

3.5 Fish and Wildlife Resources

The primary issues related to fish and wildlife resources include the loss or alteration of aquatic and terrestrial habitats in the proposed disturbance areas, including the proposed dragline walkway/haul road corridor across the Sabine River, potential changes in wetland and riparian habitat as a result of groundwater level changes within the projected mine-related groundwater drawdown area, and potential effects to aquatic habitats as a result of mine-related discharges.

The study area for direct and indirect impacts to fish and wildlife resources (including special status species) includes the area within the proposed permit boundary and the projected mine-related 5-foot groundwater drawdown area of the Carrizo-Wilcox aquifer system; and segments of the Sabine River, Cherokee Bayou, Black Slough, and Watt Creek (inclusive of their tributaries), extending downstream approximately 5 miles from the points of proposed mine water discharge. A distance of 5 miles was selected based on the proposed in-channel work for the dragline walkway and main haul road crossings of the Sabine River, and the potential for mine-related effects to aquatic and riparian habitats along the waterbodies in the study area. The fish and wildlife resources (including special status species) cumulative effects study area includes the area within the proposed permit boundary and the projected cumulative 5-foot groundwater drawdown area of the Carrizo-Wilcox aquifer system; areas of surface disturbance associated with past, present, and reasonably foreseeable future actions (see Section 2.7); and segments of the Sabine River, Cherokee Bayou, Black Slough, and Watt Creek (inclusive of their tributaries), extending downstream approximately 5 miles from the points of proposed mine water discharge. A distance of 5 miles was selected based on the proposed in-channel work for the dragline walkway and main haul road crossings of the Sabine River under the Proposed Action, and the potential for cumulative effects to aquatic and riparian habitats along the waterbodies in the study area.

3.5.1 Affected Environment

As discussed in Section 3.4, Vegetation, the proposed Rusk Permit Area lies within the east Texas Pineywoods vegetational region (Sabine 2009a). The region is characterized by irregular plains that once were covered by pine and hardwood forests. Topography of the region is characterized as gently rolling to near flat, with elevations ranging from approximately 100 to 1,000 feet amsl (Texas Forest Service 2008). The southern approximately 85 percent of the Rusk Permit Area generally can be described as undulating to steep erosional uplands that are moderately dissected on a local basis by first and second order streams and, on a more regional scale by larger streams that originate within or traverse the area enroute to the Sabine River.

Information regarding fish and wildlife resources (including threatened and endangered species) and current habitat conditions within and adjacent to the study area was gathered from literature review, agency websites, and previous work conducted at adjacent mine areas. In addition, fish and wildlife resources (including special status species) were evaluated in the proposed Rusk Permit Area and adjacent areas within the Sabine River floodplain by CNG Environmental (CNG) from February 2007 through September 2008, concurrent with other baseline surveys (e.g., vegetation, soils, wetlands). A survey of mussel species in the Sabine River in the study area was conducted in July 2010. These baseline studies documented species occurrence and habitat utilization to characterize the fish and wildlife communities in the Rusk Permit Area (Sabine 2009a; CNG 2010). Representative wildlife species that may occur in the project vicinity are identified in **Table F-1 in Appendix F**.

The baseline studies conducted by CNG included habitat assessment/delineation, evaluation of the presence or absence of mammal, bird, reptile, and amphibian (including threatened/endangered) species populations and their habitats. Methods used for evaluation of terrestrial species included: trapping to characterize the small mammal communities; scent stations, spotlight surveys, and field observations to assess the medium-sized mammals, furbearers, and other economically important species; transect surveys and windshield sightings for bird species; and active observation (during all sampling periods) and impromptu habitat searches for reptile and amphibian species. Baseline survey locations are shown in **Figure 3.5-1**.

Aquatic habitat, fish, and benthic invertebrate studies were conducted by CNG during September 2007. Studies were conducted at six stream/pond habitat locations within the Sabine River, Cherokee Bayou, Black Slough, and Watt Creek drainages (see **Figure 3.5-1**). These sites were selected as representative of the various types of aquatic habitat found within the study area (Sabine 2009a).

A mussel survey was conducted by CNG in July 2010. Seven locations were chosen for survey: at the proposed dragline crossing, two sites upstream and one downstream of the dragline crossing, at the proposed haul road bridge location, and two sites downstream of the bridge (CNG 2010).

3.5.1.1 Habitat

The study area is located in the Pineywoods region of east Texas in Harrison, Rusk, and Panola counties. This region is characterized by gently rolling grassland and woodland habitats bisected by numerous rivers, large streams, and their associated relatively flat floodplains (Sabine 2009a).

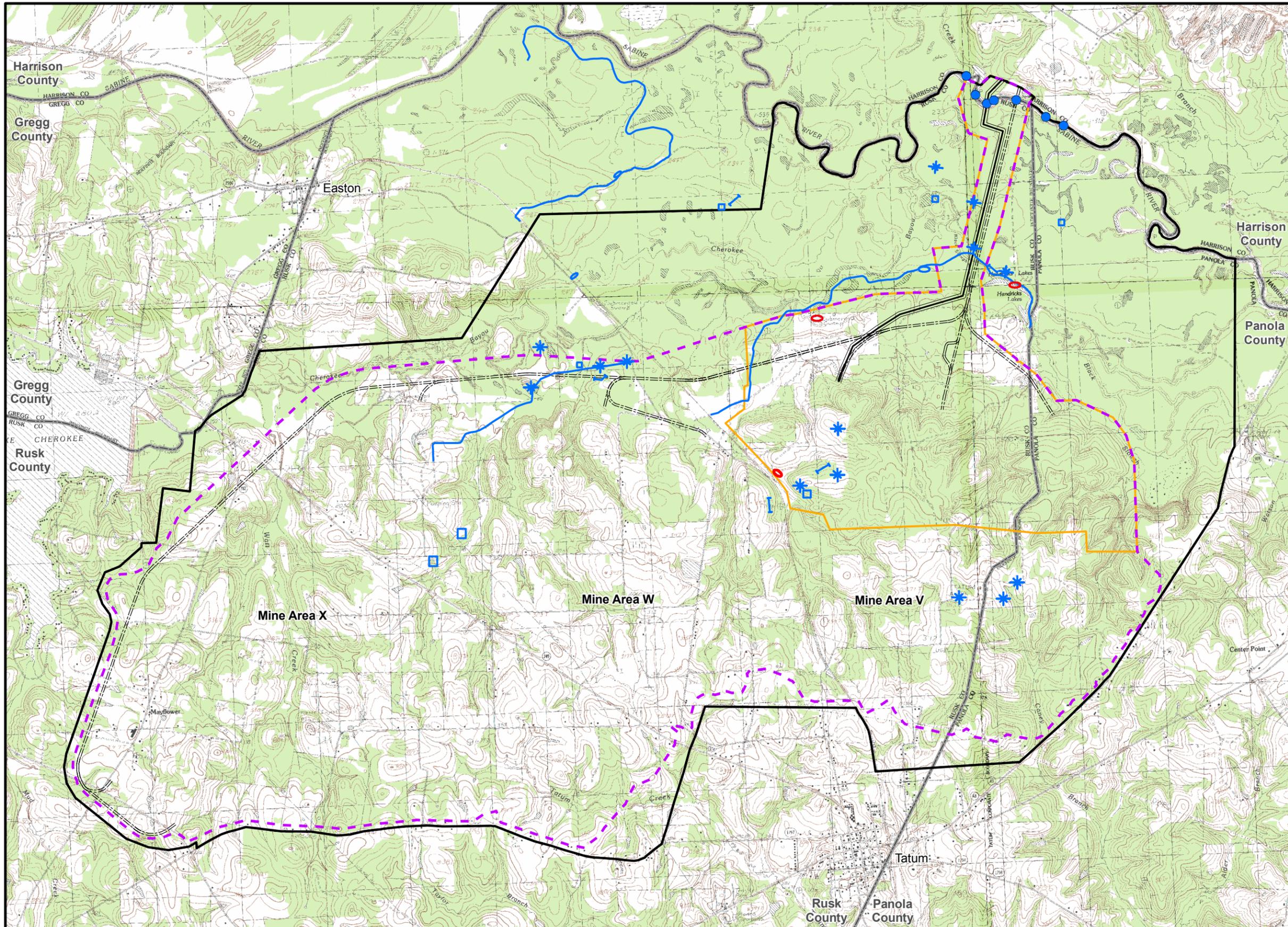
Wildlife habitat within the study area generally can be classified as forest, grassland, or aquatic. These habitats range from improved and unimproved grassland habitats to pine plantations and upland and bottomland mixed deciduous/pine forest habitats, with inclusion of wetlands and open water aquatic habitats. Overall habitat value for wildlife resources within the study area ranges from low to high. While both naturally occurring and planted forests occur throughout the Rusk Permit Area, most forest stands are in a forest management cycle for production of either pine or hardwood lumber (Sabine 2009a). Grassland habitats in the Rusk Permit Area comprise both naturally occurring grasslands and improved pasture (highly managed). Aquatic habitats in the study area include the Sabine River and its tributaries, a variety of man-made ponds and lakes used mostly as stock ponds or to support livestock, and associated wetlands and riparian zones.

Approximately two-thirds of the Rusk Permit Area consists of naturally occurring forest habitat. These wooded areas vary from the mixed hardwoods in the Sabine River floodplain to the mixed hardwood/pine woodlands in the upland areas. Virtually all forested portions of the Rusk Permit Area (both wetland and non-wetland) have been timbered aggressively. The current state of the majority of these regenerative stands is early to mid-successional (Janak 2009). The natural woodland habitats appear capable of supporting a variety of wildlife species suited for deciduous forest habitats.

Approximately 10 percent of the forests in the study area comprise pine plantations (Sabine 2009a). Between timbering cycles (a period of approximately 20 to 30 years) pine plantations provide short-term suitable habitat for a variety of wildlife and bird species, as the replanted forests transition over time from shrub- and herbaceous-dominated habitats to pine forest habitat.

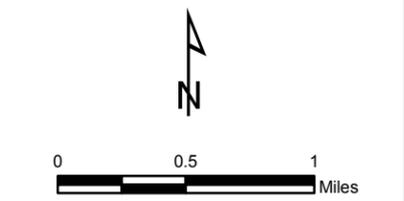
Grassland habitats in the Rusk Permit Area generally fall into one of three categories: grazed; ungrazed; or old field. These areas range from pure, highly managed stands of coastal Bermuda grass to recently clear cut areas undergoing conversion to pasture (Sabine 2009a). As noted during the field surveys, the highly maintained grassland habitats exhibited a lower potential for both wildlife species diversity and abundance (Sabine 2009a).

Aquatic habitats in the study area consist of the Sabine River and its tributaries, impoundments used for livestock/recreational purposes, and both forested and non-forested wetlands. The primary drainages located in the study area include the Sabine River, Cherokee Bayou, Black Slough, Watt Creek, and their tributaries (see **Figure 3.2-12**). Watt Creek and its tributaries cross the eastern portion of the Rusk Permit Area enroute to Cherokee Creek. Cherokee Creek, Black Slough, and their tributaries cross the northern portion of the Rusk Permit Area enroute to the Sabine River (see Section 3.2, Water Resources). Numerous impoundments, mainly used as stock ponds, are scattered throughout the study area. Perennial waters in the study area include the Sabine River, Cherokee Bayou, Black Slough, Watt Creek, Hendricks Lake (an old oxbow), and numerous other upland ponds. Numerous ephemeral streams also occur in the study area (Sabine 2009a).



- Legend**
- Proposed Rusk Permit Area Boundary
 - Proposed Mine Areas
 - Proposed First 5-year RCT
 - Permit Term Disturbance Boundary
 - Proposed Life-of-mine Disturbance Boundary
 - Main Haul Roads
 - Dragline Walkway
 - County Boundary
 - Small Mammal Sampling
 - Spotlight Lines
 - Bird Transects
 - Aquatic Stations - Streams
 - Aquatic Stations - Ponds
 - * Scent Stations
 - Approximate Mussel Survey Transects

Source: Sabine 2009a, 2010c; CNG 2010.



Rusk Permit Area EIS

Figure 3.5-1
Terrestrial and Aquatic Wildlife Survey Locations

As discussed in Sections 3.2.4 and 3.4 (Surface Water and Vegetation, respectively), the TPWD has nominated part of the Sabine River as an “ecologically significant stream segment” (TPWD 2009d). The candidate river reach extends from approximately Easton, Texas, upstream of the study area, to U.S. Highway 59, downstream of the study area. This reach is noted for its diverse riparian, wetland, and hardwood forest habitats; priority bottomland hardwood habitats with “significant overall habitat value”; and presence of the state threatened Paddlefish (*Polyodon spathula*) (TPWD 2009b). There also is a mussel sanctuary downstream of the proposed project in the Sabine River from SH 43 downstream to U.S. Highway 59 in Harrison and Panola counties (TAC 2006).

The Rusk Permit Area contains numerous wetland habitats, both forested and non-forested. The forested wetland habitats primarily are located in sloughs and depressions within the floodplains of the Sabine River, Cherokee Bayou, and their tributaries, and to a lesser extent, on the lower slopes bordering floodplains in the sandy uplands. Non-forested wetland habitats are located in back swamps, sloughs, and depressions. These habitats are located within the Sabine River floodplain and serve a wide variety of resident and migratory wildlife species (Sabine 2009a).

