The Salt Fork of the Red River and Prairie Dog Town Fork of the Red River are the two major rivers within the Study Area. Other rivers and streams include Elm Creek, Little Turkey Creek, Mulberry Creek, Salt Creek, Kent Creek, North Pease River, Middle Pease River, Quintague Creek, Callahan Draw and the White River. Figure 4-2 depicts watersheds in the Study Area and Figure 4-3 depicts major surface waterbodies in the Study Area. Numerous small perennial, intermittent and/or ephemeral unnamed tributaries to these streams also are found throughout the Study Area.

Some of the larger lakes and reservoirs in the Study Area are Baylor Lake, Dry Salt Creek Brine Lake, Little Red River Brine Lake, Lake Childress, Alfred Sessions Lake, Club Lake, Bryants Lake, Lake Theo, and Hawkins Lake. The Study Area, particularly in portions of Briscoe, Floyd, Hale, and Lubbock Counties, also contains many unnamed perennial or seasonal ponds and playa lakes.

Texas Water Quality Standards (Title 30 Texas Administrative Code [TAC] § 307), designate the site-specific uses of classified and unclassified waterbodies in Texas. In Oklahoma, beneficial uses are defined within Oklahoma Water Quality Standards (Title 785 Chapter 45). The designated site-specific or beneficial uses determine the water quality criteria that apply to each waterbody.

Classified waterbodies in the Study Area within Texas include: the Salt Fork of the Red River, Lower Prairie Dog Town Fork of the Red River, North Pease River, and Middle Pease River, each of which have site-specific uses of primary contact recreation (i.e., activities that are presumed to involve a significant risk of ingestion of water, such as wading by children, swimming, water skiing, diving, tubing, surfing, kayaking, canoeing, and rafting) and high aquatic life. Other streams in the Study Area are unclassified, meaning they are not specifically listed under the water quality standards. Unclassified waterbodies by default have presumed uses of contact recreation and aquatic life.

Perennial unclassified waterbodies are afforded a high aquatic life use, and intermittent or ephemeral waterbodies are presumed to have limited or no aquatic life use, depending on the presence of perennial pools.

In Oklahoma, North Elm Creek, Bull Creek and Elm Fork of the Red River are classified for the public and private water supply, warm water aquatic community, agriculture, primary body contact recreation and aesthetics beneficial uses. The remaining waterbodies in the Study Area in Oklahoma are unlisted, which means the default beneficial uses of irrigation, aesthetics, warm water aquatic community and primary body contact recreation apply to these waterbodies.

Waterbodies that do not meet the state water quality criteria for their designated site-specific or beneficial uses are considered impaired. Impaired waterbodies in the Study Area include Buck Creek and Prairie Dog Town Fork of the Red River, which are both listed due to bacteria (TCEQ 2008).

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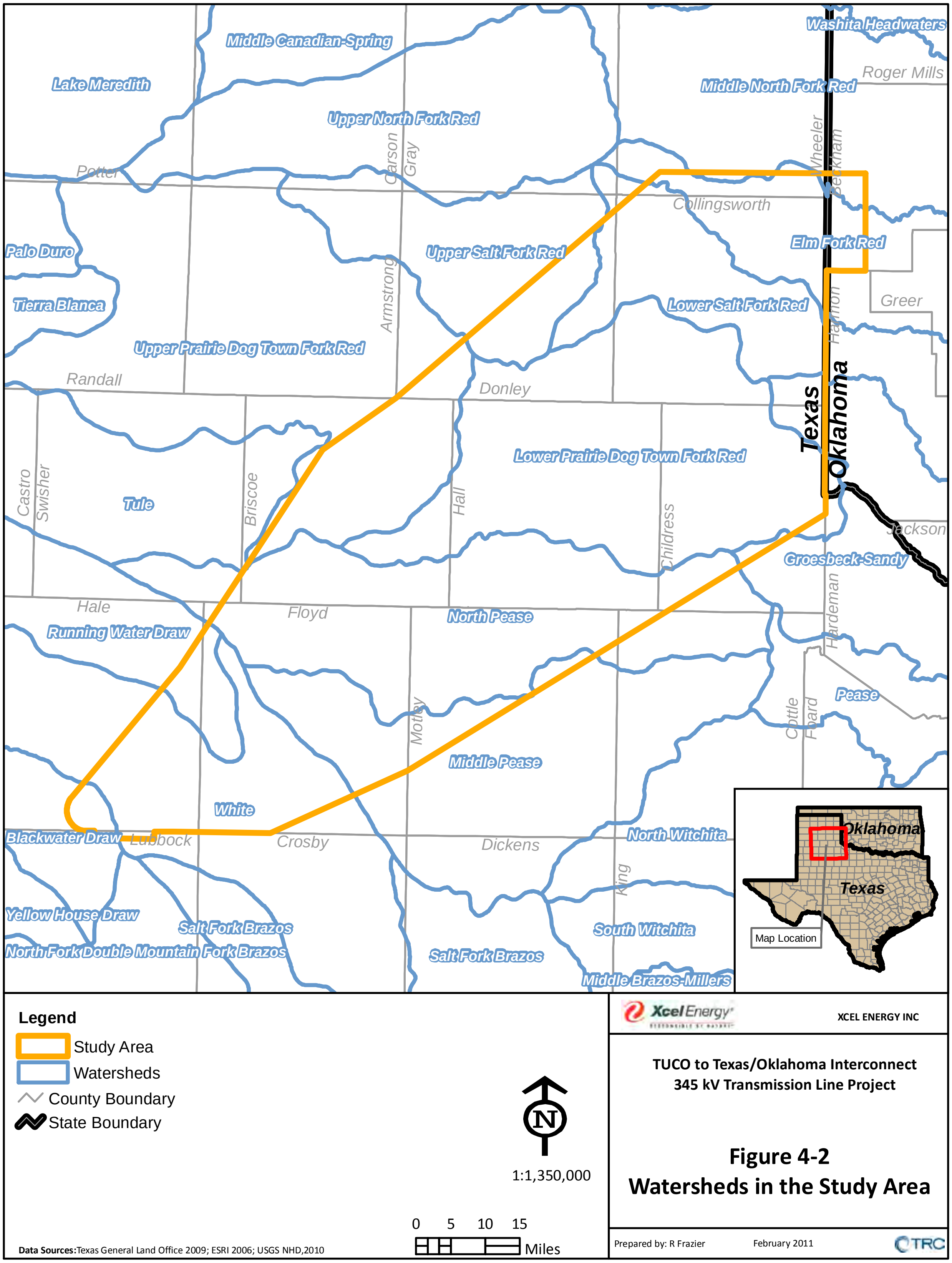

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Figure 4-2
Watersheds in the Study Area

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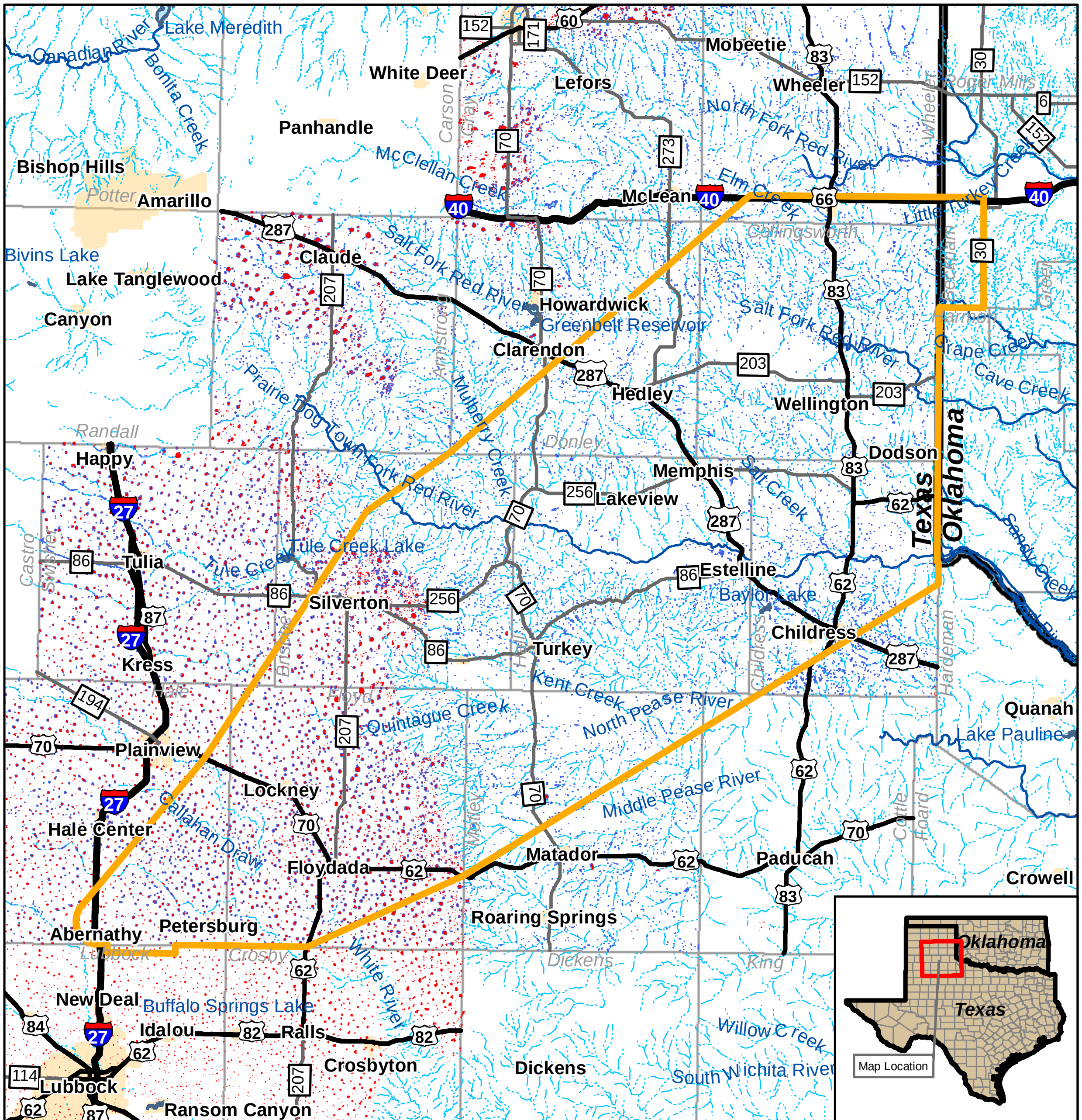

Legend

- Study Area
- Interstate
- U.S. Highway
- State Highway
- City
- County Boundary
- State Boundary
- Major Stream
- Intermittent Stream
- Intermittent Lake
- Perennial Lake
- Reservoir
- Probable Playa Lake

1:1,350,000

0 5 10 15 Miles

Data Sources: Texas General Land Office 2009; ESRI 2006; Center for Spatial Analysis 2010

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Figure 4-3
Major Surface Waters
in Study Area

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No federally or state-designated stream or river segments are present in the Study Area in Oklahoma. The TPWD designates Ecologically Significant Stream Segments (ESSS) for waters that display unique ecological value based on biological function, hydrologic function, riparian conservation areas, water quality, aquatic life, aesthetics, or habitat for threatened or endangered species. Within the Study Area, Saddlers Creek and Leila Lake Creek in Donley County, Prairie Dog Town Fork of the Red River in Hall, Childress, and Briscoe Counties, and the North Prong and South Prong Little Red River in Briscoe County are designated as ESSS (TPWD 2010b). Table 4-1 summarizes the segments of these waterways recommended for ESSS designation.

TABLE 4-1

Waterways in the Study Area Recommended for Ecologically Significant Stream Segments Designation

Name of Waterway	**Limits of Segment**	**Reason for Designation as Ecologically Significant**
Saddlers Creek (aka Barton Creek)	From the confluence with the Salt Fork of the Red River upstream to its headwaters about two miles southeast of Evans in northern Donley County	High water quality Exceptional aquatic life High aesthetic value Unique, exemplary, and extensive natural community representative of the Southwestern Tablelands ecoregion
Leila Lake Creek	From the confluence with the Salt Fork of the Red River upstream to US 287 in Donley County	High water quality Exceptional aquatic life High aesthetic value Diverse benthic macroinvertebrate community
Prairie Dog Town Fork of the Red River	From the Childress/Hardeman County line upstream to the Hall/Briscoe County line	Recorded occurrences of the federally and state-listed endangered Interior Least Tern
North and South Prongs of the Little Red River	From the confluence with the Little Red River upstream to its headwaters in Briscoe County	Presence of riparian conservation area within Caprock Canyons State Park
Source: Wicker 2010		

The Prairie Dog Town Fork of the Red River upstream of the Briscoe/Hall County line is also listed on the Nationwide Rivers Inventory for scenery, recreation, geologic, historic, and cultural value. The Nationwide Rivers Inventory is a designation for free-flowing river segments of the U.S. that possess one or more outstandingly remarkable natural or cultural values. In particular, Prairie Dog Town Fork of the Red River is considered significant because it flows through Palo Duro Canyon (outside of the Study Area), which contains Palo Duro Canyon State Park, a National Natural Landmark, and the JA Ranch, a National Historic Landmark (NPS 2010).

The Federal Emergency Management Agency (FEMA) maps and delineates floodplains and determines flood risk for susceptible areas. A 100-year floodplain (FEMA Zone A) is determined based on the area with approximately 1 percent or greater probability of flooding per year. Much of the Study Area has not been mapped by FEMA. Based on the available FEMA Flood

Insurance Rate Maps, the majority of floodplains in the Study Area are isolated basins subject to flooding, associated with playa lakes in Floyd, Hale, Lubbock, and southwestern Briscoe Counties. The Study Area also contains mapped 100-year floodplains in riparian areas associated with the Elm Fork of the Red River, Elm Creek, North Elm Creek, Bull Creek, Little Turkey Creek, Los Lingos Creek, Quitaque Creek, Running Water Draw, Callahan Draw, Crawfish Creek, and the White River, as well as smaller unnamed tributaries. Figure 4-4 depicts 100-year floodplains within the Study Area.

4.3.2 Groundwater/Aquifers

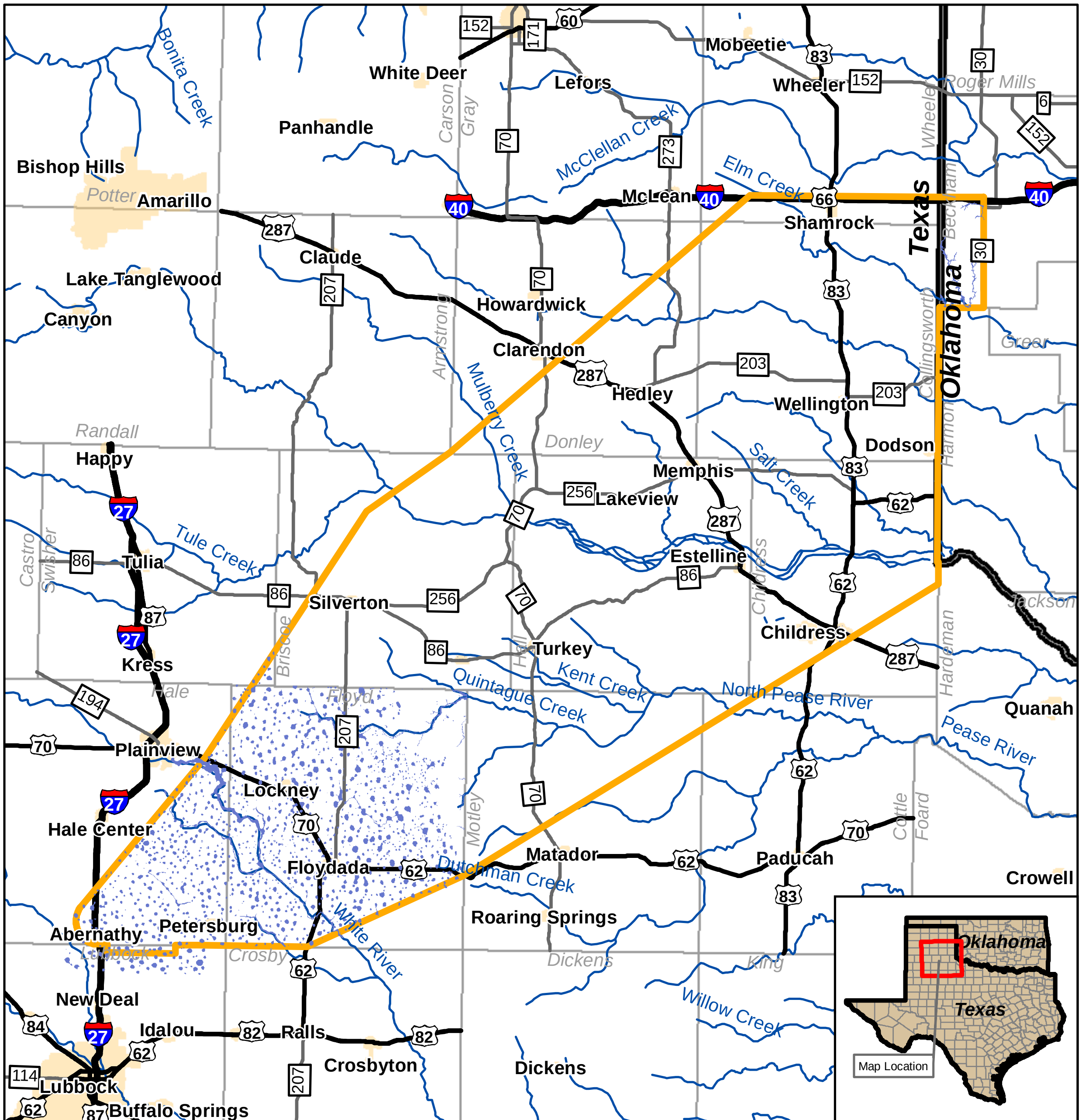
A major aquifer is defined as an aquifer that supplies large quantities of water over a large area of the state. A minor aquifer supplies a large quantity of water over a small area, or small quantities over a large area (Ashworth and Hopkins 1995). The Texas Water Development Board (TWDB) identifies major and minor aquifers within the Study Area: the Seymour, Ogallala, Blaine, Dockum, and Edwards-Trinity (High Plains) Aquifers (TWDB 2006a, 2006b). In addition, the Oklahoma Water Resources Board (OWRB) recognizes the alluvium and terrace aquifer of the North Fork of the Red River as a major aquifer within the Study Area (OWRB 2010). Figure 4-5 depicts these aquifers in the Study Area.

4.3.2.1 Major Aquifers

In Texas, the major aquifers in the Study Area include the Seymour and Ogallala Aquifers. The Seymour Aquifer underlies the Study Area in portions of Collingsworth, Childress, and Hall Counties, Texas. It is also present in northernmost Motley County and the southeastern corner of Briscoe County, Texas. The Ogallala Aquifer underlies the Study Area in southeastern Donley, central and western Briscoe, Floyd, and Hale Counties, Texas. The alluvium and terrace deposits along the North Fork of the Red River are present adjacent to the river in both Texas and Oklahoma; however, the aquifer is only mapped as a major aquifer for the portion of the Study Area in Beckham County, Oklahoma.

4.3.2.2 Minor aquifers

The Blaine, Dockum and Edwards-Trinity (High Plains) Aquifers are the minor aquifers within the Study Area. The Blaine Aquifer is present as both outcrop and subcrop in Collingsworth, Childress, and a small portion of Hall Counties. Within the Study Area, the Dockum Aquifer is mostly present as subcrop beneath the Ogallala Aquifer in Briscoe, Motley, Floyd Counties and a small portion of Hale County, although some outcrop is also present along the eastern edge of the aquifer. The Edwards-Trinity (High Plains) Aquifer occurs only in central Floyd and southern Hale Counties.



Legend

- Study Area
- Interstate
- U.S. Highway
- State Highway
- City
- County Boundary
- State Boundary
- River
- 100 Year Floodplains

1:1,350,000

0 5 10 15 Miles

Data Sources: Texas General Land Office 2009; ESRI 2006

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Figure 4-4
FEMA 100-Year Floodplains
In The Study Area

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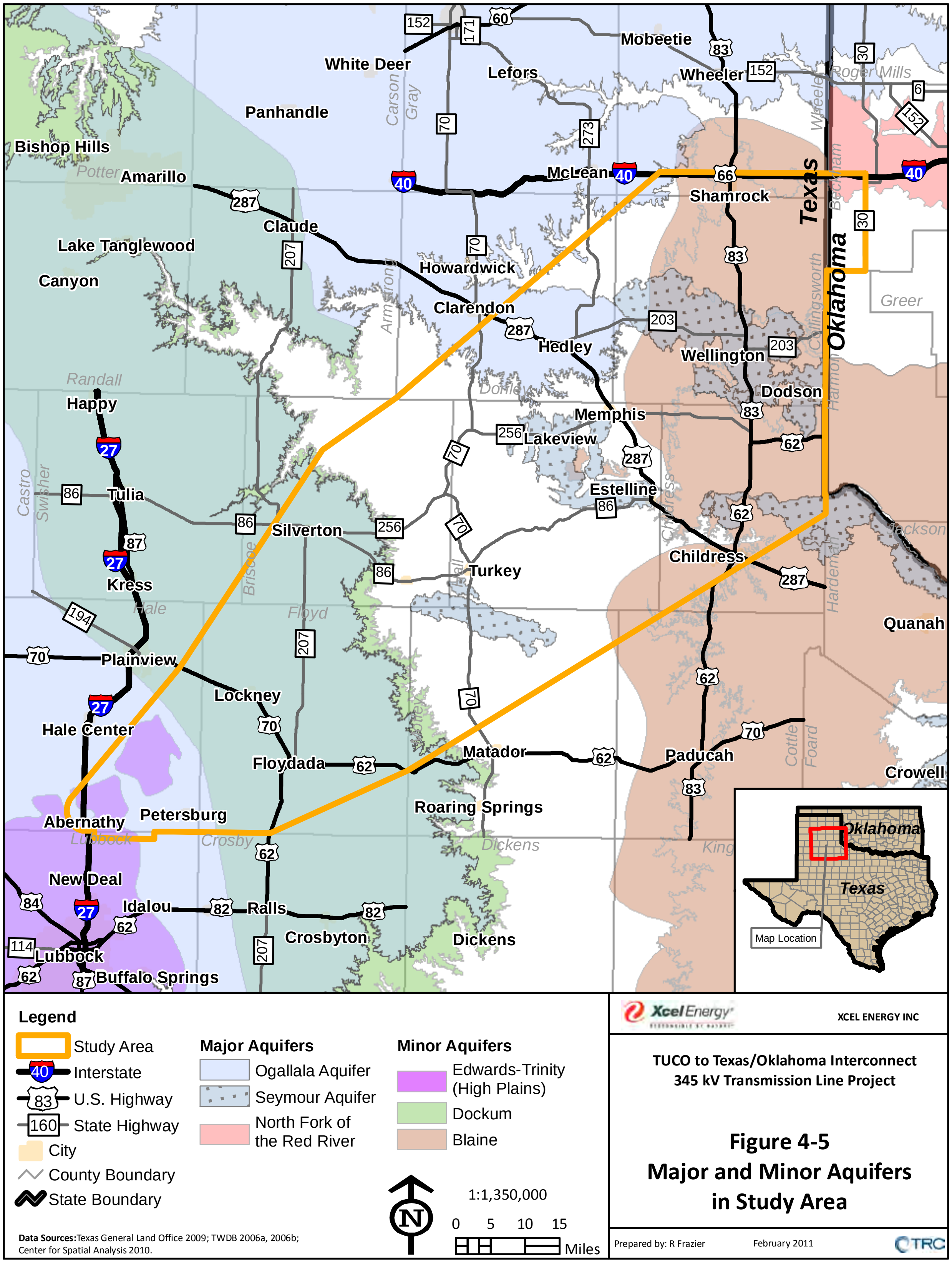

Figure 4-5
Major and Minor Aquifers in Study Area

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4.3.3 Wetlands

Wetlands within the Study Area may provide important functions such as flood control, sediment stabilization, erosion control, nutrient removal, and groundwater recharge. Impacts to waters of the U.S., including bordering wetlands and any other bordering or isolated waters with a significant nexus to other waterways, are under the jurisdiction of the USACE under Section 404 of the Clean Water Act.

