 6-1. Build Alternatives Overview

The Build Alternatives have the potential to affect between 480 and 1,524 noise sensitive receptors. The number of these newly affected noise sensitive receptors will vary depending upon which alternatives are chosen. Table 6-1 provides more information about how these noise sensitive receptors could be affected by the Build Alternatives.

Table 6-1. Potential Traffic Noise Effects on Identified Noise Sensitive Receptors by the Build Alternatives

Location	Number of Noise Sensitive Receptors	Potential Traffic Noise Effects by the Build Alternatives
Between communities	266–309	Slight noise increase—Traffic on U.S. 50 is expected to increase in the future, resulting in a small increase in traffic noise. Based on traffic predictions (CDOT 2013), this change is likely to be imperceptible to the human ear. However, there remains potential for future levels of traffic noise to result in noise impacts.
Around communities	214–1,215	Noticeable noise increase—These noise sensitive receptors would experience new traffic noise when U.S. 50 is rerouted into their respective areas. However, these traffic noise levels would not be significantly different than noise levels experienced today along U.S. 50 between communities. Traffic noise would be noticeable to those noise sensitive receptors currently located far away from the highway or other busy roads, since there is little to no traffic in these areas currently.

Traffic noise effects resulting from the Build Alternatives are discussed in more detail below by the type of location—between communities or around communities.

Between Communities—The Build Alternatives between communities generally would maintain U.S. 50 on or near its current location between towns. In these locations, between 266 and 309 noise sensitive receptors have the potential to be affected by traffic noise, depending on which route is selected in Section 2: Fort Reynolds. These noise sensitive receptors already are affected by traffic noise on U.S. 50, and they will experience increased noise levels as traffic increases on U.S. 50 in the future. Since the average traffic volume on U.S. 50 between communities is expected to increase 52 percent between 2011 and 2040 (Swenka 2014), this will increase traffic noise slightly, but the increase over existing traffic noise levels would likely be imperceptible as traffic generally has to double to have a noticeable change. However, there remains potential for future levels of traffic noise to result in noise impacts.

Around Communities—The Build Alternatives around eight communities would provide an alternate route for U.S. 50 through-traffic around Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. In these locations, between 214 and 1,215 noise sensitive receptors would be potentially affected, depending on which alternatives are chosen in these areas. These noise sensitive receptors include the Cottonwood Links Golf Course (in Fowler), two school recreational facilities (one in Swink and one in Granada), and the Best Western Bent's Fort Inn (just north of Las Animas). The Build Alternatives would result in increased noise levels for these noise sensitive receptors due to the presence of a highway and its resulting traffic that does not currently exist there today. In most cases, the noise sensitive receptors are currently located far from U.S. 50 and many are far from other roadways. Because of this, traffic noise would be noticeable for these noise sensitive receptors; however, these traffic noise levels would not be substantially different than noise levels that are experienced today along U.S. 50 between communities.

6.2.1. Build Alternatives Effects by Location

The noise sensitive receptors that have the potential to be affected by the Build Alternatives are summarized in Table 6-2 by location. Locations are listed from west to east and include the number of receptors by NAC Category that have the potential to be impacted.

Table 6-2. Summary of Potentially Affected Noise Sensitive Receptors by Location

Section[a]	Build Alternatives (if more than one)	Number of Receptors per NAC Category[b]		
		B	C	E
Section 1: Pueblo	Alternative 1: Pueblo Airport North	74	0	1
	Alternative 2: Pueblo Existing Alignment	876	11	45
	Alternative 3: Pueblo SH 47 Connection	180	1	16
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	115	1	0
	Alternative 2: Fort Reynolds Realignment	72	1	0
Section 3: Fowler	Alternative 1: Fowler North	11	3	0
	Alternative 2: Fowler South	18	0	0
Section 4: Fowler to Manzanola	—	20	1	0
Section 5: Manzanola	Alternative 1: Manzanola North	35	4	0
	Alternative 2: Manzanola South	21	0	0
Section 6: Manzanola to Rocky Ford	—	22	2	0
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	59	3	1
	Alternative 2: Rocky Ford South	26	1	0
Section 8: Rocky Ford to Swink	—	8	0	0
Section 9: Swink	Alternative 1: Swink North	34	1	1
	Alternative 2: Swink South	10	6	0
Section 10: La Junta	Alternative 1: La Junta North	13	6	0
	Alternative 2: La Junta South	43	5	0
	Alternative 3: La Junta South	31	3	0
	Alternative 4: La Junta South	13	2	0
Section 11: La Junta to Las Animas	—	15	8	0
Section 12: Las Animas	Alternative 1: Las Animas North	29	4	2
	Alternative 2: Las Animas South	40	2	1
Section 13: Las Animas to Lamar[c]	—	76	5	1
Section 14: Lamar to Granada[c]	—	16	1	0
Section 15: Granada	Alternative 1: Granada North	14	1	0
	Alternative 2: Granada South	7	1	0
Section 16: Granada to Holly	—	9	2	0
Section 17: Holly	Alternative 1: Holly North	17	3	1
	Alternative 2: Holly South	2	1	0
Section 18: Holly Transition	—	5	2	0

[a] The study area for each section location is 1,600 feet wide, except for the existing alignment area in Section 1, Alternative 2, where the alternative follows the existing alignment and the corresponding portion of Alternative 3 that follows the existing alignment. In these locations, the study area is 750 feet in width.
[b] Each receptor was counted as it occurred in each respective section. Due to the fact that some sections share common study areas, the receptors listed here may be counted twice if they occur in more than one section study area.
[c] The Build Alternatives do not include alternatives in Lamar.

7. Mitigation Strategies

Since the ultimate roadway footprint would be identified during Tier 2 studies, this Tier 1 analysis cannot identify which specific noise receptors would be affected by the Build Alternatives. However, specific noise conditions would be modeled during Tier 2 studies and mitigation would be considered based on the results of that analysis.

8. Avoidance Activities

Some traffic noise effects were avoided during the U.S. 50 Tier 1 EIS alternatives development process. Most of the noise receptors along U.S. 50 are located within the communities. The U.S. 50 Tier 1 EIS considered alternatives that would improve U.S. 50 on its existing alignment through these communities. However, these through-town alternatives were eliminated from further consideration during the alternatives development process. This resulted in the avoidance of traffic noise effects on some noise receptors within communities. This analysis did not calculate the specific number of receptors that were avoided. However, since most of the development is located within the communities, the number of receptors affected by increased traffic noise would have been dramatically higher if the through-town alternatives had not been eliminated.

9. References

Addendum to the Summary of Data Collection, Travel Demand Forecasting Model Development, and Traffic Results for the U.S. 287 at Lamar Project memorandum. Denver, CO: CH2M Hill, 2012. Print.

Colorado Department of Transportation (CDOT). *Future Traffic Volumes of SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010a]

Colorado Department of Transportation (CDOT). *Traffic Information for I-25 from MP 93 to MP 104 (Pueblo).* Web. 15 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010b]

Colorado Department of Transportation (CDOT). *Traffic Information for SH050B from MP 315 to MP 467.* Web. 2 Feb. 2010. <http://www.dot.state.co.us/App_DTD_DataAccess/Traffic/index.cfm?fuseaction=TrafficMain&MenuType=Traffic>. [CDOT 2010c]

Colorado Department of Transportation (CDOT). *Noise Analysis and Abatement Guidelines.* Denver, CO: Colorado Department of Transportation, 8 Feb. 2013. Print. [CDOT 2013]

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. 1978. Print.

Hankard Environmental, Inc. *Report No. 4-16-1: Noise Analysis U.S. 287 at Lamar Environmental Assessment.* Lafayette, CO: Hankard Environmental, Inc., 2003. Print.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987.

Swenka, David, PE, PTOE. *2008-2012 Crash Summary and 2011 AADTs and LOSS for U.S. 50.* Emailed from Colorado Department of Transportation (CDOT), Safety and Traffic Engineering Branch. Feb. 2014. Print. [Swenka 2014]

U.S. Congress. National Environmental Policy Act of 1969 (NEPA). 42 USC 4321-4347. 1969.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772). 13 Jul. 2010. Print.

U.S. Department of Transportation (USDOT). Federal Highway Administration (FHWA). *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* Dec. 2011. Print.

This page left intentionally blank.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Traffic Noise

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 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 Traffic Noise

Methodology Overview	Traffic Noise	
	Tier 1	Tier 2
Relevant Data/ Information Sources	• Aerial photography • Land use data • Existing and proposed traffic counts	• Existing and proposed traffic counts • Existing and proposed vehicle speed • Preliminary design • Land use data • Existing noise levels
Collection and/or Analysis Methodology	Aerial review of sensitive receptors adjacent to corridor alternatives (1,000 feet wide, plus 300 feet on either side of the Build Alternatives)	• Field review of sensitive receptors • Follow standard CDOT Noise Analysis and Abatement guidelines
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Tier 2 specific sections of independent utility corridor boundaries
Impacts	Identification of sensitive receptors within the boundaries of the Build Alternatives and within 300 feet of the corridor edge	Follow standard CDOT Noise Analysis and Abatement guidelines
Mitigation Options	None expected	Follow standard CDOT Noise Analysis and Abatement guidelines
Deliverables	Traffic Noise Technical Memorandum	Traffic Noise Analysis Report
Regulatory Guidance/ Requirements	• Procedures for Abatement of Highway Traffic Noise and Construction (23 CFR 772) • Noise Analysis and Abatement Guidelines (CDOT 2013) • Highway Traffic Noise Analysis and Abatement Policy Guidance (FHWA)	

This page left intentionally blank.

Appendix B. Abbreviations and Acronyms

AADT	Annual Average Daily Traffic
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CR	County Road
dB	Decibel
dBA	A-weighted decibel
DOT	Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
I-25	Interstate 25
Leq	Equivalent sound level
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act of 1969
SH	State Highway
SIU	Section of independent utility
U.S. 287	U.S. Highway 287
U.S. 50	U.S. Highway 50
U.S. 50 Tier 1 EIS	U.S. 50 Tier 1 Environmental Impact Statement
vpd	vehicles per day

This page left intentionally blank.

U.S. 50 Corridor East

Partnering for Progress

U.S. 50 Corridor East Tier 1 Draft Environmental Impact Statement

Wetland and Riparian Resources Technical Memorandum

June 2016

Table of Contents

Chapter **Pages**

1. Project Overview ... 1

2. Resource Definition ... 2

3. Applicable Laws, Regulations, and Guidance ... 3

3.1. Clean Water Act and Water Quality Act of 1987 ... 3

3.2. Emergency Wetlands Resources Act of 1986 ... 3

3.3. Intermodal Surface Transportation Efficiency Act of 1991 ... 3

3.4. Mitigation of Impacts to Wetlands and Natural Habitat ... 3

3.5. Executive Order 11990, Protection of Wetlands ... 4

3.6. Executive Order 11988, Floodplain Management ... 4

3.7. FHWA Technical Advisory T6640.8A ... 4

3.8. 1990 Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act, Section 404(b)(1) ... 4

3.9. Colorado Division of Wildlife and CDOT 2005 Memorandum of Agreement on the Administration and Implementation of Senate Bill 40 ... 4

3.10. National Environmental Policy Act/Clean Water Act Section 404 Merger Process and Agreement for Transportation Projects in Colorado (2005) ... 5

3.11. U.S. Army Corps of Engineers Wetland Delineation Manuals ... 5

3.12. CDOT Mitigation Forms and Guidance for Wetland Finding Reports ... 5

4. Methodology ... 6

4.1. Relevant Data or Information Sources ... 6

4.2. Data Collection and Analysis Methodology ... 7

4.3. Project Area ... 8

4.4. Effects ... 9

4.5. Mitigation Options ... 9

4.6. Deliverables ... 9

5. Existing Conditions ... 10

5.1. Wetland/Riparian Areas ... 10

5.2. Non-Wetland Waters of the United States ... 14

6. Effects ... 16

6.1. No-Build Alternative ... 16

6.2. Build Alternative ... 16

7. Mitigation Strategies ... 30

8. References ... 31

Appendices ... 35

Appendix A. Resource Methodology Overview for Wetland and Riparian Resources 37

Appendix B. Abbreviations and Acronyms 41

Appendix C. Accuracy Assessment of Southwest Regional Gap Analysis Project and Colorado Division of Wildlife Riparian Vegetation Mapping Along the U.S. 50 Corridor 43

C.1. Introduction 43

C.2. Results 43

C.3. Observations and Possible Explanations for Discrepancies 46

Appendix D. Geographic Information System-Based Wetland/Riparian Functional Assessment Methodology 47

D.1. Introduction 47

D.2. Overview 47

D.3. Assumptions and Limitations 47

D.4. Functions 48

D.5. Quality Control Review Process of Data for Potential Errors and Changes 52

Appendix E. Figures (E-1 through E-31) 55

Tables

Table 5-1. Hydric Soil Series in the Project Area 11
Table 5-2. Extent of Wetland/Riparian Vegetation Types within the Project Area 11
Table 5-3. Summary of Wetland/Riparian Functional Categories in the Project Area 13
Table 5-4. Named Ditches, Streams, and Rivers Located in the Project Area 14
Table 6-1. Summary of Estimated Direct, Permanent Effects to Wetland/Riparian Areas by Location (Acres) 19
Table 6-2. Summary of the Estimated Direct, Permanent Effects to Non-Wetland Linear Waterbodies in the Build Alternative 21
Table 6-3. Summary of Estimated Direct, Permanent Effects to Non-Wetland Standing Waterbodies in the Build Alternative 23

Figures

Figure 1-1. U.S. 50 Tier 1 EIS Project Area 1
Figure 4-1. Tier 1 vs. Tier 2 Decision 9
Figure 6-1. Build Alternatives 17

1. Project Overview

The U.S. 50 Corridor East Tier 1 Environmental Impact Statement (U.S. 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 U.S. 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 (U.S. 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line that. The location decision will be used by CDOT and the communities along the corridor can use to plan and program future improvements, preserve right -of- way, pursue funding opportunities, and allow for resource planning efforts.

The U.S. 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The U.S. 50 Tier 1 EIS project area (Figure 1-1) is the area in which U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment*, includes both U.S. 50 and U.S. Highway 287 (U.S. 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 *U.S. 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of U.S. 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 U.S. 50 Tier 1 EIS.

Figure 1-1. U.S. 50 Tier 1 EIS Project Area

2. Resource Definition

Wetland and riparian science and federal and state water quality laws are relatively young and are still evolving. Definitions of terminology used in this report, including the definitions of wetlands, riparian areas, and waters of the United States are presented below to ensure that all readers have a clear understanding of these terms.

Riparian areas—Many definitions of riparian areas have been used by various agencies (NRC 2002). For the purposes of this technical memorandum and the U.S. 50 Tier 1 EIS, riparian areas are defined as “areas that are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect waterbodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines” (NRC 2002, p 33). Since it is beyond the scope of this Technical Memorandum to distinguish between mapped riparian areas and wetlands, the term “wetland/riparian area” is used throughout this report.

Wetlands—The interaction of a site’s hydrology, vegetation, and anaerobic soils results in the development of characteristics unique to wetlands. The term “wetland” has a specific definition, which typically includes the wettest portions of riparian areas (33 Code of Federal Regulations [CFR] 328.3). Wetlands are commonly referred to as swamps, marshes, wet meadows, willow carrs, and bogs. Activities in wetlands are regulated by the U.S. Army Corps of Engineers. Since it is beyond the scope of this Technical Memorandum to distinguish between mapped riparian areas and wetlands, the term “wetland/riparian area” is used throughout this report.

Waters of the United States—The term “waters of the United States” is a legal term defined in 33 CFR 328.3. It generally includes all historically navigable waterways (e.g., streams, rivers, lakes, reservoirs, etc.) and their tributaries, waterbodies used in some way for interstate or foreign commerce, and wetlands adjacent to these waterbodies. Activities in waters of the United States are regulated by the U.S. Army Corps of Engineers. All non-wetland waters of the United States (Section 5.2) within the project area are assumed to be jurisdictional for the purpose of this analysis. However, the jurisdictional status of wetlands in the project area was not determined during this Tier 1 project phase for the following reasons:

- It is not needed for the planning purposes embodied by the U.S. 50 Tier 1 EIS.
- The size of the project area (150 miles long by 2 miles wide) would make this effort cost prohibitive.
- The level of accuracy and precision of the wetland/riparian data used in this analysis does not allow for such a determination.
- The evolving nature of how jurisdiction under the Clean Water Act is interpreted by the courts means that, over the expected build-out period for Tier 2 projects (i.e., decades, not months or years), this status could change for many of the identified wetland/riparian areas.
- CDOT typically conducts compensatory mitigation for all wetlands, regardless of jurisdiction.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to NEPA and its regulations (23 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 (MAP-21) of 2012, the following laws, regulations, and guidance also were followed during this analysis of wetland/riparian areas. They are described in more detail below.

- Clean Water Act and Water Quality Act of 1987
- Emergency Wetlands Resources Act of 1986
- Intermodal Surface Transportation Efficiency Act of 1991
- Mitigation of Impacts to Wetlands and Natural Habitat
- Executive Order 11990, Protection of Wetlands
- Executive Order 11988, Floodplain Management
- FHWA Technical Advisory T6640.8A
- 1990 Memorandum of Agreement Between the U.S. Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act, Section 404(b)(1)
- Colorado Division of Wildlife (CDOW) and CDOT 2005 Memorandum of Agreement on the Administration and Implementation of Senate Bill 40
- National Environmental Policy Act/Clean Water Act Section 404 Merger Process and Agreement for Transportation Projects in Colorado (2005)
- U.S. Army Corps of Engineers Wetland Delineation Manual, 1987
- CDOT Mitigation Forms and Guidance for Wetland Finding Reports

3.1. Clean Water Act and Water Quality Act of 1987

The Clean Water Act authorizes the federal government, in cooperation with state and local entities, to initiate programs to reduce or eliminate the pollution of interstate waters and tributaries and improve the sanitary condition of surface and underground waters. The Water Quality Act of 1987 amended the Clean Water Act, including many of its regulatory programs.

3.2. Emergency Wetlands Resources Act of 1986

The Emergency Wetlands Resources Act of 1986 mandated reporting to Congress on wetlands loss, including an analysis of the role of federal programs and policies in inducing such losses.

3.3. Intermodal Surface Transportation Efficiency Act of 1991

The Intermodal Surface Transportation Efficiency Act of 1991 includes guidance on mitigating wetlands impacts directly associated with projects funded through the National Highway Safety Program and the Surface Transportation Program. This includes guidance on the establishment of wetlands mitigation banks.

3.4. Mitigation of Impacts to Wetlands and Natural Habitat

Federal regulation 23 CFR 777 provides policy and procedures for evaluating and mitigating adverse impacts to wetlands and natural habitat resulting from federal-aid projects. The policies and procedures outlined in the regulation apply to projects under the Federal Lands Highway Program to the extent that such application is deemed appropriate by the FHWA.

3.5. Executive Order 11990, Protection of Wetlands

Executive Order (EO) 11990 requires all federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands while carrying out certain agency responsibilities, including:

- Acquiring, managing, and disposing of federal lands and facilities
- Funding construction or improvements
- Conducting activities or programs affecting land use

The EO also provides additional guidance to help agencies implement this initiative.

3.6. Executive Order 11988, Floodplain Management

EO 11988 requires all federal agencies to take actions to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains while carrying out certain agency responsibilities, including:

- Acquiring, managing, and disposing of federal lands and facilities
- Funding construction or improvements
- Conducting activities or programs affecting land use

The EO also provides additional guidance to help agencies implement this initiative.

3.7. FHWA Technical Advisory T6640.8A

FHWA Technical Advisory T6640.8A states that when an alternative will impact wetlands, the environmental impact statement should identify the wetlands (including function), describe the impacts, evaluate alternatives that would avoid the wetlands, and identify practicable measures to minimize harm to the wetlands. The technical advisory continues by noting that:

- During the impacts evaluation, the environmental impact statement should address the importance of the impacted wetlands and the severity of those impacts.
- This evaluation should consider several factors, including functionality, importance to the surrounding ecosystem, and uniqueness.

3.8. 1990 Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act, Section 404(b)(1)

The purpose of the U.S. Environmental Protection Agency (EPA)/Department of the Army Memorandum of Agreement (MOA) concerning mitigation under the Clean Water Act is to provide policy and procedures to help users determine the type and level of mitigation necessary to demonstrate compliance with Section 404(b)(1) of the Clean Water Act. The MOA also expresses the intent of the agreeing parties to meet the objective of the Clean Water Act to restore and maintain the chemical, physical, and biological integrity of U.S. waters, including wetlands.

3.9. Colorado Division of Wildlife and CDOT 2005 Memorandum of Agreement on the Administration and Implementation of Senate Bill 40

In the CDOW (now known as Colorado Parks and Wildlife [CPW]) and CDOT 2005 MOA concerning the administration and implementation of Senate Bill 40, these agencies agreed that future transportation

construction and maintenance activities described in Senate Bill 40 may be undertaken without written certification from CPW. The parties also agreed that all other activities that impact any stream or its banks or tributaries will require CPW certification.

3.10. National Environmental Policy Act/Clean Water Act Section 404 Merger Process and Agreement for Transportation Projects in Colorado (2005)

The purpose of the NEPA/Clean Water Act Section 404 Merger Process and Agreement for Transportation Projects in Colorado is "... to establish a procedure and provide guidance to ensure that documentation and coordination conducted to comply with the [NEPA] will meet the standards of all signatories and that any preferred alternative selected under this joint [National Environmental Policy Act/Clean Water Act] Section 404 decision-making process also complies with [Clean Water Act] Section 404(b)(1) guidelines" (NEPA/404 Merger).

3.11. U.S. Army Corps of Engineers Wetland Delineation Manuals

The purpose of the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual and subsequent Regional Supplements is to help users determine whether an area is a wetland for purposes of Section 404 of the Clean Water Act.

3.12. CDOT Mitigation Forms and Guidance for Wetland Finding Reports

Information from these reports will be used, where relevant, in describing existing conditions in the project area and in the evaluation of cumulative effects.

4. Methodology

The U.S. 50 Corridor East project is a Tier 1 environmental impact statement (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 an alternative 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 activities 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 U.S. 50 facility beginning at Pueblo, Colorado, at Interstate 25 (I-25) and extending to 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 wetland and riparian 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 wetland/riparian areas within the project area:

- CPW (formerly Colorado Division of Wildlife) riparian mapping data
- Southwest Regional Gap Analysis Project (SWReGAP) vegetation mapping data (2006)
- Hydrology information (from multiple sources)

The CPW riparian mapping data (2004) was completed for the corridor using stereo pairs of National Aerial Photography Program aerial color infrared photographs at a nominal scale of 1:40,000 feet. The minimum mapping unit used during their photo interpretation was 0.5 acre (CDOW 2004). The aerial photographs were taken circa 1988 (McLean 2006).

The SWReGAP is an update of the Gap Analysis Project's mapping and assessment of biodiversity for the five-state region encompassing Arizona, Colorado, Nevada, New Mexico, and Utah (SWReGAP 2006). The land cover map was generated using regionally consistent geospatial data (Landsat Enhanced Thematic Mapper + imagery and digital elevation model derivatives), similar field data collection protocols, a standardized land cover legend, and a common modeling approach (decision tree classifier) (Lowry et al. 2005). Landsat Enhanced Thematic Mapper data were acquired between 1999 and 2001. The minimum mapping unit for the SWReGAP data was one acre (Lowry et al. 2005).

The locations and names of surface waterbodies (e.g., streams, rivers, lakes, and reservoirs) were determined through the use of the following data sources:

- U.S. Geological Survey National Hydrography Dataset data for the project area (in geographic information system format)
- U.S. Geological Survey 7.5-minute topographic quadrangles
- *Colorado Atlas and Gazetteer* (DeLorme 1997)

4.2. Data Collection and Analysis Methodology

The following tasks were completed during the U.S. 50 Tier 1 EIS's review of wetland/riparian areas within the project area and are described in detail below.

- Identify wetland/riparian areas within the project area
- Conduct an accuracy assessment of vegetation data
- Develop a wetland/riparian functional assessment model

Wetland/riparian areas within the project area were identified. Using a geographic information system (GIS) application, the CPW riparian mapping data were combined with the SWReGAP wetland/riparian data (2006). This produced a single, comprehensive, and relatively up-to-date data set of wetland/riparian areas in the project area. Priority was given to the CPW riparian data because several leading experts at CPW thought that it provided the most complete and accurate dataset. The SWReGAP data were used to supplement areas where CPW riparian data did not exist.

After the data sets were combined, the existing wetland/riparian types were reclassified into the standard classes used by the U.S. Fish and Wildlife Service (USFWS) (Cowardin et al. 1979). These classes also are recognized by the U.S. Army Corps of Engineers (USACE), EPA, and CPW. These classes included palustrine emergent, palustrine scrub-shrub, and palustrine forested (Cowardin et al. 1979). This reclassification was necessary to normalize the two datasets into one coherent, consistent, and usable format.

This combined and reclassified dataset was used with a GIS application to produce acreage estimates for the three different wetland/riparian classes found in the project area. It is important to note that since this information was derived from aerial imagery and satellite information, the boundaries of the wetland/riparian areas are estimates and may differ from what is found on the ground.

Wetland/riparian areas from CPW riparian mapping and SWReGAP (i.e., GIS polygons) were field-checked for accuracy by comparing mapped polygons to actual on-site land use and vegetation during the fall of 2006. The SWReGAP wetland/riparian polygons had an overall accuracy of nearly 64 percent, and the CPW riparian mapping polygons had an overall accuracy of nearly 77 percent (specific vegetation types were found to have varying levels of accuracy). In a different part of Colorado, Worthey (2007) found that the overall accuracy of the SWReGAP data was 65 percent, which supports the conclusions of the accuracy

assessment performed for this project. Additional information about this accuracy assessment can be found in Appendix C.

When the location of the Build Alternative was determined, wetland/riparian areas within the alternative underwent a more detailed review. A two-step process was used for this review. The first step compared each wetland/riparian area (i.e., polygon) to what appeared in that area on 2005 color aerial photography. During this step, wetland/riparian areas were classified into the following classes:

- Probably wetland/riparian
- Unlikely wetland/riparian
- Check wetland/riparian

All CPW polygons were assigned the designation of probably wetland/riparian.

The second step in the review was done in the field by representatives of the consultant team, CDOT Environmental Programs Branch, and the USACE. All accessible polygons that had been designated as “check” polygons during the review of aerial photographs were visited. These areas included locations at Fowler, Manzanola, Rocky Ford, Swink, La Junta, and Las Animas. The status of these polygons as “probably” or “unlikely” was determined on the ground.

After this field review, polygons within the Build Alternative at Pueblo, between Pueblo and Fowler, at Granada, and at Holly were reviewed again using the 2005 aerial photographs. The field review and prior knowledge of these areas allowed the polygons classified as “check” in these areas to be reclassified. In some cases, it was found that large areas of uplands were included in wetland/riparian polygons. In these areas, polygons were split apart to better reflect on-the-ground conditions. During this effort, no new polygons were drawn, and the overall configuration of polygons was not altered (i.e., the outermost boundaries of polygons were not adjusted). The resultant polygons then were assigned a “probably” or “unlikely” designation. Polygons receiving an unlikely designation were not considered to be wetland/riparian areas by this analysis.

A third field review was conducted in October 2008. This field review included the entire length of the project area and focused specifically on removing irrigated farmlands that were incorrectly classified by SWReGAP as wetland/riparian areas. As with the previous field review, the polygons identified as irrigated farmland were classified as “unlikely” and removed from further consideration as wetland/riparian areas.

A GIS-based functional assessment was developed and performed on identified wetland/riparian areas found within the project area. Three functions were analyzed, including wildlife habitat, hydrology, and water quality. A detailed description of the functional assessment methodology is presented in Appendix D.

4.3. Project Area

The project area for the U.S. 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing U.S. 50 facility and extending from Pueblo, Colorado, at I-25 to 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 U.S. 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 U.S. 50 Tier 1 EIS’s scoping activities.

4.4. Effects

Potential effects to wetland/riparian areas and other waters of the United States were identified within the study area (1,000-foot-wide Build Alternative) using a GIS application. To calculate the potential effects, the total acreage was multiplied by a fraction, or effect ratio, that the actual future construction footprint would represent. The width of the (Tier 1) Build Alternative is generally 1,000 feet wide, and the width of the roadway footprint (to be identified during Tier 2 studies) is assumed to be 250 feet (see Figure 4-1). Therefore, the effect ratio was calculated to be 250 feet/1,000 feet = 0.25 or 0.25:1. For example, if the 1,000-foot-wide Tier 1 alternative affects 10 acres, and the recommended ultimate typical section is 250 feet, the Tier 1 potential effect at this site would be calculated as: 10 acres x (0.25) = 2.5 acres.

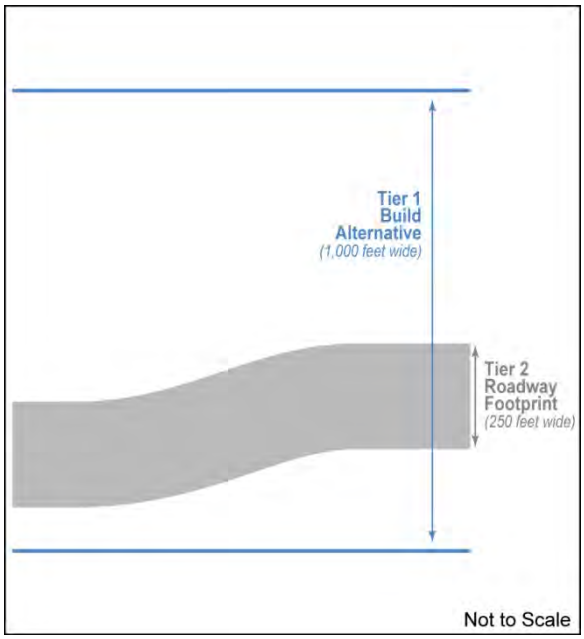


Figure 4-1. Tier 1 vs. Tier 2 Decision

The effect ratio 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 Alternative has 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 0.25:1 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 0.25:1 effect ratio for the western half, since this area would be new location and is 1,000 feet wide, and it uses a 1:1 effect ratio along the eastern half, where this option 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.

Given the 1,000-foot width of the Build Alternative, it is presumed that avoidance may be reasonably achieved through strategies identified in the U.S. 50 Tier 1 EIS, during Tier 2 studies, or both.

4.5. Mitigation Options

The development of compensatory mitigation strategies is an ongoing process and occurs in consultation with several different agencies, including CDOT, FHWA, USACE, EPA, USFWS, and CPW. Mitigation strategies for identified impacts could be a combination of banking and habitat restoration/enhancement for multiple resources. These include wetland, riparian, water quality, and habitat. Mitigation teaming opportunities also will be explored.