3.5.1.2 Terrestrial Game Species

The white-tailed deer is the most important game species in the Pineywoods region of east Texas (TPWD 2007a). This species occurs primarily in the pine and mixed pine/hardwood upland forests and the hardwood forests that occur in the floodplains of major streams and rivers (Spencer 1992). Based on data collected by TPWD from 1999 to 2003 for Rusk County, there were approximately 18 to 28 deer per 1,000 acres throughout the county (Sabine 2009a). Data collected by CNG from 2007 to 2008 in the Rusk Permit Area (most of which is located in Rusk County) suggest that the deer population in the Rusk Permit Area is approximately 9 deer per 1,000 acres (Sabine 2009a).

Upland game birds in the study area include the mourning dove and the northern bobwhite. The mourning dove is found throughout Texas, with preferred habitats consisting of dry upland areas, grain fields, and shrublands (TPWD 2005). Mourning doves commonly were observed throughout the study area during all baseline study periods (Sabine 2009a). The northern bobwhite preferred habitat consists of brush, farmlands, chaparral, and open pinelands (TPWD 2005). Northern bobwhite were documented based on a few calls heard during the baseline studies; no birds were observed (Sabine 2009a). Other upland game birds that potentially could occur in the study area are identified in **Table F-1 in Appendix F**.

Furbearers are of economic and recreational importance in Texas, and due to the state’s size and ecological diversity, it has more furbearing species than any other of the contiguous states (Schmidly 1984). Furbearers observed in the study area include the raccoon, opossum, beaver, and gray fox (Sabine 2009a). Other furbearers that potentially could occur within the study area are identified in **Table F-1 in Appendix F**.

Other game species identified in the study area during baseline studies included waterfowl, which are present in the area as migrant or winter residents. During the winter, gadwalls, widgeon, and pintails periodically were observed in large numbers (greater than 100 individuals) on the larger waterbodies in the Sabine River floodplain. Mallards were observed from fall to early spring, usually as pairs on or near the small seasonal pools in the floodplain forest habitat. Wood ducks were observed during all seasons, and both snow geese and Canada geese occasionally were observed in flight over the study area (Sabine 2009a). Other game species that potentially could occur within the study area are identified in **Table F-1 in Appendix F**.

3.5.1.3 Terrestrial Nongame Species

A diversity of nongame wildlife species (e.g., small mammals, passerines, raptors, amphibians, and reptiles) is associated with the habitats in the study area (see **Table F-1 in Appendix F**). These species have the potential to be found in the natural (floodplain forest, upland forest, aquatic, and wetland) and

man-made (pasture, improved pasture, cropland, clear cut, pine plantation, aquatic, and wetland) habitats in the study area (Sabine 2009a).

Many nongame mammal species occur in the study area (see **Table F-1** in **Appendix F**). Nongame mammal species recorded in the study area during the baseline studies included raccoon, armadillo, opossum, skunk, wood rat, white-footed mouse, harvest mouse, cotton mouse, and golden mouse, with the most frequently observed species being the raccoon (Sabine 2009a). Nongame mammals, particularly small mammal species for which there were low trap counts during the baseline studies, provide a prey base for the region's mammalian predator, snake predator, and raptor species.

Nongame birds encompass a wide variety of passerine (also known as songbirds) and non-passerine (including raptor) species. Nongame birds that occur in the Pineywoods region are identified in **Table F-1** in **Appendix F**. Many of these species are neotropical migrants that breed in North America and winter in South America. Resident species that breed and over-winter in the same area, also are common.

Baseline bird surveys were conducted by CNG in May 2007 (spring) and February/March 2008 (winter) (Sabine 2009a). Approximately 73 nongame bird species were observed in the study area, including 9 raptor species. Recorded bird densities were higher in floodplain forests than in upland forests, and also were higher in winter than in spring (see **Table F-1** in **Appendix F**).

The most common nongame bird species recorded only in floodplain transects included pine siskin, purple finch, Brewer's blackbird, red-eyed vireo, and rufous-sided towhee. The most common species recorded in both floodplain and upland transects were white-throated sparrow, yellow-rumped warbler, tufted titmouse, American robin, and northern cardinal. The most common birds recorded only in upland transects were white-crowned sparrow, summer tanager, hummingbirds, hairy woodpecker, yellow-bellied sapsucker, and red-bellied woodpecker (Sabine 2009a).

Nongame water-oriented bird species were recorded throughout the baseline surveys (see **Table F-1** in **Appendix F**). Great blue heron and great egret were the most commonly observed water birds utilizing wetlands. Cattle egret were observed regularly in association with grazing livestock in open grassland areas (Sabine 2009a).

TPWD has noted a nearby area as having important colonial water bird rookeries. These sites are in the upper end of Lake Cherokee, upstream (west) of the Rusk Permit Area (TXNDD 2009). These rookeries support cattle egret and great blue heron. Both species were noted in the study area during baseline surveys as noted above; however, no nesting activity by either species was observed. No other water bird rookeries of any species were noted in the study area during the baseline surveys (Sabine 2009a).

Windshield surveys for raptor species were conducted simultaneously with all baseline studies. The most common species noted was the turkey vulture, which was ubiquitous year-round. The black vulture was less abundant than the turkey vulture, and more seasonal. Red-tailed hawks and red-shouldered hawks commonly were observed throughout the study area. Other raptor species for which there were multiple sightings included kestrel, barred owl, and northern harrier. Species represented by single sightings include Cooper's hawk, sharp-shinned hawk, and Swainson's hawk (Sabine 2009a).

Other nongame species in the study area include amphibian and reptile species. Amphibian and reptile observations were recorded throughout the baseline studies. Additionally, notations of calls from frog species were made during nighttime surveys. Common amphibian species observed in the study area included the green tree frog, gray tree frog, chorus frog, cricket frog, and leopard frog. Common reptile species observed in the study area included western cottonmouth, Texas rat snake, red-eared slider, ground skinks, and five-lined skinks. A number of these nongame species are dependent on the limited riparian and wetland habitats associated with the creeks and ponds in the study area.

3.5.1.4 Aquatic Species

Aquatic habitats in the Pineywoods region of east Texas include large rivers and their tributaries, streams, lakes, isolated waterbodies such as stock ponds, and both forested and non-forested wetlands. With the exception of lakes, each of these aquatic habitats can be found in the proposed permit boundary.

Common fish species in the Sabine River drainage include various types of catfish such as bullheads, channel catfish, and flathead catfish; bass such as white bass, yellow bass, and striped bass; numerous species of sunfish; and various minnows, shiners, and darters (Whiteside 2007).

Aquatic baseline surveys were conducted by CNG during September 2007 to characterize the various types of aquatic habitats in the study area and determine the composition of fish and macroinvertebrate species within each aquatic habitat type (Sabine 2009a). Three ponds and three stream locations within the Sabine River floodplain and Cherokee Bayou drainage were selected as being representative of the aquatic habitats throughout the proposed permit boundary (see **Figure 3.5-1**). Electro-fishing surveys were conducted at each station to describe fish composition, and benthic samples were collected to describe macroinvertebrate communities. In addition, field measurements of select water chemistry parameters (e.g., pH, dissolved oxygen, hardness, temperature, and total alkalinity) were recorded at each station.

A total of 34 fish species were recorded from the six monitoring stations during the baseline surveys (see **Table F-2 in Appendix F**) (Sabine 2009a). Pond monitoring locations were represented by fewer species and lower capture numbers. Stream habitats exhibited greater diversity, with 14 additional fish species collected in the stream locations. Centrarchids (freshwater sunfish) dominated the data set, with 14 species overall representing 81 percent of captured individuals. Although common in the streams and rivers in the region, catfish species were underrepresented in the data collections. It is believed that the low catfish numbers were due to the species being only marginally susceptible to electro-fishing methods (Sabine 2009a).

Based on the baseline survey results, pond habitats (monitoring stations A-1, A-2, and A-3) generally were represented by fewer fish species and lower capture numbers. Station A-1 (Hendricks Lake, an old oxbow) is the largest, most permanent aquatic habitat in the study area and exhibited the greatest diversity of fish species. Station A-2 (an unnamed 3-acre impoundment) had the lowest diversity and abundance, which was coupled with the predominance of juvenile fish in the collections. The low diversity in this system was attributed to the lack of permanent water year-round due to drought periods that have occurred in this region of the state (Sabine 2009a). Station A-3 (a 1-acre pond) is typical of most of the ponds in the study area, with a bluegill/largemouth bass population structure. These species often are stocked by landowners for fishing, and the pond landscape locations limit immigration of other species, thereby limiting species diversity (Sabine 2009a).

Baseline data from two of the stream monitoring stations indicated relatively high species diversity, with 20 species collected. Stations S-1 and S-3, located along Cherokee Bayou and the outflow channel of Hendricks Lake, respectively, are considered permanent water bodies. The data indicate that these habitats serve as both congregation pools for fish within the tributary systems and, when seasonally connected by floodwaters, as conduits for species moving about the tributary system. During drought periods, station S-2 likely dries out (i.e., supports lower numbers of species) but is repopulated during wet periods with fish that have congregated in the more permanent pools (i.e., station S-1) in the tributary system (Sabine 2009a).

Baseline benthic sampling data indicated a diverse and abundant assemblage of macroinvertebrate organisms in the aquatic habitats sampled. A total of 76 taxa, including 16 insect species and 14 non-insect species, were collected during the study. The most abundant taxa consisted of flies and midges, comprising approximately 58 percent of the samples (604 individuals). No particular taxon stood out across the monitoring stations or at a particular station. Station A-1 had the lowest macroinvertebrate count; however, due to site conditions (i.e., steep sides and hard substrates), only D-net sampling was conducted. Likewise, only D-net sampling was conducted at station S-1 due to the accumulation of

crushed rock/gravel and large rocks from the railroad embankment (used to prevent scouring around the trestle) in the pool. Results obtained from the four other monitoring stations were more similar in diversity, although station A-3 had an appreciably higher number of individuals, while ranking third in the number of taxa recorded. Based on land use data and the size of the drainage area, this station has higher organics available through cattle wastes than the other sample sites (Sabine 2009a).

CNG's (2010) survey inventory of freshwater mussels in the Sabine River in and adjacent to the Rusk Permit Area documented habitat and substrate information as well as mussel species found. Sixteen different species with 644 specimens including two state threatened species (Texas pigtoe and Texas heelsplitter) were collected during the survey. One shell of a sandbank pocketbook (state threatened) also was found, suggesting the species may be present. Overall abundance and diversity of mussels in this area is comparable to some of the mussel beds in other areas of the Sabine River (CNG 2010).

3.5.1.5 Special Status Species and Species of Special Concern

Special status species are those that are listed as federally threatened or endangered, or have been proposed or are considered as candidates for such listing by the USFWS, and those species that are state listed as threatened or endangered by the TPWD. Federally listed and proposed species and federally designated critical habitat receive protection under the ESA. State-listed animal species are protected by laws and regulations contained in Chapters 67 and 68 of the Texas Parks and Wildlife Code and in Sections 65.171-65.184 of Title 31 of the TAC.

Under the ESA, the USACE, as lead federal agency for the proposed project, must determine if the proposed activities may affect a federally listed species or species proposed for federal listing. If such a determination is made, the USACE is required under Section 7 of the ESA to consult with the USFWS regarding the scope and magnitude of the effects. A BA is required under 7(c) of the ESA, if a federally listed species or critical habitat may be present in the action area.

Although the Arlington Field Office of the USFWS does not maintain a separate "species of special concern" list (USFWS 2010), the TPWD has designated categories for non-listed species that are believed to be rare or vulnerable. The TPWD designates such species as "rare." The TPWD "rare" designation is based on a species' global conservation status; these species currently have no legal protection.

A total of 44 mammal, bird, fish, reptile, and invertebrate species (26 special status species and 18 species of special concern) were identified as potentially occurring within the study area and cumulative effects study area (TPWD 2009c; USFWS 2009a). These species, their associated habitats, and their potential for occurrence within the study area and cumulative effects study area are summarized in **Tables F-3 and F-4 in Appendix F**. Occurrence potential within the study area and cumulative effects study area was evaluated for each species based on their habitat requirements and/or known distribution. This information was obtained from federal and state natural resource agencies. Based on these evaluations, 15 special status species or species of special concern were eliminated from detailed analysis, as their known range is outside of the study area and/or the study area does not include suitable habitat for these species (see **Tables F-3 and F-4 in Appendix F**). Of the remaining 29 species that are analyzed in detail, 19 are listed as threatened or endangered by the USFWS or TPWD (i.e., Rafinesque's big-eared bat, black bear, Louisiana black bear, Bachman's sparrow, peregrine falcon, American peregrine falcon, bald eagle, wood stork, interior least tern, creek chubsucker, paddlefish, timber/canebrake rattlesnake, alligator snapping turtle, Louisiana pine snake, Texas pigtoe, sandbank pocketbook, southern hickorynut, Louisiana pigtoe, and Texas heelsplitter) and 10 are listed as species of special concern by the TPWD (i.e., southeastern myotis bat, plains spotted skunk, arctic peregrine falcon, western sand darter, Sabine map turtle, rock pocketbook, Wabash pigtoe, wartyback, pistolgrip, and fawnsfoot). Brief descriptions of these species in relation to the study area and cumulative effects study area are presented below.