The majority of NWI wetlands in the Study Area are small isolated, open water ponds, agricultural ponds and other small depressional wetlands. Many of these wetlands correspond to playa lakes that are seasonally dry. Probable playa lakes also are mapped by the Texas Tech University Playa Lakes Digital Database and provided by the TPWD. The majority of the playa lakes are located in areas of relatively flat topography in the southwestern portion of the Study Area, particularly in Floyd, Hale, Lubbock and western Briscoe Counties. Playa lakes are discussed in Section 4.4.1.2.

Vegetated wetlands in the Study Area include scrub-shrub, emergent and forested wetlands. Wetlands containing scrub-shrub or mixed scrub-shrub and emergent vegetation constitute most of the acreage of wetland in the Study Area. The largest wetland systems are associated with the floodplains of major rivers and streams, particularly the Salt Fork of the Red River, Prairie Dog Fork of the Red River, North Pease River and Quitaque Creek.

Scrub-shrub wetlands in the region may occur in floodplains, along wooded draws, or in depressions, and often include plant species such as: narrowleaf willow (*Salix exigua*), sandbar willow (*Salix interior*) and/or other willows (*Salix spp.*) species, Eastern cottonwood (*Populus deltoides*), salt cedars (*Tamarix spp*.), little walnut (*Juglans microcarpa*) and/or willow baccharis (*Baccharis salicina*) (NatureServe 2010).

Emergent wetlands in the Study Area occur in isolated basins and playas or as part of larger wetland complexes along streams and in floodplains, where they may also be associated with scrub-shrub and/or forested wetlands. Some emergent wetlands in the Study Area have been disturbed or altered by agricultural practices, or occur along man-made ditches. Emergent wetland vegetation in this area typically includes species such as: saltgrass (*Distichlis spicata*), vine mesquite (*Panicum obtusum*), Durango yellowcress (*Rorippa sinuata*), spotted evening-primrose (*Oenothera canescens*), alkali-sacaton (*Sporobolus airoides*), switchgrass (*Panicum virgatum*), cordgrasses (*Spartina spp*.), common reed (*Phragmites australis*). Wetter sites along rivers or edges of ponds and lakes that are seasonally to permanently flooded typically include sedges (*Carex spp*.), chainmakers bulrush (*Schoenoplectus americanus*), pale spikerush (*Eleocharis macrostachya*), knotgrass (*Paspalum distichum*), western umbrella-sedge (simplex), cattails (spp.) (NatureServe 2010).

Forested wetlands in the Study Area are most commonly associated with floodplains and riparian areas along rivers and streams. In Texas, the majority of forested riparian wetlands contain bottomland hardwoods (TPWD 2010c), which receive periodic floodwaters from adjacent rivers and streams. Forested vegetation may occur co-dominant with shrubby vegetation. Typical dominant and associate tree species often include: elms (*Ulmus spp*.), sugarberry (*Celtis laevegatis*), American sycamore (*Platanus occidentalis*), Eastern cottonwood (*Populus deltoides*), black willow (*Salix nigra*) and peachleaf willow (*Salix amygdaloides*).

4.4 Vegetation, Fisheries, and Wildlife

The following subsections provide a description of the vegetation cover types, fisheries, and wildlife resources that are known to occur or could be encountered in the Study Area. Although wetlands are briefly discussed in this section, the preceding Section 4.3 – Water Resources, provides a more detailed description of the wetland and stream habitat types present in the Study Area.

During the Project data collection phase, the Project Team initiated agency communications with the USFWS, the USACE, the TPWD, the Oklahoma Department of Wildlife Conservation (ODWC), and other federal, state, and local agencies requesting information on species or habitats of concern that were known or could occur within or near the Study Area. Concurrent with the initial agency consultations, the Project Team also began gathering information from other sources on the vegetation and wildlife within the Study Area.

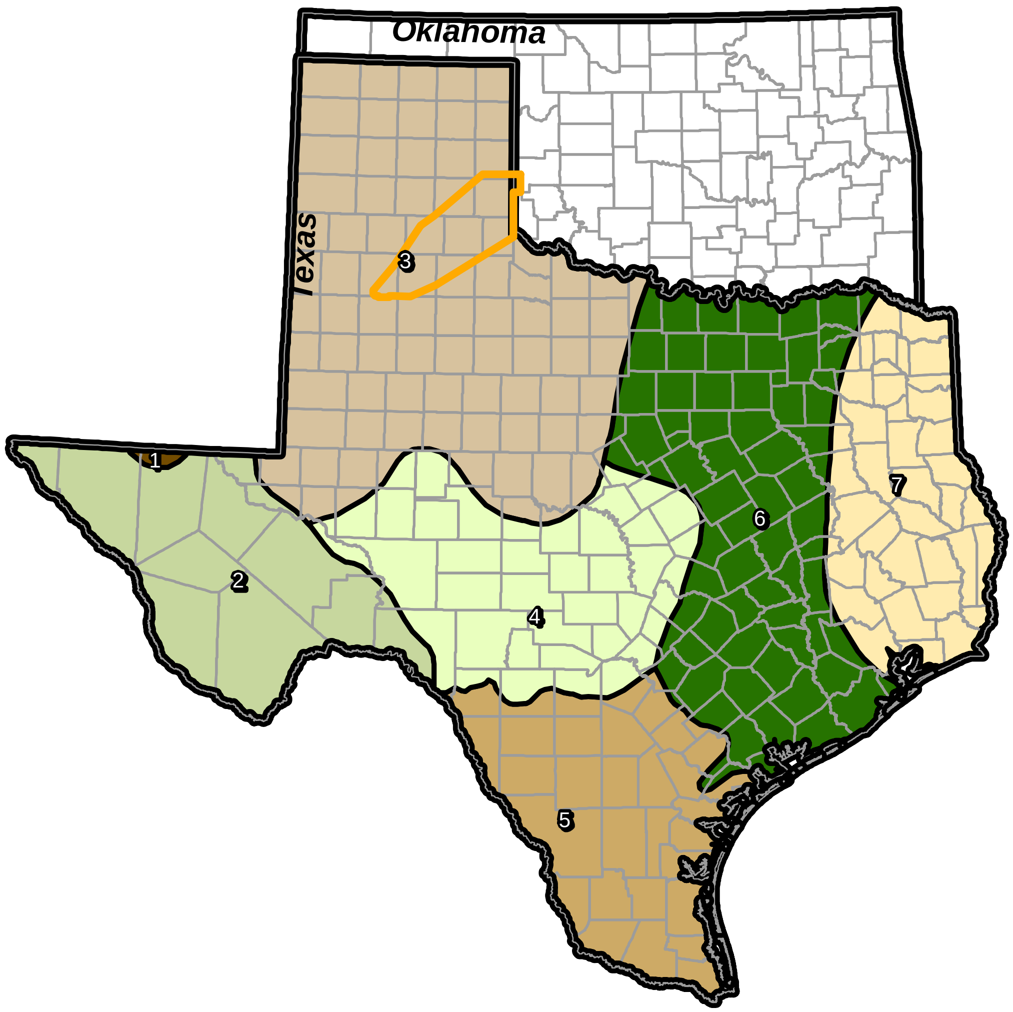
4.4.1 Vegetation

A biotic province is defined by one or more ecological associations (vegetative type, ecological climax, flora, fauna, climate, physiography, or soil) that can be differentiated with respect to adjacent provinces (Dice 1943). The Study Area lies within the Kansan Biotic Province as mapped by Blair (1950). Figure 4-6 depicts the Kansan Biotic Province.

The Kansan Biotic Province is characterized by flat plains with the occasional valley, canyon, or butte, and even rarer low hill. The long hot summers, short mild winters, and nearly constant winds cause a high rate of evaporation. Vegetation within the Province primarily consists of short-grasses with relatively few trees; forests or groves are typically only found associated with large riverine systems (Dice 1943).

In 1960, Gould et al., classified ten distinct vegetation areas within Texas. Figure 4-7 depicts the vegetational areas of Texas. Most of the Study Area is located within the vegetation area referred to as the Rolling Plains. Portions of the Study Area in western Briscoe, southeastern Swisher, eastern Hale, northwestern Lubbock, and western Floyd Counties occur in the High Plains vegetation area. The Rolling and High Plains regions of Texas comprise the southern end of the Great Plains of the central U.S. (Hatch et al. 1990).

Within the Rolling Plains region, elevation varies from 800 to 3,000 feet. Annual precipitation averages 22 to 30 inches with rainfall being most prevalent in the months of May and September. Under non-disturbed conditions, native vegetation includes tall and mid-grasses such as bluestems (*Andropogon spp*.) and gramas (*Bouteloua spp*.). When grazed, a transition to buffalo grass (*Buchloe dactyloides*), three-awn (*Aristida spp.*), and other opportunistic grasses occurs. Mesquite (*Prosopis glandulosa*) is a common invader throughout the Rolling Plains. Shinnery oak (*Quercus havardii*) and sand sage (*Artemisia filifolia*) are opportunistic when they encounter sandy soils (Hatch et al. 1990).



Legend

- Study Area
- 1. Navahonian
- 2. Chihuahuan
- 3. Kansan
- 4. Balconian
- 5. Tamaulipan
- 6. Texan
- 7. Austroriparian
- County Boundary
- State Boundary

N

1:9,500,000

0 50 100 150 Miles

Data Sources: Texas General Land Office 2009; ESRI 2006; Center for Spatial Analysis 2010

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Figure 4-6
Kansan Biotic Provinces of Texas

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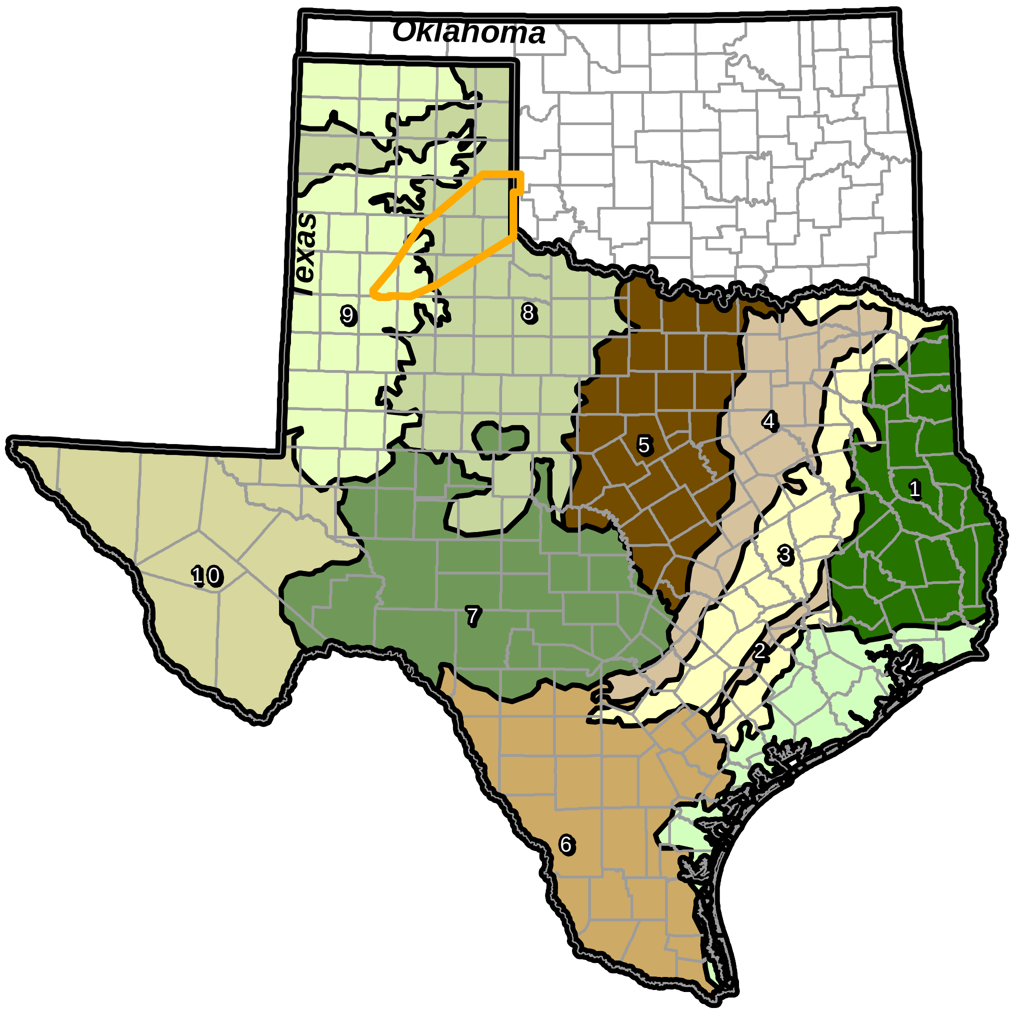

Legend

- Study Area
- 1. Piney Woods
- 2. Gulf Prairies and Marshes
- 3. Post Oak Savanah
- 4. Blackland Prairie
- 5. Cross Timbers and Prairies
- 6. South Texas Plains
- 7. Edwards Plateau
- 8. Rolling Plains
- 9. High Plains
- 10. Trans-Pecos
- County Boundary
- State Boundary

N

1:9,500,000 0 50 100 150 Miles

Data Sources: Texas General Land Office 2009; ESRI 2006; Center for Spatial Analysis 2010

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Figure 4-7
Vegetational Areas of Texas

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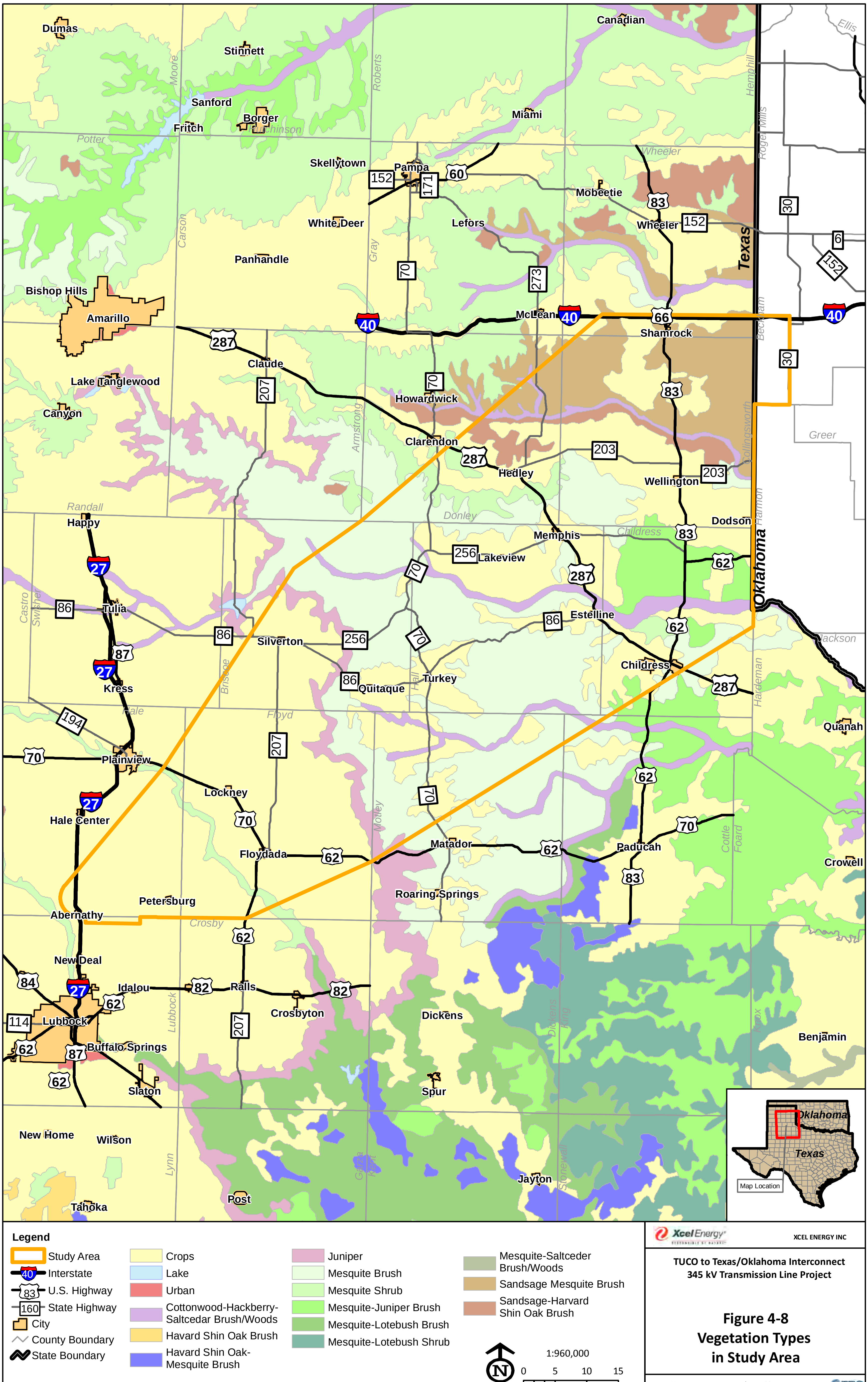

Figure 4-8
Vegetation Types in Study Area

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The High Plains area is separated from the Rolling Plains by the Caprock Escarpment. Rainfall averages 15 to 21 inches with the highest rainfall occurring from April to May and September to October. Droughts are frequent within this area. Although short-grass vegetative associations dominated by buffalo grass are the most important plant associations on the High Plains, there are distinct plant communities found on the hardlands, mixed lands, sandy lands, and caliche breaks. As a whole, the area is free from brush, but mesquite and yucca (*Yucca spp.*) have invaded portions of the area. Areas of sand support shinnery oak, and sand sage and junipers (*Juniperus spp.*) have extended their range from the breaks on the plains (Hatch et al. 1990).

4.4.1.1 Community Types

In 1984, the TPWD created a Vegetation Types of Texas map based upon previous classification schemes, Landsat data, computer analysis, and ground truthing to illustrate vegetative types at a plant association level (McMahan et al. 1984). The Study Area includes the following seven TPWD-identified vegetation types, plus crops (Wicker 2010), as depicted in Figure 4-8.

Mesquite Shrub/Grassland

Mesquite Shrub/Grassland is found throughout the High Plains and Rolling Plains. Common plant associates include narrow-leaf yucca (*Yucca angustifolia*), tasajillo (*Opuntia leptocaulis*), juniper (*Juniperus communis*), grassland pricklypear (*Opuntia macrorhiza*), cholla (*Cylindropuntia spp.*), blue grama (*Bouteloua gracilis*), hairy grama (*Bouteloua hirsute*), purple three-awn (*Aristida purpurea*), Roemer three-awn (*Aristida roemeriana*), buffalograss (*Buchloe dactyloides*), little bluestem (*Schizachyrium scoparium var. frequens*), western wheatgrass (*Pascopyrum smithii*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), James rushpea (*Caesalpinia jamesii*), scurfpea (*Psoralea spp.*), sandlily (*Mentzelia strictissima*), plains beebalm (*Mondarda pectinata*), scarlet gaura (*Gaura coccinea*), yellow evening primrose (*Calylophus serrulatus*), sandsage (*Artemisia filifolia*), and wild buckwheat (*Eriogonum spp.*) (McMahan et al. 1984).

Mesquite Brush

Mesquite Brush is primarily found in the Rolling Plains. Common plant associates include narrow-leaf yucca, grassland pricklypear, juniper, red grama (*Bouteloua eriopoda*), Texas grama (*Bouteloua rigidiseta*), sideoats grama (*Bouteloua curtipendula*), hairy grama, purple three-awn, Roemer three-awn, buffalograss, red lovegrass (*Eragrostis oxylepis*), gummy lovegrass (*Eragrostis curtipedicellata*), sand dropseed (*Sporobolus cryptandrus*), tobosa (*Hilaria mutica*), western ragweed (*Ambrosia psilostachya*), James rushpea (*Caesalpinia jamesii*), scurfpea, and wild buckwheat (McMahan et al. 1984).

Mesquite-Juniper Brush

Mesquite-Juniper Brush is primarily found on mesas and hillsides of the western Edwards Plateau. Common plant associates include lotebush (*Ziziphus obstusifolia*), shin oak (*Quercus havardii*), sumac (*Rhus spp.*), Texas pricklypear (*Opuntia lindheimeri*), tasajillo, kidneywood (*Eysenhardtia texana*), agarito (*Berberis trifoliolata*), redbud (*Cercis canadensis var. texensis*), yucca (*Yucca spp.*), Lindheimer silktassel (*Garrya ovata subsp. Lindheimeri*), sotol (*Dasylirion* *texanum*), catclaw (*Acacia greggii*), Mexican persimmon (*Diospyros texana*), sideoats grama, three-awn, Texas grama (*Bouteloua rigidiseta*), hairy grama, curly mesquite (*Hilaria belangeri*), buffalograss, and hairy tridens (*Tridens pilosus*) (McMahan et al. 1984).

Sandsage-Mesquite Brush

Sandsage-Mesquite Bruch occurs primarily on sandy uplands in Donley and Collingsworth Counties and the Rolling Plains. Common plant associates include Skunkbush sumac, Chickasaw plum (*Prunus angustifolia*), catclaw, little bluestem, sand bluestem, silver bluestem, sand dropseed, red three-awn, slickseed bean (*Strophostyles leiosperma*), wild blue indigo (*Baptisia australis*), sandlily, spearleaf ground cherry (*Physalis longifolia Nutt*.), wild buckwheat, spinytooth gumweed (*Grindelia lanceolata Nutt. var. lanceolata*), common sunflower (*Helianthus annuus L.*), spectacle pod (*Dimorphocarpa rollins*), and hierba del pollo (*Amaranthaceae alternanthera*) (McMahan et al. 1984).

Sandsage-Havard Shin Oak Brush

Sandsage-Havard Shin Oak Brush occurs on sandy soils of the Rolling Plains. Common plant associates include skunkbush sumac, Chickasaw plum, Indiangrass, switchgrass, sand bluestem, little bluestem, sand lovegrass (*Eragrostis trichodes*), big sandreed (*Calamovilfa gigantean*), sideoats grama, hairy grama, sand dropseed, sand paspalum *(Paspalum maritimum*), lead plant (*Amorpha canescens*), scurfpea, scarlet pea (*Indigofera miniata*), slickseed bean, wild blue indigo, wild buckwheat, and bush morning glory (*Convolvulus cneorum*) (McMahan et al. 1984).