4.6. Deliverables

This Wetland and Riparian Technical Memorandum is the primary deliverable being produced for this analysis of wetland/riparian areas for the U.S. 50 Tier 1 EIS.

5. Existing Conditions

This section has been divided into discussions about wetland/riparian areas and non-wetland waters of the United States.

5.1. Wetland/Riparian Areas

In general terms, wetland/riparian areas can be identified in the project area during the summer months as the green belt adjacent to streams, rivers, lakes, and reservoirs. They also can occur as seeps, sloughs, or wet meadows in areas where ground water is close to the soil surface. Approximately 14 percent of the project area has been identified as wetland/riparian areas. The locations of these wetland/riparian areas are presented in Appendix E (Figure E-1 through Figure E-4). The following section describes existing conditions in terms of the environmental characteristics that indicate the presence or absence of wetland/riparian areas, including:

- Hydrology
- Soils
- Vegetation types
- Functionality
- Threats
- Non-wetland waters of the United States

5.1.1. Hydrology

Site hydrology is the overriding characteristic that distinguishes wetland/riparian areas from adjacent uplands. The hydrology of any site or region is ultimately linked to precipitation, but the development of wetland/riparian areas is dependent on the longer-term presence of available water.

In the project area, precipitation ranges between approximately 11 inches to 16 inches per year (WRCC 2006). Evapotranspiration rates during the April through September (WRCC 2006) growing season range from 0.15 inches to 0.5 inches per day (CoAgMet 2007) depending on location and vegetation, which results in an evapotranspiration rate of greater than 30 inches per year. This indicates a water deficit and that precipitation alone is insufficient to support the establishment or persistence of wetland/riparian areas. Therefore, the hydrology of wetland/riparian areas in the project area originates primarily from surface water, ground water, or both.

Maps showing the hydrology of the project area are located in Appendix E (Figure E-9 through Figure E-12).

5.1.2. Soils

Soils in wetland/riparian areas differ from upland soils by their formation and the presence of water. Riparian soils form under two general types of conditions: flowing water (lotic) and standing water (lentic) environments (Lewis et al. 2003). Soils in flowing water conditions, such as floodplains, typically exhibit a high level of stratification developed by successive depositional events during floods. Organic matter in these areas often can be found as deposits derived from offsite sources. Soils in standing water environments, such as in depressional areas or lakes, frequently have higher levels of organic matter accumulation than either lotic areas or uplands (Lewis et al. 2003). The amount of organic matter accumulation in lentic areas is affected by the type of vegetation and the amount of wave action the site receives, among other factors (Lewis et al. 2003).

When a soil becomes saturated with water, the bio-geochemical processes change due to the lack of oxygen (anaerobic). These changes in soil chemistry are unique to saturated soils and have been termed ”hydric.” Hydric soils are defined as “... a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (NRCS 2007). Hydric soils are most commonly found in wetland areas and can be identified by field indicators such as mottling,

gleying, and darker color (i.e., chroma), among others. Hydric soils within the project area can be expected on active floodplains, floodplain terraces, depressional areas, swales, playas, and drainageways (NRCS 2007). Hydric soils also can be found as inclusions in other, non-hydric, soil types. This analysis considered the specific hydric soil series that occur in the project area (see Table 5-1). These series were identified by the Natural Resources Conservation Service (NRCS).

Table 5-1. Hydric Soil Series in the Project Area

Symbol	Series Name[a]	Landform of Occurrence
Aa	Apishapa loamy sand	Floodplains, stream terraces
Ac	Apishapa clay loam	Floodplains, terraces
Ap	Apishapa silty clay	Floodplain steps
Bm	Bloom loam	Drainageways, stream terraces
Lb	Las loam, clay substratum	Floodplains, terraces
Ld	Las clay loam, clay substratum	Floodplains, terraces
Lm	Las Animas soils	Floodplains, terraces, depressions
Lp	Las clay, wet, saline	Floodplains, terraces
Lt	Las Animas soils	Floodplains, terraces
NpB	Nepesta clay loam, saline, 1 to 3 percent slopes	Floodplains, terraces

[a]Partially hydric soil series are not included
Source: NRCS 2007

5.1.3. Vegetation Types

Within the project area, approximately 27,620 acres of wetland/riparian area have been identified, representing more than 14 percent of the total project area (see Table 5-2 and Figure E-1 through Figure E-4, located in Appendix E). All wetland/riparian areas are important to many animals in the project area, but wetland/riparian areas adjacent to streams also frequently serve as wildlife movement corridors.

Three basic wetland/riparian vegetation types, or habitats, have been identified within the project area. These habitat types are palustrine emergent, palustrine scrub-shrub, and palustrine forested (see Table 5-2).

For the purposes of this analysis, “palustrine” refers to freshwater wetland/riparian areas dominated by persistent vegetation (Cowardin et al. 1979). These vegetation types are described in more detail below.

Table 5-2. Extent of Wetland/Riparian Vegetation Types within the Project Area

Wetland/Riparian Vegetation Type[a]	Estimated Acreage
Palustrine emergent	11,139
Palustrine scrub-shrub	14,854
Palustrine forested	1,627
Total	**27,620**

[a]U.S. Fish and Wildlife Service classification system
Note: The sum of individual items may not equal totals due to rounding.
Sources: SWReGAP 2006, Cowardin et al. 1979

Palustrine Emergent

Palustrine emergent habitats are dominated by herbaceous vegetation (Cowardin et al. 1979). Palustrine emergent wetland/riparian areas within the project area comprise approximately 40 percent of the total

wetland/riparian acreage. These areas occur throughout the project area, but they generally are more prevalent from Las Animas eastward. According to the available data, the largest palustrine emergent wetland/riparian areas within the project area occur along the Arkansas River, near crossings of U.S. 50 over the Arkansas River, and on the south side of U.S. 50 just east of the unincorporated area known as Hasty. The Colorado Natural Heritage Program (CNHP) (2006) has identified three palustrine emergent community types that are considered to be imperiled (S2) in or near the project area. These community types are:

1. Alkali Sacaton-Vine Mesquite (*Sporobolus airoides-Panicum obtusum*) Herbaceous Vegetation
2. Great Plains Marsh (*Schoenoplectus acutus-Typha latifolia-Schoenoplectus tabernaemontani*) Sandhills Herbaceous Vegetation
3. Clustered Sedge Wetland (*Carex praegracilis)* Herbaceous Vegetation

Within the project area, palustrine emergent zones typically consist of cattail (*Typha* sp.) and bulrush (*Scirpus* sp.) marshes, reed canarygrass (*Phalaris arundinaceae*), and sedge (*Carex* sp.), rush (*Juncus* sp.), and mesic grass meadows. This type of wetland/riparian area is particularly important to waterfowl, shorebirds, and wading birds—such as herons, cranes, and rails—which depend on these areas for nesting, foraging, or both. The Black Rail (*Laterallus jamaicensis*), in particular, is known to occupy cattail marsh habitat in the vicinity of the Mike Higbee State Wildlife Area, as well as emergent marshes near Hasty. Red-Winged Blackbirds (*Agelaius phoeniceus*) and Yellow-Headed Blackbirds (*Xanthocephalus xanthocephalus*) are common residents of cattail marshes. Amphibians such as the northern leopard frog (*Rana pipiens*) and western chorus frog (*Pseudocris triseriata*) are associated with palustrine emergent habitats. Reptiles such as the northern water snake (*Nerodia sipedon*) and the painted turtle (*Chrysemys picta*) occupy these habitats. In addition, a variety of mammalian species use palustrine emergent habitats at different times of the year for grazing, foraging, or both.

Palustrine Scrub-Shrub

Palustrine scrub-shrub habitats are dominated by woody vegetation less than 20 feet in height (Cowardin et al. 1979). Palustrine scrub-shrub wetland/riparian areas within the project area comprise approximately 54 percent of the total wetland/riparian area and generally occur along major waterways, such as the Arkansas and Huerfano rivers. According to the CNHP (2006), two palustrine scrub-shrub community types are considered to be imperiled (S2) in or near the project area. These community types are:

1. Saline Bottomland Shrublands (*Sarcobatus vermiculatus/Sporobolus airoides)* Sparse Vegetation
2. Coyote Willow/Bulrush (*Salix exigua/Schoenoplectus pungens*)

Palustrine scrub-shrub vegetation within the project area consists of an overstory of salt cedar (also known as tamarisk) or willow (*Salix* sp.) and an understory of mixed graminoids. Salt cedar-dominated palustrine scrub-shrub areas frequently have little to no understory and provide much diminished value to birds and wildlife when compared to willow-dominated palustrine scrub-shrub areas. A variety of neo-tropical songbirds, such as Bullock's Oriole (*Icterus bullockii*), Bell's Vireo (*Vireo bellii*), Veery (*Catharus fuscescens*), and Swamp Sparrow (*Melospiza georgiana*) utilize palustrine scrub-shrub habitat for foraging, breeding, or both. The Black-Crowned Night Heron (*Nycticorax nycticorax*) breeds in these habitats. Beaver (*Castor canadensis*) occur in willow-dominated areas.

Palustrine Forested

Palustrine forested habitats are dominated by woody vegetation greater than 20 feet in height (Cowardin et al. 1979). Palustrine forested wetland/riparian areas within the project area comprise approximately 6 percent of the total wetland/riparian area and generally occur along major waterways, such as the Arkansas and Huerfano rivers. According to the CNHP (2006), three palustrine forested community types are considered to be critically imperiled (S1) or imperiled (S2) in or near the project area. These community types are:

1. Narrowleaf Cottonwood/Western Wheatgrass (*Populus angustifolia/Pascopyrum smithii*) Forest
2. Plains Cottonwood/Sand Dropseed (*Populus deltoides/Sporobolus cryptandrus*)
3. Plains Cottonwood/Western Wheatgrass-Vine Mesquite (*Populus deltoides/Pascopyrum smithii-Panicum obtusum*)

Palustrine forested areas in the project area typically occur along larger streams or rivers, such as the Arkansas River, and are characterized by an overstory of plains cottonwood. Understory vegetation is variable, and can consist of shrubby or herbaceous vegetation, or both. Many wildlife species occupy this habitat. For example, breeding colonies of Great Blue Herons (*Ardea herodias*) and Double-Crested Cormorants (*Phalacrocorax auritus*) can be found in these areas, and many raptor species utilize large cottonwoods for nesting, roosting, and perching habitat. Many mammalian species also utilize palustrine forested habitats for different portions of their life cycles. Mammals commonly associated with these wetland/riparian habitats include the white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), mink (*Mustela vison*), mountain cottontail (*Sylvilagus nuttallii*), beaver, muskrat (*Ondatra zibethicus*), white-footed mouse (*Peromyscus leucopus*), and a variety of bats (NDIS 2007).

5.1.4. Functionality

Wetland/riparian areas are transition zones between aquatic and terrestrial systems. As such, they frequently occupy important positions in the landscape for providing a variety of physical, chemical, and biological functions important to society. These functions are linked not only to processes occurring within the wetland, but also are directly linked to watershed-scale processes. Functions commonly associated with freshwater wetland/riparian areas typically fall into four basic categories, including:

1. Water storage
2. Flood flow attenuation
3. Water quality improvement
4. Wildlife/bird habitat

As part of the U.S. 50 Tier 1 EIS, a GIS-based functional assessment of wetland/riparian areas in the project area was performed to identify highly functional areas that should be considered for avoidance. This does not obviate the need for on-the-ground functional assessments during implementation of Tier 2 studies for specific segments of the U.S. 50 corridor. It does, however, provide a first approximation of where high-quality wetland/riparian areas occur and, therefore, is useful in the planning process. This analysis provides a breakdown of the acreages of the different categories (i.e., functionality) of wetland/riparian areas found in the project area (see Table 5-3) and their locations (Figure E-5 through Figure E-8, located in Appendix E). An overview of the GIS-based functional assessment methodology is presented in Appendix D.

Table 5-3. Summary of Wetland/Riparian Functional Categories in the Project Area

Wetland/Riparian Functional Category	Estimated Acreage
Category I (highest quality and/or highest function)	3,699
Category II	7,084
Category III	13,233
Category IV (lowest quality and/or lowest function)	3,603
Total	27,620

Note: The sum of individual items may not equal totals due to rounding.
Sources: McLean 2006; SWReGAP 2006

While all wetland/riparian areas should be avoided if possible, avoidance of Category I and Category II wetland/riparian areas is a higher priority than simply avoiding any wetland in the project area. These two categories are discussed in more detail below.

Category I wetland/riparian acreage represents 13 percent of the wetland/riparian areas in the project area. They are located primarily along the Arkansas River (Figure E-5 through Figure E-8, located in Appendix E). Palustrine forested wetland/riparian areas are the most common type of Category I wetland/riparian area. It is important to note that many of the palustrine forested areas rated as Category I wetlands may be degraded due to the presence of salt cedar.

Category II wetland/riparian acreage represents 26 percent of the wetland/riparian areas in the project area. They are primarily located along perennial and intermittent streams (Figure E-5 through Figure E-8, located in Appendix E). Native palustrine scrub-shrub wetland/riparian areas are the most common type of Category II wetland/riparian area.

5.1.5. Threats

Perhaps the greatest threat to all wetland/riparian areas in the project area is the invasion of salt cedar (commonly known as tamarisk). This is a highly invasive, non-native tree that has become a major problem in the entire southwest region of Colorado. According to SWReGAP (2006) and CDOW(2004), now CPW, data show that approximately 11,300 acres of salt cedar occur throughout the project area. The largest, contiguous blocks of salt cedar occur along the Arkansas and Huerfano rivers, but smaller patches of salt cedar occur wherever water persists long enough to facilitate their establishment and continued persistence. Salt cedar not only invades native wetland/riparian communities, it also can cause channelization (of stream channels), which effectively changes the formation of sandbars needed by native wetland/riparian species (e.g., cottonwood and willow) for establishment. Consequently, not only is the salt cedar degrading existing native wetland/riparian habitat, it also is preventing the creation of new native dominated wetland/riparian areas.

Other threats to wetland/riparian areas in the project area include public or private development, dewatering, and over-utilization by livestock.

5.2. Non-Wetland Waters of the United States

Approximately 900 miles of streams, rivers, canals, and ditches, plus 1,000 acres of lakes and reservoirs occur in the project area. These water resources that have been named are listed in Table 5-4. The John Martin Reservoir is a major water resource in the Lower Arkansas Valley although the reservoir itself is located outside of the project area. The reservoir is a known breeding ground for the Piping Plover (*Charadrius melodus),* a federally and state listed threatened species, and the federally and state endangered Least Tern (*Sterna antillarum*). According to available published information, the G.W. Verhoeff Reservoir, located just east of Hasty, is the only other named reservoir or lake found in the project area. Numerous unnamed streams, rivers, ditches, lakes, and reservoirs also occur in the project area. These waterbodies whether named or unnamed, are considered non-wetland waters of the United States, and their locations are shown in Figure E-9 through Figure E-12 (Appendix E).

Table 5-4. Named Ditches, Streams, and Rivers Located in the Project Area

Name	Resource Type	Location (County)
Amity Canal	Canal or ditch	Prowers
Anderson Arroyo	River or stream	Otero
Apishapa River	River or stream	Otero
Arkansas River	River or stream	Pueblo, Otero, Bent, Prowers
Buffalo Canal	Canal or ditch	Prowers
Catlin Canal	Canal or ditch	Otero
Cheyenne Creek	River or stream	Prowers
Chico Creek	River or stream	Pueblo
Chicosa Creek	River or stream	Pueblo
Clay Creek	River or stream	Prowers
Consolidated Ditch	Canal or ditch	Bent
Crooked Arroyo	River or stream	Otero
Excelsior Ditch	Canal or ditch	Pueblo
Fort Bent Canal	Canal or ditch	Prowers
Fort Lyon Canal	Canal or ditch	Otero

Name	Resource Type	Location (County)
Fountain Creek	River or stream	Pueblo
Gageby Creek	River or stream	Bent
Granada Creek	River or stream	Prowers
Graveyard Creek	River or stream	Bent
Holly Ditch	Canal or ditch	Prowers
Huerfano River	River or stream	Pueblo
Jones Ditch	Canal or ditch	Bent
King Arroyo	River or stream	Otero
Lamar Canal	Canal or ditch	Prowers
Las Animas Town Ditch	Canal or ditch	Bent
Levere Ditch	Canal or ditch	Bent
Limestone Creek	River or stream	Bent
Lubers Ditch	Canal or ditch	Bent
Lubers Drainage Ditch	Canal or ditch	Bent
Manvel Canal	Canal or ditch	Prowers
McClave Drainage Ditch	Canal or ditch	Bent
Miller Ditch	Canal or ditch	Bent
North Granada Ditch	Canal or ditch	Prowers
Old Otero Canal	Canal or ditch	Otero
Otero Canal	Canal or ditch	Otero
Oxford Farmers Ditch	Canal or ditch	Pueblo, Otero
Prowers Arroyo	River or stream	Bent
Purgatoire River	River or stream	Bent
Riverview Ditch	Canal or ditch	Bent, Prowers
Rocky Ford Canal	Canal or ditch	Otero
Rocky Ford Highline Canal	Canal or ditch	Pueblo, Otero
South Granada Ditch	Canal or ditch	Prowers
Sunflower Ditch	Canal or ditch	Bent
Thompson Arroyo	River or stream	Otero
Timpas Creek	River or stream	Otero
Vandiver Arroyo	River or stream	Otero
Wild Horse Creek	River or stream	Prowers
Wiley Drainage Ditch	Canal or ditch	Prowers
Wolf Creek	River or stream	Prowers
X-Y Canal	Canal or ditch	Prowers

Numerous unnamed streams and ditches also occur in the project area
Source: USGS 2007

6. Effects

The following sections discuss the potential of the No-Build Alternative and the Build Alternative to affect wetland/riparian areas within the study area limits.

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 U.S. 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.

Because routine maintenance and repairs are conducted on the existing highway, these activities generally would not affect wetland/riparian resources except potentially when repairing or replacing culverts. Smaller-scale improvements have the potential to affect resources located directly adjacent to the highway; however, few resources are located in these areas.

6.2. Build Alternative

The Build Alternatives consist of constructing a four-lane expressway on or near the existing U.S. 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 U.S. 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 U.S. 50 on its current alignment, with the exception of near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating U.S. 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.

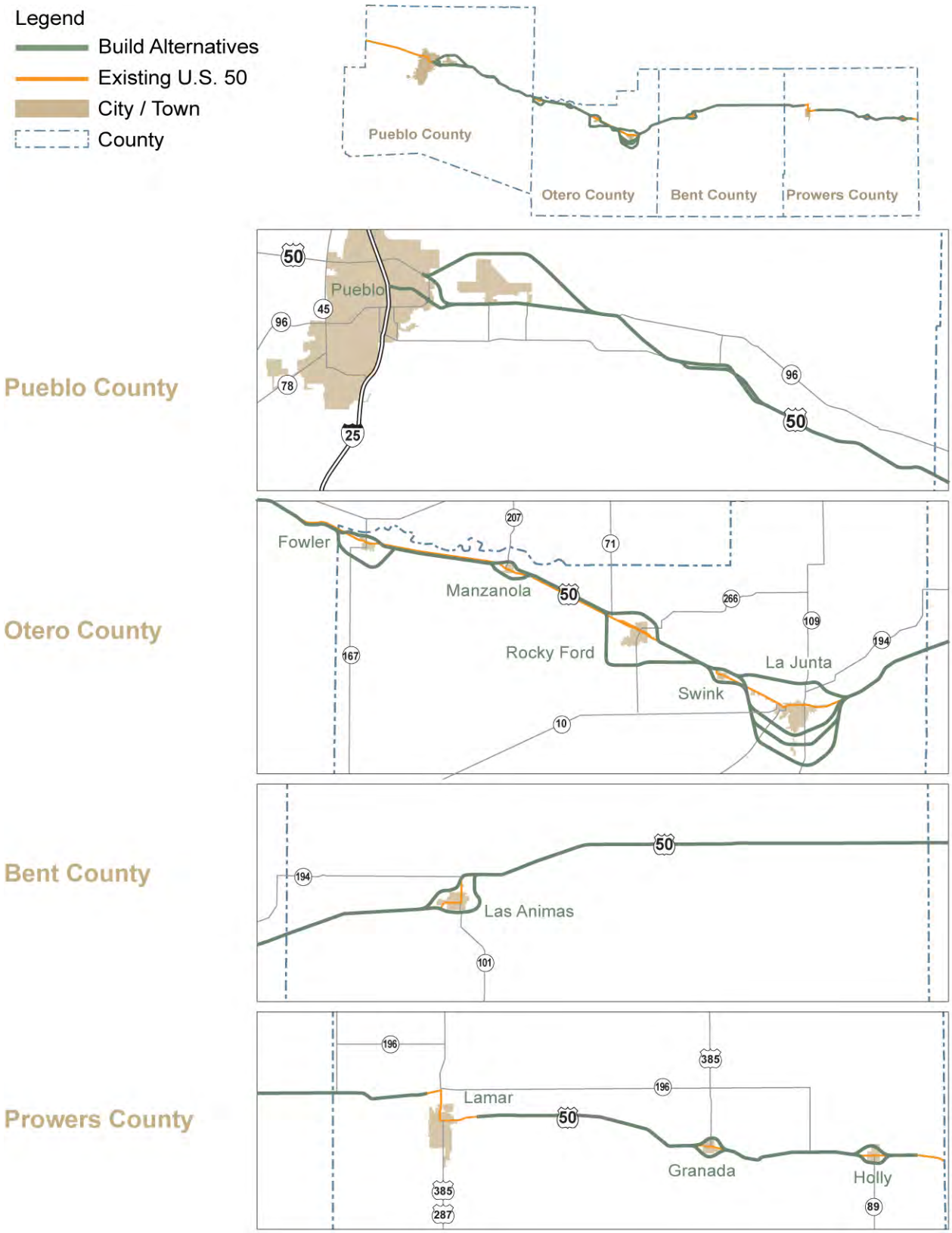


Figure 6-1. Build Alternatives

Effects resulting from the Build Alternative could occur as direct or indirect effects. These effects are discussed below.

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 clearing, excavation, fill, or grading of wetland/riparian areas during the construction of a road. Direct effects to wetland/riparian areas by the Build Alternative are discussed in terms of:

- The overall effects of the Build Alternative
- Effects in locations where only one alternative remains under consideration
- Effects in locations where more than one alternative remains under consideration

Overall Effects of the Build Alternative

Table 6-1, Table 6-2, and Table 6-3 provide estimates of the direct, permanent effects from the Build Alternatives to wetland/riparian areas, non-wetland linear waterbodies (e.g., streams, canals, ditches, etc.), and non-wetland standing bodies of water, respectively. The Functional Unit Loss column in Table 6-1 integrates wetland/riparian acreage with functionality. Therefore, it is a useful tool in comparing effects. The estimated effects in all three of these tables should be regarded as approximate and preliminary.

Furthermore, it is important to keep in mind that the potential effects listed in Table 6-1 include effects to wetland *and* riparian areas. Without formal wetland delineation for the study area, the actual extent of wetlands within each of the corridor alternatives is unknown. However, because wetlands are by definition the wettest portions of riparian areas, it is likely that a substantial amount of the potential effects to wetland/riparian areas would occur to riparian areas, and a lesser amount of effect would occur to wetland areas. More detailed reviews, including wetland delineations, as well as more refined effects analyses, will be conducted during Tier 2 studies. Furthermore, CDOT will incorporate highway design features to avoid and minimize adverse impacts to wetlands and riparian resources.

Table 6-1. Summary of Estimated Direct, Permanent Effects to Wetland/Riparian Areas by Location (Acres)

Section	Build Alternatives (if applicable)	Wetland Category				Wetland Class			Total Acres	Functional Loss	Tamarisk
		I	II	III	IV	PEM	PSS	PFO			
Section 1: Pueblo	Alternative 1: Pueblo Airport North	0	1	9	3	1	12	0	13	260	12
	Alternative 2: Pueblo Existing Alignment	0	1	22	37	1	59	0	60	1,092	59
	Alternative 3: Pueblo SH 47 Connection	0	0	21	27	0	48	0	48	902	47
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	14	22	63	27	19	99	7	126	2,827	83
	Alternative 2: Fort Reynolds Realignment	14	20	54	24	15	89	8	112	2,559	72
Section 3: Fowler	Alternative 1: Fowler North	11	5	7	2	5	9	11	25	629	7
	Alternative 2: Fowler South	2	1	1	3	1	6	1	8	169	5
Section 4: Fowler to Manzanola	—	14	4	27	4	4	41	4	49	1,129	36
Section 5: Manzanola	Alternative 1: Manzanola North	1	0	2	2	2	2	1	5	102	2
	Alternative 2: Manzanola South	3	1	0	0	0	2	2	4	114	0
Section 6: Manzanola to Rocky Ford	—	0	1	0	0	0	1	0	1	30	1
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	0	4	6	0	6	4	0	10	247	0
	Alternative 2: Rocky Ford South	1	2	10	0	5	6	1	13	299	4
Section 8: Rocky Ford to Swink	—	1	0	2	0	1	2	0	3	72	2
Section 9: Swink	Alternative 1: Swink North	3	2	2	0	2	4	0	7	162	3
	Alternative 2: Swink South	0	0	1	0	0	1	0	1	35	0
Section 10: La Junta	Alternative 1: La Junta North	9	3	15	1	4	24	0	28	723	15
	Alternative 2: La Junta South	1	1	11	2	3	11	1	15	297	11
	Alternative 3: La Junta South	3	7	8	1	7	10	2	19	466	5
	Alternative 4: La Junta South	3	1	7	0	5	5	1	11	271	4

Section	Build Alternatives (if applicable)	Wetland Category				Wetland Class			Total Acres	Functional Loss	Tamarisk
		I	II	III	IV	PEM	PSS	PFO			
Section 11: La Junta to Las Animas	—	0	4	13	3	8	11	1	20	417	9
Section 12: Las Animas	Alternative 1: Las Animas North	5	5	16	14	6	32	2	40	916	27
	Alternative 2: Las Animas South	3	3	16	1	13	10	0	23	573	6
Section 13: Las Animas to Lamar[a]	—	3	36	77	14	97	31	2	130	2,921	25
Section 14: Lamar to Granada[a]	—	9	10	66	23	18	84	6	108	2,403	74
Section 15: Granada	Alternative 1: Granada North	0	4	1	0	4	1	0	5	126	0
	Alternative 2: Granada South	1	0	1	0	1	0	1	2	44	0
Section 16: Granada to Holly	—	0	20	34	1	32	23	0	55	1,290	23
Section 17: Holly	Alternative 1: Holly North	1	8	7	0	10	5	1	16	415	5
	Alternative 2: Holly South	0	2	18	0	7	13	0	20	428	13
Section 18: Holly Transition	—	1	14	6	1	16	5	1	22	551	5

[a]U.S. Fish and Wildlife Service classification system (Cowardin et al. 1979). PEM = palustrine emergent; PSS = palustrine scrub-shrub; PFO = palustrine forested
[b]A GIS-based methodology developed for this project was used to categorize wetland/riparian areas into functional categories (See Appendix D). Category I = highest functionality; Category IV = lowest functionality. Functional units = acreage x functional points
[c]Estimated based on a 250-foot-wide construction footprint; effects include riparian and wetland areas (these two resources have not been differentiated as part of this Tier 1 effects analysis)
Note: The sum of individual items may not equal totals due to rounding.
Sources: CDOW 2004, SWReGAP 2006, CWCB 2006

Table 6-2. Summary of the Estimated Direct, Permanent Effects to Non-Wetland Linear Waterbodies in the Build Alternative

Location	Build Alternatives (if applicable)	Flow Type (feet)			Stream Type (feet)				Total[a] (feet)
		Perennial	Intermittent	Other	Natural	Canal/ Ditch	Artificial Path/ Connector	Pipeline/ Siphon	
Section 1: Pueblo	Alternative 1: Pueblo Airport North	0	5,441	1,248	5,441	1,248	0	0	6,689
	Alternative 2: Pueblo Existing Alignment	0	3,541	669	3,541	495	174	0	4,210
	Alternative 3: Pueblo SH 47 Connection	0	4,514	495	4,514	495	0	0	5,009
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	476	697	2,351	1,173	1,784	567	0	3,524
	Alternative 2: Fort Reynolds Realignment	343	931	2,315	1,274	1,721	594	0	3,589
Section 3: Fowler	Alternative 1: Fowler North	271	117	202	388	0	202	0	590
	Alternative 2: Fowler South	0	245	1,493	245	1,493	0	0	1,738
Section 4: Fowler to Manzanola	—	248	381	3,782	628	3,167	563	52	4,410
Section 5: Manzanola	Alternative 1: Manzanola North	0	20	1,043	20	1,043	0	0	1,063
	Alternative 2: Manzanola South	0	0	2,174	0	2,174	0	0	2,174
Section 6: Manzanola to Rocky Ford	—	0	325	281	325	281	0	0	606
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	0	0	2,072	0	2,072	0	0	2,072
	Alternative 2: Rocky Ford South	0	0	2,662	0	2,662	0	0	2,662
Section 8: Rocky Ford to Swink	—	281	0	0	281	0	0	0	281
Section 9: Swink	Alternative 1: Swink North	0	491	1,209	491	1,209	0	0	1,700
	Alternative 2: Swink South	108	0	259	108	259	0	0	366

Location	Build Alternatives (if applicable)	Flow Type (feet)			Stream Type (feet)				Total[a] (feet)
		Perennial	Intermittent	Other	Natural	Canal/ Ditch	Artificial Path/ Connector	Pipeline/ Siphon	
Section 10: La Junta	Alternative 1: La Junta North	0	4,105	2,477	4,105	1,157	1,319	0	6,582
	Alternative 2: La Junta South	661	2,961	1,649	3,622	1,634	14	0	5,270
	Alternative 3: La Junta South	984	3,650	2,212	4,634	2,063	80	68	6,846
	Alternative 4: La Junta South	768	5,974	1,589	6,743	1,319	270	0	8,331
Section 11: La Junta to Las Animas	—	0	5,071	2,270	5,071	2,270	0	0	7,340
Section 12: Las Animas	Alternative 1: Las Animas North	74	2,055	2,103	2,128	1,176	927	0	4,231
	Alternative 2: Las Animas South	270	60	2,969	331	2,510	459	0	3,299
Section 13: Las Animas to Lamar	—	1,112	391	4,941	1,503	4,713	227	0	6,443
Section 14: Lamar to Granada	—	530	592	6,725	1,122	6,722	0	2	7,847
Section 15: Granada	Alternative 1: Granada North	835	15	1,141	849	1,141	0	0	1,990
	Alternative 2: Granada South	0	0	1,113	0	1,113	0	0	1,113
Section 16: Granada to Holly	—	130	885	9,324	1,016	7,868	1,417	39	10,340
Section 17: Holly	Alternative 1: Holly North	441	0	3,112	441	3,036	0	75	3,552
	Alternative 2: Holly South	0	0	178	0	144	33	0	178
Section 18: Holly Transition	—	0	560	3279	560	3,008	271	0	3,839

[a]Estimated based on a 250-foot wide construction footprint
Note: The sum of individual items may not equal totals due to rounding.
Source: National Hydrography Dataset, USGS 2007

Table 6-3. Summary of Estimated Direct, Permanent Effects to Non-Wetland Standing Waterbodies in the Build Alternative

Location	Build Alternatives (if applicable)	Estimated Potential Effects[a] (acres)
Section 1: Pueblo	Alternative 1: Pueblo Airport North	0.1
	Alternative 2: Pueblo Existing Alignment	0.0
	Alternative 3: Pueblo SH 47 Connection	0.0
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	1.1
	Alternative 2: Fort Reynolds Realignment	1.1
Section 3: Fowler	Alternative 1: Fowler North	0.0
	Alternative 2: Fowler South	0.0
Section 4: Fowler to Manzanola	—	0.0
Section 5: Manzanola	Alternative 1: Manzanola North	0.0
	Alternative 2: Manzanola South	0.0
Section 6: Manzanola to Rocky Ford	—	0.0
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	0.0
	Alternative 2: Rocky Ford South	0.2
Section 8: Rocky Ford to Swink	—	0.0
Section 9: Swink	Alternative 1: Swink North	0.1
	Alternative 2: Swink South	0.0
Section 10: La Junta	Alternative 1: La Junta North	0.1
	Alternative 2: La Junta South	0.1
	Alternative 3: La Junta South	0.6
	Alternative 4: La Junta South	1.2
Section 11: La Junta to Las Animas	—	0.0
Section 12: Las Animas	Alternative 1: Las Animas North	1.2
	Alternative 2: Las Animas South	0.6
Section 13: Las Animas to Lamar	—	1.4
Section 14: Lamar to Granada	—	0.0
Section 15: Granada	Alternative 1: Granada North	0.0
	Alternative 2: Granada South	0.0
Section 16: Granada to Holly	—	3.0
Section 17: Holly	Alternative 1: Holly North	0.4
	Alternative 2: Holly South	0.2
Section 18: Holly Transition	—	2.8

[a]Estimated based on a 250-foot-wide construction footprint
Note: The sum of individual items may not equal totals due to rounding.
Source: National Hydrography Dataset, USGS 2007

Based on the estimated direct, permanent effects to wetland/riparian areas at each location as presented in Table 6-1, the Build Alternative would cumulatively affect a range of resources. Under the best-case scenario (i.e., the least effects), the Build Alternative would affect approximately 588 acres of wetland/riparian areas. Under a worst-case scenario, the Build Alternative would affect nearly 717 acres of wetland/riparian areas, which is a difference of 129 acres. This range of effect represents roughly 2.1 percent for the best-case scenario and 2.6 percent for the worst-case scenario of the 27,620 acres of wetland/riparian resources identified in the project study area. From the total range of potential effects to wetland/riparian areas from the Build Alternative, effects to palustrine forested wetland areas would be between 23 acres and 41 acres, while effects to Category I or Category II wetland areas would be between 168 acres and 222 acres. The total potential functional loss resulting from the Build Alternative ranges from roughly 13,487 units to 16,129 units.

