

### **3.0 ENVIRONMENTAL ANALYSIS**

The environmental consequences of constructing and operating the proposed Project would vary in duration and significance based on construction method and affected resource. Four levels of impact duration were considered: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction, with the resources returning to preconstruction conditions almost immediately afterward. Short-term impacts could continue for approximately 3 years following construction. Impacts were considered long-term if the resources would require more than 3 years to recover. Permanent impacts would occur as a result of activities that modify resources to the extent that they would not return to preconstruction conditions during the life of the proposed Project, such as with the construction of a compressor station. We considered an impact to be significant if it would result in a substantial adverse change in the physical environment.

In this section, we discuss the affected environment, construction and operational impacts, and propose mitigation measures for each resource. We evaluated these measures as well as proposed mitigation measures to determine whether or not additional steps would be necessary to further reduce impacts. Additional measures that we have identified appear as bulleted, boldface paragraphs in the text of the EIS. We recommend that these measures be included as specific conditions to the Certificate that may be issued to Gulf Crossing and Gulf South for the proposed Project.

Conclusions in this EIS are based on our analysis of environmental impacts and the following assumptions:

- Gulf Crossing and Gulf South would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in Section 2.0 of this EIS; and
- Gulf Crossing with Gulf South would implement the mitigation measures identified in its application and supplemental filings to the FERC.

### **3.1 GEOLOGY**

#### **3.1.1 Geological Setting**

The geologic setting of northeastern Texas, southern Oklahoma, northern Louisiana, and western Mississippi is located in the north central extent of the Gulf of Mexico Basin. Geologically, the Gulf of Mexico Basin consists of thick sedimentary buildup that applies pressure to shale or salt producing salt-flow structures and growth faults including the Sabine Uplift, the North Louisiana Salt Basin, the La Salle Arch, and the Mississippi Salt Basin. The age of the geologic units across the proposed pipeline range from Cretaceous in western northeast Texas and southeast Oklahoma; Eocene and Tertiary in northeast Texas and northwest Louisiana; Pleistocene in northwest and north central Louisiana; and Holocene in the Mississippi River valley, east Louisiana, and west Mississippi (Table 3.1.1-1). Ground subsidence can affect pipelines and aboveground facilities by causing a loss of support that would result in bending or rupture of pipelines and weaken the foundations of aboveground facilities.

##### **3.1.1.1 Topography**

Topography along the proposed pipeline route would range from flat to moderately hilly terrain. The elevation of the proposed pipeline route would vary from 75 feet above mean sea level (AMSL) in east Louisiana to 685 feet (AMSL) in northeast Texas.

**TABLE 3.1.1-1  
Geologic Units Underlying the Proposed Gulf Crossing Project**

<b>Cumulative Length Crossed (miles)</b>	<b>Group/Formation/ Type</b>	<b>Description</b>	<b>Age</b>
63.2	Alluvium	Lenticular and interfingered deposits of gravel, sand, silt, and clay. Thickness along major streams ranges up to 100 feet averaging 40 feet; along minor streams the thickness ranges up to 45 feet.	Quaternary
2.4	Blossom Sand Formation	This layer consists of very fine grained to fine grained sand with thin clay interbedding and may also contain silty, calcareous, interbeds of silt. The formation's thickness is generally around 20 feet.	Late Cretaceous
6.0	Bonham Formation	Silty, glauconitic, poorly to thinly bedded marl and clay. This formation may contain marine megafossils. The thickness of the Bonham Formation is typically around 400 feet.	Late Cretaceous
20.5	Braided Stream Terraces	Fine to coarse sand with some clay silt and gravel.	Pleistocene
3.4	Brownstown Marl	Poor to massive bedded, calcareous, silty, clay. This formation averages a thickness of 80 feet.	Late Cretaceous
0.4	Cane River Formation	Silty clay with basal glauconitic and fossiliferous silts which may weather to ironstone locally.	Eocene
17.8	Catahoula Formation	Consists of irregularly bedded gray sand and sandstone, mottled red, gray, green, and chocolate colored clay. May also consist of quartzite, sandy limestone, and cross-bedded fine green sand.	Miocene
31.4	Cockfield Formation	Lignitic clays, silts and sands.	Eocene
31.7	Cook Mountain Formation	The upper portion of this formation consists of sideritic clay. The lower portion of this formation consists of clay and fossiliferous marl. Ironstone concretions occur near the base of the formation.	Eocene
5.5	Deweyville Terraces	Clay and silty clay with some local sand and gravel.	Pleistocene
4.1	Dexter Member of Woodbine Formation	Moderately to weakly indurated sandstone, shale, and lignite with an average thickness of approximately 100 feet.	Cretaceous
4.9	Eagle Ford Formation	Shale, siltstone, and limestone. The upper part of the formation consists of limestone and shale, while the lower part of the formation consists of siltstone and fine-grained sandstone.	Cretaceous
2.8	Gober Chalk and Roxton Limestone	Chalk with local Roxton Limestone beds. Gober Chalk is characterized as being argillaceous, brittle, and bluish gray with an average thickness of 400 feet. The Roxton Limestone is characterized as a sandy, glauconitic, soft limestone that may contain marine megafossils. The thickness of local Roxton Limestone beds is averages 10 feet.	Late Cretaceous

**TABLE 3.1.1-1 (continued)  
Geologic Units Underlying the Proposed Gulf Crossing Project**

<b>Cumulative Length Crossed (miles)</b>	<b>Group/Formation/ Type</b>	<b>Description</b>	<b>Age</b>
10.2	Intermediate Terraces	Clay, sandy clay, and silt.	Pleistocene
1.8	Marlbrook Marl	Calcareous clay with variable amounts of silt and glauconitic limestone. This formation may contain marine megafossils. This formation thickness averages 300 feet.	Late Cretaceous
12.3	Midway Group	Silty, sandy, and glauconitic clay which grades up to mudstone and sand of the Wilcox Group. This formation averages a thickness of 500 feet.	Paleocene
29.5	Natural Levees	Silt, silty clay, and fine grained sand.	Holocene
5.7	Ozan Group	Calcareous silt and sand with interbedded layers of montmorillonitic, blocky, conchoidal clay.	Late Cretaceous
1.7	Pecan Gap Chalk	Limestone with alternating intervals of soft and hard limesand.	Late Cretaceous
3.7	Prairie Terraces	Clay, sandy clay, and silt.	Pleistocene
27.5	Queen City Sand Formation	Fine grained locally carbonaceous sand and lignitic clay.	Eocene
2.5	Red Brach Member of Woodbine Formation	Indurated sandstone, shale, and lignite with an average thickness of about 75 feet.	Cretaceous
4.2	Reklaw Formation	Crossbedded fine to medium grained sandstone and silty, lignitic clay with some hematite and muscovite. This formation's thickness ranges from approximately 50 to 80 feet.	Eocene
6.1	Sparta Formation	Massive sands interbedded with clay and some thin beds of lignite, lignitic sands, and shale.	Eocene
6.1	Templeton Member of Woodbine Formation	Indurated sandstone and shale with an average thickness of 75 feet.	Cretaceous
22.9	Terrace Deposits	Sand, silt, clay, and gravel in various proportions, with gravel more predominant in older, higher terrace deposits. Locally indurated with calcium carbonate (caliche) in terraces along streams.	Quaternary
5.1	Washita Group	Alternating thick clay units and thin limestone units with an average thickness of 200 ft.	Late Cretaceous
4.8	Weches Formation	Greensand, sand, and clay with an average thickness of 30 feet.	Eocene

**TABLE 3.1.1-1 (continued)  
Geologic Units Underlying the Proposed Gulf Crossing Project**

<b>Cumulative Length Crossed (miles)</b>	<b>Group/Formation/ Type</b>	<b>Description</b>	<b>Age</b>
22.6	Wilcox Group	The majority of this formation consists of mudstone with various amounts of sandstone, lignite, and ironstone concretions. This average thickness of this formation is 1,000 ft.	Paleocene/ Eocene
2.4	Wolfe City Formation	The upper portion of this formation consists of very fine grained sand and silt with local sandy calcareous concretions in discontinuous beds. The upper portion of this formation may contain marine megafossils. The lower portion of the Wolfe City Formation consists of calcareous mudstone. The formation's average thickness is 75 feet.	Late Cretaceous
9.0	Woodbine Formation	Various inter-lensing sequence of non-marine, brackish-water, and marine beds of sand, clay, sandstone, and shale 350-600 ft thick. Woodbine fossils include ammonites, gastropods, pelecypods, brachiopods.	Late Cretaceous

The topography along the proposed Mississippi Loop is flat to moderately hilly. The elevation of the loop would be approximately 380 feet AMSL at the start of the loop, 235 feet AMSL at the crossing of Pearl River (MP 11.4), and 375 feet AMSL at the end of the pipeline loop.

The Sherman, Paris, Mira, and Sterlington Compressor Stations would be located on relatively flat land and located at approximately 666, 470, 273, and 78 feet AMSL, respectively. The existing Harrisville Compressor Station would be modified to add more compression. This station is located on relatively flat land at approximately 375 feet AMSL.

### **3.1.1.2 Bedrock**

The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) defines shallow bedrock as bedrock occurring in the upper 60 inches of the soil profile. A review of soil survey databases for the project area indicates that the proposed pipeline route would cross a cumulative total of approximately 2.2 miles of soils characterized as shallow bedrock. If the areas of shallow bedrock are weathered enough, they would be ripped with backhoes or bulldozers equipped with rippers.

Should blasting be necessary, the Companies would notify the FERC before blasting and would conduct all blasting and disposal of bedrock material in accordance with their Plan and Procedures. Blasting and disposal of bedrock material would also be in compliance with applicable federal, state, and local laws, permits, and authorizations. The Companies would conduct the blasting under the supervision of a certified blasting technician and provide a blast design if within 1,000 feet of an occupied building. Residents living within one-half mile of any blasting activity would be notified 30 days in advance and again 24 hours in advance prior to blasting. Blasting would be conducted during daylight. Notice of the planned blasting would be provided to the local newspaper, and appropriate warning signs and controlled access would be implemented in the area of planned blasting.

### **3.1.1.3 Impacts to the Geologic Setting**

The primary effect of pipeline construction on geology would consist of disturbances to the existing topography along the construction right-of-way. These disturbances to topography would be most apparent in relatively steeper areas, such as the transitional zone between the West Gulf Coastal Plain Section and the Mississippi Alluvial Plain. However, since blasting is unlikely, all areas disturbed during pipeline construction would be finish-graded and restored as closely as possible to pre-construction contours during cleanup and restoration consistent with our Plan. In addition, aboveground facilities have been sited in areas without any significant topography. We conclude that construction and operation of the proposed Project would be unlikely to result in significant alterations or negative impacts to the topography or overall geologic setting occurring within the proposed Project.

### **3.1.2 Mineral Resources**

Multiple mineral resources (oil, gas, coal, cement, crushed stone, sand, gravel, salt, lime, lignite, bentonite, clay, and shale) are actively extracted in Texas, Oklahoma, Louisiana, and Mississippi (USGS 2007a). Oil and natural gas extraction is common in Texas, Oklahoma, Louisiana, and Mississippi, with significant natural gas and oil production occurring in the Wilcox Group in the Sabine Arch and formations around Louisiana salt domes. The Companies have identified a total of 840 gas and oil wells within 0.25 mile of the proposed pipeline route including 188 wells in Texas, four wells in Oklahoma, and 648 wells in Louisiana. Additionally, nine wells were identified within 0.25 miles of the Sterlington Compressor Station and one located within 0.25 mile of the Mira Compressor Station. No wells were identified within 0.25 mile of the proposed pipeline route along the Mississippi Loop and the other two compressor station areas.

According to the Companies, which utilized USGS topographic maps to identify mineral resources; a total of 17 mineral resource sites would be crossed or in close proximity to the proposed Project. Specifically, two gravel pits are within 0.25 mile of the proposed pipeline route (Table 3.1.2-1). In addition, three other gravel pits and one quarry are within 0.5 mile of the proposed pipeline right-of-way. Because none of the gravel pit or quarry mineral resources cited in Table 3.1.2-1 would be crossed by the Project, no impacts are anticipated as a result of construction activities.

**TABLE 3.1.2-1  
Mineral Resources within 0.25 Mile of the Proposed Gulf Crossing Project**

<b>Milepost (MP)</b>	<b>Parish/ County, State</b>	<b>Mineral Resource</b>	<b>Distance from Construction Work Area (feet)</b>	<b>Direction from Construction Work Area</b>	<b>Evaluation of Impacts</b>
8.9	Bryan, OK	Gravel Pit	350	N/A	No impacts are anticipated.
9.0	Bryan, OK	Gravel Pit	800	N/A	No impacts are anticipated.
11.0	Bryan, OK	Gravel Pit	1,350	N/A	No impacts are anticipated.
100.1-104.8	Franklin, TX	Talco Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
170.1-182.4	Cass, TX and Caddo, LA	Rodessa Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
184.4-187.8	Caddo, LA	North Missionary Lake Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
194.2-196.5	Bossier and Webster, LA	Bolinger Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
194.5	Bossier, LA	Quarry	1,450	N/A	No impacts are anticipated.
206.6-AG211.4	Bossier, LA	South Sarepta Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
213.6-221.0	Webster, LA	Cotton Valley Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
235.1	Claiborne, LA	Gravel Pit	1,400	N/A	No impacts are anticipated.
236.2	Claiborne, LA	Gravel Pit	1,975	N/A	No impacts are anticipated.
242.5-245.8	Claiborne, LA	Lisbon West Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
245.9-253.2	Claiborne and Lincoln, LA	Lisbon Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
254.3-266.1	Lincoln, LA	Middlefork Oil and Gas Field	Crossed	N/A	No impacts are anticipated.

**TABLE 3.1.2-1 (continued)**  
**Mineral Resources within 0.25 Mile of the Proposed Gulf Crossing Project**

<b>Milepost (MP)</b>	<b>Parish/ County, State</b>	<b>Mineral Resource</b>	<b>Distance from Construction Work Area (feet)</b>	<b>Direction from Construction Work Area</b>	<b>Evaluation of Impacts</b>
268.1-275.3	Lincoln and Union, LA	Unionville Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
AQ284.9-310.7	Union, Ouachita, and Morehouse LA	Monroe Oil and Gas Field	Crossed	N/A	No impacts are anticipated.
332.8-337.2	Richland, LA	Delhi Oil and Gas Field	Crossed	N/A	No impacts are anticipated.

NOTE:  
N/A - Direction from construction work area would be determined prior to construction.

A total of 12 active oil and gas wells would be crossed by the proposed project. The Companies indicated that construction and operation of the proposed Project would not affect any of these exploitable oil and natural gas wells. Excavation of the pipeline trench typically would extend only to a depth of approximately seven feet below the ground surface, and none of the proposed HDDs would exceed a depth greater than 100 feet below the ground surface. Oil and gas extraction operations are typically conducted at thousands of feet below the surface.

The Companies would work with oil field owners to avoid, reroute around, and/or accommodate active well sites and would work with producers to identify the locations of feeder pipelines that connect to oil and gas wells in the vicinity of the proposed pipeline route. In the event existing infrastructure cannot be avoided, such as a perpendicular crossing, the crossing would be conducted in consultation with the facilities owner in a manner that would avoid adverse impacts on the existing facilities. The proposed pipeline would, in most cases, be installed beneath the existing facilities using typical construction methods. A minimum separation would be maintained between the existing infrastructure and the proposed pipeline. Exploration of oil and gas within the permanent right-of-way would be prohibited. New drilling operations would be conducted outside of the permanent right-of-way.

### **3.1.3 Paleontological Resources**

Paleontological resources are the fossilized remains of prehistoric plants and animals, as well as the impressions left in rock or other materials as indirect evidence of the forms and activities of such organisms. Paleontological resources are generally fossilized in hard bedrock which is found only in northern Texas and southern Oklahoma. However, no known geologic formations containing fossils are located in this area of the proposed pipeline.

Prior to construction, environmental training would be provided to construction personnel describing paleontological resources that could occur in the project area. If construction personnel would encounter a potential paleontological resource during construction, work would be immobilized at the site and the surrounding area where the paleontological resource was located. Construction personnel would be required to notify the representative Environmental Inspector (EI) who would in turn notify the

Companies. The Companies would follow the measures identified in their *Plan for the Unanticipated Discovery of Historical Properties, Human Remains or Potential Paleontological Evidence During Construction* and would notify the appropriate State Historic Preservation Officer and the FERC. Upon determination of the findings at the site, remobilization or further action would correspond to findings.

Based on the low probability of encountering these resources and the Companies' adherence to their Plan; we conclude that construction and operation of the proposed project would not significantly affect paleontological resources.

### **3.1.4 Geologic Hazards**

Geologic hazards are defined by the American Geological Institute as “geologic conditions or phenomena that present a risk or are a potential danger to life and property, either naturally occurring or man-made.” (Bates and Jackson 1984). Geologic hazards potentially occurring in the vicinity of the proposed Project area include seismicity and faults, soil liquefaction, slope failures/landslides, and ground subsidence. Geologic hazards such as volcanism are not relevant to the proposed Project area and are excluded from further consideration.

#### **3.1.4.1 Seismicity and Faults**

The USGS defines seismicity as “the geographic and historical distribution of earthquakes” (USGS 2007b). Faults are fractures in rock that show evidence of geologic movement. Hazards associated with seismicity and faulting include ground shaking, surface rupture of faults, and offset along normal, reverse, or strike-slip faults. Faulting is especially hazardous to linear, rigid structures, such as pipelines, in which the ground is not moving the same distance or direction.

Historically, earthquakes have occurred in northeast Texas, south Oklahoma, Louisiana, and Mississippi, but their occurrence has been infrequent, with most having had a magnitude too low to be felt by people or cause serious damage (USGS 2007c).

Earthquakes are caused by stress building up along a fault until a critical limit is reached and the stress is released through sudden movement along the fault. This release of stress causes energy to radiate from the fault causing the ground to shake. The Companies indicated that there is no evidence of active faulting (faulting within the last 10,000 years) in the proposed Project area and determined that the proposed Project would be located in a region of low seismic risk. Based on this historical record and absence of fault activity over the last 10,000 years, we conclude that the potential for seismicity and faulting does not represent a significant risk to the stability or safety of the proposed Project.

#### **3.1.4.2 Soil Liquefaction**

Soil liquefaction is a condition that occurs when loose, cohesionless, saturated soil (usually well-sorted sand) is subjected to vibration or shock waves. During liquefaction, pore water inhibits grain-to-grain contact, and the strength of the soil is greatly reduced such that the soil may act like a viscous liquid with the ability to move and flow. Soil liquefaction can lead to landslides and earthflows, movement or failure of building foundations and footings, and mobility of buried objects.

Soils along the proposed pipeline route are poorly drained to very poorly drained in some locations as discussed in Section 3.2. The saturated soil conditions increase the risk of liquefaction. However, because soil liquefaction risk is closely related to seismic risk which was previously described as low within the proposed project area, we believe the potential for soil liquefaction is similarly low. Furthermore, the pipeline and associated facilities would be designed and constructed in accordance with

the standards specified in 49 CFR Part 192, Minimum Federal Safety Standards for the Transportation of Natural and Other Gas by Pipeline, which would adequately address the low potential for soil liquefaction. Given the low seismic risk in the area and the methods that would be used to construct the proposed pipeline and associated facilities, we conclude that soil liquefaction does not represent a significant risk to the stability or safety of the proposed Project.

#### **3.1.4.3 Slope Failures/Landslides**

Several factors contribute to slope failures and subsequent landslides including the degree of slope or tilt of geologic materials, the composition of the materials, the amount of man-made disturbance of the materials, proximity to seismic activity, and the amount of rainfall exposure. Generally flat areas were selected for the location of the proposed compressor and meter station sites; therefore, slope failure is not expected at these aboveground facility sites. Slope failures and landslides represent a potential hazard along portions of the proposed Project route that would traverse areas of side slopes and rolling terrain. Factors that would increase the potential for slope failures along slopes and rolling terrain include cutting along slopes, the weight of construction equipment, and unusually high precipitation.

Past incidences of “high” landslide activity (greater than 15 percent of area involved in landslide processes) are located between the proposed MP 66.3 and 94.5, and the Paris Compressor Station (MP 71.4). These areas are indicated as high risk primarily due to stream bank sliding and erosion caused landslides, however with the Companies procedures we believe those risks are minimized.

Construction of the pipeline would be accomplished in accordance with the Companies’ Plan, which includes measures to control runoff and erosion that would minimize the potential for slope failures. In addition, pre- and post-construction inspections would identify areas of risk, and continued monitoring along slopes would likely identify any significant landslide hazards before they develop. We conclude that given the nature of the proposed Project area and adherence to the construction and monitoring measures identified, that potential impacts from slope failures and landslides would be prevented or effectively minimized.

#### **3.1.4.4 Ground Subsidence**

Ground subsidence is a lowering of the land-surface elevation that results from changes that take place underground. Common causes of land subsidence include dissolution of limestone in areas of karst terrain; collapse of underground mines; and pumping of water, oil, and gas from underground reservoirs.

Karst terrain refers to areas characterized by dissolution of rocks such as limestone, dolomite, gypsum, and salt, resulting in sinkholes (closed depressions), pinnacled bedrock, caves/caverns, and underground drainage systems. The tendency for and rate of solubility of rock formations is variable and is believed to be affected by rock mineralogy as well as local structural features, such as jointing, bedding characteristics, and differences in groundwater chemistry.

The proposed project route includes geologic units which have the potential to form karst-like features or subsidence which eventually could result in surface expression. However, these areas currently do not exhibit surface expressions of any karst features and the proposed Project facilities are not identified as occurring in areas where underground rock dissolution would occur and therefore likely would not contribute to an increased potential for ground subsidence. The Companies have not identified any underground mines along the proposed pipeline route.

As described in Section 3.1.2, the proposed Project would traverse areas in northeastern Texas, southern Oklahoma, and northern Louisiana where oil and natural gas extraction is common. Extraction

of oil and gas from sources underlying the proposed Project facilities as well as extraction of groundwater has the potential to cause ground subsidence (USGS 2007d, USGS 2007e). Further, loading of fluvial sediments, which are abundant at the northern edge of the Gulf of Mexico Basin in Texas, north Louisiana, and central Mississippi, are susceptible to subsidence.

The proposed Project facilities would be designed and constructed to meet or exceed the federal safety standards set forth in 49 CFR Part 192, which should ensure integrity of the Project facilities and minimize the potential for any pipe failures due to ground subsidence. Additionally, the Companies would conduct regular patrols of the pipeline right-of-way during operations to identify conditions, including any areas of ground subsidence that might affect the safety or operation of the pipeline. We conclude that use of the appropriate construction methods, as well as post-construction monitoring, would minimize the potential for any risk to the proposed Project posed by ground subsidence.

### **3.1.5 Conclusion Regarding Impacts to Geologic Resources**

The proposed Project would be unlikely to affect paleontological resources and would encounter little bedrock along the pipeline route. The Companies have plans in place to address these issues should the need arise. Potential impacts to mineral sites and oil and gas producing areas would be largely avoided by means of routing, and through negotiations with affected parties, as applicable. The largest potential for effects would be related to alteration of topography, especially in steep or moderately rugged terrain. These potential effects would be mitigated through restoration of contours. Geologic hazards, such as seismic activity and liquefaction would not likely cause a significant threat to construction or operation of the proposed facilities. The potential for other hazards, such as slope failure and subsidence, would be minimized through use of special construction techniques, restoration, and post-construction monitoring. Provided the avoidance and mitigation measures described above are implemented, we conclude that the proposed Project would neither have a significant impact on geological resources nor be more than a negligible risk to the proposed pipeline from geologic hazards.

## **3.2 SOILS**

### **3.2.1 Soil Limitations**

The soils crossed by the proposed pipeline and associated aboveground facilities were analyzed using Version 2 of the Soil Survey Geographic Information System (SSURGO2). The SSURGO2 database represents the digital version of the county soil survey supplied at more detailed scales. County soil surveys represent the most detailed soils information generally available and were developed by the NRCS for use in farm and field scale resource planning. SSURGO2 spatial data are compiled by digitizing soil map units found in county soil surveys. The SSURGO2 database provides information on soil characteristics that may be used to estimate the vulnerability of specific soils to development impacts. These soil map units, along with a description of their major characteristics and limitations, are summarized in Appendix C (Table C-1). Soils found at the location of the proposed aboveground facilities and their descriptions are summarized in Appendix C (Table C-2).

### **3.2.2 Soil Characteristics**

Soils characteristics that can affect construction or increase the potential for soil impacts include: erosion potential, drainage class, presence of hydric soils, presence of shallow bedrock or coarse fragments, compaction potential, revegetation potential, presence of prime farmland, and soil contamination. We evaluated the potential soil impacts associated with construction and operation of the pipeline facilities.

### **3.2.2.1 Erosion Potential**

Erosion is the wearing away of soils caused by exposure to water, wind, ice, or other geologic forces. Many factors influence the extent to which soil is eroded, such as soil structure, drainage characteristics, texture, slope, climate, and vegetation. Erosion potential across the proposed pipeline was evaluated as either soils susceptible to water and/or wind erosion. Approximately 26.7 percent (99.8 miles) of the soils crossed by the proposed pipeline and the Mississippi Loop are classified as highly erodible to water and 5.9 percent (21.9 miles) of the soils crossed by the proposed pipeline and the Mississippi Loop are classified as highly erodible to wind.

Of the soils located at aboveground compressor stations, contractor yards and the CGT M/R station (including interconnecting pipeline right-of-way), 15.2 percent (107.4 acres) are classified as highly erodible to water and 8.1 percent (57.0 acres) are classified as highly erodible to wind.

### **3.2.2.2 Drainage Class**

The drainage class of a soil is the range of its relative wetness under natural conditions. Soils with good drainage lose water and have low wetness, while soils with poor drainage retain water and have high wetness. Differences in drainage properties are typically attributed to the soil's grain size and sorting coupled with temporal variations in the depth, persistence, and stability of the water table. Well-sorted soils consist of particles of relatively uniform size; consequently, well-sorted or coarse-grained soils have more pore space and are better drained. Poorly sorted or fine-grained soils have less pore space and prevent water from draining. The NRCS recognizes seven different drainage classes. These classes and the percentage of the proposed pipeline (including the mainline and the Mississippi Loop) that would cross each class include: very poorly drained (0.8 percent), poorly drained (15.2 percent), somewhat poorly drained (14.3 percent), moderately well drained (25.8 percent), well drained (42.5 percent), somewhat excessively drained (1.2 percent), and excessively drained (0.1 percent). Most of soils that would be crossed by the proposed pipeline are classified as well drained.

### **3.2.2.3 Hydric Soils**

Hydric soils are defined as "soils that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions" (NRCS 2007b). Soils that formed under hydric conditions in their unaltered state are still considered hydric when artificially drained or altered for such purposes as agricultural use. Hydric soils are typically poorly drained, and the presence of hydric soils is one of the criteria used for defining wetlands (NRCS 2007b). Hydric soils may also be prone to compaction and rutting. Approximately 19 percent (71.1 miles) of the soils that would be crossed by the proposed mainline and Mississippi Loop are classified as hydric, with large amounts in Richland and Madison Parishes, Louisiana. Much of the land crossed by the proposed pipeline would be agricultural land or land associated with floodplains that are now protected by levees. Therefore, some of the hydric soils crossed by the proposed pipeline route have likely been altered from their original state.

### **3.2.2.4 Compaction Potential**

The strength of a soil and its drainage abilities are altered when soils are compacted. Soil compaction decreases pore space and water-retention capacity, which restricts the transport of air and water to plant roots. As a result, soil productivity and plant growth rates may be reduced, soils may become more susceptible to erosion, and natural drainage patterns may be altered. Consequently, soil compaction is of particular concern in agricultural areas where crop yields could be adversely affected. Susceptibility of soils to compaction varies based on moisture content, composition, grain size, and

density of the soil. Poorly drained and fine-grained silt and clay soils are the most likely soils to experience compaction.

Compaction prone soils were defined as soils with clay loam or finer textures in somewhat poor to very poor drainage classes. Based on our review of data provided by the Companies, approximately 28.7 percent (107.3 miles) of the soil map units that would be crossed by the proposed pipeline and the Mississippi Loop are classified as being compaction prone. Upon implementation of the compaction minimization measures contained in the Companies' Plan, we believe that impacts due to soil compaction would be minimized.

### **3.2.2.5 Revegetation Potential**

Revegetation potential is a rating of the ability of a soil to support revegetation efforts following construction-related disturbance. The Companies evaluated the potential for revegetation of each soil map unit that would be affected by construction of the proposed pipeline by evaluating the land capability subclass (LCS) and drought susceptible soils.

Taking these factors into account, the Companies identified five general classes of revegetation potential: good, moderate, poor, wet, and wet-flood prone. The revegetation potential of soils that would be crossed by the proposed pipeline route and the Mississippi Loop are classified as 49.6percent good (185.4 miles), 6.0percent moderate (22.6 miles), 20.8percent poor (77.8 miles), 12.8 percent wet (47.8 miles), and 10.2 percent wet-flood prone (38.1 miles).

### **3.2.3 General Impacts and Mitigation**

Construction activities associated with the proposed Project, such as clearing, grading, trenching, backfilling, and restoration could temporarily and/or permanently affect erosion and compaction potential. Construction could also result in a release or discovery of a contaminant; introduce rocks to the surface soil layers; damage existing drainage or affect existing drainage patterns; and disturb or convert prime farmland.

#### **3.2.3.1 Erosion**

Soil erosion could occur during construction, as vegetation clearing, grading, topsoil segregation, open trenching, and backfilling destabilize the soil material and make it susceptible to water and wind erosion. Soils are most susceptible to erosion after vegetation is removed and before reestablishment of a vegetative cover after the proposed pipeline is installed. Soil erosion also would result from off-road vehicle traffic on the right-of-way following construction.

To minimize and mitigate the impacts to soils described above, the Companies would adopt and follow the guidelines described in their Plan during construction and operation of the proposed Project. The goals of the Companies' Plan include minimization and mitigation of erosion and promotion of revegetation in upland areas. Mitigation measures identified in the Companies' Plan include use of erosion controls (e.g., slope breakers, silt fencing, and mulch) during construction to control runoff, reducing the duration of soil disturbance, and reestablishing contours and vegetative cover as soon as practicable. The Companies' Plan regarding erosion control includes:

- At least one EI would be deployed for each construction spread during construction and restoration; the EI would have peer status with the other inspectors and would have the authority to stop activities that violate the environmental conditions of the FERC Certificate

or other authorization and order corrective action. The EI would be watching for erosion and any other possible impacts to the construction spread.

- Project-related ground disturbance would be limited to the construction right-of-way, extra workspace areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the Certificate.
- Mixing of topsoil with subsoil would be minimized by stripping topsoil from either the full work area or from the trench and subsoil storage area in actively cultivated or rotated croplands and pastures, residential areas, hayfields, wetlands and other areas at the landowner's or land managing agency's request. A minimum of 12 inches of topsoil would be stripped, if available, and the entire topsoil layer would be segregated in areas with less than 12 inches of topsoil available. Topsoil would not be used to pad the proposed pipeline. Topsoil would be segregated from other materials excavated from the trench and placed in piles that would usually be opposite the working side of the trench. Therefore, heavy equipment would not travel on the piles, and compaction of excavated topsoil would be minimized.
- Temporary erosion controls would be installed immediately after the initial disturbance of soil. Erosion controls would be properly maintained throughout construction and repaired within 24 hours, if found ineffective. Mulch, which can consist of straw, hay, or erosion control fabric, would be used to stabilize the soil surface in the right-of-way and at aboveground facilities during construction activities.
- Sediment barriers would be installed (such as silt fences and/or staked hay or straw bales, or sand bags) at the base of slopes adjacent to road crossings, to prevent siltation into waterbodies or wetlands crossed by or near the construction work area. These barriers would remain in place until revegetation is successful.
- Topsoil and subsoil would be tested for compaction at regular intervals in areas disturbed by construction activities. If either the subsoil or topsoil is severely compacted, a paraplow or other deep tillage device would be used to break up the soils. In areas where the topsoil was segregated, the subsoil would also be plowed before replacing the segregated topsoil. Soils disturbed by proposed Project-related activities would be revegetated; all turf, ornamental shrubs, and specialized landscaping would be restored in accordance with the landowner's request or the landowner would be compensated.
- All areas disturbed by Project-related activities would be revegetated or otherwise stabilized. Disturbed areas would be seeded in accordance with written recommendations from local soil conservation authorities or the request of the landowner or land management agency.
- Revegetation efforts would be confirmed through post-construction monitoring of all disturbed areas after the first and second growing seasons following completion of construction activities. In areas not used for agriculture, restoration would be considered successful when the density and cover of non-nuisance vegetation is similar to adjacent undisturbed land. In agricultural areas, revegetation would be considered successful if crop yields were similar to adjacent undisturbed portions of the same field. If vegetation cover and density were not similar or if there were excessive noxious weeds after two full growing seasons, a professional agronomist would determine the need for additional restoration measurements.

In addition to adhering to their Plan, the Companies also indicated that a Stormwater Pollution Prevention Plan (SWPPP) would be developed and implemented. The SWPPP would incorporate the requirements for minimizing and mitigating upland erosion and revegetation as described in the

Companies' Plan, and would further detail the erosion control structural best management practices, inspection procedures, and reporting protocols to be implemented during construction of the proposed Project.

During the draft EIS comment period, a landowner expressed concerns regarding the potential for erosion of the banks of Slough Creek (MP 50.7) in Lamar County, Texas. The FERC staff investigated the location and observed that the sandy banks of the creek could be susceptible to erosion from seasonal flash flooding events. Gulf Crossing proposes to cross Slough Creek by open-cut. Additionally, Gulf Crossing had proposed ATWS within the wooded riparian area on both sides of the creek. In a Data Request (February 15, 2008) to Gulf Crossing, the FERC requested that Gulf Crossing provide a plan to avoid erosion impacts to Slough Creek. As a result, Gulf Crossing has modified its crossing by placing its ATWS on each side of the creek 50 feet further from the creek in the pasture areas outside the riparian zone. Therefore, no trees would be removed along the creek which would maintain the vegetative buffer. Additionally, Gulf Crossing would reduce the size of its temporary workspace on the working side of the construction right-of-way between the two ATWS by 25 feet (reduced from 40 feet to 15 feet). We believe these measures would minimize erosion caused by the construction activities. However, to ensure that the creek banks remain stable following construction and are able to support revegetation, **we recommend that:**

- **Prior to construction, Gulf Crossing should prepare a site-specific mitigation plan for Slough Creek that details the measures that would be used to stabilize and support revegetation of the banks of the creek following construction activities.**

### **3.2.3.2 Compaction Potential**

Compaction damages the structure of the soil and restricts transport of air and water to plant roots. As a result, soil productivity and plant growth rates may be reduced. In general, about 28.7 percent (107.3 miles) of the soils that would be crossed by the proposed mainline and Mississippi Loop are considered prone to compaction due to hydric soils and soils with poor drainage. Use of the construction right-of-way, extra workspaces, and access roads by heavy construction equipment could result in some degree of soil compaction. The degree of compaction would depend on the composition, grain size, density, and moisture content of the soils at the time of construction. As described in the Companies' Plan and Procedures, measures such as restricting vehicular traffic, reducing loads, employing lower ground-pressure equipment, and rescheduling certain activities may be used when soil moisture is high to avoid and minimize compaction and rutting.

### **3.2.3.3 Accidental Releases or Discovery of Contaminants**

Other potential impacts during construction would include the accidental release of petroleum hydrocarbons or other hazardous materials, as well as the discovery of contaminated soils during trench excavation and grading activities. Soil contamination is not prevalent along the proposed pipeline route, but has been known to occur. Following regulatory database reviews, the Companies identified three locations where pre-existing soil contamination have been cited: 1) unauthorized discharges of manure pollutants in stormwater runoff on a farm in Bryan County, Oklahoma (MP C14.3); 2) a leaking petroleum storage tank within 1 mile of the mainline route located in Cass County, Texas (MP 166.5); and Polychlorinated biphenyl (PCB) contamination in shallow soil at the existing Gulf South Sterlington Compressor Station, adjacent to the site of the proposed new Sterlington Compressor Station (MP 294.8). These pre-existing soil contamination locations have been addressed through the state-appropriate agencies and are not expected to have any impact on the construction or operation of the proposed pipeline.

In order to minimize the impacts of inadvertent releases of fuel or equipment fluids during construction, the Companies would implement the general Spill Prevention, Control, and Countermeasures (SPCC) Plan to prevent and contain, if necessary, accidental spills of any material that may contaminate soils, and to ensure that inadvertent spills of fuels, lubricants, or solvents are contained and cleaned up in an appropriate manner. This SPCC Plan has been prepared by the Companies in compliance with Title 40 CFR, Part 112, which describes the management of hazardous materials, such as fuels, lubricants, and coolants, that would be used during construction.

If contaminated soils were encountered during construction, the Companies would implement procedures to identify and properly manage the contamination. The Companies have prepared their Plan for the Unanticipated Discovery of Contaminated Environmental Media, which identifies the procedures that would be implemented during construction to identify, test, treat, and dispose of such materials in accordance with the appropriate state and federal regulations.

#### **3.2.3.4 Introduction of Rocks to Surface Soil**

The Companies indicated that based on review of soil survey reports of each county and parish that the proposed pipeline would cross approximately 2.2 miles containing bedrock within 5 feet of the ground surface. Bedrock could also be encountered between 5 and 7 feet, the latter being the approximate depth of the trench for the proposed pipeline.

Trenching and mixing of excavated materials in areas where shallow bedrock is encountered could bring large rocks to the surface, which would adversely impact soil productivity and agricultural practices. In accordance with their Plan, the Companies would remove excess rock from at least the top 12 inches of soil in all cultivated cropland, hayfields, permanent pastures, residential areas, and other areas at the landowner's request. Following construction and restoration, the size, density, and distribution of rock in all construction work areas would be similar to that in adjacent areas not affected by construction. Thus, no significant impacts are anticipated as a result of pipeline construction through areas of shallow bedrock.

#### **3.2.3.5 Drainage Systems and Drainage Patterns**

Heavy equipment traffic and trenching along the construction right-of-way could damage existing drainage systems or affect existing drainage patterns, thereby affecting farm management by causing wet, unworkable soil conditions. Future crop production would likely be lowered if such damage were not corrected.

The Companies indicated that they are currently acquiring information about locations of drainage systems that would be crossed by the proposed Project and would continue to work with property owners to identify locations of existing drainage structures that could be damaged during construction. If active drainage tiles, culverts, or other drainage facilities were damaged during construction, the Companies would replace or repair them to a condition that is equal to or better than their preconstruction condition. Additionally, the Companies would be responsible for ensuring that all areas affected by construction activities were finish-graded and restored as closely as possible to preconstruction contours. Although damage to drainage structures and patterns would result in short-term impacts, the corrective procedures to be implemented by the Companies would avoid or minimize any long-term impacts.

### **3.2.4 Prime Farmland**

The NRCS defines prime farmland as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses” (NRCS 2007c). Soils classified as prime farmland have few or no rocks, a dependable water supply, a favorable growing season, are not saturated for long periods of time, typically do not flood during the growing season, and are permeable to air and water. Prime farmland is an important resource because it provides the highest crop yield per unit of energy expended. The NRCS determines the prime farmland status of all soil map units that have been surveyed, and therefore this information is available directly from the soil survey databases.

Approximately 49.0 percent (183.3 miles) of the land that would be encompassed by the proposed mainline and Mississippi Loop construction right-of-way contains soils classified as prime farmland. As described above, the Companies would implement the measures included in their Plan to minimize and mitigate any impacts to prime farmland soils. All impacts to prime farmland soils resulting from construction and operation of the proposed pipeline would be temporary because the proposed pipeline would be buried, and disturbed areas within the construction and permanent rights-of-way would largely revert to their preconstruction uses following restoration.

Prime farmlands located in the permanent footprint of aboveground facility structures would include 9.8 acres of prime farmland at the Sherman Compressor Station, 0.8 acre of prime farmland at the Paris Compressor Station, 6.8 acres of prime farmland at the Mira Compressor Station, 10.0 acres of prime farmland at the Sterlington Compressor Station, and 4.3 acres of prime farmland at the CGT M/R station. These areas of prime farmland would be lost when these areas are converted to an industrial/commercial land use. The permanent right-of-way for the CGT M/R interconnecting pipeline would also be on prime farmlands; however, the pipeline right-of-way would not preclude the use of the land for agriculture during operations.

Farmland Conversion Impact Rating documentation would not be required for the proposed Project since it would not be completed by or with assistance from a federal agency, as specified by the Farmland Protection Policy Act.

### **3.2.5 Conclusion Regarding Impacts to Soil Resources**

We believe no significant impacts would result due to the construction of the proposed Project for the following reasons: the right-of-way and extra work space areas would be returned as closely to preconstruction contours as feasibly possible; Erosion would be controlled by implementing the procedures in the Companies’ Plan; soils would be segregated and de-compacted; drainage systems would be repaired if damage is incurred during construction; and soil nutrients, lime and seeding would be distributed in disturbed areas. These efforts would minimize and mitigate any significant impacts to soil resource areas.

## **3.3 WATER RESOURCES**

### **3.3.1 Groundwater**

#### **3.3.1.1 Existing Groundwater Resources**

Along the proposed Gulf Crossing route, groundwater is a significant source of drinking water in selected areas and is used for agricultural irrigation and in industry. Although depth to groundwater is

variable along the proposed pipeline route, groundwater is often found at or near the ground surface, and the proposed Project is likely to encounter groundwater during construction activities.

Major aquifers underlying the proposed Project include Antlers, Alluvium and Terrace Deposits, Trinity Group, Woodbine Group, Nacatoch and Blossom Sands, Cypress, Wilcox, Carrizo Sand, Cane River, Sparta Sand, Cockfield, Terrace Deposits, Cook Mountain, Pleistocene Alluvium, Mississippi River Alluvial, Southern Hills, and the Coastal Lowlands. These aquifers consist of either unconsolidated depositional deposits or of lithified bedrock geologic units, whose varying properties are attributed to major geologic processes. Additional information on the aquifers that occur along the proposed Project route, as well as sole-source aquifers, wellhead protection areas, wells, springs, and contaminated groundwater is presented below.

### **Antlers Aquifer**

The portion of the proposed Project route traversing Bryan County in Oklahoma is underlain by the Antlers Aquifer. Well yields from large-capacity wells tapped to this aquifer typically yield 100-500 gallons per minute (gpm), with some exceptional wells achieving up to 1,700 gpm. The maximum depths to groundwater vary to over 200 feet. This is the major aquifer in Oklahoma, and approximately 4,600 acre-feet of water per annum are withdrawn for public supply, irrigation, and industrial uses (Osborn and Hardy 1999).

### **Alluvium and Terrace Deposits Aquifers**

The portion of the proposed Project route traversing Bryan County in Oklahoma is also underlain by alluvium and terrace deposits aquifers. These occur along the major rivers in Bryan County, Oklahoma, including the Red River, and extend 1-15 miles from the river banks. Well yields range from 10-500 gpm, with some local wells achieving over 1,000 gpm. The maximum depths to groundwater range from the 0 to 200 feet. These aquifers are major sources of water for irrigation and supplying stock wells, public water and local domestic wells, and industrial supply (Osborn and Hardy 1999).