Juniper-Mixed Brush

Juniper-Mixed Brush occurs on the Caprock Escarpment of the High Plains. Common plant associates include red-berry juniper (*Juniperus pinchotii*), one-seeded juniper (*Juniperus monosperma*), tasajillo, catclaw, skunkbush sumac, lotebush, mesquite (*Prosopis spp*.), shinnery oak, mountain mahogany (*Cercocarpus montanus*), yucca, red grama, sideoats grama, Texas grama, hairy grama, red lovegrass, gummy lovegrass (*Eragrostis curtipedicellata*), tumblegrass (*Schedonnardus paniculatus*), buffalograss, curly mesquite (*Hilaria belangeri*), tobosa, western ragweed, bitterweed, wild buckwheat, and James rushpea (McMahan et al.1984).

Cottonwood-Hackberry-Saltcedar Brush/Woods

Cottonwood-Hackberry-Saltcedar Brush/Woods occur in principal drainages within the Red River Basin. Common plant associates include Lindheimer's black willow (*Salix nigra*), buttonbush (*Cephalanthus occidentalis*), groundsel-tree (*Baccharis halimifolia*), rough-leaf dogwood (*Cornus drummondii*), Panhandle grape (*Vitis acerifolia*), heartleaf ampelopsis (*Ampelopsis cordata*), false climbing buckwheat (*Polygonum scandens*), cattail, switchgrass, prairie cordgrass (*Spartina pectinata*), saltgrass, alkali sacaton, spike sedge (*Carex nardina*), horsetail (*Equisetum arvense*), bulrush (*Scirpus atrovirens*), coarse sumpweed (*Cyclachaena xanthiifolia*), and Maximilian sunflower (*Helianthus maximiliani*) (McMahan et al. 1984).

Crops

Crops include cultivated cover crops or row crops that provide food and/or fiber for humans or domestic animals. Crops represent a commercially important commodity for the area. Important crops cultivated within the Study Area include oats, wheat, corn, cotton, and sorghum (USDA 2007).

In addition to the seven TPWD-recognized vegetative communities plus crops, areas of riparian/bottomland, hydric, and aquatic vegetation communities including playa lakes also occur in this area of Texas. These communities have been discussed in Section 4.3.3 – Wetlands. Playa lakes are discussed in the subsection below. A review of maps and aerial photography of the Study Area also reveals areas of previous disturbance, existing utility corridors, roadways, railroad rights-of-way, and easements.

4.4.1.2 Unique, Sensitive, or Protected Vegetation Communities

The Project Team conducted database searches and consultations with federal and state agencies including the USFWS, TPWD, and ODWC to identify any unique, sensitive, or protected vegetation communities that could be affected by construction or operation of the Project. These reviews and consultations identified seven Texas Natural Diversity Database (TXNDD) vegetation community records (plus crops) in the Study Area: one occurrence of Mohr's Shin Oak Series, one occurrence of Blue Grama-buffalograss series (*Bouteloua gracilis-buchloe dactyloides* series), two occurrences of Oneseed Juniper Series (*Juniperus monosperma* series), one occurrence of Cottonwood-tallgrass Series (*Populus deltoides-andropogon geradii* series), two occurrences of Sideoats Grama Series (*bouteloua curtipendula* series), and one occurrence of Havard Shin Oak/tallgrass Series (*Quercus havardii/schizachryium scoparium* series). All of the TXNDD-recorded vegetation community occurrences are located within Caprock Canyons State Park (Scott 2010). None of these vegetation communities will be impacted by the Project.

Playa Lakes

Riparian areas and playa lakes were identified through agency consultation as a vegetative community determined to be unique, sensitive, or protected in the Study Area. Playa lakes are ephemeral, shallow, circular-shaped wetland-like areas that are maintained by rainfall and may receive irrigation runoff. Although playa lakes share many of the same functions and features of wetlands when water is present, the USACE typically does not consider these systems as jurisdictional wetlands given their isolated nature and frequent and prolonged dry periods; however, jurisdiction for playas is made in a case-by-case basis. Regardless of their jurisdiction to the USACE, during wet years, these features are important sources of invertebrates and seed producing plants which are food sources for seed-eating fowl and other wildlife. Similarly, playa lakes are important refuges for migratory birds. Next to the Gulf Coast, the playa lakes region is the second most important habitat for migratory birds in the Central Flyway, and the High Plains of Texas has the highest density of playa lakes in North America (TPWD 2010a). The majority of the playa lakes are located in areas of relatively flat topography in the southwestern portion of the Study Area, particularly in Floyd, Hale, Lubbock, and western Briscoe Counties.

Although not formally protected at the federal or state level, the USFWS and TPWD have requested that impacts to playa lakes be avoided to the greatest extent possible (Cloud, Jr.

2010; Wicker 2010). The USFWS and TPWD are also participating partners of the Playa Lakes Joint Venture (PLJV), a non-profit partnership of governmental and non-governmental agencies, groups, and individuals dedicated to conserving bird habitat, including playa lakes in particular, in the Southern Great Plains (PLJV 2009).

The Project Team obtained and mapped national hydrographic digital data of potential playa lakes, and NWI maps depicting open water areas. Mapped probable or potential playa lakes occur within the Study Area, and are shown on Figure 2-1 (Sheets 1-7).

4.4.1.3 State and/or Federally Protected Vegetative Species

The Project Team consulted the USFWS, TPWD, and ODWC to determine if any protected plant species designated under the Endangered Species Act (ESA) (16 United States Code § 1531) and Chapter 88 of the TPWD Code and §§ 69.01 to 69.9 of Tile 31 of the TAC are present in the Study Area. These agencies did not identify any protected state and/or federal species located in the Study Area. Mexican mud-plantain (*Heteranthera mexicana*) is listed as a rare plant occurring in Swisher County; this plant is not protected by federal or state regulations (TPWD 2010d).

4.4.2 Fisheries

Fisheries are surface water areas that provide habitat for fishes and are typically characterized according to water temperature (warmwater or coldwater), salinity (freshwater, marine, or estuarine), types of fishing uses (commercial or recreational), and utilization by open water marine fishes that require freshwater upstream areas to spawn (i.e., anadromous). As used here, significant fisheries resources are defined as waterbodies that either: (1) provide important habitat for foraging, rearing, or spawning of fish species; (2) represent important commercial or recreational fishing areas; or (3) support large populations of commercially or recreationally valuable fish species or species listed for protection at the federal, state, or local level.

Waters within the majority of the Study Area are part of the Red River Drainage System. Some portions of the Study Area in Hale, Lubbock, southwestern Swisher, and southwestern Floyd Counties are part of Brazos River Drainage System (BEG 1996). All fisheries in the Study Area are freshwater and warmwater fisheries. Rivers and creeks crossed by the Project are not utilized by anadromous fishes, nor do they provide significant spawning or rearing areas for commercially important fish species.

4.4.3 Wildlife

A diversity of wildlife species are known to occur within the Kansan Biotic Province. Common species that could be expected to occur within the Province but may not necessarily occur within the much smaller Study Area are listed in Table 4-2.

TABLE 4-2

Common Wildlife Species of the Kansan Biotic Province

Common Name	Scientific Name	Common Name	Scientific Name
AMPHIBIANS			
Barred tiger salamander	*Ambystoma tigrinum mavortium*	Blanchard's cricket frog	*Acris crepitans blanchardii*
Plains spadefoot toad	*Spea bombifrons*	Spotted chorus frog	*Pseudacris clarki*
Green toad	*Bufo debilis*	Plains leopard frog	*Rana blairi*
Red spotted toad	*Bufo punctatus*	Couch's spadefoot toad	*Scaphiopus couchii*
Texas toad	*Bufo speciosus*	New Mexico spadefoot toad	*Spea multiplicata*
Woodhouse's toad	*Bufo woodhousii*	Great plains narrowmouth toad	*Gastrophyryne olivacea*
REPTILES			
Texas earless lizard	*Cophosaurus texanus texanus*	Texas homed lizard	*Phrynosoma comutum*
Eastern earless lizard	*Holbrookia maculate perspicua*	Roundtail homed lizard	*Phrynosoma modestum*
Eastern collared lizard	*Crolaphytus collaris collaris*	Texas spiny lizard	*Sceloporus olivaceus*
Southern prairie lizard	*Sceloporus undulates consobrinus*	Desert side-blotched lizard	*Uta stansburiana stejnegeri*
Great plains skink	*Eumeces obsoletus*	Short-lined skink	*Eumeces tetragrammus brevilineatus*
Ground skink	*Scincella lateralis*	Western hognose snake	*Gyalopion canum*
Texas spotted whiptail	*Cnemidophorus gularis gularis*	Western marbled whiptail	*Cnemidophorus tigris marmoratus*
Plains blind snake	*Leptotyphlops dulcis dulcis*	Kansas glossy snake	*Arizona elegans elegans*
Flathead snake	*Tantil/a gracilis*	Blotched water snake	*Nerodia erythrogasler transversa*
Plains black-headed snake	*Tantilla nigriceps nigriceps*	Checkered garter snake	*Thamnophis marcianus marcianus*
Western ribbon snake	*Thamnophis proximus proximus*	Western diamondback rattlesnake	*Crotalus atrox*
Prairie-lined racerunner	*Cnemidophorus sexlineatus viridis*	Prairie rattlesnake	*Crotalus viridis*
Diamondback water snake	*Nerodia rhombifer rhombifer*	Guadalupe spiny soft-shelled turtle	*Trionyx spiniferus guadalupensis*
Gopher snake	*Pituophis catenifer*	Western ribbon snake	*Thamnophis proximus*
Regal ring-necked snake	*Diadophis punctatus punctatus*	Dusky hog-nosed snake	*Heterodon nasicus gloydi*
Texas night snake	*Hypsiglena torquatajani*	Desert king snake	*Lampropeltis getula splendida*
Western coachwhip	*Masticophis flagellum testaceus*	Great plains rat snake	*Elaphe guttata emoryi*
Rough green snake	*Opheodrys aestivus*	Bull snake	*Pituophis catenifer sayi*
Texas long-nosed snake	*Phinocheilus lecontei tessellatus*	Ground snake	*Sonora semiannulata semiannulata*
Yellow mud turtle	*Kinosternon falvescens falvescens*	Ornate box turtle	*Terrapene ornata ornata*
Common snapping turtle	*Chelydra serpentina serpentina*	Texas river cooter	*Pseudemys texana*
Pallid spiny soft-shelled turtle	*Trionyx spiniferus pallidus*		

TABLE 4-2 Common Wildlife Species of the Kansan Biotic Province			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
BIRDS			
Scaled quail	*Callipepla squamata*	Sandhill crane	*Grus canadensis*
Northern bobwhite	*Colinus virginianus*	Belted kingfisher	*Ceryle alcyon*
American kestrel	*Falco sparverius*	Ash-throated flycatcher	*Myiarchus cinerascens*
Killdeer	*Charadrius vociferous*	Northern rough- winged swallow	*Stelgidopteryx serripennis*
Greater roadrunner	*Geococcyx californianus*	Chipping sparrow	*Spizella passerina*
Rock wren	*Salpinctes obsoletus*	Lark sparrow	*Chondestes grammacus*
Western meadowlark	*Sturnella neglecta*	Savannah sparrow	*Passerculus sandwichensis*
Snowy egret	*Egretta thula*	Bullock's oriole	*Icterus bullockii*
Turkey vulture	*Cathartes aura*	Dark-eyed junco	*Junco hyemalis*
Swainson's hawk	*Buteo swainsoni*	Black-chinned hummingbird	*Archilochus alexandri*
Wild turkey	*Meleagris gallopavo*	Great blue heron	*Ardea herodias*
Red-tailed hawk	*Buteojamaicensis*	Mourning dove	*Zenaida maroura*
Bam owl	*Tyto alba*	Rufous-crowned sparrow	*Aimophila rujiceps*
Golden fronted woodpecker	*Melanerpes aurifrons*	Ladder-backed woodpecker	*Picoides scalaris*
Gadwall	*Anas strepera*	Northern pintail	*Anas acuta*
Green heron	*Butorides virescens*	Lesser yellowlegs	*Tringa jlavipes*
Common nighthawk	*Chordeilus minor*	Chimney swift	*Chaetura pelagica*
Western kingbird	*Tyrannus verticalis*	American pipit	*Anthus rubescens*
Blue-headed vireo	*Vireo solitarius*	Northern harrier	*Circus cyaneus*
MAMMALS			
Black-tailed prairie dog	*Cynomys ludovicianus*	Eastern fox squirrel	*Sciurus niger*
Mexican ground squirrel	*Spermophilus mexicanus*	Spotted ground squirrel	*Spermophilus spilosoma*
Merriam's pocket mouse	*Perognathus merriami*	Yellow-faced pocket gopher	*Cratogeomys castanops*
Ord's kangaroo rat	*Dipodomys ordii*	Hispid pocket mouse	*Chaetodipus hispidus*
Fulvous harvest mouse	*Reithrodontomys fulvescens*	Plains harvest mouse	*Reithrodontomys montanus*
Texas mouse	*Peromyscus attwateri*	White-footed mouse	*Peromyscusleucopus*
Deer mouse	*Peromyscus maniculatus*	White-ankled mouse	*Peromyscus pectoralis*
Northern pygmy mouse	*Baiomys taylori*	Northern grasshopper mouse	*Onychomys leucogaster*
Feral pig	*Sus scrofa*	Plains pocket gopher	*Geomys bursarius*
Hispid cotton rat	*Sigmodon hispidus*	Eastern white-throated woodrat	*Neotoma leucodon*
Southern plains woodrat	*Neotoma micropus*	Texas kangaroo rat	*Dipodomys elator*
Coyote	*Canis latrans*	White-tailed deer	*Odocoileus virginianus*
Virginia opossum	*Didelphis virginiana*	North American porcupine	*Erethizon dorsatum*
Desert cottontail	*Sylvilagus audobonii*	Eastern cottontail	*Sylvilagus floridanus*
Black-tailed jackrabbit	*Lepus califomicus*	Red fox	*Vulpes vulpes*
Raccoon	*Procyon lotor*	Common gray fox	*Urocyon cineroargenteus*

TABLE 4-2 Common Wildlife Species of the Kansan Biotic Province			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Ringtail	*Bassariscus astutus*	Western spotted skunk	*Spilogale gracilis*
American badger	*Taxidea laxus*	Striped skunk	*Mephitis mephitis*
Hog-nosed skunk	*Conepatus leuconotus*	Bobcat	*Lynx rufus*
Mountain lion	*Puma concolor*	Western pipistrelle	*Pipistrellus hesperus*
Cave myotis	*Myotis velifer*	Eastern red bat	*Lasiurus borealis*
Hoary bat	*Lasiurus cinereus*	Silver-haired bat	*Lasionycteris noctivaflens*
Townsend's big- eared bat	*Corynorhinus townsendii*	Brazilian free-tailed bat	*Tadarida brasiliensis*
Pallid bat	*Antrozous pallidus*		
Sources: Lockwood and Freeman 2004, Davis and Schmidly 1994, Cannatella 2000, and Dixon 2000.			

4.4.3.1 Unique, Sensitive, or Protected Wildlife Habitats

The Project Team consulted the USFWS and TPWD, conducted a database search and literature review to determine if the Study Area encompassed any wildlife habitats that could be considered unique, sensitive, or protected. As a result of these activities, the Project Team determined that one state wildlife management area, the Playa Lakes Wildlife Management Area -Taylor Lakes Unit, occurs in Donley County. Interior least tern rookeries also occur in Hall and Childress Counties. There are no USFWS National Wildlife Refuges in the Study Area.

4.4.3.2 State and/or Federally Protected Wildlife Species

The Project Team conducted a comprehensive literature review to identify federal and state species of interest that could potentially be affected by the Project. These species included those that were listed as endangered or threatened, as well as those species not listed under the ESA or Chapters 67 and 68 of the TPWD Code or 31 TAC §§ 36.171-65.176 but are considered rare species of concern. The literature review included informal consultations with the USFWS and TPWD, data from the TXNDD, and aerial photographic interpretation of potential habitats within the Study Area. Table 4-3 presents a list of species protected at the federal (USFWS 2010a) and/or state level (TPWD 2010d) that potentially could occur within the Study Area.

Based on consultation with TPWD (see Appendix A), “take” of a state-listed species is prohibited pursuant to 31 TAC Part 2 Chapter 65.G Rule § 65.171. Texas Parks and Wildlife Code 1.101(5) states: “Take,” except as otherwise provided by this code, means collect, hook, hunt, net, shoot, or snare, by any means or device, and includes an attempt to take or to pursue in order to take. However, the TPWD currently does not have a regulation or procedure under which to issue an Incidental Take Permit for state-listed species.

TABLE 4-3 Federal and State Protected Species that May Occur in the Study Area Counties					
Common Name	**Scientific Name**	**State Status a/**	**Federal Status a/**	**County**	**Potential Habitat in the Study Area**
FISH					
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	T	NL	Childress	No; Species only occurs in the Red River below the Lake Texoma reservoir (Hubbs et al. 2008) and rarely in the Rio Grande (TPWD 2010d).
REPTILES					
Texas horned lizard	*Phrynosoma cornutum*	T	RSC	Beckham, Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes
BIRDS					
Peregrine falcon	*Falco peregrines*	T	RSC	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes; Potential rare migrant in Study Area
American peregrine falcon	*Falco peregrines anatum*	T	D	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes; Potential rare migrant in Study Area
Arctic peregrine falcon	*Falco peregrines tundrius*	RSC	D	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley wisher, Wheeler	Yes; Potential rare migrant in Study Area
Baird's sparrow	*Ammodramus bairdii*	RSC	NL	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes; Potential rare migrant in Study Area
Bald eagle	*Haliaeetus leucocephalus*	T	DP	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes; Occasional birds may forage in the Study Area. Study Area lacks nesting or wintering habitat.
Ferruginous hawk	*Buteo regalis*	RSC	NL	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley Swisher, Wheeler	Yes
Interior least tern	*Sterna antillarum athalasos*	E	E	Briscoe, Childress, Hall	Yes

TABLE 4-3

Federal and State Protected Species that May Occur in the Study Area Counties

Common Name	Scientific Name	State Status a/	Federal Status a/	County	Potential Habitat in the Study Area
Lesser Prairie Chicken	*Tympanuchus pallidicinctus*	RSC	C	Briscoe, Childress, Collingsworth, Cottle, Donley, Hall, Motley, Swisher, Wheeler	Yes
Mountain plover	*Charadrius montanus*	RSC	NL	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley Swisher, Wheeler	Yes
Prairie falcon	*Falco mexicanus*	RSC	RSC	Hale, Lubbock	Yes; As winter resident
Snowy plover	*Characdrius alexandrinus*	RSC	NL	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley Swisher, Wheeler	Yes; As transients
Western snowy plover	*Charadrius alexandrinus nivosus*	RSC	NL	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley Swisher, Wheeler	Yes; As transients
Western burrowing owl	*Athene cunicularia hypugaea*	RSC	NL	Beckham, Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes
Whooping crane	*Grus americana*	E	E	Beckham, Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes; As transients during migration
MAMMALS					
Black-footed ferret	*Mustela nigripes*	RSC	E	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler,	Yes; But species is considered extirpated from Texas (TPWD 2003)
Black-tailed prairie dog	*Cynomys ludovicianus*	RSC	NL	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler,	Yes
Cave myotis bat	*Myotis velifer*	RSC	RSC	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hall, Lubbock, Motley, Swisher, Wheeler	Yes

TABLE 4-3

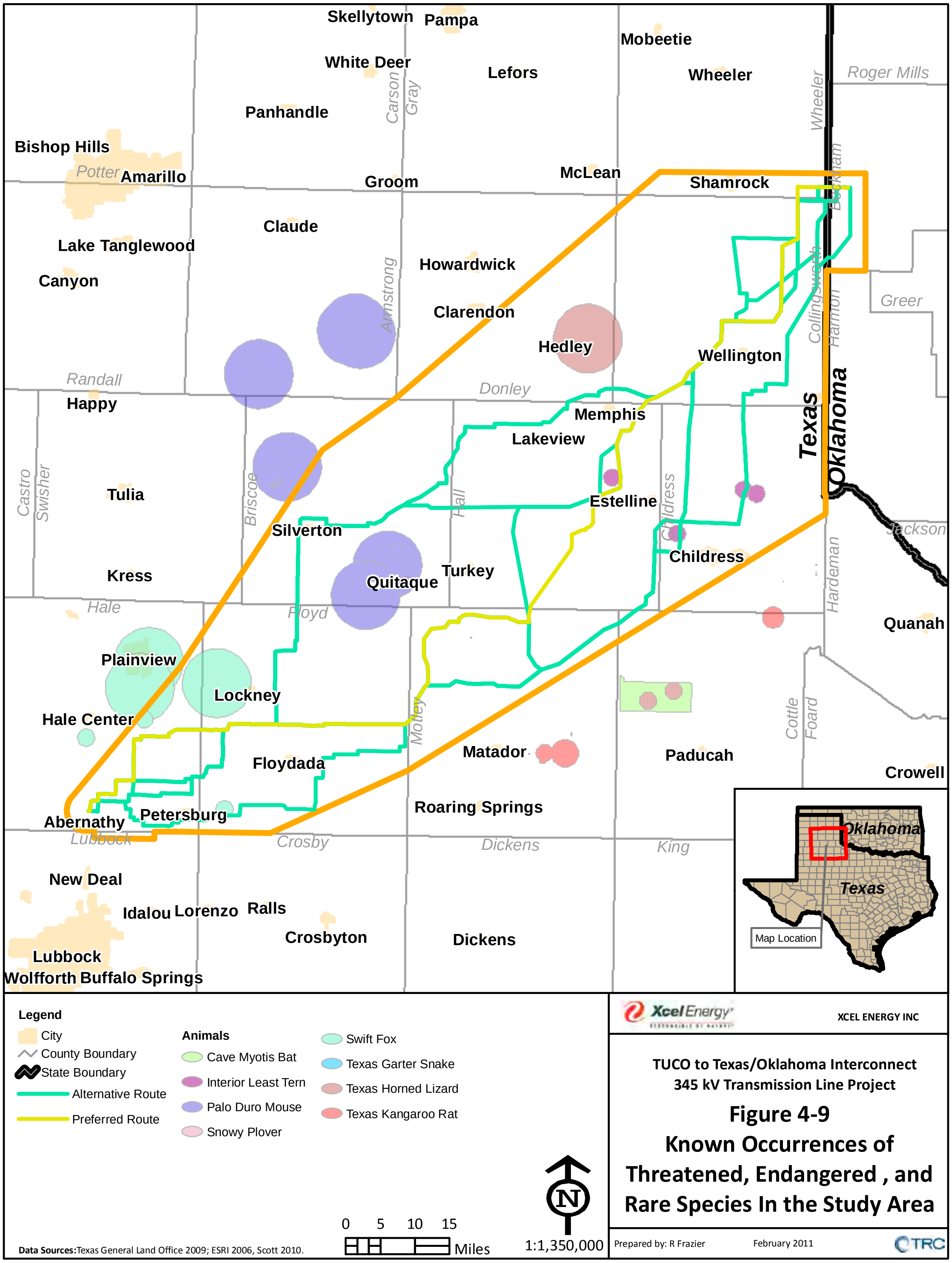
Federal and State Protected Species that May Occur in the Study Area Counties

Common Name	Scientific Name	State Status a/	Federal Status a/	County	Potential Habitat in the Study Area
Gray wolf	*Canis lupus*	E	E	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Lubbock, Motley, Swisher, Wheeler	Yes; But species is considered extirpated from Texas (TPWD 2003)
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	RSC	RSC	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes
Palo Duro mouse	*Peromyscus truei Comanche*	T	RSC	Briscoe, Floyd, Motley,	Yes; In Caprock Canyons State Park
Plains spotted skunk	*Spilogale putorius interrupta*	RSC	RSC	Briscoe, Childress, Collingsworth, Cottle, Donley, Floyd, Hale, Hall, Lubbock, Motley, Swisher, Wheeler	Yes
Swift Fox	*Vulpes velox*	RSC	NL	Briscoe, Donley, Floyd, Hale, Lubbock, Swisher, Wheeler	Yes
Texas kangaroo rat	*Dipodymys elator*	RSC	RSC	Childress, Cottle, Motley	Yes
Western small-footed bat (also known as Small-footed myotis)	*Myotis ciliolabrum*	RSC	RSC	Collingsworth, Donley,	No

Sources: USFWS 2010a; TPWD 2010d.

a/ Legal Statuses: E = Endangered; T = Threatened; C = Candidate; D = Delisted under the ESA; DP = Delisted under the ESA, protected under the Bald and Golden Eagle Act ; RSC = Rare, Species of Concern; NL = Not Listed.