The range of estimated direct, permanent effects to non-wetland flowing bodies of water from the Build Alternative as shown in Table 6-2 is between 12.6 miles and 15.4 miles. From the total range of potential effects to flowing bodies of water, effects to perennial streams comprise between 0.6 mile and 1.2 miles, while effects to intermittent streams are between 3.1 miles and 4.6 miles. The range of estimated direct, permanent effects to non-wetland standing waterbodies, as shown in Table 6-3, is between 9 acres and 13 acres.

Effects to wetland/riparian areas, non-wetland linear waterbodies, and non-wetland standing bodies of water by the Build Alternative are discussed below by location (from west to east along U.S. 50). The effects presented in Table 6-1, Table 6-2, and Table 6-3, and discussed below, are shown on figures located in Appendix E.

Section 1: Pueblo (Figure E-13)

Three local corridor alternatives are under consideration for Pueblo, including a relocation of U.S. 50 north of the Pueblo Airport (Alternative 1: Pueblo Airport North), use of the existing four-lane alignment (Alternative 2: Pueblo Existing Alignment), and a new SH 47 connection along with the existing alignment (Alternative 3: Pueblo SH 47 Connection).

Alternative 1 consists of a 7.9-mile corridor north of Pueblo that is anticipated to affect the least amount of wetland/riparian areas. Of the 13 acres estimated to be affected, none are classified as palustrine forested and roughly 8 percent are Category I or Category II. With a functional unit loss of approximately 260, this alternative also would have the least adverse effect on overall wetland/riparian functionality when compared to the other two alternatives. Approximately 6,689 feet of non-wetland channels would be directly affected by Alternative 1, of which none are perennial. Approximately 0.1 acre of standing waterbodies is expected to be directly affected under this alternative.

Alternative 2 would stay on the existing alignment and is anticipated to affect approximately 60 acres of wetland/riparian areas, none of which are palustrine forested and one acre are Category I or II. The projected functional loss resulting from Alternative 2 is 1,092 units. Approximately 4,210 feet of non-wetland channels would be directly affected by Alternative 2, of which none are perennial. No standing waterbodies are expected to be directly affected under this alternative.

Alternative 3 includes staying on the existing alignment with a new SH 47 connection. Effects analyses for this alternative indicate that 47 acres of wetland/riparian area would be affected, of which 0.2 acre are forested wetland/riparian areas and 0.6 acre are Category I or II areas. The projected functional loss for Alternative 3 is 902 units. No effect to perennial stream channels occur in this alternative, but approximately 5,009 feet of other non-wetland channel types would be affected (4,514 feet of intermittent channels and 495 feet of canal/ditch). No standing waterbodies are expected to be affected by Alternative 3.

Section 2: Pueblo to Fowler (Figure E-14)

Between Pueblo and Fowler, the Build Alternative consists of a 1,000-foot-wide corridor centered on the existing alignment. The exception to this is near Fort Reynolds, between Milepost 333 and Milepost 339, where two options are under consideration. Alternative 1: Fort Reynolds Existing Alignment would remain on the existing alignment and reconstruct the highway to a four-lane, divided expressway. Alternative 2: Fort

Reynolds Realignment realigns the highway to the south to avoid acquisition of homes in the area of Fort Reynolds. Alternative 1 is anticipated to affect 125 acres of wetland/riparian area, of which approximately 5 percent are palustrine forested and 28 percent are Category I or Category II. Slightly fewer wetland/riparian areas are anticipated to be affected by Alternative 2 (13 acres less). With regards to non-wetland channels, the anticipated effects are nearly the same between Alternative 1 and Alternative 2—estimated to be 3,524 feet and 3,589 feet, respectively. Four percent more of the anticipated effects are to perennial channels in Alternative 1. Both Pueblo to Fowler alternatives are anticipated to affect 1.1 acres of standing waterbodies.

Section 3: Fowler (Figure E-15)

Alternative 1: Fowler North is more than three miles long and is anticipated to directly affect a greater amount of wetland/riparian areas than Alternative 2: Fowler South. Under Alternative 1, 25 acres of wetland/riparian area would be adversely affected, of which 11.4 acres are classified as palustrine forested, and 16.5 acres are Category I or Category II wetland/riparian areas. In addition, construction of this alternative would likely result in a functional loss of approximately 629 units. Based on available mapping, approximately 28 percent of the wetland/riparian areas in this alternative are dominated by salt cedar. Alternative 1 would affect approximately 271 feet of perennial stream channel and an additional 319 feet of other non-wetland channels (590 feet total). No standing waterbodies are expected to be directly affected under this alternative.

Alternative 2: Fowler South is longer than Alternative 1 (nearly five miles), but would adversely affect substantially less wetland/riparian acreage due to it being farther away from the Arkansas River. Under this alternative, approximately eight acres of wetland/riparian area would be affected, of which 0.8 acre (10 percent) is classified as palustrine forested, and 3.4 acres (43 percent) are Category I or Category II wetland/riparian areas. With a functional unit loss of roughly 169, this alternative also would have less of an adverse effect on overall wetland/riparian functionality when compared to Alternative 1. Nearly 63 percent of the wetland/riparian areas in this alternative are classified by available mapping as being dominated by salt cedar. No perennial streams would be affected under this alternative; however, a greater length (approximately 1,148 feet more) of non-wetland channels would be adversely affected when compared to Alternative 1. As with Alternative 1, no standing waterbodies are expected to be affected by Alternative 2.

Section 4: Fowler to Manzanola (Figure E-16)

The Build Alternative in this section consists of a 1,000-foot-wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately 49 acres of wetland/riparian areas, of which four acres are classified as palustrine forested (8 percent) and 18 acres are Category I or Category II (36 percent). Construction in this section would result in a loss of 1,129 functional units. Effects to perennial streams would total approximately 248 feet and total effects to non-wetland channels are estimated to be nearly 4,410 feet. No standing waterbodies are expected to be affected.

Section 5: Manzanola (Figure E-17)

Both north-of-town and south-of-town alternatives remain under consideration in Manzanola. The alternatives are nearly the same length, at a little more than 2.5 miles each. Alternative 1: Manzanola North is anticipated to affect approximately five acres of wetland/riparian areas with a functional loss of 102 units. Approximately 40 percent of the wetland/riparian areas in this alternative are classified by available mapping as being dominated by salt cedar. Alternative 1 would affect approximately 1,063 feet of non-wetland channels, of which none are perennial and only 20 feet are intermittent. No standing waterbodies are expected to be directly affected under this alternative.

Alternative 2: Manzanola South is anticipated to directly affect a total of four acres of wetland/riparian areas, of which approximately 50 percent are classified as palustrine forested, and 93 percent are Category I or Category II. Construction of this alternative would result in a loss of 114 functional units, which is slightly more than Alternative 1. Approximately 2,174 feet of non-wetland channels would be directly affected by Alternative 2, more than twice the length affected by Alternative 1. None of the affected channels are perennial or intermittent. As with Alternative 1, no standing waterbodies are expected to be affected.

Section 6: Manzanola to Rocky Ford (Figure E-18)

The Build Alternative in this section consists of a 1,000-foot-wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately one acre of wetland/riparian areas, which is not classified as palustrine forested, but approximately half is Category II. Construction in this section would result in a loss of 30 functional units. No perennial streams would be affected in this section, but a total of approximately 325 feet of intermittent streams and 281 feet of other non-wetland channels are estimated to be affected. No standing waterbodies are expected to be affected.

Section 7: Rocky Ford (Figure E-19)

Alternative 1: Rocky Ford North is slightly less than seven miles long and is situated between the City of Rocky Ford and the Arkansas River. Approximately 11 acres of wetland/riparian areas are anticipated to be affected by Alternative 1, of which less than one acre are classified as palustrine forested, and four acres are Category I or Category II. In addition, construction of this alternative likely would result in a functional loss of approximately 247 units. Approximately 2,072 feet of non-wetland channels would be directly affected by the Rocky Ford North Alternative, all of which are classified as canal/ditch. No standing waterbodies are expected to be directly affected under this alternative.

At 8.2-miles in length, Alternative 2: Rocky Ford South is slightly longer than Alternative 1. It would adversely affect 12 acres of wetland/riparian areas with approximately one acre categorized as palustrine forested and three acres are Category I or Category II. With a functional loss of 299 units, this alternative would have a greater adverse effect on overall wetland/riparian functionality when compared to Alternative 1. As with Alternative 1, no perennial or intermittent streams are anticipated to be adversely affected by this alternative. All of the 2,662 feet of non-wetland channel impacts are classified as canal/ditch. Approximately 0.2 acres of standing waterbodies are expected to be affected.

Section 8: Rocky Ford to Swink (Figure E-20)

The Build Alternative in this section consists of a 1,000-foot wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately three acres of wetland/riparian areas, of which none are classified as palustrine forested and less than one acre is Category I or Category II. Construction in this section would result in a loss of 72 functional units. Effects to perennial streams would total approximately 281 feet, which accounts for all the effects to non-wetland channels. No standing waterbodies are expected to be affected.

Section 9: Swink (Figure E-20)

Alternative 1: Swink North is roughly 2.5 miles long and is comparable in length to Alternative 2: Swink South. Under Alternative 1, approximately 6 acres of effect to wetland/riparian areas likely would occur, of which none are palustrine forested, but 4.5 acres (approximately 75 percent) are rated as Category I and Category II wetland/riparian areas. The Swink North Alternative would cause the functional loss of roughly 162 units, substantially more than the Swink South Alternative. Salt cedar dominates roughly 50 percent (or nearly three acres) of the wetland/riparian areas likely to be affected by this alternative. Though no perennial streams occur in the Swink North Alternative, it would affect up to 1,700 feet of other non-wetland channels and approximately 0.1 acre of standing waterbodies.

Alternative 2 is slightly longer (by roughly a quarter of a mile) than Alternative 1. Effects analyses for this alternative indicate that only one acre of wetland/riparian area would be affected, of which there would be no effects to palustrine forested wetland/riparian areas. Approximately half of wetland/riparian areas are Category I and Category II areas. These effects are presented in Figure E-20, located in Appendix E. The projected functional unit loss for the Swink South Alternative (35 units) is substantially less than for the Swink North Alternative. Effects to perennial streams would total approximately 108 feet and total effects to non-wetland channels are estimated to be 366 feet. No standing waterbodies are expected to be affected by this alternative.

Section 10: La Junta (Figure E-31)

La Junta includes four alternatives under consideration including one north-of-town alternative, and three south-of-town alternatives that differ by length and proximity to the town. Alternative 1: La Junta North is

approximately 8.9 miles in length and includes two new bridges over the Arkansas River. The estimated adverse effect to wetland/riparian areas in the north alternative is approximately 28 acres, of which less than one acre classified as palustrine forested and approximately 13 acres (45 percent) are Category I or Category II wetland/riparian areas. If Alternative 1 were constructed, 723 wetland/riparian functional units would be lost, which is more than any of the other La Junta alternatives. No perennial stream channels occur in Alternative 1, but approximately 6,582 feet of other non-wetland channel types would be affected. In addition, the La Junta North Alternative is projected to affect 0.1 acre of standing waterbodies.

Alternative 2: La Junta South is the shortest of the La Junta alternatives at 8.5 miles in length, and is located approximately two miles south of town. This alternative is estimated to affect 15 acres of wetland/riparian areas with a functional loss of 297 units. Salt cedar is prevalent in this alternative, dominating approximately 73 percent (or 11 acres) of the wetland/riparian acreage that would be affected. Alternative 2 would affect approximately 661 feet of perennial stream channel and 2,961 feet of intermittent channels. In total, approximately 5,270 feet of non-wetland channels are anticipated to be affected, which is the fewest of all the La Junta alternatives. Approximately 0.1 acre of standing waterbodies is expected to be directly affected under this alternative.

Alternative 3: La Junta South is approximately 8.5 miles long and would cause less effect to wetland/riparian areas than Alternative 1. Approximately 19 acres of effect is estimated to occur to wetland/riparian areas, of which 1.5 acres are classified as forested and approximately 10 acres (nearly 50 percent) are rated as Category I or Category II wetland/riparian areas. These effects are presented in Figure E-31, located in Appendix E. Alternative 3 would cause a functional loss of 466 units. Of the potentially affected wetland/riparian areas, roughly 25 percent (or five acres) are classified as dominated by salt cedar. Approximately 984 feet of perennial stream channel would be affected by this alternative, which is the most among the La Junta alternatives. In addition, approximately 3,650 feet of intermittent stream channel, 2,212 feet of other non-wetland channel, and 0.6 acre of standing waterbodies likely would be affected by Alternative 3.

Alternative 4: La Junta South is the longest alternative at 11.9 miles, and farthest south at 3.3 miles from town. This alternative is anticipated to affect approximately 11 acres of wetland/riparian areas, with a functional unit loss of 271. Approximately 36 percent of the wetland/riparian areas in this alternative are classified by available mapping as being dominated by salt cedar. Alternative 4 would affect the most non-wetland channels at approximately 8,331 feet, of which 768 feet are perennial and 5,974 feet are intermittent. This alternative also affects the most standing waterbodies compared to other La Junta alternatives at 1.2 acres.

Section 11: La Junta to Las Animas (Figure E-21)

The Build Alternative in this section consists of a 1,000-foot-wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately 20 acres of wetland/riparian areas, of which one-half acre is classified as palustrine forested and four acres are Category II. Construction in this section would result in a loss of 417 functional units. No perennial streams would be affected in this section, but a total of approximately 7,340 feet of other non-wetland channels are estimated to be affected (5,071 feet of intermittent stream and 2,270 feet of canal/ditch). No standing waterbodies are expected to be affected.

Section 12: Las Animas (Figure E-22)

Alternative 1: Las Animas North is approximately 3.5 miles long and includes a replacement of the existing bridge over the Arkansas River. Despite being more than one mile shorter than the south alternative, this alternative is anticipated to adversely affect more wetland/riparian areas. Approximately 40 acres of effect is estimated to occur to wetland/riparian areas, of which two acres (6 percent) are classified as palustrine forested and 10 acres (25 percent) are rated as Category I or Category II wetland/riparian areas. If this alternative were constructed, 916 wetland/riparian functional units would be lost. Alternative 1 would affect approximately 74 feet of perennial stream channel and an additional 2,055 feet of intermittent channels. In total, approximately 4,231 feet of non-wetland channels are anticipated to be affected, nearly 1,000 feet more than Alternative 2: Las Animas South. Alternative 1 also affects more standing waterbodies compared to the South Alternative at 1.2 acres.

Alternative 2: Las Animas South is approximately 4.7 miles long and will include a new bridge crossing over the Arkansas River. Under this alternative, approximately 23 acres of effect to wetland/riparian areas likely would occur, of which none are palustrine forested and seven acres (30 percent) are rated as Category I and Category II wetland/riparian areas. Alternative 2 would cause the functional loss of approximately 573 units, 343 less than Alternative 1. Salt cedar dominates roughly 26 percent (or six acres) of the wetland/riparian areas likely to be affected by this alternative. Alternative 2 would affect fewer non-wetland channels than Alternative 1 at approximately 3,299 feet, but more of those effects are to perennial streams than Alternative 1. Approximately 0.6 acre of standing waterbodies is expected to be directly affected under this alternative.

Section 13: Las Animas to Lamar (Figure E-23 and E-24)

The Build Alternative in this section consists of a 1,000-foot wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately 130 acres of wetland/riparian areas, of which two acres are classified as palustrine forested (1.6 percent) and 39 acres are Category I or Category II (30 percent). Construction in this section would result in a loss of 2,921 functional units. Effects to perennial streams would total approximately 1,112 feet and total effects to non-wetland channels are estimated to be nearly 6,443 feet. Approximately 1.4 acres of standing waterbodies are expected to be affected.

Section 14: Lamar to Granada (Figure E-25)

The Build Alternative in this section consists of a 1,000-foot wide corridor on the existing U.S. 50 alignment. However, between Lamar and the U.S. 50 and CR GC.5 intersection, the corridor begins on the north edge of U.S 50 and extends 1,000 feet south to avoid the railroad on the north side. This section is estimated to affect approximately 108 acres of wetland/riparian areas, of which 6.5 acres are classified as palustrine forested (6 percent) and 19 acres are Category I or Category II (17.4 percent). Construction in this section would result in a loss of 2,403 functional units. Effects to perennial streams would total approximately 530 feet and total effects to non-wetland channels are estimated to be nearly 7,847 feet. No standing waterbodies are expected to be affected.

Section 15: Granada (Figure E-26)

The two alternatives under consideration in Granada include north-of-town and south-of-town routes, which are nearly the same length at 2.2 miles and 2.1 miles, respectively. Alternative 1: Granada North is anticipated to affect approximately five acres of wetland/riparian areas with a functional loss of 126 units. None of the five acres is palustrine forested, but four of the five acres are classified as Category II wetland/riparian areas. Alternative 1 also would affect approximately 1,990 feet of non-wetland channels, of which 835 feet are perennial and 15 feet are intermittent. No standing waterbodies are expected to be directly affected under this alternative.

At 2.1 miles in length, Alternative 2: Granada South is slightly shorter, and would adversely affect two acres of wetland/riparian area, three acres less than the North Alternative. Of the two acres anticipated to be affected, one-half acre is palustrine forested, and one-half acre is Category I. With a functional loss of approximately 44 units, this alternative also would have less of an adverse effect on overall wetland/riparian functionality when compared to Alternative 1. No perennial or intermittent streams are anticipated to be adversely affected by this alternative. All of the 1,113 feet of non-wetland channel impacts are classified as canal/ditch. As with the North Alternative, no standing waterbodies are expected to be affected by Alternative 2.

Section 16: Granada to Holly (Figure E-27)

The Build Alternative in this section consists of a 1,000-foot wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately 55 acres of wetland/riparian areas, of which none are classified as palustrine forested, but 20 acres are Category II (37 percent). Construction in this section would result in a loss of 1,290 functional units. This section is estimated to affect approximately 130 feet of perennial stream channel and an additional 885 feet of intermittent channels. In total, approximately 10,340 feet of non-wetland channels are anticipated to be affected. Approximately three acres of standing waterbodies are expected to be affected.

Section 17: Holly (Figure E-28)

The Build Alternative includes a north-of-town option (Alternative 1: Holly North) and a south-of-town option (Alternative 2: Holly South) in Holly. Both alternatives are approximately 2.1-miles long. Approximately 16 acres of wetland/riparian areas are anticipated to be affected by Alternative 1, of which one acre is classified as palustrine forested, and nine acres are Category I or Category II. Construction of this alternative results in fewer wetland/riparian area effects, as well a smaller functional loss of approximately 415 units compared to Alternative 2. Approximately 3,552 feet of non-wetland channels would be directly affected by Alternative 1, of which 441 feet are perennial and the remainder are classified as canal/ditch. Approximately 0.4 acre of standing waterbodies is expected to be directly affected under this alternative.

Alternative 2 is situated between the city of Holly and the Arkansas River. Effects analyses for this alternative indicate that 20 acres of wetland/riparian area would be affected, of which there would be no effects to palustrine forested areas and only two acres (8.5 percent) of effect to Category II areas. The projected functional unit loss for the south alternative (428 units) is roughly 13 units more than the Alternative 1. No perennial stream channels occur in the south alternative, and only 178 feet of other non-wetland channel types would be affected. Approximately 0.2 acre of standing waterbodies is expected to be affected by this alternative.

Section 18: Holly Transition (Figure E-29)

The Build Alternative in this section consists of a 1,000-foot wide corridor on the existing U.S. 50 alignment. This section is estimated to affect approximately 22 acres of wetland/riparian areas, of which one acre is classified as palustrine forested and 15 acres are Category I or Category II. Construction in this section would result in a loss of 551 functional units. No perennial streams would be affected in this section, but a total of approximately 3,839 feet of other non-wetland channels are estimated to be affected. Approximately 2.8 acres of standing waterbodies are expected to be directly affected.

6.2.2. Indirect Effects

Indirect effects also can contribute to the overall, or cumulative, effects to resources in the Lower Arkansas River watershed. Indirect effects occur away from the project site in time, space, or both. By their very nature, indirect effects are difficult to quantify. At this Tier 1 level of analysis, indirect effects to wetland/riparian areas by the Build Alternative 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. However, potential indirect effects to wetland/riparian areas include the following:

- Changes in drainage/flow routing—Changes in the way water is routed across the landscape (i.e., by adding a roadway or widening an existing roadway) could result in higher, lower, or no substantial change in surface water or ground water levels. Changes in water levels could result in a shift in the plant species that exist at the site.
- Decrease in water quality—Decreased water quality can affect the plant and animal species that inhabit a particular area.
- Introduction of invasive plant species—Seeds and plant parts of noxious weeds and other invasive plant species can be carried into a project site on construction equipment. Also, existing weed seeds can be spread during construction, and the wind can deliver weed seeds to newly disturbed soils. When established, they can spread into nearby undisturbed areas and will slowly degrade habitat quality for various wildlife species and result in a shift in plant and animal species composition found in a particular area.
- Increased noise levels—Increased noise levels could cause resident animal species in adjacent habitats to relocate. This effect generally lasts until resident wildlife becomes habituated to the changes.

7. Mitigation Strategies

The U.S. 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. Since wetland/riparian areas serve as habitat to certain types of wildlife, they are discussed in this plan. The Natural Resources Mitigation Strategies Plan has been included as an appendix to the U.S. 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.

8. References

Berglund, J. *Montana Wetland Assessment Method.* Washington, D.C.: Transportation Research Board. 1999. Print.

Colorado Agricultural Meteorological Network (CoAgMet). *Evapotranspiration Data for Sites in the Arkansas Valley.* Web. Jan. 2007. <http://ccc.atmos.colostate.edu/%7Ecoagmet/etr_form.php>.

Colorado Atlas and Gazetteer. Yarmouth, ME: DeLorme Mapping Company. 1997. Print.

Colorado Department of Transportation (CDOT). Mitigation forms and guidance for wetland finding reports. Print.

Colorado Department of Transportation (CDOT). *U.S. 50 Tier 1 EIS Vegetation Accuracy Assessment of SWReGAP and Colorado Division of Wildlife (CDOW) Riparian Vegetation Mapping Along the U.S. 50 Corridor.* Bozeman, MT: Colorado Department of Transportation (CDOT), Region 2. 23–27 Oct. 2006. Print.

Colorado Division of Wildlife (CDOW). *Riparian Mapping Methodology*. 2004. Web. Jan. 2007. <http://ndis1.nrel.colostate.edu/riparian/Methods.htm>.

Colorado Natural Heritage Program (CNHP). *County List of Tracked Species.* Updated 11 Aug. 2006. Web. Jan. 2007. <http://www.cnhp.colostate.edu/list.html>.

Colorado Water Conservation Board (CWCB). *Tamarisk Inventory for the Colorado, Arkansas, and Purgatoire Rivers*. Grand Junction, CO: Tamarisk Coalition, 25 Jan. 2006. Print.

Copeland, C. “Water Quality: Implementing the Clean Water Act.” *Issue Brief 89102 for Congress.* Washington, D.C.: Congressional Research Service. Aug. 2001. Print.

Council on Environmental Quality (CEQ). *Regulations for Implementing NEPA.* 40 CFR Parts 1500-1508. Washington, D.C. 1978. Print.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. *Classification of Wetlands and Deepwater Habitats of the United States* (FWS/OBS-79/31). Washington, D.C.: U.S. Fish and Wildlife Service (USFWS). 1979. Print.

Executive Order 11988. *Floodplain Management*. May 24, 1977.

Executive Order 11990. *Protection of Wetlands*. May 24, 1977.

Federal Highway Administration (FHWA). *Technical Advisory T6640.8A.* “Guidance for Preparing and Processing Environmental and Section 4(f) Documents.” Washington, D.C.: FHWA. 30 Oct. 1987. Print.

Lewis, L., L. Clark, R. Krapf, M. Manning, J. Staats, T. Subirge, L. Townsend, and B. Ypsilantis. *Technical Reference 1737-19.* “Riparian Area Management: Riparian-Wetland Soils.” Denver, CO: Bureau of Land Management (BLM). 2003. Web. Jan. 2007. <http://www.blm.gov/nstc/library/pdf/FinalTR1737-19.pdf>.

Lowry, J.H, Jr., R.D. Ramsey, K. Boykin, D. Bradford, P. Comer, S. Falzarano, W. Kepner, J. Kirby, L. Langs, J. Prior-Magee, G. Manis, L. O’Brien, T. Sajwaj, K.A. Thomas, W. Rieth, S. Schrader, D. Schrupp, K. Schulz, B. Thompson, C. Velasquez, C. Wallace, E. Waller, and B. Wolk. *Southwest*

Regional Gap Analysis Project: Final Report on Land Cover Mapping Methods. Logan, Utah: RS/GIS Laboratory, Utah State University. 2005. Print.

McLean, S. Colorado Division of Wildlife (CDOW) riparian mapping data. Apr 28, 2006.

Memorandum of agreement between the U.S. Environmental Protection Agency (EPA) and the Department of the Army (DOA) concerning the determination of mitigation under the Clean Water Act Section 404(b)(1). 1990.

Memorandum of agreement on the administration and implementation of Senate Bill (SB) 40. Colorado Division of Wildlife (CDOW) and Colorado Department of Transportation (CDOT). 2005.

Mitigation of impacts to wetlands and natural habitat. 23 CFR 777. 2000.

National Environmental Policy Act/Clean Water Act Section 404 (NEPA/404) merger process and agreement for transportation projects in Colorado. 2005.

National Environmental Policy Act of 1969 (NEPA) Regulations. 23 CFR 771. 1987.

National Research Council (NRC). Riparian areas: Functions and strategies for management. Committee on Riparian Zone Functioning and Strategies for Management; Water Science and Technology Board; Board on Environmental Studies and Toxicology; Division on Earth and Life Studies. Washington, D.C.: National Academy Press; 2002. 428 p.

Natural Diversity Information Source (NDIS). Species and habitat information. 2007. Available from: http://ndis.nrel.colostate.edu/wildlife.asp. Site accessed Jan 2007.

Natural Resources Conservation Service (NRCS). Hydric soils definition. 2007. Available from: http://soils.usda.gov/use/hydric/intro.html. Site accessed Jan 2007.

Natural Resources Conservation Service (NRCS). Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. 2006. Available from: http://soils.usda.gov/survey/geography/mlra/index.html. Site accessed Jan 2007.

Smith, R.D., Ammann, A., Bartoldus, C., Brinson, M.M. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station; 1995. Technical Report WRP-DE-9.

Southwest Regional Gap Analysis Project (SWReGAP). Land cover datasets. 2006. Available from: http://fws-nmcfwru.nmsu.edu/swregap/. Site accessed Jan 2007.

Sutter, L.A., Stanfill, J.B., Haupt, D.M., Bruce, C.J., Wuenscher, J.E. NC-CREWS: North Carolina coastal region evaluation of wetland significance. May 1999. North Carolina Department of Environment and Natural Resources. Available from: http://dcm2.enr.state.nc.us/Wetlands/NCCREWSDOC.pdf. Site accessed Apr 26, 2006.

U.S. Army Corps of Engineers (USACE). Arkansas River from John Martin Reservoir to the Colorado-Kansas state line: Channel capacity and riparian habitat planning study. Prepared for the Colorado Conservation Board, Denver, CO. Planning Assistance to States Program. Albuquerque District. Jul 1999.

U.S. Army Corps of Engineers (USACE). Corps of Engineers wetlands delineation manual. Wetlands Research Program Technical Report Y-87-1. Vicksburg, Mississippi: USACE, U.S. Department of the Army (DOA); 1987.