During all phases of the baseline fish and wildlife surveys, observers searched for endangered and threatened species that potentially could occur in the area (see **Figure 3.5-1**). Survey methods for

endangered or threatened species were the same as those described above for general fish and wildlife species (Sabine 2009a; CNG 2010).

No federal listed threatened or endangered species were observed in the study area during baseline studies (Sabine 2009a). State-listed threatened species that were observed include two mussel species (Texas pigtoe and Texas heelsplitter), with a shell of the sandbank pocketbook mussel also recorded (CNG 2010). No critical habitat of any federally listed endangered or threatened species occurs in the proposed project boundary (Sabine 2009a). Two special status species (i.e., bald eagle and the alligator snapping turtle) are moderately to highly likely to occur within suitable habitat within the study area, based on the species-specific discussion provided below. USFWS and TPWD were contacted to access current information on both federal and state listed endangered or threatened species (Sabine 2009a; TPWD 2010b; USFWS 2009a). These agencies indicated the species of special concern for the counties within which the study area is located, including some species not listed as threatened or endangered. TPWD's website was accessed to determine a complete compilation of species listed by both agencies with potential to occur within, or in the vicinity of, the proposed permit boundary. The species that are designated as threatened or endangered are listed and discussed below.

Special Status Species

Rafinesque's Big-eared Bat (Corynorhinus rafinesquii)

The Rafinesque's big-eared bat is listed as threatened by the TPWD (2009c). This bat species reaches the western extent of its range in east Texas (including Hardin, Jasper, and Liberty counties) where fewer individuals have been recorded at the periphery of its range versus a decline in overall population numbers. This species typically roost in old buildings, cisterns, and occasionally large hollow trees with partial light and forages after dark. Known from small colonies, usually segregated by sex, it is thought to be a permanent resident in the southeastern U.S., including the eastern periphery of Texas (NatureServe Explorer 2009). Although potentially suitable habitat may exist in the study area or cumulative effects study area, potential occurrence of Rafinesque's big-eared bat is considered unlikely based on the known distribution of this species.

Black Bear (Ursus americanus)

The black bear is listed as threatened by the TPWD (2010b) and federally threatened by similarity of appearance (T/SA) by the USFWS (2009a). Black bears prefer contiguous forested tracts, preferably bottomland forest. Native black bears have been extirpated from east Texas since the 1900s (Davis and Schmidly 1994); however, sightings and abundance in the southwestern Great Plains and adjacent northwestern Texas increased in the 1980s and 1990s (NatureServe Explorer 2009). While potentially suitable habitat for the black bear may exist in the study area or cumulative effects study area, potential occurrence of the species is considered highly unlikely based on its known distribution.

Louisiana Black Bear (Ursus americanus luteolus)

The Louisiana black bear is listed as a federally threatened species by the USFWS (2009a). Historically present in eastern Texas, this species currently is known to occur in Louisiana and Mississippi and, although unlikely, an occasional transient individual may wander into eastern Texas (NatureServe Explorer 2009). It is possible that the Louisiana black bear may be increasing in numbers, and viable populations may expand into east Texas (USFWS 1995); however, the TPWD has no verified sightings of black bears within or adjacent to the study area (Sabine 2009a). Although potentially suitable habitat may exist in the study area or cumulative effects study area, potential occurrence of Louisiana black bear is considered highly unlikely based on the known distribution of this species.

Bachman's Sparrow (Aimophila aestivalis)

The Bachman's sparrow is listed as threatened by the TPWD (2010b). A large sparrow native to the U.S. and primarily a resident of the southeastern U.S., this species prefers open piney woods with scattered shrubs and grassy understories; secondarily it utilizes brushy, overgrown hillsides with thickets and

brambles with scattered pine or mixed hardwoods. This species reaches the western limit of its range in eastern Texas, and is less abundant near the periphery of its range than the central portions. The species' breeding range once extended from the Midwest south to the Gulf of Mexico, and east to the Atlantic Coast; however, the Bachman's sparrow currently is only known to breed in Virginia and West Virginia. The breeding period may begin as early as mid-April and extend through August (NatureServe Explorer 2009). Bachman's sparrow populations appear to be declining in association with a decline of their preferred habitats in the southeastern U.S. (Mitchell 1998). A historic species siting was recorded in the South Hallsville No. 1 Mine Permit Area, north of the Rusk Permit Area (Sabine 2010d). Although limited potentially suitable habitat exists in the study area, there is potential for this species to occur within the study area.

Peregrine Falcon (Falco peregrinus) and American Peregrine Falcon (F. peregrinus anatum)

Both the peregrine falcon and the American peregrine falcon are listed as threatened by the TPWD (2010b). Recognized as a resident in the Trans Pecos region of Texas where nesting has been documented, these species may be seen throughout the state during migration; however, these birds are not known to nest in eastern Texas (USFWS 2003). These species forage in croplands, meadows, river bottoms, marshes, and lakes. Nest sites are located on high cliffs. Both species winter along the Texas Gulf Coast occupying a wide range of habitats during migration, including urban settings, lake shores, coastlines, and barrier islands. The breeding range extends from the northwest coast of Canada south through the Pacific Coast states, including west Texas. Breeding also may occur in South America. The breeding period is April through September (NatureServe Explorer 2009). The potential for occurrence of peregrine falcons in the study area and larger cumulative effects study area would be expected to be infrequent and transitory in nature during migration.

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is listed as threatened by the TPWD (2010b). Two subspecies of bald eagle are recognized as occurring in Texas, a northern and a southern subspecies. The northern subspecies winters on large rivers and lakes in the state but migrates out of state to nest. The southern subspecies nests in Texas, generally in the eastern half (Sabine 2009a). Nests typically are associated with large waterbodies, either reservoirs or rivers. The species' breeding range extends from Alaska and Canada south along the Pacific states through Baja California (both coasts), Sonora, New Mexico, Arizona, Texas Gulf Coast, and Florida (including the Keys); breeding is very local in the Great Basin and prairie and plains regions, where the breeding range recently has expanded to include Nebraska and Kansas. The breeding period is October through July in Texas (TPWD 2010b). TPWD historical data of nesting eagles indicates presence at Lake Cherokee (TXNDD 2009) southwest of the proposed permit boundary, suggesting that bald eagles could utilize portions of the study area for foraging or roosting. Although there are no known occurrences of bald eagles within the permit area (TPWD 2009e), there are species sitings recorded at the South Hallsville No. 1 Mine Permit Area, immediately north of the Rusk Permit Area (Sabine 2010d). Therefore, bald eagles have the potential to occur infrequently within the study area and the cumulative effects study area year-round as spring or fall migrants, breeders, or winter residents.

Wood Stork (Mycteria americana)

The wood stork is listed as threatened by the TPWD (2010b). A water-oriented bird, this species prefers marshes, swamps, or similar wetland areas. The wood stork is a resident to the Texas coastal zone and an infrequent visitor to the interior. The post-breeding dispersal of the wood stork extends from southern California, eastward across northern Mexico, central Texas, and the gulf states. Two distinct populations are recognized by the USFWS, including the Atlantic population, which is listed as federally threatened, and the Mexican population, which is listed as threatened by the TPWD (2010b) and accorded protection under state statute (USFWS 1986). Although individuals of the Mexican population formerly nested in Texas, no breeding records have been recorded since the 1960s, suggesting that this species is possibly extirpated within Texas. Wood storks breed in South America and along the Gulf Coast (mainly in the Florida Everglades). Their nesting is tied to receding water levels and concentration of food sources, regardless of date (NatureServe Explorer 2009). There are species sitings recorded at the South Hallsville

No. 1 Mine Permit Area, immediately north of the Rusk Permit Area (Sabine 2010d). It is anticipated that potential occurrence of wood storks in foraging habitats within the study area and cumulative effects study area would be transitory in nature during migration.

Interior Least Tern (Sterna antillarum athalassos)

The interior least tern is listed as an endangered species by both the USFWS and the TPWD (USFWS 2009a; TPWD 2010b). This species inhabits bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats associated with rivers and reservoirs. The interior least tern breeds inland along the Missouri, Mississippi, Colorado, Arkansas, Red, and Rio Grande River systems. Historically present within Texas, this subspecies is listed only when more than 50 miles inland from a coastline. This species nests along sand and gravel bars within braided streams and rivers and occasionally on man-made structures (e.g., inland beaches, wastewater treatment plants, gravel mines, etc.). It is anticipated that interior least terns potentially may occur in limited foraging habitats within the study area and cumulative effects study area. Further, mine activities could result in additional potential nesting or foraging habitat. However, occurrences of this species most likely would be transitory in nature during migration (NatureServe 2009; TXNDD 2009).

Creek Chubsucker (Erimyzon oblongus)

The creek chubsucker is listed as threatened by the TPWD (2010b). This species is a bottom-feeding fish that is known to occur in east Texas rivers, including the Sabine River. This species generally prefers rivers and large creeks that are highly vegetated; it is not known from impoundments. This species prefers headwaters, but not springs, and will spawn in river mouths or pools, riffles or lake outlets, or in upstream creeks. Populations of this species appear to be stable through its southern U.S. range (NatureServe Explorer 2009). Although unlikely based on the species absence during baseline surveys (Sabine 2009a) and the presence of the lake chubsucker (a competing species), there is potential for the creek chubsucker to occur within suitable habitat within the study area and the cumulative effects study area.

Paddlefish (Polyodon spathula)

Although considered stable throughout much of its range, the paddlefish is listed as threatened by the TPWD (2010b). A large, mostly cartilaginous fish of the large rivers of the eastern and central U.S., this species occurs primarily within the Mississippi drainage system, occurring in east Texas rivers, including the Sabine River. Population decline primarily can be attributed to construction of dams and disruption of migration patterns to important spawning areas. A second concern is the exploitation of the species for its roe, which is used for caviar on the world market (NatureServe Explorer 2009). Although the species was not documented during baseline surveys (Sabine 2009a), there is potential for the paddlefish to occur in suitable habitat within the study area and the cumulative effects study area.

Timber/Canebrake Rattlesnake (Crotalus horridus)

This species is listed as threatened by the TPWD (2010b). In Texas, the subspecies canebrake rattlesnake (*C. horridus atricaudatus*) is recognized. This subspecies prefers bottomlands, swampy areas, wetlands with thick brushy areas, and thickets with abundant rodent populations and many downed logs. Documented as a permanent resident within eastern Texas, the study area lies within this species' known range. The low small mammal populations observed in bottomland habitats during baseline surveys suggest less than optimum habitat for this subspecies within the portions of the study area that have been surveyed. The extensive floodplain forest may provide potential, but not optimal, habitat for this species within the study area and cumulative effect study areas (NatureServe Explorer 2009). There is a species sighting recorded in the South Hallsville No. 1 Mine Permit Area, immediately north of the Rusk Permit Area (Sabine 2010d). Based on the species known distribution, the timber/canebrake rattlesnake potentially may occur in suitable habitat within the study area and cumulative effects study area.

Alligator Snapping Turtle (Macrochelys temminckii)

The alligator snapping turtle is listed as threatened by TPWD (2010b). This species typically inhabits perennial, deep waterbodies such as rivers, large creeks, and reservoirs in Texas. Breeding occurs once per year, in the spring, and is the only time this species leaves the water. Nests are located away from water, with the hatchlings hatching in the fall (NatureServe Explorer 2009). This species is known to occur in the vicinity of the study area and, therefore, is likely within the Sabine River and its larger tributaries that drain into the Gulf of Mexico (Sabine 2009a). Based on the species distribution and the presence of potentially suitable habitat, it is highly likely that the alligator snapping turtle occurs in suitable habitat within the study area and the cumulative effects study area.

Louisiana Pine Snake (Pituophis ruthveni)

The Louisiana pine snake is listed as threatened by the TPWD (2010b) and as a candidate for federal listing by the USFWS (2009a). This species is a large-bodied semi-fossorial snake of secretive nature. The species' range includes extreme east-central Texas and western Louisiana. The Louisiana pine snake prefers pine forest habitats (long-leaf preferred) that lack mid-canopy layers but exhibit heavy herbaceous layers in sandy soils. This species has been linked to occurrence with extant populations of pocket gophers, where it utilizes the burrow systems and is believed to feed on the pocket gophers. The decline in numbers of Louisiana pine snake are attributed to timber practices that select against old growth long-leaf pine forest to faster-cycle loblolly and slash pine stands (NatureServe Explorer 2009). Based on the lack of preferred habitat and ongoing timber practices in the study area, it is unlikely that this species occurs in the study area.

Texas Pigtoe (Fusconaia askewi)

The Texas pigtoe is listed as threatened by the TPWD (2010b). This freshwater mussel species inhabits rivers with mixed mud, sand, and fine gravel substrates in protected areas associated with fallen trees or other structures. The currently known surviving populations of the Texas pigtoe documented since 1990 include the Trinity River above Lake Livingston, a tributary of the West Branch San Jacinto River, and the Sabine River above Toledo Bend Reservoir. A 2010 survey recorded individuals in the study area (CNG 2010). It also was reported in the Angelina River in 1984 and Neches River in 1986; however, it has not been subsequently identified in either location during surveys by the TPWD since 1992. Major threats to the continued survival of this species include human-related impacts within its range, including modification of terrestrial habitats and associated disturbance of vegetation, resulting in rapid erosion of sandy soils and intense sand smothering of area waters (NatureServe Explorer 2009). Based on the results of the recent CNG survey, the Texas pigtoe occurs in suitable habitat within the study area and the cumulative effects study area.