A brief discussion of each protected species that was listed as potentially occurring within the Study Area based upon the results of the literature review, agency consultation, and aerial photographic interpretation is presented below. Where data was available for known occurrences of threatened, endangered, or rare species in the Study Area, it was mapped and is presented as Figure 4-9.



TUCO to Texas/Oklahoma Interconnect
345 kV Transmission Line Project

Figure 4-9
Known Occurrences of Threatened, Endangered, and Rare Species In the Study Area

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<u>Texas Horned Lizard (*Phrynosoma cornutum*)</u>

The Texas horned lizard is state-listed as threatened and federally listed as a rare species of concern and is known to occur in the Study Area (Wicker 2010; TPWD 2010d). According to the TXNDD, one Texas horned lizard was documented in Donley and Collingsworth Counties in 1994 (Scott 2010). Texas horned lizards occur in open, arid, and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush, or scrubby trees. The lizards burrow into soil, enter rodent burrows, or hide under rocks when inactive (TPWD 2003). Because hibernation and nesting occurs chiefly in loose sand or loamy soils, ground-disturbing activities can potentially affect the Texas horned lizard. The species potentially could occur in the Study area.

<u>Peregrine Falcon (*Falco peregrines*); American Peregrine Falcon (*F. peregrines anatum*) and Arctic Peregrine Falcon (*F. peregrines tundrius*)</u>

The peregrine falcon and its two subspecies, the American and Arctic peregrine falcons, could potentially occur in the Study Area. The American peregrine falcon is state-listed as threatened, whereas the arctic peregrine falcon is state-listed as a rare species of concern (TPWD 2010d). The subspecies have been de-listed under the ESA, while the peregrine falcon is listed as a rare species of concern and is protected under the Migratory Bird Treaty Act (MBTA). Because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level. American peregrine falcons are resident breeders in the mountains of the Trans-Pecos and both subspecies migrate through Texas on their way to wintering grounds along the coast and farther south. Peregrine falcons prefer a variety of open habitats, and usually inhabit areas near water. Historically, peregrine falcons in the Great Plains nested on cliffs near rivers and lakes, on low dikes in marshes and mudbanks, and in large trees (Nemec 1984). Due to limited number of riparian areas or non-ephemeral playa lakes in the Study Area, only marginal breeding and stopover habitat is present. Peregrine falcons could potentially occur in the Study Area as rare migrants.

<u>Baird's Sparrow (*Ammodramus bairdii*)</u>

Baird's sparrow is state-listed as a rare species of concern (TPWD 2010d) and is protected under the MBTA. This bird is a cryptic grassland species that is usually flushed before it is seen. The Baird's sparrow is nomadic, with breeding populations shifting dramatically among locations from year to year. This tendency probably evolved in response to the effects of drought, fire, and movements of bison herds over the prairie. Its winter range includes parts of southern Arizona, eastern New Mexico, west Texas and parts of northern Mexico. Migrants arrive early in the first week of August. By November, most birds have migrated further south, and in the spring this species is rarely found in the state (BISON-M 2009a). The habitat requirements for this species include shortgrass prairies with scattered low bushes and matted vegetation (TPWD 2003). Baird's sparrows are very rare migrants in the Texas Panhandle, and the species has only been documented in the Study Area in Lubbock County (two occurrences) (Lockwood and Freeman 2004).

<u>Bald Eagle (*Haliaeetus leucocephalus*)</u>

The bald eagle is a state-listed threatened species (TPWD 2010d). Originally listed as endangered at the federal level on March 11, 1967, the bald eagle was down-listed to threatened on July 12, 1995, and then proposed for de-listing on July 6, 1999. After an increase from approximately 487 breeding pairs in 1963 to an estimated 9,789 breeding pairs in 2007, the bird was officially de-listed in August of 2007. Even though the species is de-listed, it is protected under the Bald and Golden Eagle Protection Act and the MBTA.

Bald eagles are present year-round throughout Texas as spring and fall migrants, breeders, or winter residents, and typically nest from October to July. Breeding populations occur primarily in the eastern half of the state and along coastal counties from Rockport to Houston, and non-breeding or wintering populations are located primarily in the Panhandle, Central, and East Texas, and in other areas of suitable habitat throughout the state. The typical nest is constructed of large sticks, with softer materials such as leaves, grass, and Spanish moss used as nest lining. Nests are typically used for a number of years, with the birds adding nest material every year. Bald eagle nests are often very large, measuring up to 6 feet in width and weighing hundreds of pounds. Eagles often have one or more alternative nests within their territories, and after the young are left on their own, they typically migrate northward out of Texas, returning by September or October.

The TPWD's Annotated County Lists of Rare Species (TPWD 2010d) includes the bald eagle as potentially occurring in all Study Area counties. The USFWS also has noted that the bald eagle is known to occur in all Study Area counties (Cloud, Jr. 2010). The TXNDD has no recorded occurrences of bald eagle individuals or nests within or near the Study Area. Based on aerial photograph and helicopter surveys of the Study Area, the Project Team has not identified any nesting or wintering habitat for this species due to the absence of tall cliffs and mature tree stands near open waterbodies. Occasional transient bald eagles may forage within or may be found in the few riparian areas present within the Study Area.

Ferruginous Hawk (*Buteo regalis*)

The ferruginous hawk is state-listed as a rare species of concern (TPWD 2010d) and is protected under the MBTA. Ferruginous hawk habitat occurs in open country primarily consisting of prairies, plains, and badlands. The hawk typically nests in tall trees along streams or on steep slopes, cliff ledges, river-cut banks, hillsides, and power line structures. It is a year-round resident in the northern plains of America and winters throughout the western two-thirds of Texas. The ferruginous hawk potentially could occur in the Study Area.

Interior Least Tern (*Sterna antillarum athalasos*)

The interior least tern is federally and state-listed as an endangered species (TPWD 2010d) and is protected under the MBTA. The birds nest in small, loosely defined colonies on barren beaches, dry mudflats, salt flats, and at sand and gravel pits along rivers throughout Texas. Interior least terns need shallow water with an abundance of small fish for foraging and utilize low, wet sand or gravel bars or floodplain wetlands for staging during migration (TPWD 2003). In Texas, the species historically nested along the Colorado River, Red River, and Rio Grande and is thought to overwinter in Central and South America. Egg-laying and incubation occur from late May through early August. The TXNDD has recorded nesting colonies of the interior least tern in Hall and Childress Counties along the Prairie Dog Town Fork of the Red River. The

USFWS noted that interior least terns are known to occur in Briscoe, Childress, Collingsworth, Donley, Hall, and Wheeler Counties (Cloud, Jr. 2010), particularly along the Prairie Dog Town Fork of the Red River. Potentially suitable habitat was observed during aerial (helicopter) surveys within the Study Area along the Salt Fork of the Red River and the Prairie Dog Town Fork of the Red River. Interior least terns are likely to occur in the Study Area along the Prairie Dog Town Fork of the Red River and could potentially occur along the Salt Fork of the Red River.

Lesser Prairie Chicken (*Tympanuchus pallidicinctus*)

The lesser prairie chicken is a federal candidate species (USFWS 2010a) and a Texas state rare species of concern (TPWD 2010d). This bird is a resident to rangeland in southwestern Kansas, the Oklahoma and Texas panhandles, southeastern Colorado, and northeastern New Mexico. Required habitat for this bird consists of intact, semi-arid grasslands, interspersed with shrubs such as sand sagebrush, sand plum, skunkbush sumac, and shinnery oak shrubs, and dominated by sand dropseed, sideoats grama, sand bluestem, and little bluestem grasses. Nests generally are located in a scraped out area lined with grasses. According to the USFWS and TPWD, a small portion of the lesser prairie chicken's estimated occupied range may overlap the Study Area in northeastern Donley and central Wheeler Counties (Cloud, Jr. 2010; Wicker 2010). According to TPWD, medium to medium-high quality habitat for the species exists in Oklahoma within a five-mile buffer area of the Study Area's boundary, and medium to medium-low quality habitat may exist within the Study Area in eastern Wheeler, Collingsworth, and Childress Counties (Wicker 2010). Available data on lesser prairie chicken estimated range and habitat was mapped and is presented on Figure 4-10. The lesser prairie chicken could potentially occur in the Study Area.

Mountain Plover (*Charadrius montanus*)

The mountain plover is a state rare species of concern (TPWD 2010d) and is protected under the MBTA. This bird utilizes short-grass prairies and dry playas dominated by blue grama, buffalo grass, and taller vegetation during the breeding season. The species appears to require some degree of bare ground which may be provided by livestock grazing, prairie dog (*Cynomyes spp*.) towns, disturbed areas around windmills and water tanks, tilled agricultural fields, and barren playas. Nests often are located near prominent objects such as woody plants, cow manure, rocks, fence posts, and power poles (BISON-M 2009b). Mountain plovers are very rare summer residents in the mid and upper elevation grasslands of the Trans-Pecos and in open grasslands of the northwestern Panhandle (TPWD 2003). Mountain plovers could potentially occur in the Study Area.

Prairie Falcon (*Falco mexicanus*)

Prairie falcons are a state and federal rare species of concern (TPWD 2010d) and are protected under the MBTA. This bird is a large falcon of the arid American West and is a winter, non-breeding resident of western Texas. Prairie falcons utilize dry grasslands and prairies, and locally alpine tundra for hunting small- to medium-sized mammals and birds. The bird usually requires cliffs for nest sites. Prairie falcons could potentially occur in the Study Area.

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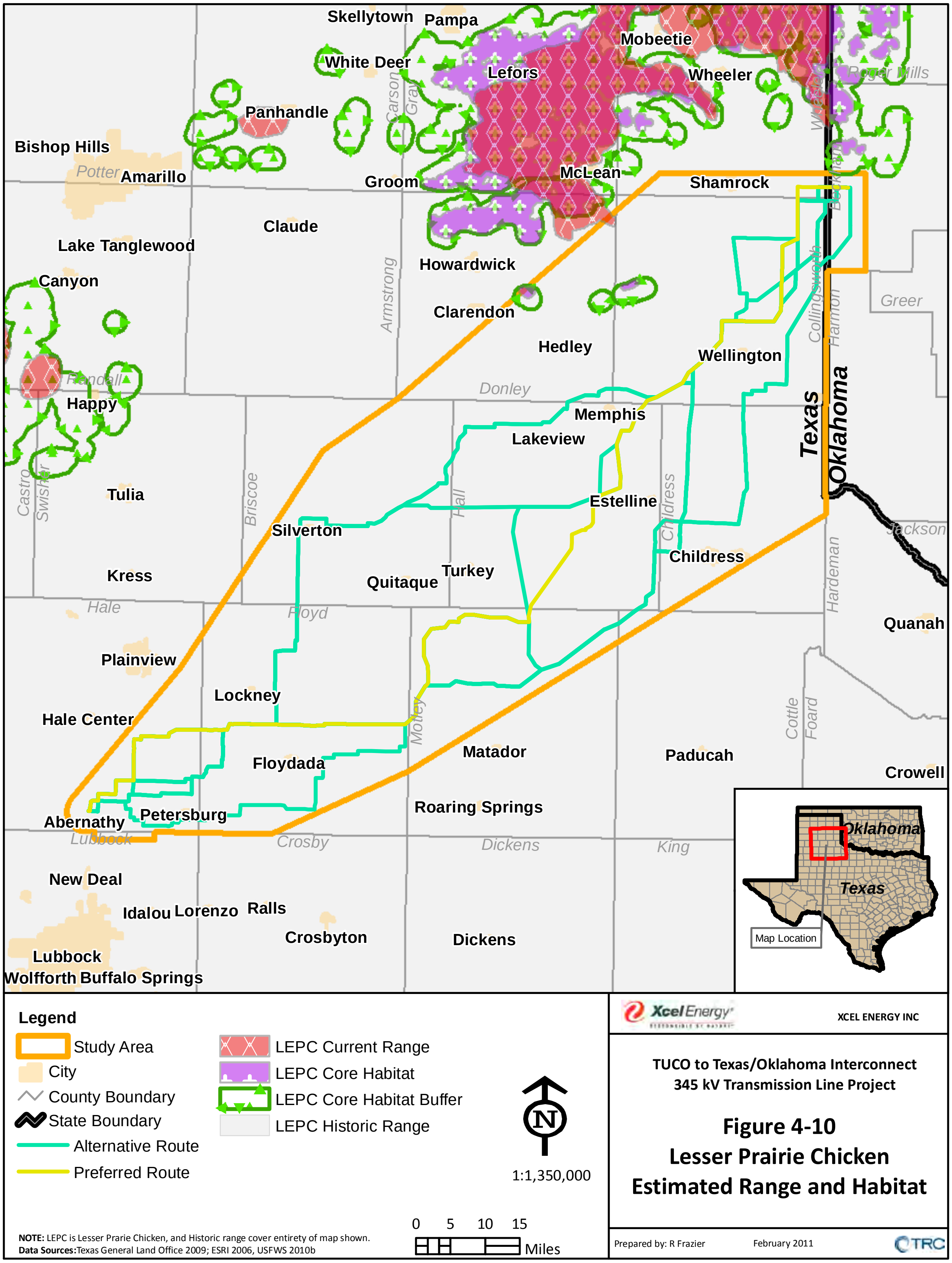

Figure 4-10
Lesser Prairie Chicken Estimated Range and Habitat

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<u>Snowy Plover (*Charadrius alexandrinus*) and Western Snowy Plover (*C. alexandrinus nivosus*)</u>

The snowy plover and its subspecies, the western snowy plover, are state-listed as rare species of concern (TPWD 2010d) and are protected under the MBTA. Reference is generally only made to the species given their similarity in appearance. Snowy plovers are rare to uncommon summer residents, primarily at saline lakes, at scattered locations in the western half of Texas (Lockwood and Freeman 2004). Snowy plovers require shore-lines for foraging where they probe for invertebrates. Habitat includes barren to sparsely vegetated dry salt flats in lagoons, dredge soils deposited on dune habitat and levees and flats at salt-evaporation ponds, river bars, along alkaline or saline lakes, reservoirs, and ponds (Cornell University 2009). Snowy plovers may also be present at playa lakes, but this is not their preferred habitat. Snowy plovers may occur in the Study Area, but given no salt lakes are present, any snowy plovers found within the Study Area are likely transients.

<u>Western Burrowing Owl (*Athene cunicularia hypugaea*)</u>

The western burrowing owl is state-listed as a rare species of concern (TPWD 2010d) and is protected under the MBTA (Wicker 2010). Western burrowing owl habitat requirements include open grasslands, especially prairie, plains, and savanna. They sometimes occupy open areas such as vacant lots near human habitation or airports and are often associated with black-tailed prairie dog (*Cynomys ludovicianus*) colonies (TPWD 2003). Western burrowing owls winter throughout much of Texas and are year-round residents in the western half of Texas. The owls can excavate their own burrows but prefer to use abandoned burrows of other animals, including black-tailed prairie dog. During breeding, the owls will enlarge a main nesting burrow but will maintain and utilize a number of smaller burrows. Resident pairs will keep the same territory throughout the year. Western burrowing owls potentially could occur within the Study Area.

<u>Whooping Crane (*Grus americana*)</u>

The whooping crane is a federally and state-listed endangered species (TPWD 2010d) and is protected under the MBTA. Whooping cranes breed in the wetlands of Wood Buffalo National Park in northern Canada and winter on the salt flats and marshes of the Texas coast at Aransas National Wildlife Refuge near Rockport, Texas. An estimated 10,000 whooping cranes were present in North America during pre-colonial times and as of October 2009 there were a total of 534 whooping cranes in North America (Stehn 2009). Population declines have historically been associated with habitat loss, and in addition, collisions with power lines currently are a source of concern regarding mortality for fledged whooping cranes (Stehn and Wassenich 2008).

The whooping crane migration route includes the Great Plains region between northern Canada and the Texas coast, with the fall migration south to Texas beginning in mid-September and the spring migration north to Canada beginning in late March or early April. The whooping crane migration corridor is essentially a straight line of 2,400 miles from central Canada to Texas. Migration along this route takes approximately 1.5 months to complete. Whooping cranes primarily migrate in groups of one to five birds (Johns et al. 1997) during daylight hours at an altitude of 1,000 to 6,200 feet when thermal currents are optimal, and gliding downward in the evening at up to 62 miles per hour to roost in shallow wetlands (USFWS 2009). Whooping cranes in migration are most vulnerable to impacting structures in the early morning and late evenings when light is diminished. Research suggests that approximately 80 percent of the fledged whooping cranes fatalities occur during migration (Lewis et al. 1992). Based on an initial review of the Study Area, the USFWS noted that a portion of the Study Area in Childress, Collingsworth and Wheeler Counties lies within the 200-mile wide whooping crane migration corridor (Cloud, Jr. 2010). Whooping cranes could potentially occur in the Study Area as migrants.

Black-footed ferret (*Mustela nigripes*)

The black-footed ferret is federally-listed as an endangered species under the ESA and state-listed as a rare species of concern in all Study Area counties except Beckham County, Oklahoma (TPWD 2010d). Black-footed ferrets formerly inhabited black-tailed prairie dog colonies in northwestern Texas but are now considered extirpated (TPWD 2003). Populations declined dramatically in the 1980s, with the last known natural population found at Meeteetse, Wyoming, in 1981. The black-footed ferret requires shortgrass prairies in close proximity to prairie dog towns. Ninety percent of this animal's diet is comprised of prairie dogs, and the ferrets also utilize prairie dog burrows for shelter and raising families. Black-footed ferrets are primarily nocturnal and are active throughout the winter. Black-footed ferrets have been reintroduced in approximately five states, but are considered extirpated from Texas and are unlikely to occur in the Study Area.

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

The black-tailed prairie dog is state-listed as a rare species of concern (TPWD 2010d). Black-tailed prairie dogs are diurnal, burrowing animals found in dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle. The species lives in large family groups (TPWD 2003). The black-tailed prairie dog is a keystone species which provided food/shelter for other rare species, such as the ferruginous hawk and western burrowing owl, as well as other wildlife species (Wicker 2010). There is one record of a prairie dog town in the TXNDD within the Study Area, in Floyd County (last observed in 1985) (Wicker 2010), and one record, also last observed in 1985, of a prairie dog town just outside the Study Area boundary in southeastern Floyd County. Black-tailed prairie dogs could potentially occur in the Study Area.

Cave Myotis Bat (*Myotis velifer*)

The cave myotis bat is federally and state-listed as a rare species of concern (TPWD 2010d). The TPWD's Annotated County Lists of Rare Species includes the cave myotis bat as potentially occurring in all Study Area counties except Hale and Beckham Counties. Cave myotis bats are colonial and cave-dwelling, also roosting in rock crevices, old buildings, carports, under bridges, and even in abandoned cliff swallow (*Hirundo pyrrhonota*) nests. The species roosts in clusters of up to thousands of individuals and hibernates in limestone caves of the Edwards Plateau and gypsum caves of the Panhandle during winter (TPWD 2003). The TXNDD has no recorded occurrences of cave myotis bats within the Study Area, although it does have a recorded occurrence of the bat outside the Study Area boundary in Cottle County

(Wicker 2010). During an initial review of the Study Area, TPWD indicated that historical records not captured in the TXNDD indicate that this species may inhabit several gypsum caves in the Study Area, such as those in the Pease River drainage and the Prairie Dog Town Fork of the Red River drainage (Wicker 2010). The cave myotis bat could potentially occur in the Study Area.

Gray Wolf (*Canis lupus*)

The gray wolf is a federally and state-listed endangered species (TPWD 2010d; USFWS 2010a). Gray wolves were formerly known throughout the western two-thirds of Texas in forests, brushlands, or grasslands, but are now extirpated from Texas (TPWD 2003). Gray wolves are very unlikely to occur in the Study Area.

Pale Townsend's Big-eared Bat (*Corynorhinus townsendii pallescens*)

The pale Townsend's big-eared bat is federally and state-listed as a rare species of concern (TPWD 2010d; USFWS 2010a). The TPWD's Annotated County Lists of Rare Species includes this species as potentially occurring in all Study Area counties. The TXNDD shows no recorded occurrences for the pale Townsend's big-eared bat within the Study Area. Pale Townsend's big-eared bats roost in caves, abandoned mine tunnels, and occasionally old buildings. The bat hibernates in groups during winter. In summer months, males and females separate into solitary roosts and maternity colonies, respectively (TPWD 2003). Pale Townsend's big-ear bat could potentially occur in the Study Area.

Palo Duro Mouse (*Peromyscus truei comanche*)

The Palo Duro mouse is state-listed as a threatened species and is a federal rare species of concern (TPWD 2010d). The TPWD's Annotated County Lists of Rare Species includes this species as potentially occurring in Briscoe, Floyd, and Motley Counties. The TXNDD shows recorded occurrences for the Palo Duro mouse within the Study Area in Briscoe County, in Caprock Canyons State Park. Palo Duro mice occur in rocky, juniper, and mesquite covered slopes of steep-walled canyons of the eastern edge of the Llano Estacado and juniper woodlands in canyon country of the panhandle (TPWD 2003). The Palo Duro mouse could potentially occur in the Study Area, but is likely limited to Caprock Canyons State Park.

Plains Spotted Skunk (*Spilogale putorius interrupta*)

The plains spotted skunk is federally and state-listed as a rare species of concern (TPWD 2010d; USFWS 2010a). The TPWD's Annotated County Lists of Rare Species (TPWD 2010d) includes this species as potentially occurring in all Study Area counties. The TXNDD shows no recorded occurrences for the plains spotted skunk in the Study Area. The eastern spotted skunk/plains spotted skunk, (*Spilogale putorius*), and the western spotted skunk, (*Spilogale gracilis*), are closely related and have alternately been considered the same or separate species by different mammalogists. *Spigale putorius interrupta* ranges from the Canadian border in Minnesota south to the Mexican border, primarily east of the Rocky Mountains to the Mississippi River. Plains spotted skunks occupy a wide range of habitat including open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands. They prefer wooded, brushy areas and tallgrass prairie (TPWD 2003). The plains spotted skunk could potentially occur in the Project Area.