U.S. Congress. *Clean Water Act of 1972 (CWA),* as amended by the Water Quality Act of 1987. 33 USC 1251–1376. Print.

U.S. Congress. *Definition of Waters of the United States.* 33 CFR 328.3. 1986.

U.S. Congress. *Emergency Wetlands Resources Act.* 16 USC 3921; 3931. 1986.

U.S. Congress. *Intermodal Surface Transportation Efficiency Act of 1991*, wetland mitigation provisions. 23 USC 103(i)(13) and 23 USC 133(b)(11).

U.S. Congress. *National Environmental Policy Act of 1969 (NEPA).* 42 USC 4321-4347. 1969.

U.S. Geological Survey (USGS). National Hydrography Dataset: Geographic information system hydrography data for the Arkansas River basin. U.S. Geological Survey (USGS). Available from: http://nhd.usgs.gov/. Site accessed Dec 2007.

Western Regional Climate Center (WRCC). Climate of Colorado narrative and state temperature and precipitation data. 2006. Available from: http://www/wrcc/dri.edu. Site accessed May 2006 and Jan 2007.

Worthey, M. Rapid field verification: A new method for assessing the accuracy of land cover data in the field [thesis]. Colorado Springs, CO: University of Colorado; 2007. 68 p.

This page left intentionally blank.

Appendices

This page left intentionally blank.

Appendix A. Resource Methodology Overview for Wetland and Riparian Resources

This resource methodology overview is attached to this technical memorandum for reference only. The lead agencies for the U.S. 50 Tier 1 EIS (i.e., 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 Wetland and Riparian Resources

Methodology Overview	Wetlands and Riparian Resources	
	Tier 1	**Tier 2**
Relevant Data/ Information Sources	• Recent aerial photography • General location of all wetlands (jurisdictional or non-jurisdictional) • NRCS, LAWCD, SECWCD, CPW, NWI mapping and other appropriate data sources • Review existing USACE and CPW mitigation permits/agreements/ programs within the project area	• Review and update Tier 1 data search and identify additional data collection requirements to complete the appropriate standard NEPA analysis • Wetland delineations (including those by others)
Collection and/or Analysis Methodology	• NWI maps, existing land cover data, aerial photography (photo interpretation), and other best available data will be used to identify generalized wetland and riparian areas • These identified wetland and riparian corridor locations will be plotted on topographic maps and aerial photos • Coordination with USACE and CPW will occur to discuss study area wetlands and riparian areas and develop appropriate corridor-wide replacement wetland and riparian banking criteria. These discussions will also determine if existing regional mitigation sites may be available for use in this process • Limited windshield surveys to field verify NWI maps and desktop analysis • A very basic functional assessment will be conducted for wetlands within the area of the recommended corridor alternative	• Review of Tier 1 efforts and agreements • Determination of applicability of the NEPA/404 merger agreement. If applicable, then follow procedures defined in the agreement • Field review to investigate study area wetlands; all wetlands will be mapped with GPS • Wetland and riparian corridor locations will be plotted on topographic maps and aerial photos. These will be used to conduct formal wetland delineations, as needed • If field review determines impact on wetlands, delineations would be conducted as detailed in the 1987 USACE Wetland Delineation Manual • If construction is planned in any area meeting the relevant criteria, SB 40 Certifications will be completed through coordination with CPW

Methodology Overview	Wetlands and Riparian Resources	
	Tier 1	**Tier 2**
	• No additional field surveys will be conducted during Tier 1 analysis	• Field surveys and testing will be limited to the proposed corridor alignments, identified through the alternatives screening process • FACWet analysis will be completed for each project impacting a minimum of 0.1 acre of wetlands
Project Area	One to four miles wide surrounding the existing U.S. 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Tier 2 specific section of independent utility corridor boundaries
Impacts	Impacts on wetlands, springs/fens, other waters of the United States, and riparian areas will be determined through a GIS process in which the impact will be determined by taking the footprint of the full Tier 1 corridor alternative at that specific location, multiplying the potentially impacted acreage by the recommended ultimate typical section footprint, divided by the Tier 1 corridor width at that location. [For example, if 1,000 feet wide Tier 1 corridor impacts 5 acres and the recommended ultimate typical section is 300 feet, the Tier 1 impact at this site would be calculated as: 5 acres x (300 feet/1,000 feet) = 1.5 acres. This example does not take into account functionality.]	Impacts on wetlands, springs/fens, other waters of the United States, and riparian areas in compliance with standard NEPA and other regulatory guidance
Mitigation Options	• Mitigation strategies will be developed for identified impacts and will likely include banking, restoration, and enhancement for multiple resource benefits, including wetland, riparian, water quality, and habitat that address future impacts and resource agency initiatives • Mitigation teaming opportunities with other public land managers will be explored	Standard mitigation procedures, as defined by regulatory guidance and/or requirements, and any additional strategies defined in the Tier 1 EIS/ROD or through other agreements
Deliverables	• Wetland and Riparian Technical Memorandum, including: wetland maps, identification and classification of potential wetland banking sites, enhancement strategies, and 404(b)(1) compliance determination • Corridor-wide PA with USACE and CPW, if needed	• CDOT Wetland Finding Report, including wetland maps (if necessary and as appropriate for Tier 2 section of independent utility level of NEPA documentation) • SB 40 Certifications, as needed • 404 Permits, as needed

Methodology Overview	Wetlands and Riparian Resources	
	Tier 1	Tier 2
Regulatory Guidance/ Requirements	• Clean Water Act/Water Quality Act of 1987 (33 USC 1251-1376) • EO 11990 Protection of Wetlands • Mitigation of Impacts to Wetlands and Natural Habitat (23 CFR 777) • USACE Wetland Delineation Manual, 1987 • Wetlands Mitigation Banks (23 USC 103(i)(13)) (23 USC 133(b)(11) (PL 102-240) • Emergency Wetlands Resources Act of 1986 (16 USC 3921; 3931) (PL 99-645) • National Environmental Policy Act/Clean Water Act Section 404 (NEPA/404) merger process and agreement for transportation projects in Colorado of 2005 • CPW and CDOT 2005 MOA on the administration and implementation of SB 40 • CDOT mitigation forms and guidance for wetland finding reports • CDOT, FHWA and USACE NEPA/404 Merger Agreement • Moving Ahead for Progress in the 21st Century Act (MAP-21)	

This page left intentionally blank.

Appendix B. Abbreviations and Acronyms

CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CR	County Road
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
GIS	Geographic information system
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act of 1969
NRCS	Natural Resources Conservation Service
SH	State Highway
SIU	Section of independent utility
SWReGAP	Southwest Regional Gap Analysis Project
U.S. 50	U.S. Highway 50
U.S. 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

This page left intentionally blank.

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

C.1. Introduction

Vegetation mapping data were field-checked for accuracy along the U.S. 50 corridor from Pueblo to the Kansas state line during the week of October 23, 2006. Points, not polygons, along the corridor were checked for accuracy. The data checked for accuracy included the SWReGAP data and the Colorado Division of Wildlife (CDOW), now known as 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.

Analysts drove the corridor, starting from the state line, and sites were checked from east to west. A speed of approximately 55 miles per hour was maintained, 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 vegetation type at a specific location. A simple “yes” or “no” was used to denote whether the mapped vegetation type matched what was observed on the ground.

C.2. Results

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

Table C-1. Accuracy Assessment of Southwest Regional Gap Analysis Project Data along the U.S. 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

Type	Mapped Versus Actual		Total Checked	Percent Correct
	Match	No Match		
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**

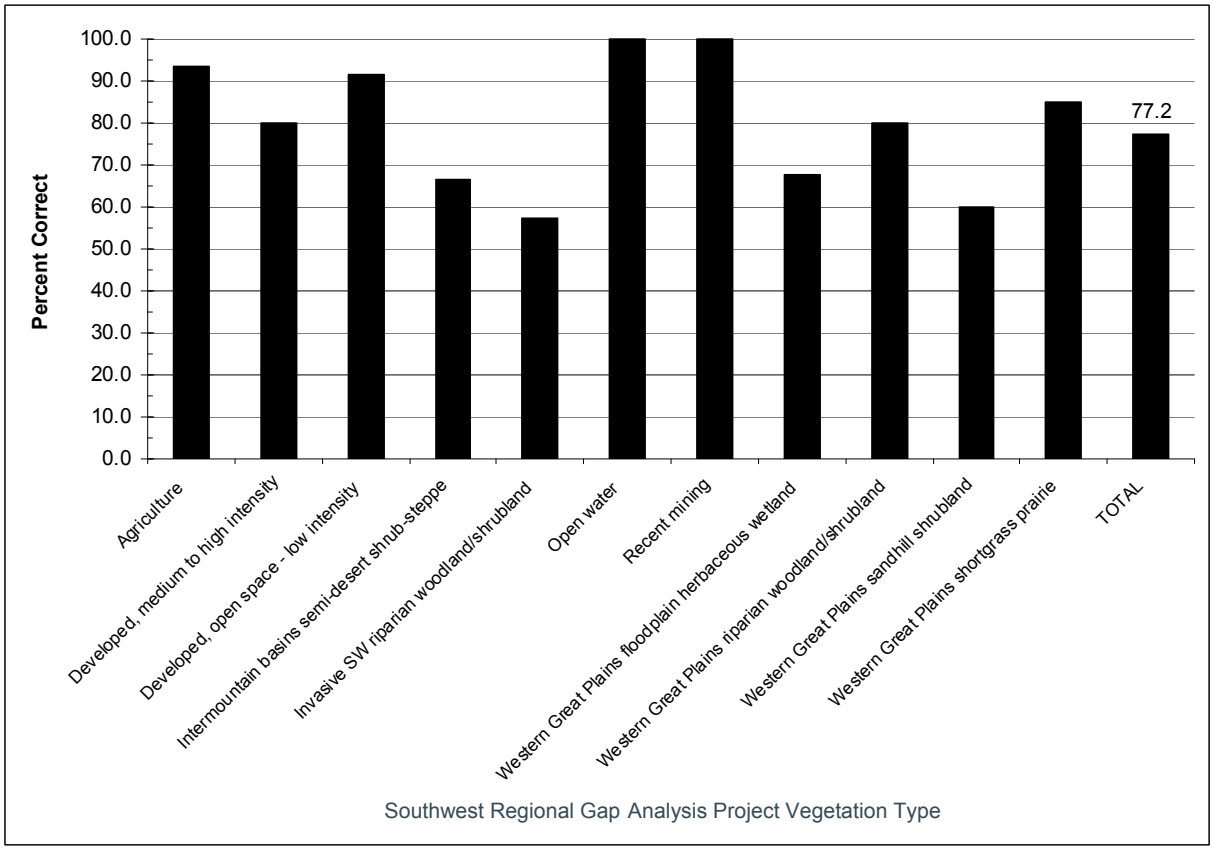


Figure C-1. Summary of Accuracy Assessment for Southwest Regional Gap Analysis Project Data along the U.S. 50 Corridor from Pueblo to the Kansas State Line

Table C-2. Accuracy Assessment of Colorado Division of Wildlife Data along the U.S. 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 tree—tamarisk	8	2	10	80.0
Riparian shrub—willow	—	4	4	0.0
TOTAL	**78**	**24**	**102**	**76.5**

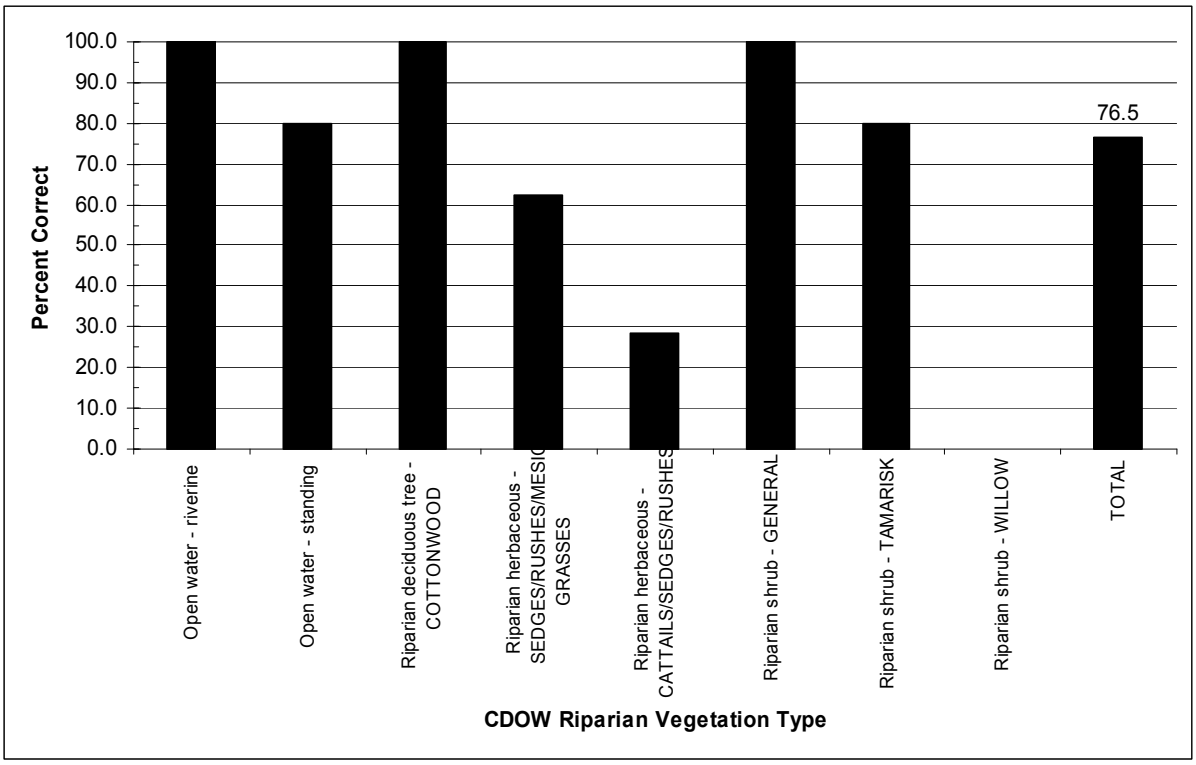


Figure C-2. Summary of Accuracy Assessment for Colorado Division of Wildlife Data along the U.S. 50 Corridor from Pueblo to the Kansas State Line

C.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 (Southwest Regional Gap Analysis Project) consist primarily of tamarisk and chinese elm—some russian olive also exists
- 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 differentiating between shortgrass prairie and shrub-steppe
- SWReGAP data seemed to have a problem with smaller polygons
- SWReGAP data did well with large polygons
- Developed, open space—low intensity category classified urban residential areas as this class, also feed lots—main criterion appears to be percent impervious cover—data might be skewed due to tree cover in urban and residential settings
- Colorado Division of Wildlife 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 Colorado Division of Wildlife wetland and riparian areas checked, in most cases the wetland area existed, but the vegetation class simply 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 D. Geographic Information System-Based Wetland/Riparian Functional Assessment Methodology

D.1. Introduction

Wetland/riparian areas in the project area were evaluated using a geographic information system(GIS)-based functional assessment that was adapted from the Montana Wetland Functional Assessment Method (Berglund 1999) and North Carolina Coastal Region Evaluation of Wetland Significance (Sutter et al. 1999). The Montana Wetland Functional Assessment Method is a field-oriented method developed in Montana and used throughout the western United States, including Colorado. The North Carolina Coastal Region Evaluation of Wetland Significance is a GIS-based method that was developed in North Carolina. Fusing the strengths of both of these methods resulted in a GIS-based functional assessment methodology that is appropriate for use in the project area, and potentially elsewhere in the western United States.

D.2. Overview

The U.S. 50 Tier 1 EIS functional assessment method assesses three functions, including general wildlife habitat, hydrology (e.g., flood flow attenuation and dynamic water storage), and water quality improvement for each mapped wetland/riparian area (i.e., GIS polygon). It assesses these functions through the use of several indicators, or predictors, such as the wetland type, adjacent land uses, proximity to streams, and presence or absence of salt cedar, among others.

Each indicator for a function is first rated as high (3 points), moderate (2 points), or low (1 point), and then summed together to arrive at a score for a particular function. The scores for each function are then summed, and a total functional score is arrived at for each polygon. One of four functional categories then is assigned to each polygon based on the functional scores and other factors. It is important to note that wetland/riparian areas were mapped by vegetation type (i.e., palustrine emergent, palustrine scrub-shrub, and palustrine forested). Therefore wetland/riparian complexes comprised of different vegetation types can have multiple functional scores and categories (Figure D-1).

D.3. Assumptions and Limitations

The assumptions and limitations of the GIS-based wetland/riparian functional assessment method are described below.

1. The method must be a GIS-based method due to the size of the project area and level of analysis required (i.e., for a Tier 1 environmental impact statement).
2. The method must utilize existing data (some data manipulation will be necessary).
3. The accuracy of the functional assessment is limited by the accuracy of the geospatial data used.
4. Some limited field verification will be performed to validate and refine the functional assessment model described in this document.
5. Field-based functional assessments of potentially affected wetland/riparian areas will be performed during the Tier 2 environmental review process.
6. Individual assessment areas for the functional assessment are comprised of one wetland/riparian vegetation polygon (i.e., palustrine emergent, palustrine scrub-shrub, and palustrine forested), which was derived from CDOW riparian mapping data and SWReGAP data. As such, the assessment areas used in his analysis will not typically correspond to assessment areas that would be defined in the field.

7. The adjacent land use analysis used in the habitat and water quality functions may not represent the dominant land use surrounding a wetland/riparian area. In most cases, this does not affect the overall functional category assigned to polygons.
8. U.S. 50 is not mapped as a land use; thus, it is not considered in the adjacent land use analysis.

D.4. Functions

Three general functions were assessed and are discussed in Figure D-1.

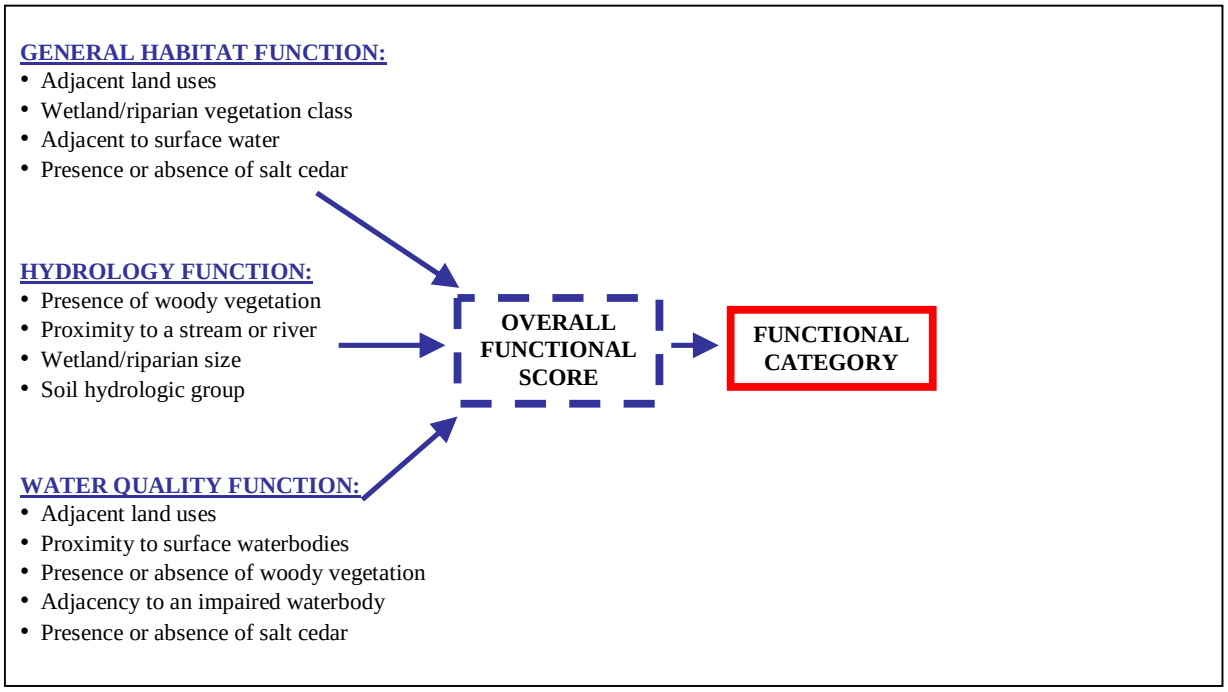


Figure D-1. Diagram of the U.S. 50 Tier 1 GIS-Based Wetland and Riparian Functional Assessment Method

Function 1—General Wildlife Habitat

The general wildlife habitat function assesses the overall suitability of the site for use by wildlife, including bird species. The indicators used to assess this function are:

- Adjacent land uses
- Riparian vegetation class
- Adjacency to surface water
- Presence or absence of salt cedar

The maximum score for general wildlife habitat is 12 points.

Adjacent Land Uses

The underlying assumption of this indicator is that more natural communities in the surrounding landscape will facilitate use of wetland/riparian areas by wildlife. The “adjacent land use” indicator was evaluated in a stepwise fashion. First, polygons that shared a line segment with—or that were completely within (i.e., intersected)—a particular land use cover type received an assigned score of 1 point (low), 2 points (moderate), or 3 points (high). For instance, polygons sharing a line segment with, or completely within, the ”urban” cover type were identified and scored as 1 point, or low. Second, polygons that had a common line segment and intersected the “agricultural” cover type, and that weren’t already scored as a 1 in the first step,

were scored as 2 points, or moderate. Finally, polygons that had a common line segment and intersected native vegetation types (e.g., grasslands), and weren't already scored as 1 point or 2 points, were scored as 3 points, or high.

Riparian Vegetation Class

It is generally recognized that as vertical structural diversity increases, habitat diversity also increases. Therefore, more complex structural diversity is generally attractive to, and used by, more wildlife and bird species than less complex areas. Scoring for this indicator was based on the structural complexity of the habitat, as indicated below.

- 3 points (high) were given to those in the palustrine forested class
- 2.5 points (moderate-high) were given to those in the palustrine scrub-shrub class (native vegetation)
- 2 points (moderate) were given to those in the palustrine scrub-shrub class (general)
- 1 point (low) was given to those in the palustrine emergent class
- 0.5 points were given to those in the palustrine scrub-shrub class (non-native vegetation)

The non-native palustrine scrub-shrub class in the project area is dominated by salt cedar (i.e., *tamarisk* sp.), and is not frequently used by most wildlife.

Adjacent to Surface Water

The presence of surface water increases use of the site by wildlife. This indicator was scored as indicated below.

- Those adjacent to a perennial waterbody were given 3 points (high)
- Those adjacent to an intermittent waterbody were given 2 points (moderate)
- Those not adjacent to a waterbody were given 1 point (low)

Presence or Absence of Salt Cedar

Salt cedar is a very aggressive non-native shrub that has overwhelmed the Arkansas River Valley in the last 100 years. Inclusion of this indicator is an attempt to recognize its detrimental effects on the value of native wetland/riparian habitats to wildlife. This indicator is scored by giving 0 points to areas dominated by salt cedar and "rewarding" native areas with a score of 3 points. Note that because much of the wetland/riparian mapping data were compiled by the CDOW using aerial photographs from the late 1980s and early 1990s, the scoring for this indicator may under-represent the current extent of salt cedar in the area.

Function 2—Hydrology

The hydrology function is designed to score a site based on its ability to slow flood waters and to store water. The indicators used to score this function are:

- Presence or absence of woody vegetation
- Proximity to a stream or river
- Size
- Soil hydrologic group

The maximum possible score for the hydrology function is 12 points.

Presence or Absence of Woody Vegetation

Woody vegetation slows flood waters more effectively than herbaceous vegetation, thereby dissipating energy and allowing time for water to infiltrate into the soil. For this reason, wetland/riparian areas containing

palustrine forested class or palustrine scrub-shrub class vegetation were given 3 points (high), and palustrine emergent class vegetated areas were scored as 1 point (low).

Proximity to a Stream or River

The closer a wetland/riparian area is to a stream or river, the more it will affect flood flows. For this reason, this indicator was scored as indicated below.

- Those areas up to 50 feet in proximity were given 3 points (high)
- Those areas from 51 to 150 feet in proximity were given 2 points (moderate)
- Those areas from 151 to 300 feet in proximity were given 1 point (low)
- Those areas farther than 300 feet from a stream or river were given 0 points

Size

This indicator assumes that the larger an area is, the greater the effect it has on flood flows and water storage. Therefore, the scoring categories below were used.

- 3 points (high) were given to areas of five or more acres
- 2 points (moderate) were given to areas measuring one to five acres
- 1 point (low) was given to areas less than one acre

Soil Hydrologic Group

Soil hydrologic groups relate to the rate at which water is able to infiltrate a particular soil. This indicator assumes that the higher the infiltration rate, the higher the likelihood that water will be stored in the wetland. The scoring of this indicator was accomplished by assigning:

- High ratings (3 points) to soil hydrologic groups A and B, which have the highest infiltration rates
- A moderate score (2 points) to soil hydrologic group C
- A low rating to soil hydrologic group D, which has the slowest infiltration rate

Scores for sites containing more than one soil hydrologic group were determined by using a weighted average based on the area covered by each of the hydrologic groups present.

Function 3—Water Quality

The water quality function is designed to score a site based on its ability and opportunity to improve water. The indicators used to score this function are:

- Adjacent land uses
- Proximity to surface waterbodies
- Presence or absence of woody vegetation
- Adjacency to an impaired waterbody
- Presence or absence of salt cedar

The maximum possible score for the water quality function is 15 points.

Adjacent Land Uses

This indicator is scored in the same way as the general wildlife habitat function. The underlying assumption of this indicator with respect to water quality is that natural communities in the surrounding landscape will supply fewer pollutants to the wetland, and, therefore, cause less degradation of the wetland than other land uses. This indicator was evaluated in a stepwise fashion. First, polygons that shared a line segment with—or that were completely within (intersected)—a particular land use cover type received an assigned score of 1

point (low), 2 points (moderate), or 3 points (high). For instance, polygons sharing a line segment with, or completely within, the ”urban” cover type were identified and scored as 1 point, or low. Second, polygons that had a common line segment and intersected the “agricultural” cover type, and that weren’t already scored as 1 point in the first step, were scored as 2 points, or moderate. Finally, polygons that had a common line segment and intersected native vegetation types (e.g., grasslands), and weren’t already scored as 1 point or 2 points, were scored as 3 points, or high.

Proximity to Surface Waterbodies

In general terms, the closer a wetland/riparian area is to a waterbody, the greater the likelihood is that the area will have an effect on water quality in the waterbody. No distinctions were made to the many possible exceptions to this, such as the area being down-gradient from the waterbody, or some sort of topographic barrier separating the area from the waterbody. This indicator was scored as indicated below:

- 3 points (high) if the area was equal to or less than 300 feet from a perennial waterbody
- 2 points (moderate) if it was equal to or less than 300 feet to an intermittent waterbody
- 1 point (low) if it was more than 300 feet to a waterbody

Presence or Absence of Woody Vegetation

Woody vegetation slows flood waters more effectively than herbaceous vegetation, thereby allowing pollutants to settle out and be processed by microbes. The rating categories indicated below were used to assess this quality.

- Palustrine forested or palustrine scrub-shrub class areas were rated as 3 points (high)
- Palustrine emergent class areas were rated as 1 point (low)

Adjacent to Impaired Waterbody

Wetland/riparian areas closer to waterbodies considered to be impaired by the Colorado Department of Public Health and Environment have higher potential to function as buffers for these impaired waters, reducing the opportunity for additional degradation. This indicator was rated as:

- 3 points (high) if the area is located adjacent to an impaired waterbody
- 1 point (low) if it is not adjacent to an impaired waterbody

Presence or Absence of Salt Cedar

Salt cedar uses large quantities of water, thereby reducing the volume of water and increasing the concentration of pollutants in waterbodies. In fact, it is estimated that current water losses from salt cedar exceed native vegetation use along the Arkansas River by approximately 53,834 acre-feet per year (salt cedar minus the water used by native plants) (CWCB 2006). For this reason, the presence of salt cedar was scored as -3 points, whereas areas with no salt cedar were scored as +3 points.

Scoring

For each function, the scores from all indicators are summed. Maximum scores for each function are as indicated below:

- Habitat is 12 points
- Hydrology is 12 points
- Water quality is 15 points

The overall functional score for a site calculated as the sum of the three functions. The maximum wetland/riparian area functional score is 39 points. After a riparian area was scored, the following four categories were used for avoidance prioritization.

Category I

Category I includes riparian areas of exceptionally high quality. These areas are generally rare to uncommon in the state or region, or are important from a regulatory standpoint. To be rated as a Category I site, the riparian area must:

- Score 12 functional points for habitat, or
- Be classified as a palustrine forested area, or
- Score 12 functional points for hydrology, or
- Have total actual functional points higher than 80 percent (more than 31.2 points) of total possible functional points

Category II

Category II riparian areas are more common than Category I riparian areas, and include those that function at very high levels for habitat, or are assigned high ratings for many of the assessed functions and values. To be rated as a Category II site, the area must not qualify as a Category I site and must:

- Have two of the three functions achieve more than 80 percent of points possible for those functions, or
- Be classified as palustrine scrub-shrub where tamarisk is not dominant, or
- Have total actual functional points achieve more than 65 percent (more than 25.4 points) of total possible functional points

Category III

Category III riparian areas are more common and generally less diverse than Category I or Category II areas. They can provide many functions and values, although they may not be assigned high ratings for as many parameters as are Category I and Category II areas. To be rated as a Category III site, the area must not qualify as a Category I, Category II, or Category IV site.

Category IV

Category IV wetland/riparian areas generally are small, isolated, lack vegetative diversity, or possess a combination of these characteristics. These sites provide little in the way of habitat, and often are directly or indirectly disturbed by urban and agricultural land uses. To be rated as a Category IV site, the area must not qualify as a Category I, II, or III site and must:

- Have two of the three functions achieve equal or less than 30 percent of points possible for those functions, or
- Have total actual functional points equal or less than 30 percent (11.7) of total possible functional points

D.5. Quality Control Review Process of Data for Potential Errors and Changes

The base dataset consists of two different source datasets. The dataset was too large to be able to check all entries. Thus, to ensure data quality, a quality control checklist was created to track data development for completeness and maintain integrity of the database. This quality control checklist included visual quality control and spatial analysis checks, which are described in more detail below.

Visual Quality Control

Visual quality control refers to manually reviewing the data for anomalies. This process was used to evaluate data for:

- Completeness (i.e., no missing features or layers)
- Positional accuracy to the source data
- Correct attribution
- Annotation placement, notation, and spelling

Spatial Analysis Checks

Spatial analysis checks were completed to validate the functional assessment model results. Random area checks were performed throughout each functional indicator to identify errors in the spatial analysis application, as indicated below:

- Random area checks were completed to identify polygons smaller than a specified size
- Checks were completed to identify duplication of line segments (e.g., rivers and streams)
- Checks were performed for duplicate polygons to identify overlapping polygons within the same feature class that would result in classification conflict
- Logic checks were conducted on all spatial analyses to ensure results supported indicator parameter queries

Field verification of selected polygons was completed in July 2007.