### **Trinity Group Aquifer**

The portion of the proposed Project route traversing Grayson, Fannin, Lamar, Delta, and Hopkins Counties in Texas is underlain by the Trinity Group Aquifer. This aquifer receives inflow from the surrounding formations. In Grayson, Fannin, and Lamar counties, the Trinity Group consists of the Antlers formation, and in Delta and Hopkins counties, the Trinity Group consists of the Hooper and Simsboro formations. The Simsboro formation is closest to the surface, overlaying the Hooper formation. Depths of wells completed in the Trinity Group Aquifer commonly range between 50 and 800 feet, but some well depths exceed 3,000 feet. Wells commonly yield from 50 to 500 gpm, and some yield as much as 2,000 gpm (USGS 2008a).

### **Woodbine Group Aquifer**

The Woodbine Group Aquifer is exposed at the surface in a north-south trending zone across the portion of the proposed Project route traversing Johnson, Tarrant, Denton, Cooke, Grayson Counties, and parts of Fannin and Lamar Counties in Texas. This aquifer is primarily recharged by rainfall, and also by surface-water seepage from lakes and streams. The maximum depth from the top of the aquifer is about 2,000 feet below the land surface. Depths of wells completed in the Woodbine Group Aquifer yield from about 100 gpm to 700 gpm (USGS 2008b).

### **Nacatoch and Blossom Sands Aquifer**

Although minor, the Nacatoch and Blossom Sands Aquifers in northeast Texas are important supplies of domestic and livestock water. Also utilized by several municipalities, these aquifers average well yields of 500 gpm, with maximum depths to groundwater varying from the surface to over 500 feet (USGS 2008b).

The Cretaceous Nacatoch of the Navarro Group is a sandy aquifer that extends in a northerly direction from Limestone County, Texas to Hunt County, Texas, and also along the border of Delta and Hopkins Counties, Texas. The Blossom Sands Aquifer underlies central Fannin County, Texas and extends eastward through Lamar County, Texas.

### **Cypress Aquifer**

The portion of the proposed Project route traversing Franklin, Titus, Morris, and Cass Counties in Texas is underlain by the Cypress Aquifer. The Cypress Aquifer is comprised four hydraulically interconnected formations: the Wilcox Group, and the Carrizo Sand, Reklaw Formation, and Queen City Sand of the Eocene Claiborne Group. This aquifer system is the principal source of fresh groundwater for the aforementioned counties. Well yields are wide-ranging, from less than 50 gpm to over 500 gpm, as are the depths to aquifers, from 100 to over 1,200 feet. Concerning the project, the groundwater above 60 feet in this aquifer contains little or no iron, but is acidic and corrodes the metal pipes, pumps, and casing with which it comes into contact (Broom 1971). Gulf Crossing's cathodic protection maintenance program, in accordance with DOT requirements, would protect the pipeline from the corrosive effects of the Cypress Aquifer.

### **Carrizo-Wilcox Aquifer**

The portion of the proposed Project route traversing the Caddo, Bossier, Webster, Claiborne, Lincoln, Union, and Ouachita Parishes of Louisiana is underlain by the Carrizo-Wilcox Aquifer. Well depths range from 100 to 600 feet, with ranging well yields of less than 30 gpm to 300 gpm (LDEQ 1996). The water from this aquifer is considered to be of good quality, and approximately 14.6 million gallons per day of water are withdrawn for public supply, rural, domestic, and general irrigation uses (LDEQ 2003, Sargent 2002).

### **Cane River Aquifer**

A portion of the proposed Project route traversing Caddo, Bossier, Webster, Claiborne, Lincoln, Union, and Ouachita Parishes of Louisiana is also underlain by the Cane River Aquifer. This aquifer is composed of stratified clay (overlying, and completing the bottom parts) and massive beds of sand in the outcrop area (as lenses in the middle parts of the formation). This aquifer is part of the Middle Claiborne Aquifer. Throughout this aquifer, well yields vary from 100 gpm to 300 gpm, with depths ranging from 200 to 800 feet (USGS2008c).

### **Sparta Sand Aquifer**

The portion of the proposed Project route traversing the Caddo, Bossier, Webster, Claiborne, Lincoln, Union, and Ouachita Parishes of Louisiana, and also Morehouse and Richland Parishes of Louisiana is underlain by the Sparta Sand Aquifer. This aquifer is the most important aquifer in this part of Louisiana and is part of the Middle Claiborne Aquifer. Throughout this aquifer, well yields vary from 100 gpm to 300 gpm, with depths to aquifer ranging from 200 to 800 feet (USGS2008c).

### **Cockfield Aquifer**

A portion of the proposed Project route traversing the Union, Ouachita, Morehouse, and Richland Parishes of Louisiana is underlain by the Cockfield Aquifer. This aquifer is recharged primarily by direct infiltration and in the Mississippi River valley by movement through alluvial and terrace deposits. The maximum depths to groundwater range from 200 feet to 2,150 feet. The quality of the water withdrawn from this aquifer is considered fair, and approximately 7.4 mgd are withdrawn for public water supply use (LDEQ 2003, Sargent 2002).

### **Terrace Deposits Aquifer**

A portion of the proposed Project route traversing Caddo, Bossier, Webster, Claiborne, Lincoln, Union, and Ouachita Parishes of Louisiana is underlain by the Terrace Deposits Aquifer. Wells completed in this aquifer yield from 40 to 400 gpm, with depths to aquifer varying from the surface to 40 to 150 feet (LDEQ 1996).

### **Cook Mountain Aquifer**

A portion of the proposed Project route traversing Morehouse and Richland Parishes of Louisiana is underlain by the Cook Mountain Aquifer. This Aquifer is overlain by Pleistocene age deposits and the Cockfield Formation. Depths to aquifer range from just below the surface to 100 feet below the land surface. Well yields do not exceed 50 gpm (Sandford 1973).

### **Pleistocene Alluvium Aquifer**

A portion of the proposed Project route traversing Morehouse and Richland Parishes of Louisiana is underlain by the Pleistocene Alluvium Aquifer. The depths to this aquifer vary from the surface to less than 100 feet below the surface. There are large quantities of groundwater associated with this aquifer, with well yields reaching 1,500 to 2,000 gpm.

### **Mississippi River Alluvial Aquifer**

The portion of the proposed Project route traversing Madison Parish in Louisiana is underlain by the Mississippi River Alluvial Aquifer. The Mississippi River Alluvial Aquifer is hydraulically related to the Mississippi River and its major tributaries. Groundwater typically is encountered within 30 to 40 feet of the ground surface. The quality of water from this aquifer is considered relatively poor due to the presence of arsenic and poor taste and odor qualities, but approximately 353.6 mgd are withdrawn for irrigation and industrial uses (LDEQ 2003, Sargent 2002).

## **Southern Hills Aquifer**

The portion of the proposed Mississippi Loop traversing through Hinds and Copiah Counties in Mississippi is underlain by the Southern Hills aquifer. The Southern Hills aquifer is the only Sole Source Aquifer (SSA) crossed by the Project, and is discussed further in the Section on SSA.

## **Coastal Lowlands Aquifer**

The portion of the proposed Mississippi Loop traversing through Simpson County in Mississippi is underlain by the Coastal Lowlands Aquifer system. Hydraulically related to the Mississippi, Pearl, and Red Rivers, this aquifer features high-yield wells producing upwards of 4,000 gallons per day from varying depths. This aquifer supplies most sectors: industry, agriculture, commercial, and municipalities (USGS 2008d).

## **Sole-Source Aquifers**

Sole-source or principal-source aquifers are defined by the EPA as those that supply a minimum of 50 percent of the drinking water used in the area overlying the aquifer. The areas served by these aquifers may not have readily available alternate water sources. The Southern Hills Aquifer in Mississippi is the only sole-source aquifer located in the proposed Project area (EPA 2006). This aquifer is part of the larger Coastal Lowlands Aquifer, and is comprised of a collection of smaller aquifers such as the Chicot equivalent, Evangeline equivalent, Jasper equivalent, and Catahoula equivalent. The Southern Hills aquifer extends from north-central Mississippi to coastal areas of Mississippi and Louisiana, and intersects the proposed Project right-of-way between MP L0.0 through MP L11.5 of the proposed Mississippi Loop. The Southern Hills regional aquifer system is the primary source of public and domestic water supplies in 10 parishes of southeastern Louisiana and areas of southwestern Mississippi, serving over 1,000,000 persons.

## **Aquifer Protection Programs**

Texas, Louisiana and Mississippi have state or regional aquifer protection programs in place. The state of Texas has instituted Groundwater Conservation Districts, Louisiana has designated “areas of ground water concern” based upon water quantity levels and the state of Mississippi participates in the Mississippi, Arkansas, and Tennessee Regional Aquifer Study (MATRAS) to develop groundwater rules, regulations, and/or conservation programs for their respective states. The proposed Project would not cross any aquifers protected by either the Texas or Mississippi programs; however, the proposed Project would cross one aquifer in Louisiana, the Sparta aquifer (described above) which has “areas of groundwater concern”.

## **Wellhead Protection Areas**

The Companies consulted with Texas Commission on Environmental Quality (TCEQ) and Texas Water Development Board (TWDB), Oklahoma Department of Environmental Quality (ODEQ), Louisiana Department of Environmental Quality (LDEQ), and MDEQ regarding the location of wellhead protection areas, which are designated to protect the drinking water supplies obtained from municipal or community wells. The ODEQ identified one wellhead protection area, the TCEQ and TWDB did not identify any wellhead protection areas, the LDEQ identified two wellhead protection areas, and the MDEQ identified one wellhead protection area located within the proposed pipeline construction right-of-way. The locations of the wellhead protection areas crossed by the proposed Project are listed in Table 3.3.1-1.

<b>TABLE 3.3.1-1 Drinking Water Wellhead Protection Areas Crossed by the Proposed Gulf Crossing Project</b>			
<b>Identifier</b>	<b>County/Parish</b>	<b>Begin Milepost</b>	<b>End Milepost</b>
<b>Pipeline</b>			
#28808	Bryan County, OK	6.4	6.6
PWS ID # 1027003	Claiborne, LA	235.2	235.7
PWS ID # 1027009	Claiborne, LA	240.6	240.7
<b>Mississippi Loop</b>			
PWS ID # 610040-03	Simpson, MS	L7.6	L8.1

The Companies would comply with state and local regulations and the Companies' SPCC Plan when working in wellhead protection areas to protect against the potential for impaired quality, decreased yield, or other disruptions of service. To protect these areas, the storage of petroleum products, hazardous materials, chemicals, refueling, and lubricating operations would be located more than 150 feet from water supply wells. Additionally, refueling operations in, or within 200 feet of a private well or within 400 feet of a municipal or community water supply would include the following precautions:

- Adequate amounts of absorbent materials and containment booms must be kept on hand by each construction crew to enable the rapid containment and cleanup of any spill which may occur.
- Where fuel must be stored within wetlands or near waterbodies, secondary containment will be provided.
- Secondary containment structures must be lined with suitable plastic sheeting, provide a containment volume of at least 150 percent of the storage vessel, and allow for at least 1foot of freeboard.

To further protect wellhead protection areas during refueling activities, **we recommend that:**

- **Prior to construction, the Companies should revise their SPCC Plan to include:**
  - a. **the restriction of refueling areas to a limited number of designated areas within wellhead protection areas;**
  - b. **the use of signs to mark each designated refueling area within wellhead protection areas; and**
  - c. **the labeling of each designated refueling area within wellhead protection areas by milepost on the construction alignment sheets.**

### **Wells and springs**

The majority of residential properties throughout the areas crossed by the Project obtain their water supplies from private wells. Based on consultation with the TWDB Groundwater Database, Oklahoma Water Resources Board Reported Well Locations of Oklahoma, Louisiana Department of

Transportation and Development Water Well Registry, and Mississippi Office of Land and Water Resource Permit Wells Dataset (taken from the Mississippi Automated Resource Information System), the Companies identified 10 wells located within 150 feet of the proposed construction right-of-way and aboveground facility boundaries. The identified wells included one industrial well, three irrigation wells, three domestic water supply wells, one public municipal water supply well, one rig supply well, and one monitoring well. These wells and their locations relative to the proposed Project are listed in Table 3.3.1-2.

**TABLE 3.3.1-2  
Wells Located within 150 Feet of the Proposed Gulf Crossing Project<sup>a</sup>**

Well Type	County/Parish	Approximate Milepost	Approximate Water Level (feet)	Approximate Distance from Centerline (feet)
Domestic	Morris, TX	126.3	N/A	82.0
Public Supply – Municipal	Claiborne, LA	235.5	70.0	109.0
Rig Supply	Claiborne, LA	243.8	210.0	137.0
Domestic	Ouachita, LA	292.5	162.0	90.0
Industrial	Ouachita, LA	294.8	0.0	82.0
Irrigation	Madison, LA	336.1	20.0	137.0
Domestic	Madison, LA	AY339.2	15.2	76.0
Irrigation	Madison, LA	348.6	18.0	60.0
Irrigation	Madison, LA	348.6	18.0	100.0
Monitoring Well	Madison, LA	351.9	22.0	55.0

NOTES:  
N/A – Not Available

<sup>a</sup> Actual well locations may vary due to the level of accuracy associated with well coordinate data. The Companies would confirm the actual location of the wells prior to construction.

Because the locations of wells listed in the agencies’ databases are not exact, the Companies would confirm actual well locations in the field prior to construction. For most of the Project area, public water supply information is not available primarily due to national security concerns with water supplies. Based on agency consultations and field surveys, no springs have been identified within 150 feet of the proposed construction right-of-way and aboveground facility boundaries. In addition, the Companies would also perform well monitoring to determine well yield and water quality.

**Contaminated Groundwater**

Based on agency consultations and a review of agency databases, the Companies have identified three sites with potential contaminated groundwater within a 1-mile radius of the proposed Project area and facilities. These sites are identified and described in Table 3.3.1-3. In addition to these three sites, several additional sites were identified as Resource Conservation and Recovery Act (RCRA) Large Quantity Generators (LQG) and Small Quantity Generators (SQG), the Facility Index System/Facility Registry System (FINDS), and as having underground storage tanks (UST), of which some are currently being monitored or for which remedial actions have reportedly been conducted or are sites that have been subject to previous regulatory action.

**TABLE 3.3.1-3  
Potentially Contaminated Groundwater Sites Located within 1.0 Mile  
of the Proposed Gulf Crossing Project Centerline**

<b>Milepost</b>	<b>County/Parish</b>	<b>Source and Type of Contamination</b>	<b>Distance/ Direction</b>
C14.3	Bryan County, OK	NPDES: Potential high nitrate levels in groundwater. Remediated with a Supplemental Environmental Project in 2003	Farm south of centerline
66.5	Cass County, TX	Underground leaking petroleum storage tank. Final Concurrence (closed October 1990)	Less than 1.0 mile south of the centerline
294.8	Ouachita, LA	PCB Contamination in Shallow Soil, (contaminated soil removed, "no further action" notification by LDEQ pending)	Adjacent to proposed new Sterlington Compressor Station

### 3.3.1.2 General Impacts and Mitigation

In general, the potential for temporary and permanent impacts to groundwater resulting from construction and operation of the proposed Project depends upon whether the proposed Project facilities would cause localized changes to existing groundwater flow paths. Most aquifers underlying the proposed Project area would not be impacted due to their depth and the generally shallow nature of trenching and disturbance. The proposed Project generally would not affect changes in the overall quantity of groundwater, which is determined by the quantity of recharge to the aquifer, except to the extent that clearing of vegetation reduces evapotranspiration (movement of water from soil to air through vegetation) and pipeline trenching increases the potential for infiltration of rainfall in specific locations. In porous soils, an open trench could provide a more direct pathway for infiltration compared to undisturbed land. Increased infiltration and reduced evapotranspiration could result in increased recharge to groundwater, thus increasing groundwater storage. However, given the localized nature of the pipeline trench relative to the surrounding area, such increased recharge would likely not be significant and may even be offset given the increased potential for runoff from cleared areas. Soil compaction could also increase runoff and affect groundwater recharge.

Backfill placed within the pipeline trench would typically be somewhat more permeable than the surrounding soil and rock units; consequently, the trench could act as a preferential pathway for groundwater flow in areas where it intersects the water table. Thus, the pipeline trench would potentially alter the existing groundwater flow patterns within shallow saturated zones. However, this alteration would not be significant overall.

Permanent impacts to groundwater recharge could also occur from development of impervious surfaces and structures at the proposed aboveground facility sites. However, these impacts would likely be minor considering the relatively small area of the aboveground facility structures relative to the total potential recharge area.

Excavation of the pipeline trench could also alter the quantity and quality of groundwater that flows to specific points of discharge, such as a well or spring, by altering groundwater flow paths. Altered groundwater flow paths, in turn, could result in changes to the quality of groundwater at specific locations. Temporary impacts to groundwater flow paths would most likely be in the shallow aquifers, such as the Coastal Lowlands Aquifer and Mississippi River Alluvial aquifers, but would not likely be permanent after construction and restoration. Because wells are typically screened considerably deeper (at least 60 feet, with many being much deeper) than the shallow underground intrusion by the project

(generally less than 10 feet), impacts to wells resulting from the proposed construction activity would be unlikely.

Dewatering of the pipeline trench during construction would be necessary where shallow groundwater is encountered. Dewatering would temporarily depress groundwater levels in the immediate vicinity of the trench. However, because trenching typically proceeds at a relatively rapid rate, the depression of the water table around the trench would be expected to recover rapidly once the trench is backfilled. Therefore, dewatering would temporarily affect flow patterns in nearby springs and shallow wells if present, but such impacts would likely be minor and of a brief duration.

Accidental spills and leaks of hazardous materials could impact groundwater resources through introduction of contaminants, especially in highly permeable areas near wells. The Companies have agreed to adopt the spill prevention and control measures included in their Procedures. Additionally, the Companies have developed a Project-specific SPCC Plan, which describes management of the hazardous materials, such as fuels, lubricants, and coolants, that would be used during construction. Given the implementation of the measures in their Procedures and SPCC Plan, the risk of accidental spills or other introductions of hazardous materials to groundwater would be effectively minimized.

The Companies indicated that they did not anticipate encountering any contaminated groundwater plumes during construction or operation of the proposed Project. If contaminated groundwater was encountered, construction activities could cause it to be dispersed to other groundwater resources, surface water resources, or adjacent land. In the event that hazardous materials were discovered during construction of the proposed Project, the Companies would stop work, notify the appropriate state and federal agencies, and proceed in accordance with all applicable laws and regulations. Additionally, the Companies would follow the procedures outlined their Plan for the Unanticipated Discovery of Contaminated Environmental Media to ensure that any hazardous materials encountered during construction are properly identified, tested, and disposed of in accordance with the appropriate state and federal regulations. These procedures include:

- testing and, as applicable, mitigation for compacted soils (see Section 3.2 for additional discussion);
- installation trench breakers at specified intervals to reduce the potential for the trench to act as a preferential groundwater flow path. Trench breakers would reduce the ability of the trench to convey groundwater, and no long-term impacts to the water table or groundwater migration patterns would be anticipated as a result of the proposed Project;
- measures to reduce the impacts resulting from trench dewatering including discharging the pumped water to well vegetated areas or properly constructed temporary retention structures that would promote infiltration and minimize or eliminate runoff; and
- installation of trench plugs to prevent parallel flow in the trenches.

Based on the anticipated impacts to groundwater, the Companies stated construction methods, and the implementation of their Plan and Procedures; we believe that construction and operation of the proposed Project would not change regional flow paths, groundwater recharge or discharge conditions, or groundwater quality. These features are largely determined by larger-scale geologic features that form the hydrogeologic setting and aquifers would not be directly affected because their upper margin would be located well below the depth of the pipeline trench. We also believe that construction and operation of the proposed project would not significantly affect groundwater through accidental spills or unanticipated contact with contaminated sites, given adherence to the Procedures and Project-specific SPCC Plan.

### **3.3.1.3 Site-specific Impacts and Mitigation**

The route of the proposed Mississippi Loop would cross the Southern Hills Aquifer, a designated sole-source aquifer, for approximately 11.5 miles between L0.0 to L11.5. However, the relatively deep aquifer system would not be directly affected by trenching and construction activities because its upper margin would be located well below the seven-foot depth of the pipeline trench. One HDD would be utilized within the Southern Hills Aquifer to cross the Pearl River located at MP L11.4. The proposed HDD would avoid or minimize impacts to the waterbody; however, groundwater could be contacted during the drill. Potential impacts to this aquifer or other groundwater sources are expected to be minimal due to the limited area used for pipeline construction and implementation of mitigation protocols in concert with the Companies' Plan and Procedures, SPCC Plan, and HDD Contingency and Inadvertent Release Plan. No other regional or state protected aquifers would be disturbed or affected by the proposed Project given their absence from the proposed Project.

Wellhead protection areas were identified in multiple areas within and along the proposed pipeline route, as identified in Table 3.3.1-1. Construction through these areas must protect against the potential for impaired quality, decreased yield, or other disruptions of service. We previously recommend that the Companies limit refueling activities to specific areas to reduce potential impacts to wellhead protection areas. Section 3.3.1.1 describes the measures to avoid or minimize potential impacts to wellhead protection areas and groundwater resources.

In order to mitigate for potential affects to wells, at the request of the landowner, the Companies would test the wells located within 150 feet of construction of the proposed Project. The scope of the requested pre- or post-construction monitoring would be negotiated on an individual basis with the landowners. Several private wells, including wells used for domestic supply, are located within 150 feet of the proposed route and would be subject to potential impacts. To ensure that these resources are adequately protected, the Companies have prepared a preliminary Well Monitoring and Mitigation Plan. To ensure accuracy of the locations of each of the wells within this specified area with respect to the proposed Project, prior to construction the Companies would re-evaluate those wells listed to confirm whether they are active and within 150 feet of the project construction area.

### **3.3.1.4 Conclusion Regarding Groundwater Resources**

Aquifers typically would not be impacted by the proposed Project given their depth and the relatively shallow nature of construction activity. Impacts to shallow aquifers and groundwater resources would be adequately avoided or minimized through implementation of the Companies' Plan and Procedures, SPCC plan, and our recommendations. Given these measures, we believe that impacts to groundwater resources would not be significant.

## **3.3.2 Surface Water Resources**

### **3.3.2.1 Existing Surface Water Resources**

#### **Waterbody Crossings**

Approximately 896 waterbodies would be crossed by construction and operation of the proposed Project. Specifically, the proposed Project would cross 196 perennial streams, 668 intermittent streams, and 32 lakes and ponds. A table identifying these waterbodies, as well as their widths, locations along the proposed Project route, state waterbody classifications, and proposed crossing methods, is included as Appendix D of this EIS.

As identified in Appendix D, the applicable state has assigned each affected surface waterbody a designated use, which characterizes the best intended uses of that waterbody. Construction and operation of the proposed Project would require the crossing of 243 waterbodies in Texas, including 2 crossings along the Texas/Oklahoma border. In Texas, all waterbodies crossed are designated for contact recreation. In addition to this basic designated use, each waterbody has been assigned additional classification(s). These include: high aquatic life use, intermediate aquatic life use, limited aquatic life use, and public water supply.

Construction and operation of the proposed Project would require the crossing of 74 waterbodies in Oklahoma, including two crossings along the Oklahoma/Texas border. In Oklahoma, all waterbodies crossed are designated for warm water aquatic community, agricultural beneficial use, industrial and municipal process and cooling water, recreation primary body contact beneficial use, and aesthetics beneficial use. In addition to this basic suite of designated uses, several waterbodies have additional classifications. These include: emergency water supply beneficial use, public and private water supply beneficial use, fish and wildlife propagation beneficial use, Class I irrigation for agriculture, hydropower beneficial use, and secondary body contact beneficial use for recreation.

Construction and operation of the proposed Project would require the crossing of 511 waterbodies in Louisiana, all of which have designated uses of primary contact recreation, secondary contact recreation, and fish and wildlife propagation. In addition to this basic suite of designated uses, several waterbodies have additional classifications. These include: drinking water supply, agriculture, and outstanding natural resource waters.

Construction and operation of the proposed Project would require the crossing of 68 waterbodies in Mississippi, all of which have designated uses of fish and wildlife propagation and recreation (primary and secondary contact).

Only one waterbody, an ephemeral stream that would be crossed by the interconnecting pipeline for the CGT M/R station, would be affected by construction of the proposed aboveground facility sites or use of pipe storage and contractor yards. However, 16 additional temporary workspaces (ATWS) would be located within 50 feet of waterbodies as discussed further in Section 3.3.2.3. Construction of the proposed pipeline would require the use of 33 temporary and 12 permanent access roads that would cross waterbodies in Oklahoma, Texas, and Louisiana. Culverts would be installed for all 45 of these access roads (see Section 3.8 for additional discussion of access road requirements). Proposed permanent modifications would involve construction of new gravel roads or improvements to existing gravel roads. Based on review of USGS topographic maps, new and/or improved roads would not affect any waterbodies.

### **Major and Navigable Waters**

The major waterbodies (greater than 100 feet wide) and navigable waterbodies that would be crossed by the proposed Project are listed in Table 3.3.2-1. The proposed Project would cross 22 major waterbodies and 9 navigable waterbodies.

### **Sensitive Waterbodies**

Sensitive waterbodies include those streams designated as one or more of the following: having special status by federal or state resource agencies, providing habitats for threatened and endangered species, having potable water intakes within 3 miles downstream of the proposed pipeline crossing, or not attaining specified water quality uses. No state or locally designated surface water protection areas or

surface water intakes located within 3 miles downstream of the proposed Project waterbody crossings would be affected by the proposed Project.

**TABLE 3.3.2-1  
Major and Navigable Waterbodies that would be Crossed by the  
Proposed Gulf Crossing Project**

<b>Waterbody</b>	<b>Approximate Milepost</b>	<b>County/Parish</b>	<b>Length of Crossing (feet)</b>	<b>Major Waterbody</b>	<b>Navigable Waterbody</b>	<b>Proposed Crossing Method</b>
<b>Pipeline</b>						
Choctaw Creek	4.0	Fannin, TX	125	X		HDD
Red River	4.3	Fannin, TX / Bryan, OK	125	X		HDD
Stock Pond	6.7	Bryan, OK	177	X		Open Cut
Stock Pond	BC28.6	Bryan, OK	126	X		Open Cut
Red River	41.3	Bryan, OK / Fannin, TX	400	X		HDD
Stock Pond	54.7	Lamar, TX	122	X		Open Cut
Stock Pond	61.1	Lamar, TX	190	X		Open Cut
Stock Pond	BJ108.6	Titus, TX	370	X		Open Cut
Red River	188.4	Caddo / Bossier, LA	1,000	X	X	HDD
Bayou D'Arbonne	AQ284.9	Union, LA	150	X	X	HDD
Ouachita River	291.8	Union / Ouachita, LA	700	X	X	HDD
Bayou De Siard	298.1	Ouachita, LA	300	X		HDD
Little Boeuf Bayou	AT305.4	Ouachita / Morehouse, LA	150	X		HDD
Bayou Lafourche	AU317.0	Morehouse / Richland, LA	200	X	X	HDD
Boeuf River	320.2	Richland, LA	300	X	X	HDD
Cypress Creek	AV322.6	Richland, LA	200	X		HDD
Bayou Macon	BX334.1	Richland / Madison, LA	250	X	X	HDD
Crawfish Pond	337.9	Madison, LA	2,658	X		Open Cut
Joe's Bayou	AY338.7	Madison, LA	275	X		HDD
Tensas Bayou	344.5	Madison, LA	100		X	HDD
Tensas Bayou	345.5	Madison, LA	100		X	HDD
Despair Lake (Tributary to Tensas Bayou)	346.9	Madison, LA	250	X		HDD

**TABLE 3.3.2-1 (continued)  
Major and Navigable Waterbodies that would be Crossed by the  
Proposed Gulf Crossing Project**

<b>Waterbody</b>	<b>Approximate Milepost</b>	<b>County/Parish</b>	<b>Length of Crossing (feet)</b>	<b>Major Waterbody</b>	<b>Navigable Waterbody</b>	<b>Proposed Crossing Method</b>
Mothiglam Bayou	349.4	Madison, LA	165	X		HDD
<b>Mississippi Loop</b>						
Pearl River	L11.4	Copiah / Simpson, MS	242	X	X	HDD

In Texas, the Sulphur River (94.0) has been designated as ecologically sensitive water resource with significantly valued priority bottomland hardwood forest habitat and habitat for paddlefish (TPWD 2007/ USFWS 1985). The Red River (crossed twice at the Texas/Oklahoma border, MP 4.3 and 41.3) provides habitat for threatened and endangered species, including the pallid sturgeon (federally endangered), and also supports commercial fishing for various freshwater species. The Companies propose to cross both of these waterbodies using HDD to avoid impacts. Fisheries of special concern are discussed in more detail in Section 3.6.2.1.

Bois D’Arc Creek (MP 47.2) is also designated as an ecologically sensitive water resource with significantly valued priority bottomland hardwood forest habitat (TPWD 2007). Additionally, Bois D’Arc Creek provides valuable hydrologic function relating to water quality and flood attenuation (USFWS 1985). At this specific crossing, the surrounding land is agricultural with no wetlands or bottomland hardwood forests. Furthermore, the Companies propose to cross this waterbody using HDD; therefore, no wetlands or bottomland hardwoods would be impacted at the Bois D’Arc crossing.

Sanders Creek (MP 55.4) is designated in the Texas Administrative Code (TAC Title 31, §57.157) as a mussel sanctuary within the Project limits and would be crossed by bore, thereby avoiding impacts to the mussel resources within the waterbody.

In Oklahoma, the Blue River (MP BB27.6) is listed on the Nationwide Rivers Inventory (NRI). The NRI listing designation has been assigned for those rivers that possess one or more “outstandingly remarkable” natural or cultural values judged to be of more than local or regional significance. By crossing this river using the HDD method, the Companies would avoid direct impacts to the waterbody and adjacent habitat, satisfying the federal mandate to mitigate for actions that would otherwise adversely affect a NRI river (NPS 2006). In a letter dated 25 July 2007, the OWRB recommended BMPs that the Companies have acknowledged and are following with the implementation of their Plan and Procedures.

In Louisiana, there are four designated waterbodies that would be crossed by the proposed Project. The Red River (MP 188.4), as previously discussed, provides habitat for threatened and endangered species as well as supporting commercial fishing. Bayou Dorcheat (MP 217.5) has been designated as a Louisiana Natural and Scenic River, pursuant to the Louisiana Scenic Rivers Act. This Bayou is recognized as having unique and diverse characteristics, and is protected through management by LDWF (LDWF 2006). Bayou D’Arbonne is listed on the NRI, and would be crossed by the Project at three locations (MP 235.3, MP 267.0, and MP AQ284.9). This river is used for boating, fishing, and canoeing (LDWF 2005). The segment of the river that would be crossed at MP AQ284.9 has also been designated as a Louisiana Natural and Scenic River, as a result of it providing diverse habitats and supporting several unique plant and animal species (LDWF 2005). The Ouachita River (MP 291.8) is listed as a fishery of special concern as a result of providing habitat for state listed endangered species and

as a result of supporting commercial fishing (LDWF 2005). The Companies propose to conduct all of these crossings using HDD to avoid impacts except for the crossing of Bayou D'Arbonne at MP 235.3. The crossings occurring at MPs 267.0 and AQ284.9 occur in areas classified as outstanding natural resource waters; whereas, the segment crossing MP 235.3 is not classified as such.

The Pearl River (MP L11.4) in Mississippi is listed on the NRI as being a scenic example of a large Gulf Coast river with adjacent swampland (NPS 2006). The Pearl River has also been designated a critical habitat for the Gulf sturgeon (*Acipenser oxyrinchus desotoi*), along with other endangered, threatened, and special-status species. Information on these other listed species associated with the Pearl River is provided in Section 3.7. The Companies propose to cross the Pearl River using HDD to avoid impacts.

Nineteen waterbodies that would be crossed by the proposed project are listed as impaired waterbodies. The location of these waterbodies and causes of impairment are listed in Table 3.3.2-2. Mitigation would involve HDD crossing methods, which would be utilized for avoidance of direct disturbance of contaminants and their resuspension in the waterbody. In all instances where open-cut methods are to be employed, the impairment is associated solely with water quality. Although minor short-term impacts would occur during the brief construction period, there would not be any resultant increases in the impairments.

Waterbody	County/Parish	Pollutant Cause	Proposed Crossing Method
Red River	Bryan, OK	Total Dissolved Solids Turbidity	HDD
Blue River	Bryan, OK	Turbidity Enterococcus	HDD
Red River	Bryan, OK	Total Dissolved Solids	HDD
White Oak Creek	Titus, TX	Depressed dissolved oxygen	HDD
Black Bayou	Caddo, LA	Dissolved Oxygen	HDD
Red River	Caddo/ Bossier, LA	Color Sulfates	HDD
Cypress Bayou	Bossier, LA	Color Dissolved Oxygen	Open Cut
Bayou Bodcau	Bossier/ Webster, LA	Dissolved Oxygen	HDD
Bayou Dorcheat	Webster, LA	EPA – Dissolved Oxygen Mercury Copper Lead	HDD

**TABLE 3.3.2-2 (continued)**  
**Impaired Waterbodies<sup>a</sup> Crossed by the Proposed Gulf Crossing Project**

<b>Waterbody</b>	<b>County/Parish</b>	<b>Pollutant Cause</b>	<b>Proposed Crossing Method</b>
Bayou D'Arbonne	Claiborne, LA	Sulfates Total Dissolved Solids Total Fecal Coliform	Open Cut
Bayou D'Arbonne	Lincoln and Union, LA	EPA – Dissolved Oxygen Sulfates Total Dissolved Solids	HDD
Ouachita River	Union / Ouachita, LA	Mercury Nitrate/Nitrite Dissolved Oxygen Total Phosphorus	HDD
Bayou De Siard	Ouachita, LA	Mercury Nitrate/Nitrite Dissolved Oxygen Total Phosphorus	HDD
Little Bayou Boeuf	Morehouse / Ouachita, LA	Dioxin	HDD
Bayou Lafourche	Morehouse / Richland, LA	Dioxin Nitrate/Nitrite Dissolved Oxygen Total Phosphorus Total Suspended Solids Turbidity	HDD
Boeuf River	Richland, LA	Carbofuran DDT Dioxin Mercury Nitrate/Nitrite Dissolved Oxygen Sedimentation/ Siltation Total Suspended Solids Turbidity Toxaphene	HDD
Big Creek	Richland, LA	Atrazine Carbofuran DDT Methyl Parathion Nitrate/Nitrite Dissolved Oxygen Total Fecal Coliform Total Suspended Solids Turbidity	HDD

<b>TABLE 3.3.2-2 (continued)</b> <b>Impaired Waterbodies<sup>a</sup> Crossed by the Proposed Gulf Crossing Project</b>			
<b>Waterbody</b>	<b>County/Parish</b>	<b>Pollutant Cause</b>	<b>Proposed Crossing Method</b>
Turkey Creek	Richland, LA	Total Fecal Coliform Chloride	Open Cut
Bayou Macon	Richland / Madison, LA	DDT EPA – Nutrients EPA – Dissolved Oxygen Total Fecal Coliform Total Suspended Sediments Turbidity	HDD
Joe’s Bayou	Madison, LA	Carbofuran DDT Nitrate/Nitrite Dissolved Oxygen Total Phosphorus Total Suspended Solids Turbidity	HDD
Tensas Bayou	Madison, LA	Carbofuran DDT Nitrate/Nitrite Dissolved Oxygen Total Phosphorus Total Suspended Solids Turbidity Toxaphene	HDD
Pearl River	Copiah / Simpson, LA	Nutrients Organic Enrichment/Low dissolved Oxygen Pesticides Sediment/Siltation	HDD
NOTE:			
<sup>a</sup> List of impaired waterbodies is based on the 2004 EPA-approved 303(d) lists for Texas, Oklahoma, Louisiana, and Mississippi.			

### 3.3.2.2 General Impacts and Mitigation

Waterbody crossings, as identified in Appendix D, would be accomplished using open-cut, HDD, bore, or flume methods, as described below and in Section 2.3.2. As proposed, approximately 93 percent of all waterbody crossings would be accomplished using open-cut methods. The Companies may elect to use the dam-and-pump method at select waterbodies proposed for open cut depending on the amount of flow and site-specific conditions at the time of construction or as agreed to in discussions with state agencies. The Companies propose to utilize HDD for 16 of the 22 major waterbody crossings. The major waterbodies that would be crossed using open-cut methods include: stock ponds (MP 6.7, MP BC28.6, MP 54.7, MP 61.1, and MP BJ108.6) and the Crawfish Pond located at MP 337.9.

Cypress Creek located at MP 273.3 is associated with two forested wetlands (Table 3.4.1-2). To minimize impacts to these wetlands, we also recommend in Section 3.4.2.1 that Gulf Crossing evaluate alternative construction approaches for Cypress Creek and the two wetlands associated with it.

The Companies propose to cross all of the navigable waterbodies via HDD (see Table 3.3.2-1). The Companies have developed Procedures which are designed to minimize impacts associated with waterbody crossings. These measures include, but are not limited to:

- requirement to obtain all necessary permits from the COE and state agencies prior to construction, and notify applicable state agencies at least 48 hours before commencing with instream trenching;
- use of EIs during construction;
- route the proposed pipeline as close to perpendicular to the axis of the waterbody as practicable and minimize the number of individual crossings where waterbodies meander or have multiple channels;
- limit the use of equipment within the waterbody to that necessary to construct the crossing, and utilize equipment bridges for passage of other construction equipment;
- placement of spoil at least 10 feet away from the water's edge, with installation of sediment barriers to prevent the flow of spoil or silt-laden water to the waterbody;
- completion of all instream construction activity, including stabilization and re-contouring of banks, within 24 hours for minor waterbody crossings (less than 10 feet wide) and 48 hours for intermediate waterbody crossings (10 to 100 feet wide);
- use of temporary erosion and sediment control measures such as sediment barriers and trench plugs; and
- restoration activities, including restoration of preconstruction bank contours, installation of slope breakers, and revegetation of disturbed riparian areas.

The Companies indicated that construction of the proposed project would occur during the period of May 2008 through October 2008, pending the Commission's approval of the Project. The proposed schedule for construction is partially outside the standard period for construction in waterbodies containing warmwater fisheries (i.e., June 1 through November 30) as indicated in the FERC Procedures. The FERC Procedures require written approval by the appropriate state agencies before construction can occur in waterbodies outside the specified window. Written approval has been received by the Companies from each applicable agency (MDWFP, TPWD, ODWC, and LDWF). In addition Gulf Crossing has agreed not to construct in waterbodies in Oklahoma between March 1 and May 31 to avoid impacts to breeding fish populations.

General impacts to waterbodies, including sensitive waterbodies, potentially resulting from pipeline construction, accidental spills, and construction of aboveground facilities are discussed in more detail below.

### **Pipeline Construction**

Construction of the proposed pipeline through waterbodies using open-cut methods would result in several temporary affects to water quality and instream habitat (see Section 3.6). The clearing and grading of stream banks, instream trenching, trench dewatering, and backfilling of the instream trench would affect water quality and instream habitat by increasing turbidity, sedimentation, water temperature,

modifying aquatic habitat and decreasing dissolved oxygen (DO) levels. The use of heavy equipment or other vehicles in and near surface waterbodies, without proper containment, could also introduce chemical contaminants, such as fuels and lubricants, into surface waters or may result in accidental spills during construction.

The extent of the potential impacts resulting from increased sedimentation and turbidity would depend on the amount of material disturbed, the sediment grain size, stream velocity, and channel stability. These factors would determine the amount of suspended sediment and the downstream distance that the suspended sediment is transported. In general, where the streambed consists of fine materials such as sand and silt, as is likely along the proposed Project route, the increase in turbidity and suspended sediments would be relatively greater when compared to locations where the streambed consists of coarser materials such as gravel and cobble. However, stream gradients tend to be relatively low in the area of the proposed Project; thus, suspended sediments within these streams typically would only be transported over short distances. TPWD informed Gulf Crossing that any streams with a crossing width of 30 feet or greater would require a permit for the disturbance of streambed materials. TPWD indicated that Lewis Creek (MP Q104.0) in Franklin County would require a permit based on its 30-foot width. However, Gulf Crossing has since changed the alignment in that location so that Lewis Creek would be crossed at a narrower location which would not require a permit.

Increased turbidity can reduce light penetration into the water and thereby reduce photosynthetic activity and levels of DO in the water column. Organic materials suspended in the water can further reduce DO by increasing the biochemical oxygen demand (BOD). Resuspension of sediments also can introduce contaminants, metals, and nutrients bound to the sediments into the water column. However, locations where contaminated sediments may exist along the pipeline route have been documented and have consequently been proposed to be crossed utilizing HDD; therefore, adverse impacts resulting from resuspension of contaminants would be avoided. If contaminated sediments were encountered during construction, the Companies would implement procedures in their Plan for the Unanticipated Discovery of Contaminated Environmental Media to identify and properly manage the contamination. An EI would be on site during construction to monitor for potential contamination. Indicators of contamination could include, but are not limited to, discoloration of subsoil, sheen and/or odor. If these indicators were present, the EI would stop work in the relevant spread of the project area, and employ the measures as stated in the Plan for the Unanticipated Discovery of Contaminated Environmental Media.

Removal of vegetation from riparian areas would cause an increase in surface runoff and erosion from the pipeline corridor. However, the use of temporary and permanent sediment controls (e.g., silt fence and slope breakers) would minimize this impact by directing surface runoff to well vegetated areas along the sides of the construction right-of-way. Removal of riparian vegetation and the loss of associated shading at waterbody crossings would result in elevated water temperatures, but potential impacts would not be expected to be significant because of the limited amount of stream bank canopy that would be cleared. Following construction, trees and shrubs also would be allowed to reestablish themselves, except for a 10-foot-wide corridor centered over the pipeline.

The Companies would follow the measures specified in their Procedures regarding spill prevention, containment, and minimization near waterbodies. These measures include overall structuring of operations to reduce the risk of accidental spills, proper training of employees, regular inspection of all equipment, preparation to contain and recover spilled materials, and storage of hazardous materials and refueling of equipment at least 100 feet from any waterbody or in an upland area at least 100 feet from any wetland.

## Aboveground Facilities

Construction of the proposed aboveground facilities would directly affect only one ephemeral stream, which would be crossed by the interconnecting pipeline for the CGT M/R station. Impacts on this waterbody would be minimized by the implementation of the measures specified in the Companies' Procedures. To minimize indirect impacts to waterbodies, the Companies would implement the erosion control measures described in their Plan. These measures include using erosion controls (e.g., slope breakers, silt fencing, and mulch during construction to control runoff, reducing the time of soil disturbance, and reestablishing contours and vegetative cover as soon as practicable as described in Section 3.2.3.