<u>Swift Fox (*Vulpes velox*)</u>

The Swift Fox is listed as a state rare species of concern (TPWD 2010d). The range of the swift fox in Texas is limited to the northern and western portions of the Panhandle Region. Vegetation in swift fox habitat is usually sparse and short, dominated by short- and mid-grass species. The swift fox has one litter per year and usually breeds in late December or January. After a mean gestation period of 51 days, a litter of three to six pups are born in March or early April. The pups emerge from the natal den at approximately 1 month and continue to occupy the den throughout the summer, although their parents may move them to different den sites several times. Dispersal of the young usually begins in August or September and continues through the fall and winter. Adult swift foxes usually live in pairs, although three adults may sometimes raise a litter. The swift fox has been described as the most subterranean of all North American canids, and natal dens are usually located on higher ground. The swift fox is primarily nocturnal, and diurnal behavior is usually restricted to sunning activities around den sites. The swift fox has the potential to occur in Briscoe, Donley, Floyd, Hale, Lubbock, Swisher, and Wheeler Counties. The TXNDD shows recorded occurrences for the swift fox in the Study Area in Floyd and Hale Counties (Wicker 2010).

<u>Texas Kangaroo Rat (*Dipodomys elator*)</u>

The Texas kangaroo rat is federally and state-listed as a rare species of concern (TPWD 2010d; USFWS 2010a). The TPWD's Annotated County Lists of Rare Species (TPWD 2010d) includes this species as potentially occurring in Childress, Cottle, and Motley Counties. The TXNDD shows recorded occurrences of Texas kangaroo rat within the Study Area in Donley County. Texas kangaroo rats are found mostly in association with scattered mesquite (*Prospis glandulosa*) shrubs and sparse, short grasses in areas underlain by firm clay soils and along fencerows adjacent to cultivated fields or roads. They burrow into soil with openings usually at the base of mesquite or shrubs (TPWD 2003). Texas kangaroo rats could potentially occur in the Study Area.

4.5 Community Values and Resources

The term "community values" is included as a factor for the consideration of transmission line certification under the PURA § 37.056(c)(4), but this term has not been specifically defined in the statute or by the PUC. Recently, the PUC has included issues such as those listed below within the discussion of community values. These are discussed in this section unless otherwise noted.

- Public meetings or public open houses are discussed in Section 2.5.2 (Section 17 of the PUC CCN Application Form).
- Approvals or permits required from other governmental agencies are discussed in Section 1.3 (Section 19 of the PUC CCN Application Form).
- Segment descriptions that comprise the Alternative Routes are provided in Appendix E.
- Habitable structures within 500 feet of the centerline of the proposed Project (Section 20 of the PUC CCN Application Form) are discussed in Section 5.6.1 and listed in a table provided in Appendix G.
- AM, FM, microwave, and other electronic installations in the area (Section 21 of the PUC CCN Application Form).

- Federal Aviation Administration-registered airstrips, private airstrips, and heliports located in the area (Section 22 of the PUC CCN Application Form).
- Irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems (Section 23 of the PUC CCN Application Form).
- Comments received from community leaders and members of the public are included in Appendix D.

In addition to the aforementioned items, the Project Team also evaluated the Project for community resources, designated scenic vistas, and state-registered institutions such as churches, hospitals, nursing homes, schools, and day care centers.

The Project Team sent consultation letters, conducted numerous meetings with elected and appointed officials, and hosted open house public meetings (see Section 2.5.2) to identify and collect information regarding community values and community resources. In general, the Study Area is sparsely populated with limited concentrated communities and community services. In the Study Area, there are 136 churches, 14 health clinics, nine nursing homes, six hospitals, 13 day care centers, and 28 schools with a total of 6,047 students. No hospitals, day care facilities, churches, nursing homes, or schools are located within 500 feet of the centerline of the Preferred Route or any of the Alternative Routes. Section 5.6.1 and Appendix G provide additional information on habitable structures within 500 feet of the centerline of the Preferred and Alternative Routes.

The Project Team consulted with the USDA FSA to determine the location of Conservation Reserve Program (CRP) lands within the Study Area. Because of privacy provisions in a Farm Bill, the specific locations of CRP lands are not available to the public. In lieu of location data, SPS obtained a list of landowners enrolled in the CRP in the Study Area counties through a Freedom of Information Act request (see Appendix A). According to this information, the number of participants enrolled in the CRP for all counties in the Study Area is 4,683. Given this number of participants enrolled in the CRP in the Study Area counties, it is possible the Preferred Route and Alternative Routes traverse CRP lands. Following CCN issuance, SPS will consult with affected landowners along the certificated route, identify the location of CRP lands within the ROW, determine the remaining term of CRP enrollment, and coordinate with the USDA-FSA and landowner to obtain easement acquisition across these lands.

The Project Team consulted with the USDA-NRCS to determine the location of Farm and Ranchland Protection Program, Grasslands Reserve Program, and Wetlands Reserve Program (WRP) lands within the Study Area. Based on this consultation (see Appendix A), no lands within the Study Area are enrolled in the Farm and Ranchland Protection Program, Grasslands Reserve Program, or WRP.

The Project Team also consulted with the Archaeological Conservancy, Audubon Texas, Native Prairies Association of Texas, The Nature Conservancy, The Texas Land Conservancy, Playa Lakes Joint Venture, and Quail Tech Alliance. There is one conservation easement held by The Nature Conservancy within the Study Area, located at Elm Fork Ranch in Collingsworth County (see Appendix A). No other distinct conservation easements or properties associated with these entities were identified.

Table 4-4 presents census population data for the counties in the Study Area. Growth rates in the Study Area range from -1.64 percent per year (Cottle County) to 2.59 percent per year (Childress County), with an overall 0.68 percent per year growth rate.

The U.S. Census Bureau classifies 13 major sectors of employment in the Study Area. The sectors of employment vary from county to county, but for most of the counties in the Study Area, the three industries with the greatest number of employees are: (1) agriculture, forestry, hunting and fishing, and mining; (2) retail trade; and (3) educational, health, and social services (U.S. Census Bureau 2000).

TABLE 4-4

1990 and 2000 Census Data for Study Area

	Census 2000	Census 1990	Percent Change	Growth Rate (percent per year)	County Area (Square Miles)	Population Density (Census 2000) (per square mile)
Beckham County, Oklahoma	19,799	18,812	5.25	0.51	905	21.9
Briscoe County, Texas	1,790	1,971	-9.18	-0.96	901.59	2.0
Childress County, Texas	7,688	5,953	29.14	2.59	713.61	10.8
Collingsworth County, Texas	3,206	3,573	-10.27	-1.08	919.44	3.5
Cottle County, Texas	1,904	2,247	-15.26	-1.64	901.59	2.1
Donley County, Texas	3,828	3,696	3.57	0.35	933.05	4.1
Floyd County, Texas	7,771	8,497	-8.54	-0.89	992.51	7.8
Hale County, Texas	36,602	34,671	5.57	0.54	1,004.77	36.4
Hall County, Texas	3,782	3,905	-3.15	-0.32	904.08	4.2
Lubbock County, Texas	242,628	222,636	8.98	0.86	900.7	269.4
Motley County, Texas	1,426	1,532	-6.92	-0.71	989.81	1.4
Swisher County, Texas	8,378	8,133	3.01	0.30	900.68	9.3
Wheeler County, Texas	5,284	5,879	-10.12	-1.06	915.34	5.8
All Counties in Study Area	344,086	321,505	7.02	0.68	11,882.17	28.8
Source: U.S. Census 2000						

4.6 Land Use

The Study Area is sparsely settled with few residences; the predominant land use is open rangeland/pasture or cropland. Information on land use is provided below.

4.6.1 Urban/Residential Areas and Habitable Structures (Section 20 of the PUC CCN Application Form)

The average population density of the counties within the Study Area is 28.8 persons per square mile (see Table 4-5 for Census 2000 data). All of the Study Area within Lubbock County is outside of the metropolitan area of the City of Lubbock. Outside of Lubbock County, the average population density in the Study Area is only nine persons per square mile. Existing incorporated areas are concentrated near the major and secondary transportation routes located in the Study Area. Table 4-5 presents information on the municipalities in the Study Area.

Single-family residences are scattered throughout the Study Area on larger tracts along the various Farm-to-Market roads and County Roads in predominately undeveloped open land. Through a combination of aerial photograph interpretation and field reconnaissance, the Project Team identified habitable structures located within 500 feet of the centerline of each Alternative Route. Appendix G contains a table listing all habitable structures located within 500 feet of the Alternative Route Segments. This table presents the type of structure, distance, and direction from the route centerline, and a description of the habitable structure and any related or associated structures.

TABLE 4-5

Community Data for Towns/Cities within the Study Area

Name	County, State	Population*
Abernathy	Hale, Texas	2839
Childress	Childress, Texas	6778
Dodson	Collingsworth, Texas	115
Estelline	Hall, Texas	168
Floydada	Floyd, Texas	3676
Hedley	Donley, Texas	379
Lakeview	Hall, Texas	152
Lockney	Floyd, Texas	2056
Memphis	Hall, Texas	2479
Petersburg	Hale, Texas	1262
Quitaque	Briscoe, Texas	432
Shamrock	Wheeler, Texas	2029
Silverton	Briscoe, Texas	771
Turkey	Hall, Texas	494
Wellington	Collingsworth, Texas	2275
Erick	Beckham, Oklahoma	1,023
Texola	Beckham, Oklahoma	27

Sources: *Data from U.S. Census 2000

4.6.2 Parks and Recreation Areas (Section 25 of the PUC CCN Application Form)

Inspection of GIS data sources (including Geographic Names Information System, StratMap, TPWD, and the Texas General Land Office) revealed 10 parks (one state park and nine local or county parks) within the Study Area; however, only one park, Caprock Canyons State Park and Trailway, is located within 1,000 feet of the centerline of the Preferred Route or any of the Alternative Routes. Additional information on Alternative Routes in relation to the trailway is provided in Section 5.6.2.

There are no federal parks in the Study Area.

4.6.3 Irrigation Systems (Section 23 of the PUC CCN Application Form)

Throughout the region and Study Area, agriculture is an important segment of the economy and is represented mostly by rangeland/pasture and cropland. The Study Area is located within both the Texas Agriculture Statistics Service District No. 1 North – Northern High Plains, and District No. 2 North – Northern Lower Plains.

Every county within the Study Area raises cattle, for beef production, as the main livestock. Hale County also uses cattle for dairy production, and has a large amount of hogs. Corn is the most harvested crop (17,811,000 bushels) in the Study Area. Other crops include grain (10,179,000 bushels), wheat (4,881,400 bushels), cotton (1,287,900 bales), peanuts (38,600,000 pounds), and sunflower seeds (21,450,000 pounds) (USDA 2007, 2010).

Portions of land in this area are mechanically irrigated via commercial radial/pivotal or lateral movement watering systems. Figure 2-1 (Sheets 1-7) (Appendix B) identifies irrigated lands in the Study Area.

4.6.4 Aesthetics

Aesthetic values of the Study Area must be considered as a factor for transmission-line corridors per PURA § 37.056(c)(4)(A)-(C). The scenic qualities that make up the aesthetic value of an area include: topographic variations, rivers, vegetative variety, degree of human development, and uniqueness of the landscape relative to other surrounding locations. The Study Area is largely undeveloped open land and exhibits several general types of landscapes that contribute to the area's scenic qualities. These landscape categories include large tracts of flat open lands; some more hilly terrain with shrubland areas; and creeks and their associated canyons and outwash areas.

There are no designated federal, state, or local scenic areas in the Study Area; however, the Texas Department of Transportation has mapped several travel trails throughout Texas that have special cultural and or scenic interest. One of these trails, the Texas Plains Trail, is partly located within the Study Area. The Texas Plains Trail is a driving route/trail in northeastern Texas that explores areas of scenic, historic, and cultural interest. Table 4-6 lists the alternative segments which cross the trail.

TABLE 4-6 Route Segments Crossing the Texas Plains Trail	
Route Segment	**County**
HH	Motley
QQ	Motley
AQ	Hall
AO	Hall
AI	Briscoe

4.6.5 Transportation/Aviation

4.6.5.1 Roadways

The existing transportation system in the region is an extensive system of county roads, farm-to-market roads, state highways, and U.S. highways. Major roadways in the Study Area are depicted on Figure 2-1, (Sheets 1-7) (Appendix B) and described in Table 4-7.

TABLE 4-7 Description of Highways in the Study Area	
Highway	**Description**
Interstate Hwy 27	Interstate Hwy 27 runs in a north-south direction, crossing the southwestern tip of the Study Area in Hale County, and passing through the city of Abernathy.
Interstate Hwy 40	Interstate Hwy 40 runs in an east-west direction in the northeastern portion of the Study Area, in southern Wheeler County. Along this length of the route, it passes through the city of Shamrock.
U.S. Hwy 62	U.S. Hwy 62 crosses through the Study Area at several locations. In the southern portion of the Study Area in Floyd County, U.S. Hwy 62 runs north-south until reaching the city of Floydada where it changes to an east-west direction through the remainder of Floyd County. Furthermore, It occurs in the Study Area again in Childress County, returning to a north-south direction for about 20 miles before changing to an east-west direction.
U.S. Hwy 70	U.S. Hwy 70 crosses the southwestern portion of the Study Area in a northwest-southeast direction in Hale and Floyd counties, passing through the cities of Lockney and Floydada.
U.S. Hwy 287	U.S. Hwy 287 crosses near the center to northeast portion of the Study Area in a northwest-southeast direction, passing through Donley, Hall, and Childress Counties, and cities of Memphis and Childress.
U.S. Hwy 83	U.S. Hwy 83 is located in the eastern portion of the Study Area and runs in a north-south direction in Wheeler, Collingsworth, and Childress Counties, and becomes U.S. Hwy 62 in northern Childress County. U.S. Hwy 83 passes through the cities of Shamrock and Wellington.
State Hwy 207	State Hwy 207 runs in a north-south direction through Briscoe and Floyd Counties, passing through the city of Floydada, and connecting to U.S. Hwy 62.
State Hwy 86	State Hwy 86 is located in the center of the Study Area in an east-west direction, passing through Briscoe and Hall Counties. No notable cities are crossed by this state highway.
State Hwy 256	State Hwy 256 runs west to northeast toward the center of the Study Area, branching off of State Hwy 86 in Briscoe County, continuing in a north-south direction with State Hwy 70, and remaining in an east-west direction through Hall and Childress Counties and the city of Memphis until ending at

TABLE 4-7 Description of Highways in the Study Area	
Highway	**Description**
	U.S. Hwy 83.
State Hwy 70	State Hwy 70 is located toward the center of the Study Area running in a north-south direction through Donley, Briscoe, Hall, and Motley Counties. In Hall County, it connects with State Hwy 256 and intersects State Hwy 86.
State Hwy 203	State Hwy 203 branches off of U.S. Hwy 287 and runs east-west through Donley and Collingsworth Counties in the northeastern portion of the Study Area. It intersects U.S. Hwy 83 in the city of Wellington.
State Hwy 273	State Hwy 273 occurs briefly in the northeastern portion of the Study Area running in a north-south direction in Donley County, and ending at State Hwy 203.

4.6.5.2 Aviation Facilities (Section 22 of the PUC CCN Application Form)

A review of aerial photographs, U.S. Geological Survey (USGS) topographic maps, and airport data, shows there are 13 active Federal Aviation Administration (FAA) Registered public airports within the Study Area (FAA 2010). Section 5.6.5.2 provides information on airstrips in relation to Alternative Routes.

4.6.5.3 Electronic Installations (Section 21 of the PUC CCN Application Form)

There are 128 communication towers throughout the Study Area, including Amplitude Modulation (AM) and Frequency Modulation (FM) radio transmitters, cellular towers, microwave relay stations, and other types of tower structures with a wide variation of heights and tower construction. Communication towers within the Study Area are depicted on Figure 2-1, Sheets 1-7 (Appendix B). Towers located near the center line of Alternative Route Segments are discussed in Section 5.6.6.

4.6.6 Coastal Management Program (Section 27 of the PUC CCN Application Form)

The Study Area is not located within the State of Texas Coastal Zone Boundary as defined in 31 TAC § 503.1; therefore, the Project is not subject to the CCN requirement for coastal zone management consistency approval.

4.7 Historical and Archaeological Sites (Section 26 of the PUC CCN Application Form)

The Study Area includes portions of the Southern High Plains of Texas, the Caprock Canyonlands, and the Panhandle as defined by Perttula (2004), or the High Plains and Lower Plains as defined by Biesaart et al. (1985). Figure 4-11 depicts the archaeological planning regions of Texas.

The Project Team consulted the Texas Historical Commission's (THC) Archaeological Sites Atlas, the Oklahoma Archaeological Survey, and other relevant sources to determine whether prehistoric or historic archaeological sites are located within or near the proposed Alternative Routes. The goal was to identify archaeological sites, historic properties, standing structures, and historic cemeteries that could be located within or adjacent to the power line corridors.

The literature review identified sites with respect to specific cultural periods, including the prehistoric, protohistoric, and historic periods. The literature review also was correlated with geological, watercourse, and landform data to define high, medium, and low probability areas for as yet unidentified cultural resources (see Figure 4-11).

The Project Team has identified 17 locations of previously recorded archaeological sites along the proposed Alternative Routes; these locations are summarized in Table 4-8.

Seven of these locations may be eligible for the National Register of Historic Places (NRHP). All of the remaining locations identified with the exception of site 41CI11 are considered to have unknown potential for NRHP eligibility given the lack of sufficient data to make this determination. Site 41CI11 is not considered eligible as the THC Atlas states that it was destroyed during the construction of Baylor Lake. For a cultural resource to be eligible for the NRHP, it must possess integrity of location, design, setting, materials, workmanship, feeling, and association. Not all seven aspects of integrity must be present for a resource to be eligible for the NRHP, but overall, a resource must retain the defining features and characteristics that were present during its period of significance. In addition, the cultural resource must meet one or more of the following criteria:

A. Be associated with events that have made a significant contribution to the broad patterns of our history; or

B. Be associated with the lives of persons significant in our past; or

C. 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 value, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or

D. Have yielded or may be likely to yield information important in prehistory or history (NPS 1994, 36 CFR §§ 800.3-800.13).

4.7.1 Cultural Background

The archaeological record of the Study Area consists of five periods: Paleoindian (9500–5500 B.C.), Archaic (5500 B.C.–A.D. 250), Late Prehistoric (A.D. 250–1450), Protohistoric (A.D. 1450–1800), and Historic (A.D. 1800–Present).

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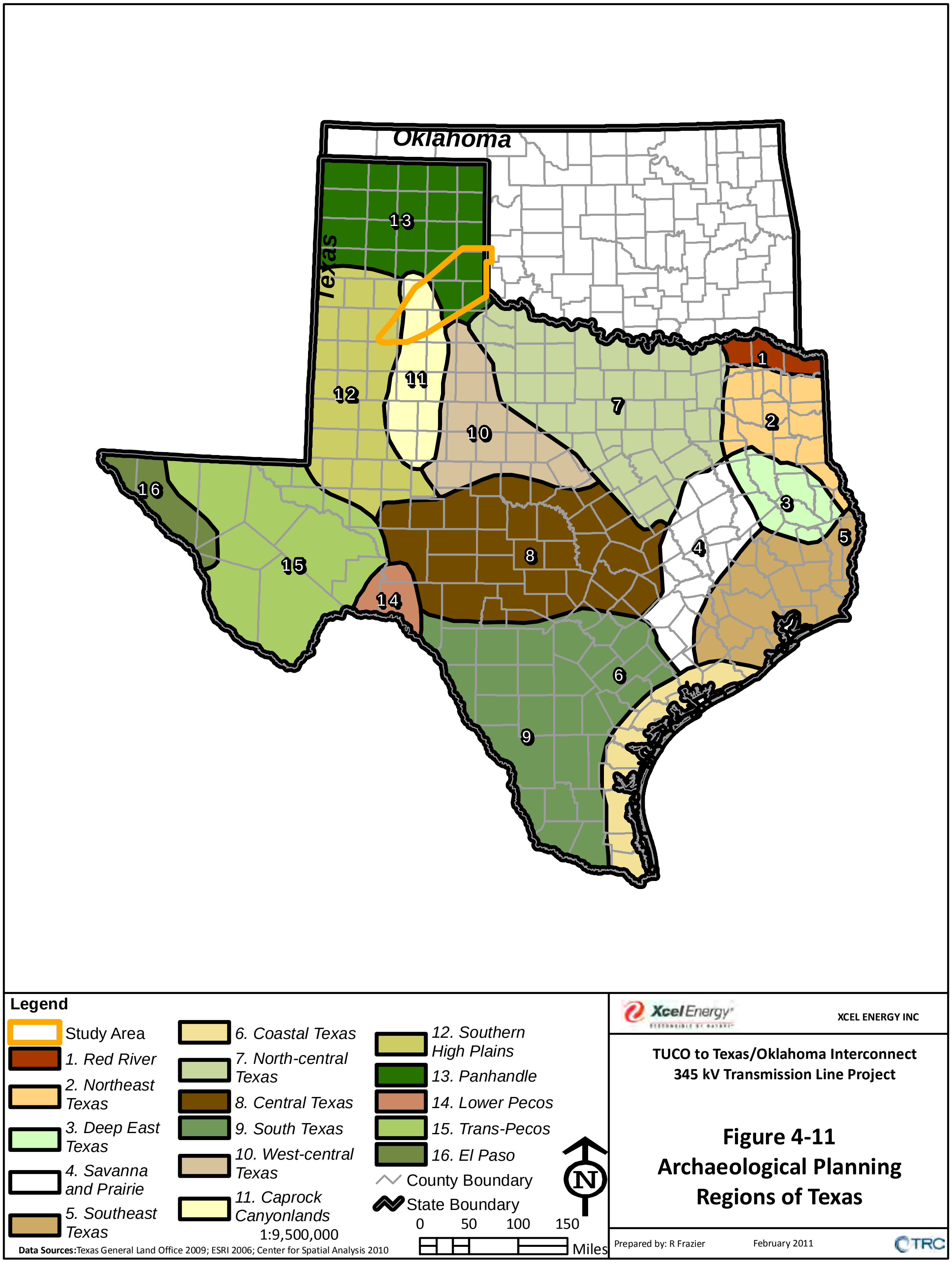

TUCO to Texas/Oklahoma Interconnect
345 kV Transmission Line Project

Figure 4-11
Archaeological Planning Regions of Texas

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TABLE 4-8

Previously Recorded Archaeological Locations Within 1,000 Feet of Proposed Center Lines

Quad	Site Number	Segment Transected	Alternative Routes	Distance from Route Centerline (feet)	Cultural Affiliation	NRHP Eligible	Site Description	Additional Comments
Lesley	41HL63	AZ	3, 4	713	Archaic	Possible	Small temporary campsite; subsurface artifacts noted at approx 1 foot below surface; 'dartpoint base', flakes, burned rock; heavily collected	Recorded by Charles Hood, 1974
Folley	41MY12	QQ	16, 17, 18, 19	281	Prehistoric	indeterminate	Lithic scatter	Recorded by J. Brett Cruse, 1981
Parnell	41HL4	AQ	1, 2, 5, 20	421	Late Prehistoric	Possible	Artifact scatter with feature; hearth, debitage, bone, Harrell and Fresno serrated corner notched points, Williams point,	Recorded by A. V. McFarland, 1968, but record notes that last visit in 1954?
Hughes Canyon	41HL53	AO	1, 2, 5, 6	430	Late Prehistoric	Indeterminate	Camp exposed by edgewash, little debitage and burned rock.	Recorded by J. Hughes of WTSU in 8/1973
Hughes Canyon	41HL49	AO	1, 2, 5 ,6	522	Archaic	indeterminate	Late prehistoric, Camp/quarry, hearths, debitage, burned rock	Recorded by J. Hughes of WTSU in 8/1973
Hughes Canyon	41HL60	AO	1, 2, 5 ,6	432	Archaic	indeterminate	Camp exposed by edge wash and road cut; little debitage and few burned rocks, 'other' artifacts	Recorded by J. Hughes of WTSU in 8/1973
Hughes Canyon	41HL61	AO	1, 2, 5 ,6	965	Prehistoric	indeterminate	Archaic, Camp exposed by edge wash; little debitage and few burned rocks, 'other' artifacts	Recorded by J. Hughes of WTSU in 8/1973
Heel Fly Draw	41HL16	AO	1, 2, 5 ,6	559	Archaic	Possible	Camp/quarry exposed by edge wash; hearths, burned rock, debitage	Recorded by J. Hughes of WTSU in 7/1973
Heel Fly Draw	41HL22	AO	1, 2, 5 ,6	775	Prehistoric	Possible	Archaic, Campsite exposed by edge wash; hearths, debitage, 'other' artifacts	Recorded by J. Hughes of WTSU in 7/1973