This page left intentionally blank.

Appendix E. Figures (E-1 through E-31)

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

Figure E-1. Wetland/Riparian Types—Pueblo County
Figure E-2. Wetland/Riparian Types—Otero County
Figure E-3. Wetland/Riparian Types—Bent County
Figure E-4. Wetland/Riparian Types—Prowers County
Figure E-5. Wetland/Riparian Functional Assessment Areas—Pueblo County
Figure E-6. Wetland/Riparian Functional Assessment Areas—Otero County
Figure E-7. Wetland/Riparian Functional Assessment Areas—Bent County
Figure E-8. Wetland/Riparian Functional Assessment Areas—Prowers County
Figure E-9. Hydrography—Pueblo County
Figure E-10. Hydrography—Otero County
Figure E-11. Hydrography—Bent County
Figure E-12. Hydrography—Prowers County
Figure E-13. Wetland/Riparian Impacts—Pueblo
Figure E-14. Wetland/Riparian Impacts—Pueblo to Fowler (west)
Figure E-15. Wetland/Riparian Impacts—Pueblo to Fowler (east)
Figure E-16. Wetland/Riparian Impacts—Fowler to Manzanola
Figure E-17. Wetland/Riparian Impacts—Manzanola
Figure E-18. Wetland/Riparian Impacts—Manzanola to Rocky Ford
Figure E-19. Wetland/Riparian Impacts—Rocky Ford
Figure E-20. Wetland/Riparian Impacts—Rocky Ford to Swink, Swink North and Swink South Alternatives
Figure E-21. Wetland/Riparian Impacts—La Junta to Las Animas
Figure E-22. Wetland/Riparian Impacts—Las Animas
Figure E-23. Wetland/Riparian Impacts—Las Animas to Lamar (west)
Figure E-24. Wetland/Riparian Impacts—Las Animas to Lamar (east)
Figure E-25. Wetland/Riparian Impacts—Lamar to Granada
Figure E-26. Wetland/Riparian Impacts—Granada
Figure E-27. Wetland/Riparian Impacts—Granada to Holly
Figure E-28. Wetland/Riparian Impacts—Holly
Figure E-29. Wetland/Riparian Impacts—Holly Transition
Figure E-30. Wetland/Riparian Impacts—Fowler North and Fowler South Alternatives
Figure E-31. Wetland/Riparian Impacts—La Junta South 1 and La Junta South 2 Alternatives

This page left intentionally blank.