## Conclusion Regarding General Impacts to Surface Water

The proposed Project would impact surface waters along the pipeline route through increased sedimentation and turbidity caused by instream trenching, bank disturbance, and runoff from cleared areas. However, these impacts would be minimized and mitigated through implementation of the Companies' Procedures which include measures for sediment and erosion control and require rapid crossings of minor and intermediate streams. Most major waterbodies would be crossed via HDD, thereby avoiding impacts with successful completion of the procedure. Frac-out or other problems associated with an unsuccessful HDD would be addressed by the Companies' HDD Contingency Plan.

The potential for impacts to water quality resulting from accidental spills would be minimized by implementation of the Companies' SPCC Plan and Procedures. Given the measures described above to avoid or minimize impacts, we believe that that generalized impacts to surface water would not be significant.

### 3.3.2.3 Alternative Measures to FERC's Procedures

Based on field surveys and engineering evaluations, the Companies have identified certain locations where it would be necessary for ATWSs to be located within 50 feet of a waterbody. The companies propose alternative measures for 16 locations to those described in Section V.B.2.a of our Procedures, which relates to the location of extra workspaces adjacent to waterbodies. Section V.B.2.a states that all extra work areas, such as staging areas and additional spoil storage areas, should be located at least 50 feet away from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. The location and basis for each requested variation from Section V.B.2.a of the FERC's Procedures are identified in Table 3.3.2-3.

<b>TABLE 3.3.2-3 Summary of Alternative Measures to Section V.B.2.a of FERC's Procedures for the Proposed Gulf Crossing Project</b>		
<b>Affected Waterbody</b>	<b>Milepost</b>	<b>Basis for Alternative Measures</b>
WB-OK-8-D Stock Pond	6.7	ATWS would be needed within 50 feet of stock pond for adjacent crossing of Grassy Lake Road.
WB-TX-104-A Lewis Creek (IT)	Q104.0	ATWS would be needed within 50 ft for this waterbody crossing due to multiple bends in pipe.
WB-TX-119-A Unnamed Tributary to Stinking Creek (IT)	119.3	ATWS would be needed within 50 ft of waterbody due to bends in pipeline and for crossing of CR3355.
WB-TX-124-A Horse Creek (IT)	U123.6	ATWS would be needed within 50 ft of waterbody for the crossings of CR3145, CR3140, and the waterbody.

<b>TABLE 3.3.2-3 (continued)</b> <b>Summary of Alternative Measures to Section V.B.2.a of FERC's Procedures</b> <b>for the Proposed Gulf Crossing Project</b>		
<b>Affected Waterbody</b>	<b>Milepost</b>	<b>Basis for Alternative Measures</b>
WB-TX-134-F Pond	BL134.4	ATWS would be needed within 50 ft of pond for the Southern Pacific railroad crossing.
WB-LA-183-A Unnamed Tributary to Flag Branch Bayou (IT)	182.6	ATWS would be needed within 50 ft of a waterbody for the pullback section associated with the I-49 HDD crossing.
WB-LA-183-C Unnamed Tributary to Flag Branch Bayou (PN)	AA183.5	ATWS would be needed within 50 ft of a waterbody for the HDD entry associated with the I-49 HDD crossing.
WB-LA-195-RC Unnamed Tributary to Lake Dogwood (IT)	194.6	ATWS would be needed within 50 ft of a waterbody for adjacent crossing of Ford Road.
WB-LA-198-RC Unnamed Tributary to Cypress Bayou (IT)	197.3	ATWS would be needed within 50 ft of a waterbody for the SH 157 crossing.
WB-LA-236-A Unnamed Tributary to Bayou D'Arbonne (IT)	235.6	ATWS needed within 50 ft of waterbody for crossing of SH 79 and SH 520.
WB-LA-277-C Unnamed Tributary to Bayou D'Arbonne Lake (IT)	277.9	ATWS would be needed within 50 ft of waterbody for adjacent crossing of Allen Mann Road.
WB-LA-285-RD Unnamed Stream (IT)	AQ285.4	ATWS needed as false right-of-way for the pullback section of D'Arbonne Bayou HDD. If streams are flowing at time of construction, they will be spanned with mat bridges and, if necessary, work will take place from those bridges.
WB-LA-285-RF Unnamed Stream (IT)	AQ285.5	
Adjacent Pond	287.7	ATWS would be needed within 50 ft of pond for construction of pipeline crossover.
Waterbody (IT)	289.5	ATWS would be needed within 50 ft of a waterbody for HDD pullback section associated with Blasingame Tributary HDD.
WB-LA-307-B Unnamed Canal to Coulee Ditch (PN)	309.1	ATWS would be needed within 50 ft of canal for HDD entry associated with Galion Bayou/Coulee Ditch HDD crossing.

The Companies' Procedures also require that the Companies file a site-specific construction plan for each extra workspace with a less than 50-foot setback from the water's edge except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. In accordance with their Procedures, the Companies would be required to file these site-specific construction plans prior to the start of construction.

#### **3.3.2.4 Site-Specific Impacts and Mitigation**

##### **Sensitive Waterbodies**

The Companies propose to use HDD in 19 of the 22 crossings of impaired waterbodies, as identified in Table 3.3.2-2. Use of the HDD method to cross these waterbodies would significantly

minimize potential impacts to these resources; however, should the HDD fail or a frac-out occur, the Companies would implement their HDD Contingency Plan as discussed below. The impaired waterbodies that would be crossed utilizing the open-cut method are Cypress Bayou, Bayou D'Arbonne (MP 235.3), and Turkey Creek. The impairments to these waterbodies crossed utilizing the open-cut method are all water-quality related. The impaired waterbodies that would be crossed utilizing the HDD methods are Red River, Blue River, White Oak Creek, Black Bayou, Bayou Bodcau, Bayou Dorcheat, Bayou D'Arbonne (MP 267.0 and MP AQ289.4), Ouachita River, Bayou De Siard, Little Bayou Boeuf, Bayou Lafourche, Boeuf River, Big Creek, Bayou Macon, Joe's Bayou, Tensas Bayou and Pearl River. Because there are no state or locally designated surface water protection areas or surface water intakes located within 3 miles downstream of the proposed Project waterbody crossings, no impacts to these areas are anticipated.

In their comments to the draft EIS, LDWF expressed concern about the proposed open-cut crossing of Bayou D'Arbonne at MP 235.3. This waterbody crossing is also associated with two forested wetlands (Table 3.4.1-2). Therefore, to minimize impacts to this crossing of Bayou D'Arbonne, we recommend in Section 3.4.2.1 that Gulf Crossing evaluate alternative construction approaches for Bayou D'Arbonne and the wetlands associated with it.

Given the use of HDD to cross most sensitive waterbodies, the Companies' HDD Contingency Plan, and implementation of their Procedures, we believe that impacts sensitive waterbodies would not be significant.

### **Horizontal Directional Drill Crossings**

The Companies propose to use 34 HDDs to install the proposed pipeline underneath 59 waterbodies, including: 19 of the 22 impaired waterbody crossings; 16 of the 22 major waterbodies; nine navigable waterway crossings; two Louisiana Natural and Scenic Rivers, and three NRI listed streams (the Blue River, Bayou D'Arbonne, and the Pearl River) and all waterbodies containing potential habitat for listed threatened or endangered species (Table 2.3.2-1, Table 3.3.2-1, and Table 3.3.2-2). As described in Section 2.3.2, HDD is a trenchless crossing method that may be used to avoid direct impacts to sensitive resources, such as waterbodies, by directionally drilling beneath them. A successful HDD would result in little or no impact to the waterbody being crossed.

The feasibility of each proposed HDD would be evaluated based on site-specific geotechnical data collected at each of the proposed HDD sites. The results of these geotechnical analyses would be provided to the FERC for our review prior to construction. In the event of HDD failure, the Companies could attempt to re-drill the crossing using a different location or profile, change the drilling procedures, or employ alternate crossing methods such as open-cut. We do not believe that the HDD methods are likely to fail; however, should the planned geotechnical analyses indicate that any proposed HDD crossing is not feasible or if HDD methods fail, the Companies would obtain approval from the FERC's Director of OEP before they would begin an alternative crossing method for any waterbody crossing that had been proposed to be achieved using HDD.

A successful HDD would result in little or no impact on the feature being crossed. For this reason, HDD is considered a preferred crossing method for sensitive resources such as waterbodies and wetlands. However, there are certain impacts that could occur as a result of HDD, the potentially most significant of which would be an inadvertent release of drilling mud or frac-out. Such releases typically occur in the vicinity of the HDD entry or exit hole and/or in the vicinity of the associated HDD mud pits/tanks. Frac-out based release of drill mud could occur along the drilling path (potentially reaching the resource that is being avoided by the HDD) if unfavorable ground conditions exist. The Companies have prepared an HDD Contingency Plan to address the possibility of an inadvertent release.

The drilling mud to be used for the Project would be comprised of bentonite clay that is composed of relatively inert materials. The Companies plan to use bentonite clay without any toxic drilling additives. Bentonite physically acts like clay sediment and, without drilling additives, has been determined not to be detrimental to vegetation, fish, or wildlife in small quantities.

### Hydrostatic Testing

The Companies would withdraw water from streams or obtain it from municipal sources as described in Table 3.3.2-4. Withdrawal of large amounts of water for hydrostatic testing of pipeline segments could result in several affects to waterbodies. Specifically, water supply, recreation, and aquatic habitat could be affected by hydrostatic test water withdrawals that could reduce the quantity of water in the subject streams. Other potential impacts could include the increased entrainment of aquatic organisms.

<b>TABLE 3.3.2-4 Proposed Hydrostatic Test Water Source and Discharge Locations</b>				
<b>Project Component/Facility</b>	<b>Water Source</b>	<b>Withdrawal Location (MP)</b>	<b>Approximate Volume (gallons)</b>	<b>Discharge Location (MP)</b>
<b>PIPELINE</b>				
Construction Spread 1	Red River	4.3	12,064,386	4.3
	Red River	41.1	12,064,386	41.1
Construction Spread 2	Sulphur River	94.0	18,695,048	94.0
Construction Spread 3	Black Bayou	175.5	24,356,760	175.5
Construction Spread 4	Red River	188.4	17,289,120	188.4
Construction Spread 5	Bayou D'Arbonne	284.9	17,441,112	284.9
Construction Spread 6	Ouachita River	291.5	14,743,250	291.5
	Joes Bayou	338.5	14,743,250	338.5
<b>HDDs</b>				
Choctaw Creek & Red River	Red River	4.3	189,990	4.3
Blue River	Blue River	27.6	151,992	27.6
Red River	Red River	41.1	265,986	41.1
Bois D'Arc Creek	Bois D'Arc Creek	47.2	189,990	47.2
Sulphur River	Sulphur River	94.0	151,992	94.0
White Oak Creek	White Oak Creek	107.0	151,992	107.0
Black Bayou 1	Black Bayou	175.5	227,988	175.5
I-49	Trucked-in	N/A	151,992	188.4
Red River	Red River	188.4	151,992	188.4
Bayou Bodcau Reservoir	Bayou Bodcau Reservoir	210.1	189,990	210.1
Dorcheat Bayou	Bayou Dorcheat	217.5	151,992	217.5
Black Bayou 2	Black Bayou	219.8	189,990	219.8
HWY 167	Trucked-in	N/A	151,992	262.1
Lake D'Arbonne Tributary	Bayou D'Arbonne	267.0	265,986	267.0
Francis Creek Break	Francis Creek Break	282.6	151,992	282.6
Bayou D'Arbonne	Bayou D'Arbonne	284.9	189,990	284.9
Blasingame Tributary 1	Blasingame Tributary 1	289.9	151,992	289.9

**TABLE 3.3.2-4 (continued)**  
**Proposed Hydrostatic Test Water Source and Discharge Locations**

<b>Project Component/Facility</b>	<b>Water Source</b>	<b>Withdrawal Location (MP)</b>	<b>Approximate Volume (gallons)</b>	<b>Discharge Location (MP)</b>
Blasingame Tributary 2	Blasingame Tributary 2	290.6	151,992	290.6
Ouachita River	Ouachita River	291.5	113,994	291.5
Bayou De Siard	Bayou De Siard	298.1	227,988	298.1
Little Boeuf Bayou	Little Boeuf Bayou	305.7	227,988	305.7
Coulee Ditch & Galion Bayou	Coulee Ditch	309.4	151,992	309.4
Bayou Lafourche/Mott Rd	Bayou Lafourche	313.1	151,992	313.1
Little Lake	Little Lake	316.3	113,994	316.3
Bayou Lafourche	Bayou Lafourche	316.9	151,992	316.9
Boeuf River	Boeuf River	320.2	151,992	320.2
Cypress Creek	Boggy Bayou & Cypress Creek	322.5	151,992	322.5
Big Colewa Creek	Big Colewa Creek	327.6	151,992	327.6
Macon Bayou	Macon Bayou	334.0	151,992	334.0
Joes Bayou	Joes Bayou	338.5	189,990	338.5
Tensas Bayou 1	Tensas Bayou	341.6	151,992	341.6
Tensas Bayou 2	Tensas Bayou	344.5	151,992	344.5
Tensas Bayou 3 and I-20	Tensas Bayou	345.5	189,990	345.5
Lake Despair	Lake Despair	347.0	113,994	347.0
Mothiglam Bayou	Mothiglam Bayou	349.4	151,992	349.4
<b>Aboveground Facilities</b>				
Sherman Compressor Station	Trucked-in	N/A	33,500	0.0
Sherman Launcher Site	Trucked-in	N/A	6,000	0.0
Enogex M/R Station Launcher/Receiver Site	Trucked-in	N/A	6,000	32.8
Paris Compressor Station	Trucked-in	N/A	33,500	71.4
Paris Launcher/Receiver Site	Trucked-in	N/A	6,000	71.4
Mira Compressor Station	Trucked-in	N/A	33,500	182.7
Mira Launcher/Receiver Site	Trucked-in	N/A	6,000	182.7
Sterlington Compressor Station	Trucked-in	N/A	33,500	294.8
Sterlington Launcher/Receiver Site	Trucked-in	N/A	6,000	294.8
Tallulah Receiver Site	Trucked-in	N/A	6,000	353.2
<b>MISSISSIPPI LOOP</b>				
<b>Pipeline</b>				
Pipeline Mississippi Loop	Pearl River	L11.4	6,763,656	L11.4
<b>HDDs</b>				
I-55	Trucked-in	N/A	113,994	L11.4
Pearl River	Pearl River	L11.4	189,990	L11.4

<b>TABLE 3.3.2-4 (continued)</b>				
<b>Proposed Hydrostatic Test Water Source and Discharge Locations</b>				
<b>Project Component/Facility</b>	<b>Water Source</b>	<b>Withdrawal Location (MP)</b>	<b>Approximate Volume (gallons)</b>	<b>Discharge Location (MP)</b>
<b>Aboveground Facilities</b>				
Harrisville Compressor Station (additional compression only)	Trucked-in	N/A	10,000	L17.8
Launcher Site at MP L0.0	Trucked-in	N/A	6,000	L0.0
Receiver Site at MP L17.8	Trucked-in	N/A	6,000	L17.8
NOTE:				
N/A = Not Applicable				

Discharge of hydrostatic test water would contribute to a change in water quality of receiving waters if the source water quality is different than the receiving water, especially during low flow or drought conditions when there is less water available in the receiving stream for dilution.

The Companies would avoid or adequately minimize potential impacts to waterbodies resulting from hydrostatic testing by implementing their Procedures, which include, but are not limited to, the following measures:

- obtain and comply with all applicable water withdrawal permits, special-status stream permits, and proper notifications prior to construction;
- address the operation and fueling of any pumps located within 100 feet of waterbodies or wetlands in the proposed Project-specific SPCC Plan;
- maintain adequate flow rates in all source waterbodies to protect aquatic life and to provide for all downstream uses;
- screen all hydrostatic test water withdrawal intakes to prevent entrainment of fish and aquatic organisms; and
- regulate the discharge of hydrostatic test waters using energy dissipation devices to prevent erosion, scour, turbidity, or excessive streamflow.

Additionally, the Companies have indicated that biocides, chemical de-watering agents, and other potentially toxic hydrostatic test water additives would not be used during hydrostatic testing. The Companies would obtain appropriate NPDES discharge permits prior to conducting hydrostatic testing; would sample all test water according to the permit to determine its suitability; and would implement treatment measures, if needed, prior to discharge.

Given compliance with the Companies' Procedures, proposed measures, and any additional mitigation measures that may result from continuing agency consultations, we believe that impacts to waterbodies resulting from hydrostatic testing would be adequately minimized.

### 3.3.3 Conclusion Regarding Surface Water Resources

The proposed Project would cross many waterbodies, but potential impacts would be minimized or mitigated through implementation of the Companies' Procedures. Most minor and intermediate streams would be crossed using open-cut methods, but they would typically be crossed in less than 48 hours and restored and stabilized rapidly. Most major or sensitive waterbodies, and most designated Natural and Scenic, NRI, and navigable rivers, would be crossed by HDD and impacts would be avoided. In the event of HDD frac-out, the Companies would implement their HDD Contingency Plan. Given these measures as described above and our recommendations, we believe that potential impacts to surface water resources would occur but due to their short duration would not be significant.

## 3.4 WETLANDS

Wetlands are areas that are inundated or saturated with surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (Environmental Laboratory 1987). Wetlands perform a number of valuable functions including flood flow attenuation, peak storm water flow filtration and attenuation, sediment and nutrient retention, groundwater recharge and discharge, wildlife habitat creation, recreational opportunities, and erosion control.

Unavoidable wetland crossings would be subject to review and approval by the Fort Worth, Tulsa, and Vicksburg Districts of the COE. The COE has sole jurisdiction for wetlands permitting, including the provisions of any required wetland compensatory mitigation.

### 3.4.1 Existing Wetland Resources

Field surveys and desktop reviews of available data were completed to determine wetland presence within the proposed Project area. The Companies' field investigators delineated wetland boundaries using *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) methods. The COE is responsible for approving wetland delineations, but field verification of the Companies' wetland delineations have not yet been completed.

Using the Cowardin et al. (1979) wetland classification system, field investigators identified four wetland types within the proposed Project area:

- palustrine forested (PFO);
- palustrine scrub-shrub (PSS);
- palustrine emergent (PEM); and
- palustrine open-water (POW).

The majority of the 164 wetlands that would be affected by the proposed Project are located in Louisiana (approximately 72 percent of the total number), with the remainder occurring in Texas (24 percent), Mississippi (2 percent), and Oklahoma (2 percent). The location, classification, crossing length, and affected acreage for each impacted wetland is listed in Appendix E. A summary of the wetland types affected by the proposed Project is provided in Table 3.4.1-1. Operational impacts on forested and scrub-shrub wetlands would include a permanently maintained 10-foot-wide corridor centered over the proposed pipeline. In addition, the Companies' Procedures would allow for selective thinning of trees exceeding 15 feet in height within a 30-foot-wide corridor (15 feet on either side of the proposed pipeline centerline) in forested wetlands. Aboveground facilities, pipe storage and contractor

yards, and access roads would not affect any wetlands; therefore, these facilities are not considered further in this section.

Wetland Type <sup>a</sup>	Number of Wetlands Crossed	Permanent Operation Impact (acres) <sup>c</sup>		Temporary Construction Impact (acres) <sup>d</sup>	Estimated Crossing Length (feet) <sup>e</sup>
		10-foot-wide Corridor (acres) <sup>b</sup>	30-foot-wide Corridor (acres) <sup>c</sup>		
PEM	43	0.0	0.0	9.0	7,022.2
PFO	85	12.9	39.2	107.3	68,239.2
PSS	35	3.8	3.8	28.0	18,125.9
POW	1	>0.0 <sup>f</sup>	>0.0 <sup>f</sup>	0.0	0.0
Total <sup>d</sup>	164	16.7	43.0	144.3	93,387.3

NOTES:

<sup>a</sup> Wetland Type:  
 PEM = Palustrine emergent  
 PFO = Palustrine forested  
 PSS = Palustrine scrub-shrub  
 POW = Palustrine open-water

<sup>b</sup> Operational impacts for the pipeline facilities were based on a 10-foot-wide, mowed permanent right-of-way.

<sup>c</sup> Operational impacts for the pipeline facilities were based on a 30-foot-wide permanent right-of-way that includes a 10-foot-wide mowed corridor and an additional width of 20 feet where selective removal of trees greater than 15 feet tall is allowed.

<sup>d</sup> Temporary Wetland impact calculations were based on a 75-foot-wide construction right-of-way.

<sup>e</sup> Totals may differ slightly from data presented in Appendix E due to rounding.

<sup>f</sup> Values shown as >0.0 indicate impacts are between 0.0 and 0.1 acre.

### Palustrine Forested Wetlands

PFO wetlands are dominated by woody vegetation that is at least 20 feet tall (Cowardin et al. 1979). These areas often contain extensive bottomland hardwoods. Common tree species in the PFO wetlands observed within the proposed Project right-of-way include willow oak (*Quercus phellos*), water oak (*Quercus nigra*), laurel oak (*Quercus laurifolia*), nuttall oak (*Quercus nuttallii*), swamp chestnut oak (*Quercus michauxii*), American elm (*Ulmus americana*), red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), water tupelo (*Nyssa aquatica*), and bald cypress (*Taxodium distichum*).

### Palustrine Scrub-shrub Wetlands

PSS wetlands include all wetlands dominated by woody vegetation less than 20 feet tall (Cowardin et al. 1979). Common shrub species in the PSS wetlands observed within the proposed Project right-of-way include bulrushes (*Scirpus spp.*), wool-grass (*Scirpus cyperinus*), button bush (*Cephalanthus occidentalis*), wax myrtle (*Myrica cerifera*), groundsel brush (*Baccharis halimifolia*), swamp cyrilla (*Cyrilla racemiflora*), and sweet leaf (*Symplocos tinctoria*) along with saplings of many of the same species found in forested wetlands.

## Palustrine Emergent Wetlands

PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens (Cowardin et al. 1979). Common herbaceous plants in the PEM wetlands traversed by the proposed Project right-of-way include narrow leaf cattail (*Typha angustifolia*), duck potato (*Sagittaria lancifolia*), lizard tail (*Saururus cernuus*), sedges (including the genera *Carex*, *Cyperus*, *Eleocharis*, *Scirpus*, and *Rynchospora*), and rushes (*Eleocharis* spp. and *Juncus* spp). Larger PEM wetlands can include rooted aquatics, including cow lilly (*Nuhar lutea*), fragrant water lily (*Nymphaea odorata*), pickerelweed (*Pontederia cordata*), and water shield (*Brasenia schreberii*).

## Palustrine Open-Water Wetlands

POW wetlands rarely occur along the proposed Project route. These wetlands are often shallow, beaver or manmade ponds, but typically do not contain emergent wetland vegetation.

### 3.4.1.1 Significant and High Quality Wetlands

Wetlands with significant high quality forested communities occur along the proposed route and may comprise a component of relatively higher quality forested wetlands. Bottomland hardwood communities may contain ecologically diverse plant species and provides habitat for a variety of wildlife. These high quality areas occurring along the proposed route are identified in Table 3.4.1-2.

<b>Milepost</b>	<b>Approximate Distance Crossed (feet)</b>	<b>Description</b>	<b>Crossing Method</b>
175.5 to 175.9	2,140	Bald cypress and tupelo swamp	HDD
Z176.6 to Z177.0 <sup>b</sup>	2,225	Bald cypress and tupelo	Open Cut
AA183.5 to AA183.6	350	High quality bottomland forest	Open Cut
210.2 to 210.2	100	Bald cypress and tupelo	HDD
214.2 to 214.2	10	High quality bald cypress/ bottomland forest	Open Cut
214.3 to 214.4	816	Bald cypress and tupelo	Open Cut
217.0 to 217.4	3,077	High quality mature bottomland forest	Open Cut
217.6 to 218.0	727	High quality mature bottomland forest	HDD/Open Cut
235.1 to 235.3 <sup>b</sup>	932	High quality mature bottomland forest	Open Cut
235.4 to 235.5 <sup>b</sup>	617.9	High quality mature bottomland forest	Open Cut
238.3 to 238.9	3,116	High quality mature bottomland forest	Open Cut
266.7 to 267.2	2,403	High quality forested wetland	HDD

<b>TABLE 3.4.1-2 (continued)</b>			
<b>High Quality Forested Wetlands Occurring Along the Proposed Gulf Crossing Project</b>			
<b>Milepost</b>	<b>Approximate Distance Crossed (feet)</b>	<b>Description</b>	<b>Crossing Method</b>
273.1 to 273.2 <sup>b</sup>	167	High quality mature bald cypress swamp / bottomland hardwood forest	Open Cut
273.2 to 273.3 <sup>b</sup>	597	High quality mature bald cypress swamp / bottomland hardwood forest	Open Cut
289.9 to 290.0	691	High quality bald cypress brake	HDD
290.5 to 290.6	434	High quality forested swamp	HDD
295.5 to AR296.2	3,990	High quality bald cypress and tupelo swamp	Open Cut
311.8 to 311.9	582	High quality mature bottomland hardwood forest	Open Cut
314.0 to 314.1	286	High quality mature bottomland hardwood forest	Open Cut
AU317.2 to AU317.2	55	High quality bottomland hardwood forest	Open Cut
AU317.4 to AU317.5	530	High quality bottomland hardwood forest	Open Cut
327.3 <sup>a</sup> to 327.4	0	High quality bald cypress and tupelo swamp	HDD
NOTE:			
<sup>a</sup> ATWS for HDD of Big Colewa Creek			
<sup>b</sup> Alternative construction approaches or route variations are recommended for these wetland crossings.			

### **Wetlands Reserve Program Lands and Prior Converted Wetlands**

The Companies identified lands in the NRCS Wetland Reserve Program (WRP) and the associated Prior Converted Wetlands managed by the NRCS that are proposed to be crossed by the Project. The NRCS administers the WRP, which is a voluntary program that offers landowners the opportunity to protect, restore, and enhance wetlands located on their property (NRCS 2006). The private owner retains title to the lands in the WRP, but the NRCS controls a protective easement over the properties. The program attempts to restore wetland function and wildlife habitat, and to promote long-term conservation through technical and financial assistance. Prior Converted (cropland and farmed wet pasture) wetlands are wetlands converted to agriculture that are targeted for voluntary restoration.

The Companies identified three WRP lands managed by the NRCS that are proposed to be crossed by the Project. Based on available mapping and coordination with the NRCS, the Companies indicated that one WRP land would be crossed by the proposed pipeline route in Fannin County, Texas, and two WRP lands would be crossed in Madison Parish, Louisiana, including a WRP special project

area. The location, size, and characteristics of these WRP lands are identified in Table 3.4.1-3. No Prior Converted Wetlands have been identified along the proposed pipeline route.

Enter Milepost	Exit Milepost	County/Parish	Acreage Impacted <sup>a</sup>	Vegetation Description <sup>b</sup>
46.7	47.8	Fannin, TX	10.0	Open land, small forested wetland areas, perennial creek.
AY340.4 <sup>c</sup>	AY341.1	Madison, LA	3.3	Open land.
349.4 <sup>d</sup>	349.7	Madison, LA	0.0	Open land.
<b>Total Acres</b>			<b>13.3</b>	

NOTES:

<sup>a</sup> Acreage is calculated based on a 75-foot-wide construction right-of-way.

<sup>b</sup> Open land includes former agricultural lands undergoing restoration to forested wetland areas.

<sup>c</sup> FWS special project area. Route variation is proposed to limit impacts.

<sup>d</sup> WRP would be crossed by HDD.

The WRP special project area has been developed between the FWS and the NRCS to restore habitat for the Louisiana black bear in Madison Parish, Louisiana between MP AY340 and MP AY342 (FWS 2007). This WRP special project area is discussed in more detail in Section 3.8.4.

Route variations have been evaluated to avoid or reduce impacts to WRP lands, with the exception of two WRP lands. The WRP land located at MP 349.4 would be crossed using the HDD method, thereby avoiding impacts. A route variation is being evaluated for one WRP located within the Louisiana WRP special project area. Specific WRP land route variations are further discussed in Section 3.8.3 and 4.4.

### 3.4.1.2 Impacts and Mitigation

As shown in Table 3.4.1-1, construction of the proposed Project would affect 164 wetland areas, resulting in a total of approximately 144.3 acres of wetland disturbance during construction. These impacts would include approximately 107.3 acres of PFO wetlands and an additional 37.0 acres of PSS, POW, and PEM wetlands.

In the short term, construction activities would diminish the recreational and aesthetic value of wetlands through clearing, trenching, spoil placement, vehicle traffic, and related construction disturbances. Wetland functions such as erosion control, buffering and flood flow attenuation, and sediment and nutrient retention also would be affected by construction. These effects typically would be greatest during and immediately following construction. Clearing of wetland vegetation would result in both short- and long-term loss of wetland wildlife habitat and some wetland functions, with the duration of the impact varying by habitat type.

Excavation of the pipeline trench during open-cut construction, installation of the pipe, and backfill of the trench could affect the rate and direction of water movement within wetlands. In addition, excavation activities could alter perched water tables by disturbing impermeable soil layers. This could adversely affect wetland hydrology and revegetation by creating soil conditions that might not support

wetland communities and hydric vegetation at preconstruction levels. Failure to properly segregate soils during construction would result in mixed soil layers, which would alter biological components of the wetland and affect the reestablishment of native wetland vegetation. Temporary stockpiling of soil and the movement of heavy machinery across wetlands also would lead to inadvertent compaction and furrowing of soils, which would alter natural hydrologic patterns, inhibit seed germination, and increase seedling mortality. Altered surface drainage patterns, storm water runoff, runoff from the trench, accidental spills, and discharge of hydrostatic test water also would negatively affect water quality by increasing the potential for siltation and turbidity resulting from construction activities.

Impacts to PSS wetlands would be mostly short term, as regeneration likely would occur within two to four years. PEM and POW wetlands, which can regenerate more rapidly, typically would be affected only temporarily as they may become reestablished in one or two growing seasons. Due to the relatively long period required for PFO wetlands to regenerate, up to 30 years or more, impacts to these wetland types would be long term. Operation of the proposed Project would permanently affect approximately 39.2 acres of PFO wetlands and 3.8 acres of PSS wetlands. No operational impacts are anticipated for POW and PEM wetlands.

During operation of the proposed Project, the Companies' Procedures allow for annual maintenance of a 10-foot-wide strip centered over the pipeline. Additionally, trees that are within 15 feet of the pipeline and greater than 15 feet in height may be cut and removed. These activities would not affect PEM wetlands, as these herbaceous areas typically would not be maintained or mowed. However, mowing, clearing, and tree removal would affect PSS and PFO wetlands along the permanent right-of-way. Functions associated with these wetland types would be altered as forested or scrub-shrub wetlands within the maintained portion of the permanent pipeline right-of-way would be permanently converted to an herbaceous state. The overall acreage of wetlands would not be significantly reduced; however, a conversion of PFO to PSS and PEM would occur.

The Companies' field investigators are in the process of completing wetland surveys; therefore, **we recommend that:**

- **Prior to construction, the Companies should file with the Secretary for review field-delineated locations for all affected wetlands.**

### **3.4.1.3 General Wetland Construction and Mitigation Procedures**

The COE requires that all appropriate and practicable actions be taken to avoid or minimize wetland impacts, pursuant to its Section 404(b) (1) guidelines, which restrict discharges of dredged or fill material where a less environmentally damaging and practicable alternative exists. All wetland crossings would be subject to review by the COE to ensure that wetland impacts are fully identified and that appropriate wetland restoration and mitigation measures are identified. The Companies also would comply with all conditions of the Section 404 permit authorizations that may be issued by the COE or Regional Permit 2. See Section 3.4.3 for additional discussion of compensatory mitigation requirements.

The Companies have attempted to avoid or minimize impacts to wetlands through reductions in the nominal construction right-of-way width in wetlands to 75 feet, evaluation of route alternatives, and use of their Procedures. The Companies' proposed route would be collocated with or would parallel existing pipeline or utility rights-of-way for approximately 182.3 miles or 51 percent of the proposed mainline route and for all of the Mississippi Loop, thereby reducing impacts to previously undisturbed wetlands.

Section 2.3.2 describes the specialized pipeline construction procedures that the Companies would implement to minimize impacts to wetlands. Within the construction right-of-way, the Companies would leave existing root systems intact where possible; would install erosion control devices to minimize sediment flow into the wetland; and would use natural succession processes. If natural succession processes are not successful at the end of the third year of post construction monitoring, the Companies would use special seed mixes during restoration, as recommended by local agencies. Our Procedures require that the company develop a plan with a qualified ecologist for active restoration of the disturbed areas.

The Companies would use the minimum construction equipment necessary within wetlands for clearing, trench excavation, pipe fabrication and installation, trench backfilling, and restoration activities. If standing water or saturated soil conditions were present, or if construction equipment caused ruts or mixing of the topsoil and subsoil, construction equipment operating in wetland areas would be further limited to the use of low-ground-pressure equipment or normal equipment operating from timber riprap or prefabricated equipment mats. The Companies also would minimize impacts to wetlands by implementing the measures identified in their Procedures. These measures include, but are not limited to:

- clear marking of wetland boundaries and buffers in the field until construction is complete;
- limitation of tree stump removal and grading to the area directly over the pipeline trench, unless it was determined that safety-related construction constraints required grading or removal of tree stumps from under the working side of the construction right-of-way;
- stripping of topsoil from the area directly over the trench line to a maximum depth of 12 inches in unsaturated soils;
- minimization of the amount of time that topsoil is segregated and the trench is open;
- use of sediment barriers to prevent sediment flow into a wetland;
- de-watering of trenches in a way that does not cause sedimentation in a wetland;
- use of trench breakers to ensure maintenance of the original wetland hydrology;
- prohibition of the storage of hazardous materials and re-fueling within 100 feet of a wetland; and
- restoration of preconstruction contours, vegetative restoration, and monitoring.

#### **3.4.1.4 Alternative Measures to the FERC's Procedures**

The Companies propose alternative measures to those described in Sections VI.A.3 and VI.B.1 of our Procedures, which relates to the construction right-of-way and the location of extra workspaces in wetlands. Section VI.A.3 states the width of the construction right-of-way should be 75 feet or less in wetlands. Section VI.B.1 states all extra work areas, such as staging areas and access roads, should be located at least 50 feet outside of identified wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. The locations and basis for each requested variation are identified in Table 3.4.1-4.

**TABLE 3.4.1-4  
Summary of Alternative Measures to FERC's Procedures  
for the Proposed Gulf Crossing Project**

<b>Affected Wetland/ Facility</b>	<b>Milepost</b>	<b>Affected Area (acres)</b>	<b>Wetland Type/ Identifier</b>	<b>Applicable Section in the Companies' Procedures</b>	<b>Basis for Alternative Measures</b>
WL-LA-189-A	188.7	0.00 <sup>b</sup>	PFO	VI.A.3 and VI.B.1.a	TWS <sup>a</sup> and ATWS are needed on the east side of the Red River, within 50-ft of a wetland. The ATWS and TWS are needed for the Red River HDD exit.
WL-LA-210-A	209.7	0.25	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the west side of Bayou Bodcau within a wetland. ATWS of 40-ft x 270-ft is needed for a pull back section of the Bayou Bodcau HDD.
WL-LA-217-B	217.2	2.06	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the west dies of Dorcheat Bayou within a wetland. An ATWS of 25-ft x 2,474-ft and a TWS of 40-ft x 200-ft are needed for a pull back section of Dorcheat Bayou HDD. An ATWS of 100-ft x 200-ft is needed for the Dorcheat Bayou HDD exit.
WL-LA-218-A	217.8	0.64	PSS	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the east side of Dorcheat Bayou within a wetland. An ATWS of 100-ft x 200-ft and a TWS of 40-ft x 200-ft are needed for the entry of the Dorcheat Bayou HDD.
WL-LA-220-B Black Bayou	219.9	2.81	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS would be needed on the east side of Black Bayou within a wetland. An ATWS of 100-ft x 200-ft would be needed for the Black Bayou HDD exit. An ATWS of 50-ft x 1,050-ft and a TWS of 40-ft x 1,250-ft are needed for the pull back section of Black Bayou HDD.
WL-LA-221-A Black Bayou	220.2	0.19	PEM	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the east side of Black Bayou within a wetland. An ATWS of 50-ft x 90-ft and a TWS of 40-ft x 90-ft are needed for the pull back section of the Black Bayou HDD.
WL-LA-235-C	235.5	0.23	PFO	VI.B.1.a	TWS and ATWS are needed on the west side of State Highway 120 within a wetland. An ATWS of 50 ft x 200 ft is needed to bore State Highway 120.
WL-LA-259-B	259.2	0.09	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the west side of Highway 167 within a wetland. An ATWS of 50-ft x 40-ft and a TWS of 40-ft x 45-ft are needed for pull back section of Highway 167 HDD.
WL-LA-282-A	BU282.9	0.0 <sup>b</sup>	PFO	VI.B.1.a	ATWS would be needed on the east side of Francis Creek Break within 50-ft of a wetland. An ATWS of 100-ft x 200-ft would be needed for the Francis Break HDD exit.

**TABLE 3.4.1-4 (continued)  
Summary of Alternative Measures to FERC's Procedures  
for the Proposed Gulf Crossing Project**

<b>Affected Wetland/ Facility</b>	<b>Milepost</b>	<b>Affected Area (acres)</b>	<b>Wetland Type/ Identifier</b>	<b>Applicable Section in the Companies' Procedures</b>	<b>Basis for Alternative Measures</b>
WL-LA-284-RB	AQ284.7	0.92	PSS	VI.A.3 and VI.B.1.a	An ATWS of 100-ft x 200-ft and a TWS of 40-ft x 200-ft would be needed on the west side of Bayou D'Arbonne for the HDD entry within a wetland.
WL-LA-297-B	298.9	1.38	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the east side of Bayou De Siard within a wetland. An ATWS of 50-ft x 680-ft and TWS of 40-ft x 650-ft are needed for the pullback section of Bayou De Siard HDD.
WL-LA-304-B	305.8	3.64	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the east side of Little Boeuf Bayou within a wetland. An ATWS of 100-ft x 200-ft would be needed for the Little Boeuf Bayou HDD exit and an ATWS of 50-ft x 1,450-ft and a TWS of 40-ft x 1,650-ft are needed for the pullback section of Little Boeuf Bayou HDD.
WL-LA-307-A	309.2	0.57	PFO	VI.B.1.a	ATWS would be needed on the west side of Coulee Ditch and Galion Bayou within a wetland. An ATWS of 125-ft x 200-ft would be needed for the Coulee Ditch and Galion Bayou HDD exit.
WL-LA-320-A	AV322.0	1.14	PFO	VI.A.3 and VI.B.1.a	TWS is needed on the west side of Cypress Creek within a wetland. ATWS of 25-ft x 1988-ft is needed for the pullback section of Cypress Creek HDD.
WL-LA-321-A	AV322.8	0.64	PFO	VI.A.3 and VI.B.1.a	TWS and ATWS are needed on the east side of Cypress Creek within a wetland. An ATWS of 100-ft x 200-ft and a TWS of 40-ft x 200-ft are needed for the HDD entry.
WL-LA-325-A	327.3	0.34	PFO	VI.B.1.a	ATWS would be needed on the west side of Big Colewa Creek within a wetland. An ATWS of 50-ft x 300-ft would be needed for the pullback section of Big Colewa Creek HDD.
BW-PEM-002	L 6.4	0.05	PEM	VI.B.1.a	ATWS would be needed on the east side of Interstate 55 within a wetland. An ATWS of 20-ft x 100-ft would be needed for the Interstate 55 HDD exit.

Note:

<sup>a</sup> Temporary work space (TWS) represents a 100 foot temporary construction right-of-way in wetland areas.

<sup>b</sup> TWS and ATWS is located within 50 feet of a wetland, but not in a wetland.

The Companies' Procedures also require that the Companies file a site-specific construction plan for each extra workspace that would not be located at least 50 feet outside of a wetland boundary. Although the Companies have provided preliminary site-specific drawings for the proposed extra workspace areas in wetlands, the required site-specific written plans have not yet been submitted. In accordance to their Procedures, the Companies would be required to file these site-specific construction plans prior to the start of construction.

The Companies would be required to implement the other wetland protective measures included in our Procedures in the areas relevant to the proposed alternative measures. The Companies' Procedures also require that the Director of OEP approve any access road improvements or new access roads in wetlands. The Companies have recently finalized the locations of access roads needed for the Project, which would temporarily impact 15.6 acres of wetlands. In response to the draft EIS, LDWF recommended that any new access roads constructed within wetlands in Louisiana also have one 24-inch culvert installed every 500 feet to maintain surface water flow. However, Gulf Crossing has not proposed to construct new access roads within wetlands in Louisiana.

The Companies would be required to complete all wetland permitting and compensatory mitigation consultations with the COE before that start of construction at any extra workspace areas or any access roads located within wetlands, as discussed above. Based on our review, we have determined that the proposed alternative measures to the Companies' Procedures (including those that would affect PFO wetlands), as described in Table 3.4.1-4, appear reasonable and are adequately justified.

### **3.4.2 Site-specific Wetland Impacts and Mitigation**

Although the impacts to forested wetlands would occur, the Companies have attempted to minimize impacts through avoidance, re-routes, and the use of HDD methods. In response to our recommendations in the draft EIS, Gulf Crossing further reduced impacts to specified forested wetlands by eliminating ATWS, reducing ATWS, and adopting route variations. The Companies propose to use HDD methods to cross 22 wetlands, of which, seven wetlands would be crossed by HDD or a combination of HDD and open cut methods. Gulf Crossing would use HDD methods to cross wetlands associated with White Oak Creek (MP 106.9), Black Bayou (MP 175.5 and MP 219.4), Dorcheat Bayou (MP 217.6), D'Arbonne Bayou (MP 266.7), Ouachita River (MP 291.8), Wham Brake (MP 305.7), Galion Bayou (MP 308.8), Cypress Creek (AV322.8), and Big Colewa Creek (MP 327.4).

#### **3.4.2.1 High-quality, Sensitive, or Special-status Wetlands**

The Companies indicate that 22 high quality forested wetland communities occur along the proposed pipeline route as listed in Table 3.4.1-2. Nine of these areas are in or are adjacent to mature bottomland hardwood forests along the Project right-of-way in wetlands located at MP 217.0, 217.6, the floodplain of Bayou D'Arbonne (MP 235.1, 235.4, and 238.3), Cypress Creek (MP 273.1 and 273.2), MP 311.8, and MP 314.0. Impacts to high quality forested areas would be minimized through the use of HDD methods at Black Bayou (MP 175.5), Bayou Bodcau (MP 210.2), Bayou Dorcheat (MP 217.6), Bayou D'Arbonne (MP 266.7), and Blasingame Tributary (MP 289.9 and MP 290.5). HDD methods would also minimize impacts at Big Colewa Creek (MP 327.4), with the exception of the ATWS required for the pullback section of the HDD crossing.