TABLE 4-8

Previously Recorded Archaeological Locations Within 1,000 Feet of Proposed Center Lines

Quad	Site Number	Segment Transected	Alternative Routes	Distance from Route Centerline (feet)	Cultural Affiliation	NRHP Eligible	Site Description	Additional Comments
Heel Fly Draw	41HL27	AO	1, 2, 5 ,6	659	Archaic	Indeterminate	Prehistoric, Quarry/camp site exposed by edge wash, debitage and burned rocks noted, also 'other artifacts'	Recorded by J. Hughes of WTSU in 7/1973
Heel Fly Draw	41HL26	AO	1, 2, 5 ,6	895	Prehistoric	Indeterminate	Archaic, Quarry/camp site exposed by edge wash; debitage, burned rock, 'other' artifacts	Recorded by J. Hughes of WTSU in 7/1973
Plaska	41HL8	AQ	1, 2, 5 ,20	915	Unknown	Possible	Prehistoric, "Permanent, shelter construction unknown"; "unusual amount" burned rock, debitage, "expertly finished" flaked stone tools, bone, shell; subsurface deposits probable; large site, 0.25 mi from farm house	Recorded by A. V. McFarland, 1968, but noted last visit was 1966?
Wellington NW	41CG5	EP	12	933	Prehistoric	Possible	Late prehistoric, artifact scatter "probable campsite" residential; pottery, Harrell points, beveled knives, drills, triangular side-notched points, groundstone, debitage including obsidian, bone, burned rock	Recorded by L.R. Christo, 1969. surveyed by H&GN Ry Co. Copyright 11/01/1953
Floydada	41FL10	J	15	47	Archaic	indeterminate	Archaic, the Texas Archeological Research Laboratory (TARL) key site card only "information in files: more to come from Jim Word"	probably recorded by James H. Word
Floydada	41FL29	H	15	647	Prehistoric	Possible	Unknown Prehistoric, S bank of White River channel. Cut has exposed hearth with charcoal and bone subsurface deposits.	Recorded by James H. Word, 1971
Sandhill/Floydada	41FL8	H	15	12	Prehistoric	indeterminate	Prehistoric, points, scrapers, hearth stones and debitage	Recorded by James H. Word, 1970

TABLE 4-8

Previously Recorded Archaeological Locations Within 1,000 Feet of Proposed Center Lines

Quad	Site Number	Segment Transected	Alternative Routes	Distance from Route Centerline (feet)	Cultural Affiliation	NRHP Eligible	Site Description	Additional Comments
Carey	41CI11	AD	7, 9, 11, 12, 13, 14, 15, 16, 17, 18	147	Prehistoric	No	Unknown Prehistoric, Marcos points, site destroyed by construction of Baylor Lake	Re-recorded by Carolyn Spock, 1994

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4.7.1.1 Paleoindian Period (ca. 9500–5500 B.C.)

The earliest evidence of humans on the High Plains (Llano Estacado) and adjacent Rolling Plains of Texas is material associated with the Paleoindian period when the Pleistocene-Holocene transition in climatic conditions occurred. This transition was marked by a change from a somewhat cool period with little seasonal differentiation to one with warmer temperatures and more seasonal differentiation that resulted in an overall reduction in the plant biomass (Johnson and Holliday 1995, Quigg et al. 1993). The Paleoindian period (9500–5500 B.C.), is divided into three subperiods or complexes named for different cultural groupings: Clovis (9500–9000 B.C.), Folsom (9000–8000 B.C.), and Plano (8000–5500 B.C.). Stylistically distinct projectile points associated with late Pleistocene and early Holocene megafauna characterize these complexes. In addition, Paleoindian chipped stone assemblages exhibit a very refined and standardized technology. Campsites most frequently occurred on hills, and kill/butchering locales were associated with playas or streams (Wendorf and Hester 1962; Johnson and Holliday 1995).

Currently, many researchers now view Paleoindian groups, such as the Clovis peoples, as more generalized hunter-gatherers who also exploited a variety of floral and smaller faunal resources (Cordell 1997; Ferring 1995; Haynes and Haury 1982; Johnson 1987; Moore 1996). Recent research by Waguespack and Surovell (2003), however, suggests Clovis hunting behavior was more specialized (i.e., focal) rather than generalized (i.e., diffuse). Other Paleoindian groups, like Folsom and Plano peoples, likely “placed more emphasis on large-game hunting and less on collecting plant foods that required extensive processing” (Moore 1996). By the end of the period, only modern fauna remained.

The diagnostic artifact for Clovis components is the large lanceolate Clovis spear point, which exhibits a single short basal flute on both faces. The Clovis tool kit also includes spurred end scrapers; large unifacially flaked side scrapers; keeled scrapers on large blades; flake knives; backed worked blades; gravers; perforators; shaft straighteners; and bone points and foreshafts (Gunnerson 1987:10). Surface finds and a few excavated assemblages occur throughout North America. The Clovis type site, Blackwater Draw, is between the towns of Clovis and Portales, New Mexico, southwest of the Study Area. Lubbock Lake (41LU1), just south of the Study Area, has a Clovis component (Bousman et al. 2004; Holliday et al. 1983, 1985; Johnson 1987).

Folsom assemblages, discerned by the production of small, finely made lanceolate points, are indicative of a hunting and gathering subsistence economy that focused on the seasonal availability of animal and plant resources and “are oriented toward butchery and the working of hides, bone and wood” (Amick 1996). The association of Folsom points with *Bison antiquus*—a late Pleistocene bison that was larger than modern bison (*Bison bison*) and formed smaller herds (McDonald 1981)—suggests Folsom groups were primarily bison hunters (Amick 1994 and 1996; Figgins 1927; Staley and Turnbow 1995). The earliest evidence for communal hunts occurs with Folsom assemblages. These communal hunts required greater social organization and control than that evidenced in Clovis sites (Frison 1978, 1991). The Folsom type site is in northeastern New Mexico, near Folsom. Lake Theo (41BI70), in the proposed project vicinity, and Lubbock Lake have a Folsom component (Bousman et al. 2004; Harrison and Killen 1978;

Holliday 1997; Holliday et al. 1983, 1985).

Plano complex projectile points lack flutes and instead, consist of large lanceolate forms with basal grinding and long parallel flaking (Wheat 1972; Wormington 1957). The Plainview complex contains laterally thinned points—Plainview, Meserve, Milnesand, and Frederick—and is generally considered the earliest Plano complex. The indented base series includes Firstview, Alberta, and Cody complex points, such as Eden and Scottsbluff. Agate Basin and Hell Gap points comprise the constricted base series (Cordell 1979). Lake Theo, Lubbock Lake, Plainview (41HA1), Rex Rodgers (41BI42), and Ryan's site have Plainview components (Bousman et al. 2004; Hartwell 1995; Holliday 1997; Holliday et al. 1983, 1985 and 1999; Johnson and Holliday 1980; Johnson et al. 1982; Speer 1978).

4.7.2.2 Archaic Period (ca. 5500 B.C.–A.D. 250)

The climate became warmer and more arid during the Archaic period (ca. 5500 B.C.–A.D. 250). Although this period saw a continuation of the mobile hunting and gathering pattern of the Paleoindian period, there was a shift towards resource diversification. In other words, the Archaic adaptation was a "diffuse" economy (Judge 1982).

A climatic shift, the onset of the Altithermal[1] led to a decrease in big game populations, causing humans to focus on smaller animals and plants. The resource base included a variety of plants and the modern suite of Plains fauna. Archaic populations probably had a primary dependence on plant foods, a seasonally mobile settlement pattern, and a flexible social structure in which group size and composition varied in response to changing economic opportunities. Areas where the density and distribution of key plant resources were predictable on a seasonal basis were reoccupied (Judge 1982). A greater dependence on plant foods is reflected in a higher frequency of grinding tools during the Archaic. The Archaic period is divided into Early Archaic (5500–3000 B.C.), Middle Archaic (3000–1000 B.C.), and Late Archaic (1000 B.C.–A.D. 250).

Early and Middle Archaic sites are uncommon in the area, whereas Late Archaic sites are better represented (Boyd et al. 1989; Quigg et al. 1993). Recent work suggests that the paucity of identified Early and Middle Archaic sites is likely due to geomorphic conditions rather than cultural trends. According to a model developed by Lintz et al. (1993) and further elaborated by Boyd et al., (1997), from ca. 6,000 to 3,000 years ago the greater Caprock-Canyonlands and western Rolling Plains were subject to severe erosion that removed most of the Pleistocene and early- to mid-Holocene deposits. This severe erosion left only the archaeological record from ca. 1000 B.C. to the present (Boyd et al. 1997; Lintz et al. 1993).

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[1] Antevs (1955) proposed in very broad terms that the climatic period in place approximately 7000 to 4500 B.P. (comparable to the middle Holocene) was a time of drier and warmer conditions compared to the present and labeled this period the **Altithermal**. Antevs' model is based on evidence of erosional and depositional cycles as observed in geologic strata across the western United States.

The only excavated site with an Early Archaic component within or near the project area is Lubbock Lake. The component represents the killing and butchering locus of a small bison herd (Johnson and Holliday 2004). Early Archaic projectile point (dart) styles include large, straight-stemmed indented or concave base forms—Bulverde, Gower, Martindale, and Pandale—large stemmed, straight base forms—Nolan—and unstemmed forms—Kinney and Pandora (Boyd et al. 1989; Quigg et al. 1993; Suhm and Jelks 1962).

The Middle Archaic coincides with the Altithermal, during which time temperatures increased and effective moisture decreased, resulting in massive aeolian deposition across the region (Holliday 1989; Johnson and Holliday 1986). In response to decreased surface water, Middle Archaic groups dug wells. Blackwater Draw Locality #1 contains 19 identified wells (Johnson and Holliday 2004). Marks Beach, just west of the project area, has a probable well (Honea 1980). The Middle Archaic component at Lubbock Lake contains 28 identified activity areas—camps and bison kill/butchering loci—and includes an oven—a large oval basin filled with ash and topped with burned caliche—that was probably used for processing plants (Johnson and Holliday 1986, 2004). The Middle Archaic tool kit includes large dart points with weak to barbed shoulders, concave or indented base dart points, bifaces, scrapers, drills, gouges, spokeshaves, hammerstones, one-hand manos, metates, and awls (Quigg et al. 1993). Diagnostic dart points include Carrollton, Ellis, Kent, Marshall, Nolan, Palmillas, Pedernales, Trinity, and Williams (Boyd et al. 1989).

By the beginning of the Late Archaic, the climate had returned to cooler, moister conditions, and available surface water increased (Johnson and Holliday 2004). Although surface finds of Late Archaic materials are common, Late Archaic occupations in stratified contexts are rare "because sedimentation during this time was very localized" (Johnson and Holliday 2004). Lubbock Lake is such a site, containing nine identified buried Late Archaic occupation surfaces (Holliday 1985; Holliday et al. 1983 and 1985; Johnson and Holliday 2004). Site 41LU29, which is on the east rim of Yellowhouse Draw and overlooks Lubbock Lake, has a Late Archaic hearth (Johnson 1987) and 41LU6, which is in Yellowhouse Draw, had a Late Archaic cache (Buchanan 1995). In general, the Late Archaic is characterized by hunting and gathering by small groups. Late Archaic dart point styles exhibit wide diversity. Dart points consist of forms with pronounced shoulder barbs (e.g., Marcos, Marshall, Shumla, Williams) or of relatively short points with broad, shallow corner or side notches (e.g., Ensor, Ellis, Edgewood) (Boyd et al. 1989; Hughes 1976; Johnson and Holliday 1986; Suhm and Jelks 1962).

4.7.2.3 Late Prehistoric and Protohistoric Periods (A.D. 250–1450)

The Late Prehistoric period (A.D. 250–1450) (also known as the Ceramic period) is characterized by the appearance of pottery and the introduction of the bow and arrow. These traits, however, were not uniformly adopted across the region. In the upper Texas Panhandle, the use of pottery and arrow points appears to be nearly 2,000 years old, whereas in north-central Texas, the earliest usage occurred about 1,200 years ago. In addition, houses and even villages are commonly found in some areas but are scarce in others. Horticulture also was unevenly adopted across the region. Despite these differences, the Late Prehistoric is divided into two subperiods—Late Prehistoric I (A.D. 250–1150) and the Late Prehistoric II (A.D. 1000–

1450)—on the basis of ceramic types, projectile point forms, features, and subsistence practices (Quigg et al. 1993).

During Late Prehistoric 1, the climate was wetter than during the Late Archaic, and due to less favorable conditions, the number of bison declined on the Southern Plains (Dillehay 1974; Hughes 1991). In the Texas Panhandle region, two Late Prehistoric I groups flourished contemporaneously throughout much of the first millennium A.D. The Lake Creek complex, a Plains Woodland manifestation centered on the Canadian River (Hughes 1962, 1991), is north of the project area. The Palo Duro complex is centered on the Caprock-Canyonlands, which separates the High Plains (Llano Estacado) on the west from the Rolling Plains on the east (Boyd 2004), and includes the project area. The northern portion of the Palo Duro complex overlaps the southwestern portion of the Lake Creek complex. Most of the tested and excavated Palo Duro sites are either residential bases or campsites or rockshelters. Characteristic artifacts include Mogollon brownwares, Scallorn and Deadman's arrow points, and Clear Fork gouges. Other artifacts consist of bifaces, unifaces, drills, gouges, spokeshaves, manos, metates, bedrock mortars, pestles, bone awls, and mussel shell jewelry. Structures consist of oval and rectangular pithouses with or without entryways. Associated features include clay-lined and unlined pits, rock-lined and unlined hearths, and baking pits. Nearly extended to semiflexed to flexed burials with grave goods occur. Deer, pronghorn, bison, rabbits, freshwater mussels, and a variety of plants contributed to the diet. No cultigens, however, have been identified (Boyd 2004). Palo Duro sites within or near the Study Area include Kent Creek (41HL66), Tahoka Lake, Blue Clay (41BI42), County Line (41BI33), Floydada Country Club (41FL1), Montgomery (41FL17), and Deadman's Shelter (41SW23) (Boyd 2004).

The Late Prehistoric II or Plains Village period is represented in the Texas Panhandle by the Antelope Creek focus (or phase) of the Panhandle Aspect (A.D. 1200–1450/1500), which was focused along the Canadian and North Canadian rivers and their main tributaries (Brooks 2004). Antelope Creek sites are large, containing as many as 80, generally rectangular rooms (Stuart and Gauthier 1984). Antelope Creek exhibits an interesting mix of puebloan-like masonry architecture "and a material culture bearing many similarities to Central Plains village farming societies" (Brooks 2004). Structures consist of single and multiple rooms with walls "characterized by two parallel rows of upright slabs, with the interior space filled with adobe and rubble. Succeeding rows of upright slabs were placed on top of, and inset slightly over, the lower courses" (Stuart and Gauthier 1984). Alibates agatized dolomite was especially favored for chipped stone tools. Projectile points are side-notched and pottery includes Pueblo tradewares—various black-on-white types, Jeddito Yellow Ware, Lincoln Black-on-red, St. Johns Polychrome, Agua Fria Glaze-on-red, and other glazewares—and cordmarked wares, especially Borger Cordmarked. Subsistence strategies consisted of horticulture, gathering, and hunting. Antelope Creek people grew corn, beans, and squash and gathered a variety of edible wild plants (e.g., purslane, goosefoot, acorns, hackberry, wild plum, prickly pear, mallow, lambsquarter, and marsh elder). Hunting focused on the procurement of bison but also included mule deer, pronghorn, and smaller game (Brooks 2004). Antelope Creek disappeared rapidly after ca. A.D. 1450/1500, apparently because of severe drought conditions (Brooks 2004; Lintz 1984, 1986). Antelope Creek sites in Texas include Antelope Creek 24, Alibates 28, Medford

Ranch, Footprint, Spring Canyon, and Canyon City (Brooks 2004).

4.7.2.4 Protohistoric Periods (A.D. 1450–1800)

The Protohistoric period of A.D. 1450–1800 is marked by significant changes throughout the region. The upper Panhandle region is abandoned by sedentary groups, perhaps ahead of the advancement of the Apachean groups. Farther south of the Canadian River, a series of sites reflect interaction with tremendous trade networks that linked the Southwestern Puebloans and the Caddoans. Several of these sites have fortified palisades. Three complexes in the lower Panhandle and western Oklahoma region include the Tierra Blanca, Garza, and the Wheeler/Little Deer complexes (Boyd et al. 1997, 1989).

Researchers have attempted to link these archaeological complexes to named groups in the early Spanish records and to modern Indians. Thus, from Coronado's journal, the Querecho often are linked to Apaches in the northern Panhandle, and the Teyas are linked to the Caddoans further south. The Querecho, a name of Puebloan origin referring to buffalo hunters, cannot, with certainty, be associated with any historic tribe. The Querecho probably were an eastern Apachean group, and they may be ancestors of the Jicarillas, Lipans, and Kiowa (Newcomb 1990).

Historic Period (A.D. 1800–Present)

Although the first entrance of Europeans into the project area was the Coronado entrada in 1541, this expedition was brief and had no lasting effects on the area. Another brief Spanish appearance in the area occurred in 1787 when Jose Mares, a retired corporal seeking to establish a wagon route between Santa Fe and San Antonio (Texas), arrived in Palo Duro Canyon and followed the Red River part way to San Antonio (Hinshaw 1976). The Historic period (A.D. 1800–present) begins with the Euro-American (Hispanic and Anglo) occupation of the Southern High Plains. The first Euro-Americans "were buffalo hunters and U.S. military units, followed by sheepherders (pastores), traders, ranchers, and settlers" (Johnson and Holliday 2004).

In 1845, a military reconnaissance expedition led by Lt. James W. Abert crossed the Texas Panhandle along the Canadian River, north of the project area (Abert 1999). An army expedition led by Captain Randolph Marcy from Fort Smith to Santa Fe in 1849 followed the south bank of the Canadian River through Oklahoma and the Texas Panhandle (Gordon 1988). During a survey of a potential transcontinental railroad route across the Southwest in 1853–1854, the Whipple Expedition traveled through the Texas Panhandle along the Canadian River (Gordon 1988).

Buffalo hunters like George Causey sealed the fate of the bison herds of the Llano Estacado. Causey, along with his brothers John and Bob and several other men, came to the Texas Caprock in 1877 (Hinshaw 1976). George built a sod house at Casas Amarillas in Yellow House Canyon and stayed there until at least 1880. The Causey outfit killed their last bison in 1882 and afterward, George Causey turned to cattle ranching in the future Lea County, New Mexico (Hinshaw 1976).

After the disappearance of the bison, cattle ranching dominated the Texas Panhandle and Llano Estacado. In the fall of 1875, Charles Goodnight trailed a cattle herd into Palo Duro Canyon and along with John Adair (Goodnight's investor) established the JA ranch empire along the Prairie Dog Town Fork of the canyon. By the 1880s, big operations controlled ranching in the Texas Panhandle and Llano Estacado (Jordan 1993). Trails were established to move herds to market. At least one such trail, the Potter-Bacon Trail (1878–1884), passed through the project area (Skaggs 1991). The cattle boom of the early 1880s led to a cattle glut that severely damaged the shortgrass plains and resulted in a crash of beef prices in 1886. Cattle ranching in Texas never again reached the levels of its early years (Jordan 1993).

By the late 19th century/early 20th century, multiple railroad companies—including Roscoe, Snyder and Pacific Railway; Santa Fe Railroad; and Stamford and Northeastern Railway—provided service to the once remote areas of Texas. In the 1930s, the Great Depression brought financial hardship to most farming and ranching communities. Product demand was at an all-time low, which forced many families to leave the area for better prospects elsewhere. It was not until the 1940s, during World War II, that economic growth again resumed in the form of petroleum production (Texas State Historical Association 2009).

4.7.3 Previous Investigations

Numerous investigations have been completed in the Southern High Plains, the Caprock Canyonlands, and the Texas Panhandle area. Most of the surveys were reported in the Hughes report to USACE, filed in Cottle County. Other surveys were conducted by L.R. Christo; Glenn T. Goode; David T. Hughes; Jack Hughes; A. V. McFarland; Carolyn Spock; James H. Word; A.J. Taylor and F. M. Ogelsby of TARL; Darryl Pleasant, Debra L Beene, and Gary L. Shaw of Geo-Marine Inc.; and Lance K. Trask of AR Consultants.

4.7.4 Archaeological Assessment

Examination of existing site records indicates that there are several recent archaeological projects within and near the Study Area. However, the absence of documented sites in the Study Area and areas currently showing as devoid of cultural resources are more indicative of the lack of survey rather than a lack of resources in the area. The previous survey coverage can only be rated as poor or non-existent. Although some archaeological sites potentially eligible to the NRHP have been identified based on previous surveys, following CCN issuance, additional eligible sites may be found when the Project Team performs a Class III survey along the certificated route.

4.8 Mineral and Energy Resources

4.8.1 Non-Fuel Minerals

In 2006, more than 96 percent of non-fuel mineral value in Texas resulted from the production of the top six industrial minerals: cement (portland and masonry), crushed stone, construction sand and gravel, salt, lime, and industrial sand and gravel (USGS 2007). According to the USGS Mineral Data Resource System (USGS 2007), there are six sand and gravel operations and one active uranium mine in the Study Area.

4.8.2 Organic Fuel Minerals

No coal- or lignite-bearing formations are present within the Study Area.

The Project Team reviewed USGS topographic maps, aerial photographs, and current data from the Railroad Commission of Texas (RRC) to assess the extent of organic fuel extraction within the Study Area. There are no oil fields present in the Study Area.

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5.0 ENVIRONMENTAL ANALYSIS OF ALTERNATIVE ROUTES FOR PREFERRED ROUTE SELECTION

After the Alternative Routes were identified, the Project Team initiated a detailed evaluation of each Alternative Route considering various opportunities and constraints along with public comments. The evaluation of Alternative Routes and the selection of a Preferred Route were based on the requirements of PURA § 37.056(c)(4)(A)-(D), the PUC CCN Application Form, and P.U.C. SUBST. R. 25.101. This analysis included application of the PUC's policy of prudent avoidance and incorporated the data obtained from all the sources described in Section 2.1.