Sandbank Pocketbook (Lampsilis satura)

The sandbank pocketbook is listed as a threatened by the TPWD (2010b). This freshwater mussel inhabits small to large rivers with moderate flows and swift current with gravel, gravel-sand, and sand bottom substrates. This species is known from southern portions of the Mississippi interior basin and western Gulf drainages of Arkansas, Mississippi (extreme south), Louisiana, and Texas. In Texas, it has been reported from the Lower Sabine watershed. The 2010 survey found one shell of a sandbank pocketbook, suggesting that the species may be present, but in very low numbers (CNG 2010). Major threats to this species include loss of habitat as a result of siltation, impoundments, and the addition of pollutants to streams and rivers (NatureServe Explorer 2009). The sandbank pocketbook potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Southern Hickorynut (Obovaria jacksoniana)

The southern hickorynut is listed as a threatened by the TPWD (2010b). This freshwater mussel occupies medium-sized waterbodies with low to moderate current and gravel substrates. This species is uncommon to rare throughout its historic range (i.e., portions of the southeastern U.S.). This species is known within the Neches, Sabine, and Red River drainages and the Lower Sabine watershed of eastern Texas

(NatureServe Explorer 2009). Based on the species distribution, the southern hickorynut potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Louisiana Pigtoe (Pleurobema riddellii)

The Louisiana pigtoe is listed as a threatened by the TPWD (2010b). This freshwater mussel inhabits streams and moderate-sized rivers, usually in flowing water on substrates of mud, sand, and gravel to depths of 20 feet or less. This species historically was present from the San Jacinto and Trinity rivers eastward to the Neches and Sabine systems within the Lower Sabine watershed. This species was assumed extirpated from much of its former range earlier this century, although extinction of the species was not documented. Aside from historical distributional data for Louisiana and current surveys by the TPWD, there has been little effort to conduct a full inventory within the species' entire range. The biological and environmental tolerances of this species are not fully known; however, absence of the Louisiana pigtoe from previously occupied areas, even when other mussels are still present, suggests low tolerance. Much of the area it inhabits has sandy soils, which are extremely susceptible to disturbance with subsequent negative impacts on regional aquatic ecosystems (NatureServe Explorer 2009). Although unlikely based on the species assumed extirpation through much of its former range, the Louisiana pigtoe potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Texas Heelsplitter (Potamilus amphichaenus)

The Texas heelsplitter is listed as a threatened by the TPWD (2010b). This freshwater mussel inhabits quiet waters (including small to medium rivers and reservoirs) with mud and sand substrates. In Texas, this species is known only from the Sabine, Neches, and Trinity rivers within the Lower Sabine watershed. The 2010 survey recorded three live and six dead individuals (CNG 2010). There is little documented information on the species' biology, including required or preferred habitat, host fishes, and environmental tolerances (NatureServe Explorer 2009). Based on the results of the recent CNG (2010) survey, the Texas heelsplitter occurs in suitable habitat within the study area and the cumulative effects study area.

Species of Special Concern

Southeastern Myotis Bat (Myotis austroriparius)

The southeastern myotis bat is designated as a rare species by the TPWD. This species occurs in the southeastern U.S., ranging from coastal North Carolina south into peninsular Florida, west through Louisiana, and into eastern Texas and southeastern Arkansas. In Texas, this species occurs westward to the Pineywoods region of east Texas. The southeastern myotis bat is a colonial species that winters in the vicinity of its summer range. The species hibernates during the winter in northern areas, although southern populations emerge to forage during warm spells. This species inhabits a variety of habitats including caves, mines, bridges, buildings, culverts, and tree hollows, preferring oak-hickory to mixed conifer-hardwood habitats and is often associated with human habitations near streams or lakes. During the winter months, the species typically hibernates in tightly packed clusters in caves and mines in northern regions and in more exposed areas (e.g., bridges and hollow trees) in the south. Beginning in mid-March, females congregate in nursery colonies in relatively warm caves with high domed ceilings or tree hollows not far from water, while the males roost separately. Vandalism in caves is a primary cause of this species' decline. Management practices that change water quality and aquatic insect abundance also are likely to affect this species. Loss of upland roosts leaves the species vulnerable to drowning during floods. (NatureServe Explorer 2009). Based on the species known distribution and the presence of potentially suitable habitat, the southeastern myotis bat potentially may occur within the study area and the cumulative effects study area.

Plains Spotted Skunk (Spilogale putorius interrupta)

The plains spotted skunk is designated as a rare species by the TPWD. This subspecies occurs in the eastern half of the state, east of the Balcones Escarpment, westward through north-central Texas, and to the Panhandle as far south as Garza County (Davis and Schmidly 1994). Plains spotted skunks occur largely in wooded habitats and tall-grass prairies, preferring rocky canyons and outcrops when such sites

are available. They are less common in the short-grass plains. In areas where common, the species tends to live around farmyards, often denning under or in buildings. In rocky areas, they prefer cracks and crevices in the rocks or a burrow under a large rock. They also occasionally den in hollow trees or in attics of buildings. (NatureServe Explorer 2009). The potential occurrence of the plains spotted skunk in the study area and cumulative effects study area would be expected to be infrequent.

Arctic Peregrine Falcon (Falco peregrinus tundrius)

The arctic peregrine falcon is designated as a rare species by the TPWD. This subspecies migrates across the state from more northern breeding areas in the U.S. and Canada to winter along the coast from the Atlantic seaboard southward into Mexico, with a few wintering along the Texas coast. During migration (in April and October), the arctic peregrine falcon is known to concentrate on North and South Padre Islands. This species occupies a wide variety of habitats during migration, including urban settings, lake shores, coastlines, and barrier islands. Sightings of these birds in the interior of the state are possible during their migratory periods. The species' breeding range is restricted to the arctic islands and tundra regions of Alaska, Canada, and Greenland (NatureServe Explorer 2009). The potential occurrence of arctic peregrine falcon in the study area and cumulative effects study area would be expected to be infrequent and transitory in nature during migration.

Western Sand Darter (Ammocrypta clara)

The western sand darter is designated as a rare species by the TPWD. The western sand darter occurs in the mainstream Mississippi River and its larger tributaries, from southern Minnesota and Wisconsin (including the Lake Michigan drainage) southward into Mississippi, Louisiana, and Texas. In Texas, the range of this species includes the Neches, Sabine, and Red River basins. This species inhabits medium to large streams where it occurs in sandy areas with moderate current. The height of the spawning season occurs in July and early August; females with mature eggs are found in late August (NatureServe Explorer 2009). Based on the species' known distribution, the western sand darter potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Sabine Map Turtle (Gratemys ouachitensis sabinensis)

The Sabine map turtle is designated as a rare species by the TPWD. This species is known only from the Sabine River drainage of Louisiana and Texas and favors permanent freshwater habitats with logs and aquatic vegetation. This small to medium-sized turtle is among the smallest of the map turtles. Little is known about the reproductive habits of this species. Limited data indicate that females nest in late spring and summer on sunny sites, probably on sandy riverbanks. Pollution of waterways, impacts from earth-moving activities that increase waterway turbidity, and reservoir construction are the major causes for decline in this species (NatureServe Explorer 2009). Based on the known species distribution within the Sabine River, it is anticipated that the Sabine map turtle potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Rock pocketbook (Arcidens confragosus)

The rock pocketbook is designated a rare species by the TPWD. This species is distributed from Wisconsin, Minnesota, and South Dakota, south through Iowa and Kansas to the Gulf states, east to Alabama, Tennessee, Kentucky, and Indiana, and recently in Oklahoma. It is known within east Texas river basins. From the Red through Guadalupe River basins, this species inhabits medium to large rivers in standing or slow flowing water tolerating moderate currents and some reservoirs with mud, sand, and gravel substrates. Based on the recent CNG (2010) survey, the rock pocketbook occurs in suitable habitat within the study area and the cumulative effects study area.

Wabash Pigtoe (Fusconaia flava)

The Wabash pigtoe is designated as a rare species by the TPWD. This species occurs along the entire Mississippi drainage; from western New York to eastern Kansas, Nebraska, and South Dakota; and south to Texas and Louisiana and the Tombigbee River in Alabama. Known within the east Texas river basins,

including the Red, Sabine, Neches, Trinity, and San Jacinto rivers, this species inhabits creeks to large rivers (to depths of 15 feet) with moderate to swift current velocities and mud, sand, and gravel substrates in all habitats except deep shifting sands. A stable substrate composed of coarse sand and gravel appear most suitable. This species can be mistaken for the round pigtoe (NatureServe Explorer 2009). Based on the known species' distribution within the Sabine River, the Wabash pigtoe potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Wartyback (Quadrula nodulata)

The wartyback is designated as a rare species by the TPWD. This species is distributed throughout the Ohio, Cumberland, Mississippi, and Tennessee River systems. Known to occur in the Sabine and Neches rivers, this species inhabits medium to large rivers at depths of up to 15 to 18 feet with a sand and mud substrate. (NatureServe Explorer 2009). Based on the species' known distribution within the Sabine River, the wartyback potentially may occur in suitable habitat within the study area and the cumulative effects study area.

Pistolgrip (Tritogonia verrucosa)

The pistolgrip is designated a rare species by the TPWD. This species is widely distributed in the U.S. It is found in the Mississippi River drainage and Gulf drainage streams from the Alabama river system west to central Texas; from western Pennsylvania, west to southern Minnesota, south and west to Oklahoma and Texas; and the Cumberland, Tennessee, and Alabama River systems. It is known within east and central Texas in the San Antonio River and the Cypress Bayou systems including the Red River drainage as well as the Sabine River. The 2010 survey (CNG 2010) recorded more than 50 live individuals in the study area. This species inhabits stable substrate, rock, hard mud, silt, and soft bottoms, often deeply buried. Based on the results of the recent CNG (2010) survey, the pistolgrip occurs in suitable habitat within the study area and the cumulative effects study area.

Fawnsfoot (Truncilla donaciformis)

The fawnsfoot is designated as a rare species by the TPWD. This species historically is known from the Red, Cypress, and Sabine river drainages in east-central Texas and currently may be found within the Neches, Trinity, Brazos, and San Jacinto river drainages. This freshwater mussel prefers moderate flowing rivers and larger streams with sand, gravel, and perhaps sandy-mud substrates. Living specimens have not been documented in reservoirs; however, live specimens have been documented in flowing rice irrigation canals. Little is known about this species including required or preferred habitat, host fishes, reproductive seasons, or environmental tolerances (NatureServe Explorer 2009). Based on the species historic distribution within the Sabine River drainage, it is assumed that the fawnsfoot may occur in suitable habitat within the study area and the cumulative effects study area.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Terrestrial Wildlife

Potential impacts to terrestrial wildlife as a result of the Proposed Action can be classified as short-term and long-term, direct and indirect. Short-term impacts are associated with habitat removal and disturbance as well as mine operations-related activities. These impacts would cease following mine closure and completion of successful reclamation. Long-term impacts include permanent changes to, or loss of, habitats and the wildlife populations that depend on those habitats, irrespective of reclamation success. Direct impacts include wildlife mortality, habitat loss and alteration, habitat fragmentation, and displacement. Indirect impacts include increased noise and human presence.

Surface Disturbance

Temporary and permanent loss or alteration of habitat would be the greatest potential impact to terrestrial wildlife. Construction and operation of the proposed project would result in habitat loss and alteration, and

also would result in direct losses of smaller, less mobile wildlife species, such as small mammals and reptile species. It is anticipated that the larger species displaced from the proposed disturbance areas to surrounding habitats during construction and operation would return following reclamation. The proposed disturbance areas would be reclaimed to achieve the post-mining land uses as required by RCT and discussed in Section 2.5.3, Closure and Reclamation. Section 2.5.3.10 more specifically explains monitoring for RCT-designated fish and wildlife habitat. However, if surrounding habitats are already at carrying capacity, these species may be forced to use marginal habitat, migrate, or they may represent indirect mortality impacts related to the project.

As discussed in Section 3.4, Vegetation, up to approximately 14,392 acres of vegetation and aquatic resources would be lost as a result of the Proposed Action. In the mine areas, a related direct loss of wildlife habitat would occur incrementally over the 30-year life of the mine, with approximately 500 acres of mine disturbance at any given time. **Table 2-4** presents the proposed acreages of disturbance by mine year, and **Figure 2-2** shows the surface water features within the Rusk Permit Area that would be temporarily removed. To further minimize impacts to habitats and the species dependent on them, Sabine has committed to limiting disturbance (to the extent possible) within high-value habitat and prompt revegetation of disturbance areas in accordance with the proposed Reclamation Plan, as discussed in Section 2.5.3, Closure and Reclamation, and the proposed Conceptual Mitigation Plan for waters of the U.S. (**Appendix C**),

Land use of the project area is anticipated to be similar before and after mining. As discussed in Section 2.5.3, Closure and Reclamation, RCT-designated post-mining land uses would be similar to existing land uses, primarily including pastureland, forest land, and developed water resources, with fish and wildlife habitats interspersed as features within the RCT-designated land uses. Pending completion of reclamation, habitat impacts in these areas would be considered short-term. Based on the direct and compensatory mitigation ratios presented in Section 2.5.3.6, Restoration of Waters of the U.S., including wetlands, and as discussed in Sabine's proposed Conceptual Mitigation Plan (**Appendix C**), ponds and streams would be reclaimed at a 1:1 ratio, resulting in no net loss of aquatic habitat following reclamation. Non-forested and forested wetlands would be reclaimed at a ratio of 1.5:1 and 2:1, respectively, resulting in a net increase of wetland and riparian habitats following reclamation. In addition, Sabine's Fish and Wildlife Plan includes the restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas as would be implemented under the Proposed Action as well as other habitat enhancements (see Section 2.5.3 and **Figure 2-10**) that would produce long-term benefits to terrestrial wildlife species.