The Companies have attempted to minimize impacts to many of these wetlands through avoidance, re-routes, reduction of ATWS, and use of HDD methods. Additionally, LDWF has identified four subsequent mature bottomland hardwood forests wetlands along the proposed pipeline route, two of which area associated with Cypress Creek (MP 273.3) and two associated with Bayou D'Arbonne (MPs 235.1 and 235.4). In response to our recommendations in the draft EIS, Gulf Crossing has proposed

to minimize impacts to the mature bottom land forest located between MP 217.0 and MP 217.4 by reducing the ATWS. We have determined that an extension of the HDD proposed for the crossing of Bayou Dorcheat would avoid or further minimize impacts to the two high quality wetlands located between MP 217.0 and MP 218.0. Additionally, alternative constructions methods and route variations would further reduce impacts to other high quality wetland resources along the proposed pipeline route. Therefore, **we recommend that:**

- **Prior to construction, Gulf Crossing should file with the Secretary for review and approval of the Director of OEP an evaluation for alternative construction approaches or route variations to minimize impacts to high quality forested wetland crossings at MPs Z176.6, 217.0, 217.6, two forested wetlands at MPs 235.1 and 235.4 associated with and including Bayou D'Arbonne at MP 235.3, and the two forested wetland crossings at MPs 273.1 and 273.2 associated with and including Cypress Creek at MP 273.3. The evaluations should consider route variations, the use of HDDs, reduced construction rights-of-way, or other methods to minimize impacts.**

Based on available mapping and coordination with the NRCS, the Companies indicated that one WRP land in Fannin County, Texas and two WRP lands in Madison Parish, Louisiana, would be crossed by the proposed pipeline route. Based on consultations with the NRCS, the Companies would be required to obtain Compatible Use Permits and subordination agreements from the NRCS authorizing the crossing of any WRP lands. It is the position of the NRCS that all WRP lands with hydric soils are considered wetlands, although the Companies indicated that not all lands enrolled in the WRP and Prior Converted Wetlands program would necessarily be classified as wetlands using COE wetland delineation methods. Further consideration of potential Project-related effects to WRP lands is provided in our analysis of impacts to special interest areas, which is included in Section 3.8.4. In that Section, we are recommending the Companies consult further, with the NRCS in order to finalize plans that include measures to minimize or mitigate impacts to these areas. Additionally, the Companies have evaluated and approved route variations that would avoid or limit impacts to WRP lands (see Section 4.4).

A route variation has been adopted from MP AR295.6 to MP AR297.9 to avoid WRP lands; however, Gulf Crossing has not assessed the route variation for impacts to the high quality cypress-tupelo forest also located in this area. Therefore, **we recommend:**

- **Prior to construction, Gulf Crossing should file with the Secretary for review and approval of the Director of OEP, and NRCS for review the construction and operational impacts to high quality cypress-tupelo forest associated with the route variation to avoid WRP lands located between MP AR 295.6 to MP AR297.9. If high quality cypress-tupelo forest impacts are identified, Gulf Crossing should evaluate alternative construction approaches or route variations to minimize impacts to the high quality forested wetland crossings.**

### **3.4.3 Wetland Restoration and Compensatory Mitigation**

For temporary and short-term wetland impacts, the Companies would restore wetlands in accordance with their Procedures. The requirements for wetland restoration measures identified in the Companies' Procedures include:

- consultation with appropriate land management or state agencies to develop a Project-specific restoration plan that includes measures for reestablishing herbaceous and woody species;

- prohibition on the use of herbicides or pesticides within 100 feet of a wetland, except as allowed by the appropriate agencies; and
- monitoring of the success of wetland revegetation annually for the first 3 years after construction or until wetland revegetation is considered successful.

Revegetation would be considered successful if the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If revegetation were not successful at the end of 3 years, a remedial revegetation plan would be developed and implemented in consultation with a professional wetland ecologist. The remedial revegetation plan would serve as a guide to actively revegetate the wetland with native wetland herbaceous and woody plant species. Revegetation efforts would be continued until revegetation is successful.

As noted above, the Companies would complete wetland permitting, including development of measures for compensatory mitigation for all wetland impacts, in consultation with the COE. Based on the results of the consultations completed to date, the Companies have proposed to compensate for wetland impacts through purchase of wetland mitigation bank credits.

The Companies, as part of the wetlands permitting process, have filed their Pre-Construction Notification (PCN) with the appropriate COE Districts. The Companies are continuing consultations with the COE regarding appropriate mitigation for wetland impacts.

#### **3.4.4 Conclusion Regarding Impacts to Wetlands**

The proposed Project would impact a number of wetlands, including forested wetlands that would be affected over the long-term or permanently. However, wetland impacts would be minimized by the collocation of the proposed pipeline with existing rights-of-way, and the implementation of the Companies' Procedures. Based on a nation-wide survey of 480 wetlands affected by interstate pipeline construction, 86 percent were determined successfully restored as jurisdictional wetlands (FERC 2004). Restoration of wetlands in the southeast U.S. was more successful than the national average due, largely, to favorable precipitation conditions. The Companies will continue agency consultation regarding measures to minimize or mitigate impacts to high quality wetlands, WRP lands, and Prior Converted Wetland areas.

### **3.5 VEGETATION**

#### **3.5.1 Existing Vegetation Resources**

Construction and operation of the proposed Project would affect four general vegetative cover types: agricultural lands, open lands, upland forests, and wetlands. Wetland (forested, emergent, and scrub-shrub) resources, impacts, restoration, and mitigation are discussed in detail in Section 3.4; therefore, wetlands are not included in this section. Within these general classifications are more distinctive vegetative communities that would be encountered by the proposed pipeline. The upland forests class consists of oak-hickory pine forests, slope hardwood forest, northern post oak savannahs, hardwood forests, pine forests, and pine plantations. Riparian species associated with rivers, creeks, and streams, as well as slope species associated with floodplains, are accounted for within their respected forested class listed above. The open land areas consist of pastures, scrub/shrub lands, and prairies. Agricultural areas include actively farmed areas and croplands. Further discussions of potential impacts to agricultural areas, as well as mitigation measures, are discussed in Section 3.8. Vegetative cover community types that would be crossed by the proposed Gulf Crossing project are described in Table 3.5.1-1.

**TABLE 3.5.1-1  
Vegetation Cover Communities Occurring along the Proposed  
Gulf Crossing Project**

<b>Vegetation Cover Type</b>	<b>General Description</b>	<b>Common Species</b>
AGRICULTURAL	Areas under active farming, including field crops	Cotton ( <i>Gossypium</i> spp.), soybeans ( <i>Glycine</i> spp.), corn ( <i>Zea</i> spp.)
OPEN LANDS		
Pasture	Areas used for livestock grazing or hay production	Primarily bermuda grass ( <i>Cynodon dactylon</i> ) and crabgrasses ( <i>Digitaria</i> spp.), broomsedge ( <i>Andropogon</i> spp.), bluegrass species ( <i>Poa</i> spp.), bahiagrass ( <i>Paspalum notatum</i> )
Scrub/Shrub	Shrubs, low lying vegetation consisting of saplings and understory species	Greenbriar ( <i>Smilax</i> Spp), dewberries ( <i>Rubus</i> spp.), peppervine ( <i>Ampelopsis arborea</i> ), yaupon holly ( <i>Ilex vomitoria</i> )
Northern Blackland Prairies	Texas tallgrass prairies	Silveanus dropseed ( <i>Sporobolus silveanus</i> ), Mead's sedge ( <i>Sporobolus aspera</i> ), longspike tridens ( <i>Tridens stricta</i> ), asters ( <i>Aster</i> spp.), yellow Indian grass ( <i>Sorghastum nutans</i> ), black-eyed Susans ( <i>Rudbeckia hirta</i> ) prairie clovers ( <i>Lespedeza</i> spp.) big bluestem ( <i>Andropogon gerardii</i> )
UPLAND FORESTS		
Northern Post Oak Savannah	Mixture of woodland and prairie habitat	Woodland species: Post Oak ( <i>Quercus stellata</i> ), Blackjack oak ( <i>Quercus marilandica</i> ), Eastern red cedar ( <i>Juniperus virginiana</i> ), black hickory ( <i>Carya texana</i> );  Prairie species: little bluestem ( <i>Schizachyrium scoparium</i> ), big bluestem ( <i>Andropogon gerardii</i> ), Indian grass ( <i>Sorghastrum nutans</i> ), and tall dropseed ( <i>Sporobolus asper</i> ).
Oak/Hickory/Pine Forest	60% hardwoods depending on slope, soil type, and moisture conditions and loblolly pine typically comprises up to 20% percent of the canopy	In drier locations: southern red oak ( <i>Quercus falcata</i> ), post oak ( <i>Quercus stellata</i> ), white oak ( <i>Quercus alba</i> ), cherrybark oak ( <i>Quercus pagoda</i> ), mockernut hickory ( <i>Carya tomentosa</i> ), hickory ( <i>Carya</i> spp.), and winged elm ( <i>Ulmus alata</i> ). Wet location: laurel oak ( <i>Quercus laurifolia</i> ), southern magnolia ( <i>Magnolia grandiflora</i> ), water oak ( <i>Quercus nigra</i> ), American hornbeam ( <i>Carpinus caroliniana</i> ), eastern hop hornbeam ( <i>Ostrya virginiana</i> ), sweetgum ( <i>Liquidambar styraciflua</i> ) Tupelo gum ( <i>Nyssa</i> sp), Bald Cypress ( <i>Taxodium distichum</i> )

**TABLE 3.5.1-1 (continued)  
Vegetation Cover Communities Occurring along the Proposed  
Gulf Crossing Project**

Vegetation Cover Type	General Description	Common Species
Slope Hardwood	Found in floodplain regions	Similar species found in Oak/Hickory/Pine Forest including: swamp white oak ( <i>Quercus michauxii</i> ), nuttall oak ( <i>Quercus nuttallii</i> ), willow oak ( <i>Quercus phellos</i> ), American elm ( <i>Ulmus americana</i> ), American beech ( <i>Fagus grandifolia</i> ), pecan ( <i>Carya illinoensis</i> ), yellow poplar ( <i>Liriodendron tulipifera</i> )
Hardwood Forest	Upland and bottomland hardwood forest	Willow oak ( <i>Quercus phellos</i> ), water oak ( <i>Quercus nigra</i> ), swamp white oak ( <i>Quercus michauxii</i> ), white oak ( <i>Quercus alba</i> ), southern red oak ( <i>Quercus falcata</i> var <i>falcata</i> ), Tupelo gum ( <i>Nyssa</i> spp.), Bald Cypress ( <i>Taxodium distichum</i> )
Pine plantation	Pine plantation includes varying age stands of loblolly pine that are planted, managed, and periodically cut for timber production	Canopy species: loblolly pine ( <i>Pinus taeda</i> ) with occasional sweet gum ( <i>Liquidambar styraciflua</i> ); understory species: McCartney rose ( <i>Rosa bracteata</i> ), blackberry ( <i>Rubus</i> spp.), green briar ( <i>Smilax</i> spp.), Carolina jasmine ( <i>Gelsemium sempervirens</i> ), yaupon holly ( <i>Ilex vomitoria</i> )
Pine Forest	Pine dominated community	Loblolly pine ( <i>Pinus taeda</i> ), short leaf pine ( <i>Pinus echinata</i> ); understory species; flowering dogwood ( <i>Cornus florida</i> ), wax myrtle ( <i>Myrica cerifera</i> ), Carolina Jasmine ( <i>Gelsemium sempervirens</i> )
<p>NOTES: USGS (Chapman, S.S. et. al. 2004a, 2004b)(Woods, A.J. et. al. 2005)(Griffith, G.E. et. al 2004)(Daigle, J.J. et. al. 2005)</p>		

**Project Facilities**

Approximately 5,488 acres of agricultural lands, open lands, and upland forests would be affected by construction of the proposed Gulf Crossing Project. The Mississippi Loop would affect approximately 235 acres during construction. Agricultural and open lands would be allowed to return to preconstruction conditions; therefore, no permanent impacts are anticipated. ATWS for the project would require the use of approximately 727 acres of agricultural land (62 percent), upland forest (36 percent), and wetland (2 percent). Table 3.5.1-2 describes the vegetative communities affected by the proposed Gulf Crossing Project excluding ATWS.

**TABLE 3.5.1-2  
Vegetative Communities Affected by the Proposed  
Gulf Crossing Project**

Vegetation Community	Pipeline Facilities <sup>a</sup>		Aboveground Facilities		Access Roads	
	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)
Agricultural <sup>c</sup>	1853.6	0.0	23.0	11.4	86.9	18.8
Open land <sup>b, c</sup>	418.2	0.0	25.4	15.6	33.1	1.5
Hardwood/ Oak/Hickory /Pine Forest/and Slope Hardwood	1219.4	749.8	21.4	9.9	65.2	5.9
Hardwood Forest /Northern Post Oak Savannah	478.1	294.8	6.4	2.5	19.5	1.8
Pine Forest	26.0	14.0	0.0	0.0	0.0	0.0
Pine plantation	260.0	137.5	0.0	0.0	0.0	0.0
<b>Total</b>	<b>4,255.3</b>	<b>1196.1</b>	<b>76.2</b>	<b>39.4</b>	<b>204.7</b>	<b>28.0</b>

NOTES:

<sup>a</sup> Acreages reflect a nominal 100-foot-wide construction right-of-way and the proposed 60-foot-wide permanent right-of-way that would be maintained in upland areas following construction, and additional temporary workspaces

<sup>b</sup> Open land cover type consists of scrub-shrub, prairies, and pasture. Temporary impacts are based on a 100-foot-wide construction corridor.

<sup>c</sup> Vegetation in agriculture and open land would be allowed to regenerate.

### **Pipeline Facilities**

Construction of the pipeline would affect 4,225 acres. Temporary storage and contractor yards used to support construction activities of the proposed pipeline would affect approximately 617 acres of land. These areas would not be permanently impacted and would return to their original vegetative condition following construction. The majority of storage and contractor yards would be located in industrial commercial areas (64 percent) while the remaining (36 percent) would temporarily impact agricultural lands.

### **Aboveground Facilities**

The proposed aboveground facilities include four new compressor stations, seven new M/R facilities, pig launchers and receivers, mainline valves (MLVs), and other ancillary facilities. The Sherman Compressor Station would be constructed on agricultural land; the Mira Compressor Station would be built on forested land, and the Paris Compressor station would be constructed in both forested and open land areas. The Sterlington Compressor Station would be constructed in an existing industrial

area; however, the location does contain an area of trees and grasses that would be affected by construction. All pig launchers/receivers, mainline valves, and other ancillary facilities would be located within the proposed pipeline construction right-of-way or compressor station sites and would not contribute additionally to vegetation impacts. The extra compression that would be added to the Harrisville Station would not impact vegetative communities. The construction of seven M/R stations would not significantly impact vegetation communities and would only permanently impact 12.6 acres of forest, agricultural lands, and open lands combined.

## **Access Roads**

The Companies indicate that construction of the proposed pipeline and aboveground facilities would require the use of 241 private access roads. Of the 241 roads, 213 would be used only for temporary access including one newly constructed temporary access road, and 102 of these access roads would not require improvements. The 28 remaining roads would be new permanent access roads. Impacts to vegetation resulting from the use of access roads would not be significant, permanently impacting 18.8 acres of agricultural land, 7.7 acres of forest land, and 1.5 acres of open land. Access roads are further discussed in Section 3.8.1.1 and Appendix F.

### **3.5.1.1 Vegetative Communities of Special Concern or Value**

Based on a map review, field surveys, available information, and consultations with resources agencies, Gulf Crossing identified several areas of vegetation that are of special concern or value. Identified areas include: the Silveanus Dropseed prairie community, Texas Water Oak-Willow Oak community, Caddo Black Bayou Preserve, bald cypress/water tupelo forested wetlands, and easement lands held by the Farm Service Agency (FSA) in the Conservation Reserve Program (CRP).

Gulf Crossing originally proposed to cross through a portion of a tall grass community that is a remnant of the Texas Blackland Prairie Ecoregion located in Lamar County, Texas (MP 57.5). This prairie is dominated with Silveanus Dropseed (*Sporobolus silveanus*), and is registered with the Native Prairie Association of Texas (NPAT) which is assisting the private landowner (Johnny Johnson) to preserve the Silveanus Dropseed. Gulf Crossing completed surveys on the Johnson property to evaluate the quality and abundance of this remnant prairie along the proposed project route near MP 57.5. These surveys confirmed the presence of Silveanus Dropseed in two areas, approximately 142 feet and 270 feet, along the proposed route.

Another special area of concern is a bottomland forest community following the creeks and floodplains of the Sulphur river system known as the Water Oak-Willow Oak community located between MP 108.1 and MP 111.5 in Titus County, Texas. This riparian community is species-rich in hardwood trees such as sweetgums, white oaks, willows, and blackgums. This community is susceptible to extirpation and degradation due to uncontrolled forest clearing of mature stands and the channelization of rivers and streams (TOES, 1998). Gulf Crossing completed field surveys of this area and confirmed the presence of the Water Oak-Willow Oak community.

Caddo Black Bayou Preserve (MP 175.6 to MP 176.3) is home to upland and bottomland hardwood forests, bald cypress and water tupelo swamps, unique sandhill forests and rare plant species such as Arkansas Oaks, golden-golden wave tickseed, Louisiana squarehead, and heart-leaved skullcap. Both upland and bottomland areas (bald cypress and water tupelo wetlands) of the preserve are proposed to be crossed by the Gulf Crossing Project in Louisiana and along the Mississippi Loop. These areas are further discussed in Sections 3.4, 3.6, and 3.8.

The FSA-administered CRP is a voluntary program that allows owners of agricultural tracts to conserve environmentally sensitive lands with financial assistance from the federal government (USDA 2006). Through the planting of native grasses, trees, and other cover, these easements are designed to reduce soil erosion, sedimentation, improve water quality, and establish and improve aquatic and wildlife habitat. Vegetation found in these easements performs a critical role in providing these ecological values. A number of CRP lands would be crossed by the proposed pipeline route. However, the location/s and number/s of CRP lands are being withheld by the NRCS for confidentiality reasons. The Companies are consulting with the FSA to identify CRP lands affected by the project. CRP lands are also discussed in Section 3.8.

### 3.5.1.2 Extensive Forested Tracts

Based on a review of aerial photo graphs and field surveys, the Companies have identified several areas of large forested tracts that would be crossed by the proposed pipeline. Construction of the proposed Project would disturb approximately 98.4 acres of extensive forests including: oak/hickory/pine, slope hardwood forest, northern post oak savannah, hardwood forest, pine forest and pine plantation. The location of these tracts and the length of the associated crossings are identified in Table 3.5.1-3.

<b>County/Parish</b>	<b>Begin Milepost</b>	<b>End Milepost</b>	<b>Length (miles)</b>	<b>Permanent Conversion to Herbaceous Land</b>
Morris/Cass <sup>a</sup>	134.7	135.8	1.1	8.0
Cass <sup>a</sup>	136.7	138.7	2.0	14.5
Cass <sup>a</sup>	151.3	152.4	1.1	8.0
Cass <sup>a</sup>	152.7	154.2	1.5	10.9
Cass <sup>a</sup>	155.8	157.3	1.5	10.9
Cass	157.7	160.2	2.5	18.2
Cass <sup>b</sup>	160.8	162.6	1.8	13.1
Cass <sup>a</sup>	162.6	165.4	2.8	20.4
Cass	167.3	168.4	1.1	8.0
Cass	168.7	BN169.8	1.1	8.0
Cass	170.4	172.3	1.9	13.8
Cass	174.6	174.9	0.3	2.2
Caddo	174.9	Z177.1	2.2	16.0
Caddo	Z177.4	179.2	1.8	13.1
Caddo	179.7	180.7	1.0	7.3
Caddo	181.0	182.3	1.3	9.5
Bossier	AD193.3	196.0	2.7	19.6
Bossier	196.1	197.3	1.2	8.7
Bossier	197.3	199.3	2.0	14.5
Bossier	201.6	203.8	2.2	16.0
Bossier	204.0	208.4	4.4	32.0

**TABLE 3.5.1-3 (continued)**  
**Extensive Forested Tracts Crossed by the Proposed Gulf Crossing Project**

<b>County/Parish</b>	<b>Begin Milepost</b>	<b>End Milepost</b>	<b>Length (miles)</b>	<b>Permanent Conversion to Herbaceous Land</b>
Bossier/Webster	209.4	210.6	1.2	8.7
Webster	210.7	AG211.7	1.0	7.3
Webster <sup>b</sup>	213.1	214.2	1.1	8.0
Webster	214.2	215.5	1.3	9.5
Webster <sup>b</sup>	216.1	217.4	1.3	9.5
Webster <sup>b</sup>	220.5	221.7	1.2	8.7
Webster <sup>b</sup>	222.3	224.4	2.1	15.3
Webster/Claiborne <sup>a</sup>	224.6	226.1	1.5	10.9
Claiborne <sup>a</sup>	226.5	227.5	1.0	7.3
Claiborne <sup>a</sup>	228.5	230.3	1.8	13.1
Claiborne <sup>a</sup>	230.5	232.7	2.2	16.0
Claiborne <sup>a</sup>	239.9	241.4	1.5	10.9
Claiborne <sup>a</sup>	241.4	243.2	1.8	13.1
Claiborne <sup>b</sup>	243.4	245.8	2.4	17.5
Claiborne <sup>b</sup>	246.3	248.6	2.3	16.7
Claiborne <sup>b</sup>	248.6	AM249.9	1.3	9.5
Claiborne <sup>b</sup>	250.1	251.8	1.7	12.4
Lincoln <sup>a</sup>	258.3	259.6	1.3	9.5
Lincoln	259.6	261.0	1.4	10.2
Lincoln <sup>a</sup>	BT262.6	264.1	1.5	10.9
Lincoln <sup>b</sup>	264.1	266.0	1.9	13.8
Lincoln/Union	266.7	268.7	2.0	14.5
Union <sup>a</sup>	270.6	271.9	1.3	9.5
Union <sup>a</sup>	271.9	274.0	2.1	15.3
Union <sup>a</sup>	274.3	275.5	1.2	8.7
Union <sup>a</sup>	277.2	278.2	1.0	7.3
Union <sup>b</sup>	279.1	281.4	2.3	16.7
Union <sup>a</sup>	281.6	283.2	1.6	11.6
Union <sup>b</sup>	AQ285.3	AQ286.5	1.2	8.7
Union <sup>b</sup>	AQ286.8	287.8	1.1	8.0
Union <sup>b</sup>	287.8	290.8	3.0	21.8
Ouachita <sup>a</sup>	298.3	299.6	1.3	9.5
Ouachita <sup>a</sup>	299.6	304.3	4.7	34.2
Morehouse <sup>b</sup>	308.4	309.5	1.1	8.0

<b>TABLE 3.5.1-3 (continued)</b>				
<b>Extensive Forested Tracts Crossed by the Proposed Gulf Crossing Project</b>				
<b>County/Parish</b>	<b>Begin Milepost</b>	<b>End Milepost</b>	<b>Length (miles)</b>	<b>Permanent Conversion to Herbaceous Land</b>
Hinds	L0.2	L1.7	1.5	10.9
Simpson	L15.1	L16.8	1.7	12.4
Simpson	L16.8	L17.8	1.0	7.3
<b>TOTAL</b>			<b>98.4</b>	<b>715.6</b>
Notes:				
<sup>a</sup> Route following an existing corridor.				
<sup>b</sup> Portion of route is following an existing corridor.				

Operation of the proposed Project would require the conversion of approximately 715.6 acres of extensive forest tracts to herbaceous areas from maintenance of the proposed 60-foot right-of-way. To reduce impacts, we are recommending in Section 2.2.1 that the Companies limit the width of their permanent right-of-way to 50 feet.

### 3.5.2 General Impacts and Mitigation

#### 3.5.2.1 General Impacts

The primary impacts of the proposed Project on the identified vegetative communities would result from the removal of vegetation along the proposed pipeline route and at aboveground facility sites during construction and routine maintenance. The cutting or removal of vegetation during construction could lead to increased soil erosion, associated sedimentation and turbidity in streams and wetlands, an increase in invasive or exotic plant species, and a reduction in wildlife habitat. Clearing and construction activities along the proposed pipeline right-of-way and associated facilities could also result in soil compaction. Additionally, heavy machinery could damage riparian vegetation associated with waterbodies, whether the equipment is moving or parked for extended periods, thereby potentially reducing water quality in adjacent streams. All areas disturbed during construction, but not needed permanently as part of the pipeline or aboveground facilities or permanent access roads would be allowed to revert to pre-construction vegetative conditions.

In those areas where a HDD would be used to cross special features such as waterbodies, wetlands, roads, special interest and sensitive areas, and areas that are difficult for construction, the Companies propose to use hand-laid electric-grid guide wires to assist guidance of the drill bit along the proposed route. For heavily vegetated areas with small trees and shrubs, a small pathway, approximately 2-to-3 feet wide, would be cut with hand tools in order to position the guide wires. As a result, this activity would result in minimal vegetation disturbance along the path of the HDD and would avoid sensitive vegetative areas.

The permanent right-of-way would be mowed or otherwise maintained every three years and would be maintained in an herbaceous state. Additionally, a 10-foot-wide corridor over the pipeline centerline would be maintained annually in an herbaceous state. Periodic maintenance of the permanent pipeline right-of-way would prevent the regrowth of forested vegetative communities and would result in regular disturbance of tree saplings. Construction of the aboveground facilities would result in the

permanent conversion of some vegetated areas to non-vegetated industrial/commercial areas, either as standing structures or associated facilities, such as parking and storage areas.

The severity of the impacts caused by temporary construction activities and permanent pipeline features, would depend on the type of vegetation impacted, the size of the area cleared, and the time required for vegetation to become re-established. General impacts to vegetation communities are described in further detail below.

### **Community-specific Impacts**

The proposed Project would impact approximately 5,488 acres of agricultural lands, open land, and upland forests during construction. Vegetated areas would be primarily impacted by the proposed pipeline, aboveground facilities, and extra work areas. The anticipated impacts to vegetation types associated with specific project components are listed in Table 3.5.1-2. Relatively large amounts of agriculture and forested lands would be affected by construction and operation of the proposed Project, and to a lesser extent open land. Smaller impacts would result from the construction of aboveground facilities, construction and modification of access roads, and use of pipe storage and contractor yards.

Although agricultural and open lands would also occur within the permanent pipeline right-of-way, the vegetation in those areas would not be significantly changed from preconstruction conditions. Impacts to open lands would be short term, as these areas typically would return to their herbaceous or shrub status within one or two years following construction.

Impacts to pine plantations within the temporary construction right-of-way would be long term, as re-growth to preconstruction condition would take at least 20-30 years for species, such as loblolly pine, to reach maturity. Hardwood species, such as oaks, could take as long as 50 to 100 years to reach maturity. Impacts to forested areas, including pine plantations, mixed hardwood-loblolly pine forests, hardwood forests, and northern post oak savannah resulting from construction and operation of the proposed Project would include a change in vegetative strata and appearance, conversion of community type, edging effects, and loss of habitat and mature forests stands.

Maintenance of the permanent right-of-way, as mentioned above, would have a much greater impact on forested lands than on agricultural, pasture, and open lands. These impacts would represent a marked, permanent change from forested vegetation to herbaceous or shrubby vegetation. Although agricultural and open lands occur along the pipeline and the Mississippi Loop, the herbaceous vegetation in these areas would not be significantly changed from preconstruction conditions.

### **Mitigation**

To minimize Project-related effects to vegetative communities, the Companies would follow their Plan which identifies baseline mitigation measures for minimizing erosion and enhancing revegetation in upland areas. Implementation of the Companies' Plan would aid vegetative restoration and prevent or minimize sedimentation and turbidity in streams and wetlands. Some of the restoration and best management practices identified their Plan include the following:

- use of at least one EI per construction spread, who would ensure compliance with the Companies' Plan, Procedures, and other required conditions;
- segregation of topsoil;
- installation of temporary erosion control measures, such as slope breakers, sediment barriers, and mulch;

- commencement of cleanup immediately after backfilling and completion of restoration within 20 days;
- installation of permanent erosion control devices, such as trench breakers, and slope breakers;
- testing and mitigation for soil compaction;
- revegetation in accordance with the recommendations of the local soil conservation authority, other land management agencies, or the affected landowner;
- provision of barriers to control off-road vehicle activities; and
- post-construction monitoring and maintenance of revegetated areas.

Further, the Companies' Plan requires that all upland areas disturbed by construction be fertilized, limed, and seeded in accordance with the prescribed schedule and seed mixes specified by local soil conservation authorities or land management agencies. The Companies indicated that they have begun discussions with state and federal agencies regarding seeding mixtures, but that these consultations are not yet complete. To ensure that appropriate vegetative restoration practices would be implemented, **we recommend that:**

- **Prior to construction, the Companies should finalize consultations with MDWFP, ODWC, TPWD, LDWF, the Nature Conservancy, NRCS; local soil conservation agencies; and other appropriate agencies regarding seeding and vegetation restoration practices for the proposed Project. The Companies should file with the Secretary for review a report that describes the outcome of these consultations and identifies the agency-recommended seeding and vegetation restoration practices.**

Where implemented, the use of HDD methods would minimize impacts to special vegetative communities, riparian vegetation, site-specific forested wetland crossing plans (discussed in Section 3.4.3), and select locations. These requirements would ensure that proposed Project impacts to various vegetative communities are adequately minimized.

Project impacts to vegetative communities would vary depending upon disturbance duration, magnitude, and vegetation cover type. As described above, approximately 43 percent of the disturbed vegetation would be forested. Due to the nature of forest regrowth, the clearing of forested areas may result in long-term to permanent impacts. However, the Companies have avoided forested areas to the extent possible through selective routing and would minimize impacts through extensive collocation within existing rights-of-way (54 percent). Permanent impacts to riparian forested areas would be minimized by the measures described above for HDD. Impacts to other forested areas would be minimized by the mitigation measures discussed above. Impacts to agricultural, grassland vegetation, or pasture lands would be minimal and limited primarily to the construction phase.

Based on the identified measures to avoid and minimize impacts to forested areas, and the relatively minor impacts to agricultural areas, pastures, and open lands, we believe the impacts to vegetative communities would be minimized to the greatest extent practical for the proposed Project.

### **3.5.2.2 Impacts to Vegetation Communities of Special Concern or Value**

Most of the general impacts described above are applicable to specific designated vegetation types or conservation programs. These designated areas are: Silveanus Dropseed community, Texas Water Oak-Willow Oak community, Caddo Black Bayou Preserve, and easement lands held in the FSA-managed CRP, which may be herbaceous or forested.

Gulf Crossing has completed surveys to evaluate Silveanus Dropseed quality and abundance along the proposed project route that crosses the Johnson property. Gulf Crossing adopted a route variation in response to letters from the landowner, the NPAT, and the TPWD requesting an alternative route through the Johnson property.

Gulf Crossing has completed surveys to evaluate the quality and abundance of the Water Oak-Willow Oak community along the proposed project route. Gulf Crossing adopted a route variation to avoid the Water Oak-Willow Oak community.

Based on consultations the proposed pipeline does not cross any CRP lands, containing protected vegetative covers, such as hardwood forests, pine forests, and native grasses. Consultations are ongoing. If CRP lands are identified along the proposed Project, impacts and mitigation for vegetation in CRP lands would be similar to those described above, depending on whether each site was forested or not. Impacts to CRP lands are discussed in more detail in Section 3.8.

Impacts to Caddo Black Bayou and other WMAs would be avoided, or minimized, by using HDD methods to cross these areas. As discussed in Section 3.3, in the event of a frac-out or HDD failure, Gulf Crossing would implement their HDD Contingency Plan. Impacts to wetlands and WMAs are discussed in Sections 3.4 and 3.8, respectively.

The large forested tracts identified along the proposed route would be affected by the clearing of a 100-foot-wide construction right-of-way and the routine mowing, cutting, and trimming along the proposed permanent pipeline right-of-way. Cleared forested areas located outside of the permanent right-of-way would be allowed to reestablish; however, effects to those areas would be long term, as vegetative strata would be altered for at least 30 years depending on the species type, until mature trees replace the early herbaceous, shrub, and sapling succession strata. Forested areas within the permanent pipeline right-of-way would be permanently impacted and replaced by herbaceous and shrubby areas. As described above, impacts to forested areas would have the same consequences: lack of diversity, fragmentation, community type conversion, strata changes, appearance, edging effects, and loss of habitat. Through selective routing and collocation within existing rights-of-way, the Companies would avoid impacts related to fragmentation and disturbance to much of the large forested regions.

Due to the diverse nature of the vegetative communities associated with specially designated lands within the proposed Project area, impacts to vegetative communities of special concern would range from temporary to permanent. Adherence to the mitigation measures described above would minimize impacts to vegetative communities. Selective routing variations (see Section 4.4) collocation with existing rights-of-way, and the avoidance of some sensitive vegetative communities would further minimize impacts to sensitive communities. Thus we believe that impacts to sensitive communities would be minor for these areas.

### **3.5.3 Exotic or Invasive Plant Communities**

Invasive species can out-compete and displace native plant species, thereby negatively altering the appearance, composition, and habitat value of affected areas. Chinese tallow tree, purple loosestrife, and cogon grass are some invasive species of concern for the project area. Chinese tallow tree is a deciduous tree reaching up to 60 feet in height that is fast growing, can thrive in both wet and dry sites, can displace native vegetation, and is able to successfully invade undisturbed forests (Invasive Species 2006).

Purple loosestrife is a perennial herb that invades both disturbed and undisturbed wetlands, where it can out-compete native plant species (NPS 2005). This species produces seeds for dispersal and also

spreads via underground stems. Cogon grass is a perennial grass that spreads through wind-blown seeds and forms dense infestations by branching underground rhizomes, a thick system of mat-forming roots that sprout. Cogon grass competes with hardwood species for light, water, and nutrients and can grow so extensively that it decreases growth and increases mortality of young trees (Matlack 2002). Cogon grass can also spur fires that are more frequent and intense than would otherwise occur (NPS 2006).

The Companies prepared their Exotic and Invasive Species Control Plan to minimize the introduction of exotic and invasive species and monitor for them. This plan requires contractors to wash equipment prior to arriving to the job sites or contractor yards in an effort to prevent the introduction of unwanted species along the pipeline route. The plan also requires monitoring of the right-of-way for three to five years following construction as part of their revegetation monitoring program to allow for the early detection of exotic or invasive species. Additionally, in order to minimize the impacts of exotic and invasive species, the Companies would implement their Plan, which includes measures to reduce erosion such as topsoil stripping and specific vegetation restoration measures. Further, as described above, locally prescribed seed mixes and post-construction monitoring measures would be implemented to further minimize the spread of exotics to and within the Project area.

The Companies indicated that it would continue to coordinate with federal and local NRCS offices and state agencies to obtain recommendations for the control and management of exotic and invasive species along the pipeline right-of-way with state resource agencies to identify appropriate control measures for invasive and exotic plant species.

The temporary removal of vegetation may result in increased opportunities for invasive and exotic species to establish themselves in Project rights-of-way and additional workspaces. Adherence to the Companies' Exotic and Invasive Species Control Plan in conjunction with consultations with local and state agencies would minimize the potential for the introduction or establishment of nuisance and exotic species within the Project area.

### **3.6 WILDLIFE AND AQUATIC RESOURCES**

#### **3.6.1 Wildlife**

##### **3.6.1.1 Existing Wildlife Resources**

A variety of wildlife species and habitat types would be affected by construction and operation of the proposed Project. Common habitat types found along the proposed pipeline route include upland forests, pine plantations, wetlands, open water, and open lands. Sections 3.4 and 3.5 describe the vegetative components of these habitat types. Wildlife species, including game species, commonly associated with these habitat types are listed in Table 3.6.1-1. In addition to the wildlife species discussed below, Section 3.7 describes federal and state-listed threatened and endangered species occurring or potentially occurring in the Project area.

#### **Upland Forest**

Upland forests within the Project area consist of oak/hickory/pine forests, slope hardwood forests, hardwood forests, northern post oak savannahs, and pine forests. Although each forest type contains a unique assemblage of vegetative species, they all provide habitat for similar wildlife species, such as the white-tailed deer, eastern box turtle, and barred owl. Upland forests provide wildlife species with a variety of foraging, rearing, nesting, and cover habitats. Specific features such as plant species type, tree condition, canopy cover, and successional stage of each upland forest can influence the dominate types of

**TABLE 3.6.1-1  
Common Wildlife Species That Occur along the Proposed Pipeline**

Common Name	Scientific Name	Upland Forest	Pine Plantation	Forested	Wetlands		Open Lands
					Scrub/Shrub	Emergent	
Bachman's Sparrow	<i>Aimophila aestivalis</i>	X	X				X
Common Yellowthroat	<i>Geothlypis trichas</i>				X	X	
Eastern Wild Turkey <sup>a</sup>	<i>Meleagris gallopavo</i>	X	X				X
Northern Bobwhite <sup>a</sup>	<i>Colinus virginianus</i>	X	X				X
Wood Duck	<i>Aix sponsa</i>			X	X	X	
Swainson's Warbler	<i>Limnothlypis swainsonii</i>			X			
Great Egret	<i>Ardea alba</i>			X	X	X	
Greater Yellowlegs	<i>Tringa melanoleuca</i>					X	X
Mississippi Kite	<i>Ictinia mississippiensis</i>	X		X	X	X	X
Eastern Meadowlark	<i>Sturnella magna</i>					X	X
Cattle Egret	<i>Bubulcus ibis</i>				X	X	X
White-tailed Deer <sup>a</sup>	<i>Odocoileus virginianus</i>	X	X	X	X	X	X
Eastern Cottontail <sup>a</sup>	<i>Sylvilagus floridanus</i>	X	X				
Striped Skunk	<i>Mephitis mephitis</i>	X	X				X
Virginia Opossum	<i>Didelphis virginiana</i>	X	X	X			X
Raccoon	<i>Procyon lotor</i>	X	X	X	X	X	X
Eastern Gray Squirrel <sup>a</sup>	<i>Sciurus carolinensis</i>	X	X	X			
American Beaver	<i>Castor canadensis</i>			X	X	X	
Louisiana Pine Snake	<i>Pituophis melanoleucus ruthveni</i>	X	X				X
Woodhouse Toad	<i>Bufo woodhousei</i>				X	X	X
Timber Rattlesnake	<i>Crotalus horridus</i>	X	X	X			
Brown Snake	<i>Storeria dekayi</i>	X		X	X	X	X

NOTE:  
<sup>a</sup> Species with significant commercial or recreational value.

wildlife within an upland forest. A dense understory would provide cover and food for small- to medium-sized mammal species. Large standing dead trees with cavities or exfoliating bark would provide habitat for nesting/roosting birds and mammals.

In addition, forests provide an inner habitat as well as an edge habitat, each of which attract a variety of species that utilize that particular habitat. Interior forested habitats are secluded, wetter, and more stable than edge habitats. Edge habitats are defined as those areas where two different habitat types meet. This distinct boundary has an increased diversity in plant and wildlife species and functions as a wildlife travel corridor.

### **Pine Plantation**

Pine plantations within the Project area are generally composed of loblolly pine. Wildlife use of pine plantation habitat varies according to wildlife species life stage, season, and forest successional stage. Pine plantation areas have an average rotation time of 20 to 30 years, allowing regular change in the successional vegetation species and habitat types. All successional stages provide some form of forage, cover, and nesting habitat for various wildlife species. Early and intermediate successional stages are most used by wildlife. As pine plantations mature, they become near monocultures of closely-spaced, similarly-aged trees, decreasing their value as wildlife habitat. However, even after the canopy has closed, openings, edge habitat, and areas periodically subjected to prescribed fire can provide relatively good habitat and forage capable of sustaining a diverse wildlife assemblage.

### **Open Lands**

Open lands include upland scrub/shrub areas, agricultural fields, pastures, prairies, and maintained rights-of-way. Open land habitat can be important to a variety of species, particularly birds and small mammals by providing edge areas and feeding and rearing habitats. Upland scrub/shrub areas are typically areas that were cleared for maintained rights-of-way. Plant species within these areas are low lying and overgrown understory. Agricultural fields along the proposed pipeline route are typically soybean and corn row crops. Pastures are herbaceous areas with low plant diversity. Prairies, many of which are considered to be of special concern and/or have special value for their vegetative communities, are generally natural areas covered in grasses and forbs. Section 3.5, Table 3.5.1-1 discusses these vegetation types in more detail.

### **Forested Wetlands**

Forested wetlands are dominated by woody vegetation that is at least 20 feet tall. Section 3.4 provides a more detailed description of the vegetation communities present in wetland habitats. The diverse vegetation assemblages comprising forested wetlands provide an abundance of cover, foraging and nesting habitat for a variety of wildlife species, especially those that are dependant upon these resources, such as migrating birds, reptiles, amphibians, and mammals. During winter flooding periods, this habitat also provides migratory waterfowl wintering habitat for species such as mallards, pintails, and gadwalls.

### **Scrub-Shrub Wetlands**

Scrub-shrub wetlands consist of saplings and low-lying vegetation; however, due to their lack of a developed tree canopy, scrub-shrub wetlands are typically not as structurally diverse as forested wetlands. As in forested wetlands, scrub-shrub wetlands provide an abundance of cover, foraging and nesting habitat for a variety of wildlife species including mammals, birds, and reptiles. Section 3.4 provides a more detailed description of the vegetation communities present in wetland habitats.

## **Emergent Wetlands**

Emergent wetlands are characterized by the presence of erect, herbaceous plants that are used by a variety of wildlife species for cover and as foraging and nesting habitat. Vegetation in emergent wetlands associated with the proposed Project includes various herbaceous species, which are described in Section 3.4. Emergent wetlands provide food sources for waterfowl and nursery habitat for amphibians, crustaceans, and fish. Additionally, migratory birds may use emergent wetland habitats as resting sites.

## **Open Water**

Open water habitats within the proposed Project area include large rivers and streams, natural lakes, ponds, and manmade waterbodies. Similar to wetland habitat types, open water habitats provide food and water sources, in addition to habitat for species such as wading birds, waterfowl, beavers, otters, snakes, and other wildlife species dependent upon an aquatic environment. Waterbodies are specifically discussed in Section 3.3, fisheries resources within these waterbodies are discussed in Section 3.6.2.

### **3.6.1.2 Sensitive or Managed Wildlife Habitats**

The proposed Project would cross the Bodcau Wildlife Management Area (WMA), the acquisition boundary of the Red River National Wildlife Refuge (NWR), the Caddo Black Bayou Preserve, WRP and CRP lands, Louisiana Wetland Management District easements, and large forested tracts. The D'Arbonne NWR and the Heartwood Natural Area are also located within the vicinity of the proposed Project; however, the proposed pipeline would not cross within the boundaries of these two areas. Sensitive vegetative communities, such as the Silveanus Dropseed community and Water Oak-Willow Oak series are discussed in Section 3.5.

### **Bodcau Wildlife Management Area**

The proposed Project would cross approximately 4,500 feet of the Bodcau WMA (MP 209.5 to 210.4). The Bodcau WMA is a 34,355-acre area located on the border of Bossier and Webster Parishes, Louisiana. The area contains a wide range of wildlife habitat ranging from cypress swamps to upland pine and hardwood forests interspersed with grasslands and open fields. Many species of grasses and forbs that are typically found in states west of Louisiana can be found growing in the grassland areas. There are numerous seasonally flooded sloughs, beaver ponds, and large areas of flatland, bottomland, hardwood forests. One unique feature of the area is that the bottomland forest rapidly merges with the upland forest on a series of ridges that extend into the bottomland area.