The analysis of each Alternative Route included quantifying and comparing the opportunities and the constraints along each route. The length (miles) or quantity (number) of the opportunities and environmental and land use constraints potentially impacted by each Alternative Route was quantified using GIS data, aerial photography, and field data. The relative strength of the various routing opportunities also was considered. For example, existing linear features that follow existing ROWs are generally considered stronger routing opportunities because the affected properties have usually already been disturbed by the existing ROW, a linear land use is already in place, and impacts associated with the existing linear use have often been previously mitigated. This provides an opportunity to minimize new impacts by paralleling existing ROWs. The Preferred Route was identified by following routing opportunities (particularly existing ROWs) containing few constraints.

Segments comprising each Alternative Route are described in Appendix E. The potential impacts on the existing environmental and land use resources are addressed in the following subsections and summarized in Table 5-1.

5.1 Physiography and Geology

Construction of the proposed Project does not require digging to great depths or disturbing the underlying site physiography and geology. Construction and operation of the proposed Project is not expected to have a significant impact on the physiographic or geologic resources located within the Study Area.

5.2 Soils

Construction of electric transmission lines can cause short-term impacts associated with soil erosion and soil compaction. Typically, transmission projects result in few long-term effects on soils.

Soil erosion is a continuing natural process that can be accelerated by human disturbance associated with construction. Factors that influence the degree of erosion include soil texture, structure, length, percent of slope, vegetative cover, rainfall, and wind intensity. Vegetation clearing, access road construction, equipment movement, and excavation for transmission structure foundations could accelerate the erosion process, and without adequate protective measures, potentially result in discharge of sediment into waterbodies.

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Table 5-1

Quantitative Data for Alternative Routes

Opportunities and Constraints	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Total Length (miles) of Route	188.40	187.50	186.60	185.20	186.90	186.90	182.00	183.20	181.90	181.50	183.90	180.90	186.80	185.50	192.00	195.90	197.70	195.90	187.10	182.30
Length (miles) of ROW parallel or adjacent to other existing ROW (highway, railroads, etc.)	12.80	12.80	12.80	12.80	5.40	7.60	5.30	5.90	5.30	5.90	5.30	5.20	10.20	22.30	19.70	3.10	20.10	5.20	5.40	3.20
Length (miles) of ROW parallel or adjacent to existing pipeline	8.70	9.00	9.00	8.70	5.10	6.90	16.10	16.40	16.70	16.10	17.00	16.40	16.30	15.00	15.80	11.50	10.40	13.40	6.40	4.80
Length (miles) of ROW parallel or adjacent to apparent property lines	124.30	142.50	140.30	127.30	119.40	118.70	101.00	125.60	101.00	100.50	126.80	113.20	121.50	113.70	128.44	105.30	112.20	104.50	89.70	110.50
Length (miles) of ROW parallel or adjacent to existing transmission line ROW	20.40	20.40	20.40	20.40	24.90	31.45	11.30	11.10	10.50	11.10	10.49	11.31	22.74	30.24	30.50	7.25	26.21	12.83	12.37	15.30
Length (miles) of existing transmission line ROW used	15.17	15.17	15.17	15.17	15.17	19.59	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	0.00	0.00	0.00	4.42	4.42	0.00
Number of commercial AM radio transmitters within 10,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of FM radio transmitters within 2,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of non-AM or -FM electronic installations (microwave, cellular, television towers, etc.), within 2,000 ft of ROW centerline	4	4	4	4	5	6	3	4	5	5	5	4	4	8	8	2	6	3	7	4
Number of habitable structures within 500 ft of ROW centerline	61	62	62	59	52	55	51	56	48	50	49	47	49	55	61	43	59	49	46	57
Number of cemeteries within 1,000 feet of centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length (miles) of ROW across rangeland/pasture	61.99	69.36	68.38	65.21	51.67	55.44	33.20	41.85	33.04	31.32	42.45	33.51	46.55	35.27	31.52	46.00	48.42	45.34	43.74	51.34
Length (miles) of ROW across dryland cropland (non irrigated)	49.31	48.31	48.31	49.61	46.07	47.07	37.35	43.17	37.03	38.76	41.68	36.72	41.84	38.84	47.74	35.36	35.66	37.01	35.23	33.77
Length (miles) crossing dryland cropland (non irrigated) at property line or field edge	38.55	37.35	37.35	38.67	35.43	34.88	24.83	30.46	24.90	26.63	29.36	24.73	27.93	28.41	38.15	25.44	27.44	25.53	22.00	23.74
Length (miles) of ROW across pasture or cropland with mobile irrigation systems	7.16	7.16	7.16	7.16	6.83	8.50	9.35	9.35	7.70	8.11	7.70	8.11	8.11	9.22	5.39	7.47	8.58	9.33	8.91	7.06
Length (miles) of ROW across pasture or cropland with mobile irrigation systems that is along property line or field edge	5.28	5.28	5.28	5.28	5.06	6.14	6.98	6.98	6.26	6.67	6.26	6.67	6.67	7.88	5.14	5.65	6.86	6.92	6.51	5.24
Length (miles) of ROW across playa lakes	5.3	5.3	5.3	5.3	5.1	6.1	2.7	2.7	2.9	2.9	2.9	2.9	2.9	2.9	3.0	2.2	2.2	3.0	3.0	2.2
Number of FAA-listed airfields within 10,000 ft of ROW centerline with runways less than 3,200 ft.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of FAA-listed airfields within 20,000 ft of ROW centerline with runway greater than 3,200 ft.	2	2	2	2	3	2	2	2	1	2	1	2	2	3	3	1	1	1	2	2
Number of heliports within 5,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of private airstrips within 10,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW across 100-year floodplains	7.37	7.37	7.37	7.37	7.22	8.02	7.04	7.04	7.15	7.76	7.15	7.76	7.76	7.76	7.63	6.54	6.67	7.19	6.59	5.93
Length (miles) of ROW through bottomland/riparian woodland	2.34	2.69	2.69	2.34	2.59	3.05	2.33	2.68	2.42	2.50	2.76	2.15	2.20	1.66	1.10	2.56	1.75	3.02	2.34	2.02
Length (miles) of ROW across potential (mapped or otherwise indicated) wetlands	8.08	8.44	8.44	8.06	8.22	8.97	4.70	5.05	4.96	4.99	5.31	4.71	4.67	4.18	4.07	4.82	4.11	5.48	5.04	4.34
Length (miles) of ROW through upland woodland/brushland	2.67	2.72	2.72	2.72	4.11	4.11	2.03	2.06	2.03	2.01	2.08	1.92	1.81	2.30	2.29	2.51	2.72	2.51	2.82	2.51
Number of FM & RR road crossings	15	15	15	15	15	15	15	15	16	16	16	16	15	15	18	16	15	16	14	13
Estimated length (miles) of ROW within foreground visual zone of U.S. and state highways	15.91	15.91	15.91	15.91	8.77	8.77	7.64	8.65	7.64	8.65	7.64	7.58	19.95	14.99	14.80	7.50	14.85	7.50	8.71	8.64
Number of U.S. and state highway crossings (engineering constraint, limited to State and U.S. Highways)	9	9	9	9	8	8	7	7	7	7	7	7	11	7	7	7	7	7	8	8
Length (miles) of ROW through areas of high archaeological/historic site potential	52.96	58.05	57.50	48.61	59.95	60.32	45.29	51.53	49.27	49.95	54.47	55.90	63.16	48.10	45.03	48.14	45.93	48.03	52.98	51.65
Length (miles) of ROW through areas of medium archaeological/historic site potential	43.00	46.57	46.01	43.61	39.44	36.59	41.50	45.04	40.83	39.46	45.37	44.45	45.89	42.69	45.73	43.68	43.54	40.48	43.39	44.65
Number of recorded historic or prehistoric sites crossed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of additional National Register listed or determined-eligible sites within 1,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length (miles) of ROW across parks/recreational areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Number of additional parks and/or recreational areas within 1,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Estimated length (miles) of ROW within foreground visual zone of recreational or park areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.16	1.16	0.00	0.00	0.00	0.00	0.00	1.03	1.08
Number of stream crossings	173	172	171	150	172	172	203	198	203	207	194	199	209	187	185	196	170	196	203	179
Length (miles) of ROW parallel (within 100 ft) to streams	11.25	13.76	13.78	9.66	11.37	11.40	12.30	15.49	12.30	12.23	15.56	14.74	15.67	13.02	12.24	11.56	11.19	11.59	13.32	13.64

Table 5-1

Quantitative Data for Alternative Routes

Opportunities and Constraints	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of river crossings	7	4	4	9	9	9	4	7	4	4	7	4	4	11	6	5	7	5	8	6
Length (miles) of ROW across known habitat of federally endangered/threatened species	0.00	0.00	0.00	0.00	0.00	0.00	2.29	0.00	2.29	0.00	2.29	2.29	2.29	7.29	9.08	2.29	7.29	2.29	0.00	0.00
Length (miles) of ROW across open water (lakes, ponds, etc.)	0.06	0.08	0.08	0.04	0.05	0.05	0.07	0.10	0.21	0.23	0.22	0.28	0.21	0.18	0.05	0.09	0.06	0.09	0.06	0.08

SPS will develop a Storm Water Pollution Prevention Plan (SWPPP) to minimize the impacts of soil erosion and protect waterways from sedimentation. This SWPPP will specify revegetation practices, work area inspection frequency (both during and after construction), erosion prevention controls, and identify priority areas for revegetation. Based on consultation with the Texas Commission on Environmental Quality (January 4, 2010), discharges of storm water runoff from construction projects of this type are eligible for coverage under General Permit No. TXR150000, General Permit to Discharge Wastes, pursuant to the Texas Pollutant Discharge Elimination System, Section 402 of the Clean Water Act. SPS will comply with the requirements of this General Permit to minimize potential erosion associated with storm water runoff. Construction and operation of the proposed Project are not expected to result in significant impacts to the Study Area associated with erosion or storm water runoff.

The Study Area contains approximately 1,613,421 acres of Prime Farmland soils (36 percent of the Study Area). This includes soils designated as “Prime Farmland if irrigated” and “Prime Farmland if protected from flooding or not frequently flooded during the growing season.” Where present along the transmission line, the primary impact of Project construction and operation on Prime Farmland soils would be the small amount of land taken out of production by the small transmission structure foundations. However, the NRCS does not consider the construction and operation of electric transmission lines to be a conversion of Prime Farmland because the affected land can still be used for agricultural purposes after installation (Kiniry 2009). Based on consideration for the amount of space disturbed/occupied by pole installation, the extent of Prime Farmland soils impacted would be negligible (Benton 2010). Therefore, construction and operation of the proposed Project would not result in significant impacts to Prime Farmland soils in the Study Area.

5.3 Water Resources

5.3.1 Surface Waters

Construction and operation of the proposed Project would have relatively minor impacts on surface waters in the Study Area. Construction-related impacts may include short-term effects on water quality associated with localized increases in turbidity and downstream sedimentation, resulting from storm water runoff from adjacent upland construction areas. Turbidity has the potential to result in localized temporary impacts to aquatic habitat and organisms. Conservation measures to control erosion and sedimentation will be included in the project SWPPP, which will be designed and implemented to minimize impacts to surface water quality during construction. As recommended by the TPWD in a letter dated August 26, 2010 (Wicker 2010), erosion and sediment runoff controls will be properly installed, as needed, to minimize the potential for sediment and debris to enter waterways along the project route.

Because construction will proceed quickly at waterbody crossings, with little or no in-stream activity, disturbances will be limited. Construction access across streams and rivers will be minimized to the extent practicable. Long-term impacts on water quality or aquatic organisms are not anticipated. To the extent possible, routes have been developed to cross streams perpendicularly, minimize multiple crossings of waterbodies, and minimize paralleling waterbodies. It is anticipated that rivers, streams, and playa lakes will be spanned by the aboveground conductors, without the need to place any support structures, fill, or other obstructions within the waterbody. Water quality and other stream attributes are expected to return to pre-construction conditions within a short period after the completion of construction.

Construction and operation of the proposed Project are not expected to result in significant impacts to surface water resources.

5.3.2 Floodplains

Larger streams and rivers in the Study Area such as the Elm Fork of the Red River, Elm Creek, North Elm Creek, Bull Creek, Little Turkey Creek, Los Lingos Creek, Quitaque Creek, Running Water Draw, Callahan Draw, Crawfish Creek and the White River are associated with mapped 100-year floodplains. In addition, there are many mapped floodplains associated with isolated basins or playa lakes, particularly in the southwestern portion of the Study Area.

Transmission structures will be sited to avoid floodplains and playa lakes to the extent possible. If it becomes necessary to place a transmission structure within a floodplain, due to site-specific constraints, the structure would be designed and constructed so that it would not impede the flow of water or create any hazard during flooding. As a result, construction and operation of the proposed Project would not have significant impacts on the floodplain function, nor would the Project adversely affect adjacent or downstream properties.

5.3.3 Groundwater

The construction, operation, and maintenance of the Project are not expected to adversely affect groundwater resources within the Study Area. Any impacts to groundwater resources from construction and operation of the Project facilities are expected to be temporary and localized. In general, potential impacts to groundwater would be negligible because the transmission line will be erected above-ground, requiring only minor shallow excavation for the installation of pole structures. Where groundwater is present under unconfined, water table conditions, there is a possibility that very shallow groundwater may be encountered during excavation. However, any impacts would be limited to a very localized increase in turbidity due to ground disturbance during construction. Construction and operation of the proposed Project are not expected to result in significant impacts to water quality.

No significant impacts to groundwater quantity are expected to result from construction or operation of the proposed Project, since no new groundwater withdrawals are proposed. Some new impervious surface area will be associated with the new structure foundations, but the area affected is too small to have any impact on groundwater recharge.

5.3.4 Wetlands

The Project will be designed to span wetlands and waters of the U.S. where possible, to avoid placement of any structures within wetlands. Placement of any pole structures within a wetland, if necessary due to site-specific constraints, would require some fill within the wetland. This would result in a small loss of wetland area at the base of the pole structure. Although it is anticipated that permanent impacts can be avoided by spanning wetlands, if it becomes necessary to place any pole structures within a wetland, this would at most result in a very small impact footprint over the length of the entire Project.

Wetlands could be temporarily affected by land disturbance within and adjacent to the wetland. To minimize these impacts, work within wetlands and/or construction access across wetlands will be minimized to the extent practicable. Work within wetlands, if required, could result in temporary, localized changes to wetland hydrology and water quality, due to vegetation clearing, soil compaction, and/or ground disturbance. In addition, disturbance of adjacent upland areas could result in erosion and sedimentation within the wetland. Conservation measures to control erosion and sedimentation will be included in the Project SWPPP, which will be designed and implemented to minimize impacts to water quality in wetlands and surface waters during construction.

Some temporary impacts to wetlands also may result from the alteration of wetland habitat due to vegetation clearing. Vegetation within emergent and scrub-shrub wetlands is expected to recover quickly following construction and restoration of any disturbed work areas. If the Project crosses any forested wetland areas, some permanent modification of the wetland habitat may result, since large trees will not be allowed to regrow within the maintained ROW, due to the periodic vegetation management required for safe operation of the transmission lines.

Available GIS data, NWI maps, aerial mapping, and field reconnaissance have been used to identify potential wetlands and locate routes to avoid or minimize potential impacts to wetland areas. Following CCN issuance, SPS will conduct on-the-ground surveys of the certificated electric transmission line route for waters of the U.S. (wetlands and waterbodies) and will design transmission structures to span wetlands and waterbodies wherever practicable. SPS also will attempt to place additional temporary work spaces to avoid wetlands where possible. Reports of the wetland delineation for the certified transmission line route will be reported to the USACE. SPS will consult with USACE to determine permit requirements pursuant to Section 404 of the Clean Water Act and will obtain any required permits prior to initiation of construction.

Construction and operation of the proposed Project are not expected to result in significant or long-term impacts to wetlands.

5.4 Vegetation, Fisheries, and Wildlife

The following subsections describe potential impacts of the Project on vegetation, fisheries, and wildlife resources in the Study Area.

5.4.1 Vegetation

With the exception of permanent removal of vegetative cover at transmission structure locations, temporary impacts to vegetation and wildlife will result from the removal of primarily woody scrub-shrub vegetation where present during clearing of the ROW and additional temporary workspaces. The entire construction ROW will be cleared of woody vegetation and then graded where necessary at structure locations to create a level and safe working surface for construction equipment. Vegetation will be removed by mechanical cutting. During operation of the line, woody vegetation that could interfere with the conductors will be trimmed or removed to ensure the safe and reliable operation and maintenance of the 345 kV electric transmission line in accordance with North American Electric Reliability Corporation standards. Vegetation on stream banks will be left intact to the extent possible. Natural revegetation will be encouraged, and if seeding or plantings are necessary, revegetation will be conducted using a seed mixture of native species developed in consultation with individual landowners.

In a letter to TRC dated July 1, 2010, the USFWS recommended revegetation of disturbed workspaces immediately following construction with native vegetation appropriate to habitat type. Unless otherwise requested by landowner preference, natural revegetation will be encouraged. If seeding or plantings are necessary, SPS will revegetate the disturbed ROW and additional temporary work areas with a native plant species seed mixture appropriate for the land type, and will not use introduced, noxious, or invasive plant species. Where requested by the landowner, SPS will consult with landowners to develop and implement site-specific revegetation measures (i.e., avoid seeding in cultivated agricultural lands). Where necessary, revegetation will be implemented as soon as practicable following Project construction.

Construction and operation of the proposed Project are not expected to result in significant impacts to vegetation.

5.4.1.1 Unique, Sensitive, or Protected Vegetation Communities

In a letter to TRC dated July 1, 2010, the USFWS recommended that temporary work areas avoid riparian corridors, and temporary ROWs within or adjacent to riparian areas be hand cleared (Cloud, Jr. 2010). In a letter to TRC dated August 26, 2010, the TPWD recommended that natural buffers contiguous to aquatic systems remain undisturbed (Wicker 2010). SPS will locate additional temporary work areas (i.e., staging areas, stringing corridors, access roads) at least 100 feet from waterbodies and wetlands and use care to locate additional temporary work areas in previously disturbed or open lands (i.e., agricultural croplands, agricultural rangeland/pasture, areas clear of vegetation), wherever practicable. In addition, SPS will span waterbodies and wetlands present within the ROW, and maintain an undisturbed 100-foot vegetative buffer where natural riparian vegetation communities are contiguous with waterbodies/wetlands, wherever practicable. Should placement of temporary ROWs or workspaces within riparian areas be unavoidable, SPS will hand clear these areas (i.e., use chainsaws), wherever practicable, to minimize impacts to habitat from heavy machinery.

TPWD and USFWS have expressed concern regarding potential impacts to waterways and associated floodplains, riparian corridors, playa lakes, and wetlands (Cloud, Jr. 2010; Wicker 2010). SPS has conducted GIS data collection, aerial photograph interpretation, and aerial and field reconnaissance to identify potentially saturated lands and aquatic resources (i.e., playa lakes, ponds, rivers and streams, wetlands, FEMA 100-year floodplains) and placed Alternative Route Segments in such a manner as to avoid or minimize potential crossings or impacts to these areas. Following CCN issuance, SPS will conduct on-the-ground surveys of the certificated electric transmission line route for waters of the U.S. (wetlands and waterbodies); design transmission structures to span waters of the U.S. wherever practicable; place additional temporary work spaces to avoid wetlands wherever practicable; consult with the USACE to determine any permit requirements pursuant to Section 404 of the Clean Water Act; and obtain any such required permit prior to initiation of construction. Accordingly, construction activities would not result in substantive impacts to waterbodies, wetlands, or floodplains.

Playa Lakes

Playa lakes have been identified by the USFWS and the TPWD as important habitats for migratory birds. As previously detailed, playa lakes are not specifically regulated and protected at the federal or state level but are considered ecological areas of importance. A potential impact that could result from the Project is an increase in avian mortality or injury due to collision with the new transmission line.

TPWD indicated that indirect avian mortality could also occur as birds directly killed as a result of contact with new infrastructure fall into standing water, decay, and possibly increase the spread of diseases, including avian cholera and botulism (Wicker 2010). Avian cholera and botulism are a major source of non-hunting mortality of playa lake wintering birds, affecting thousands each year (Haukos and Smith 1992); however, it is likely that predators and scavengers would most likely dispose of any deceased birds quickly, reducing the likelihood of decay and spread of disease.

TPWD recommends that transmission lines that cross or are located near creeks, drainages, reservoirs, and playa lakes have line markers installed at the crossings or closest points to the drainages to reduce the potential of collisions. SPS has conducted GIS data collection (i.e., obtained the TPWD probable playa lake database, supplemented by national hydrographic data sets), aerial photograph interpretation, and aerial reconnaissance to identify potential playa lakes, and minimized the placement of Alternative Route Segments through or adjacent to potential playa lakes. Any playa lake that cannot be avoided would be spanned wherever practicable. Following CCN issuance, if necessary, SPS will determine appropriate locations for placement of line markers. During Project operations, SPS will assess and adjust the placement of transmission line markers as prudent. Construction and operation of the proposed Project are not expected to result in significant impacts to playa lakes.

5.4.2 Fisheries

The proposed transmission line would span any surface water bodies present in the Study Area and SPS does not propose to site any structures, equipment, or facilities in water bodies; therefore, the Project is not expected to impact fisheries in the Study Area.

5.4.3 Wildlife

Temporary wildlife impacts are those associated with the disturbance and disruption to habitats during the construction period (e.g., noise and vegetation clearing), whereas permanent impacts are those associated with the conversion of small areas of existing habitat to early successional habitats due to the periodic maintenance of the permanent ROW. Construction and operation of the Project will result in temporary and permanent alteration of wildlife habitat, as well as direct impacts to wildlife species. The clearing of ROW vegetation would reduce cover, nesting, and foraging habitat for some wildlife. During construction, some wildlife would be displaced from the ROW and surrounding areas to similar habitats nearby. Some wildlife displaced from the

ROW would return to the newly disturbed area and adjacent, undisturbed habitats soon after completion of construction. Routine maintenance activities on the permanent ROW would have similar but less extensive effects on wildlife species in the area, depending on the time of year maintenance activities were conducted. Given the short duration of the disturbance and abundance of similar habitat coupled with the existing land uses in the Project vicinity, impacts to wildlife species are not expected to be significant.

TPWD and USFWS have expressed concern regarding habitat fragmentation caused by the construction of new overhead power lines. In a letter to TRC dated July 1, 2010, the USFWS recommended SPS consider transmission line routes that parallel existing utility or transportation ROWs in order to minimize overall environmental impacts that might result from new ROW acquisition and clearing (Cloud, Jr. 2010). In a letter to TRC dated August 26, 2010, the TPWD recommended routing transmission lines adjacent to existing utility and roadway ROWs to minimize habitat fragmentation.

SPS developed Alternative Route Segments in accordance with PUC regulations and maximized use of existing ROWs, wherever practicable. SPS will use an approximately 150-foot-wide ROW, which is a generally accepted industry standard for 345 kV electric transmission line construction and operation. SPS also conducted GIS data collection, aerial photograph interpretation, and aerial reconnaissance to identify potential sensitive habitats such as playa lakes, other wetland and riparian areas, and communities of native vegetation and placed Alternative Route Segments in such a manner as to minimize potential crossings of these areas. Finally, the ROW will not be fenced, preventing potential habitat fragmentation and allowing wildlife ingress and egress.

Temporary and permanent impacts to wildlife from the construction and operation of the proposed Project are not expected to be significant.