Game Species

Under the Proposed Action, impacts to white-tailed deer would include the incremental short-term reduction of potential foraging habitat during the 30-year life of the mine and the incremental increase in habitat fragmentation. These impacts may result in a short-term decrease in deer populations; however, based on project area surveys, TPWD data, and conversations with local hunters, the deer population densities in and surrounding the Rusk Permit Area are relatively low (Sabine 2009a). Also, it is anticipated that deer temporarily displaced by project-related activities would be able to relocate to surrounding habitats and incrementally would re-inhabit the project-related disturbance areas following the re-establishment of vegetation. Therefore, it is anticipated that impacts to deer populations would be low.

Impacts to small game species would be similar to impacts to white-tailed deer. Direct impacts would include the short-term loss of potentially suitable breeding, nesting, and foraging habitat; habitat fragmentation; and displacement of species. Direct impacts also may include nest or burrow abandonment or the loss of eggs or young, resulting in reduced productivity for that breeding season. However, clearing operations would be conducted during non-breeding periods to avoid the peak migratory bird breeding season, thereby minimizing the impact to breeding birds to the extent possible. Since most of the small game species observed during baseline surveys are considered habitat generalists, it is anticipated that displaced species would find suitable habitat surrounding the mine area, and the population density within the mine area would be expected to increase following the re-establishment of vegetation.

Nongame Species

During baseline surveys, a variety of nongame species were recorded within the study area, including migratory birds (see **Table F-1** in **Appendix F**). Although no nest sites were recorded during the surveys, it is probable that nesting birds could occur within or adjacent to proposed disturbance areas. Potential direct impacts to migratory birds would include the short-term loss of potentially suitable breeding, roosting, and foraging habitat. However, based on the availability of potentially suitable breeding and foraging habitat in the surrounding area, effects to local bird populations are anticipated to be low. If construction or ground-clearing activities were to occur during the breeding season, direct impacts to breeding birds could include the loss of active nest sites or abandonment of a nest site due to increased human presence and noise in proximity to a nest site. Loss of an active nest site, incubating adults, eggs, or young would be in violation of the Migratory Bird Treaty Act. To minimize impacts to breeding birds, Sabine has committed to: 1) clearing vegetation outside of the peak breeding season; 2) minimizing disturbance areas to the extent possible; 3) avoiding rookeries and raptor nest sites during the breeding season to the extent possible; and 4) increasing the availability of surface water resources for breeding or nesting migratory birds away from active mining areas. Mitigation measure FW-1 is being considered to further minimize potential impacts to breeding birds (see Section 3.5.4, Monitoring and Mitigation Measures). Impacts to other nongame species would be similar to impacts to game species.

Construction of the proposed 138-kV transmission line (see **Figure 2-2**) within the transportation and utility corridor incrementally would increase the collision potential for migrating and foraging bird species (e.g., raptors and waterfowl) (Avian Power Line Interaction Committee [APLIC] 1994) and bat species. Collision potential typically is dependent on variables such as the location in relation to high-use habitat areas (e.g., nesting, foraging, and roosting), line orientation to flight patterns and movement corridors (e.g., river corridors), species composition, visibility, and line design. To minimize collision potential for migrating and foraging bird species, the proposed transmission line would be designed and constructed in accordance with the guidelines presented in the Environmental Criteria for Electric Transmission System (USDI, USDA 1970) and/or REA Bulletin 61-10 (Powerline Contacts by Eagles and Other Large Birds). The configuration of power lines greater than 69-kV typically does not present an electrocution potential, based on conductor placement and orientation (APLIC 1996).

Feral hogs are considered nongame nuisance species by the TPWD (Taylor 2007). Feral hogs have been documented in the Rusk Permit Area and can reach levels where control may become necessary. In these cases, Sabine would employ several potential methods for control of nuisance animals. These may include trapping, avoidance tactics, or other measures (Sabine 2009a).

Human Presence and Noise

Proposed project activities would result in impacts to terrestrial wildlife species due to increased human presence and noise. The most common wildlife responses to noise and human presence are avoidance or acclimation. The total extent of habitat lost as a result of wildlife avoidance response is impossible to predict since the degree of this response varies from species to species and can vary between different individuals of the same species. However, it is anticipated that most of the terrestrial wildlife species known to occur in the project vicinity already are acclimated to human presence on some level, or that they have the ability to acclimate. During initial development stages, many species most likely would disperse from the area; however, as species become acclimated to human presence and noise, the majority most likely would return to reoccupy undisturbed habitats within and surrounding the proposed disturbance areas.

Increased human/wildlife interactions during the construction and operation phases of the project have the potential to result in wildlife harassment, poaching, and illegal harvest. Increased human presence and related increases in traffic levels on project access routes would increase the potential for wildlife/vehicle collisions, with the greatest potential occurring during peak construction.

Groundwater Level Change

This section focuses on the potential long-term, indirect impacts to terrestrial wildlife species due to a potential reduction in surface water availability and potential decrease in associated riparian and wetland habitats as a result of groundwater level change in the Carrizo-Wilcox aquifer.

The potential loss or reduction in available surface water as a result of groundwater level change could result in long-term changes in wildlife habitats where the surface water sources are hydraulically connected to the Carrizo-Wilcox aquifer within the projected mine-related 5-foot groundwater drawdown area. As discussed in Sections 3.2.3.2 and 3.2.4.2, Environmental Consequences (Groundwater and Surface Water, respectively), groundwater drawdown primarily would be limited to the proposed life-of-mine disturbance area and would have minor impacts on surface water. The habitats associated with naturally occurring groundwater-fed perennial and intermittent stream reaches and associated perennial pools encompass riparian vegetation (both woody and herbaceous plant species) and wetland areas. Reduction or loss of riparian and wetland habitats associated with these water sources would impact terrestrial wildlife dependent on these sources, resulting in a possible reduction or loss of cover, breeding sites, foraging areas, and changes in both plant and animal community structure, as discussed below. However, based on Sabine's proposed reclamation procedures, long-term impacts to riparian habitats and surface water sources would be minimized by the development of surface water features and associated riparian habitat within the mine area. Also, based on Sabine's proposed Conceptual Mitigation Plan (see **Appendix C**) for waters of the U.S., including wetlands, there would be net increases of approximately 151.2 acres of forested wetland habitat and 31.3 acres of non-forested wetland habitat in the long term.

Naturally occurring perennial and intermittent streams provide important wildlife habitat in the study area. Riparian habitat and its associated plant communities contribute to greater wildlife species diversity, compared to the adjacent upland areas. The loss of surface water and the associated riparian habitat would alter the available habitat for species that depend on these riparian areas, resulting in: 1) a reduction of available water for consumption; 2) a reduction in riparian vegetation for breeding, foraging, and cover; 3) reduction in the regional carrying capacity; 4) displacement and loss of animals; and 5) reduction in prey availability. The degree of impacts to wildlife resources would depend on a number of variables, such as the existing habitat values and level of use; species' sensitivity (i.e., level of dependency on riparian areas); and the extent of the anticipated water and riparian habitat reductions.

Most species displaced from the proposed project area are anticipated to use surrounding habitat during construction and operation and return following reclamation; however, if surrounding habitat is already at carrying capacity, these species may be forced to use marginal habitat, migrate, or they may represent indirect mortality impacts related to the project.

Species likely affected by reductions in surface water sources and associated habitats could include big game, upland game birds and mammals, waterfowl, nongame birds (e.g., raptors and passerines), mammals (e.g., bats), reptiles, amphibians, and fish. The extent of these indirect effects from the mine's dewatering activities would depend on the species' use and relative sensitivity, as discussed for each group below.

Game Species

Big game species such as the white-tailed deer require water during the summer and fall periods, as well as during the winter period, as needed, to satisfy physiological requirements. The reduction or loss of existing water sources could impact white-tailed deer use and movements. Due to reduced habitat availability resulting from earlier habitat alteration in the area, low populations of deer currently occupy the study area, which lacks important big game corridors and key seasonal habitats. As a result, it is assumed that some individuals would be locally displaced due to the reduction of surface water and riparian vegetation. Displaced individuals could be lost from the population should they relocate to areas already at carrying capacity; however, this loss cannot be quantified. Impacts to regional deer populations from the reduction of surface water and riparian vegetation would be expected to be low.

A reduction in the riparian community would affect the amount of suitable habitat available for small game species (waterfowl, small fur-bearing mammals, etc.). A decline in surface water availability would impact the extent of open water and riparian vegetation along portions of the streams and perennial ponds. As previously discussed, most of the small mammal species detected during surveys of the project area are considered habitat generalists. It is anticipated that nongame mammal species would find suitable habitat surrounding the mine area during construction and operation of the mine, and population density within the mine area would increase following reclamation and revegetation.

Short- and long-term effects to waterfowl species that may be present within the study area would vary, depending on the vegetative structure and habitat types associated with springs that may support migrating and wintering birds. The impacts to waterfowl species that commonly occur within the study area may include the reduction of ponds and intermittent and perennial streams within the projected mine-related 5-foot groundwater drawdown area that support adequate riparian habitat for foraging and cover. The reduction or loss of available surface water and associated emergent plants in these naturally occurring wetland areas currently used by waterfowl would result in the displacement of these birds to adjacent habitats. Project reclamation activities would help to offset these impacts and provide enhanced habitat for wildlife utilization.

Nongame Species

As previously discussed, a variety of bird species may breed, forage, or roost in or near the study area. Potential long-term impacts to bird species could include loss of nesting, roosting, and foraging habitat along the reaches of intermittent and perennial drainages that occur within the projected mine-related 5-foot groundwater drawdown area of the Carrizo-Wilcox aquifer complex. These losses would result from an incremental reduction in available habitat for both resident and migratory bird species. In addition, the regional carrying capacity would be reduced by the incremental loss of available nest and roost sites. Some bird species are closely associated with riparian habitats large enough to support trees and increased shrub density while other species may use these trees for roosting only.

Potential impacts to amphibian and reptile species that are associated with the perennial water sources that may be affected by mine-related groundwater drawdown would parallel those discussed for other terrestrial wildlife species. The loss or reduction in surface water availability and associated riparian vegetation would result in an incremental loss of suitable breeding, foraging, and cover habitats for these species. Project reclamation activities would help to offset these impacts and provide enhanced habitat for wildlife utilization.

Water Discharge

The drainages within and immediately around the active mine areas would flow primarily in response to local precipitation events, attenuated in lower stream reaches by the presence of sediment control ponds. The Sabine River, the major perennial stream located immediately north of the mine areas, would be the receiving waterbody for water discharged from the mine dewatering activities. Although runoff volumes would increase during the mining period, releases to the river would be attenuated by the water management system. Additional managed discharges would not substantially increase downstream flows in the river during the period of water discharges.

Any minor increased flows into the Sabine River may result in an increase in available water, foraging and breeding habitat, and cover for terrestrial wildlife. Increased flows may better support existing plant communities of riparian woodlands and emergent vegetation immediately adjacent to the Sabine River.

Aquatic Species

Surface Disturbance

The potential effects of the project on aquatic resources are closely related to impacts on groundwater and surface water resources. Mine construction and operation would remove aquatic habitat consisting of

intermittent streams and stock ponds and temporarily impact perennial water resources of the Sabine River and Cherokee Slough. Approximately 48.3 acres of open water habitat (ponds) and 27.5 acres of perennial and intermittent stream habitat incrementally would be removed during the life of the mine. The removal of the stock ponds would eliminate habitat for macroinvertebrates and possibly nongame fish species. Intermittent water sources flow seasonally and often dry out during drought periods, limiting aquatic resources available in these water bodies. Loss of these types of habitats likely would have minimal impacts, particularly if removal occurred during dry periods. Mine reclamation would replace open water habitat at a 1:1 ratio per Sabine's proposed Conceptual Mitigation Plan (**Appendix C**).

Short-term, local increases in suspended sediment concentrations, turbidity, and sediment deposition could occur during construction of the mine haul road and dragline walkway and mining activities. The related short-term increases in sediment transport could result in localized effects on macroinvertebrate communities and bottom substrate composition. However, these potential changes would be limited to several miles or less in relation to the disturbance areas. The mussel sanctuary located between SH 43 and U.S. Highway 59 is approximately 4 miles downstream of the proposed dragline walkway and main haul road crossing of the Sabine River. Potential sedimentation related effects to the mussel sanctuary would be anticipated to be short-term and minor. Fish species, if present during these activities, would be able to tolerate short-term increases in sediment. Sedimentation resulting from mining activity would be confined to the collection ditches and sediment control ponds. After water is detained in the ponds, suspended sediment levels would be similar to background conditions. Suspended sediment concentrations would stabilize and return to typical background concentrations after the main haul road bridge and dragline walkway construction activities are completed. By implementing proper drainage design including sediment control ponds and erosion control measures during and after construction and operations, the impact of potential increased sediment levels on aquatic species and their habitat would be low. Mitigation measures SW-1 and SW-2 are being considered to further reduce potential for impacts to the Sabine River from erosion and sedimentation during construction activities (see Section 3.2.4.3, Surface Water Monitoring and Mitigation Measures).