Dominant tree species in the bottomland forests include bald cypress, water, overcup, willow, and cow oaks. Shortleaf and loblolly pine, white, red, and cherrybark oaks, sweetgum and elm trees dominate upland forests. Understory species in the bottomland area include poison ivy, honeysuckle, rattan, buttonbush and swamp privet. Upland understory species include blackberry, honeysuckle, poison ivy and beautyberry and sawbriar. In addition, an area within the WMA is being set aside for the management of Arkansas oak trees, which are a globally rare tree species. Game species include white-tailed deer, squirrel, rabbit, dove, quail, waterfowl, and wild turkey for hunting; and bass for fishing (LDWF 2005).

### **Red River National Wildlife Refuge**

The Red River NWR, when finalized, will be managed by FWS and will consist of 50,000 acres of federal lands and waters along the Red River between Colfax, Louisiana and the Arkansas state line.

Four focus areas have been identified to help guide land acquisition efforts, including the Lower Cane River and the Spanish Lake lowlands in Natchitoches Parish, the Bayou Pierre floodplain in Desoto and Red River Parishes, and a site for headquarters in Bossier Parish (FWS 2007a).

The Red River NWR will be established when enough land has been acquired to constitute an area that can be effectively managed as a wildlife refuge. The Red River Valley historically consisted of bottomland hardwoods, cypress sloughs, and shrub swamps. Establishment of the NWR will provide habitat for migratory birds, as well as restore and conserve the native plant and animal communities that once occurred in these areas (FWS 2007a). The proposed pipeline route would traverse the acquisition boundary of the Red River NWR within Caddo Parish.

### **Nature Conservancy Preserve**

The proposed Project would cross approximately 4,000 feet of The Nature Conservancy's Caddo Black Bayou Preserve between MP 175.6 and MP 176.3. The Caddo Black Bayou Preserve is a 486-acre area located in northwestern Caddo Parish, Louisiana. Caddo Black Bayou Preserve is a spring-fed, natural area that includes braided streams, cypress-tupelo swamps, bottomland hardwood forests and a unique sandhill forest that harbors a variety of rare plant species, as discussed in Section 3.5. The Preserve has many high quality forested wetlands provide important habitat for migratory waterfowl and other wildlife species (TNC 2007.)

### **USDA-managed Lands**

The proposed Project would cross three WRP easements, managed by the NRCS, and an undetermined number of CRP easements, managed by the NRCS and the FSA. Information regarding CRP lands is being withheld by the NRCS for confidentiality reasons. These programs are voluntary and promote the conservation and enhancement of various wetland and upland habitats including forested areas, although CRP easements may also include herbaceous open lands. Each of the three WRP easements that would be crossed is considered to be open land, one of which is interspersed with forested wetlands and contains a waterbody. In conserving and enhancing various habitat types, these programs also establish additional wildlife habitat. WRP and CRP lands are described in further detail in Sections 3.4 and 3.8.

### **Louisiana Wetland Management District Easements**

The Louisiana Management District provides management and technical assistance to private landowners holding approximately 25,710 acres in northeastern Louisiana. These acres include nine fee title tracts, 37 easements, and six leases that are managed for the purposes of reforestation of marginal agricultural areas and the development and maintenance of moist soil units (FWS 2007b). The proposed pipeline route would traverse two conservation easement tracts (the Richard Adcock and W.W. Farms tracts) in Richland Parish.

### **Extensive Forested Tracts**

Several non-managed, large forested tracts would be crossed by the proposed Project. These tracts are discussed in Section 3.5, with the tract locations and crossing mileposts shown in Table 3.5.1-2. These large forested areas are often crossed by roads, utility rights-of-way, and railroads, but typically are not fragmented by any other land use type. Some forest interior species, such as many songbirds, exclusively use or nest in relatively large forested areas to avoid disturbed areas and edge habitats. In addition to providing protected nesting habitat, these large forested tracts also comprise contiguous forest habitat corridors for migration, feeding, and escape cover for a number of wildlife species.

## **D'Arbonne National Wildlife Refuge**

The D'Arbonne NWR is a 17,419-acre area owned by FWS. The forested wetlands and surrounding uplands are important for the preservation of the Lower Mississippi Valley's biological integrity and support concentrations of ducks, wading birds, and raptors, as well as the endangered red-cockaded woodpecker and wood stork (TNC 2007, FWS 2007c). Although the proposed pipeline would be constructed in the vicinity of the NWR near MP AQ285, it would remain approximately 2,000 feet from the area's northern border.

## **Heartwood Natural Area**

The Heartwood Natural Area, designated by the State of Louisiana is located just north of the D'Arbonne NWR near MP AQ286. The area is known for its high botanical diversity (over 110 native woody species) and old-growth forest, which are extremely rare in Louisiana and provides unique habitat for wildlife resources (TNC 2007, FWS 2007c). The proposed pipeline would not cross through the Heartwood Natural Area but would remain approximately 607 feet north of its northern boundary.

### **3.6.1.3 Unique and Sensitive Wildlife Species**

Unique or sensitive wildlife species, such as colonial nesting waterbirds and migratory songbirds and waterbirds, may be found within the vicinity of the proposed Project. As previously stated, federally, and state-listed threatened and endangered species are discussed in Section 3.7.

#### **Colonial Nesting Waterbirds and Migratory Birds**

The Migratory Bird Treaty Act regulates the taking of or impacts to migratory birds, including their nests. Numerous migratory bird species, including colonial nesting waterbirds and waterfowl, and neotropical songbirds, would potentially occur within the vicinity of proposed Project facilities. Representative bird species that potentially occur in the Project area are listed in Table 3.6.1-2.

“Colonial nesting waterbirds” is a collective term used to refer to a variety of bird species that obtain all or most of their food from aquatic and wetland environments and gather in large colonies, or rookeries, during their respective nesting seasons. Colonial nesting waterbirds concentrate in these rookeries on sandbars and islands within or along the riparian zones of major waterways. No colonial nesting waterbird rookeries were identified within the Project area during consultations with FWS and state agencies; however, Gulf Crossing has recently observed two rookeries in proximity to the proposed pipeline within Webster and Lincoln Parishes, Louisiana. In Section 3.6.1.5, we have recommended that Gulf Crossing conduct pre-construction surveys and avoid construction activities within 1,000 feet of these rookeries during the nesting season.

Construction of the proposed Project would not correspond with the typical migratory period for waterfowl; however, the construction period would correspond to the nesting season of various species of neotropical migratory songbirds, such as vireos, warblers, and flycatchers. Some avian species, such as the prothonotary warbler and Swainson's warbler, expected to occur in floodplain and riparian forested wetlands have experienced population declines due to habitat loss and fragmentation. Migratory bird habitat and populations can be protected through avoidance of certain habitats on a temporal basis, such as avoidance during nesting and breeding seasons (FWS 2007d).

TABLE 3.6.1-2 Migratory Bird Species that Potentially Occur in the Project Area		
Species Group	Common Name	Scientific Name
Colonial Nesting Waterbirds	Great Egret	<i>Ardea alba</i>
	Great Blue Heron	<i>Ardea herodias</i>
Waterfowl	Wood Duck	<i>Aix sponsa</i>
	Gadwall	<i>Anas strepera</i>
	Mallard	<i>Anas platyrhynchos</i>
Neotropical Migratory Songbirds	Red-eyed vireo	<i>Vireo olivaceus</i>
	White-eyed vireo	<i>Vireo griseus</i>
	Yellow-throated vireo	<i>Vireo flavifrons</i>
	Swainson's warbler	<i>Limnothlypis swainsonii</i>
	Kentucky warbler	<i>Oporornis formosus</i>
	Prothonotary warbler	<i>Protonotaria citrea</i>
	Great crested flycatcher	<i>Myiarchus crinitus</i>
	Acadian flycatcher	<i>Empidonax vireescens</i>
	Summer tanager	<i>Piranga rubra</i>
	Blue grosbeak	<i>Passerina caerulea</i>
	Indigo bunting	<i>Passerina cyanea</i>
	Orchard oriole	<i>Icterus spurius</i>
Migratory Birds	Bald eagle	<i>Haliaeetus leucocephalus</i>

In addition to protections afforded by the MBTA, the bald eagle is also protected under the Bald and Golden Eagle Protection Act. The bald eagle nests within the vicinity of the proposed Project between October and mid-May and one bald eagle nest is known to occur along the proposed pipeline route. The nest is 1.5 miles southeast of the proposed pipeline near MP 9 in Fannin County, Texas (TPWD 2007a). In addition, FWS has also indicated that there could be potential bald eagle nests located near the Red River.

The Companies have agreed to adhere to the National Bald Eagle Management Guidelines which recommends that natural buffers be maintained between construction activities and nests and that certain activities be avoided during the nesting season. In addition, the Companies have agreed to develop a Migratory Bird Plan which would discuss potential pre-construction migratory bird surveys, as well as impacts and mitigation for migratory birds. In Section 3.6.1.5, we have recommended that a Migratory Bird plan be developed and that any bald eagle nests identified during construction be avoided and immediately reported to the FWS.

#### 3.6.1.4 General Impacts and Mitigation

Construction and operation of the proposed Project would result in several temporary and long-term impacts to wildlife species and their habitats including: loss of habitat; habitat fragmentation; edge effects; and species displacement, injury, and mortality. As described in Sections 3.5 and 3.8, a total of approximately 5,663.4 acres of wildlife habitat would be temporarily disturbed and about 2,768.1 acres

of habitat would be permanently affected by the proposed Project. Related impacts to wetland and vegetative habitats are also described in Sections 3.4 and 3.5, respectively.

### **Pipeline Facilities**

As stated in Sections 3.5 and 3.8, the construction of pipeline facilities would temporarily require the disturbance of approximately 4,402.3 acres of wildlife habitat. Of this total amount, approximately 47 percent would be forested, consisting of pine plantation (6 percent), forested wetland (2 percent), and other upland forests (39 percent). The remaining impacts would consist mostly of agricultural land (42 percent) and open lands (10 percent) as well as small amounts of non-forested wetlands (1 percent) and open water areas (0.3 percent).

Pipeline construction would result in temporary and long-term impacts to wildlife and their habitats. As described previously, construction of the proposed pipeline would require the clearing of vegetation within the construction right-of-way, temporarily eliminating and reducing the quality of cover, nesting, and foraging habitat for wildlife. Long-term impacts due to construction would occur in habitat types with longer recovery periods, such as forested areas.

Impacts to wildlife species and habitats resulting from construction of the proposed Project would depend on the vegetation type affected, the mobility and habitat requirements of affected wildlife species and the amount of adjacent wildlife habitat. Specifically, construction activities including increased noise and habitat disruption would impact wildlife by displacing, stressing, injuring or leading to the mortality of wildlife. Species typically move away from inhospitable environments, utilizing nearby suitable habitats, and resulting in a temporary increase in competition for habitat and resources until the disruption has passed. Less mobile species may experience direct mortality from habitat clearing and the passing construction spreads if unable to escape the area. Disruption of any habitat type could cause alterations in the breeding, feeding, nesting, and rearing activities of species that actively use those habitats. Fragmentation of forested areas would decrease the amount of inner forest habitat available to those species that use it, but increase the amount of habitat for those species that utilize edge habitats.

Construction of the proposed Project would occur between April and October of 2008. Hunting seasons for common species such as deer, waterfowl, wild turkey, and small game are generally between the fall and spring seasons and may be affected by construction in ways identical to those discussed above.

Potential effects to wildlife using forested habitats would be more severe than those to wildlife inhabiting other habitat types, as vegetative strata in forested areas would undergo a more measurable change. Impacts to upland forest, pine plantation, and forested wetland habitats resulting from proposed construction activities would be long-term; however, they would also be localized. Disturbed areas located outside the permanent right-of-way would be allowed to revert to their preconstruction cover type, but this process would take 30 years or more in some forested habitats. Non-forested habitats (including open lands, scrub-shrub, emergent wetlands) would be affected by Project construction, but due to the relatively short time required for regrowth of non-forested vegetation, these habitats would recover more quickly from construction-related disturbances.

Operation and maintenance of the permanent pipeline right-of-way would result in effects similar to those described for Project construction. Habitat impacted by vegetation maintenance along the permanent pipeline right-of-way would be maintained as herbaceous or scrub-shrub habitat. This maintenance would represent a conversion of habitat and would be most significant in previously forested upland and wetland habitats. Forest interior species would avoid cleared areas and edge habitats, which could potentially impact migratory patterns. Conversely, those species that depend upon a forest-open

land interface for feeding opportunities may benefit from edge-effects associated with right-of-way maintenance.

Project impacts to wildlife communities and habitat would vary depending upon disturbance duration, magnitude, and vegetation cover type. The potential for direct mortality and displacement due to construction activities would last for a relatively short duration. Due to the nature of vegetation regrowth, the clearing of forested areas may result in long-term to permanent alterations to wildlife habitat. Any impacts to wildlife habitat associated with open lands would be minimal and limited primarily to the construction phase or within one growing season. Despite the potential long-term impacts associated with Project construction and operation, avoidance and mitigation measures described below would ensure that wildlife habitat impacts would be minimized.

### **Aboveground Facilities, Access Roads, ATWS, and Pipe Storage and Contractor Yards**

The construction of aboveground facilities, access roads, ATWS, and pipe storage and contractor yards would impact a total of approximately 1,261.2 acres of wildlife habitat. The construction of aboveground facilities would impact approximately 25.4 acres of open lands (including 15.0 acres impacted by the Paris compressor station), 23.0 acres of agricultural land (including 20.0 acres impacted by the Sherman compressor station), and 27.8 acres of forested land (including 25 acres impacted by the Paris and Mira compressor stations). The construction of new or modified access roads would impact approximately 220.3 acres during construction, with the vast majority of these impacts affecting existing roads. Access roads to be constructed or modified are located in agricultural land, forested land, open land, and wetlands. Construction of new access roads would permanently affect 18.8 acres of agricultural land, 7.7 acres of forested land, and 1.5 acres of open land. The use of ATWS and pipe storage and contractor yards would impact approximately 682.4 acres of agricultural land, 269.8 acres of forested lands, and 12.5 acres of non-forested wetlands.

Areas within the permanent boundaries of aboveground facilities and new access roads would be converted to industrial use. As a result of this conversion, wildlife habitats would be lost or diminished in value. Lands permanently converted due to operation of aboveground facilities would affect only a small percentage of the land area and wildlife habitat affected by the proposed Project. Generally, wildlife occurring in these areas would be permanently displaced, which could result in increased stress, injury, and/or mortality. Construction and operation of structures, parking lots, and roads at the aboveground facility sites would result in the loss and permanent conversion of some existing wildlife habitat into potentially non-vegetated industrial/commercial uses. Construction impacts to open land habitats would be short-term, as they would be restored within one to three years after construction.

Due to the relatively small quantity of land required for aboveground facilities, the loss of habitat and disturbance to wildlife species would be localized and minor. Any direct impacts to wildlife species or to their habitat, as described above, would be minimized through the implementation of avoidance and mitigation measures described below.

### **Impact Minimization and Mitigation Measures**

The Companies would minimize impacts to wildlife and wildlife habitats through selective routing, collocation with existing rights-of-way, and other measures described in the Companies' Plan and Procedures.

The proposed Project would avoid sensitive or managed wildlife habitats, including large forested areas, to the extent practical. Collocation with existing utility rights-of-way would minimize impacts to previously undisturbed wildlife habitats and would substantially reduce the amount of wildlife habitat

clearing required. As described in Section 3.5, non-forested areas would generally be restored within one growing season for herbaceous habitats and within three years after construction for scrub-shrub habitats found in open lands.

Due to proposed pipeline installation methods and vegetation restoration measures included in the Companies' Plan and Procedures, we believe that impacts to wildlife would be minimal. Measures included in the Companies' Plan and Procedures are described in detail in Sections 3.4 and 3.5.

Right-of-way maintenance would affect a relatively small percentage of the forested habitat relative to the total amount of forested lands in the general vicinity of the proposed Project. Operational maintenance of the right-of-way would be relatively infrequent and performed in accordance with measures described in the Companies' Plan and Procedures. Due to these measures, we believe that impacts to wildlife resulting from operation of the proposed Project would be minimal.

### **3.6.1.5 Sensitive or Managed Wildlife Habitats and Species Effects and Mitigation**

#### **Bodcau Wildlife Management Area**

Gulf Crossing proposes to cross the Bodcau WMA using a combination of open-cut and HDD methods. Impacts to approximately half (2,400 of 4,500 feet) of the crossing length would be avoided by use of an HDD. The remaining crossing length (2,100 feet) would be conducted by open-cut crossing methods. Areas impacted by construction would include 6.9 acres of mixed pine/hardwood forest and 0.9 acres of bottomland forests adjacent to Bayou Bodcau. Impacts associated with the permanent right-of-way would include 2.7 of mixed pine/hardwood and 0.3 acres of bottomland forested areas.

LDWF has granted Gulf Crossing's request for a Special Use Permit to cross this area with the condition that Gulf Crossing contact the LDWF Area 1 District Supervisor prior to construction and that they obtain a letter of no objection from the COE. Gulf Crossing has agreed to contact the LDWF Area 1 District Supervisor prior to construction, however, they have not obtained a letter of no objection from the COE; therefore, **we recommend that:**

- **Gulf Crossing should complete its consultation with the COE on construction methods through the Bodcau WMA and file documentation of the results to the Secretary prior to construction within the WMA.**

As described previously, open-cut construction would result in the displacement of mobile wildlife and the mortality of wildlife unable to avoid construction activities. This displacement and avoidance may lead to an increased use of adjacent areas within the WMA, resulting in a temporary increase in competition for habitat and resources. With the implementation of an HDD, adherence to our recommendation, and the avoidance of the future management area for Arkansas oak trees, we believe that construction and operation of the proposed Project would not significantly affect the Bodcau WMA.

#### **Red River National Wildlife Refuge**

The proposed pipeline route would traverse the acquisition boundary of the Red River NWR. Much of this area would be crossed using open-cut construction methods; however, the HDD construction method would be used to cross the Red River at MP 188.4. FWS does not yet own any land within the acquisition boundary in the vicinity of the proposed route; therefore they exercise no regulatory control over the area and no impacts to the Red River NWR are anticipated.

## **Nature Conservancy Preserve**

Gulf Crossing proposes to cross the Nature Conservancy's Caddo Black Bayou Preserve using a combination of open-cut and HDD methods. Open-cut crossing methods and work spaces would temporarily impact 3.3 acres of mature upland mixed pine/hardwood forest within the preserve as well as 1.0 acre of younger, more sparsely distributed pine. Permanent impacts associated with right-of-way maintenance would include 1.7 and 0.6 acres of these habitats, respectively. Open-cut construction would result in the displacement of mobile wildlife and the mortality of wildlife unable to avoid construction activities. As previously discussed, this displacement and avoidance may result in a temporary increase in competition for adjacent habitat and resources. Gulf Crossing plans to continue consultation with the Nature Conservancy to discuss impacts and mitigation within the Preserve, **therefore, we recommend that:**

- **Prior to the construction across the Caddo Black Bayou Preserve, Gulf Crossing should complete consultations with the Nature Conservancy regarding impacts and mitigation within the Preserve and file documentation of the results with the Secretary.**

The use of an HDD across the western portion of the Preserve would avoid impacts to the large wetland complex that occurs within its boundaries. With the implementation of HDD crossing methods through the wetlands within the Preserve, and adherence with our recommendation, we believe that construction and operation of the proposed Project would not significantly affect the Caddo Black Bayou Preserve.

## **USDA-managed Lands**

Gulf Crossing has identified three WRP lands that would be crossed by the proposed Project, one of which would be crossed by HDD, avoiding impact. One of the two remaining WRP easements that would be crossed is forested to some extent. Construction across this area would result in the long-term or permanent removal of trees which would result in impacts to wildlife and wildlife habitat similar to those discussed above. In Sections 3.8 and 4.4, we have recommended that Gulf Crossing consult with the applicable agencies regarding crossing methods and impacts to two WRP lands to be crossed by open cut methods. The number and locations of the CRP lands to be crossed cannot be disclosed due to confidentiality reasons; however, wildlife would be displaced during construction through those areas. Given the use of HDD methods to cross one WRP easement and our recommendations for continued consultations, we believe that construction and operation of the proposed Project would not significantly affect USDA managed lands.

## **Louisiana Wetland Management District Easements**

The proposed pipeline route would traverse two conservation easement tracts (the Richard Adcock and W.W. Farms tracts) in Richland Parish. Specific impacts to these parcels have not been determined, therefore, we have recommended in Section 3.8 that Gulf Crossing consult with the FWS regarding the crossing of these lands and that they file the results of the consultations with the Secretary prior to construction.

## **Extensive Forested Tracts**

As discussed above and in Section 3.5, approximately 98.4 miles of the proposed pipeline route would traverse large areas of relatively unfragmented forest. Construction and operation of the proposed Project in large forested tracts would result in several temporary and long-term impacts to wildlife species and habitats. These impacts would include loss of forest interior habitat and displacement of wildlife;

increased stress and mortality, leading to reduced reproduction and recruitment; increased rates of predation, parasitism, or inter-specific competition; increased destruction of habitat of understory species by browsing species; inhibition of migration, dispersal, foraging, and other movements of forest interior species that are hesitant to cross openings; and increased expansion of non-native or invasive plant or animal species.

Although forested habitat fragmentation can cause long-term and adverse effects to wildlife that use large forested tracts, the proposed pipeline would be collocated for approximately 54 percent of its length in order to minimize the effects of fragmentation. In addition, the Mississippi Loop would be collocated for 100 percent of its length. The prevention of excessive fragmentation would also minimize increased species competition, loss of higher quality habitat access, and increased edge effects. Conversely, construction of the proposed Project would benefit many wildlife species that utilize forest edge and open habitats, such as white-tailed deer, wild turkey, certain raptors, and foxes.

Given the measures to avoid and minimize impacts to large forested areas, we believe that the construction and operation of the proposed Project would not result in significant impacts to wildlife from disturbance of these areas.

### **D'Arbonne National Wildlife Refuge**

The proposed pipeline would pass approximately 2,000 feet north of the D'Arbonne NWR, but would not cross within its boundaries. As the pipeline would not cross the area, we do not believe that construction and operation of the proposed Project would significantly impact the D'Arbonne NWR.

### **Heartwood Natural Area**

The proposed pipeline would pass approximately 600 feet north of the Heartwood Natural Area, but would not cross within its boundaries. Mobile species retreating from construction activities could move into the area, temporarily increasing species competition within the area; however, we do not believe that construction and operation of the proposed Project would significantly impact the Heartwood Natural Area.

### **Colonial Nesting Waterbirds and Migratory Birds**

Colonial nesting waterbirds could be impacted by construction through displacement of adults and mortality of the young if their habitats or nests were damaged or disturbed during construction. In its comments on the proposed Project, the FWS recommended that any construction activity within 1,000 feet of a colonial nesting waterbird rookery should be restricted to the non-nesting period (i.e., September 1 through February 15) to minimize disturbance to colonial nesting waterbirds. We agree with FWS recommendations, and therefore, we recommend that:

- **Gulf Crossing should perform a pre-construction survey to determine if colonial nesting waterbird rookeries are occupied during the construction period and file the results with the Secretary for review and written approval. Gulf Crossing should avoid construction activities within 1,000 feet of occupied rookeries during the period of September 1 through February 15.**

Migratory birds could also be impacted by construction if their habitats or nests were damaged or disturbed during construction. Disturbance during nesting and brooding activities could result in nest abandonment and exposure of eggs and young to the environment. As previously discussed, the proposed Project would be constructed between April and October of 2008, pending Commission approval, which

would avoid the normal migratory period for most migratory waterfowl. However, several species of neotropical migrants would likely be within the Project area during the construction period and proposed Project-related activities could disrupt their nesting activities.

The Companies have stated that they would adhere to the National Bald Eagle Management Guidelines to minimize impacts to bald eagles and their nests. The Companies are currently consulting with the FWS to determine the necessity for migratory bird surveys along the pipeline corridor and have agreed to develop and submit a Migratory Bird Plan to the FWS that would address the extent of potential migratory bird surveys and the extent and duration of impacts to various migratory bird habitats.

To further minimize impacts to migratory birds, the FWS has recommended that the permanent right-of-way through upland forests be maintained in adherence with the Companies' Procedures for forested wetlands, which includes permanent maintenance of only a 10-foot wide strip over the pipeline centerline and selective thinning of trees exceeding 15 feet in height within 15 feet on either side of the pipeline centerline. The FWS has also recommended that any bald eagle nests identified during construction be avoided and immediately reported to the FWS, Lafayette office, therefore, **we recommend that:**

- **The Companies should finalize the Migratory Bird Plan in consultation with FWS in order to determine pre-construction survey requirements, impacts, right-of-way maintenance procedures, and mitigation for migratory birds, including bald eagles and any nests that may be encountered within or in close proximity to the construction right-of-way. The finalized document should be filed with the Secretary prior to construction.**

The Companies would not conduct routine vegetative maintenance of the permanent pipeline right-of-way more frequently than once every 3 years, except along a corridor not exceeding 10 feet in width centered on the proposed pipeline, which would be maintained annually in an herbaceous state to facilitate periodic corrosion and leak detection surveys. Furthermore, the Companies would not conduct routine vegetative maintenance clearing between April 15 and August 1 of any year, which would minimize the potential for Project-related disturbance of migratory bird nesting periods.

The potential exists for Project-related construction activities to affect colonial nesting waterbirds and migratory bird species in the proposed Project area, but the anticipated construction schedule, adherence to our recommendations, and implementation of the Companies' Plan and would adequately minimize population-level impacts if they did occur

### **3.6.1.6 Conclusion Regarding Impacts to Wildlife Habitats and Species**

The proposed Project would affect wildlife and wildlife habitats along the proposed route. Impacts would be temporary, long-term, and permanent. Specifically, wildlife would be displaced, injured, or killed by construction activities, but these impacts would be minor on a population level. Wildlife habitats would be cleared, but would be allowed to revegetate in areas outside of the permanent right-of-way, resulting in a minor net loss of habitat. Based on the characteristics of identified wildlife and wildlife habitats, anticipated impacts to them, and measures proposed by the Companies to avoid or minimize these impacts, we believe that construction and operation of the proposed Project would not significantly impact wildlife or wildlife habitats.

### 3.6.2 Aquatic Resources

#### 3.6.2.1 Existing Aquatic Resources

As described in Section 3.3, the proposed pipeline would cross a total of 896 waterbodies, all of which are classified as freshwater and support warmwater fisheries. These waterbodies support numerous aquatic species, including fishes and mussels. Specifically, each waterbody that would be crossed by the proposed Project is classified as having fish and wildlife propagation uses and provides aquatic habitat, food, resting, reproductive opportunity, and/or travel corridors to aquatic species. Table 3.6.2-1 lists warmwater fish and mussel species commonly found in waterbodies affected by the proposed Project.

<b>TABLE 3.6.2-1 Fish and Mussel Species Commonly Occurring in the Proposed Project Area</b>	
Common Name	Scientific Name
<b>Fish Species</b>	
Arkansas River Shiner	<i>Notropis girardi</i>
Bigeye Shiner	<i>Notropis boops</i>
Bigmouth Buffalo <sup>a</sup>	<i>Ictiobus cyprinellus</i>
Black Crappie <sup>b</sup>	<i>Poxomis nigromaculatus</i>
Blue Catfish <sup>a,b</sup>	<i>Ictalurus furcatus</i>
Bluegill <sup>b</sup>	<i>Lepomis macrochirus</i>
Bowfin <sup>a,b</sup>	<i>Amia calva</i>
Channel Catfish <sup>a,b</sup>	<i>Ictalurus punctatus</i>
Common Carp <sup>a,b</sup>	<i>Cyprinus carpio</i>
Flathead Catfish <sup>a,b</sup>	<i>Pylodictis olivaris</i>
Largemouth Bass <sup>b</sup>	<i>Micropterus salmoides</i>
Longear Sunfish <sup>b</sup>	<i>Lepomis megalotis</i>
Longnose Gar <sup>a</sup>	<i>Lepisosteus osseus</i>
Paddlefish <sup>a</sup>	<i>Polydon spathula</i>
Shortnose Gar <sup>a</sup>	<i>Lepisosteus platostomus</i>
Smallmouth Buffalo <sup>a</sup>	<i>Ictiobus bubalus</i>
Spotted Gar <sup>a</sup>	<i>Lepisosteus oculatus</i>
Spotted Sunfish <sup>b</sup>	<i>Lepomis punctatus</i>
White Bass <sup>b</sup>	<i>Morone chrysops</i>
White Crappie <sup>b</sup>	<i>Poxomis annularis</i>
<b>Mussel Species</b>	
Mapleleaf	<i>Quadrula quadrula</i>
Southern Mapleleaf	<i>Quadrula apiculata</i>
Texas Liliput	<i>Toxolasma texasensis</i>
Three Ridge	<i>Amlema plicata</i>
Wabash Pigtoe	<i>Fusconaia flava</i>

<b>TABLE 3.6.2-1 (continued)</b> <b>Fish and Mussel Species Commonly Occurring in the Proposed Project Area</b>	
<b>Common Name</b>	<b>Scientific Name</b>
Washboard	<i>Megalonaias nervosa</i>
Three-horned Wartyback	<i>Obliquaria reflexa</i>
Louisiana Fatmucket	<i>Lampsilis hydriana</i>
Pimpleback	<i>Quadrula pustulosa</i>
Paper Pondshell	<i>Utterbackia imbecillis</i>
Deer Toe	<i>Truncilla truncata</i>
Fawnsfoot	<i>Truncilla donaciformes</i>
Rock Pocketbook	<i>Arcidens confragosus</i>
Pistolgrip	<i>Trtigonina verrucosa</i>
NOTES:	
<sup>a</sup>	Commercially valuable species.
<sup>b</sup>	Recreationally valuable species.

No waterbodies crossed by the proposed Project contain or have the potential to contain species managed by the National Marine Fisheries Service. As a result, no essential fish habitat as defined by the Magnuson-Stevens Fishery Conservation and Management Act would be affected by the proposed Project.

### **Fisheries of Special Concern**

Fisheries of special concern include areas containing exceptional recreational or commercial fisheries, specially designated streams or rivers, and waterbodies supporting threatened or endangered aquatic species. The proposed Project would cross five waterbodies containing fisheries of special concern. These include the Red River, which would be crossed twice along the Texas/Oklahoma border (MPs 4.3 and 41.3) and a third time in Louisiana (MP 188.4), Sanders Creek (MP 55.4) in Texas, the Sulphur River (MP 94.0) in Texas, the Ouachita River (MP 291.8) in Louisiana, and the Pearl River in Mississippi (MP L11.4). In addition to the five fisheries of special concern, ODWC has noted that perennial streams in Oklahoma are uncommon and extremely valuable to wildlife. Perennial stream crossings in Oklahoma include the two Red River Crossings on the Texas/Oklahoma border, Pepper Creek (MP 7.6), Island Bayou (MP D19.6), the Blue River (MP BB27.6), and three crossings of Sulphur Creek (MP 29.3, 29.4, and 29.5).

TPWD has also identified Pine Creek as a fishery of special concern. The waterbody would be 20 miles downstream of a crossing of the Red River, but would not be crossed by the proposed pipeline. Three additional waterbodies, including Bois D'Arc Creek in Texas and Bayous Dorcheat and D'Arbonne in Louisiana are specially designated as Louisiana Natural and Scenic Rivers, ecologically sensitive resource waters, or are listed in the National Rivers Inventory. As these waterbodies are primarily designated for reasons other than exceptional fisheries or fish habitat, they are discussed in Section 3.3.2.1.

With the possible exception of Sanders Creek, Island Bayou, Pepper Creek, and Sulphur Creek, each of these waterbodies supports valuable commercial fisheries for catfish, freshwater drum, buffalo, and bowfin. The Pearl River also supports a commercial fishery for gar. In addition to commercial fisheries, each river provides habitat for protected species, including the pallid and shovelnose sturgeons, blue sucker, and Ouachita rock-pocketbook in the Red River; the pink mucket pearl mussel in the Ouachita River; and the paddlefish in the Sulphur River. The Pearl River has been designated as critical habitat for Gulf sturgeon, and is listed in the National Rivers Inventory. Each of these crossings would be conducted by HDD, avoiding impacts to the fisheries. Sanders Creek is designated in the Texas Administrative Code (TAC Title 31, §57.157) as a mussel sanctuary within the Project limits and would be crossed by bore, thereby avoiding impacts to the mussel resources within the waterbody. Additional information for these waterbodies is provided in Section 3.3. Protected species are discussed in Section 3.7. No waterbodies crossed by the Project are known to support significant spawning aggregations of commercial or recreational fisheries of exceptional value.

Of the eight perennial waterbody crossings that would be conducted in Oklahoma, three would be crossed by HDD (the Blue River and two crossings of the Red River), avoiding impacts to the waterbodies, and five would be crossed by flume (Pepper Creek, Island Bayou, and three crossings of Sulphur Creek), minimizing impacts from turbidity and sedimentation. In addition Gulf Crossing has agreed not to construct in waterbodies in Oklahoma between March 1 and May 31 to avoid impacts to breeding fish populations. In Section 4.4.3, we have also recommended that Gulf Crossing incorporate the revised Everhart route variation, which would avoid two crossings of Sulphur Creek (MPs 29.3 and 29.4).

With the use of HDD and bore measures to cross each of the five fisheries of special concern, HDD and flume methods to cross the eight perennial waterbodies in Oklahoma, and adherence to Gulf Crossing's Procedures and our recommendation, we believe that the construction and operation of the proposed Project would not significantly impact fisheries of special concern.

### **General Impacts and Mitigation**

The Companies' proposed waterbody crossing methods are identified in Appendix D of this EIS. Waterbody crossings would be accomplished using either the open-cut or the HDD method, as described in detail in Section 2.3.2. The use of the open-cut crossing method would result in several temporary impacts to aquatic resources including fish and mussels. With the exception of potential impacts from a frac-out, the use of the HDD crossing method would result in the avoidance of impacts to aquatic resources. Additionally, hydrostatic test water would be withdrawn from the source waterbodies listed in Table 3.3.2-4 to facilitate the HDD crossing method and testing of pipeline integrity. Intake of the test water could result in the entrainment of fish and other aquatic organisms and a disruption of stream flow.

Impacts to water quality and aquatic habitats associated with construction of the proposed Project are generally described in Section 3.3. Some of these impacts include physical disturbance, interruptions to fish passage, sedimentation, turbidity, altered water temperatures and DO, and the introduction of contaminants.

Pipeline construction using open-cut methods would result in sedimentation and turbidity in surface waters and aquatic habitats, as described in Section 3.3. Larger benthic invertebrates, which typically provide a key food source for fishes, could be buried under accumulated sediments along with fish spawning sites. In addition to altering fish habitat and food sources, sedimentation can affect mussel species by eliminating habitat or causing direct mortality through burial by sediments. Further, reduced levels of DO, arising from increased turbidity can result in stress, displacement, and mortality to aquatic life including fishes and mussels, particularly during periods of low flows or high water temperatures.

As described in Sections 2.3.2 and 3.3, the use of a HDD would significantly minimize impacts to waterbodies and aquatic species. However, HDD methods are not without risk. A frac-out would cause increased turbidity and sedimentation and would result in impacts to aquatic habitats similar to those described above.

Overhanging vegetation in riparian and adjacent wetland areas, undercut banks, logs and other streamside features provide cover for fish. These types of cover and instream habitats would be disturbed by clearing and open-cut trenching during construction, resulting in decreased shading, increased water temperatures, and displacement of fish from disturbed areas. However, streamside clearing would be localized and would occur immediately adjacent to the construction right-of-way. Overall, these impacts would be relatively minor, as they would affect a relatively small length of a much longer linear stream feature.

Introduction of pollutants into waterbodies and aquatic habitats could occur through the disturbance of contaminated soils or sediments during open-cut operations, accidental spills, hydrostatic testwater discharges, and the inadvertent releases of drilling fluids during HDD. Pollutants would affect fishes and other aquatic life through acute or chronic toxicity; and sub-lethal effects would affect reproduction, growth, and recruitment. Filter feeding species, such as mussels, would be particularly vulnerable to the introduction of pollutants or the disturbance of contaminated sediments. Disturbance and resuspension of contaminated soils and sediments would result in adverse impacts to water quality and instream habitat. No waterbodies containing contaminated soils would be crossed by the proposed Project.

The Companies would not introduce chemicals into the hydrostatic test water. In addition, the test water would be discharged into upland areas through an energy-dissipating device and their Plan and Procedures would be implemented to control erosion and limit the flow of any contaminated sediments into waterbodies. Accidental spills and inadvertent releases of drilling fluids would be controlled and impacts minimized by implementation of the Companies' SPCC Plan and HDD Contingency Plan, respectively. Hydrostatic permitting and notifications are discussed in Section 3.3.

Overall, the impacts to aquatic habitats and species resulting from construction of the proposed Project would be minor, localized, and short-term. Many of the species that occur in the waterbodies crossed by the proposed Project route are accustomed to occasionally turbid conditions and are therefore resilient to such periodic impacts. Removal of riparian vegetation would impact in-stream conditions, but would be localized and relatively minor over the length of the waterbody. The introduction of contaminants to aquatic habitats is relatively unlikely due to the implementation of The Companies' Procedures and SPCC Plan. Operation of the proposed Project would not significantly affect aquatic species and habitats.

### **Minimization and Mitigation Measures**

The Companies propose to construct the Project between April and October of 2008, pending Commission approval. Our Procedures require written approval from the appropriate state agencies prior to conducting construction activities within warmwater fisheries outside of the FERC-approved time window (June 1 and November 30). Written approval has been received from each applicable agency (MDWFP, TPWD, ODWC, and LDWF). In addition, Gulf Crossing has agreed to ODWC's request that it not construct in waterbodies in Oklahoma between March 1 and May 31 to avoid disruption of breeding activities.

In accordance with their Procedures, erosion and sediment controls would be implemented at all waterbody crossings during construction to reduce potential impacts to affected waterbodies. In addition,

the Companies would implement the measures identified in their SPCC Plan, which describes the management of hazardous materials such as fuels that would be used during construction, in order to prevent spills or to minimize their impacts and to prevent contamination of surface water. The Companies have also developed an HDD Contingency Plan that describes the procedures that would be implemented to monitor for, contain, and clean up any potential releases of drilling fluid during HDD operations. The risk of accidental spills or other introductions of hazardous materials to waterbodies and their effects on aquatic life would be effectively minimized by the implementation of the Companies' HDD Contingency Plan and SPCC Plan, as well as their Procedures.

Entrainment of fish eggs and larvae associated with hydrostatic testing would be minimized by the implementation of the Companies' Procedures. These measures include screening to limit entrainment of fishes and maintenance of adequate flow rates to protect aquatic life during withdrawals for hydrostatic testing. Although it is possible that fish eggs and larvae would be entrained through the screens, such impacts would most likely be minor overall.

### **3.6.2.2 Conclusion Regarding Impacts to Aquatic Habitats and Species**

The proposed Project would result in minor, largely temporary impacts to aquatic habitats and species; however, the measures proposed by the Companies, including the use of HDD methods to cross many streams would significantly limit impacts to aquatic species and habitat. Given these measures, the characteristics of identified aquatic species, and the temporary and localized nature of impacts to them, we believe that construction and operation of the proposed Project would result in only minor impacts to aquatic habitat and species.

## **3.7 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES**

### **3.7.1 Federally Listed Threatened and Endangered Species**

Section 7 of the Endangered Species Act (ESA) requires each federal agency to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of federally listed endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat for any federally listed species. The FERC, as lead agency in the review of the proposed Project, is required to consult with FWS to determine whether federally listed species, or their designated critical habitat may occur in the Project area, and to determine the proposed action's potential effects on these species and critical habitats. For actions involving major construction activities with the potential to affect listed species or designated critical habitats, the FERC must report its findings to the FWS in a Biological Assessment (BA).

The Companies as non-federal representatives, conducted informal consultation with FWS field offices in Tulsa, Oklahoma; Arlington, Texas; Lafayette, Louisiana; and Jackson, Mississippi. In addition, the Companies consulted with appropriate state agencies possessing expertise regarding sensitive species, and reviewed endangered and threatened species related database information.

We have reviewed the information submitted by the Companies, performed our own research, and consulted directly with the FWS. Our analysis of the potential for Project-related impacts to federally listed species and their designated critical habitats is provided in this EIS. To comply with Section 7 of the ESA, we request that the FWS consider this final EIS as our BA for the proposed Project.

Based on the Companies' consultation with the FWS and our review of existing records, fifteen federally listed endangered or threatened species are reported to potentially occur in the vicinity of the proposed Project. These species and their management status are listed in Table 3.7.1-1.

**TABLE 3.7.1-1  
Federally Listed Species Potentially Occurring in the Proposed  
Gulf Crossing Project Area**

<b>Species</b>	<b>Oklahoma Status</b>	<b>Texas Status</b>	<b>Louisiana Status</b>	<b>Mississippi Status</b>	<b>County/Parish (Portion of Potential Range Crossed by the Proposed Project)</b>	<b>Determination</b>
<b>Birds</b>						
Eskimo Curlew ( <i>Numenius borealis</i> )	--	E	--	--	Grayson, Fannin, Lamar, Counties, TX.	No Effect. Eliminated from further study due to no occurrence in project area.
Interior least tern ( <i>Sterna antillarum athalaso</i> )	E	E	E	E	Bryan County, OK; Grayson, Fannin, Lamar, Delta, Hopkins, Franklin, Titus, Morris, Cass Counties, TX; Caddo, Bossier, Madison Parishes, LA	Is not likely to adversely affect.
Piping Plover ( <i>Charadrius melodus</i> )	T	T	T	T	Bryan County, OK; Grayson, Delta, Hopkins Counties, TX	No Effect.
Red-cockaded woodpecker ( <i>Picoides borealis</i> )	E	E	E	E	Bossier, Caddo, Webster, Union, Ouachita, Morehouse Parishes, LA	Is not likely to adversely affect.
Whooping Crane ( <i>Grus americana</i> )	E	E	--	--	Grayson and Lamar Counties, TX	No Effect.
<b>Mammals</b>						
Louisiana black bear ( <i>Ursus americanus luteolus</i> )	--	T	T	T	Fannin, Lamar, Delta, Hopkins, Morris, Cass Counties, TX; Richland and Madison Parishes, LA; Hinds Copiah, Simpson Counties, MS	Is not likely to adversely affect.
Ringed map turtle ( <i>Graptemys oculifera</i> )	--	--	T	T	Copiah, Hinds, Simpson Counties, MS	Is not likely to adversely affect.
<b>Fishes</b>						
Bayou darter ( <i>Etheostoma rubrum</i> )	--	--	--	T	Copiah, Hinds Counties, MS	No effect.