Figure E-1. Wetland/Riparian Types—Pueblo County

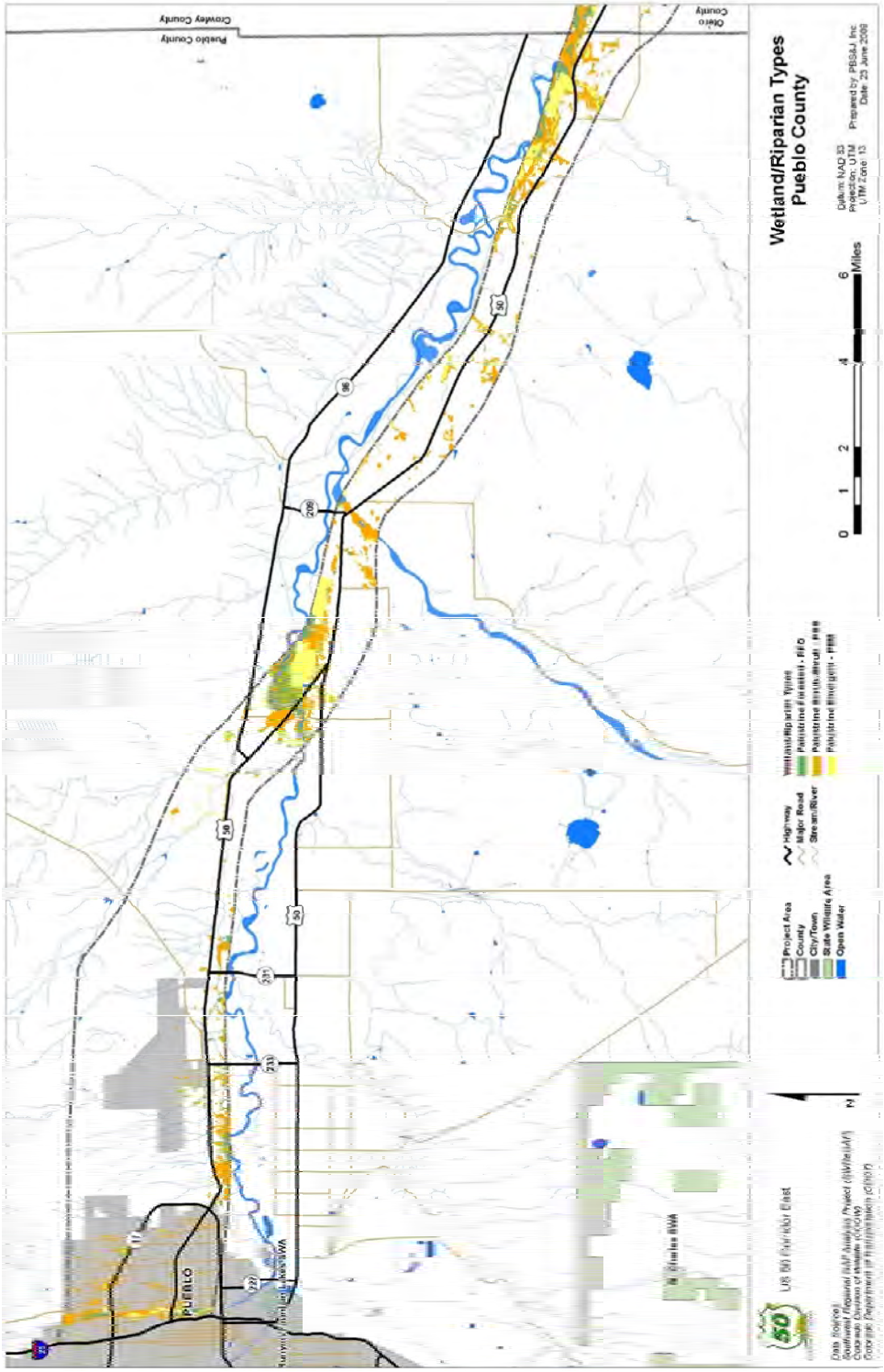


Figure E-2. Wetland/Riparian Types—Otero County

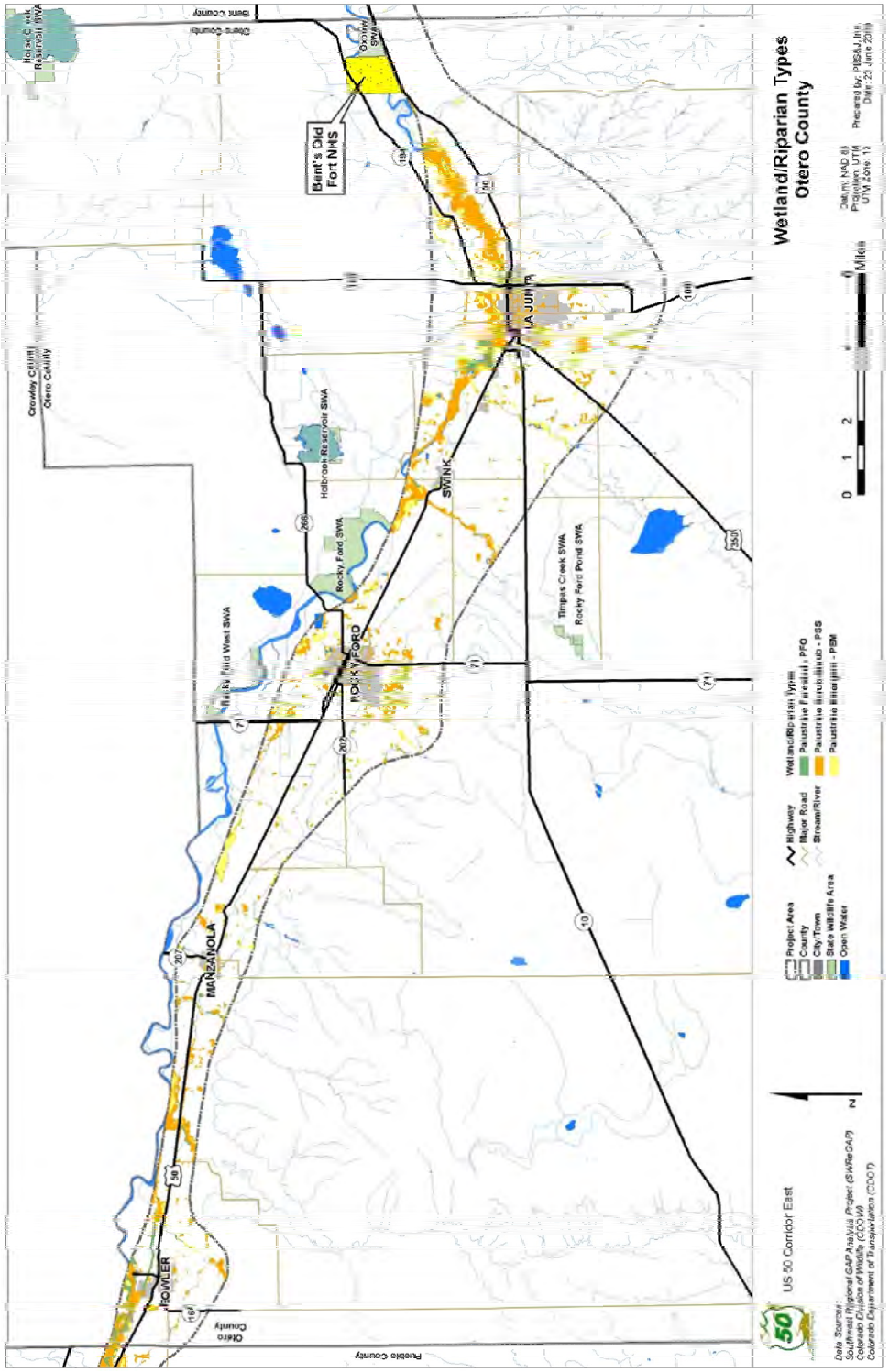


Figure E-3. Wetland/Riparian Types—Bent County

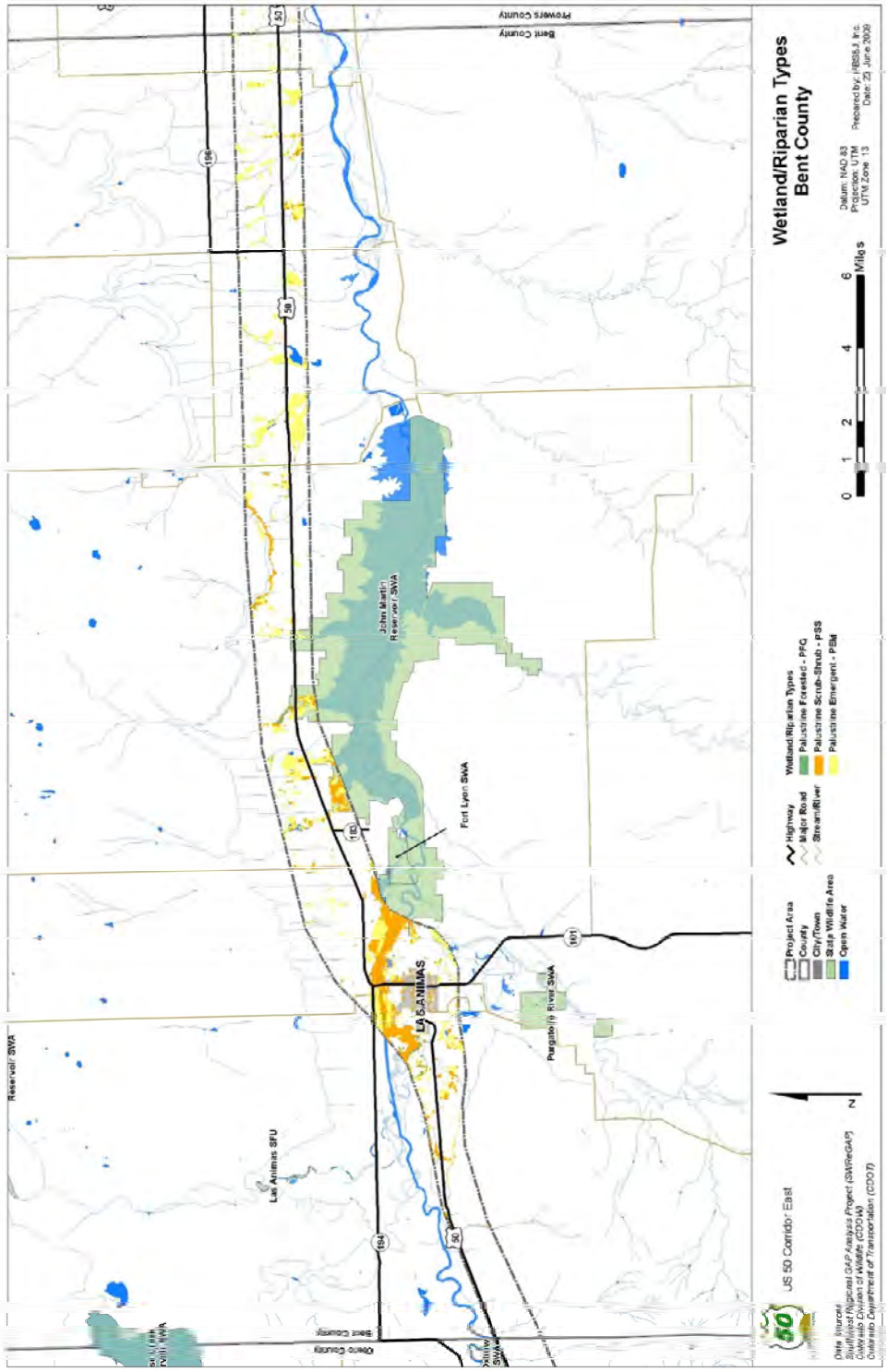


Figure E-4. Wetland/Riparian Types—Prowers County

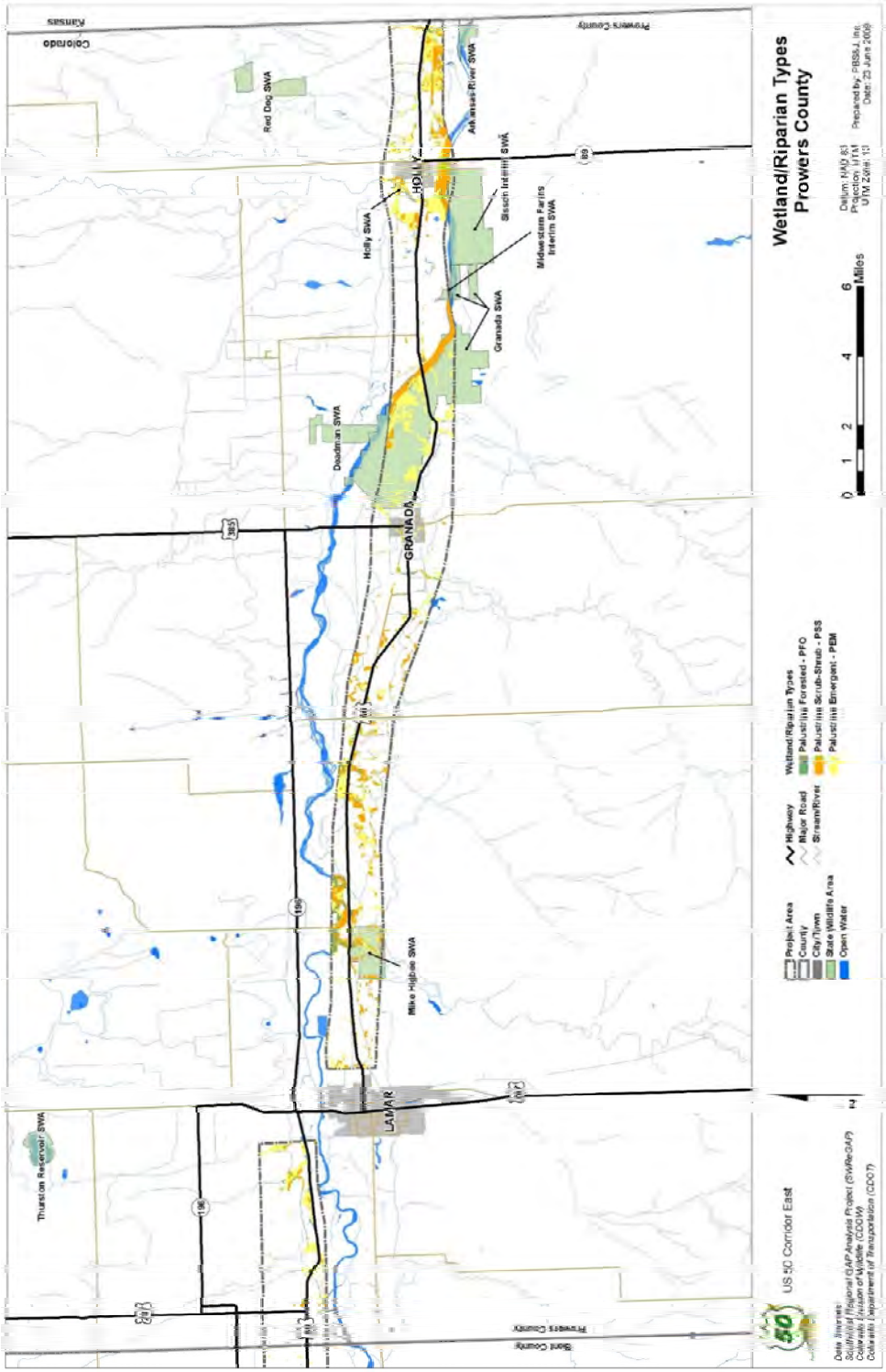


Figure E-5. Wetland/Riparian Functional Assessment Areas—Pueblo County

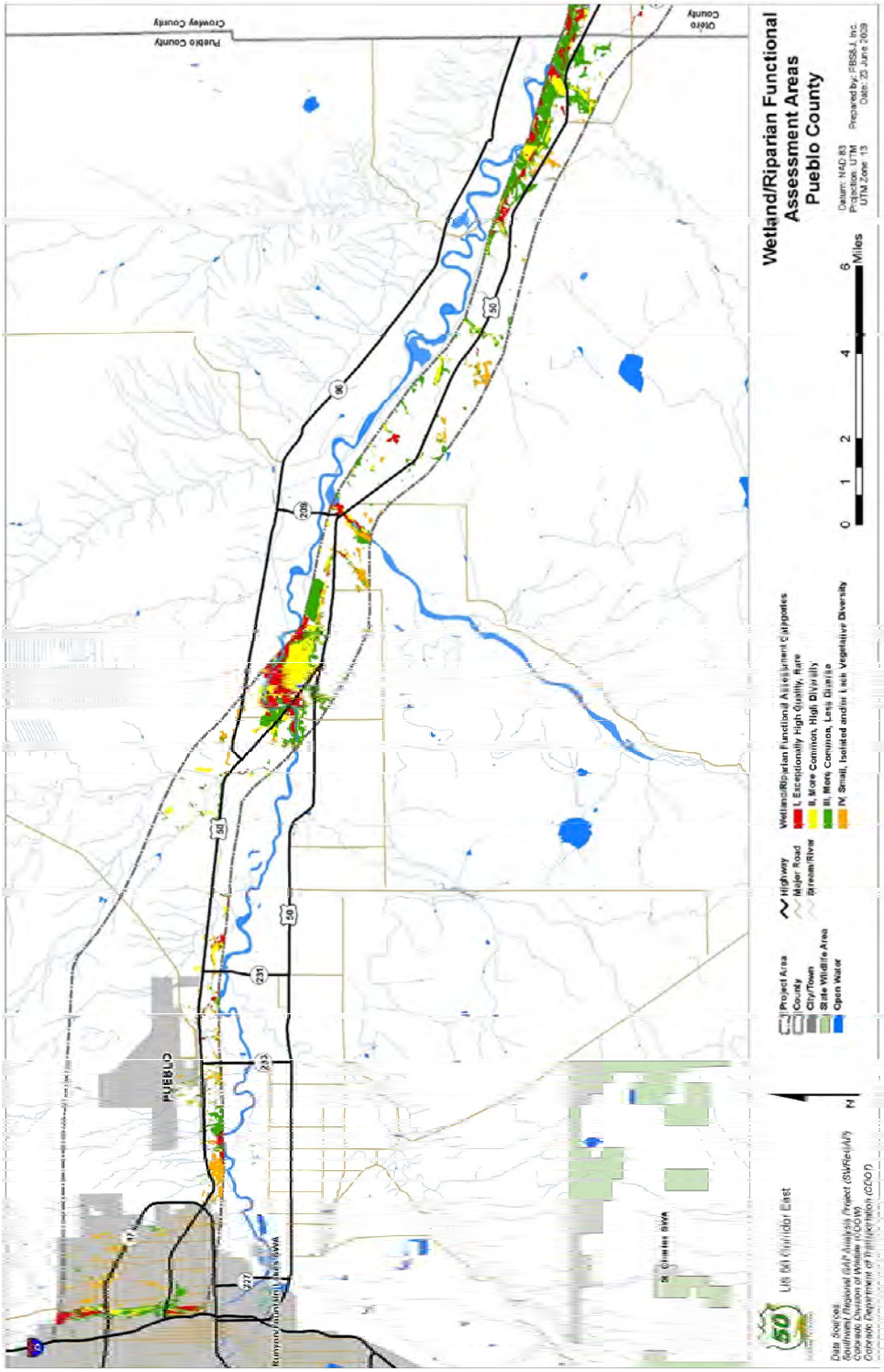


Figure E-6. Wetland/Riparian Functional Assessment Areas—Otero County

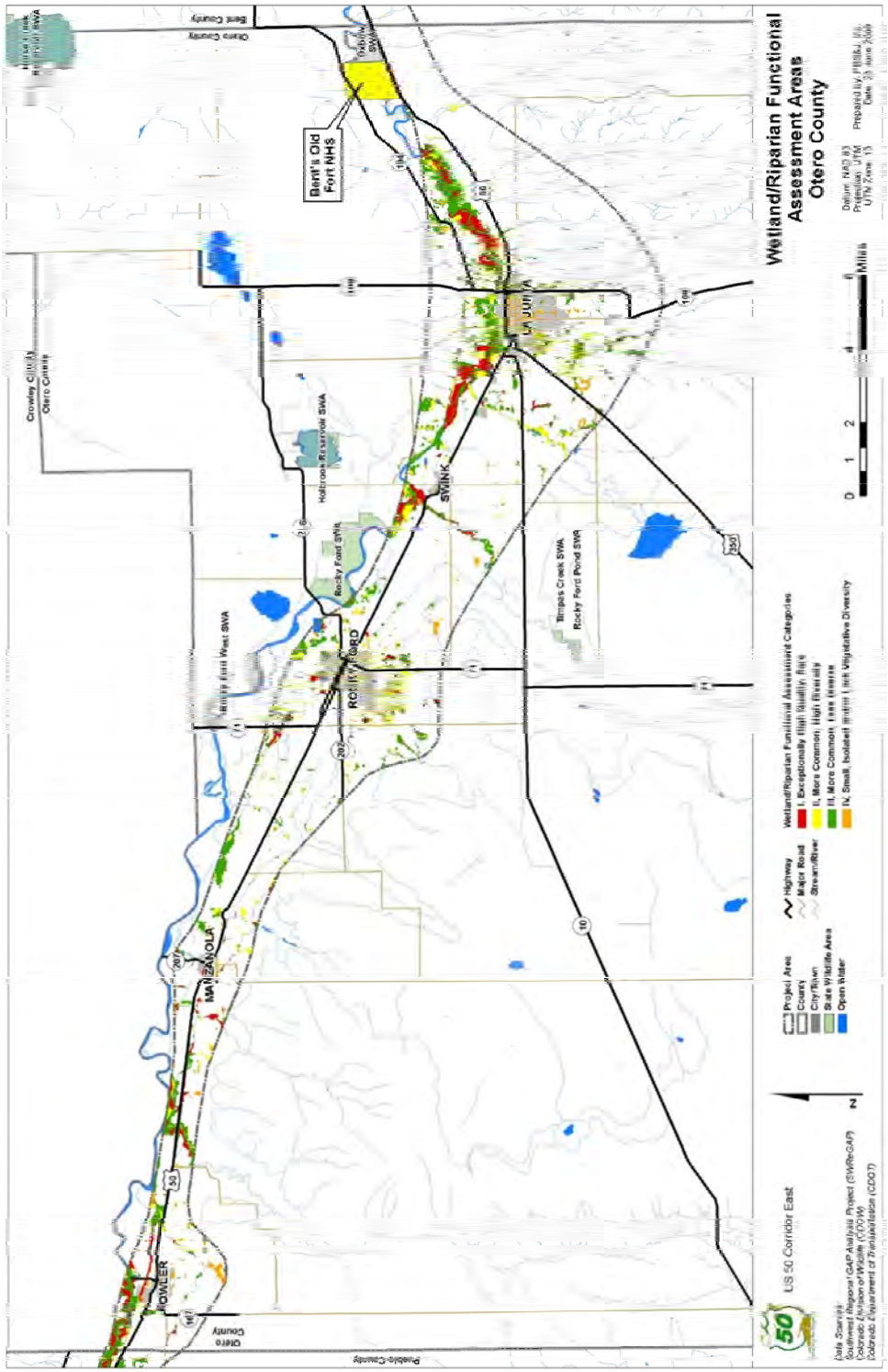


Figure E-7. Wetland/Riparian Functional Assessment Areas—Bent County

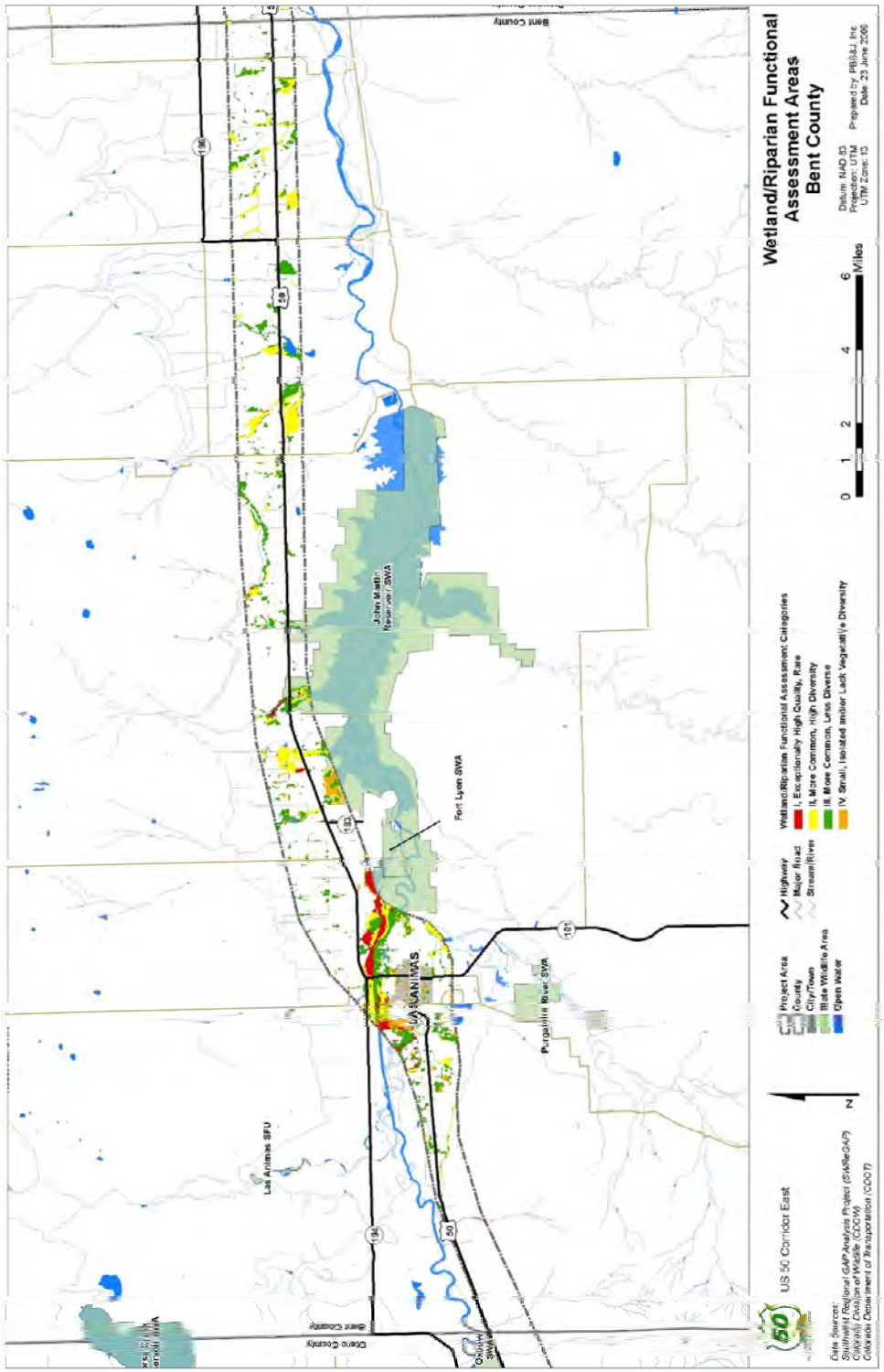


Figure E-8. Wetland/Riparian Functional Assessment Areas—Prowers County

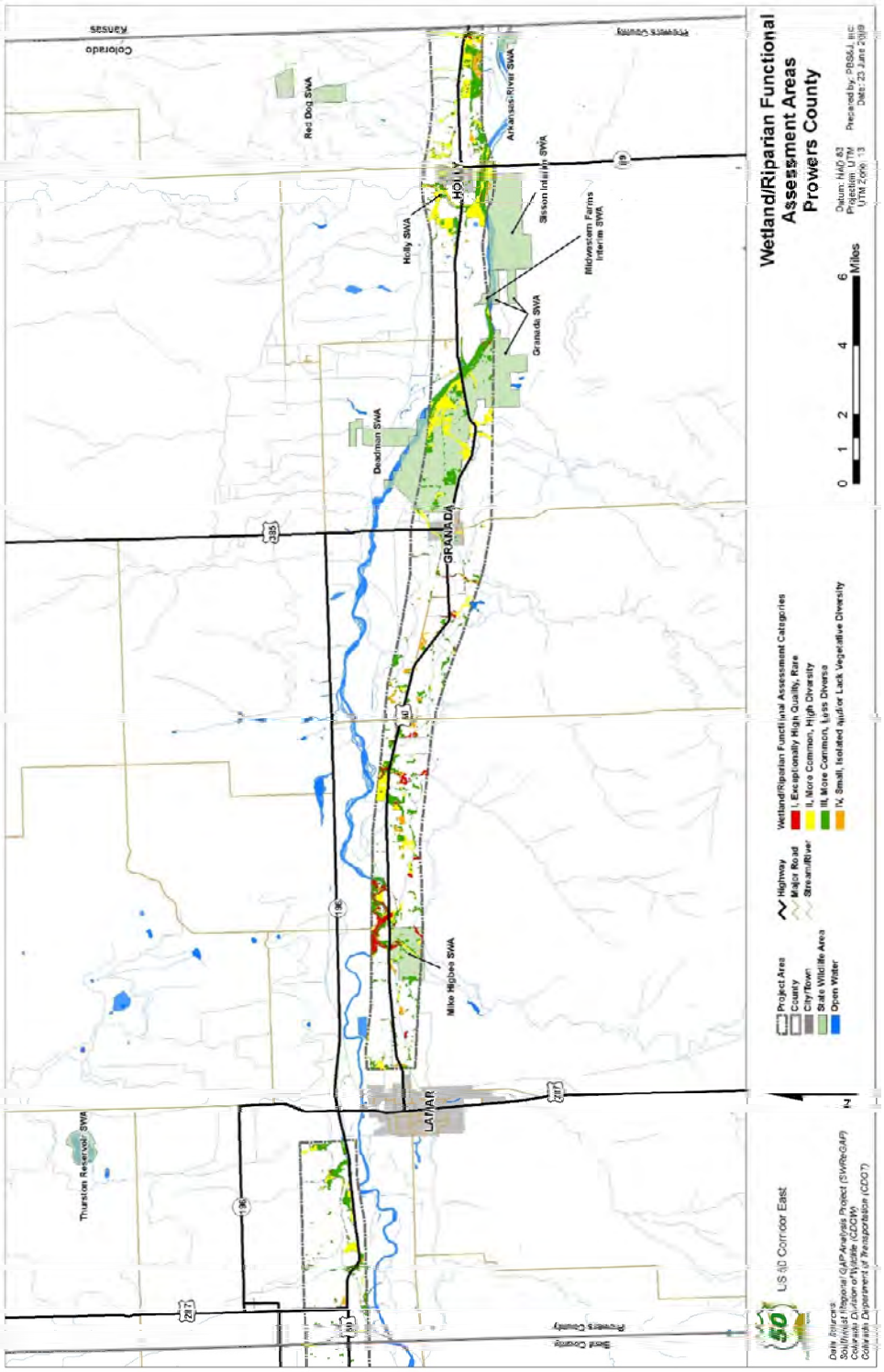


Figure E-9. Hydrography—Pueblo County

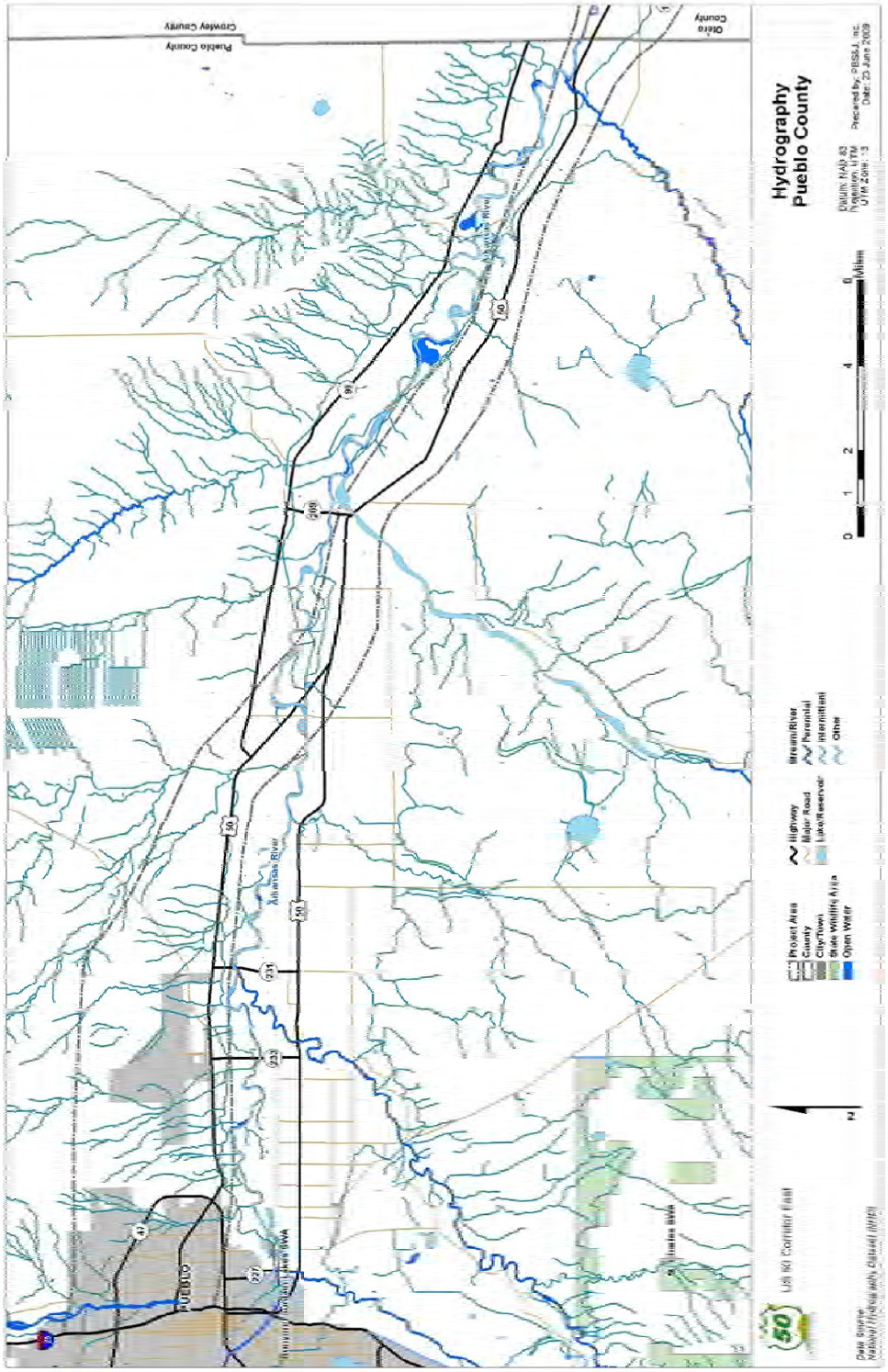


Figure E-10. Hydrography—Otero County

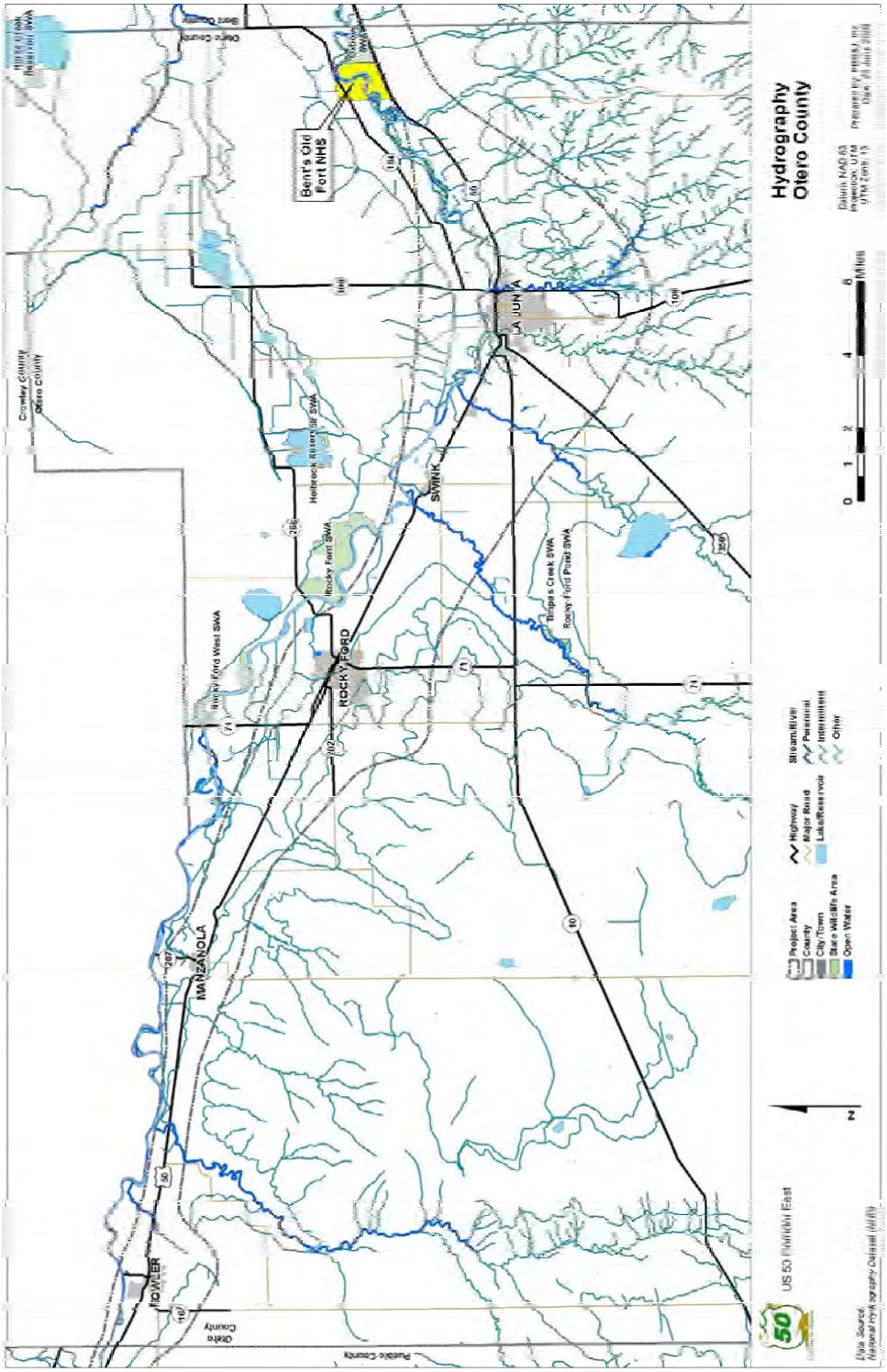


Figure E-11. Hydrography—Bent County

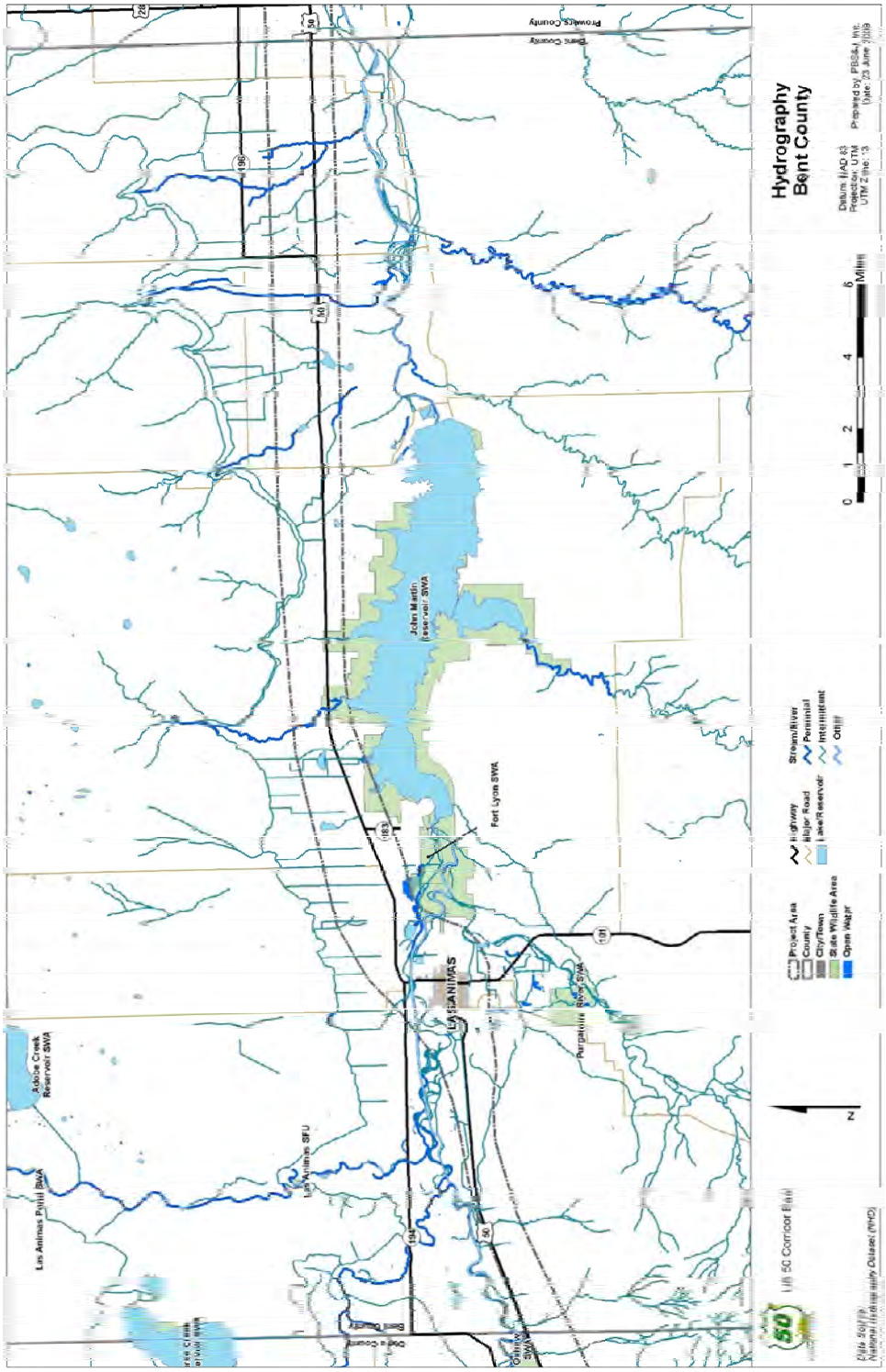


Figure E-12. Hydrography—Prowers County

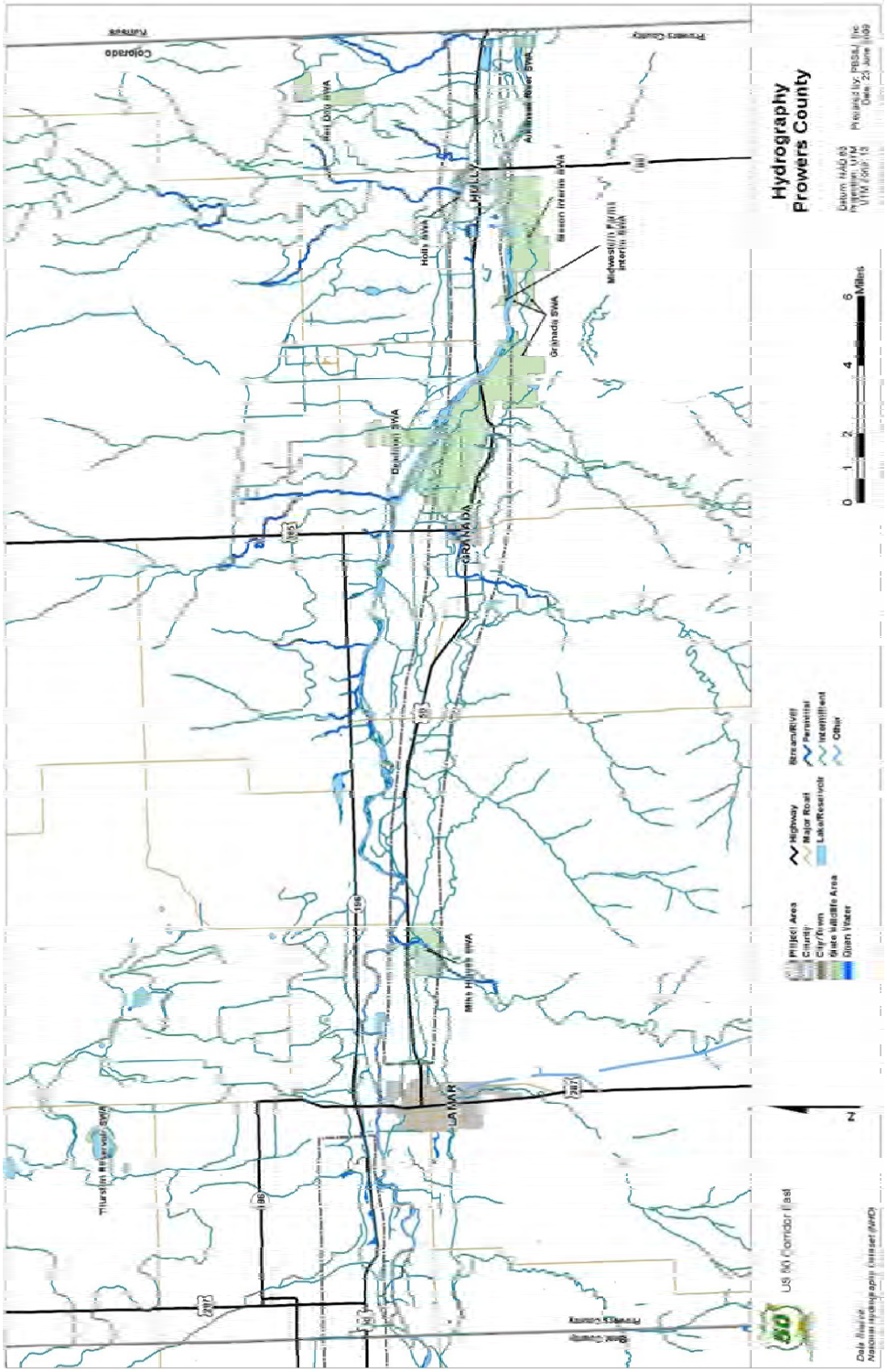


Figure E-13. Wetland/Riparian Impacts—Pueblo

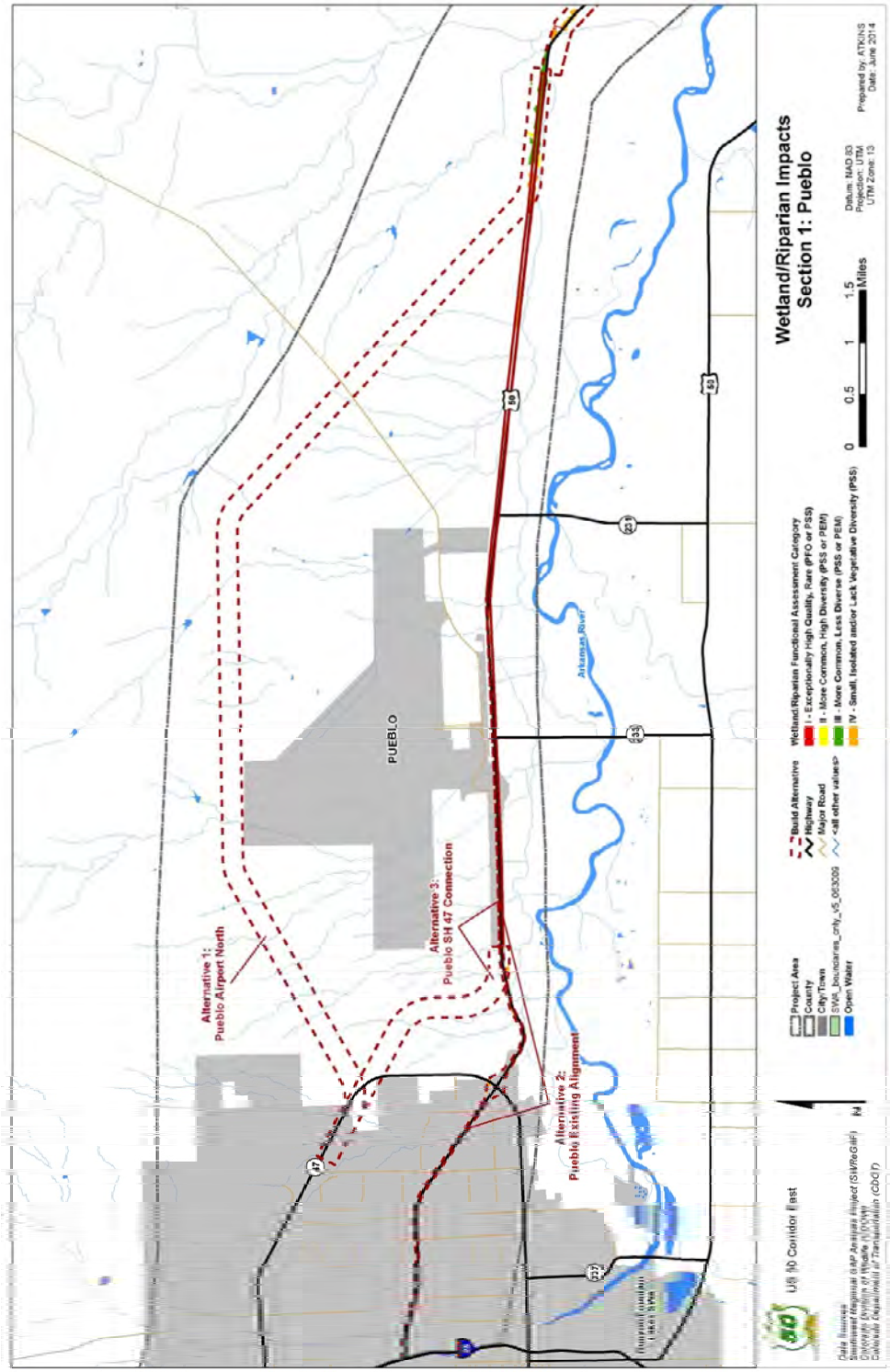


Figure E-14. Wetland/Riparian Impacts—Pueblo to Fowler (west)

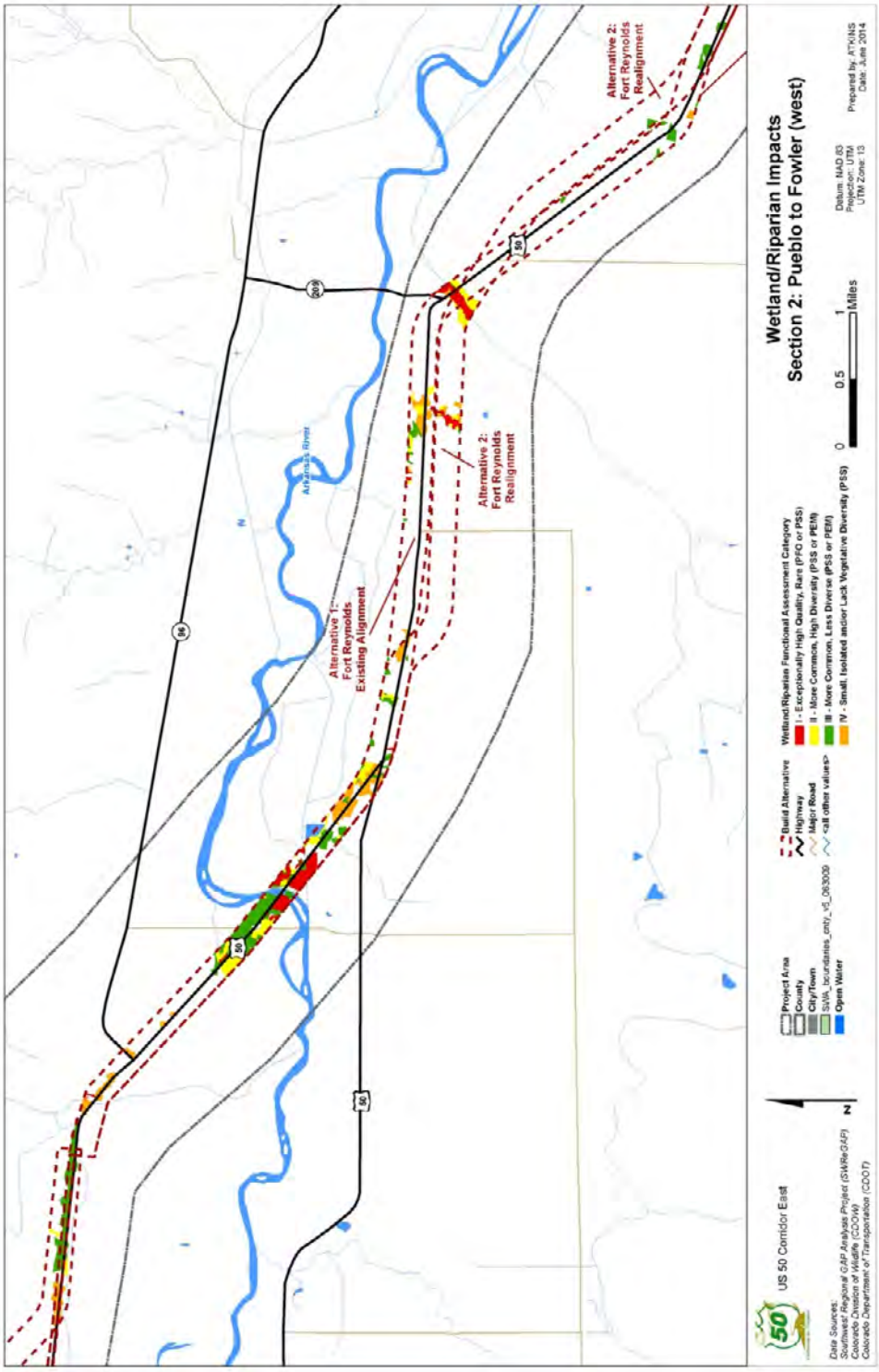


Figure E-15. Wetland/Riparian Impacts—Pueblo to Fowler (east)

9.