Water Level Change

Dewatering activities potentially could result in loss or reduction in available surface water as a result of groundwater level change, and related short-term changes in aquatic habitats, where surface water sources are hydraulically connected to the Carrizo-Wilcox aquifer system within the projected mine-related 5-foot groundwater drawdown area. Localized reductions in aquatic habitat availability for areas upstream of the proposed discharge points could occur. Since aquatic habitat in these areas is mainly intermittent stream reaches, filter-feeding and suspension-feeding macroinvertebrates are expected to be a minor part of the aquatic community and little impact is anticipated. In areas located downstream of the proposed discharge points, a slight increase in flow may be noted and could increase the amount of aquatic habitat available to resources in the Sabine River.

Water Discharge

The drainages within and immediately around the active mine area would flow primarily in response to local precipitation events, attenuated in lower stream reaches by the presence of sediment control ponds. The Sabine River, the major perennial stream located immediately north of the mine areas, would be the receiving waterbody for water discharged from the mine's TPDES-regulated discharge points (see **Figure 2-5** for discharge [outfall] locations). Although runoff volumes would increase during the mining period, releases to the river would be attenuated by the water management system. Therefore, mine-related discharges would not substantially increase downstream flows in the river.

Any minor increases in flows would increase the amount of available habitat for aquatic species below the TPDES outfalls (see **Figure 2-5**). The relative increase in habitat is not quantifiable; however, it may result in increased numbers of fish and macroinvertebrates, particularly in those sections of the streams that presently exhibit intermittent flow. Sufficient information is not available for the affected reaches to predict the predominant types of habitat that would exist after mine discharge is initiated. The effects of

mine-related discharges on water quality are expected to be minor, as all discharged water would need to meet TPDES permit requirements for water quality.

Special Status Species

The impact analysis for sensitive wildlife resources (i.e., special status species and species of special concern) focused on those species that were identified in Section 3.5.1.4, Special Status Species and Species of Special Concern, as potentially occurring within the study area and cumulative effects study area. Occurrence potential was based on agency information and species' occurrence review as summarized in Section 3.5.1.5 and **Tables F-3** and **F-4** in **Appendix F**. Project-related impact assessments for those 19 special status species and 10 species of special concern are presented below.

Potential project-related impacts to special status species would parallel those described above for general fish and wildlife. These potential direct and indirect impacts would include: 1) loss of suitable habitat resulting from proposed construction and operations and associated habitat fragmentation; 2) effects of human presence and noise; 3) collision potential for bird species (raptors and waterfowl) associated with the proposed 138-kV transmission line; 4) water-related effects associated with construction of the proposed dragline walkway and the main haul road crossings of the Sabine River; 5) effects of mine water discharge on aquatic habitats; and 5) effects of mine-related groundwater drawdown on surface waters and associated habitats.

The proposed location of the transportation and utility corridor in which the dragline walkway and main haul road crossing of the Sabine River would be constructed was located by Sabine in consultation and review with the USACE, TPWD, and RCT to minimize the impacts of the crossing on fish and wildlife species. Construction of these facilities would be short-term in nature, and implementation of Sabine's erosion control measures would minimize associated sedimentation and turbidity. Therefore, any increase in sediment transport that would occur would be short-term and localized to within a few miles of the crossing. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize these effects.

The potential loss or reduction in available surface water as a result of groundwater level change could result in long-term changes in aquatic, riparian, and wetland habitats where the surface waters are hydraulically connected to the Carrizo-Wilcox aquifer within the projected mine-related 5-foot groundwater drawdown area (see **Figure D-1**). These effects would be minimized through implementation of Sabine's proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S., including wetlands, which would result in a long-term net increase of approximately 182.5 acres of wetland vegetation. No direct effect to these habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated.

Mine water would be discharged from the proposed sediment control ponds through TPDES-regulated outlets (see **Figure 2-5**) to tributaries of the Sabine River. Although runoff volumes would increase during mining, releases would be attenuated by the water management system. As discussed in Section 3.2.4, Surface Water, the effects of mine-related water discharge, including potential sedimentation effects, to the Sabine River and its tributaries are expected to be minimal.

Rafinesque's Big-eared Bat

No known Rafinesque's big-eared bat roost sites occur within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution; however, suitable roosting and foraging habitat occurs in the Rusk Permit Area. Direct impacts to the species, if present, could include the long-term, incremental loss of approximately 841 acres of potentially suitable roosting and foraging habitat (i.e., floodplain hardwood forests) associated with proposed construction and operation activities over the 30-year life of the mine. Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Potential impacts to this species, if present, as a result of the proposed project would be considered minimal, based on the overall availability of suitable roosting and foraging habitat in the vicinity.

Mine water discharge and mine-related groundwater level changes are not expected to affect Rafinesque's big-eared bat. Although localized changes in vegetation composition may occur along some streams, these changes are not expected to result in the loss of roost sites or foraging areas. Therefore, no change in the present level of potentially suitable Rafinesque's big-eared bat habitat in the study area is expected as a result of water discharge or ground water level changes.

Black Bear/Louisiana Black Bear

Black bear or Louisiana black bear occurrences would be limited to transitory individuals within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution. However, direct impacts to the species, if present, as a result of surface disturbance-related activities could include the long-term, incremental loss of approximately 841 acres of potentially suitable floodplain hardwood habitat and 6,235 acres of potentially suitable upland forest habitat associated with construction and operation activities over the 30-year life of the mine.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures include notifying the TPWD and the RCT if a black bear is identified on site, and if needed, Sabine in coordination with TPWD would develop a strategy for avoidance or relocation of the bear, as applicable (see Section 2.8, Comparative Analysis of Alternatives). Based on these measures and the overall availability of suitable foraging habitat in the vicinity, potential impacts to this species as a result of the proposed project would be considered minimal.

The effect of mine water discharge and groundwater level changes are not expected to affect black bears. As previously mentioned, some localized change to vegetation composition may result along stream banks, but these potential minor changes are not anticipated to affect bears, if present.

Bachman's Sparrow

Bachman's sparrow occurrences would be limited to migratory individuals within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution. However, direct impacts to migrating individuals, if present as a result of surface disturbance-related activities could include the short-term, incremental loss of foraging habitat, including approximately 1,281 acres of potentially suitable pine plantation habitat and approximately 4,236 acres of potentially suitable pasture habitat, associated with construction and operation activities over the 30-year life of the mine, as well as power line collision potential described above in Nongame Species impacts.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures include designing and constructing power line facilities as outlined in Section 3.5.2.1, Environmental Consequences, Nongame Species. Potential impacts to migrating individuals as a result of the proposed project would be considered minimal, based on the overall availability of suitable foraging habitat in the vicinity and the low occurrence potential of migrating individuals.

The effects of mine water discharge and groundwater level changes are not expected to affect Bachman's sparrows. These activities may result in some localized changes in vegetation composition along some streams but are not expected to impact available sparrow habitat.

Peregrine Falcon/American Peregrine Falcon

Peregrine falcon or American peregrine falcon occurrences would be limited to migratory individuals within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution. However, direct impacts to the migrating individuals, if present, as a result of surface disturbance-related activities, could include the short-term, incremental loss of foraging habitat, including approximately 4,236 acres of potentially suitable habitat (i.e., pasture), associated with construction and

operation activities over the 30-year life of the mine, as well as power line collision potential as described above in Nongame Species impacts.

Impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures include designing and constructing power line facilities as outlined in Section 3.5.2.1, Environmental Consequences, Nongame Species. Potential impacts to this species as a result of the proposed project would be considered minimal, based on the overall availability of suitable foraging habitat in the vicinity and the low occurrence potential of migrating individuals.

The effects of mine water discharge and water level changes are not expected to result in habitat changes that would change the availability of food resources for falcons within this area and, thus, no associated impacts are anticipated.

Bald Eagle

Known bald eagle nest sites have been identified approximately 5 miles southwest of the Rusk Permit Area along Lake Cherokee and species sightings recorded to the north in the South Hallsville No. 1 Mine Permit Area (Sabine 2010d). As such, foraging, roosting, and breeding pairs may be present within the Rusk Permit Area. Direct impacts to the species, if present, could include the long-term, incremental loss of approximately 917 acres of open water and adjacent floodplain forest breeding, foraging, and roosting habitat associated with construction and operation activities over the 30-year life of the mine. Transmission line collision potential as described above in Nongame Species impacts also would exist for this species. If construction-related activities were to occur within the breeding season, direct impacts to breeding pairs, if present, may include the abandonment of a breeding territory or nest site or the potential loss of eggs or young, which would reduce productivity for that breeding season.

Impacts associated with loss of potentially suitable habitat would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures that would minimize impacts to this species include: 1) avoidance of raptor nest sites during the breeding season, to the extent possible; 2) increasing the availability of water sources away from active mining areas; 3) conducting clearing operations, to the extent possible, during non breeding periods to avoid the peak migratory bird breeding season; 4) reporting any bald eagle sighting within the mine area to the RCT and TPWD, and avoiding the area, if possible, or minimizing activity to the extent possible; and 5) designing and constructing transmission line facilities as outlined in Section 3.5.2.1, Environmental Consequences, Nongame Species. Based on the species known distribution, potential impacts to this species as a result of the proposed project would be considered moderate. Mitigation measure WL-1 is being considered to further minimize potential impacts to breeding migratory birds, including bald eagles (see Section 3.5.4).

The effects of mine water discharge and groundwater level changes are not expected to result in habitat changes that would change the availability of food resources for eagles within the study area and, thus, no related impacts are anticipated.

Wood Stork

Wood stork occurrences would be limited to migratory individuals within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution; however, species sightings were recorded in the South Hallsville No. 1 Mine Permit Area, north of the Rusk Permit Area (Sabine 2010d). Direct impacts to the migrating individuals, if present, as a result of surface disturbance-related activities could include the short-term, incremental loss of foraging habitat, including approximately 290 acres of potentially suitable aquatic/wetland habitat, associated with construction and operation activities over the 30-year life of the mine. Transmission line collision potential as described in the Nongame Species impacts also would exist for this species.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures that would minimize impacts to this species include: 1) reporting any wood stork sighting within the mine area to the RCT and TPWD, and avoiding the area, if possible, or minimizing activity to the extent possible; and 2) designing and constructing transmission line facilities as outlined in Section 3.5.2.1, Environmental Consequences, Nongame Species. Potential impacts to this species as a result of the proposed project would be considered minimal, based on the overall availability of suitable foraging habitat in the vicinity and the low occurrence potential for migrating individuals.

The effects of mine water discharge and groundwater level changes are not expected to result in habitat changes that would change the availability of food resources for this species within the study area and, thus, no related impacts are anticipated.

Interior Least Tern

Interior least tern occurrences would be limited to migratory individuals within the Rusk Permit Area. Direct impacts to the migrating individuals, if present, could include the short-term, incremental loss of foraging habitat including approximately 139 acres of potentially suitable aquatic/wetland habitat, associated with construction and operation activities over the 30-year life of the mine. Collision potential as described in Nongame Species impacts also would exist for this species.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures include the design and construction of transmission line facilities as outlined in Section 3.5.2.1, Environmental Consequences, Nongame Species. Potential impacts to this species as a result of the proposed project would be considered minimal, based on the low occurrence potential for this species in the Rusk Permit Area. While occurrence of breeding pairs in the Rusk Permit Area is unlikely, Sabine has committed to monitoring the mine area for the tern each year between April 1 and July 31, in accordance with the USFWS's published profile for the species (May 1998). If the species is observed, Sabine would notify the RCT and develop a management strategy for the species in coordination with the USFWS.

The effects of mine water discharge and groundwater level changes are not expected to result in habitat changes that would change the availability of food resources for this species within the study area and, thus, no related impacts are anticipated.

Creek Chubsucker

Occurrences of the creek chubsucker could include spawning individuals within the Sabine River and its tributaries within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution, absence during baseline surveys, and presence of the lake chubsucker. However, if present, direct impacts to the species could include the short-term, incremental loss of spawning habitat associated with construction and operation activities over the 30-year life of the mine. Potential impacts to this species as a result of the proposed project would be considered low, based on the overall availability of suitable habitat within the Sabine River basin and the unlikely occurrence potential for the species.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated; effects to these habitats located within the mine-related 5-foot groundwater drawdown area may occur where the surface waters are hydraulically connected to the Carrizo-Wilcox aquifer. In addition, construction of the proposed dragline walkway and main haul road crossings of the Sabine River may result in increases in sedimentation and turbidity. However, as discussed above, any increase in sediment transport in the Sabine River as a result of these construction activities would be short-term and localized to within a few miles of the crossing. Therefore, the effects of mine-related water discharge, groundwater

level changes, and construction on the Sabine River are not expected to result in spawning habitat alterations that would change the availability of resources for this species. As a result, potential related impacts to this species are anticipated to be low.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. Also, additional mitigation, as described in Section 3.2.3.3 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

Paddlefish

Occurrences of the paddlefish could include spawning individuals within the Sabine River in the vicinity of the Rusk Permit Area. Direct impacts to the species, if present, could include the short-term, incremental loss of spawning habitat associated with the proposed construction at the Sabine River crossing. Potential impacts to this species as a result of the proposed project would be considered low, based on the overall availability of suitable habitat within the Sabine River and the absence of the species during baseline surveys.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effects to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. In addition, construction of the proposed dragline walkway and main haul road crossings of the Sabine River may result in increases in sedimentation and turbidity. However, as discussed above, any increase in sediment transport in the Sabine River as a result of these construction activities would be short-term and localized to within a few miles of the crossing.