**TABLE 3.7.1-1 (continued)  
Federally Listed Species Potentially Occurring in the Proposed  
Gulf Crossing Project Area**

Species	Oklahoma Status	Texas Status	Louisiana Status	Mississippi Status	County/Parish (Portion of Potential Range Crossed by the Proposed Project)	Determination
Gulf sturgeon ( <i>Acipenser oxyrinchus desotoi</i> )	--	--	T	T	Simpson, Hinds, Copiah Counties, MS	Is not likely to adversely affect.
Pallid sturgeon ( <i>Scaphyrhynchus albus</i> )	--	--	E	E	Bossier, Caddo, Madison Parishes, LA	Is not likely to adversely affect.
<b>Invertebrates</b>						
Ouachita Rock- pocketbook ( <i>Arkansia wheeleri</i> )	E	--	--	--	Lamar County, TX	Is not likely to adversely affect.
Pink Mucket Pearlymussel ( <i>Lampsilis abrupta</i> )	--	--	E	--	Morehouse Parish, LA	Is not likely to adversely affect.
<b>Insects</b>						
American Burying Beetle ( <i>Nicrophorus americanus</i> )	E	--	--	--	Bryan County, OK; Lamar County, TX	Is not likely to adversely affect.
<b>Plants</b>						
Earth Fruit ( <i>Geocarpon minimum</i> )	--	--	T	--	Caddo County, LA	Is not likely to adversely affect.
Western Prairie Fringed Orchid ( <i>Platanthera praeclara</i> )	T	--	--	--	Bryan County, OK	Is not likely to adversely affect.
NOTES:						
E = Endangered.						
T = Threatened.						

The Companies have initiated consultations with the FWS regarding impacts to federally listed species as the FERC's non-federal representative, but these consultations are not yet complete. Consultations from each FWS office apply to species within the office's region. The FWS Lafayette, Louisiana Ecological Services Field Office concurred with our determination that the proposed Project is

not likely to adversely affect the pallid sturgeon, earth fruit, Louisiana black bear, interior least tern, red-cockaded woodpecker, and the pink mucket pearl mussel. The FWS Arlington, Texas Ecological Services Field Office, concurred that the whooping crane, the interior least tern, and the piping plover would have no effect from the proposed Project and they also concur with the determination that the proposed Project is not likely to adversely affect the Louisiana black bear and the American burying beetle. In a letter dated August 10, 2007, the Jackson, Mississippi Ecological Services Field Office concurred with our determination that the Mississippi Loop is not likely to adversely affect any of the listed species and stated that no further consultation from this office is necessary.

Currently there are unresolved issues for the Louisiana black bear and the American burying beetle. Gulf Crossing initiated additional consultations with the TPWD Tyler Regional Complex to inquire if additional surveys would be necessary for the Louisiana black bear. The American burying beetle survey report submitted to the FWS Tulsa, Oklahoma Ecological Services Field Office was missing information required by the FWS survey protocol. The Tulsa FWS will not complete Section 7 consultations until these items are submitted with the survey report. Because of the unresolved issues regarding the Louisiana black bear and the American burying beetle, **we recommend that:**

- **Gulf Crossing should not begin construction activities until:**
  - a. **the staff completes Section 7 consultations with the FWS; and**
  - b. **Gulf Crossing has received written notification from the Director of OEP that construction or use of mitigation may begin.**

The preferred habitats, potential for occurrence within the Project vicinity, and our assessment of potential Project effects to federally listed threatened or endangered species are discussed further below.

### **Interior Least Tern**

The interior least tern, a federally listed endangered species, is a small migratory shorebird that is found throughout much of the United States. Breeding, nesting, and rearing occur on non-vegetated portions of sandbars and islands in various rivers, including the Mississippi and Red River systems. Major threats to this species include habitat loss and human disturbance of nesting colonies (FWS 2007d).

The proposed Project would cross the Red River at approximately MP 4.3, 41.3, and MP 188.4. The LDWF stated that the Louisiana Natural Heritage Program (LNHP) database contained a record of the interior least tern present on the banks of the Red River in Bossier Parish, Louisiana approximately 0.7 mile north of the proposed pipeline near MP 188.3 (LDWF 2007a). Gulf Crossing would use the HDD method to cross the Red River at all three proposed pipeline crossings of the Red River. A 150-foot wide buffer would be maintained between the bank of the river and the HDD staging area for the protection of the interior least tern.

The nesting season for interior least terns extends from May 15 through August 31. Gulf Crossing has proposed to construct the proposed Project during this general timeframe, but potential impacts to nesting habitats would be avoided by positioning the HDD entry and exit points well away from non-vegetated sandbars and islands. In the event of a frac-out, the Companies' HDD Contingency Plan would be implemented to minimize potential impacts to the species, such as habitat degradation through the loss of drilling mud.

Should the proposed HDD crossing fail, Gulf Crossing would consult with its engineers and with the resource agencies for alternative crossing measures. The new crossing method would be developed

and approved prior to initiating any instream construction activities at the Red River, and it is anticipated that the required agency consultations would identify any appropriate measures to avoid and minimize potential adverse effects to interior least tern.

The FWS Arlington, Texas Ecological Services Field Office stated that the proposed Project would have no effect on the interior least tern (FWS 2007g). The FWS Lafayette, Louisiana Ecological Services Field Office concurred with Gulf Crossing's finding that the proposed Project is not likely to adversely affect the interior least tern (FWS 2007c). However, to minimize any potential affects to the interior least term during construction, **we recommend that;**

- **Gulf Crossing should use qualified biologists to survey appropriate interior least tern nesting habitat found within 650 feet of any construction areas, should construction activities occur during the nesting season of May 15 to August 31. If any nesting sites are observed, Gulf Crossing should immediately notify the Secretary and reinitiate consultation with the FWS.**

Based on agency consultation, the use of HDD methods to cross the Red River, and Gulf Crossing's commitment to surveying potential habitat prior to construction, we have determined that the proposed Project is not likely to adversely affect the interior least tern.

### **Piping Plover**

The piping plover is a federally listed threatened species that typically winters on the beaches of Texas and Louisiana. Piping plovers breed in the Northern Plains and the Great Lakes regions and may use the Red River as a migratory stopping point (NatureServe 2007). The loss of northern breeding ground habitat, increased predation, and human disturbance, threaten this species (FWS 1991a).

The proposed Project would cross the Red River at three locations. No observations of the piping plover were noted in the TPWD Natural Diversity Database (NDD) or the Oklahoma Natural Heritage Inventory (ONHI) within one mile of the proposed pipeline route (OBS 2006, TPWD 2007b). Gulf Crossing would avoid impacts to the piping plover by using the HDD method to cross the Red River at all three locations. The FWS Arlington, Texas Ecological Services Field Office concurred that the proposed Project would have no effect on the piping plover (FWS 2007g).

Based on agency consultation and the use of HDD methods to cross the Red River, we have determined that construction and operation of the proposed Project would have no effect on the piping plover.

### **Red-cockaded Woodpecker**

The red-cockaded woodpecker, a federally listed endangered species, excavates cavities in mature (greater than 60 years old) pine trees found in open, park-like stands with little or no understory or midstory (FWS 2002). Generally, red-cockaded woodpeckers are intolerant of dense hardwood midstories resulting from fire suppression. An aggregate of suitable cavity trees is called a cluster and may include one to 20 or more cavity trees on tracts from 3 to 60 acres. Foraging habitat is defined as pine and pine-hardwood stands (i.e., 50 percent or more of the dominant trees are pine trees) over 30 years old that are located contiguous to and within 0.5 mile of the cluster (FWS 2002).

Gulf Crossing is using occurrence information, aerial photography, and field investigations to identify potential nesting or foraging habitat along the proposed pipeline route. More intensive field surveys will be performed at areas identified as potential nesting habitat.

The LNHP does not contain records of occurrence within 1 mile of the pipeline route; however, a representative of a managed pine plantation has identified many inactive RCW clusters and potential foraging habitat. The inactive clusters were identified within the proposed pipeline route near MPs 204.2 to 207.0 in Bossier Parish, Louisiana. Gulf Crossing has used qualified biologists to conduct surveys of potential nesting habitat found within 0.5 miles of the route for RCW cavities or individuals along the originally proposed route. Initial project area field investigations and aerial photography identified 36 areas along the project route as potential RCW habitat that would require additional field surveys. Surveys of the 36 areas were performed between July 25 and October 10, 2007. Of the 36 surveyed areas, two were identified as potential RCW foraging habitat and five were identified as RCW nesting and foraging habitat. No active RCWs or signs of recent RCW activity were observed. The results of the surveys indicate that the proposed Project would not affect any active foraging or nesting habitat.

The FWS Lafayette, Louisiana Ecological Services Field Office concurred with Gulf Crossing's determination that the proposed Project is not likely to adversely affect the red-cockaded woodpecker (FWS 2008a).

Based on consultations with the FWS Lafayette, Louisiana Ecological Services Field Office and the results of the surveys, we have determined that construction and operation of the proposed Project is not likely to adversely affect the red-cockaded woodpecker.

### **Whooping Crane**

The whooping crane is listed as a federally endangered species. Whooping cranes feed in upland grain fields, wetlands, and riparian areas. The whooping crane breeds in wetland areas of northern Canada (TPWD 2007c). Whooping cranes will migrate south to Aransas National Wildlife Refuge, on the Gulf Coast of Texas, in September. Habitat conversion to agriculture, short breeding seasons, collisions with aerial obstructions during migration, predation, and killing by humans, has adversely impacted the mortality of the species (FWS 2005).

Although no occurrences were noted within 2 miles of the pipeline route in the TPWD NDD, there may still be the potential for the migrating species to enter or be near the proposed pipeline route (TPWD 2007a). Nesting habitat would not be affected by the proposed Project; however, migratory foraging habitat may be altered. Due to the wide variety of foraging habitat types used by the crane, and the wide variety of habitat available outside of the proposed Project area, the impacts to foraging habitat would be minimal. Generally, within one year of construction, habitat within the proposed Project right-of-way would be restored and available for use by the whooping crane. The Arlington FWS concurred with a no effect determination and no additional consultation with the FWS is required (FWS 2007g). If whooping cranes are identified within 0.1 mile of the Project right-of-way during construction, Gulf Crossing would halt all work, wait for the individual to leave, and would immediately notify the Secretary and the FWS.

Based on the migratory nature of the crane, anticipated impacts to foraging habitat, and consultations with the FWS, we have determined that construction and operation of the proposed Project would have no effect on the whooping crane.

### **Louisiana Black Bear**

The Louisiana black bear, a federally listed threatened species, is one of 16 recognized subspecies of the American black bear. Louisiana black bear populations are listed in Fannin, Lamar, Delta, Hopkins, Morris, and Cass Counties, Texas; Richland and Madison Parishes, Louisiana; and in Copiah,

Hinds, and Simpson Counties, Mississippi. Black bear habitat is primarily associated with forested wetlands; however, bears may utilize a variety of habitat types including marsh, spoil banks, and upland forests. In upland forests, black bears utilize soft and hard forage for food, thick vegetation for escape cover, vegetated corridors for dispersal and movement, large trees for den sites, and isolated areas for refuge from human disturbance. The primary threats to this species are from the continued loss of bottomland hardwoods and fragmentation of the remaining forested tracts as well as human conflicts where they may be intentionally and illegally shot or killed in automobile collisions (FWS 2007d). The FWS also noted that bears may become habituated to human food sources, especially garbage, when activities encroach on their habitat (FWS 2007c). Such habituation can cause nuisance behavior by black bears, which can be very difficult to control and may require removal of the animal or euthanasia, thereby impacting the recovery of this species.

Louisiana black bears den from December through April, preferably in bald cypress and water-tupelo trees with visible cavities that have a diameter at breast height of 36 inches or greater and are located along rivers, lakes, streams, bayous, sloughs, or other waterbodies. Where suitable den trees are unavailable, black bears will often den in shallow burrows or depressions within areas of dense cover (FWS 2007d). The FWS has extended legal protection to “actual” and “candidate” den trees. Actual den trees include any tree used by a denning bear during winter and early spring; candidate den trees are those with visible cavities, having the appropriate diameter, and located along a waterbody. The Companies would construct between April and October, thus preventing disturbance to potentially denning bears.

Louisiana black bear surveys were performed in conjunction with wetland and waterbody surveys. No bears or potential den trees were identified along the Project route during these surveys. The TPWD NDD has identified one sighting of a black bear approximately 1.4 miles northeast of the proposed pipeline in the vicinity of MP 161.5 (TPWD 2007b). Due to difficulty in distinguishing the two subspecies, it was not specified if the sighting was of the Louisiana black bear. There are no occurrences of a black bear (*Ursu americanas*) breeding population along the proposed Project right-of way. The Arlington FWS office has concurred with the Companies’ determination that the proposed Project is not likely to adversely affect the Louisiana black bear.

The proposed route would also cross forested tracts within Richland and Madison Parishes, Louisiana that are being proposed by the FWS as critical habitat for the Louisiana black bear. Critical habitat designation has not been approved for these forested tracts. The Louisiana NHP database identified a potential Louisiana black bear sighting approximately 2,100 feet southwest of MP 348.0 (LDWF 2007a). The proposed pipeline route in Richland and Madison Parishes, Louisiana avoids most forested areas and would be primarily located in agricultural areas. No potential den trees were observed during preliminary field surveys. Gulf Crossing and the FWS are currently in consultation regarding approximately 2.7 miles of the proposed pipeline, from MP AY340 to AY343, which cross through the black bear management area.

The proposed pipeline route approaches, but does not cross the Tensas National Wildlife Refuge (NWR) in Madison Parish, Louisiana. The closest section of the NWR lies approximately 0.5 mile south of MP AY341. The FWS has expended considerable effort in establishing and maintaining forested corridors to allow bear movement and to promote habitat connectivity. The currently proposed route in this area would potentially affect a forested wetland if clearing associated with open-cut construction proceeded as planned. However, most of the forested wetlands encountered were located more than 5 miles northwest of the Tensas River NWR boundary.

Gulf Crossing would provide environmental training to project personnel to reduce the potential for confrontation with the Louisiana black bear. Instruction would include proper food and garbage removal techniques, bear habituation, and identification of potential den trees. Gulf Crossing would

develop measures with the FWS for re-vegetation of affected bear habitats and would share this information with project personnel.

Gulf Crossing submitted to the FWS “Gulf Crossing Project Louisiana Black Bear Operation and Maintenance Procedures” to be implemented during construction and operation of the Project. The operation and maintenance procedures are based upon the “Louisiana Black Bear Conservation Recommendations for Pipelines”, provided by the FWS, and the “Louisiana Black Bear Conservation Provisions for Construction-Related Activities Occurring Within Occupied Habitat”. Example measures would include: returning the construction corridor to pre-construction surface contours, leaving stumps and root systems of cut trees to promote resprouting, and not clearing vegetation during the denning season. In a letter dated January 11, 2008, the FWS acknowledged that by Gulf Crossing following the “Gulf Crossing Project Louisiana Black Bear Operation and Maintenance Procedures”, impacts to the Louisiana black bear would be minimized near MP AY340 to AY343. The Lafayette FWS also concurred with our determination that the proposed Project is not likely to adversely affect the Louisiana black bear.

Additional correspondence was initiated by Gulf Crossing with the TPWD Tyler Regional Complex. To ensure that the potential impacts to the Louisiana black bear are adequately addressed, **we recommend that:**

- **Prior to construction, Gulf Crossing should finalize consultations with the TPWD Tyler Regional Complex to determine the need for additional surveys or mitigation that would further minimize or avoid potential impacts to the Louisiana black bear. Gulf Crossing should file the results of this consultation with the Secretary**

Based on the lack of potential den trees observed during surveys, the reduced amount of Louisiana black bear habitat crossed, construction timeframes altered to avoid the denning season, and Gulf Crossing’s adherence to the measures provided in the “Louisiana Black Bear Conservation Recommendations for Pipelines” and the “Louisiana Black Bear Conservation Provisions for Construction-Related Activities Occurring Within Occupied Habitat”, and consultations with the FWS, we have determined that construction and operation of the proposed Project is not likely to adversely affect the Louisiana black bear.

### **Ringed Map Turtle**

The ringed map turtle, a federally listed threatened species, occurs in the main channel of the Pearl River from near its mouth upstream to Neshoba County in Mississippi. The ringed map turtle's habitat is typically riverine, with a moderate current, and numerous basking logs for adequate sunning. Nesting habitat for this species consists of large, sand and gravel bars adjacent to rivers and streams. The decline of this turtle is attributed primarily to habitat alteration due to channel modification for flood control, navigation, and impoundment, as well as water quality degradation from sedimentation and pollution. Turbidity and sedimentation likely impact the turtle indirectly by adversely affecting its food source of snails and insects (FWS 1992a).

Gulf South proposes to cross the Pearl River by HDD, thereby avoiding impacts to potential habitat. As noted above in regard to the interior least tern, the Companies’ planned pre-construction geotechnical investigations, HDD Contingency Plan, commitment not to use toxic drilling additives, as well as our recommendation regarding review and approval of alternate methods in the unlikely event that HDD should fail, all provide additional protective measure for this species.

The Jackson FWS has concurred with our determination that the proposed Project is not likely to adversely affect the ringed map turtle (FWS 2007h).

Based on the proposed crossing methods of the Pearl River, the Companies' HDD Contingency Plan and consultations with the Jackson FWS, we have determined that construction and operation of the proposed Project is not likely to adversely affect the ringed map turtle.

### **Bayou Darter**

The bayou darter, a federally listed threatened species, is a small fish endemic to Bayou Pierre and the lower reaches of its tributaries: White Oak Creek, Foster Creek, and Turkey Creek, which are located in Copiah, and Hinds Counties, Mississippi. The best habitat for the bayou darter occurs in shallow, meandering sections of Bayou Pierre downstream of headcut areas where stable gravel riffles or sandstone exposures are present and moderate to swift flows occur. Major threats to the Bayou darter are habitat alteration from gravel pit operations, poor agricultural practices, and chemical and/or oil spills (FWS 1991b).

The proposed Project would not cross Bayou Pierre, White Oak Creek, Foster Creek, or Turkey Creek in Mississippi.

Based on no project activities being performed at any of the possible locations for the Bayou darter, we have determined that construction and operation of the proposed Project would have no effect the bayou darter.

### **Gulf Sturgeon**

The Gulf sturgeon, a federally listed threatened species, is an anadromous fish that inhabits the Gulf of Mexico and its drainages, primarily from the Mississippi River east to the Suwannee River. This species may also occur sporadically as far west as Texas and in marine waters in Florida. Adult Gulf sturgeon tend to congregate in the deeper waters of rivers with moderate currents and sand and rocky bottoms (FWS 1994). Spawning adults move upstream in the spring to spawn over coarse substrates such as bedrock, cobble, and gravel in water up to 26 feet deep. Spawning in the upstream reaches of rivers is typically followed by downstream migrations. Juveniles (less than 2 years of age) are not known to migrate out of rivers and estuaries. The species is threatened by habitat destruction and degradation, and by construction of dams that have prevented access to historical migration routes and spawning areas (FWS 1994).

The historical range of the Gulf sturgeon included the Mississippi and Pearl Rivers; the Pearl River would be crossed by the proposed Project route, as well as some larger tributaries. Additionally, the entire Pearl River downstream of Ross Barnett Dam is currently designated as critical habitat for the Gulf sturgeon, including the area of the proposed Project crossing at the border of Copiah and Simpson Counties. Primary constituent elements of the critical habitat include abundant food items, riverine spawning sites, holding areas, flows, water quality, sediment quality, and unobstructed migratory pathways. A review of the Mississippi NHP records indicates that there are no known sightings of the Gulf sturgeon within 1 mile of the proposed Project area (MMNS 2007).

The Pearl River would be crossed by HDD, significantly avoiding impacts to aquatic habitat and species. As noted above in regard to the interior least tern, the Companies' planned pre-construction geotechnical investigations, HDD Contingency Plan, commitment not to use toxic drilling additives, as well as our recommendation regarding review and approval of alternate methods in the unlikely event that HDD should fail, all provide additional protective measure for this species.

The Jackson FWS has concurred with the Companies' determination that the proposed Project is not likely to adversely affect the Gulf sturgeon (FWS 2007h).

Based on the avoidance of habitat in the Pearl River by using HDD, the HDD Contingency Plan, the consultations with the FWS, and our recommendation, we have determined that construction and operation of the proposed Project is not likely to adversely affect the Gulf sturgeon.

### **Pallid Sturgeon**

The pallid sturgeon, a federally listed endangered species, is a large, freshwater fish that lives in large, free flowing, turbid rivers with low to medium gradients. This species could occur in the Atchafalaya, Red, and Mississippi Rivers. Spawning is thought to occur in Louisiana, but detailed habitat requirements are not known. Threats to this species include habitat loss through river channelization and placement of dams (FWS 2001).

A review of the Louisiana NHP records indicates no known sightings of the pallid sturgeon within 1 mile of the proposed Project area (LDWF 2007a). The potential occurrence of the pallid sturgeon within the proposed Project area is limited to large rivers such as the Red River, which would be crossed by HDD at approximately MP 188.4 in Louisiana. As noted above in regard to the interior least tern, the Companies' planned pre-construction geotechnical investigations, HDD Contingency Plan, commitment not to use toxic drilling additives, as well as our recommendation regarding review and approval of alternate methods in the unlikely event that HDD should fail, all provide additional protective measure for this species.

The Lafayette FWS office concurred with the Companies' finding that the Project is not likely to adversely affect the pallid sturgeon (FWS 2007c).

Based on the avoidance of habitat in the Red River by using HDD, the HDD Contingency Plan, and consultations with the FWS, we have determined that construction and operation of the proposed Project is not be likely to adversely affect the pallid sturgeon.

### **Ouachita Rock Pocketbook**

The Ouachita rock pocketbook mussel is federally listed as endangered. The mussel inhabits large areas in medium sized, slower moving rivers with mud, sand, or gravel substrates (FWS 2007i). Major threats to the mussel include habitat modification through impoundments or channelization, or water quality degradation (FWS 2007i).

The Ouachita rock pocketbook mussel is noted to potentially occur in the Red River Basin area. Single dead specimens were observed in Sanders and Pine Creeks, both of which are tributaries of the Red River (FWS 2004). However, the TPWD NDD indicated that there were no known recorded observations of the mussel within 1 mile of the project area (TPWD 2007b). The proposed Project would cross the Red River using the HDD method, avoiding impacts to the habitat and species. As noted above in regard to the interior least tern, the Companies' planned pre-construction geotechnical investigations, HDD Contingency Plan, commitment not to use toxic drilling additives, as well as our recommendation regarding review and approval of alternate methods in the unlikely event that HDD should fail, all provide additional protective measure for this species.

Sanders Creek would be crossed using the open cut method. However, we have recommended in Section 3.6.1 that Gulf Crossing provide a detailed plan to cross this waterbody by HDD or horizontal

bore, both of which, if successful, would avoid impacts to the Ouachita rock pocketbook potentially occurring within there. Pine Creek would not be crossed by the proposed Project.

The Ouachita rock pocketbook would potentially occur only in waterbodies crossed, or recommended to be crossed by HDD or horizontal bore methods; therefore, we have determined that construction of the proposed Project is not likely to adversely affect the Ouachita rock pocketbook.

### **Pink Mucket Pearlymussel**

The pink mucket pearlymussel is federally listed as endangered. The mussel inhabits medium to large rivers with strong currents (FWS 2007j). The pink mucket pearlymussel can be found on sandy and gravel substrates as well as rocky ledges in areas with fast moving water, or mud in slower moving waters (FWS 2007j). Habitat modification, through impoundments or channelization, and water quality degradation are major threats to the survival of this species (FWS 2007j).

The Louisiana NHP indicates that there are no known sightings of the pink mucket pearlymussel within 1 mile of the proposed Project area (LDWF 2007a). Currently the mussel is only known to occur in Bayou Bartholomew in Morehouse Parish, Louisiana. The proposed Project would not cross Bayou Bartholomew. However, the species has been documented as occurring in the Ouachita River in Morehouse Parish, Louisiana. The proposed Project would cross this river using the HDD method, avoiding impacts to the habitat and species. As noted above in regard to the interior least tern, the Companies' planned pre-construction geotechnical investigations, HDD Contingency Plan, commitment not to use toxic drilling additives, as well as our recommendation regarding review and approval of alternate methods in the unlikely event that HDD should fail, all provide additional protective measure for this species.

The Lafayette FWS office has concurred with Gulf Crossing's determination that the proposed Project is not likely to adversely affect the pink mucket pearlymussel in a letter dated June 8, 2007. However, an applicant for a second pipeline project recently notified the FWS that a mussel preliminarily identified as a pink mucket pearlymussel was found in Coulee Ditch in Morehouse Parish, Louisiana. Coulee Ditch would be crossed by the proposed Project by HDD methods and would therefore, not impact the mussel. In a letter dated January 11, 2008, the Lafayette FWS stated that even if the mussel is positively identified as a pink mucket pearlymussel, the proposed Gulf Crossing Project would not impact it.

Both the Coulee Ditch and the Ouachita River would be crossed by the proposed Project; however, both crossings would be conducted by HDD methods. As discussed in Section 3.3, HDD methods, if successful, would avoid impacts to the feature crossed. Therefore, we have determined that the proposed Project is not likely to adversely affect the pink mucket pearlymussel.

### **American Burying Beetle**

The American burying beetle (ABB) is a federally listed endangered species. The ABB can be found in a variety of habitats such as cropland, coniferous forests, herbaceous grasslands, and edge habitat (FWS 2007k). Habitat loss, isolation of populations, and loss of food sources have contributed to the decline of the ABB.

There has been one recorded observation of the ABB north of MP 33 in Oklahoma. The FWS has stated that ABB populations have recently been discovered in Lamar County, Texas. Between June 18 and August 10, 2008 Gulf Crossing performed surveys required in Bryan County, Oklahoma, and Lamar County, Texas. No ABBs were observed during the field survey. Field surveys indicate the

majority of the surveyed route contains poor habitat for ABBs and they are not likely to occur within the proposed Project Area.

The Arlington FWS office concurs with our determination that the proposed Project is not likely to adversely affect the American burying beetle (FWS 2007l). The Tulsa FWS also concurs that the proposed Project is not likely to adversely affect the ABB (FWS 2008b). However, the Tulsa office indicated that Section 7 consultation with the Service would not be complete until the following information is added to the submitted survey report: bait disturbance data on datasheets for transects 5 and 20; corrected survey dates on Table 1 and the datasheets; missing information in the summary report spreadsheet; and clarification on the classification of suitable vs. unsuitable habitat. The finalization of Section 7 consultation would be completed with the submittal of this information; therefore, **we recommend that:**

- **Prior to construction, Gulf Crossing should file the complete American burying beetle survey report with the Tulsa FWS and the Secretary.**

Based on FWS consultations and survey results, we have determined that the Project is not likely to adversely affect the American burying beetle.

### **Earth Fruit**

The earth fruit is federally listed threatened species. The earth fruit is a small plant that may possibly exist in Caddo Parish, Louisiana. It completes its life cycle in 4 to 6 weeks on areas of bare to lightly herbaceous covered saline soils (LDWF 2007b).

The Louisiana NHP database has no known sightings of the earth fruit listed within 1 mile of the proposed Project area (LDWF 2007a). The Lafayette FWS office concurred with Gulf Crossing's determination that the proposed Project is not likely to adversely affect the earth fruit in a letter dated June 8, 2007.

Based on the lack of suitable habitat and consultations with the FWS, we have determined that construction and operation of the proposed Project is not likely to adversely affect the earth fruit.

### **Western Prairie Fringed Orchid**

The western prairie fringed orchid is federally listed as threatened in Oklahoma. It is a perennial that emerges in May and blooms in June to July. Western prairie fringed orchids can be found in moist habitats or sedge meadows that have been lightly grazed, periodically burned, or mowed regularly (FWS 1992b). Fire suppression, overgrazing, habitat fragmentation, and conversion of native prairie to croplands have contributed to the species decline.

The Tulsa FWS has stated that the western prairie fringed orchid is considered extirpated from Oklahoma.

Based on the lack of suitable habitat, we have determined that construction and operation of the proposed Project is not likely to adversely affect the western prairie fringed orchid.

## **3.7.2 Special-status Species**

### **3.7.2.1 State-listed and Rare Species**

In addition to federally listed species, other special status species may also occur within the vicinity of the proposed Project facilities. Special status species include state-listed endangered, threatened, and species of concern identified through consultations with the ODWC, TPWD, LDWF, and MDWFP.

Based on our research and consultation with ODWC, TPWD, LDWF and MDWFP, we have determined that 23 state-listed or rare species, in addition to those discussed above as federally listed, could occur within the vicinity of the proposed Project. These species, their status, and preferred habitat are presented in Table 3.7.2-1. The seven state-listed species that were also identified as federally listed species are discussed in Table 3.7.1-1.

In general terms, impacts to state-listed species would typically be similar to those described above for federally listed species. Birds could be affected by loss of nesting or foraging habitat during clearing for the proposed Project and they could also be disturbed by human activity. Fish could be affected by open-cut trenching through stream habitats, along with the associated increases of turbidity and sediment load. Although larger streams and rivers would typically be crossed by HDD methods that would avoid the impacts associated with open-cut crossings, frac-outs could occur resulting in turbidity and deposition of drilling mud. Terrestrial wildlife, such as mammals and reptiles, could be subject to mortality or displacement during clearing and could lose habitats along the right-of-way.

The generalized impacts described above would largely be avoided or minimized through implementation of the measures that the Companies have proposed and we have recommended. These measures include selective routing through previously disturbed areas where possible, following the FERC's Upland Erosion Control, Revegetation, and Maintenance Plan, development of an HDD Contingency Plan, and implementation of the Companies' Plan and Procedures. The Companies are also developing measures in consultation with the FWS for migratory birds. Given the nature of the species present and the measures that would be implemented as part of this proposed Project, we have determined that impacts to state-listed species would be adequately avoided or minimized.

Although surveys were completed for the American burying beetle, we have determined that the survey report additional information must be submitted to the FWS and filed with the Secretary prior to construction. Additionally, we have determined that Gulf Crossing should continue to consult with the TPWD to determine the need for additional surveys for the Louisiana black bear and submit these consultations to the Secretary prior to construction.

**TABLE 3.7.2-1  
State-Listed and Rare Species Potentially Occurring in the Proposed  
Gulf Crossing Project Area<sup>a</sup>**

Species	Oklahoma Status/Rank <sup>b</sup>	Texas Status/ Rank <sup>bcd</sup>	Louisiana Status/ Rank <sup>b</sup>	Mississippi Status/ Rank <sup>be</sup>	Habitat
<b>Birds</b>					
Bald Eagle	--	T	E	--	Prefers habitat near waterbodies such as coasts, lakes, rivers, and forested wetlands.
Bachman's sparrow ( <i>Aimophila aestivalis</i> )	--	T	--	--	Fire-maintained mature to old pine woodland. Well-developed grass and herb groundcover with limited shrub and hardwood midstory. Able to colonize recent clearcuts, but such habitat is suitable only for a short time. Dry open pine with an undercover of grasses and shrubs, hillsides with patchy brushy areas, overgrown fields with thickets and brambles, grassy orchards, and large clear-cuts.
Peregrine falcon/Arctic Peregrine falcon ( <i>Falco peregrinus / tundrius</i> )	--	E/T	--	--	Nest on high cliffs or tall buildings Migratory only. Eliminated from further study.
Peregrine falcon/ American ( <i>Falco peregrinus / anatum</i> )	--	E	--	--	Nest on high cliffs or tall buildings only in Western Texas. Eliminated from further study.
Wood stork ( <i>Mycteria americana</i> )	--	T	--	--	Swamps and marshes.
<b>Fish</b>					
Blackside Darter ( <i>Percina maculate</i> )	--	T	--	--	Prefers quiet pools with gravel to sand substrate in creeks to medium sized rivers.
Bluehead Shinner ( <i>Pteronotropis hubbsi</i> )	--	T	--	--	Slow moving, muddy/sandy substrate, small to medium sized rivers and backwaters.
Blue Sucker ( <i>Cycleptus elongates</i> )	--	T	--	--	Large areas of major rivers, channels, and flowing pools, all with moderate current.

**TABLE 3.7.2-1 (continued)  
State-Listed and Rare Species Potentially Occurring in the Proposed  
Gulf Crossing Project Area<sup>a</sup>**

<b>Species</b>	<b>Oklahoma Status/Rank<sup>b</sup></b>	<b>Texas Status/ Rank<sup>bcd</sup></b>	<b>Louisiana Status/ Rank<sup>b</sup></b>	<b>Mississippi Status/ Rank<sup>be</sup></b>	<b>Habitat</b>
Creek chubsucker ( <i>Erimyzon oblongus</i> )	--	T	--	--	Creeks and small tributaries of the Red River. River mouths sand and gravel substrate pools, riffles, and lake outlets.
Crystal Darter ( <i>Crystallaria asprella</i> )	--	--	--	E	Prefers sand and gravel bars in large flowing rivers and streams.
Frecklebelly Madtom ( <i>Norturus munitus</i> )	--	--	--	E	Found in rocky riffles and rapids of medium to large rivers.
Paddlefish ( <i>Polyodon spathula</i> )	--	T	S3	--	Slow water in medium and large rivers. Channels, oxbows, backwaters, and impoundments.
Pearl darter ( <i>Percina aurora</i> )	--	--	--	E	Found in shallow, swift rivers; gravel riffles; and gravel or sand pools.
Shovelnose Sturgeon ( <i>Scaphyrhynchus platyrhynchus</i> )	S2	T	--	--	Large, deep turbid rivers with sand or gravel substrate.
<b>Mammals</b>					
Rafinesque's big-eared bat ( <i>Corynorhinus rafinesquii</i> )	--	T	--	--	Shallow caves or rock shelters, hollow trees, abandoned buildings, girder bridges for nesting and roosting. Mature upland and lowland forest.
Red Wolf ( <i>Canis rufus</i> )	--	E	--	--	Brushy and forested areas, apparently now extinct in Texas. Eliminated from further study.
<b>Reptiles</b>					
Alligator snapping turtle ( <i>Macrochelys temminckii</i> )	S2	T	S3	--	Slow, deep water of rivers, sloughs, oxbows, canals, swamps, bayous, ponds, and shallow creeks.
Northern scarlet snake ( <i>Cemophora coccinea copei</i> )	--	T	--	--	Well drained soils, scrubby pines or oaks, found under logs or debris.
Rainbow Snake ( <i>Farancia erytrogramma</i> )	--	--	--	E	Creeks, lakes, cypress swamps, marshes, and tidal flats.
Texas Horned Lizard ( <i>Phrynosoma cornutum</i> )	S2	T	--	--	Open areas with sparse vegetation in sandy to rocky soils, likes to burrow. Eliminated from further study.

**TABLE 3.7.2-1 (continued)  
State-Listed and Rare Species Potentially Occurring in the Proposed  
Gulf Crossing Project Area<sup>a</sup>**

Species	Oklahoma Status/Rank <sup>b</sup>	Texas Status/ Rank <sup>bcd</sup>	Louisiana Status/ Rank <sup>b</sup>	Mississippi Status/ Rank <sup>be</sup>	Habitat
Timber (canebrake) rattlesnake ( <i>Crotalus horridus</i> )	--	T	--	--	Hardwood forests in river bottoms, swampy areas, floodplains, wet pine flatwoods, and hydric hammocks.
<b>Amphibians</b>					
Eastern Tiger Salamander ( <i>Ambystoma tigrinum</i> )	--	--	P	--	Found in a variety of habitats including woodlands, marshes, grasslands, farmlands, and suburbs.
<b>Invertebrates</b>					
Delicate Spike ( <i>Elliptio arctata</i> )	--	--	--	E	Prefers large and medium rivers with riffles. Found among and under rocks.
NOTES:					
<sup>a</sup> Sources: OBS 2007, TPWD 2007b, LDWF 2007a, MMNS 2007, NatureServe 2007.					
<sup>b</sup> E = Endangered, T = Threatened, S2 = Imperiled in state, S3 = Rare or local throughout the state or found in a restricted region of the state, P = Prohibited from possession or harvest of this species, SC = Species of concern, SH = Historically occurred, SA = Accidental occurrence in state.					
<sup>c</sup> Texas Parks and Wildlife Division does not designate species rank for rare or sensitive species.					
<sup>d</sup> Species are listed as rare or imperiled in Texas, but Texas Parks and Wildlife Division have yet to identify species potentially affected by the proposed Project.					
<sup>e</sup> The Mississippi NHP database did not identify any federally or state-listed species within 1 mile of the proposed Project area.					

### 3.8 LAND USE, RECREATION AND SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

In this section we quantify the acreage that would be impacted during construction and operation, describe the current land use of that acreage, and discuss the impacts the proposed Project would have on that land use. We also identify recreational and special interest areas in proximity to the proposed project and assess potential impacts to the activities that occur in those areas. Finally, we discuss the visual resources of the area and evaluate how the proposed project may alter the viewscape.

#### 3.8.1 Land Use

Acreage that would be traversed by the proposed Project has been divided into eight land use categories: agriculture, forested land, pasture, open land, open water, residential, industrial/commercial, and wetlands. Table 3.8.1-1 reports the acreage by land use type that would be affected by construction and operation of the proposed Project. Descriptions of the eight land use categories used in this land use assessment are included in Table 3.8.1-1 and wetlands are described in additional detail in Section 3.4.

Approximately 6,108.8 acres would be affected by the construction of the proposed Project (Table 3.8.1-1). The pipeline construction right-of way and additional temporary workspaces represent approximately 84.7 percent of that acreage. The remaining acreage is divided between aboveground facilities (1.6 percent), access roads (3.6 percent), and pipe storage and contractor yards (10.1 percent). The primary land use types that would be affected during construction are agricultural (43.3 percent) and forested land (38.7 percent). An additional 7.8 percent would be open land and 7.0 percent would be commercial/industrial land. The remaining land use types represent less than 5.0 percent of the proposed construction acreage. Following construction areas outside the permanent right-of-way including lands temporarily used for pipe storage and contractor yards, ATWS, and most construction access roads (approximately 93 percent) would be allowed to revert to their original use and cover type.

Approximately 2,798.4 acres would be converted to an industrial application for the life of the Project. Of that acreage, 97.2 percent would be associated with pipeline right-of-way, 1.8 percent would be associated with above ground structures, and 1.0 percent would be associated with access roads. Land currently classified as agriculture would make up about 41.0 percent of this land, forested land would be 43.5 percent, open land would be 9.6 percent. The remaining land use types represent less than 10.0 percent of the acreage that would be permanently converted.

As described in Section 2.0, the Project as proposed would parallel existing pipeline and utility rights-of-way for approximately 200.1 miles (Table 3.8.1-2). Where the proposed Project parallels the existing right-of-way held by Kinder Morgan, between MP 34.0 and 157.4, the proposed and existing rights of way would overlap by 10 feet. Where the proposed project parallels other existing rights-of-way, the proposed and existing rights-of-way right-of-way would be adjacent but not overlap.

### **Pipeline Facilities**

Construction of the proposed pipeline would impact approximately 4,942.0 acres. These impacts would be associated with right-of-way and ATWS (Table 3.8.1-1 and ATWS Appendix F-1). Agricultural land would make up approximately 46.0 percent of this acreage, 42.4 percent would be forested land, and 7.8 percent would be open land. The remaining land use types represent less than 10.0 percent. Construction of the Mississippi Loop would impact an additional 233.4 acres associated with pipeline right-of-way and ATWS. Of the 233.4 acres, lands classified as agricultural would make up approximately 16.8 percent, 68.4 percent would be forested land, and 13.8 percent would be open land. The remaining land use types would represent less than 10.0 percent of this construction acreage.

As proposed approximately 2,591.5 acres of land would be permanently encumbered by the pipeline right-of-way. Of this acreage, approximately 42.3 percent is classified as agriculture, 42.7 percent is forested land, and 8.9 percent would be open land. The remaining land use types represent less than 10.0 percent of the acreage required during operation. Approximately 129.5 acres of land would be permanently encumbered by Mississippi Loop right-of-way. Of this, approximately 15.7 percent is agricultural, 68.2 is forested land, and 14.9 percent is open land. The remaining land use types represent less than 10.0 percent of the required acreage.

As reported in Section 2.2, FERC is recommending limiting the permanent right-of-way to 50 feet. This would significantly reduce the acreage in the permanent right-of-way.