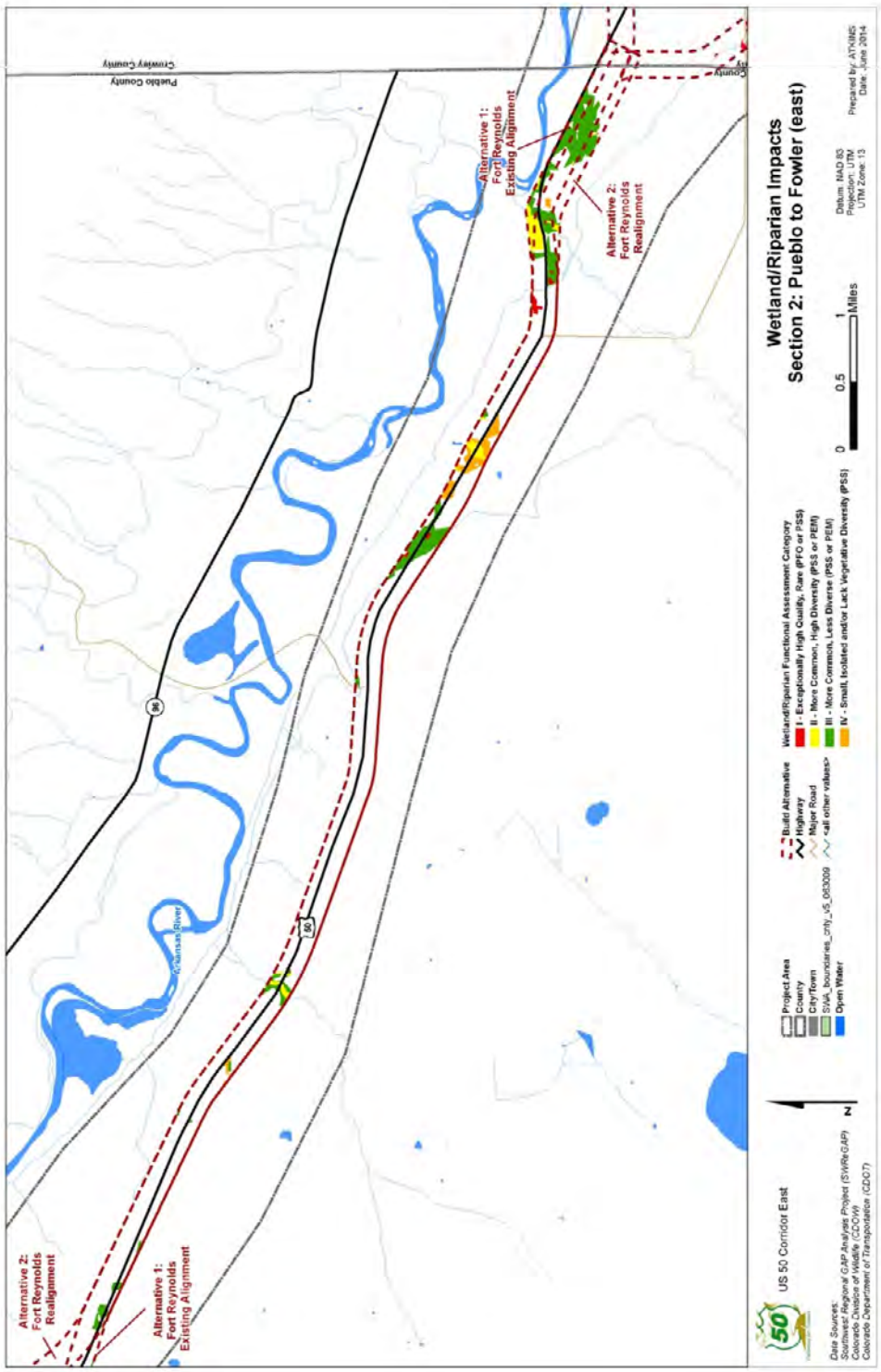


Figure E-16. Wetland/Riparian Impacts—Fowler to Manzanola

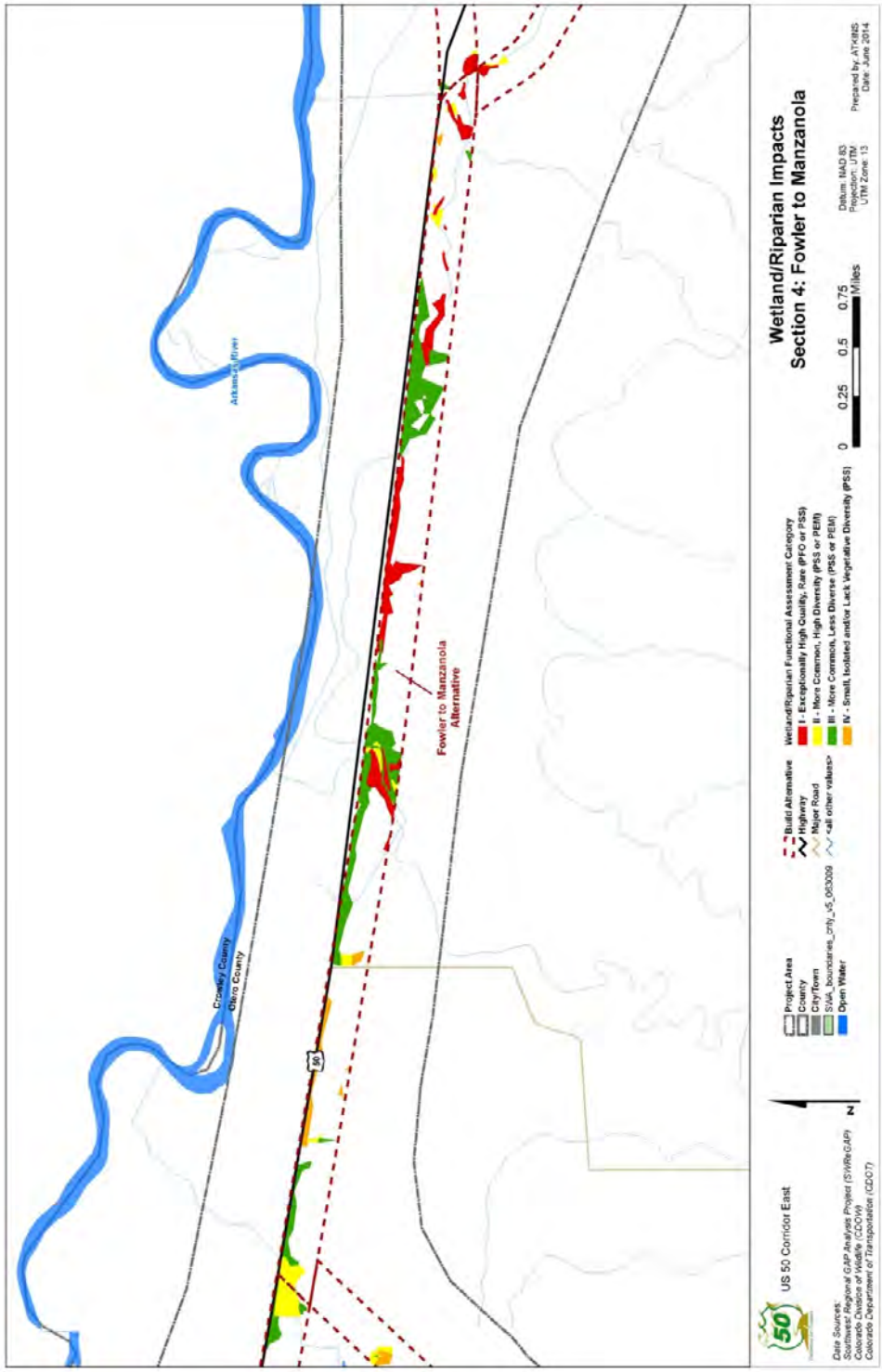


Figure E-17. Wetland/Riparian Impacts—Manzanola

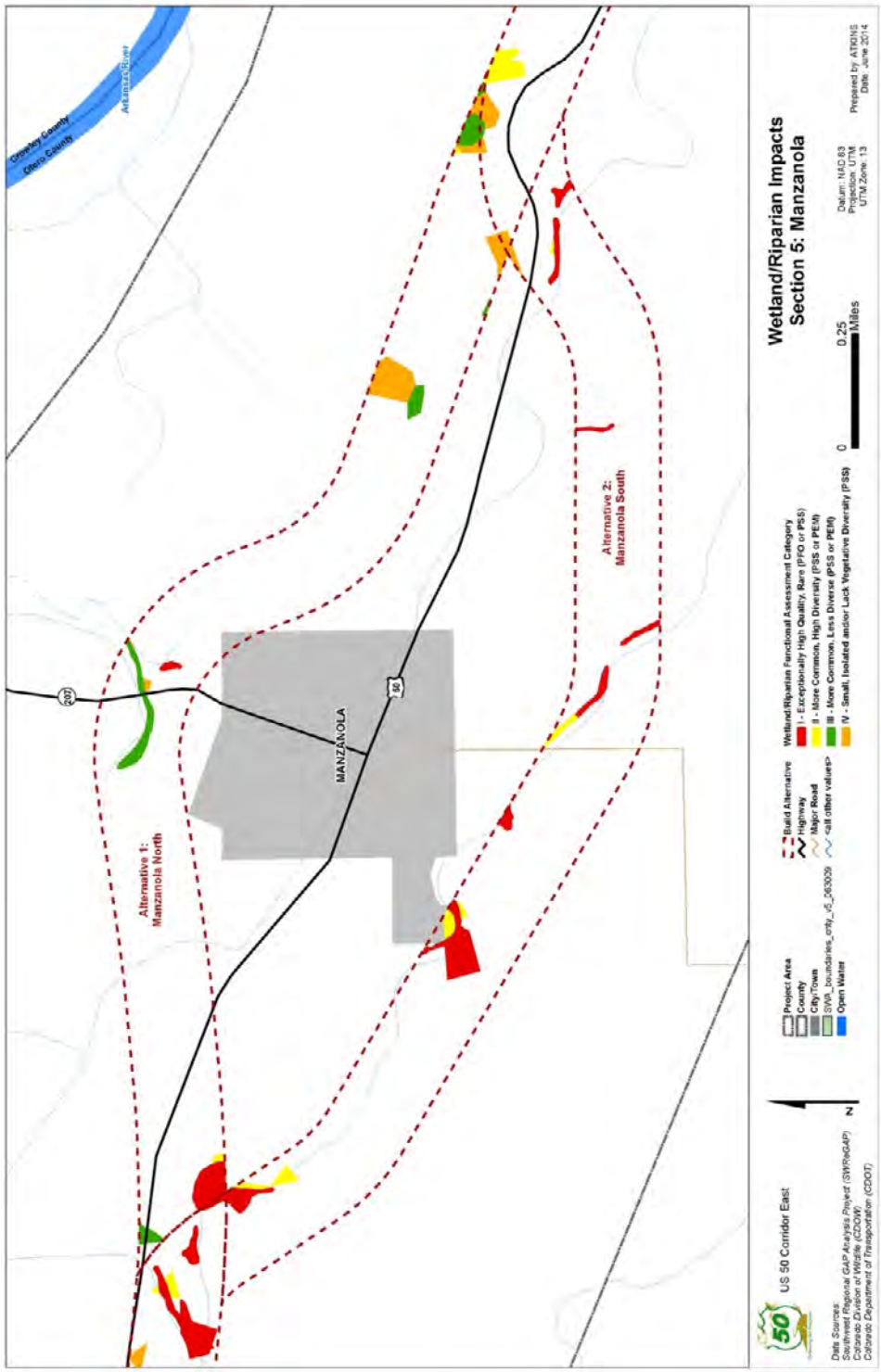


Figure E-18. Wetland/Riparian Impacts—Manzanola to Rocky Ford

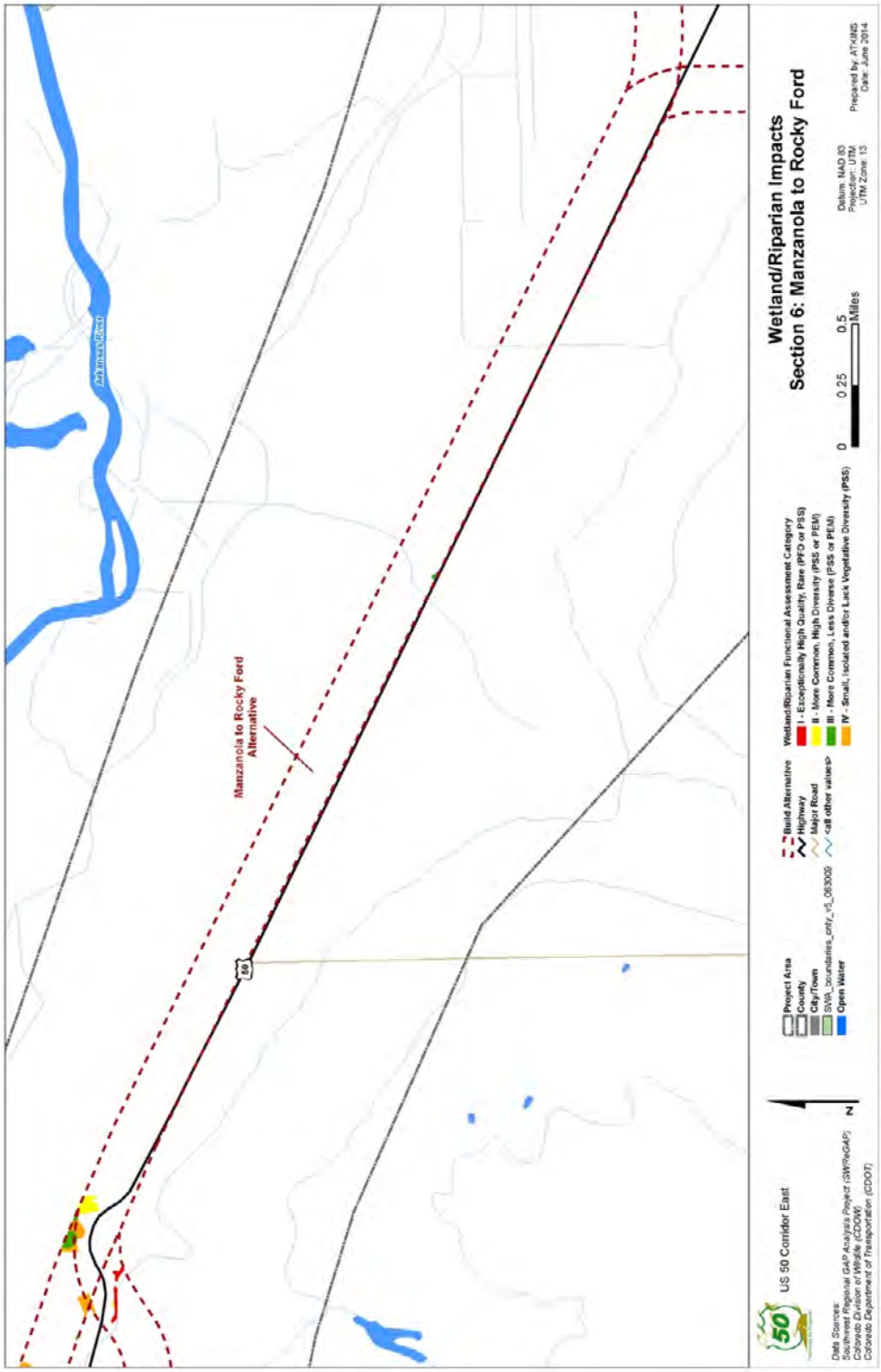


Figure E-19. Wetland/Riparian Impacts—Rocky Ford

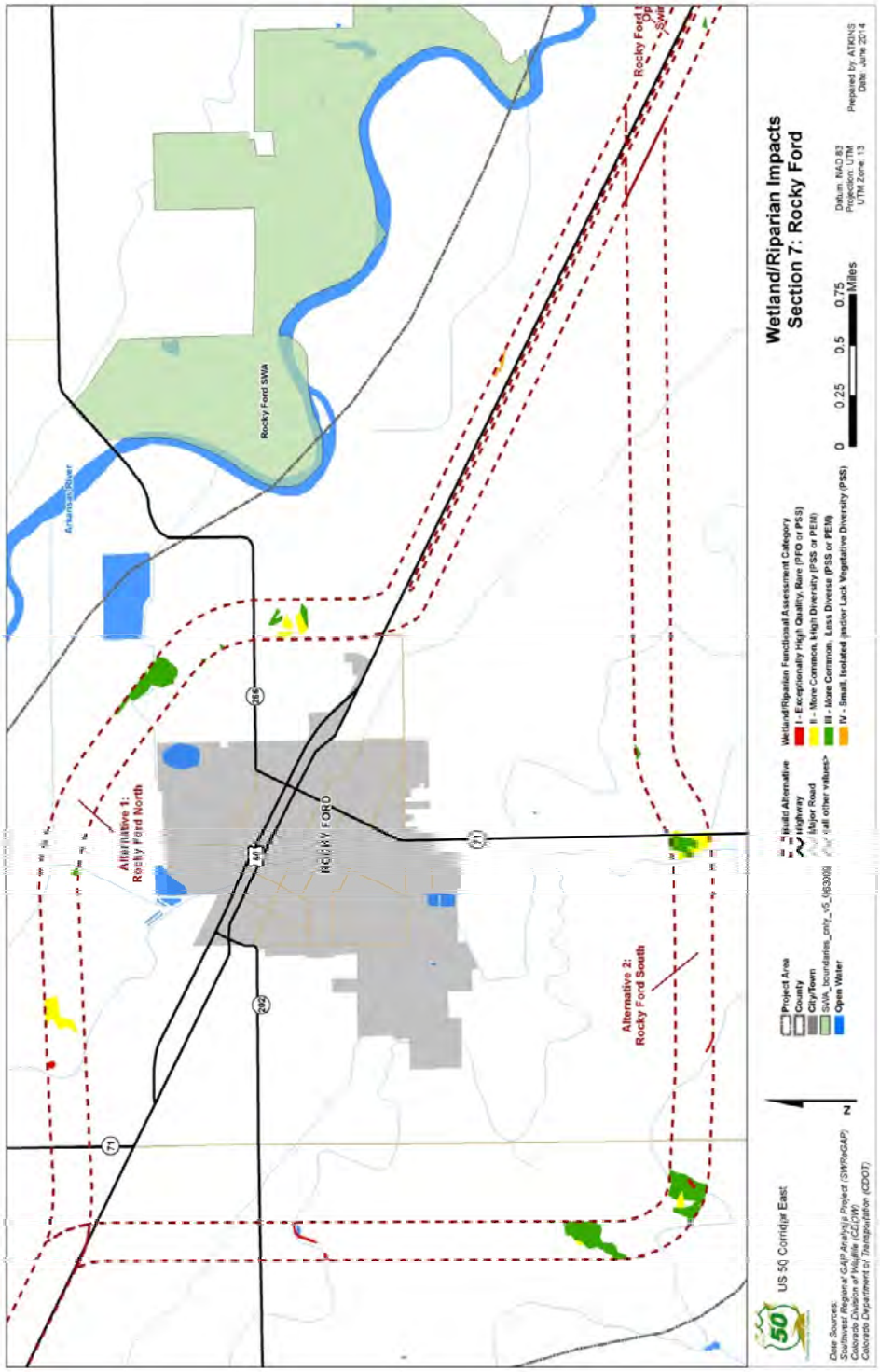


Figure E-20. Wetland/Riparian Impacts—Rocky Ford to Swink, Swink North and Swink South Alternatives

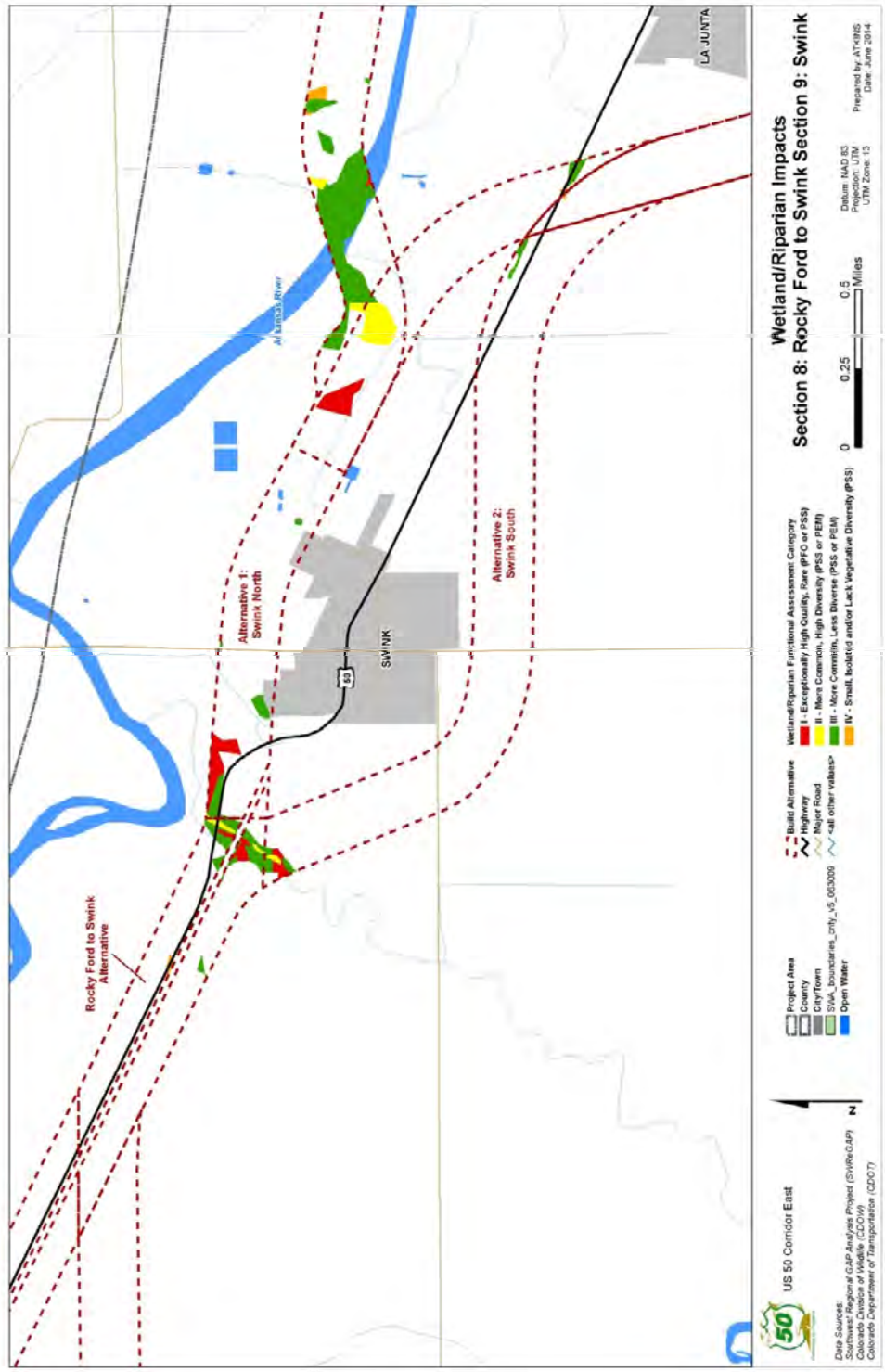


Figure E-21. Wetland/Riparian Impacts—La Junta to Las Animas

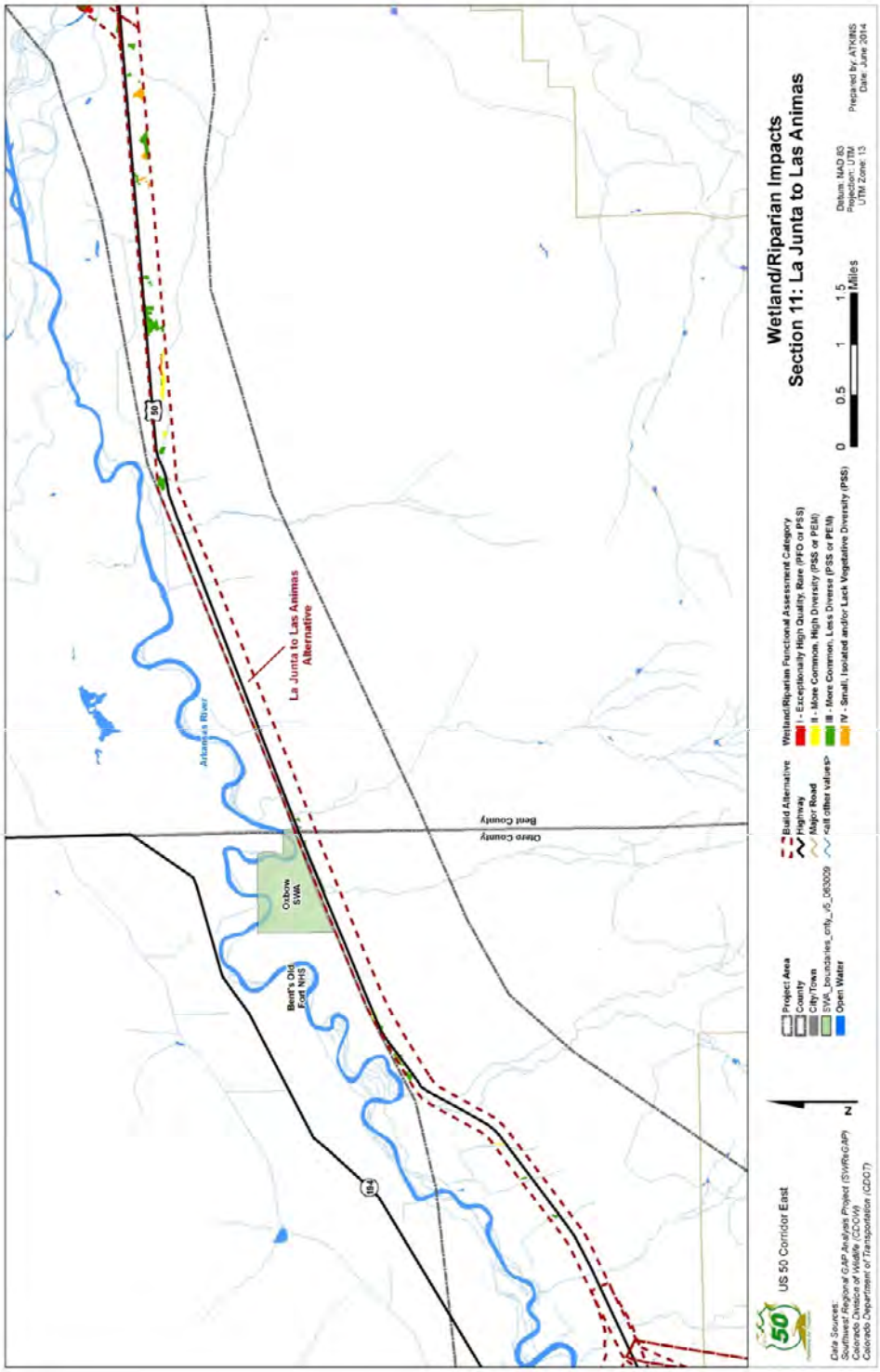


Figure E-22. Wetland/Riparian Impacts—Las Animas

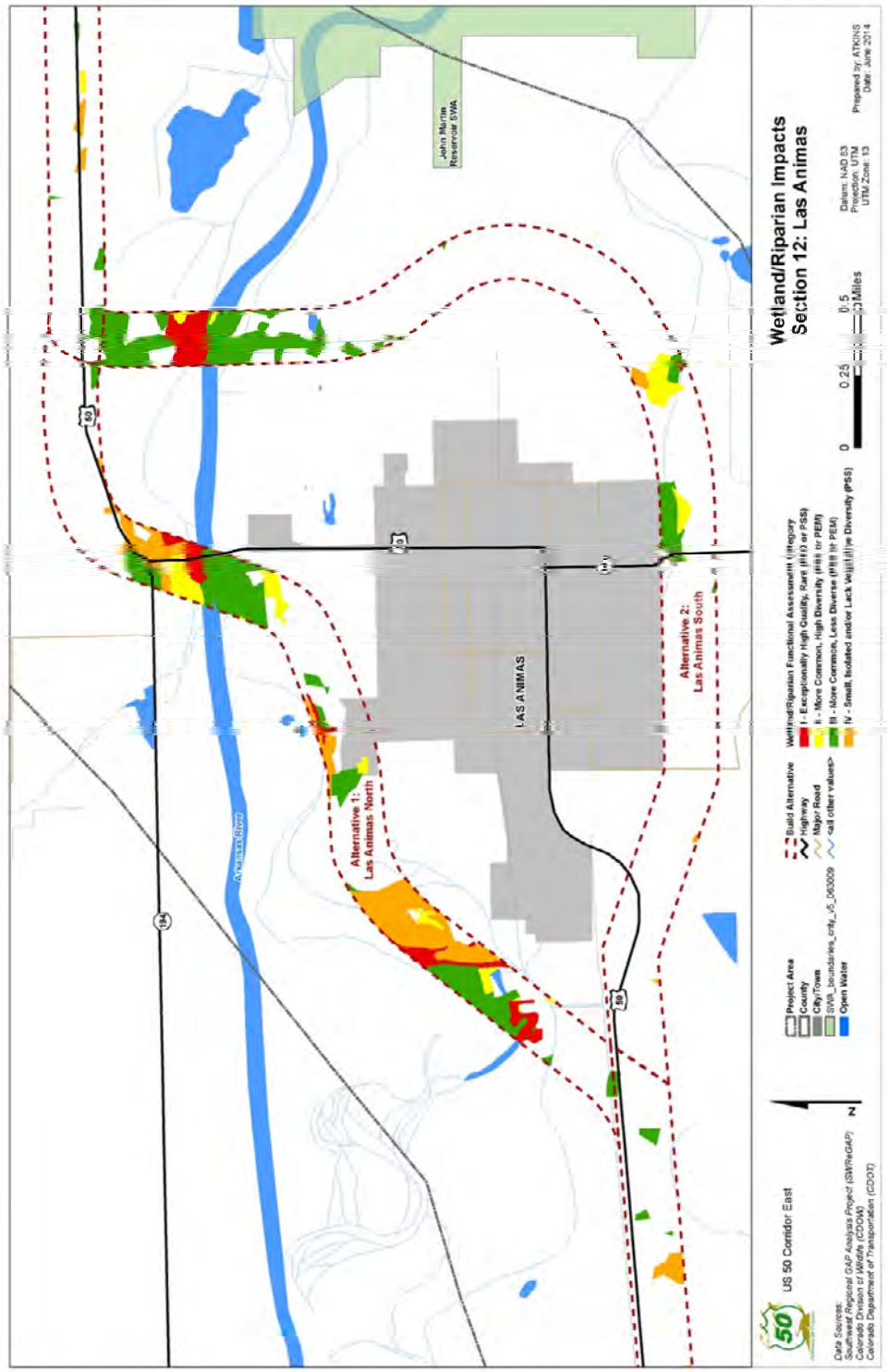


Figure E-23. Wetland/Riparian Impacts—Las Animas to Lamar (west)

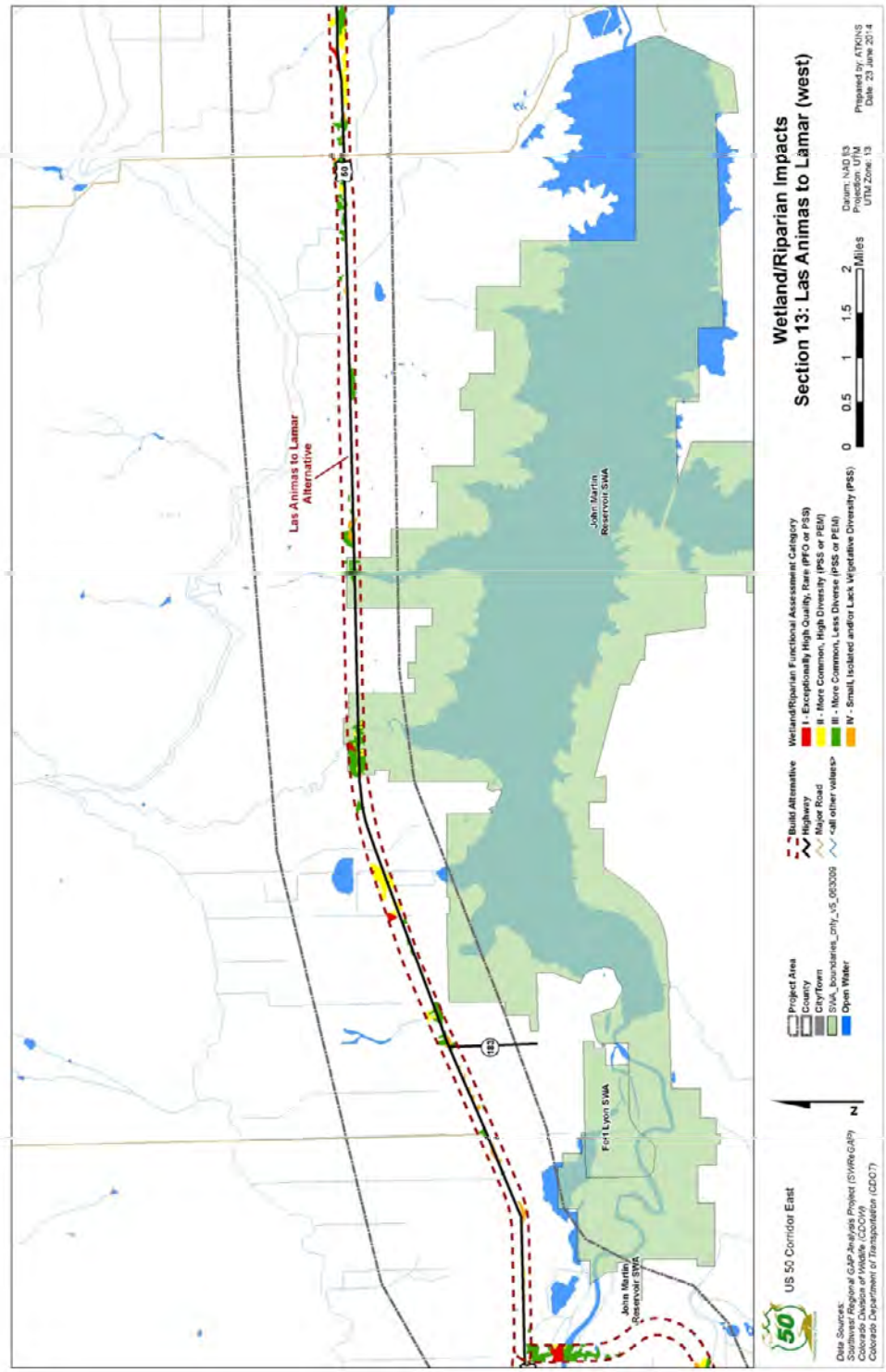


Figure E-24. Wetland/Riparian Impacts—Las Animas to Lamar (east)