Based on Sabine's applicant-committed protection measures, any paddlefish observed stranded in the riverbed during river flow bypass operations for the dragline walkway crossing of the Sabine River would be relocated to the river flow above or below the bypass. This activity would be performed by a biologist and/or Sabine staff permitted by TPWD to handle this species. Therefore, potential related impacts to this species are anticipated to be low.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. Also, additional mitigation, as described in Section 3.2.3.3 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

Timber/Canebrake Rattlesnake

No known timber/canebrake rattlesnake occurrences were identified within the Rusk Permit Area, although a species siting was recorded in the South Hallsville No. 1 Mine Permit Area, immediately north of the Rusk Permit Area (Sabine 2010d). Potential species occurrence is considered low based on limited prey base within suitable habitat. However, direct impacts to the species, if present, could include adult and juvenile mortality due to crushing from vehicles and equipment and the long-term, incremental loss of approximately 841 acres of potentially suitable floodplain hardwood forest habitat associated with construction and operation activities over the 30-year life of the mine.

Habitat To further minimize impacts, Sabine has committed to notifying the RCT if a timber/canebrake rattlesnake is observed on site. If observed in an area proposed for disturbance, a biologist and/or Sabine

staff permitted by TPWD to handle this species would conduct surveys of the area and relocate individuals to potential habitat well away from active mine areas. Habitat impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Based on implementation of these measures, potential impacts to this species as a result of the proposed project would be considered minimal.

Alligator Snapping Turtle

Known alligator snapping turtle occurrences have been identified approximately 5 miles south of the Rusk Permit Area within Martin Creek Lake, and there are species sightings recorded in the South Hallsville No. 1 Mine Permit Area, north of the Rusk Permit Area (Sabine 2010d). As such, foraging and breeding individuals may be present within the Rusk Permit Area. Based on Sabine's applicant-committed protection measures, during the spring, areas along the proposed transportation and utility corridor and near sediment control ponds would be monitored for nesting female alligator snapping turtles. If a nest is observed, it would be marked for avoidance and the RCT would be notified. If the nest is located in an area where disturbance potential exists, TPWD would be contacted for assistance in relocating the nest to a protected area. During Sabine River flow bypass operations for the dragline walkway, the construction area would be surveyed, and any stranded turtles would be monitored or relocated to the river bed where water flow is available. The survey and potential relocation would be performed by a biologist and/or Sabine staff permitted by TPWD to handle this species. If present, potential impacts to this species as a result of the proposed project would be considered minimal, based on the implementation of Sabine's applicant-committed protection measures and the overall availability of suitable habitat in adjacent watersheds.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated; effects to these habitats located within the mine-related 5-foot groundwater drawdown area may occur where the surface waters are hydraulically connected to the Carrizo-Wilcox aquifer. In addition, construction of the proposed dragline walkway and main haul road crossings of the Sabine River may result in increases in sedimentation and turbidity. However, as discussed above, any increase in sediment transport in the Sabine River as a result of these construction activities would be short-term and localized to within a few miles of the crossing.

Potential impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas.

Louisiana Pine Snake

No known Louisiana pine snake occurrences were identified within the Rusk Permit Area. Potential species occurrence is considered low based on limited availability of preferred habitat and ongoing timber practices in the Rusk Permit Area. Direct impacts to the species, if present, as a result of surface disturbance-related activities could include adult and juvenile mortality due to crushing from vehicles and equipment and the long-term, incremental loss of potentially suitable forested habitat, where present, associated with construction and operation activities over the 30-year life of the mine.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Potential impacts to this species as a result of the proposed Project would be considered minimal, based on the overall availability of suitable habitat in the vicinity.

Texas Pigtoe

Texas pigtoe populations are known within the Rusk Permit Area. Direct impacts to the species as a result of project construction could include the loss of adult and juvenile individuals, the short-term incremental loss of potentially suitable habitat within the Sabine River, and short-term temporary habitat impacts due to increased turbidity and sedimentation. Based on the documented occurrence of this species in the vicinity of the proposed dragline walkway and main haul road bridge crossings of the Sabine River (CNG 2010), there is a high potential for the loss of individuals during construction. Mitigation measure FW-2, in Section 3.5.4, Monitoring and Mitigation Measures, is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road. Based on the implementation of Sabine's applicant-committed protection measures and the overall availability of suitable habitat in adjacent watersheds, potential habitat-related impacts for this species as a result of construction would be considered low to minimal.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the Texas pigtoe are anticipated.

Sandbank Pocketbook

One shell of a sandbank pocketbook was found during surveys suggesting the species may be present in the study area, but in very low numbers (CNG 2010). Direct impacts to the species as a result of project construction and operation could include the loss of adult and juvenile individuals, incremental loss of potentially suitable habitat within the Sabine River and its tributaries, and short-term temporary habitat impacts due to increased turbidity and sedimentation. Based on the documented occurrence of this species in the vicinity of the proposed dragline walkway and main haul road bridge crossings of the Sabine River (CNG 2010), there is a high potential for the loss of individuals during construction. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation

and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road. Based on implementation of Sabine's applicant-committed protection measures and the overall availability of suitable habitat in adjacent watersheds potential habitat-related impacts for this species as a result of construction would be considered low to minimal.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the sandbank pocketbook are anticipated.

Southern Hickorynut

No known southern hickorynut populations are known within the Rusk Permit Area; however, populations are known within segments of the Sabine River. Potential species occurrence is considered low based on the species' known distribution. Direct impacts to the species, if present, could include the loss of adult and juvenile individuals as a result of construction-related activities. Direct impact also could include the short-term incremental loss of potentially suitable habitat within the Sabine River and short-term temporary habitat impacts due to increased turbidity and sedimentation associated with construction of the dragline walkway and main haul road bridge. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Constructed-related habitat impacts would be minimized through implementation of concurrent mine reclamation and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the southern hickorynut are anticipated.

Louisiana Pigtoe

No known Louisiana pigtoe populations are known within the Rusk Permit Area. While presumed extirpated, historic records indicate presence within the Lower Sabine watershed. However, potential species occurrence is considered low based on the species presumed low tolerance for habitat alterations and environmental changes (NatureServe 2009). If present, potential impacts to this species as a result of the proposed project would be considered minimal, based on the implementation of Sabine's applicant-committed protection measures.

Texas Heelsplitter

Texas heelsplitter populations are known within the Rusk Permit Area. Direct impacts to the species as a result of project construction could include the loss of adult and juvenile individuals, short-term incremental loss of potentially suitable habitat within the Sabine River, and short-term temporary habitat impacts due to

increased turbidity and sedimentation. Based on the documented occurrence of this species in the vicinity of the proposed dragline walkway and main haul road bridge crossings of the Sabine River (CNG 2010), there is a high potential for the loss of individuals during construction. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation Measures) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the Texas heelsplitter are anticipated.

Species of Special Concern

Southeastern Myotis Bat

Southeastern myotis bat occurrences would be limited to roosting and foraging individuals within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution. Direct impacts to the species, if present, could include the long-term, incremental loss of approximately 841 acres of potentially suitable roosting and foraging habitat (i.e., floodplain hardwood forests) associated with construction and operation activities over the 30-year life of the mine.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Potential impacts to this species as a result of the proposed project would be considered minimal, as it is assumed that occurrence would be limited to foraging and roosting individuals.

Plains Spotted Skunk

Occurrences of the plains spotted skunk would be limited to transitory individuals within the Rusk Permit Area. Potential species occurrence is considered unlikely based on the species' known distribution. However, direct impacts to the species, if present, could include the long-term, incremental loss of approximately 8,357 acres of potentially suitable forested habitat and 4,236 acres of potentially suitable grassland/pasture habitat associated with construction and operation activities over the 30-year life of the mine.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Potential impacts to this species as a result of the proposed project would be considered minimal, based on the overall availability of suitable foraging habitat in the vicinity and the unlikely occurrence potential of the species. Also, additional mitigation, as described in Section 3.2.3.3 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

Arctic Peregrine Falcon

Arctic peregrine falcon occurrence would be limited to migratory and winter resident individuals within the Rusk Permit Area. Direct impacts to the species, if present, could include the short-term, incremental loss of foraging habitat including approximately 290 acres of potentially suitable habitat (i.e., aquatic/wetland) associated with construction and operation activities over the 30-year life of the mine. Transmission line collision potential as described in Nongame Species impacts also would exist for this species.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Additional applicant-committed measures, include design and construction of transmission line facilities as outlined in Section 3.5.2.1, Environmental Consequences, Nongame Species. Potential impacts to this species as a result of the proposed Project would be considered minimal, based on the overall availability of suitable foraging habitat in the vicinity.

Western Sand Darter

Occurrences of the western sand darter could include spawning individuals within medium to large streams in the Sabine River basin including the Rusk Permit Area. Direct impacts to the species, if present, could include the short-term, incremental loss of spawning habitat associated with construction and operation activities within the Sabine River and its tributaries over the 30-year life of the mine. Potential impacts to this species as a result of the proposed project would be considered low, based on the overall availability of suitable habitat in the vicinity and the absence of the species during baseline surveys.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated; effects to these habitats located within the mine-related 5-foot groundwater drawdown area may occur where the surface waters are hydraulically connected to the Carrizo-Wilcox aquifer. In addition, construction of the proposed dragline walkway and main haul road crossings of the Sabine River may result in increases in sedimentation and turbidity. However, as discussed above, any increase in sediment transport in the Sabine River as a result of these construction activities would be short-term and localized to within a few miles of the crossing. The effects of mine-related water discharge and construction at the Sabine River crossing are not expected to result in spawning habitat alterations that would change the availability of resources for this species. Therefore, potential related impacts to this species are anticipated to be low.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. Also, additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

Sabine Map Turtle

No Sabine map turtle occurrences were identified within the Rusk Permit Area. Potential species occurrence is considered low. Direct impacts to the species, if present, could include adult and juvenile mortality due to crushing from vehicles and equipment, abandonment of a breeding site or the potential loss of eggs or young, and the short-term, incremental loss of approximately 290 acres of potentially suitable aquatic/wetland habitat associated with construction and operation activities over the 30-year life of the mine. Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and Fish and Wildlife Plan. Potential impacts to this species

as a result of the proposed project would be considered minimal, based on the overall availability of suitable habitat in the vicinity.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated; effects to these habitats located within the mine-related 5-foot groundwater drawdown area may occur where the surface waters are hydraulically connected to the Carrizo-Wilcox aquifer. In addition, construction of the proposed dragline walkway and main haul road crossings of the Sabine River may result in increases in sedimentation and turbidity. However, as discussed above, any increase in sediment transport in the Sabine River as a result of these construction activities would be short-term and localized to within a few miles of the crossing. Therefore, potential related impacts to this species are anticipated to be low.

Impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas.

Rock pocketbook

Rock pocketbook has been recorded within the Rusk Permit Area. Direct impacts to the species as a result of project construction could include the loss of adult and juvenile individuals, the short-term incremental loss of potentially suitable habitat within the Sabine River, and short-term temporary habitat impacts due to increased turbidity and sedimentation. Based on the documented occurrence of this species in the vicinity of the proposed dragline walkway and main haul road bridge crossings of the Sabine River (CNG 2010), there is a high potential for the loss of individuals during construction. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation Measures) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the rock pocketbook are anticipated.

Wabash Pigtoe

No Wabash pigtoe populations are known within the Rusk Permit Area; however, populations are known within segments of the Sabine River. Potential species occurrence is considered low based on the

species' known distribution, although suitable habitat is present in the study area. Direct impacts to the species, if present, could include the loss of adult and juvenile individuals as a result of construction-related activities, the short-term incremental loss of potentially suitable habitat within the Sabine River associated with construction of the dragline walkway and main haul road bridge and short-term temporary habitat impacts due to increased turbidity and sedimentation. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation Measures) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the Wabash pigtoe are anticipated.

Wartyback

No known wartyback populations are within the Rusk Permit Area; however, populations are known within segments of the Sabine River. Direct impacts to the species, if present, could include the loss of adult and juvenile individuals as a result of construction- and operations-related activities, the short-term incremental loss of potentially suitable habitat within the Sabine River associated with construction of the dragline walkway and main haul road bridge and short-term temporary habitat impacts due to increased turbidity and sedimentation.

Construction-related habitat impacts would be minimized through the implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the wartyback are anticipated.

Pistolgrip

The pistolgrip mussel has been recorded within the Rusk Permit Area. Direct impacts to the species as a result of project construction could include the loss of adult and juvenile individuals, the short-term incremental loss of potentially suitable habitat within the Sabine River, and short-term temporary habitat impacts due to increased turbidity and sedimentation. Based on the documented occurrence of this species in the vicinity of the proposed dragline walkway and main haul road bridge crossings of the Sabine River (CNG 2010), there is a high potential for the loss of individuals during construction. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation Measures) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts to the pistolgrip are anticipated.