**TABLE 3.8.1-1**  
**Acres Potentially Affected by the Proposed Project**  
**Land Uses Affected by the Proposed Project (Acres) <sup>a, b</sup>**

Facility or Parish/County	Agricultural		Forest Land		Open Land		Open Water		Residential		Industrial/ Commercial		Wetlands		Total	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.
<b>MAINLINE PIPELINE</b>																
<b>Pipeline Facilities</b>																
Grayson, TX	40.1	24.1	4.7	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.8	26.9
Bryan, OK	320.8	192.6	107.4	64.4	23.2	13.9	4.1	2.5	0.0	0.0	0.0	0.0	0.2	0.1	455.7	273.5
Fannin, TX	63.1	37.9	9.4	5.7	21.8	13.1	0.6	0.4	0.0	0.0	0.0	0.0	0.7	0.5	95.7	57.5
Lamar, TX	429.2	257.5	82.6	49.6	28.1	16.8	0.0	0.0	5.7	3.4	0.7	0.4	0.3	0.2	546.6	328.0
Delta, TX	1.7	1.0	3.2	1.9	1.8	1.1	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	7.3	4.4
Hopkins, TX	0.4	0.2	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.7
Franklin, TX	68.2	41.0	48.2	28.9	20.5	12.3	0.7	0.4	0.0	0.0	0.3	0.2	1.9	1.6	139.8	84.4
Titus, TX	182.5	109.5	56.2	33.7	3.6	2.2	0.9	0.5	0.0	0.0	1.3	0.8	0.2	0.2	244.7	146.9
Morris, TX	74.5	44.7	37.9	22.8	2.4	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	115.1	69.1
Cass, TX	72.1	43.3	385.0	230.7	13.7	8.2	0.0	0.0	1.1	0.7	0.8	0.5	9.1	7.5	481.8	290.9
Caddo, LA	35.9	21.6	89.1	53.8	17.8	10.7	1.8	1.1	4.2	2.5	1.2	0.7	9.5	10.7	159.5	101.1
Bossier, LA	52.7	31.9	180.5	110.6	23.5	13.7	0.0	0.0	0.0	0.0	0.0	0.0	4.4	3.8	261.1	160.0
Webster, LA	3.5	2.1	111.3	70.9	30.6	18.3	0.2	0.1	1.2	0.7	0.0	0.0	17.2	14.8	164.1	106.9
Claiborne, LA	0.0	0.0	271.4	162.9	54.4	32.6	0.0	0.0	0.0	0.0	1.8	1.1	10.0	8.5	337.6	205.1
Lincoln, LA	0.0	0.0	141.3	85.0	38.8	23.3	0.2	0.1	0.0	0.0	0.0	0.0	1.1	4.3	181.3	112.7
Union, LA	21.7	13.0	220.1	129.6	19.2	11.4	0.3	0.2	0.0	0.0	0.0	0.0	13.2	17.5	274.6	171.7
Ouachita, LA	38.1	23.2	46.8	29.8	18.3	11.3	1.2	0.7	0.1	0.1	7.8	4.9	35.0	30.4	147.3	100.4
Morehouse, LA	105.7	64.3	10.1	5.9	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	14.1	14.7	130.2	85.1
Richland, LA	103.0	63.6	18.0	10.8	58.7	35.4	1.8	1.1	4.7	2.8	0.0	0.0	12.3	11.4	198.4	125.1
Madison, LA	206.3	124.4	12.4	7.4	9.4	5.6	1.7	1.0	0.0	0.0	1.3	0.8	2.0	1.9	233.1	141.1
Subtotal Pipeline Facilities	1,819.5	1,095.9	1,836.4	1,107.7	385.9	231.4	14.5	8.7	17.0	10.2	15.3	9.4	131.4	128.2	4,220.0	2,591.5
<b>Aboveground Facilities</b>																
Sherman Compressor Station	20.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	10.0
Paris Compressor Station	0.0	0.0	5.0	1.0	15.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	10.0
Mira Compressor Station	0.0	0.0	20.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	10.0
Sterlington Compressor Station <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	10.0	0.0	0.0	20.0	10.0
Enterprise M&R Station <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Enogex M&R Station	3.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.4
Crosstex M&R Station <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Texas M&R Station	0.0	0.0	2.8	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.4

**TABLE 3.8.1-1 (continued)**  
**Acres Potentially Affected by the Proposed Project**  
**Land Uses Affected by the Proposed Project (Acres) <sup>a, b</sup>**

Facility or Parish/County	Agricultural		Forest Land		Open Land		Open Water		Residential		Industrial/ Commercial		Wetlands		Total	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.
CGT M&R Station	0.0	0.0	0.0	0.0	6.6	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	4.3
CGT Interconnecting Pipeline	0.0	0.0	0.0	0.0	3.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	2.3
SESH M&R Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gulf South M&R Station <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Valves and Other Facilities <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal Aboveground Facilities	23.0	11.4	27.8	12.4	25.4	15.6	0.0	0.0	0.0	0.0	20.0	10.0	0.0	0.0	96.2	49.4
<b>Extra Work Areas</b>																
Contractor/Storage Yards	225.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	378.0	0.0	0.0	0.0	603.0	0.0
Additional Temporary Workspace	452.2	0.0	257.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	722.0	0.0
Access Roads	86.7	18.6	81.3	4.3	33.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.0	216.6	24.4
Subtotal Extra Work Areas	763.9	18.6	338.6	4.3	33.1	1.5	0.0	0.0	0.0	0.0	378.0	0.0	28.1	0.0	1541.6	24.4
Subtotal Mainline Pipeline	2,606.4	1,125.8	2,202.8	1,124.4	444.4	248.5	14.5	8.7	17.0	10.2	413.3	19.4	159.5	128.2	5,857.8	2,665.3
<b>MISSISSIPPI LOOP</b>																
<b>Pipeline Facilities</b>																
Hinds, MS	22.9	13.7	57.1	34.3	25.6	15.3	0.0	0.0	0.0	0.0	1.1	0.7	0.0	0.0	106.7	64.0
Copiah, MS	11.2	6.7	17.9	10.8	2.9	1.7	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	32.7	19.6
Simpson, MS	0.0	0.0	72.1	43.3	3.8	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	76.3	45.9
Subtotal Pipeline Facilities	34.1	20.4	147.1	88.4	32.3	19.3	0.7	0.4	0.0	0.0	1.1	0.7	0.4	0.3	215.7	129.5
<b>Aboveground Facilities</b>																
Harrisville Compressor Station <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Valves and Other Facilities <sup>c</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal Aboveground Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Extra Work Areas</b>																
Contractor/Storage Yards	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0	14.0	0.0
Additional Temporary Workspace	5.2	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	0.0
Access Roads	0.2	0.2	3.4	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	3.6
Subtotal Extra Work Areas	5.4	0.2	15.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0	35.3	3.6
Subtotal Mississippi Loop	39.5	20.6	163.0	91.8	32.3	19.3	0.7	0.4	0.0	0.0	15.1	0.7	0.4	0.3	251.0	133.1
<b>TOTAL PROJECT</b>	<b>2,645.9</b>	<b>1,146.4</b>	<b>2,365.8</b>	<b>1,216.3</b>	<b>476.7</b>	<b>267.8</b>	<b>15.2</b>	<b>9.1</b>	<b>17.0</b>	<b>10.2</b>	<b>428.4</b>	<b>20.1</b>	<b>159.9</b>	<b>128.5</b>	<b>6,108.8</b>	<b>2,798.4</b>

**TABLE 3.8.1-1 (continued)**  
**Acres Potentially Affected by the Proposed Project**  
**Land Uses Affected by the Proposed Project (Acres) <sup>a, b</sup>**

<sup>a</sup> Data was derived from field and desktop verification

<sup>b</sup> Acreages were calculated using linear crossing data and are based on a 100-foot-wide temporary right-of-way in uplands, a 75-foot-wide temporary right-of-way in wetlands, and a 60-foot-wide new permanent right-of way.

<sup>c</sup> Temporary and permanent disturbance is entirely within the existing or proposed compressor stations sites and/or right-of-way.

<sup>d</sup> Interconnecting pipeline for CGT M/R Station is included with aboveground facilities because it is integral to the M/R station. Construction acreage for interconnecting pipeline excludes portion of construction right-of-way that overlaps with temporary workspace for the M/R station.

**TABLE 3.8.1-2  
Existing Rights-of-Way Paralleled by the Pipeline**

<b>Milepost Begin</b>	<b>Milepost End</b>	<b>Type of Right-of-Way</b>	<b>Easement Owner</b>	<b>Width of Existing Right- of-Way (feet)</b>
<b>Mainline Pipeline</b>				
34.0	35.0	Pipeline	Kinder Morgan	100
35.6	39.5	Pipeline	Kinder Morgan	100
40.5	40.8	Pipeline	Kinder Morgan	100
42.8	55.3	Pipeline	Kinder Morgan	100
57.1	57.3	Pipeline	Kinder Morgan	100
58.0	62.4	Pipeline	Kinder Morgan	100
62.8	69.3	Pipeline	Kinder Morgan	100
69.5	70.5	Pipeline	Kinder Morgan	100
73.2	75.6	Pipeline	Kinder Morgan	60
76.5	76.7	Pipeline	Kinder Morgan	60
77.3	80.0	Pipeline	Kinder Morgan	60
80.6	84.5	Pipeline	Kinder Morgan	60
85.2	92.0	Pipeline	Kinder Morgan	60
100.6	101.1	Pipeline	Atmos	60
101.3	103.8	Pipeline	Kinder Morgan	60
104.4	107.4	Pipeline	Kinder Morgan	60
110.9	114.6	Pipeline	Kinder Morgan	60
115.0	115.4	Pipeline	Kinder Morgan	60
116.0	119.2	Pipeline	Kinder Morgan	60
119.5	121.1	Pipeline	Kinder Morgan	60
121.3	121.4	Pipeline	Kinder Morgan	60
121.8	124.1	Pipeline	Kinder Morgan	60
124.6	124.8	Pipeline	Kinder Morgan	60
124.8	126.2	Power Line	Entergy	100
127.0	127.4	Power Line	Entergy	100
127.4	128.1	Pipeline	Kinder Morgan	50
128.5	131.5	Pipeline	Kinder Morgan	60
131.5	133.9	Power Line	Entergy	100
133.9	134.1	Pipeline	Kinder Morgan	50
134.1	134.4	Power Line	Entergy	100
134.4	135.3	Pipeline	Kinder Morgan	50
135.3	135.7	Power Line	Entergy	100
135.8	138.6	Power Line	Entergy	100
138.6	145.4	Pipeline	Kinder Morgan	60
146.1	152.4	Pipeline	Kinder Morgan	60
152.8	157.4	Pipeline	Kinder Morgan	60
161.0	166.2	Power Line	Entergy	100
166.7	166.9	Power Line	Entergy	100
172.8	173.2	Pipeline	Undetermined	20
179.2	179.6	Pipeline	Exxon	30
208.9	209.0	Pipeline	Kerr McGee	25
211.7	212.1	Pipeline	Duke Energy	20
212.9	213.9	Pipeline	Gulf South	40

**TABLE 3.8.1-2 (continued)  
Existing Rights-of-Way Paralleled by the Pipeline**

<b>Milepost Begin</b>	<b>Milepost End</b>	<b>Type of Right-of-Way</b>	<b>Easement Owner</b>	<b>Width of Existing Right- of-Way (feet)</b>
215.6	216.0	Pipeline	Gulf South	40
216.0	216.1	Pipeline	Conoco Phillips	40
216.1	217.5	Pipeline	Gulf South	40
217.6	218.0	Pipeline	Gulf South	40
218.0	218.3	Power Line	LP&L	40
218.3	220.9	Pipeline	Gulf South	40
223.9	227.9	Pipeline	Gulf South	40
228.0	228.1	Pipeline	Gulf South	40
228.2	234.4	Pipeline	Gulf South	40
235.5	237.2	Pipeline	Gulf South	40
237.6	238.4	Pipeline	Gulf South	40
238.4	239.1	Power Line	Entergy	80
239.7	241.2	Pipeline	Gulf South	40
241.2	243.0	Power Line	LP&L	40
243.0	243.5	Pipeline	Gulf South	40
243.5	243.7	Power Line	LP&L	40
243.9	244.7	Pipeline	Regency	60
244.7	245.3	Pipeline	Gulf South	60
245.6	246.3	Pipeline	Gulf South	60
246.3	246.4	Power Line	LP&L	60
246.4	246.9	Pipeline	Gulf South	60
247.1	249.2	Pipeline	Gulf South	60
249.8	250.3	Pipeline	Gulf South	60
250.7	253.0	Pipeline	Gulf South	60
253.0	253.1	Pipeline	Will Drill	60
253.1	253.2	Pipeline	Gulf South	60
253.2	254.2	Pipeline	Texas Gas	60
256.0	259.9	Pipeline	Gulf South	60
262.6	263.5	Pipeline	Gulf South	60
263.7	264.9	Pipeline	Gulf South	60
268.8	270.7	Pipeline	Shoreline	60
270.7	275.5	Pipeline	Gulf South	60
277.3	278.0	Pipeline	Gulf South	60
278.0	278.5	Power Line	LP&L	60
278.5	278.9	Pipeline	Gulf South	60
279.3	283.0	Pipeline	Gulf South	60
285.4	285.7	Pipeline	Center Point Energy	20
287.4	287.8	Pipeline	Center Point Energy	60
287.8	288.0	Power Line	LP&L	30
288.0	289.3	Pipeline	Center Point Energy	60
289.3	290.1	Pipeline	Gulf South	60
292.6	293.5	Pipeline	Center Point Energy	60

**TABLE 3.8.1-2 (continued)  
Existing Rights-of-Way Paralleled by the Pipeline**

<b>Milepost Begin</b>	<b>Milepost End</b>	<b>Type of Right-of-Way</b>	<b>Easement Owner</b>	<b>Width of Existing Right-of-Way (feet)</b>
293.8	295.5	Pipeline	Gulf South	60
297.7	304.2	Pipeline	Gulf South	60
306.8	308.9	Pipeline	Gulf South	60
310.1	312.5	Pipeline	Gulf South	60
313.4	314.4	Pipeline	Gulf South	60
318.5	320.3	Pipeline	Gulf South	60
320.6	322.2	Pipeline	Gulf South	60
326.6	327.9	Pipeline	Gulf South	60
330.0	331.3	Pipeline	Gulf South	60
332.9	333.3	Pipeline	Gulf South	60
334.1	334.4	Pipeline	Gulf South	60
335.5	336.6	Pipeline	Gulf South	60
336.6	336.8	Pipeline	Atmos	60
336.8	337.5	Pipeline	Gulf South	60
337.5	338.0	Pipeline	CO 2	20
347.5	352.3	Pipeline	Columbia Gulf	30
<b>Mississippi Loop</b>				
L0.0	L17.8	Pipeline	Gulf South	60
Note:				
Project Total = 200.1 miles				

### **Aboveground Facilities**

The proposed pipeline includes four new compressor stations, seven new M/R stations (four of which would be collocated with proposed or existing compressor stations, and one of which would include an interconnecting pipeline) and eight pig launcher/receivers (seven of which are collocated with other proposed or existing aboveground structures). The pipeline would also include 18 mainline valves none of which would be collocated with other above ground structures. The Mississippi Loop includes upgrades at an existing compressor station and two pig launcher/receivers; one of which is collocated with an existing compressor station.

The above ground facilities would require a total of 96.2 acres of land in addition to the pipeline right-of-way. Compressor station construction would impact approximately 23.0 acres of agricultural land, 27.8 acres of forested lands, 20.0 acres of Industrial/commercial land, and 25.4 acres of open land. Construction of the Enogex, Texas Gas, and CGT meter and regulation stations (including the CGT M/R interconnecting pipeline) would affect 16.2 acres. No other aboveground structure would require land located outside the permanent pipeline ROW.

Operation of the aboveground facilities would impact approximately 49.4 acres outside the permanent pipeline right-of-way; approximately 23.1 percent is agriculture land, 25.1 percent forested land, 31.6 percent open land, and 20.2 percent industrial/commercial land.

## **Access Roads**

The proposed Project would rely primarily on existing public and private roadways and the right-of-way itself to access the pipeline. During construction, a total of 241 access roads would be required (Appendix F-2). Of these, 139 would be either newly constructed or would require modifications resulting in impacts to 220.3 acres during construction (the majority of these impacts would occur on existing roads).

During operations 28 access roads would be permanently maintained, including those associated with the aboveground facilities. A total of 28.0 acres would be permanently affected. Of that acreage approximately 67.1 percent is currently agricultural land, 27.5 percent is forest land, and the remaining 5.4 percent is open land. All other access roads would be allowed to return to their preconstruction status. Modification of access roads located in wetlands is discussed in Section 3.4.1.

## **Pipe Storage and Contractor Yards**

During construction, 22 pipe storage and contractor yards totaling 617.0 acres would be temporarily utilized (Table 3.8.1-1) (Appendix F-3). Approximately 63.5 percent of the area affected by pipe storage and contractor yards would consist of existing commercial or industrial uses, the remainder is agricultural or pasture land use. Following construction, all pipe storage and contractor yards would be returned to their pre-construction conditions or as specified by landowner agreement.

### **3.8.2 Right-of-Way Easement**

Prior to construction the Companies may secure temporary and permanent right-of-way easements. During the process, the Companies would negotiate landowner compensation for use of the right-of-way. The easement agreement between the company and landowner typically is a private contract that may, among other things: specify compensation for loss of use during construction, loss of nonrenewable or other resources, damage to property during construction, and allowable uses of the permanent right-of-way after construction. These terms can include restrictions on the construction of aboveground structures, including house additions, garages, patios, pools, or any other object not easily removable from the right-of-way, or the planting and cultivating of trees and orchards. During negotiations, the Companies and affected landowners would address the following:

- allowable uses within the right-of-way;
- mechanisms required to allow the pipeline to be traversed by heavy equipment such as log skidders; and
- minor route adjustments to accommodate landowner needs (provided that the route adjustments do not affect environmentally sensitive areas or other non-consenting landowners).

If an easement cannot be negotiated with a landowner and the proposed Project has been certificated by the FERC, the Companies could use the right of eminent domain granted to it under Section 7(h) of the NGA and the procedure set forth under the Federal Rules of Civil Procedure (Rule 71A) to obtain the right-of-way and extra workspace areas. Although the Companies still would be required to compensate the landowner for the right-of-way and for any damages incurred during construction, a court would determine the level of compensation.

FERC often receives comments regarding the potential for a pipeline easement to alter property values. This potential is assessed in Section 3.9.5.

### **3.8.3 General Land Use Impacts and Mitigation**

Land use impacts occur when acreage is encumbered by an easement and when vegetative communities are altered during operation and or construction (e.g. trees are cleared from forest land resulting in conversion to pasture land).

The extent and duration of land use impacts depends upon multiple factors including:

- pre-construction land use;
- post construction restoration methods; and
- activity allowed in the permanent right-of-way.

Following construction, acreage outside the permanent right-of-way would generally be graded, seeded, or otherwise allowed to revert to pre-construction conditions. As such, with the exception of forested acreage, land use impacts outside the permanent right-of-way would be short-term. Although forested areas outside the permanent right-of-way would be allowed to return to pre-construction conditions, re-growth of mature trees would take several years. As such, the duration of impacts in forested acreage is dependent on the type and age of trees removed and long-term impacts could be associated with forested land in the construction right-of-way. To reduce the duration of this impact, some trees would be replanted.

Sections 3.1.2, 3.2.2 and 3.3.2 discuss measures that would be taken to minimize effects to areas of sensitive land use types through avoidance, collocation, and the minimization of construction right-of-way. Measures that would be implemented to minimize or mitigate impacts to wetlands and vegetation are further discussed in Sections 3.4.2 and 3.5.2, respectively. Project avoidance and minimization measures would be implemented to ensure that conversion and impacts to land use types are minimized. Even with these efforts, Project construction would still result in some long-term impacts in forested areas outside the permanent right-of-way.

Lands contained within the permanent pipeline right-of-way where reversion to the pre-construction cover type would not be compatible with the operation of the Project facilities would experience permanent land use type alterations. Land uses not allowed within the permanent right-of-way would include aboveground construction, below ground construction, and the growth, planting, or cultivation of trees. Allowable land uses would include agriculture (including the use of farming equipment and cultivation), and pasture land.

Given the conditions outlined above and compensation negotiated during the easement acquisition process, minor land use impacts do exist and some would persist for the life of the Project.

#### **3.8.3.1 Impacts and Mitigation Specific to Existing Land Use**

The vegetative cover in open land, open water, industrial/commercial lands, and other lands would not be converted by construction or operation of the proposed Project. Wetlands would be affected by the proposed Project, and these impacts are discussed in detail in Section 3.4. Other land use types, including agriculture, forested areas, pastures, and residential lands would be subject to impacts or conversion of land use and are discussed in more detail below.

## **Agricultural, Timber, and Pasture Lands**

The Companies propose to initiate construction in Spring 2008 with a goal of an in-service date of October of 2008. This construction timeframe would include a typical growing season, thus Project-related crop loss could occur. In addition to following the construction procedures and as outlined in their Plan, the Companies would consult with landowners to further reduce impacts on active agricultural fields. Where impacts cannot be mitigated or avoided, the Companies would work with landowners to determine the appropriate compensation for anticipated crop damage and for loss of growing time. The Companies would conduct follow-up inspections of all disturbed areas after the first and second growing season, as outlined in their Plan, to assure the success of revegetation efforts.

While the Companies would implement construction and monitoring procedures in agricultural lands, including pastureland, to minimize adverse effects and ensure proper restoration, pastureland disturbed by construction could take several years to return to preconstruction levels of production. In addition, construction through pastureland could temporarily affect some livestock operations, and some landowners could incur additional costs for supplemental livestock feed. Compensation for such losses would be accomplished through the easement negotiation process. To ensure the safety of livestock during construction, the Companies would likely either construct temporary fencing to keep livestock away from construction areas or develop a grazing deferment plan to minimize impacts to pastureland during construction and restoration activities in accordance with their Plan.

As discussed above, impacts to forested lands would range from long-term in areas outside the permanent pipeline right-of-way to permanent for areas within the permanent pipeline right-of-way. As such, timber production within the construction and permanent rights-of-way would be temporarily reduced or permanently precluded, respectively. The Companies would negotiate with affected landowners to obtain an easement agreement that eliminates timber production within the permanent pipeline right-of-way. Compensation for any losses or limitations on future timber production values within the construction and permanent pipeline rights-of-way would be addressed during those easement negotiations.

Appropriate landowner settlements, special construction measures, restoration, and post-construction monitoring would ensure that landowners are able to resume pre-Project activities in construction easements or that such impacts would be mitigated. Further, settlement negotiations would ensure that property owners are fairly compensated for any loss of revenue associated with the construction or operation of the Project. Given these conditions and the compensation associated with the easement acquisition process, impacts on agricultural, timber, and pasture land would be minor though some would persist for the life of the project.

### **Existing Residences**

Approximately 17.0 acres of low-density residential land use would be affected during construction of the proposed pipeline facilities. There are no residential structures within 50 feet of the construction work areas associated with the Mississippi Loop. Once construction is complete, approximately 10.2 acres would be within the permanent pipeline right-of-way.

Table 3.8.3-1 lists residences within 50 feet of the construction work area.

<b>TABLE 3.8.3-1 Residences Within 50 feet of Construction Work Area and Proposed Mitigation</b>					
<b>MP</b>	<b>County/Parish, State</b>	<b>Number of Residences</b>	<b>Distance from Construction Work Area (feet)</b>	<b>Distance from Pipeline Centerline (feet)</b>	<b>Proposed Mitigation</b>
98.3	Franklin, TX	1	28	68	a
101.1	Franklin, TX	1	40	100	a
128.5	Morris, TX	1	36	96	a
201.3	Bossier, LA	1	26	59	a, b
239.8	Claiborne, LA	1	30	70	a
246.3	Claiborne, LA	1	38	98	a
249.3	Lincoln, LA	1	32	72	a
249.9	Lincoln, LA	1	47	87	a
249.9	Lincoln, LA	1	26	113	a, b
275.9	Union, LA	1	32	92	a
281.6	Union, LA	1	44	104	a
329.1	Richland, LA	1	25	104	a, b

NOTES:

a Avoid removal of mature trees, immediately restore all lawn areas after backfilling the trench, and fence the construction work throughout the open trench phase of construction.

b Reduce the construction work area to maintain 25 feet between the residence and the construction work area.

The general impacts of construction and operation of the proposed Project on residences would result from construction-related disturbances, limitation of land use type within the permanent pipeline right-of-way, and alteration of future development patterns. Specifically, potential construction-related disturbances include inconvenience caused by increased congestion and the noise and dust generated by construction; locally increased traffic; effects on landscaping (including alteration and loss of plantings), wells, and septic systems; and removal of objects such as sheds and trailers from the construction right-of-way. Uses and structures that would be precluded from the permanent pipeline right-of-way include construction of aboveground structures not associated with the proposed Project, construction of septic system leach fields, and planting or cultivation of trees or orchards.

To minimize disruptions to residential areas near construction work areas, the Companies would attempt to coordinate construction work schedules with affected landowners prior to starting construction. To further minimize impacts to residential areas within the vicinity of construction work areas, the Companies would implement the following measures on an as-needed basis:

- maintain access to all residences except for brief periods essential to pipe-laying activities;
- where necessary, install temporary safety fencing to control access and minimize the hazards associated with an open trench;
- notify affected landowners in advance of any scheduled disruption of household utilities and limit the duration of any interruption to the smallest time possible;

- repair any damages to residential property that result from construction activities or provide compensation at fair market value; and
- restore all areas disturbed by construction work areas to “as before or better” conditions.

In general, the FERC seeks to avoid residences because construction activities could inconvenience residents, remove or damage shade trees, disrupt landscaping and gardens, and potentially damage structures. For example, operation of large construction equipment in the immediate vicinity of homes can create dust, noise, and/or muddy conditions. Precautions also must be taken to protect pets and small children. As described in Section 2.5, EIs would be responsible for monitoring and ensuring compliance with all environmental mitigation measures required by the FERC Certificate, if granted, including those residential mitigation measures identified above. Finally, during the easement negotiation process, minor reroutes to the proposed Project’s pipeline alignment also could be made in accordance with landowner needs and requirements if they do not impact significant environmental resources or other landowners.

The Companies contacted local government planning officials to determine whether any new development is scheduled to occur in the vicinity of the Project. No proposals for new residential or commercial development within 0.25 mile of the construction right-of-way or associated aboveground facilities were identified during these consultations.

Given the measures outlined above, impacts to residences would be minor and generally short-term.

### 3.8.4 Recreation and Special Use Areas

#### Levee Crossings

The proposed Project would cross levees associated with the Red River (MP 188.4), Ouachita River (MP 291.8), and Little Boeuf Bayou (MP AT305.4) in Red River and Ouachita Parishes, Louisiana. These levees provide flood control and augment Louisiana’s system of waterborne recreation and transportation. To determine applicable levee crossing requirements, Gulf Crossing is consulting with the Red River, Ouachita River, and Little Boeuf Bayou Districts, the Louisiana Levee Board, Louisiana Department of Transportation and Development, and the COE.

These agencies would review Gulf Crossing’s proposal and detailed construction plans for the proposed levee crossings and would issue permits authorizing the crossings of these levees before construction could occur. Therefore, **we recommend that:**

- **Prior to construction, Gulf Crossing should file with the Secretary the applicable levee crossing permits and authorizations issued by the Red River, Ouachita River, and Little Boeuf Bayou Levee Districts, Louisiana Levee Board, Louisiana Department of Transportation and Development, and COE.**

We believe that permitting and consultation requirements would ensure that the proposed Project would not adversely affect these levees.

#### Red River National Wildlife Refuge

The proposed pipeline route would traverse the acquisition Boundary of the Red River National Wildlife Refuge (NWR), which is intended to be an approximately 50,000-acre refuge with five focus

areas. The acreage, located in Caddo Parish, is to be managed by FWS. At this time however, FWS has not acquired any land in the vicinity of the proposed pipeline route.

### **Louisiana Wetland Management District Easements**

Louisiana Management District provides management and technical assistance to private landowners holding approximately 25,710 acres in northeastern Louisiana. These include former Farmer's Home Administration parcels, fee title tracts, and leases on private lands. The proposed pipeline route would traverse two conservation easement tracts (the Richard Adcock and W.W. Farms tracts) in Richland Parish. Therefore, **we recommend that:**

- **Prior to construction, Gulf Crossing should file with the Secretary the applicable documentation of meetings, special considerations, and agreements reached as a result of consultation with the Louisiana Management District regarding methods used to traverse the Richard Adcock and W.W. Farms tracts.**

### **Heartwood Natural Area**

The Heartwood Natural Area, designated by the State of Louisiana is located just north of the D'Arbonne NWR near MP AQ286. The area provides unique habitat for wildlife resources (Section 3.6). The proposed pipeline route is more than 600 feet away from the Heartwood Natural Area. As such, no land use impacts would occur in the Heartwood Natural Area.

### **Bodcau State Wildlife Management Area**

The pipeline route would cross the Bodcau State Wildlife Management Area (WMA), a 34,355-acre management area in Bossier and Webster Parishes, Louisiana. The WMA is owned by the COE and a private landowner but managed by the LDWF (LDWF, 2005). To reduce impacts Gulf Crossing has proposed a route that results in the shortest crossing distance of approximately 4,500 feet. In addition, impacts to approximately half (2,400 of 4,500 feet) of the crossing length would be avoided by use of an HDD. The remaining crossing length (2,100 feet) would be conducted by open-cut crossing methods.

### **Caddo Black Bayou Preserve**

The Nature Conservancy's Caddo Black Bayou Preserve would be crossed by the proposed pipeline between MP 175.6 to 176.1 in Caddo Parish, Louisiana. The land use along this portion of the pipeline corridor is primarily pasture land. In Section 3.6, we are recommending that Gulf Crossing complete consultation with The Nature Conservancy regarding the crossing of the preserve. We believe that such consultation and any resulting special considerations and agreements would ensure that the proposed Project would not negatively impact conservancy lands along the proposed route.

### **The Nationwide Rivers Inventory**

The Nationwide Rivers Inventory (NRI): is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. The proposed Project would traverse three NRI water bodies: the Blue River, crossed at MP 27.6 in Bryan County, Oklahoma; Bayou D'Arbonne, crossed twice at MPs 267.0, and 284.9, in Lincoln, and Union Parishes, Louisiana, respectively; and the Pearl River, crossed at MP L11.4 of The Mississippi Loop in Copiah County, Mississippi. To reduce potential impacts these rivers would be crossed using HDD.

**Louisiana Natural and Scenic Rivers**

Bayou Dorcheat, crossed at approximate MP 217.6 in Webster Parish, Louisiana, and the segment of Bayou D’Arbonne crossed at MP 284.9, are both designated as Louisiana Natural and Scenic Rivers. To reduce potential impacts these rivers would be crossed using HDD.

**USDA-managed Lands**

The CRP, WRP, and Prior Converted Wetlands program are voluntary programs administered by the NRCS. The CRP is a voluntary program, administered by the Farm Service Agency (FSA) and planned and implemented by the NRCS. The CRP allows owners of agricultural land to conserve those lands through planting of native grasses, trees, and other cover, with financial assistance from the federal government (NRCS 2006a). Typically, these easements retire croplands with erodible soils or otherwise sensitive croplands from production for a period of 10 to 15 years. The WRP offers landowners the opportunity to protect, restore, and enhance wetlands located on their property (NRCS 2006a). The program attempts to improve wetland function and wildlife habitat, and to promote long-term conservation through technical and financial assistance. Prior Converted wetlands are former wetlands converted for agricultural use that are targeted for voluntary restoration under direction of the NRCS and its WRP. After restoration, Prior Converted wetlands are placed in a permanent, protective easement in exchange for compensation and cost-share assistance.

The Companies indicated that no prior converted wetlands would be traversed by the proposed pipeline. A number of CRP lands would be crossed by the proposed pipeline route. However, the location/s and number/s of CRP lands are being withheld by the NRCS for confidentiality reasons.

Three WRP parcels would be traversed by the Project. One is in Fannin County Texas; the remaining parcels are in Madison Parish Louisiana (Table 3.8.4-1). The WRP located between MP AY340 and MP AY342 is part a special project area designed to restore habitat for the Louisiana black bear.

<b>TABLE 3.8.4-1 WRP Lands Crossed by the Project</b>				
<b>Enter Milepost</b>	<b>Exit Milepost</b>	<b>County/Parish</b>	<b>Acreage Impacted<sup>a</sup></b>	<b>Vegetation Description<sup>b</sup></b>
<b>Mainline</b>				
46.7	47.8	Fannin, TX	10.0	Open land, wetland, open water
340.4 <sup>c</sup>	341.1	Madison, LA	3.3	Open land
349.4 <sup>d</sup>	349.7	Madison, LA	0.0	Open land
		Total Acres	13.3	
NOTES:				
<sup>a</sup> Acreage is calculated based on a 75-foot-wide construction right-of-way.				
<sup>b</sup> Open land includes agricultural lands undergoing restoration to forested wetland.				
<sup>c</sup> FWS special project area. Route variation is proposed to limit impacts.				
<sup>d</sup> WRP would be crossed by HDD.				

The WRP land between MP 46.7 and 47.8 is the subject of current discussions between Gulf Crossing and the agency that manages WRP lands for Texas. Section 4.4 contains a condition requesting that Gulf Crossing adopt a route variation to further reduce impacts on this WRP tract.

The Louisiana WRP special project area has been developed between the FWS and the NRCS to restore habitat for the Louisiana black bear in Madison Parish, Louisiana. Two WRPs in this special project area would be avoided by a recently identified route variation as discussed in Section 4.4. Therefore, **we recommend:**

- **Prior to construction, Gulf Crossing should continue to consult with the NRCS and FWS regarding special considerations and agreements for crossing the affected WRP special project area from MP 340.4 to MP 341.1. Gulf Crossing should file with the Secretary for review all applicable documentation of meetings, special considerations, and agreements reached as a result of consultation with the FWS and NRCS regarding construction activities on this WRP in Madison Parish.**

The WRP land located at MP 349.4 would be crossed using the HDD method, thereby avoiding impacts.

A final WRP parcel, located between MP 352.6 and MP 353.1, would be avoided by a recently identified route variation as discussed in Section 4.4.

Upon disturbance caused by construction of the proposed Project, landowners may no longer be eligible to participate in the CRP or to receive the payments that they currently obtain from the NRCS. Because lands included in the construction or permanent pipeline rights-of-way potentially would no longer be eligible for inclusion in the CRP program, affected landowners could experience an associated financial loss. Compensation for any losses or limitations associated with CRP lands would be addressed during those easement negotiations.

### **3.8.5 Transportation**

The proposed Project area is predominately comprised of low-density, rural areas. As such, existing transportation infrastructure in the area traversed by the proposed Project route includes mostly rural roads and highways. Potential impacts are related to project related congestion and potential road or lane closures associated with construction.

With respect to congestion, the majority of construction-related traffic typically occurs in the early morning and late evening, outside the normal times of expected peak traffic. In addition, the Companies report that equipment would be staged near construction corridors in order to minimize movement of heavy equipment and oversized loads. As such, we believe that congestion-related delays would not occur in association with construction of the proposed Project.

Regarding potential road and lane closures, approximately 57 major U.S. or state and interstate highways would be crossed by the proposed pipeline route (Table 3.8.5-1) as well as numerous railroads and lightly traveled paved and unpaved rural roads. As described in Section 2.3, most of the railroads, major highways, and interstates would be crossed using subsurface boring techniques in order to avoid road closings and traffic delays. Even though most of the major road crossings would be bored, crossings at, Interstate 49 (MP 183.2), Highway 167 (MP 259.6), Mott Road (MP 312.9), Interstate 20 (MP 345.2), and Interstate 55 (MP L6.1) would be accomplished via HDDs in association with the crossing of adjacent water body features. Crossing of more lightly traveled paved and unimproved, unpaved rural roads would use open-cut installation, requiring temporary lane blockages and closures and

implementation of detours. In the event that a suitable detour cannot be found, construction across the roadway would be staged to allow at least one lane of traffic to remain open except during actual installation of the pipeline. The Companies have stated that they would make efforts to schedule lane closures outside of peak traffic periods.

<b>TABLE 3.8.5-1 Major Highway Road Crossings</b>		
<b>Facility/Road Name</b>	<b>Parish/County</b>	<b>Milepost</b>
US Highway 78	Bryan County, OK	C12.7
State Highway 70E	Bryan County, OK	22.4
US Highway 70	Bryan County, OK	31.3
US Highway 82	Lamar County, TX	61.6
State Highway 19	Lamar County, TX	75.0
State Highway 37	Franklin County, TX	P98.4
State Highway 71	Franklin County, TX	101.3
US Highway 271	Titus County, TX	BJ108.0
Interstate 30	Titus County, TX	T123.1
US Highway 77	Morris County, TX	U131.1
State Highway 67	Morris County, TX	134.2
State Highway 77	Cass County, TX	141.1
State Highway 8	Cass County, TX	152.7
State Highway 59	Cass County, TX	160.8
State Highway 43	Cass County, TX	164.9
Interstate 49	Caddo Parish, LA	183.2
US Highway 71	Caddo Parish, LA	184.2
State Highway 537	Bossier Parish, LA	190.3
State Highway 3	Bossier Parish, LA	196.0
State Highway 157	Bossier Parish, LA	197.2
State Highway 2	Bossier Parish, LA	202.8
US Highway 371	Webster Parish, LA	212.1
State Highway 160	Webster Parish, LA	218.2
State Highway 159	Webster Parish, LA	BR223.8
State Highway 2	Claiborne Parish, LA	228.6
State Highway 534	Claiborne Parish, LA	229.7
US Highway 79	Claiborne Parish, LA	235.5
State Highway 520	Claiborne Parish, LA	235.5
State Highway 2	Claiborne Parish, LA	239.2
State Highway 806 / Arizona	Claiborne Parish, LA	241.4
State Highway 518	Claiborne Parish, LA	246.3
State Highway 152	Lincoln Parish, LA	256.0
US Highway 167	Lincoln Parish, LA	259.6
State Highway 545	Lincoln Parish, LA	261.4
LA State Highway 151	Lincoln Parish, LA	261.7
State Highway 151 / Fuller Road	Lincoln Parish, LA	263.3

<b>TABLE 3.8.5-1 (continued)</b>		
<b>Major Highway Road Crossings</b>		
<b>Facility/Road Name</b>	<b>Parish/County</b>	<b>Milepost</b>
State Highway 33	Union Parish, LA	271.9
State Highway 15	Union Parish, LA	275.7
State Highway 15	Union Parish, LA	275.7
LA State Highway 143	Union Parish, LA	287.8
State Highway 165	Ouachita Parish, LA	297.4
State Highway 165	Ouachita Parish, LA	297.5
State Highway 134	Ouachita Parish, LA	298.3
State Highway 34	Ouachita Parish, LA	299.6
LA Highway 134	Ouachita Parish, LA	300.2
State Highway 139	Ouachita Parish, LA	304.7
LA Highway 134	Ouachita Parish, LA	305.1
State Highway 137	Morehouse Parish, LA	315.7
State Highway 583	Richland Parish, LA	320.6
State Highway 183	Richland Parish, LA	324.4
State Highway 854	Richland Parish, LA	325.9
State Highway 584	Richland Parish, LA	330.5
State Highway 854	Richland Parish, LA	332.7
State Highway 17	Richland Parish, LA	333.5
U.S. Highway 80	Madison Parish, LA	340.5
Interstate 20	Madison Parish, LA	345.4
Interstate 20	Madison Parish, LA	345.4
U.S. Highway 65	Madison Parish, LA	352.5
<b>Mississippi Loop</b>		
Interstate 55	Hinds County, MS	L6.2
State Highway 473	Copiah County, MS	L9.4

We received a comment from the Oklahoma Department of Transportation requesting that Gulf Crossing coordinate with them on all construction activities and use of public roadways to minimize impacts to motorists. Construction across all roadway features would be accomplished in accordance with the Companies' Plan and the requirements of all applicable crossing permits and approvals. Therefore, any effects to local transportation patterns or infrastructure would be temporary and minor. As periodic maintenance and inspection activities along the proposed pipeline route would involve only infrequent light vehicle movement, no impacts to transportation are anticipated during operation of the proposed Project.

### **3.8.6 Visual Resources**

Visual resources refer to the composite of basic terrain, geologic features, hydrologic features, vegetative patterns, and anthropogenic features that include the visual appeal of an area for residents or visitors. The proposed Project could alter existing visual resources in three ways: (1) construction activity and equipment may temporarily alter viewsapes (2) construction and right-of-way maintenance would alter existing vegetation patterns, and (3) aboveground facilities would represent permanent alterations to

the viewscape. The significance of these visual impacts primarily would depend on the quality of the current viewshed, the degree of alteration of that view, the number of potential viewers, and the perspective of the viewer.

### **3.8.6.1 Current Viewshed**

Most of the proposed Project would extend through primarily rural areas that consist of agricultural lands (43.3 percent) and forested lands (38.7 percent), with only a relatively small area of low-density residential lands. Most areas along the route do not provide long-range unobstructed views, in part because of the topography and in part because much of the land adjacent to the proposed route is forested. However, public viewpoints are present along some of the roadways in the Project area.

The pipeline does cross three water bodies that are listed on the Nationwide Rivers Inventory (NRI), two areas that are designated as Louisiana Natural and Scenic Rivers, and 4,500 feet of the Bodcau State Wildlife Management Area (WMA). Those listed on the NRI are the Blue River, Bayou D'Arbonne, and the Pearl River while the areas designated in Louisiana are The Bayou Dorcheat and a segment of the Bayou D'Arbonne.

### **3.8.6.2 General Impacts and Mitigation**

#### **Pipeline Facilities**

During construction, there would be temporary impacts to visual quality for viewers in the vicinity of the construction right-of-way due to the presence of construction equipment, work crews, and construction activities. This temporary alteration to the views likely would be perceived by some as detrimental while others may derive enjoyment from viewing construction activity. In either case, pipeline construction would represent a short-term, localized alteration to visual resources of the Project area.

After completion of construction, the temporary right-of-way would be restored to approximately preconstruction contours and would be allowed to revert to preconstruction uses and land use type. About 49.6 percent of the proposed pipeline route would traverse agricultural, pasture, and open lands. Pipeline installation in these areas would not result in a significant change to visual resources, as existing vegetative patterns would not be affected during operation of the proposed Project. However, affected forested areas outside the permanent pipeline right-of-way could take many years to recover, and forested land within the permanent right-of-way would be maintained in a condition free of woody vegetation for the life of the Project. To reduce visual impacts related to the permanent pipeline corridor, the proposed route would be collocated with or parallel existing utility rights-of-way where possible, thereby minimizing impacts to previously undisturbed vegetation. In these areas, the visual impacts of the proposed Project would be minor because widening of the existing corridor would not significantly alter existing visual resources. The long-term visual impacts resulting from views of the corridor in existing forested areas where the proposed route would not be collocated with existing rights-of-way generally would be limited to a relatively small number of individuals, or brief observations afforded in areas where the corridor intersects roadways. As a result, we believe the visual impact of the permanent pipeline corridor would be minor.

The Project does not cross any waterbodies that are listed under the National Wild and Scenic River Program by the NPS. As described previously, the pipeline route would cross three water bodies listed by the NRI, two of which have segments that are listed as Louisiana State Natural and Scenic Rivers. The crossing of all of these water bodies would be crossed using the HDD techniques. Where

possible, the river crossings have been made in locations with existing rights-of-way in order to minimize any visual impacts.

### **Aboveground Facilities**

The proposed mainline includes 4 new compressor stations, 7 new metering and regulating (M/R) stations (4 of which would be collocated with proposed or existing compressor stations and one of which includes an interconnecting pipeline) and 8 pig launcher/receivers (7 of which are collocated with other proposed or existing aboveground structures). The mainline would also include 18 mainline valves none of which would be collocated with other above ground structures. The Mississippi Loop includes upgrades at an existing compressor station and two pig launcher/receivers; one of which is collocated with an existing compressor station.

Most of the aboveground facilities would either be constructed in areas where existing viewsheds contain similar features or where views would be occluded by existing vegetation or topography. Given the limited visibility of these sites, screening provided by existing vegetation or landscaping, and frequent collocation with existing utility rights-of-way or industrial facilities, the aboveground facilities as a group would represent a minor visual alteration that would persist for the life of the Project. The potential site-specific visual impacts of each aboveground facility are described below.

### **Compressor Stations**

Typical compressor stations contain several buildings which house compressor units and other associated equipment. Aboveground features outside the buildings themselves would include piping and pig launcher/receiver facilities. Portions of these sites may be paved, covered with gravel, or landscaped, depending on facility operations and maintenance requirements. A chain-link fence would surround the perimeter of each compressor station site. For each of the four new compressor stations, the Companies would purchase a 20.0 acre parcel, of which only 10.0 acres would be permanently altered.

Gulf South plans to add compression to the Harrisville Compression Station in Simpson County, Mississippi. The compressor station is part of a proposed project that should be completed prior to the start of the Gulf Crossing Project. Since this compressor station would already have been constructed, any visual impacts from new aboveground facilities would be consistent with the existing visual setting.

The proposed Sherman Compressor Station would be located at MP 0.0 in Grayson County, Texas in an area dominated by agricultural land. The surrounding landscape is composed of open land broken by mature forest and hedge rows. Gulf Crossing has committed to the following considerations and coordination for this site:

- to retain an architect to assist with the design and siting of the compressor station, landscaping, and lighting to meet the functional needs of the Project and aesthetic preferences of the community;
- enclose the compressor station in a building constructed to meet or exceed the federal standards of 55 decibels at the nearest noise sensitive area; additional noise mitigation would include: mufflers for air intake and exhaust turbines and reciprocating engines, turbines would be started with an electric motor, and a silencer (muffler) on the starting gas/air exhaust;
- mainline or custody transfer regulators would be buried at the site;

- reduce the building elevation, as site conditions allow, to result in an overall lower building and stack height of between 10 feet and 20 feet; and
- to plant evergreen trees (e.g. cedar, pine) around the perimeter of the site to minimize visual impacts.