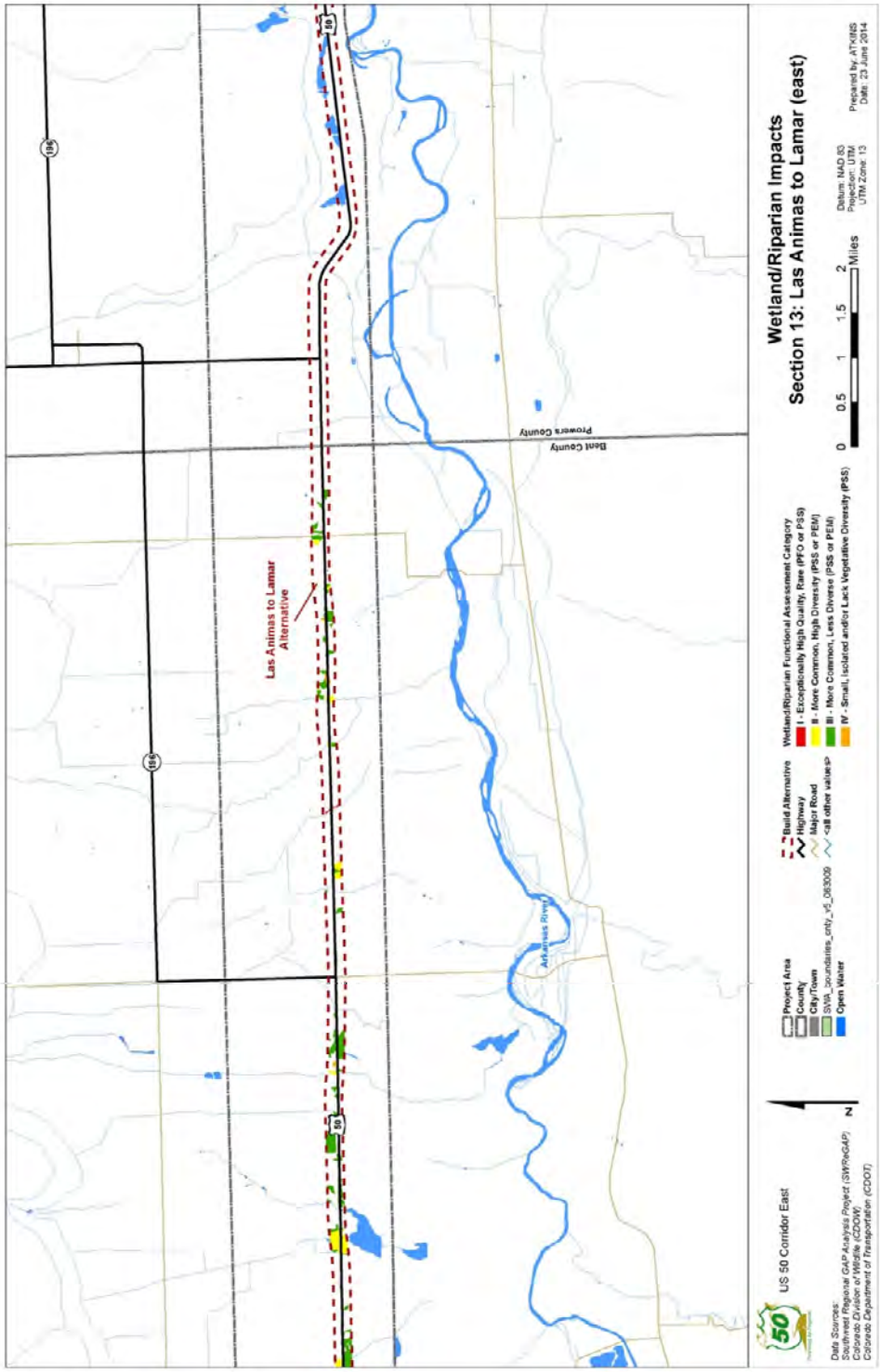


Figure E-25. Wetland/Riparian Impacts—Lamar to Granada

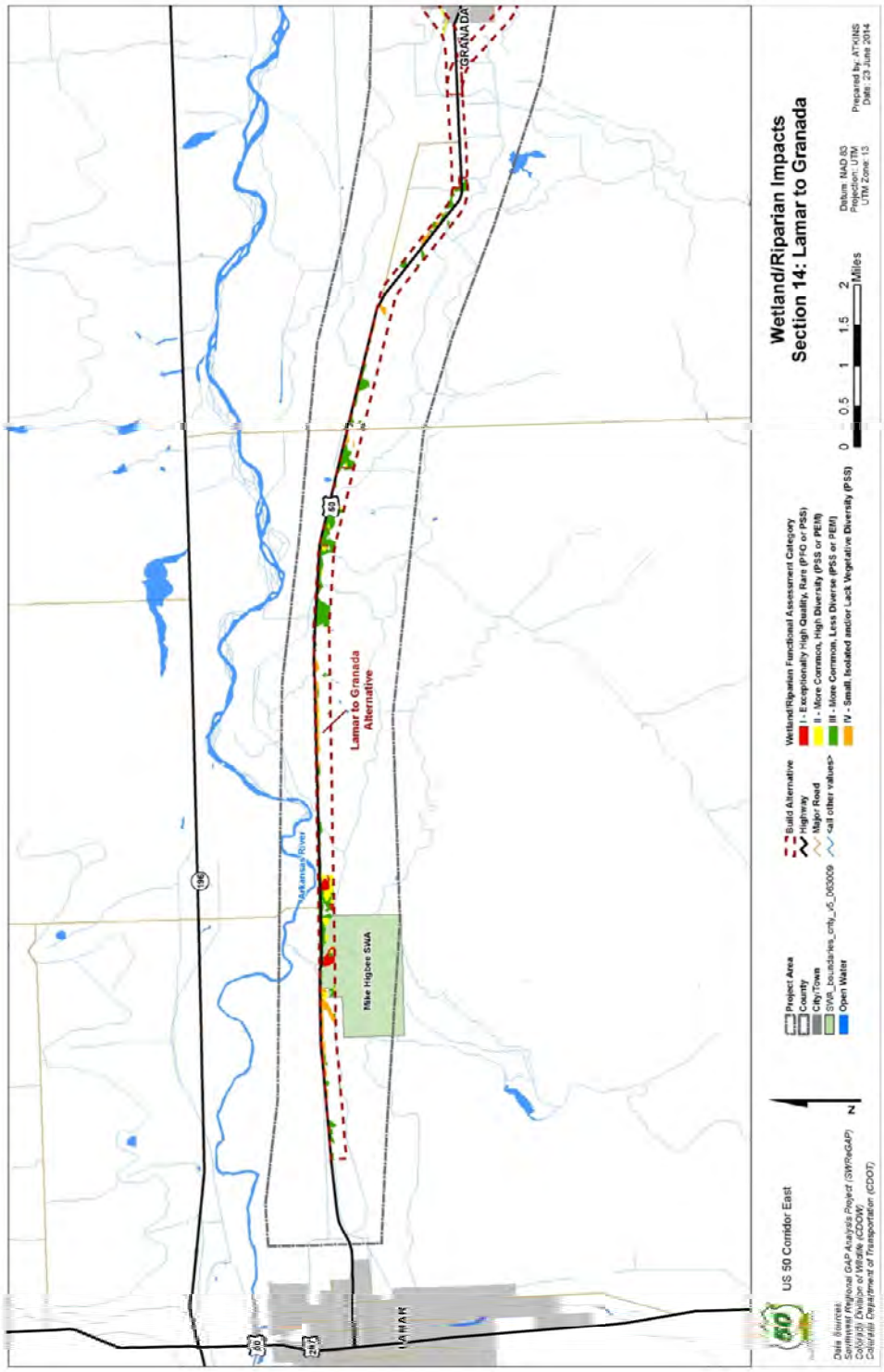


Figure E-26. Wetland/Riparian Impacts—Granada

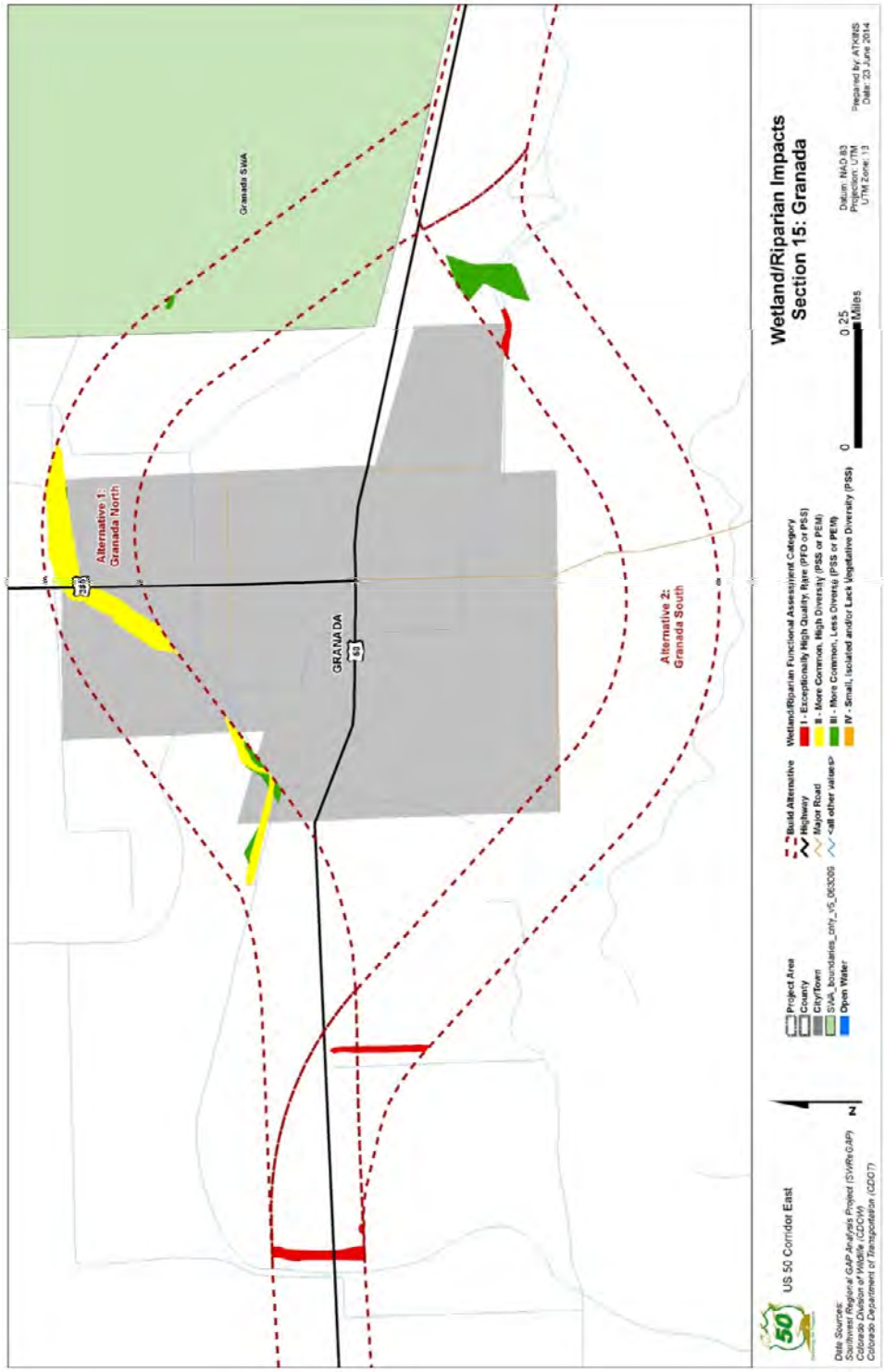


Figure E-27. Wetland/Riparian Impacts—Granada to Holly

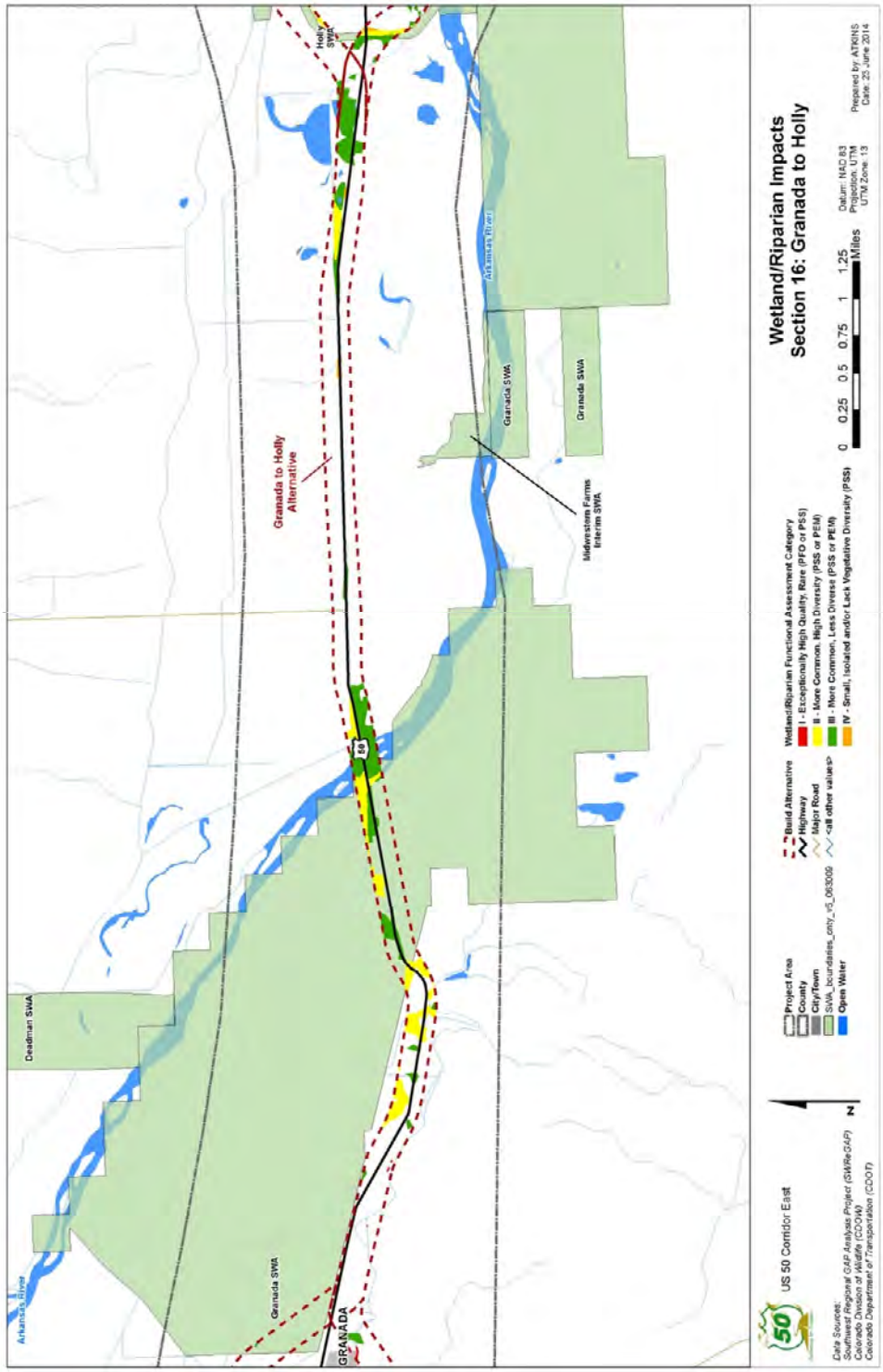


Figure E-28. Wetland/Riparian Impacts—Holly

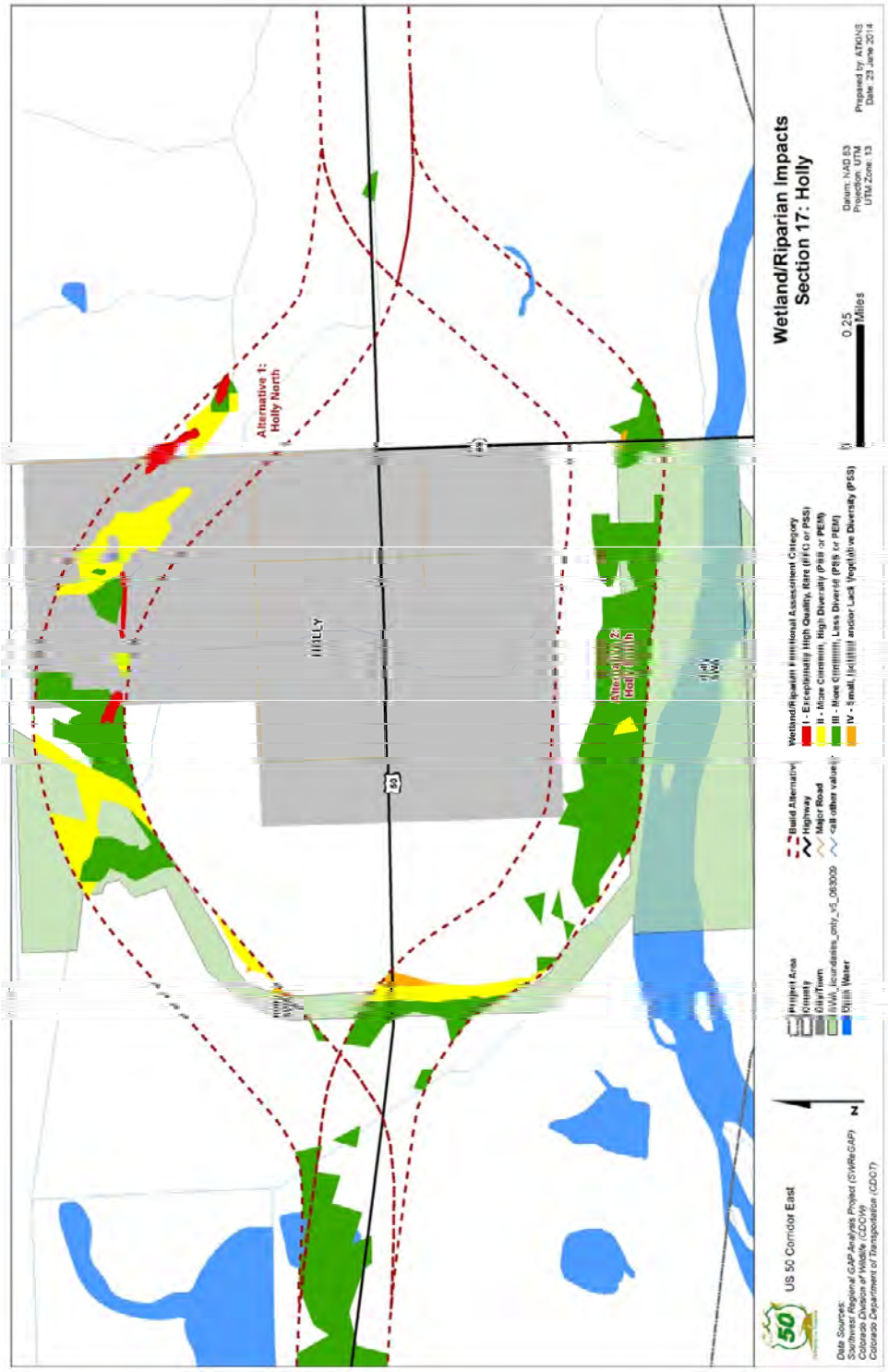


Figure E-29. Wetland/Riparian Impacts—Holly Transition

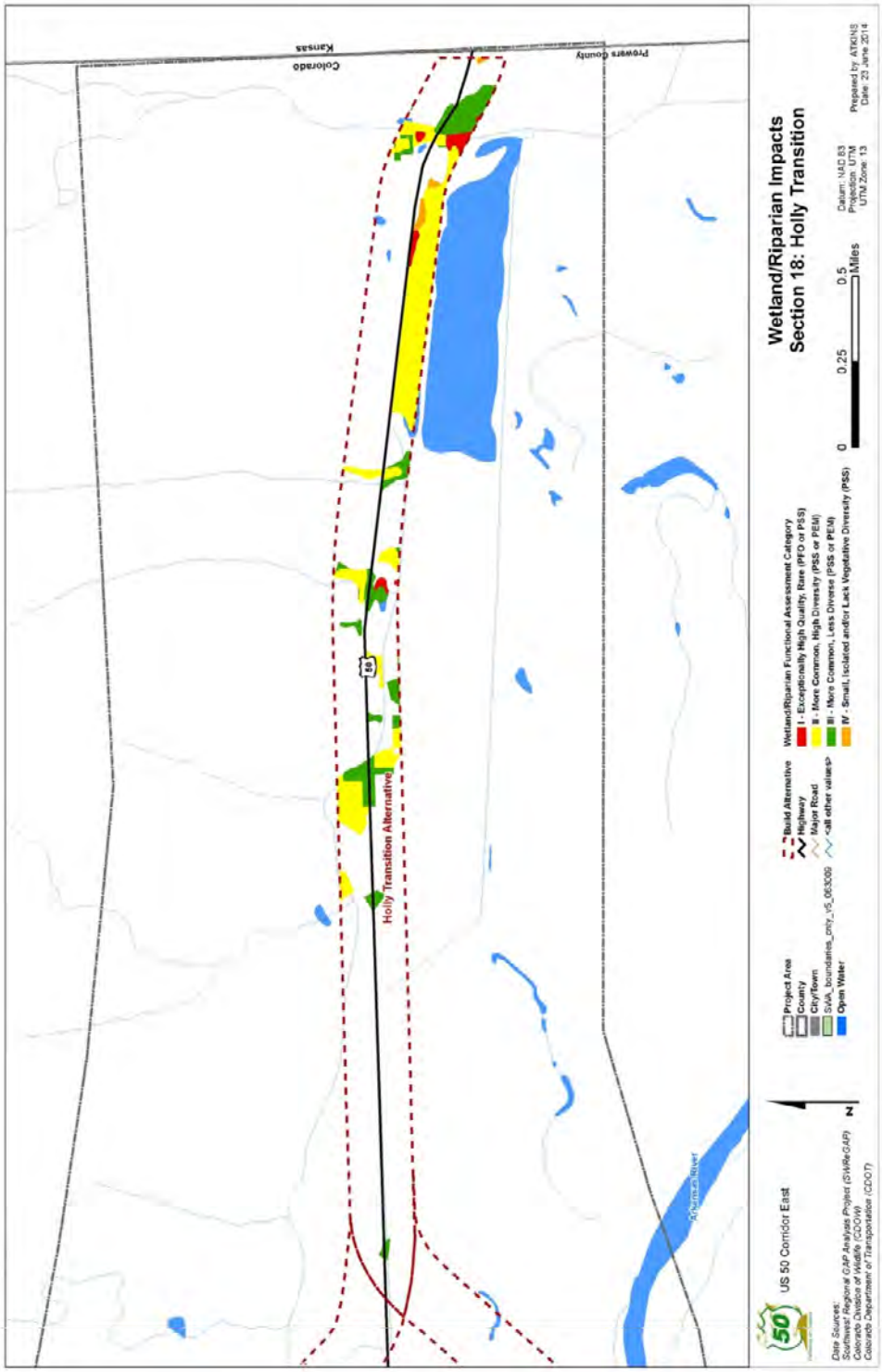


Figure E-30. Wetland/Riparian Impacts—Fowler North and Fowler South Alternatives

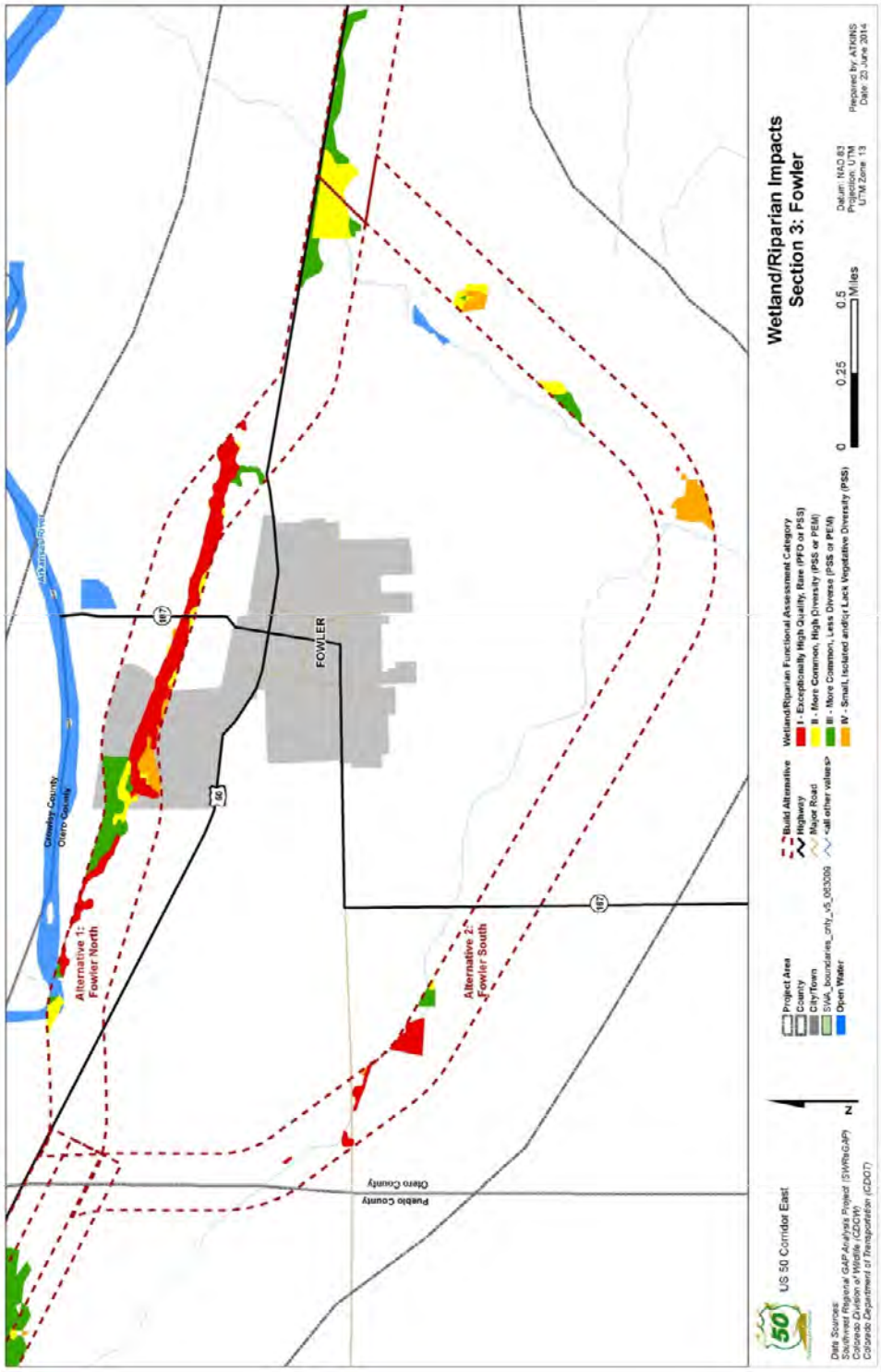
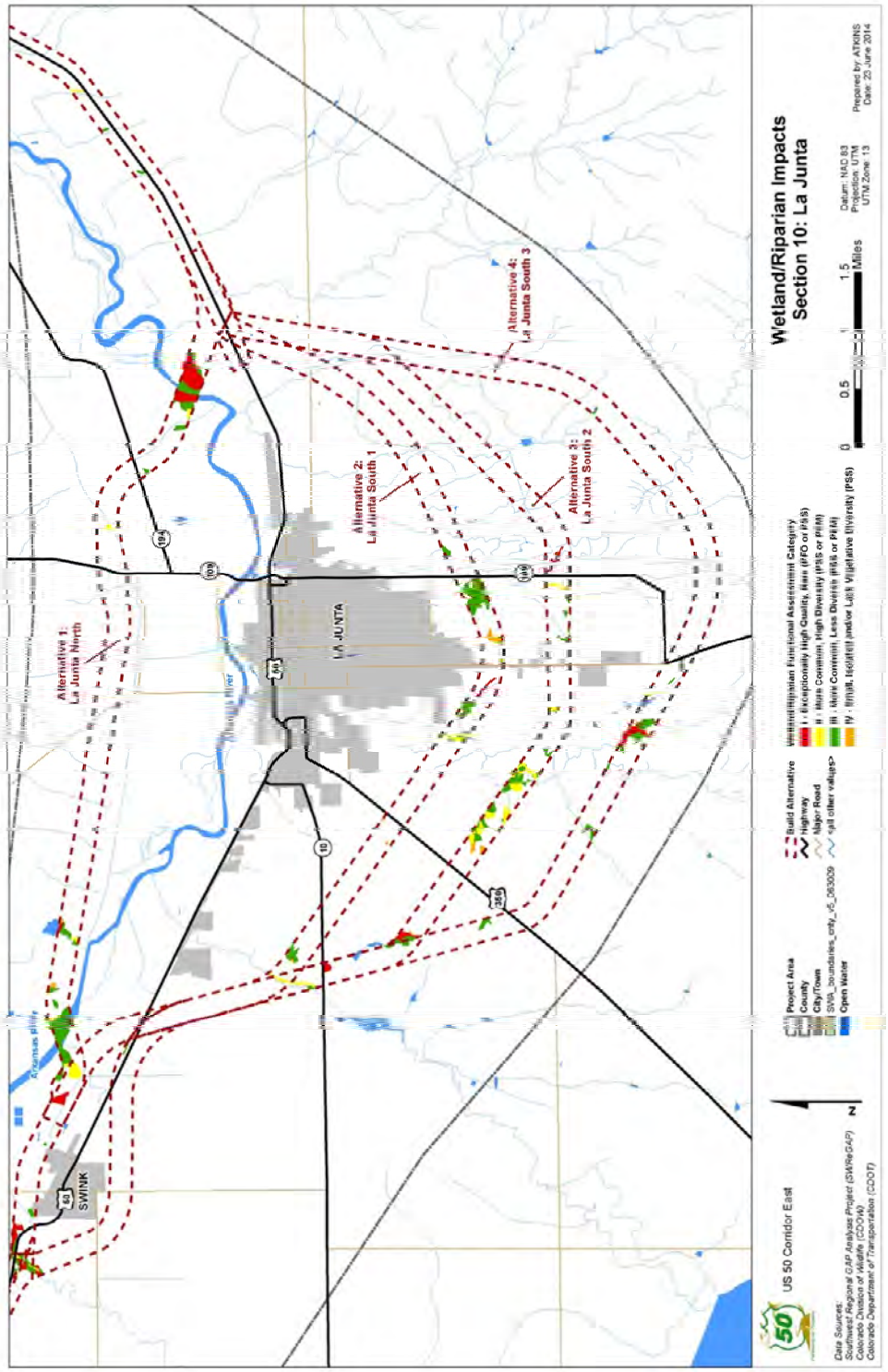


Figure E-31. Wetland/Riparian Impacts—La Junta South 1 and La Junta South 2 Alternatives



This page left intentionally blank.