Fawnsfoot

No fawnsfoot populations are known within the Rusk Permit Area. Historic records indicate presence within the Sabine River drainage. Potential species occurrence is considered low based on the species' known distribution. Direct impacts to the species, if present, could include the loss of adult and juvenile individuals as a result of construction- and operations-related activities, the short-term, incremental loss of potentially suitable habitat within the Sabine River associated with construction of the dragline walkway and main haul road bridge and short-term temporary habitat impacts due to increased turbidity and sedimentation. Mitigation measure FW-2 (see Section 3.5.4, Monitoring and Mitigation Measures) is being considered to minimize impacts to mussels that may be present in the construction footprint of the proposed haul road and dragline walkway crossings.

Construction-related habitat impacts would be minimized through implementation of concurrent and final reclamation in accordance with Sabine's Reclamation Plan and proposed Conceptual Mitigation Plan (**Appendix C**) for waters of the U.S. Sabine's Fish and Wildlife Plan would be implemented to minimize impacts to fish species and aquatic communities including restoration, enhancement, and maintenance of natural riparian habitats associated with streams, lakes, and other wetland areas. As discussed above, any increase in turbidity and sediment transport in the Sabine River as a result of construction activities would be short-term and localized to within a few miles of the crossing. Therefore, spawning habitat alterations that would change the availability of resources for this species are considered to be low to negligible, depending on the distance from the proposed crossings. Additional mitigation, as described in Section 3.2.3.4 under Surface Water, is being considered to further minimize the short-term sedimentation and turbidity effects to the Sabine River during construction of the dragline walkway and main haul road.

As discussed above, based on implementation of Sabine's applicant-committed protection measures for water resources, the effects of mine water discharge on the Sabine River and its tributaries are anticipated to be minimal. Also as discussed above, no direct effect to aquatic, wetland, or riparian habitats outside of the projected mine-related 5-foot groundwater drawdown area, including the Sabine River, would be anticipated. Therefore, no related impacts for the fawnsfoot are anticipated.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the Rusk Permit Area would not be developed. However, ongoing operations at the existing South Hallsville No. 1 Mine (inclusive of the South Marshall Permit Area) would continue under existing authorizations with up to approximately 17,600 total acres of habitat disturbance. Existing mine-related effects to fish and wildlife resources would continue through closure and final reclamation (approximately 2035).

Terrestrial Species

Under the No Action Alternative, the Rusk Permit Area-related impacts to approximately 14,392 acres of terrestrial and aquatic habitats and related direct and indirect impacts to wildlife species would not occur. The related wildlife displacement and habitat fragmentation would not occur, and the current habitat mosaic would be retained (Section 3.5.1, Affected Environment).

Aquatic Species

Under the No Action Alternative, no potential Rusk Permit Area-related flow alterations or associated changes in aquatic habitat would occur in the Sabine River or Cherokee Bayou. No loss of intermittent or perennial stream habitats or stock ponds as a result of mine-related surface disturbance would occur.

Special Status Species and Species of Special Concern

No Rusk Permit Area-related impacts associated with surface disturbance, groundwater level changes, or surface water discharge would occur; therefore, related impacts to special status species or species of special concern would occur.

3.5.3 Cumulative Impacts

The past and present actions and RFFAs are identified in Section 2.7 and shown in **Figure 2-12**.

3.5.3.1 Terrestrial Species

Surface Disturbance

The major past and present actions in the vegetation cumulative effects study area include four existing lignite mines (inclusive of the existing South Hallsville No. 1 Mine), two existing power plants and their associated cooling water reservoirs, and other actions for which USACE Section 404 Permits have been issued. Two RFFAs (the proposed Marshall Lignite Mine and a potential conveyor for Rusk Permit Area) also occur in the vegetation cumulative effects study area; however, it is anticipated that the potential conveyor would be constructed within the currently proposed disturbance area for the Rusk Permit Area. These operations have resulted, or would result, in approximately 78,316 total acres of disturbance, inclusive of approximately 1,910.2 acres of disturbance to waters of the U.S., including wetland habitats. Of this total, the approximately 67,697 acres of lignite mining-related disturbance have been, or would be, incrementally reclaimed over the life of these operations. The remaining 10,619 acres of disturbance represent long-term to permanent disturbance areas. The proposed Rusk Permit Area incrementally would increase the cumulative disturbance by up to an additional 14,392 acres, inclusive of 303.1 acres of disturbance to waters of the U.S., including wetland habitats, all of which would be incrementally reclaimed over the life of the mine as discussed in Section 2.5.3.10, Monitoring of the Reclaimed Site, for RCT-specified post-mining reclamation success for fish and wildlife habitat, as well as Section 3.5.3.6, Restoration of Waters of the U.S. Including Wetlands. Based on an estimated waters of the U.S. (including wetlands) total cumulative disturbance of approximately 2,213.3 acres, the known compensatory

mitigation for past and present actions, and the proposed compensatory mitigation for the Rusk Permit Area, there would be an estimated net increase of 1,736.5 acres of water of the U.S. (including wetlands) in the cumulative effects study area. This net increase in acreage would represent a conversion of upland habitat to aquatic and wetland habitats.

Overall, cumulative impacts for the nearby projects described above would parallel those of the proposed action. Consequently, the cumulative effects to wildlife resources would be directly related to habitat loss or alteration, fragmentation, and animal displacement, as well as alteration of native habitats into pastureland, cropland, and residential/industrial areas in the project area. Cumulative habitat loss or alteration would result in direct loss of smaller, less mobile wildlife species (e.g., small mammals and reptiles/amphibians), and the displacement of more mobile species into adjacent habitats that currently may be at or near carrying capacity. The proximity of the proposed project to past and present operations has affected wildlife habitat value and availability within the project vicinity.

Although wildlife populations that occur in the cumulative effects study area would continue to occupy their respective habitats and breed successfully, species composition and population numbers may change relative to the amount of cumulative habitat loss and disturbance from the incremental development. Although subsequent reclamation of mine sites would restore habitats to specified post-mining land uses, it is expected that all reclaimed areas would be capable of supporting wildlife; however, species composition and densities would be expected to change. Revegetated areas would be planted with species appropriate to the proposed post-mining land uses, but natural processes of species competition and survival will modify these communities over time. Thus, it is expected that wildlife habitats on reclaimed areas gradually would evolve to more closely resemble the surrounding undisturbed habitats, leading to similar gradual changes in the wildlife populations using these areas.

Water Level Change

As discussed in Section 3.2.3.3, cumulative effects from groundwater level changes are not anticipated. As a result, no related cumulative effects are anticipated for terrestrial species.

Water Discharge

During operations in the Rusk Permit Area, the drainages within and immediately around the active mine area would flow primarily in response to local precipitation events, attenuated in lower stream reaches by the presence of sediment control ponds. Therefore, the proposed project would result in minimal contribution to downstream flows. Additional managed discharges from other mining operations in the cumulative effects study area would not be anticipated to substantially increase downstream flows in the river during the period of water discharges. As a result, no related cumulative effects are anticipated for terrestrial species.

3.5.3.2 Aquatic Species

Surface Disturbance

The major past and present actions in the wildlife cumulative effects study area are the same as those listed above in the Terrestrial Species section. These operations have resulted, or would result, in approximately 705.8 acres of disturbance to waters of the U.S., including wetland habitats. The proposed Rusk Permit Area incrementally would increase the cumulative disturbance of 303.1 acres to waters of the U.S., including wetland habitats, all of which would be incrementally reclaimed over the life of the mine. Based on an estimated waters of the U.S. (including wetlands) total cumulative disturbance of approximately 2,213.3 acres, the known compensatory mitigation for past and present actions, and the proposed compensatory mitigation for the Rusk Permit Area, there would be an estimated net increase of 1,736.5 acres of water of the U.S. (including wetlands) in the cumulative effects study area. This net increase in acreage would represent a conversion of upland habitat to aquatic and wetland habitats.

Overall, cumulative impacts for the nearby projects described above would parallel those of the Proposed Action. Consequently, the cumulative effects to aquatic resources would be directly related to habitat loss or alteration, fragmentation, benthic macroinvertebrate and periphyton elimination, and species displacement that have primarily resulted from the past, present, and reasonably foreseeable future actions as well as alteration of intermittent stream habitats into perennial ponds within the cumulative effects study area.

Although aquatic populations that occur in the cumulative effects study area would continue to occupy their respective habitats and breed successfully, species composition and population numbers may change relative to the amount of cumulative habitat loss and disturbance from the incremental development. Although subsequent reclamation would restore habitats to specified post-mining land uses, it is expected that all reclaimed waters of the U.S., including wetlands, would be capable of supporting aquatic species; however, species composition and densities would be expected to change. Revegetated herbaceous wetlands would be planted with species appropriate to the proposed post-mining land uses, but natural processes of species competition and survival will modify these communities over time. Thus, it is expected that aquatic habitats on reclaimed areas gradually would evolve to more closely resemble the surrounding undisturbed habitats, leading to similar gradual changes in the aquatic species and populations using these areas. If reclamation results in an altered aquatic habitat from pre-disturbance conditions, new aquatic species would likely colonize the reclaimed aquatic habitat.

Water Level Change

As discussed in Section 3.2.3.3, cumulative effects from groundwater level changes are not anticipated. As a result, no related cumulative effects are anticipated for aquatic species.

Water Discharge

During operations in the Rusk Permit Area, the drainages within and immediately around the active mine area would flow primarily in response to local precipitation events, attenuated in lower stream reaches by the presence of sediment control ponds. Therefore, the proposed project would result in minimal contribution to downstream flows. Additional managed discharges from other mining operations in the cumulative effects study area would not be anticipated to substantially increase downstream flows in the river during the period of water discharges. As a result, no related cumulative effects are anticipated for aquatic species.

3.5.3.3 Special Status Species and Species of Special Concern

Surface Disturbance

Overall, cumulative impacts would parallel those discussed above for terrestrial species. Consequently, the cumulative effects to special status species and species of special concern would be directly related to habitat loss or alteration, habitat fragmentation, and animal displacement that primarily have resulted from these activities. Habitat alteration also potentially could result in the direct loss of smaller, less mobile species (e.g., mussels, snakes, and turtles).

As discussed for general terrestrial wildlife, projects within the cumulative effects study area would affect approximately 78,316 acres of disturbance, inclusive of approximately 1,910.2 acres of disturbance to waters of the U.S., including wetland habitats. However, the disturbance acreage would eventually be revegetated or reclaimed. The proposed Rusk Permit Area incrementally would increase the cumulative disturbance by up to an additional 14,392 acres, inclusive of 303.1 acres of disturbance to waters of the U.S., including wetland habitats, all of which would be incrementally reclaimed over the life of the mine. Consequently, direct impacts to special status species and species of special concern from surface disturbance activities would result in the incremental short-term loss of potentially suitable habitat until final reclamation is completed.

Water Level Change

As discussed in Section 3.2.3.3, cumulative effects from groundwater level changes are not anticipated. As a result, no related cumulative effects are anticipated for special status species or species of concern.

Water Discharge

During operations in the Rusk Permit Area, the drainages within and immediately around the active mine area would flow primarily in response to local precipitation events, attenuated in lower stream reaches by the presence of sediment control ponds. Therefore, the proposed project would result in minimal contribution to downstream flows. Additional managed discharges from other mining operations in the cumulative effects study area would not be anticipated to substantially increase downstream flows in the river during the period of water discharges. As a result, no related cumulative effects are anticipated for aquatic species.

3.5.4 Monitoring and Mitigation Measures

Based on the EIS analysis, the USACE is considering the following additional mitigation for wildlife resources:

FW-1: If vegetation clearing activities should be required during the migratory bird breeding season (March through July), pre-construction breeding bird surveys would be conducted prior to these activities. A qualified biologist would survey potentially suitable habitat for nesting activity and other evidence of nesting. If active nests are located, or other evidence of nesting is observed, appropriate protection measures, including establishment of buffer areas and constraint periods, would be implemented until the young have fledged and dispersed from the nest area.

Effectiveness: This measure would minimize potential effects to breeding raptor and migratory bird species if construction or vegetation clearing activities should be required during the breeding season.

FW-2: Prior to construction of the proposed haul road bridge and the proposed dragline walkway crossing of the Sabine River, mussel surveys would be conducted by a qualified biologist within the proposed disturbance areas and immediately downstream of the crossings. Mussels found during the survey would be relocated to appropriate habitat in coordination with TPWD.

Effectiveness: This measure would minimize potential impacts to individual mussels located in the Sabine River within the construction footprint of the proposed haul road bridge and dragline walkway.

3.5.5 Residual Adverse Effects

Residual adverse effects to terrestrial species, including special status species and species of special concern, would include the permanent net loss of approximately 182.5 acres of terrestrial upland habitat, resulting from the conversion of these lands to wetland habitat. Residual adverse effects to species using shrub and forested habitats would include long-term loss of habitat, as it would take up to 15 years for shrub species to fully re-establish and 20 plus years for tree species to re-establish. Assuming successful reclamation is achieved, these shrub and forested habitat residual adverse effects would cease over time.

There would be no residual adverse effects to aquatic species due to implementation of Sabine's proposed Conceptual Mitigation Plan (**Appendix C**).