5.4.3.1 Unique, Sensitive, or Protected Wildlife Habitats

Caprock Canyons State Park, Caprock Canyons State Park Trailway, and Playa Lakes Wildlife Management Area-Taylor Lakes Unit are located within the Study Area. The Alternative Routes and Preferred Route do not cross Caprock Canyons State Park or the Taylor Lakes Unit. The Trailway, which is associated with Caprock Canyons State Park, is a multi-use trailway and is not a unique, sensitive, or protected wildlife habitat. Potential Project impacts to the Trailway are discussed in Section 5.6.2, Parks and Recreation Areas.

5.4.3.2 Migratory Birds

In addition to the recommendations to protect migratory birds near playa lakes (see Section 5.4.1.1), TPWD identified additional measures to protect migratory birds in general in its August 26, 2010 letter to TRC.

Specifically, TPWD recommended that SPS avoid removing vegetation during the primary migratory bird nesting season (March through August) to avoid adverse impacts to migratory birds. If clearing vegetation during the nesting season cannot be avoided, TPWD recommends surveying the construction area to ensure that no nests with eggs or young will be disturbed during construction. TPWD notes that if migratory bird species are found nesting on or adjacent to the project area, they must be dealt with in a manner consistent with the MBTA. TPWD also recommended that measures be implemented to prevent electrocution of perching raptors (Wicker 2010). SPS will follow the procedures described in the following publications for the protection of raptors and other migratory birds: Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006) and the Avian Protection Plan Guidelines (APLIC 2005).

USFWS recommended that line markers be installed at or near transmission crossings of drainages (Cloud, Jr. 2010). SPS will use avian flight diverters in areas where migratory birds likely would be present. SPS also will implement the Avian Power Line Interaction Committee (APLIC) standards for structure design to prevent the electrocution of raptors. USFWS also recommended construction activities be conducted in accordance with its National Bald Eagle Management Guidelines.

Construction and operation of the proposed Project are not expected to result in significant impacts to migratory birds.

5.4.3.3. Threatened and Endangered Species

SPS conducted a comprehensive literature review to identify federal and state species of interest that potentially could be affected by the Project. These included species that were listed as endangered or threatened, as well as those species not listed under the ESA or Chapters 67 and 68 of the TPWD Code or 31 TAC §§ 36.171-65.176 but considered rare species of concern. This review determined that potential habitat for two federally endangered birds, one federal candidate bird, and three federally delisted birds may be present in the Study Area. Potential habitat for three state endangered species, five state threatened species, and 17 state rare species of concern may be present in the Study Area (see Table 4-3).

In a letter dated August 30, 2010, ODWC indicated that two state-listed species could occur within the Study Area: the Texas horned lizard and the burrowing owl. ODWC requested to be notified if either animal is encountered during the Project (Ray 2010). SPS will notify ODWC should these species be encountered during Project construction or operation.

SPS contacted the Oklahoma Ecological Services Field Office of the USFWS in regard to threatened and endangered species. It responded by providing a species list for Beckham County, Oklahoma and referred the Project Team to range maps and information resources concerning the lesser prairie chicken, a federal candidate species (O'Meilia 2010). The Arlington, Texas Ecological Services Field Office also expressed concern regarding potential Project impacts to lesser prairie chicken habitat (Cloud, Jr. 2010). The Project Team mapped known lesser prairie chicken habitat in and near the Study Area (Figure 4-10). None of the Alternative Routes or the Preferred Route traverse lesser prairie chicken habitat or the estimated range of this species.

USFWS also recommended that Project construction should be avoided in interior least tern nesting and staging areas from May through August. SPS will survey the certificated route prior to construction for least terns and their nests, and will avoid construction in areas where least terns are found during the nesting season. Should the transmission line route be constructed immediately near or over the Red River (where the least tern has been documented), SPS will place bird diverters along these sections of the line.

TPWD provided the Project Team with data from the TXNDD regarding recorded occurrences of threatened and endangered species in the Study Area. Recorded occurrences in the TXNDD are depicted on Figure 4-9. Once the PUC has certificated a route for the proposed Project, SPS will survey the route in accordance with state and federal protocols for threatened and endangered species, suitable nesting/burrow habitat, leks, and other suitable habitats for the threatened and endangered species with the potential to occur in the Study Area.

SPS does not anticipate Project construction and operation would result in significant impacts to state- or federally listed threatened or endangered species.

5.5 Community Values and Resources

5.5.1 Community Values

As discussed in Section 4.5, community values are a factor for consideration under PURA § 37.056(c)(4). Impacts to community values and resources could occur if the location and construction of a transmission line results in changes to land use, the loss of public access to a valued resource, or loss of the use of a resource due to the proposed transmission line, structures, or ROW.

The Project Team sent consultation letters, conducted numerous meetings with elected and appointed officials, and hosted open house public meetings to identify and collect information regarding local community values. In general, the Study Area is sparsely populated and the Alternative Route Segments avoid direct impacts to the churches, health clinics, hospitals, schools, and state-registered day care centers identified in the Study Area.

The following sections describe the potential effects on community resources and land use in the Study Area.

5.5.2 Community Resources

The Project represents a major long-term investment by SPS in the region. Construction of the Project facilities will have a positive impact on employment, income, and tax revenues across the U.S. (for manufacturing of the materials) and in the Texas counties directly affected by Project activities. During the operational phase of the Project, additional tax revenues will accrue to the jurisdictions where facilities are located. The counties in the Study Area are not expected to see an increase in the cost of public services as a result of the Project. However, in the event public services are impacted during the short-term construction period, any costs will be more than offset by increased employment, and increased employment income, as well as the long-term economic and fiscal benefits of the Project from increased tax revenue.

The short-term impact of non-local construction workforce on the local population will be minimal due to the temporary nature of the construction phase. No long-term population impacts will result from construction of the Project.

It is expected that a large portion of the local payroll dollars during construction will be spent locally for living, goods and services, and entertainment. In addition, some portion of the non-local construction payroll will be spent locally for the purchase of temporary housing, food, gasoline, entertainment, and luxury items. The dollar amount in a given area would depend on the number of construction workers in that area and the duration of their stay.

It is likely that some portion of construction materials and supplies will be purchased locally. These direct payroll and materials expenditures will have a positive impact on local economies and could stimulate indirect expenditures within the region as inventories are restocked or new workers are hired to meet construction demands. In addition, sales tax will be paid on all goods and services purchased with payroll monies or for construction materials.

Upon completion, the transmission system will be subject to applicable state, county, and local property taxes. Property taxes are levied only on those assets specifically identified by state tax law. The amount of property taxes is determined by multiplying the assessed value of the property times the local tax rate. The assessed value of the property subject to tax is determined annually by either the applicable county tax assessor or state tax assessment authority. Local tax rates are determined by individual county, town, school, and/or other governing bodies according to their estimated budget needs each year. These tax revenues are used to support county governments, public school systems, police and fire departments, road and bridge programs, and various other local public programs.

Construction of Project facilities could add an additional minor, short-term service load on the availability of local community services such as police, fire, and medical. However, the temporary increase in the non-local workforce population will be small relative to the current population and is not anticipated to stress local service providers.

5.6 Land Use

Land displaced by the transmission line construction represents the largest land use impact. In addition, land use impacts result from the compatibility of electric transmission line ROW with adjacent land uses. Most existing land uses will continue during construction.

Movement of workers and materials through the area during construction results in temporary impacts to land uses within the ROW. Temporary effects on residents and businesses in the area immediately adjacent to construction work areas may also occur from construction noise and dust, as well as temporary disruption of traffic flow. Coordination among SPS, its contractors, and landowners regarding access to the ROW and construction scheduling will minimize these temporary disruptions.

Following construction, disturbed work areas will be graded or otherwise restored and allowed to revert to approximate preconstruction conditions, except where individual landowner agreements negotiated during the easement acquisition process dictate other acceptable restoration measures. Natural revegetation will be encouraged, and if seeding or plantings are necessary, revegetation will be conducted using a seed mixture of native species developed in consultation with individual landowners. As a result, land use impacts to these areas would be temporary. Because vegetation is expected to return to preconstruction conditions within one to two growing seasons, impacts to lands currently classified as agricultural, pasture, commercial/industrial, or open land located within ROW will be short term and minor. Shrublands within the ROW will be maintained in a low-growth state to minimize potential interference with the conductors.

Permanent land use conversion will not occur to most lands within the ROW. Allowable land uses generally permitted within the permanent ROW would include agriculture, including the use of farming equipment and the cultivation of row crops, and rangeland/pastureland. The only future land uses not allowed in the permanent ROW are aboveground construction and the growth, planting, or cultivation of trees.

5.6.1 Urban and Residential Areas and Habitable Structures (Section 20 of the PUC CCN Application Form)

P.U.C. SUBST. R. 25.101(b)(3)(B) requires that an application for a new transmission line must address consideration of whether new transmission line routes utilize or parallel existing compatible ROWs, property lines, or other natural or cultural features. In general, installation of new utilities along existing, previously disturbed ROWs (e.g., transmission line, pipeline, road, or apparent property line) is generally preferable to construction where new ROWs would need to be established. Construction and operational effects on land use can normally be reduced by the use of previously disturbed ROWs, compared to establishment of new corridors. The Alternative Routes minimize land use impacts by paralleling and abutting existing ROWs wherever practicable and for a substantive portion of their length. Table 5-1 indicates the length of each Alternative Route that follows existing corridors, such as transmission lines, public roads and highways, and property lines.

The PUC also considers the number of habitable structures located in the vicinity of each Alternative Route when evaluating impacts. To the extent practicable, the Project Team attempted to avoid habitable structures during the routing process. The Study Area is sparsely settled with few residences in largely undeveloped open land, and all the alternative routes in the Study Area avoid cities and towns.

The Project Team conducted a review of aerial photography followed by field verification to determine the number of habitable structures located within 500 feet of the center line of each Alternative Route. Table 5-1 identifies the total number of habitable structures located within 500 feet of the center line of each Alternative Route. Appendix G lists the habitable structures located within 500 feet of each Alternative Route Segment. No hospitals, schools, churches, cemeteries, or day-care centers are located within 500 feet any of the Alternative Routes.

As a result of the routing conducted by the Project Team to avoid towns and habitable structures and maximize the use of existing corridors, impacts to urban and residential areas are minimal.

5.6.2 Parks and Recreation Areas (Section 25 of the PUC CCN Application Form)

Only one park or recreation area would be affected by the proposed Project. Segment AM of the Preferred Route (Alternative Route 20) and Segment WW of Alternative Route 19 would cross the Caprock Canyons Trailway in Hall County (see Figure 2-1, Sheet 4). This is a 15,000-acre multi-use park operated by the TPWD with a trail that extends for approximately 64 miles through three counties along a former railway. Approximately 150 feet of the trailway would be traversed by either of these alternatives. The main park area of the Caprock Canyons Park would not be affected by any of the Alternative Routes.

Segment AM would cross the trailway just north of the intersection of Highway 86 and County Road 21 (approximately 8.5 miles west of the intersection of Highway 86 and U.S. 287). The topography in this area is generally flat. Adjacent to the trailway on the south and north, the land is cultivated and in active agriculture. An existing electric distribution line is adjacent to County Road 21 and currently crosses the trailway in a north-south direction at this location. The proposed transmission line would be located adjacent to the existing distribution line, along the east side of County Road 21.

Segment WW would cross the trailway 0.5-mile north of Highway 86 (approximately 7.5 miles northeast of the intersection of Highway 86 and Highway 70). The topography in this area is generally flat, and there are fields in active cultivation within a 0.5-mile east and west of the crossing.

The Project Team has initiated consultation with TPWD for guidance and approval to cross the Caprock Canyons Trailway. SPS does not anticipate that construction or operation of the Project will interfere with long-term use of the Caprock Canyons Trailway or any other park or recreation area.

5.6.3 Irrigation Systems (Section 23 of the PUC CCN Application Form)

All of the Alternative Routes would cross agricultural land including cultivated cropland, pasture, and rangeland. Impacts to agricultural land would vary depending on the amount and type of land uses crossed. Because existing agricultural land uses can be resumed following construction, there would be no long-term or significant displacement of farming or grazing activities.

The Project Team identified croplands and pastures in the Study Area that are irrigated by mechanical irrigation systems (rolling or pivot type irrigation). Table 5-1 provides the total length of each Alternative Route that crosses irrigated agricultural land. Impacts to these areas will be minimized by siting the transmission structures outside of the zone of irrigation system movement to the extent possible (i.e., along roadways, property lines, or areas not irrigated).

Because there would be no long-term impact to grazing or farming, and mechanical irrigation systems will be avoided to the extent possible, no significant impacts to agricultural practices are anticipated from the construction of the transmission lines along any of the Alternative Routes.

5.6.4 Aesthetics

Impacts to visual resources can occur when the ROW, transmission lines, and/or structures alter the character of existing views. The degree of scenic impact is highly subjective and depends on the value that viewers place on the landscape in its natural form versus the presence of the transmission line. Factors that affect the amount of overall visual impact include the numbers of viewers who would see the facilities, how long they would view the facilities, the expectations of those viewers in terms of what they are used to seeing and their aesthetic preferences, the natural scenic quality of the existing landscape, and the extent other manmade features such as utilities, buildings, and roadways are already present in the area.

Construction of the transmission line could have temporary and permanent aesthetic effects. Temporary impacts would include views of the actual assembly and erection of the Project. Permanent impacts would involve the views of the structures and lines associated with the Project. SPS proposes to use two-pole, steel structures which generally reduce visual impacts as their visibility fades into the background horizon as poles become more distant from the viewer. There are no officially designated federal, state, or local scenic areas in the Study Area that would be affected by the Project. Visual impacts are likely to be experienced mostly by local residents and motorists on roadways near the Project. The local roadways are relatively lightly traveled, limiting the number of viewers who would see the Project, and those travelers who do see the Project would likely experience its view for a relatively short period of time.

Based on the presence of few residences and the lack of designated visual resources in the Study Area, no significant impacts to aesthetic resources are anticipated.

5.6.5 Transportation and Aviation

5.6.5.1 Roadways

Construction of the Project will result in minor, short-term impacts to the transportation network in the Study Area. The movement of construction equipment and materials and the daily commuting of employees to and from the construction work areas may slightly increase traffic volumes. Because construction will move sequentially along the transmission line route, traffic flow impacts that do arise will be temporary on any given section of roadway.

Overall, SPS does not anticipate significant traffic impacts along the route during construction. No traffic-related impacts are anticipated during operation of the Project.

SPS will consult with the Texas Department of Transportation and county public works departments to obtain road crossing permits where required. Table 5-1 provides the number of roads crossed by each Alternative Route.

5.6.5.2 Aviation Facilities (Section 22 of the PUC CCN Application Form)

Thirteen FAA-registered airfields are located within the Study Area. There are no FAA-registered airports with runways no more than 3,200 feet in length located within 10,000 feet of the center line of the proposed Project. There are no private airstrips within 10,000 feet of the center line of the proposed Project. There are no heliports located within 5,000 feet of the center line of the proposed Project. All Alternative Routes (including the Preferred Route) are located within 20,000 feet of at least one FAA-registered airport with at least one runway longer than 3,200 feet. Table 5-2 provides information on these three airports and the Alternative Route Segments located within 20,000 feet. Table 5-1 indicates how many airports each Alternative Route is near.

TABLE 5-2

Aviation Facilities

Airfield Name	Label on Figure 2-1 (Sheets 1-7)	Latitude (Degree Decimal)	Longitude (Degree Decimal)	Runway Length in Feet	Elevation in Feet	Potential to Exceed 100:1 Horizontal Slope	Distance in Feet to Centerline - Segment	Alternative Routes
Abernathy Municipal	AM1	33.8459136	-101.762948	4,000	3,327	yes	9,314 – B 18,637 – F 18,637 – I 16,500 – L 16,900 – M	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
Memphis Municipal	MM2	34.7395894	-100.529701	4,600	2,102	yes	16,300 – BA 16,200 - BC 13,284 –BD	1, 2, 3, 4, 5, 6, 19, 20
Silverton Municipal	SM3	34.4667306	-101.300438	3,575	3,267	yes	7,848 -AI	1, 2, 3, 4, 5, 6

In accordance with Federal Aviation Regulations (FAR), the FAA uses a 100:1 horizontal slope criteria for evaluating potential obstructions at airports with runways longer than 3,200 feet in length that are available for public use and are located within 20,000 feet of a proposed structure. After the PUC certificates a route for the Project and engineering and pole placement along the route are finalized, the Project Team will provide the FAA Notice of Proposed Construction or Alteration (FAA Form 7560-1) for all pole structures proposed to be located within 20,000 feet of any of the airports listed in Table 5-2.

5.6.6 Electronic Installations (Section 21 of the PUC CCN Application Form)

The Project Team identified 128 electronic installations or towers in the Study Area. As confirmed through the Federal Communications Commission database, no commercial AM radio transmitters are located within 10,000 feet of the center line of any of the Alternative Routes, nor are any FM radio transmitters located within 2,000 feet of the center line of any of the Alternative Routes. Table 5-3 presents information on cellular, television, and microwave relay towers that are located within 2,000 feet of the center line of Alternative Route Segments.

Based on the Project Team's review, none of the existing communication towers or guy wires will be directly affected by any of the Alternative Routes. Therefore, no significant impacts to communication towers are anticipated from the construction of the transmission line along any of the Alternative Route.

TABLE 5-3

Electronic Installations Relative to Transmission Line Segments

Label on Opportunities and Constraints Maps	Tower Type	Segment ID	Direction of Tower From Segment Center Line	Distance in Feet
A	Cellular	AI	W	1,047
B	Cellular	AW	NW	93
C	Cellular	AJ	S	1,415
D	Microwave	W	E	933
E	Cellular	W	S	746
F	Cellular	W	S	467
G	Cellular	BA	S	749
H	Microwave	BB	S	1,410
I	Cellular	AK	NW	253
J	Television	BF	N	532
K	Television	BF	N	532
L	Television	BF	N	532
M	Television	BF	N	532
N	Cellular	WW	W	310
O	Microwave	U	W	430
P	Cellular	G	W	1,465
Q	Cellular	O	S	822

5.7 Historical and Archaeological Sites (Section 26 of the PUC CCN Application Form)

5.7.1 Archaeological and Historical Resources

Because of the limited physical disturbance associated with construction of a transmission line project and the ability to span areas where significant resources could occur, potential impacts to archaeological and cultural resources that would result from development of the Project are expected to be limited.

As discussed in Section 4.7, the Project Team identified a total of 17 previously recorded archaeological sites within 1,000 of the centerline of the Project. Construction activities associated with any proposed project have the potential to adversely impact cultural resources through changes in the quality of the archaeological, historical, or cultural characteristics that qualify a property to meet the criteria of eligibility to the NRHP. These impacts occur when the construction of a project alters the integrity of locations, design, setting, materials, construction, or association that contribute to a resource's significance in accordance with the NRHP criteria. As discussed in 36 CFR 800, adverse impacts on NRHP-listed or -eligible properties may occur under conditions that include, but are not limited to:

- Destruction or alteration of all or part of a property;
- Isolation from or alteration of the property's surrounding environment (setting); or
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

There are direct or indirect impacts from the Project. Specifically, direct impacts typically occur during construction. Indirect impacts include those caused by construction that occur later in time or are further removed, but are foreseeable. These indirect impacts may include changes in land use patterns, population density, or accelerated growth rates.

Avoidance is the preferred form of mitigation for direct or indirect impacts to cultural resources. An alternative form of mitigation of direct impacts can be developed for archaeological and historical sites with the implementation of a program of detailed data retrieval. Also, relocation may be possible for some historic structures. Careful design considerations can reduce indirect impacts to historical properties.

The method typically utilized to assess an area for potential prehistoric cultural resources is to identify high probability areas (HPAs). Locations that are usually identified as HPAs for the occurrence of prehistoric sites include water crossings, stream confluences, drainages, alluvial terraces, wide floodplains, and upland knolls. When defining HPAs, a distance relationship to a water resource (about 1,000 feet) is set that would encompass landforms deemed appropriate for the presence of cultural resource sites. HPAs were identified along the Alternative Routes using USGS topographic maps. These areas will be reviewed with the THC during development of the survey design.

Following CCN issuance, SPS will conduct a cultural resources survey of the certificated route in accordance with a preapproved research design developed in consultation with the THC for the new transmission line project. Field work will focus on identifying all cultural resources within the Project’s Area of Potential Effect, and assessing their status in terms of the criteria established for the NRHP. The results of these surveys will be presented to the THC for review and comment.

The Project Team will survey for historical and archaeological resources along the certificated route, and will work with the appropriate agencies if resources are found in order to ensure that any potential impacts to resources are properly mitigated or avoided.

5.7.3 Native American Tribal Consultation

On July 30, 2010, SPS sent letters to representatives of the Apache Tribe of Oklahoma, the Comanche Nation of Oklahoma, and the Kiowa Tribe of Oklahoma requesting the tribes to communicate concerns they may have about potential impacts the Project may have on traditional cultural properties and historic properties. No response has been received from these tribes to date.

5.8 Mineral and Energy Resources

As part of the routing process, SPS placed Alternative Route Segments to avoid spanning visible active oil and gas wells. No active oil and gas wells are spanned by the Preferred or Alternative Routes. No sand or gravel operations are spanned by the Preferred or Alternative Routes.

6.0 SELECTION OF THE PREFERRED ROUTE

The Project Team performed a quantitative analysis of each Alternative Route using the routing opportunities and constraints listed in Section 2.1. Specifically, this analysis included calculation of the cumulative length (miles) each route parallels and abuts routing opportunities, the cumulative length (miles) each route is affected by routing constraints, or the cumulative number of constraints located within a specific distance from the center line of each Alternative Route. Table 5-1 presents the results of this quantitative analysis of routing opportunities and constraints for each Alternative Route. This information was reviewed along with management considerations such as:

- Avoiding and/or minimizing impacts to natural and human environmental characteristics
- Engineering constraints
- Cost estimates
- Construction, operation, and maintenance considerations
- Comments received through the public open houses, agency consultation, and correspondence
- Comments received from landowners and other stakeholders
- Considerations related to ROW and property issues
- Overall permitting considerations

Based on this evaluation, SPS selected Alternate Route 20 as its Preferred Route.

The Preferred Route minimizes the distance across 100-year floodplains. The study area contains numerous creeks and rivers. The Preferred Route crosses six rivers and 179 streams. Each of the river crossings are sited for constructability with narrow crossings and stable banks.

The Preferred Route minimizes impacts to habitable structures and maximizes alignment along property lines. These were two considerations mentioned through the numerous comments received from the public open houses. The Preferred Route is approximately 180.2 miles long, has 33 habitable structures located within 500 feet of the centerline, and is parallel to approximately 110 miles of property lines.

The Preferred Route also minimizes impacts to mechanically irrigated pasture and cropland, wetlands, and non-irrigated cropland. No schools, cemeteries, hospitals, churches or known threatened and endangered species habitat will be affected by the Preferred Route.

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7.0 LIST OF PREPARERS

This Environmental Assessment was prepared for SPS by TRC. SPS provided information in Section 1.0. Personnel with primary responsibilities for the preparation of this document include the following.

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APPENDIX A

Agency Correspondence

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APPENDIX B

Figure 2-1 (Sheets 1-7) Alternative Route Segments and Opportunities and Constraints in the Study Area (oversized maps)

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APPENDIX C

Figure 2-2 (Sheets 1-7) Preliminary Alternative Route Segments (oversized maps)

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APPENDIX D

Public Involvement

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APPENDIX E

Alternative Route Segment Descriptions

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APPENDIX F

Soil Types in the Study Area

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APPENDIX G

Habitable Structures within 500 Feet of the Alternative Route Segments

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