The Paris Compressor Station would be located at MP 72.7 in Lamar County, Texas. The surrounding landscape is composed of open land broken by mature forest and hedge rows.

Since residences may be able to view both facilities and finalized detailed screening plans have not been provided, **we recommend that:**

- **Prior to construction, Gulf Crossing should file with the Secretary for review and written approval by the Director of OEP, final site screening plans for the Sherman and Paris Compressor Stations. Include copies of any screening plan agreements and correspondence with community groups.**

The proposed Mira Compressor Station would be located at MP 182.7 in Caddo Parish, Louisiana. The proposed parcel consists of both open and forested land in an area surrounded by forest allowing the forest land surrounding the compressor to screen it from viewers.

The final proposed compressor station would be Sterlington located at MP 294.8 in Ouachita Parish, Louisiana. The location of this station would be in an area already characterized as industrial and commercial so no additional visual impacts are anticipated.

### **Metering and Regulation Stations**

Gulf Crossing has proposed the construction of 7 new M/R stations, four of which would be constructed within existing or proposed compressor stations. The M/R stations that would be collocated with compressor stations would have no incremental visual impact. The three M/R stations that would not be collocated would typically have a control building enclosed by a chain link fence and a permanent access road. The M/R stations would be similar in size to small sheds or barns.

There would be no residences with views of the proposed Enogex M/R station (MP 32.8). While the facility would be visible to drivers on nearby roadways, the station would be located near and consistent with an industrial site located approximately 150 feet to the northeast.

There would be no residences with views of the proposed Texas Gas M/R station (MP 299.5). While it would be screened by forest on three sides, it would be briefly visible to drivers on LA State Highway 34.

There would be no residences with views of the proposed CGT M/R station (MP 335.8) or the interconnecting pipeline. While it would be screened by forest on all sides, it may be briefly visible to boaters on Macon Bayou.

### **Pig Launcher/Receivers**

Of the eight proposed pig launcher/receivers 7 would be collocated with other above ground structures and would have no incremental visual impact. The remaining site located at MP L0.0 on the Mississippi loop would be screened from residences by existing trees but would be briefly visible to drivers.

## **Mainline Valves**

MLV sites typically consist of a 50- by 50-foot area surrounded by a chain-link fence within the confines of the permanent pipeline right-of-way. Aboveground elements of each MLV site typically include 12-inch-diameter piping, with valving extending aboveground for blowoffs and bypass.

Based on review of aerial alignment sheets and information provided by the Gulf Crossing, it is likely that a MLV would be visible from nearby residences at two locations (MP 88.2 and MP 141.1). The other proposed MLVs and side valves appear to be either located adjacent to other aboveground facilities or would not be generally visible to nearby residents or the public due to existing vegetation or other visual screens. Each of the visible MLVs would appear as a small fenced area within a cleared right-of-way corridor unless the valve is located in an open field. Although this would result in a long-term effect on visual quality, the significance of the impact would vary with the viewer. Although visible to nearby residents, due to the small size of the MLV facilities, we don't believe the visual impact would be significant at these locations.

### **3.8.6.3 Summary of Visual Impacts**

The long-term visual impacts resulting from views of the pipeline corridor would generally be short term and minor. While impacts in existing forested areas would be long term, the proposed route parallels existing rights-of-way and, where the proposed route would not be collocated with existing rights-of-way, views generally would be limited to a relatively small number of individuals and brief observations afforded in areas where the corridor intersects roadways.

The Project does not cross any water bodies that are listed under the National Wild and Scenic River Program by the NPS. As described previously, the pipeline route would cross three water bodies listed by the NRI, two of which have segments that are listed as Louisiana State Natural and Scenic Rivers. The crossing of all of these water bodies would be crossed using the HDD techniques. Where possible, the river crossings have been made in locations with existing rights-of-way in order to minimize any visual impacts.

As currently proposed some aboveground structures may be visible to residences. We have requested that the Companies assess potential visual impacts at specific sites, and develop site-specific screening plans if warranted.

Pending the results of further assessment of specified aboveground structures, the Project would represent a minor viewscape alteration that would persist for the life of the Project.

## **3.9 SOCIOECONOMICS**

### **3.9.1 Region of Influence**

The proposed Gulf Crossing Project would consist of approximately 356.3 miles of 42-inch-diameter interstate natural gas pipeline, four new compressor stations, and seven new metering and regulating (M&R) stations at interconnect locations along the pipeline. This portion of the proposed Project is referred to as the mainline portion. The portion of the proposed Project that would be constructed by Gulf South is a 17.8-mile-long pipeline loop (Mississippi Loop), which would include adding compression to the existing Harrisville Compressor Stations. The proposed pipelines and associated facilities would be located in nine counties in Texas (Grayson, Fannin, Lamar, Delta, Hopkins, Franklin, Titus, Morris, and Cass), one county in Oklahoma (Bryan), three counties in Mississippi (Hinds, Copiah, and Simpson), and ten parishes in Louisiana (Caddo, Bossier, Webster, Claiborne,

Lincoln, Union, Ouachita, Morehouse, Richland, and Madison). For the purposes of our socioeconomic analysis, we define these counties and parishes as the proposed Project's region of influence.

If the proposed Project was constructed, several potential socioeconomic effects could manifest themselves. Within the region of influence, construction-related effects may include alteration of population levels or local demographics, increased demand for housing or public services, and increased employment opportunities as well as increased government revenue associated with sales and payroll taxes during construction. Potential socioeconomic impacts associated with operation of the proposed Project would include employment opportunities, ongoing local expenditures by the operating company, an increased tax base, and an increase in the demand for provision of public services.

### **3.9.2 Population**

Table 3.9.2-1 reports population and selected demographic characteristics in the states, counties, and parishes that the proposed Project would cross. Using census data for the year 2000 (U.S. Census Bureau 2006a), the Census Bureau projects total population in these counties and parishes in 2005 to have been 1,356,466. Half of the counties in the area of influence have increased in population at rates greater than 10 percent since 1990 with the greatest population increase (33.6 percent) occurring in Fannin County, Texas.

Population densities in the region of influence range from a low of 20.0 persons per square mile in Madison Parish, Louisiana to a high of 286.9 persons per square mile in Hinds County, Mississippi. These densities are generally lower than respective state averages and indicative of largely rural communities. Grayson County in Texas; Caddo, Bossier, and Ouachita Parishes in Louisiana; and Hinds County in Mississippi have somewhat higher population densities. However, the Companies proposed the pipeline route in order to avoid high-density areas to the extent practicable.

Relative to the states, the majority of the counties and parishes have a lower percentage of people who describe themselves as Asian, Native American, or Hispanic, as black or African American. However, the overall proportion of county and parish residents belonging to minority groups is similar to state averages.

During construction, the region of influence would experience a temporary increase in population. Construction is scheduled for April through October 2008 with the peak construction workforce being 3,550 workers, of which an estimated 98 percent (3,479) would be non-local. Assuming that 0.8 family members (FERC 2003) would accompany each non-local worker, total construction related immigration would be approximately 6,263 people. Construction of the main pipeline would occur concurrently using an estimated six individual construction spreads distributed along the Project route and an additional spread for construction of the Mississippi loop. As such, workers would be distributed along the length of the proposed Project route and throughout the region of influence. This would represent a minor, temporary population increase confined to the period of Project construction and would not significantly alter the demographics observed within the region of influence.

During operation, it is estimated that 10 full-time workers and their families would live in the region of influence. This would represent a negligible, but long-term change in population and demographics.

**TABLE 3.9.2-1  
Existing Population and Demographics Conditions in the  
Region of Influence for the Proposed Gulf Crossing Project**

<b>State/ County/ Parish</b>	<b>2005 Population<sup>a</sup></b>	<b>Population Change since 1990 (%)</b>	<b>Population Density</b>	<b>White, non Hispanic (%)</b>	<b>Black or African American (%)</b>	<b>Hispanic (%)</b>	<b>Asian (%)</b>	<b>Native American (%)</b>
<b>Texas</b>	<b>22,859,968</b>	<b>34.6</b>	<b>87.4</b>	<b>49.2</b>	<b>11.7</b>	<b>35.1</b>	<b>3.3</b>	<b>1.0</b>
Grayson	116,834	23.0	125.1	81.7	2.9	8.8	0.7	1.0
Fannin	33,142	33.6	37.2	73.1	7.7	7.2	0.4	1.0
Lamar	49,644	13.0	54.7	79.6	13.3	4.4	0.6	1.0
Delta	5,327	14.5	21.4	87.1	7.0	4.1	0.3	0.9
Hopkins	31,960	10.8	43.5	78.8	7.6	12.2	0.4	0.8
Franklin	10,200	3.7	35.9	73.6	5.0	10.2	0.5	1.0
Titus	29,445	22.6	72.6	54.5	9.9	34.7	0.7	1.0
Morris	12,936	-2.0	51.3	70.7	23.6	4.3	0.3	1.0
Cass	30,155	0.6	32.2	77.3	18.8	2.5	0.2	1.0
<b>Oklahoma</b>	<b>3,543,442</b>	<b>12.6</b>	<b>51.7</b>	<b>72.5</b>	<b>7.7</b>	<b>6.6</b>	<b>1.5</b>	<b>8.0</b>
Bryan	37,623	17.2	41.6	78.0	1.6	3.7	0.6	12.0
<b>Louisiana</b>	<b>4,507,331</b>	<b>6.8</b>	<b>104.6</b>	<b>61.6</b>	<b>33.1</b>	<b>2.8</b>	<b>1.4</b>	<b>1.0</b>
Caddo	251,309	1.2	286.0	49.7	46.5	1.9	0.9	0.0
Bossier	105,541	22.6	126.8	71.7	21.3	3.9	1.4	1.0
Webster	41,356	-1.5	69.5	64.8	33.2	1.0	0.3	0.0
Claiborne	16,309	-6.3	21.6	51.0	48.1	1.0	0.0	0.0
Lincoln	42,108	0.9	89.3	56.6	39.9	1.7	1.4	0.0
Union	22,901	10.1	26.1	69.7	27	2.8	0.3	0.0
Ouachita	148,237	1.3	242.8	62.3	34.8	1.4	0.8	0.0
Morehouse	29,989	-6.1	37.8	54.3	44.6	0.9	0.3	0.0
Richland	20,526	-0.5	36.7	61.0	37.5	1.4	0.2	0.0
Madison	13,728	10.2	20.0	36.0	61.5	2.5	0.3	0.0
<b>Mississippi</b>	<b>2,844,658</b>	<b>10.5</b>	<b>62.3</b>	<b>59.7</b>	<b>36.9</b>	<b>1.7</b>	<b>0.7</b>	<b>0.0</b>
Hinds	250,800	-1.4	286.9	32.7	65.2	0.9	0.5	0.0
Copiah	28,757	4.2	37.6	47.6	50.7	1.4	0.3	0.0
Simpson	27,639	15.4	47.5	63.4	34.7	1.5	0.1	0.0
<b>Total</b>	<b>1,356,466</b>							

NOTE:

<sup>A</sup> U.S. Census Bureau - State and County Quickfacts. <http://quickfacts.census.gov/qfd/>.

### 3.9.3 Economy and Employment

The civilian labor force within the region of influence includes approximately 649,969 individuals (Table 3.9.3-1). The major employment sector is education, health, and social services in all counties and parishes traversed with the exception of Titus and Morris counties where the largest employment sector is manufacturing, followed by education, health, and social services. While unemployment rates are lower than the state average in 15 of the 23 counties and parishes traversed by the proposed Project, per capita income in most counties and parishes is below the respective state average.

State/County /Parish	Per Capita Income (\$) <sup>a</sup>	2003 Population below Poverty Level (%) <sup>b</sup>	2005 Civilian Labor Force <sup>c</sup>	2005 Unemployment Rate (%) <sup>c</sup>	Major Industry <sup>b</sup>
<b>Texas</b>	30,732	16.2	11,309,000	5.30	Education, health, and social services
Grayson	24,652	13.5	56,960	5.20	Education, health, and social services
Fannin	22,013	15.4	13,954	6.10	Education, health, and social services
Lamar	23,593	17.8	23,207	6.10	Education, health, and social services
Delta	20,979	15.9	2,508	5.70	Education, health, and social services
Hopkins	24,128	14.5	17,574	4.50	Education, health, and social services
Franklin	28,038	13.7	5,176	4.60	Education, health, and social services
Titus	24,507	16.4	14,882	4.70	Manufacturing
Morris	25,385	17.1	6,172	6.00	Manufacturing
Cass	23,265	17.4	13,350	6.20	Education, health, and social services
<b>Oklahoma</b>	27,840	14.6	1,751,900	4.40	Education, health, and social services
Bryan	22,316	17.2	19,864	3.70	Education, health, and social services

**TABLE 3.9.3-1 (continued)**  
**Existing Income and Employment Conditions within the**  
**Region of Influence for the Proposed Gulf Crossing Project**

<b>State/County /Parish</b>	<b>Per Capita Income (\$)<sup>a</sup></b>	<b>2003 Population below Poverty Level (%)<sup>b</sup></b>	<b>2005 Civilian Labor Force<sup>c</sup></b>	<b>2005 Unemployment Rate (%)<sup>c</sup></b>	<b>Major Industry<sup>b</sup></b>
<b>Louisiana</b>	27,297	18.1	2,027,700	7.10	Education, health, and social services
Caddo	30,278	19.7	119,227	6.10	Education, health, and social services
Bossier	27,341	13.4	51,407	5.30	Education, health, and social services
Webster	23,582	17.9	19,599	6.40	Education, health, and social services
Claiborne	23,552	22.3	7,007	6.30	Education, health, and social services
Lincoln	23,003	21.1	18,702	6.60	Education, health, and social services
Union	23,361	17.5	10,538	6.30	Education, health, and social services
Ouachita	26,595	19.6	73,006	6.10	Education, health, and social services
Morehouse	21,202	23.3	11,851	9.20	Education, health, and social services
Richland	20,967	23.4	7,932	7.80	Education, health, and social services
Madison	18,427	17.9	4,685	9.70	Education, health, and social services
<b>Mississippi</b>	24,518	18.3	1,318,800	7.90	Education, health, and social services
Hinds	28,896	20.5	127,058	6.90	Education, health, and social services
Copiah	20,283	21.2	12,958	8.40	Education, health, and social services
Simpson	24,030	19.7	12,352	6.50	Education, health, and social services
<b>Total</b>			<b>649,969</b>		

NOTES:

<sup>a</sup> Bureau of Economic Analysis: Regional Economic Accounts. <http://www.bea.gov/bea/regional/reis/drill.cfm>

<sup>b</sup> U.S. Census Bureau - State and County Quickfacts. <http://quickfacts.census.gov/gfd/>.

<sup>c</sup> Bureau of Labor Statistics - <http://www.bls.gov/lau/home.htm>

The Companies would employ approximately 71 local workers during construction. During operation, the proposed Project would create 10 full-time equivalent positions. These positions would

represent a minor increase in employment opportunities during construction and a negligible, permanent increase during operation.

### 3.9.4 Housing

Table 3.9.4-1 reports selected housing statistics for the region of influence. Within this region, there are approximately 18,563 vacant rental units and an additional 9,999 units used for seasonal, recreational, or occasional use. Approximately 14,719 hotel or motel rooms supplement this potential housing stock.

<b>TABLE 3.9.4-1 Temporary Housing Units Available within the Region of Influence for the Proposed Gulf Crossing Project</b>				
<b>State/County/Parish</b>	<b>Vacant Rental Units<sup>a</sup></b>	<b>Units for Seasonal, Recreational, or Occasional Use<sup>a</sup></b>	<b>Number of Hotel/Motel Rooms</b>	<b>Total Units</b>
<b>Texas</b>	<b>249,240</b>	<b>173,149</b>	<b>N/A</b>	<b>422,389</b>
Grayson	1,274	1,735	611 <sup>b</sup>	3,620
Fannin	363	385	121 <sup>g</sup>	869
Lamar	651	238	306 <sup>b</sup>	1,195
Delta	30	89	12	131
Hopkins	512	357	256 <sup>b</sup>	1,125
Franklin	118	864	44 <sup>b</sup>	1,026
Titus	320	120	329 <sup>b</sup>	769
Morris	162	118	28 <sup>c,h</sup>	308
Cass	290	289	43 <sup>b</sup>	622
<b>Oklahoma</b>	<b>50,165</b>	<b>32,293</b>	<b>N/A</b>	<b>82,458</b>
Bryan	475	660	205 <sup>b</sup>	1,340
<b>Louisiana</b>	<b>54,185</b>	<b>39,578</b>	<b>N/A</b>	<b>93,763</b>
Caddo	4,327	741	>2,686 <sup>d</sup>	7,754
Bossier	1,374	450	>2,046 <sup>d</sup>	3,870
Webster	433	458	308 <sup>d</sup>	1,199
Claiborne	171	597	61 <sup>d</sup>	829
Lincoln	891	156	520 <sup>d</sup>	1,567
Union	139	882	40 <sup>f</sup>	1,061
Ouachita	1,969	395	1,551 <sup>b</sup>	3,915
Morehouse	295	253	40 <sup>b</sup>	588
Richland	159	246	209 <sup>b</sup>	614
Madison	104	167	92 <sup>b</sup>	363
<b>Mississippi</b>	<b>29,486</b>	<b>21,845</b>	<b>N/A</b>	<b>51,331</b>
Hinds	4,154	421	5,006 <sup>e</sup>	9,581
Copiah	191	176	145 <sup>e</sup>	512

**TABLE 3.9.4-1 (continued)**  
**Temporary Housing Units Available within the**  
**Region of Influence for the Proposed Gulf Crossing Project**

<b>State/County/Parish</b>	<b>Vacant Rental Units<sup>a</sup></b>	<b>Units for Seasonal, Recreational, or Occasional Use<sup>a</sup></b>	<b>Number of Hotel/Motel Rooms</b>	<b>Total Units</b>
Simpson	161	202	60 <sup>e</sup>	423
<b>Total</b>	<b>18,563</b>	<b>9,999</b>	<b>14,719</b>	<b>43,281</b>

NOTES:

<sup>a</sup> U.S. Census Bureau. American fact finder. <http://factfinder.census.gov/>

<sup>b</sup> United States Hotel Directory and Reservations. <http://www.2motelrates.com>

<sup>c</sup> Scenic View Marina Website. April 2007: <http://scenicviewmarina.com/motel2.html>

<sup>d</sup> Coordinating and Development Corporation. <http://www.cdconline.org>

<sup>e</sup> State of Mississippi. [http://www.visitmississippi.org/packages/hotel\\_motels\\_resorts.asp](http://www.visitmississippi.org/packages/hotel_motels_resorts.asp)

<sup>f</sup> D'Arbonne Lake Motel. Farmerville, LA. April 2007

<sup>g</sup> Bonham Economic Development Corporation. [http://www.bonhamedco.com/community\\_profile.html](http://www.bonhamedco.com/community_profile.html)

<sup>h</sup> Cajun Cowboy Motel Website. <http://www.cajuncowboymotel.com>

At its peak, construction of the proposed Project would require about 3,479 non-local workers. If each non-local worker required his or her own housing unit, an extremely unlikely event given the nature of pipeline construction, the non-local work force would occupy about 8.0 percent of the temporary housing within the region of influence. Thus, while local hotels may have very low vacancy rates during construction periods, the temporary housing appears capable of meeting the temporary and moderate increase in housing demand that would result from construction of the proposed Project; the housing demands of the 10 individuals employed during operation of the proposed Project would have a negligible effect on area housing.

### 3.9.5 Property Values

The FERC frequently receives comments regarding project impacts on property values. The concerns generally center on four topics: devaluation of property if encumbered by a pipeline easement, identification of the party responsible for property taxes within a pipeline easement, the potential for project effects on landowner insurance premiums, and the potential for reduced property values associated with lost timber and agricultural production.

There are a number of factors that can influence how a natural gas project may influence the value of any land parcel. Some of these factors include the size of the property, the presence of other pipelines in the area, the current value of the parcel and its land use, and the value of other nearby properties. Potential purchasers may or may not make a decision based on the presence of the proposed Project and the future use of the property. It is possible that the potential purchaser will not acquire the parcel due to the presence of the pipeline. However, each potential purchaser has differing criteria and means.

That said, if the pipeline was constructed and a landowner felt that the presence of the pipeline reduced their property value, he or she could appeal to the local property taxation agency and obtain a reassessment of the property value that incorporated the easement. Following the reassessment, the property owner would be responsible for all property taxes associated with their parcel.

Regarding the potential for insurance premium adjustments associated with pipeline proximity, insurance advisors consulted on other natural gas projects reviewed by the FERC have indicated that LNG terminals and associated pipeline infrastructure do not affect homeowner insurance rates (FERC 2004). As such, the FERC believes that homeowners' insurance rates are unlikely to change as a result of construction and operation of the proposed Project facilities.

As described in Section 3.8, construction and operation of the proposed Project would result in a short-term loss of croplands (2,645.9 acres) as well as loss of timber (2,365.8 acres) and agricultural (1,146.4 acres) productivity. After construction is complete, agricultural practices would be allowed to resume along the right-of-way and croplands will be monitored for 2-years to determine if any restoration is needed. While timberlands within the temporary construction areas would be allowed to convert back to pre-construction uses, timberlands within the right-of-way will not. During easement negotiations, compensation for any loss of current or future agricultural and timber production would be considered.

### 3.9.6 Government Revenue

The applicant estimates that, during construction, approximately \$15.6 million of the estimated \$312.5 million construction payroll would be spent locally for the purchase of goods such as housing, food, gasoline, and entertainment. The exact amount would be dependent on the proportion of the workforce that was local, the behavior of individual workers, and the duration of their stay. In addition, approximately \$28.5 million worth of construction related materials would be purchased locally. These construction-related expenditures would be subject to Texas' state sales tax of 6.25 percent, Louisiana's state sales tax of 4 percent, Mississippi's state sales tax of 7 percent, or Oklahoma's 4.5 percent sales tax. This increase in sales tax revenue would represent a minor, short-term increase in government revenues.

Table 3.9.6-1 contains the Applicant's estimate of the annual taxes that would be payable to each county and parish traversed by the proposed Project. On average, operations-related taxes would represent approximately 1.9 percent of each individual county's total revenues. Thus, operation of the proposed Project would provide a permanent, minor increase in government revenues.

<b>TABLE 3.9.6-1 County Revenue and Estimated Annual Taxes for the Proposed Gulf Crossing Project</b>			
<b>State/County/Parish</b>	<b>Total Revenue<sup>a</sup></b>	<b>Estimated Annual Taxes</b>	<b>Percent Change</b>
<b>Texas</b>			
Grayson	239,223,000	1,025,000	0.4
Fannin	46,364,000	249,000	0.5
Lamar	91,460,000	1,672,000	1.8
Delta	12,355,000	20,000	0.0
Hopkins	72,755,000	3,000	0.0
Franklin	23,565,000	307,000	1.3
Titus	120,351,000	572,000	0.5
Morris	25,043,000	242,000	1.0
Cass	81,303,000	1,093,000	1.3

<b>TABLE 3.9.6-1 (continued)</b>			
<b>County Revenue and Estimated Annual Taxes for the Proposed Gulf Crossing Project</b>			
<b>State/County/Parish</b>	<b>Total Revenue<sup>a</sup></b>	<b>Estimated Annual Taxes</b>	<b>Percent Change</b>
<b>Oklahoma</b>			
Bryan	51,041,000	2,276,000	4.5
<b>Louisiana</b>			
Caddo	603,142,000	1,817,000	0.3
Bossier	240,908,000	1,721,000	0.7
Webster	76,982,000	1,180,000	1.5
Claiborne	39,726,000	2,278,000	5.7
Lincoln	73,936,000	1,244,000	1.7
Union	30,700,000	1,891,000	6.2
Ouachita	296,142,000	2,028,000	0.7
Morehouse	71,029,000	937,000	1.3
Richland	55,064,000	1,382,000	2.5
Madison	21,135,000	1,543,000	7.3
<b>Mississippi</b>			
Hinds	553,902,000	720,000	0.1
Copiah	50,163,000	220,000	0.4
Simpson	39,764,000	1,610,000	4.0
<b>Total</b>	<b>2,916,053,000</b>	<b>26,030,000</b>	<b>1.9</b>
NOTES:			
<sup>a</sup> U.S. Census Bureau - 1997 Finance and Employment FastFacts: <a href="http://harvester.census.gov/finance/asp/finance.asp">http://harvester.census.gov/finance/asp/finance.asp</a>			

### 3.9.7 Public Services

Table 3.9.7-1 summarizes the number of full-time equivalent educational, medical, police, and fire protection employees in the counties and parishes traversed by the proposed Project. These employees serve a population of approximately 1,356,466 people (Table 3.9.2-1).

Construction of the proposed Project would temporarily increase demand for medical, police, and fire protection services; increased demand would correspond to the movement of each construction spread. The Applicant has consulted with the local municipal services to make sure that they are able to respond to a major emergency, should one occur, during construction and operation of the Project.

**TABLE 3.9.7-1  
Existing Educational, Medical, Police, and Fire Full-time Equivalents  
within the Region of Influence for the Proposed Gulf Crossing Project<sup>a</sup>**

<b>State/County/Parish</b>	<b>Education</b>	<b>Health and Hospitals</b>	<b>Police Protection</b>	<b>Fire Protection</b>	<b>Total Health, Fire, and Police</b>
<b>Texas</b>	<b>539,530</b>	<b>62,160</b>	<b>52,718</b>	<b>18,680</b>	<b>133,558</b>
Grayson	2,798	1,505	211	125	1,841
Fannin	812	3	51	10	64
Lamar	1,657	1	99	44	144
Delta	210	0	6	0	216
Hopkins	836	297	71	25	1,229
Franklin	221	0	19	0	19
Titus	1,022	643	56	22	721
Morris	468	0	11	0	11
Cass	1,241	287	59	20	366
<b>Oklahoma</b>	<b>80887</b>	<b>10,446</b>	<b>8,209</b>	<b>3,954</b>	<b>22,609</b>
Bryan	986	0	65	29	94
<b>Louisiana</b>	<b>101,050</b>	<b>13,675</b>	<b>11,791</b>	<b>4,280</b>	<b>29,746</b>
Caddo	7,078	84	859	523	1,466
Bossier	2,809	604	228	167	999
Webster	990	0	59	12	71
Claiborne	470	395	18	0	413
Lincoln	943	4	92	51	147
Union	639	36	60	0	96
Ouachita	3,657	24	442	374	840
Morehouse	852	0	100	53	153
Richland	600	403	21	4	428
Madison	386	0	1	0	1
<b>Mississippi</b>	<b>69,336</b>	<b>17,885</b>	<b>7,094</b>	<b>3,164</b>	<b>28,143</b>
Hinds	7,412	0	1,194	446	1,640
Copiah	791	141	58	15	214
Simpson	655	53	51	0	104
<b>Total</b>	<b>37,533</b>	<b>4,480</b>	<b>3,831</b>	<b>1,920</b>	<b>11,277</b>

NOTE:  
<sup>a</sup> U.S. Census Bureau - 1997 Finance and Employment FastFacts:  
<http://harvester.census.gov/finance/asp/finance.asp>

We note that construction of the proposed Project would occur during a portion of the school year, and a significant influx of students would place considerable strain on the region's approximately

37,533 education workers. However, due to the nature of the proposed construction and the April through October schedule, non-local workers are not expected to be accompanied by substantive numbers of children. Thus, any impact on the education system would be minor and temporary.

During operation, the 10 full-time workers and their families would represent a negligible increase in the local population and demand for public services such as schools, local law enforcement, and fire protection. This increase could be offset by increased government revenue stemming from the Project.

### **3.9.8 Impacts on Specific Economic Sectors**

Below, we consider the potential for the proposed Project to result in significant effects to the agriculture and forestry economic sectors. These sectors are defined to include activities associated with harvested crops, timber production, livestock pasturing, and dairy production. This analysis focuses on the effects of potential land use changes (i.e., incorporation of agricultural lands into the construction or permanent rights-of-way) on regional economic sectors. Additional discussions of the potential for site-specific effects to agricultural or forestry lands that would be crossed by the proposed pipeline route are in Sections 3.2 and 3.8.

Approximately 57 percent of Texas is described as rangeland. Texas cover types also include cropland (16 percent), pastureland (10 percent), and forested land (6 percent). Approximately 47 percent of Louisiana is described as forested land, 21 percent is cropland, 9 percent is pastureland; and less than 1 percent is rangeland. Mississippi is 55 percent forested land, 18 percent cropland, 12 percent pastureland, and less than 1 percent rangeland. Oklahoma is 17 percent forested lands, 22 percent cropland, 32 percent rangeland, and 18 percent pastureland (NRCS 2006).

As described in Section 3.8, construction and operation of the proposed Project would permanently affect approximately 1,146.4 acres of agricultural land and 137.5 acres of lands currently utilized for commercial forestry as pine plantation, as these areas would be contained within the permanent pipeline right-of-way. As discussed throughout this EIS, agricultural operations within the vast majority of permanent pipeline right-of-way would not be precluded during operations. Because landowners would be compensated, via the easement acquisition process, for construction related losses associated with agricultural land and because affected agricultural lands generally return to preconstruction productivity within a few years, impacts to the agricultural sector would be negligible and short-term. Similarly, given the magnitude of the land potentially affected relative to the total amount of land dedicated to sector production and again noting the existence of compensation via the easement acquisition process, impacts to the forestry sector would be negligible but would persist for the life of the project.

### **3.9.9 Environmental Justice**

Executive Order 12898 on Environmental Justice recognizes the importance of using the NEPA process to identify and address, as appropriate, any disproportionately high and adverse health or environmental effects of its programs, policies, or activities on minority populations and low-income groups. The provisions of Executive Order 12898 apply equally to Native American programs. Consistent with Executive Order 12898, the CEQ called upon federal agencies to actively scrutinize the following issues with respect to environmental justice (CEQ 1997):

- the racial and economic composition of affected communities;
- health-related issues that may amplify project effects on minority or low-income individuals;
- and

- public participation strategies, including community or tribal participation in the process.

The EPA provides guidance on determining whether there is a minority or low income community to be addressed in a NEPA analysis. Minority population issues must be addressed when they comprise over 50 percent of an affected area or when the minority population percentage of the affected area is substantially greater than the minority percentage in the larger area of the general population. Low income populations are those that fall within the annual statistical poverty thresholds from the U.S. Department of Commerce, Bureau of the Census Population Reports, Series P-60 on Income and Poverty.

### **3.9.9.1 Potential for Disproportionate and Adverse Impacts**

Minority populations comprise less than 50 percent of the population in 19 of the 23 counties and parishes traversed by the proposed Project, and minorities do not comprise more than 50 percent of the population in the region of influence as a whole. However, minorities do comprise greater than 50 percent of the population in four of the counties or parishes within the region of influence (Table 3.9.2-1). Caddo and Madison Parishes, Louisiana, have minority populations that comprise approximately 50.3 and 64 percent, respectively, of the total parish populations. Similarly, Hinds and Copiah Counties, Mississippi, have minority populations that comprise approximately 67.3 and 52.4 percent, respectively, of the total county populations. To further assess whether the minority population in the region of influence is substantially greater than the minority population in surrounding areas, we compared county and parish level demographics to the respective statewide proportions. The proportion of individual minority populations is greater than respective state level statistics in 15 of the 23 counties and parishes that make up the region of influence for the proposed Project (Table 3.9.2-1). These statistics are indicative of a potentially disproportionate effect on minority populations.

The majority of the counties and parishes traversed by the proposed Project have unemployment rates that are similar to or lower than the respective statewide levels, but 9 of the counties or parishes within the region of influence have unemployment rates that are higher than the respective state levels (Table 3.9.3-1). These include Fannin, Lamar, Delta, Morris, and Cass Counties, Texas (unemployment rates ranging from 5.7 to 6.2 percent relative to a statewide average of 5.3 percent); Morehouse, Richland, and Madison Parishes, Louisiana (unemployment rates ranging from 7.8 to 9.7 percent relative to a statewide average of 7.1 percent); and Copiah County, Mississippi (unemployment rate of 8.4 percent relative to a statewide average of 7.9 percent). Additionally, per capita income figures are lower in 20 of the 23 counties and parishes within the region of influence as compared to statewide income data (Table 3.9.3-1), and per capita income within these counties and parishes, ranges from 2.0 to 32.5 percent lower than the respective statewide values. Similarly, the percentage of the population below the poverty level is higher than statewide percentages in 14 of the counties or parishes within the region of influence, most notably Louisiana, where seven of ten parishes have poverty rates ranging from 1.2 percent to 22.6 percent higher than statewide percentages. These statistics are indicative of a potentially disproportionate effect on low-income communities.

Given the potential for disproportionate effects on minority and low-income communities, we have considered whether potential Project-related effects would be adverse. As described in Section 3.9, the proposed Project would have negligible to minor effects on socioeconomic characteristics and economies within the region of influence and many of the Project-related effects, while minor, would generally be viewed as positive. As discussed throughout this EIS, any potentially negative environmental effects associated with the proposed Project would be minimized and/or mitigated, as applicable. Further, the proposed Project would generally be located in rural areas of low population density. Although the racial and economic composition of the counties and parishes traversed by the proposed Project route shows some deviations from state-level statistics, as described above, there is no

evidence that the proposed Project would cause a disproportionate share of adverse environmental or socioeconomic impacts on any racial, ethnic, or socioeconomic group.

The primary health issue related to the proposed Project would be the risk associated with an unanticipated pipeline failure. Section 3.12 discusses the localized risks to public safety that would result from a pipeline failure and describes how applicable safety regulations and standards would minimize the potential for these risks. The routing of the proposed Project through rural, sparsely populated areas would further minimize the number of persons who would be at risk of injury due to a pipeline failure, and there is no evidence that such risks would be disproportionately borne by any racial, ethnic, or socioeconomic group.

To summarize, though the racial and economic composition of the counties and parishes traversed by the proposed Project route shows some deviations from state-level statistics, as described above, there is no evidence that the proposed Project would cause a disproportionate share of adverse environmental or socioeconomic impacts on any racial, ethnic, or socioeconomic group. The socioeconomic impacts of the proposed Project are generally not considered to be adverse, and there is no evidence that the slight risk of a pipeline failure would be disproportionately borne by any group.

### **3.9.9.2 Public Participation Strategies**

Executive Order 12898 also emphasizes the importance of providing opportunities for community input into the NEPA process. The mailing list for the Project was initiated when the notification announcing the pre-filing environmental review process for the proposed Project was first issued in November 2006 and has been continuously updated during the EIS process. The original mailing list included all affected property owners along the proposed facilities, as identified by the Companies, without any distinction based on minority or income status. Though no tribal lands would be crossed by the proposed Project route, the mailing list also included Native American tribes identified as having an interest in the general Project area.

In addition, the Companies mailed notification letters to landowners, government officials, and the general public informing them about the project and inviting them to attend open houses to learn about the Project and to ask questions and express their concerns. Six open houses were held in the Project area in January and March 2007. These meetings were held in non-government buildings such as community centers and local hotels. Notifications of these open houses were also published in local newspapers. The FERC staff also held four public scoping meetings in the Project area during April 2007 to provide property owners, municipalities, counties, special interest groups, and state and federal regulatory agencies an opportunity to comment on the Project. The dates and locations of the meetings were included in the NOI issued by the FERC and posted on the FERC Internet website. A FERC-sponsored public site visit was held in July 2007 to give the public an opportunity to learn more about the Project modifications proposed by the Companies, as announced in a Supplemental NOI issued by the FERC. A second site visit was noticed and held in September 2007 to assess potential alternative locations for the Sherman Compressor Station.

The distribution list for the Final EIS includes affected landowners; federal, state, and local government agencies; elected officials; environmental and public interest groups; Native American tribes; local libraries and newspapers; and other parties who provided scoping comments, asked to remain on the mailing list, or wrote to the FERC or one of the cooperating agencies asking to receive a copy of the document. A formal notice was published in the Federal Register, indicating that the Final EIS is available and has been mailed to individuals and organizations on the distribution list prepared for the proposed Project (see Appendix A). Section 1.4 further describes the public notification and participation

process completed for the proposed Project, and Section 3.10 describes contacts with Native American tribes that traditionally occupied, or currently occupy, the Project area.

### **3.9.9.3 Environmental Justice Summary**

In summary, information about the proposed Project has been readily available to the public and no disproportionately high and adverse human health or environmental effects on minority and/or low-income communities or Native American tribes have been identified. Furthermore, Project construction would provide some short-term job opportunities in the region of influence. The only long-term socioeconomic effects of the Project are likely to be beneficial, based on the increase in tax revenues that would accrue to the counties and parishes affected by the Project. A more specific discussion about the Project-related impacts on residential areas, air quality and noise, and safety is presented in Sections 3.8, 3.11, and 3.12 respectively. Cumulative impacts are discussed in Section 3.13.

## **3.10 CULTURAL RESOURCES**

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires the FERC to take into account the effect of its undertakings (including the issuance of Certificates) on any properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP) and to provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. The Companies, as non-federal parties, are assisting the FERC in meeting their obligation under Section 106 of the NHPA by conducting the field surveys and evaluations required by ACHP regulations in 36 CFR 800.

### **3.10.1 Results of Cultural Resources Survey**

The Companies initiated a cultural resources survey in January 2007 for the proposed pipeline, compressor station sites, associated aboveground ancillary facilities, and access roads for the proposed Project within Texas, Oklahoma, Louisiana, and Mississippi. The survey of the proposed pipeline was conducted within a 300-foot-wide survey corridor along collocated portions of the proposed pipeline route and within a 350-foot-wide corridor centered on the proposed pipeline route in non-collocated areas. The Companies have completed cultural resources surveys of approximately 96.8 percent of the proposed pipeline route. Of the 11.8 miles remaining to be surveyed, 3.6 miles remain unavailable due to lack of access permission from landowners. Permission was recently obtained for the other 8.2 miles, and surveys are currently being completed.

In addition to the proposed pipeline corridor, 69 of 241 (28.6 percent) access roads have been surveyed to date, as have all 22 of the proposed contractor/storage yards. The remaining survey area consists of recently adopted route variations and access roads. The remaining surveys are anticipated to be completed in February 2008.

#### **3.10.1.1 Texas**

The survey within the Texas portion of the proposed Project identified 14 previously unrecorded prehistoric sites and loci. One of the sites is considered eligible for listing in the NRHP; however, the site would be avoided by realignment of the pipeline route. There are five previously recorded prehistoric sites in the Texas portion of the proposed Project. One of the sites is potentially eligible for listing in the NRHP, but would not be affected by the proposed Project.

Gulf Crossing identified 23 previously unrecorded historic sites and loci in the Texas portion of the proposed Project. Of these sites, 21 were recommended as not eligible for listing in the NRHP, and

we are not recommending any additional work. The remaining two previously unrecorded historic sites and loci were not assessed for their eligibility for listing on the NRHP; however, both of these resources are located outside of the Area of Potential Effect of the proposed Project. There were five previously recorded historic sites located in the Texas portion of the proposed Project. None of these sites is considered eligible for listing in the NRHP, and we are not recommending any additional work.

Gulf Crossing identified one additional previously recorded site within the Texas portion of the proposed Project which contained both prehistoric and historic components. This site is not considered eligible for listing in the NRHP and we are not recommending any additional work.

Three historic cemeteries are located near the proposed Project in Texas. However, all of these cemeteries would be avoided by the proposed pipeline route. One of the cemeteries is located close enough to the proposed Project that monitoring and exclusion fencing is recommended to avoid inadvertent damage due to construction of the proposed Project.

Gulf Crossing submitted a copy of the Texas Phase I survey report to the Texas SHPO on June 14, 2007, and requested concurrence with their findings. An addendum report, which provides the results of additional cultural resources survey conducted in Texas since the submittal of the initial Phase I survey report, was submitted to the Texas SHPO on January 14, 2008. The Companies requested concurrence with the findings of both survey reports and a response from the Texas SHPO is pending.

### **3.10.1.2 Oklahoma**

The survey within the Oklahoma portion of the proposed Project identified two previously unrecorded prehistoric sites and one previously unrecorded prehistoric locus. One of the sites and the locus are not considered eligible for listing in the NRHP, and we are not recommending any additional work. The remaining previously recorded prehistoric site is considered to be potentially eligible for listing on the NRHP, but the Companies have developed a route variation to avoid the site. Surveys of the route variation are scheduled to be completed by early March 2008, and results will be submitted to the Oklahoma SHPO and the Oklahoma Archaeological Survey (OAS).

Gulf Crossing identified five previously unrecorded historic sites and one unrecorded historic locus in the Oklahoma portion of the proposed Project. None of these resources are eligible for listing in the NRHP, and we are not recommending any additional work.

Gulf Crossing identified one previously unrecorded site within the Oklahoma portion of the proposed Project which contained both prehistoric and historic components. This site is not considered eligible for listing in the NRHP and no further investigation of the site is recommended.

No historic cemeteries were located near the proposed Project route in Oklahoma.

Gulf Crossing submitted a copy of the Oklahoma Phase I survey report to the Oklahoma SHPO and the OAS on June 14, 2007, and requested concurrence with their findings. The Companies received review letters from the OAS and the Oklahoma SHPO on June 18, 2007 and July 9, 2007, respectively. Both the Oklahoma SHPO and OAS concurred with the report's findings. An addendum report providing the results of survey completed since submittal of the initial Phase I survey report was submitted to the Oklahoma SHPO and OAS on January 14, 2008. Responses from the Oklahoma SHPO and OAS on the addendum report are pending. An additional addendum report will be submitted to the Oklahoma SHPO and OAS upon the completion of the remaining Phase I cultural resources survey.

### **3.10.1.3 Louisiana**

The survey within the Louisiana portion of the proposed Project identified 11 previously unrecorded prehistoric sites and loci. One of these sites was recommended as potentially eligible for listing in the NRHP. The site will be avoided by the proposed Project by horizontal directional drill. There are no previously recorded prehistoric sites in the Louisiana portion of the proposed Project.

Gulf Crossing identified 35 previously unrecorded historic sites and loci in the Louisiana portion of the proposed Project. None of the sites are eligible for listing in the NRHP, and we are not recommending any additional work. The Companies identified two previously-recorded historic sites located in the Louisiana portion of the proposed Project. These sites are recommended not eligible for listing in the NRHP, and we are not recommending any additional work.

A total of eight previously unrecorded sites and loci located within the Louisiana portion of the proposed Project contained both prehistoric and historic components. Two of these sites are potentially eligible for listing on the NRHP. Both sites will be avoided by the proposed Project, one by realignment of the pipeline route and the other by horizontal drilling. The Companies relocated one previously recorded site in the Louisiana portion of the proposed Project corridor that consisted of both prehistoric and historic components. This site is not considered eligible for listing to the NRHP and we are not recommending any additional work.

One historic cemetery was located near the proposed Project route in Louisiana. However, the cemetery would be entirely avoided by the proposed pipeline route, and no effect to the resource is anticipated in association with construction of the proposed Project.

The Companies submitted a copy of the Louisiana Phase I survey report to the Louisiana SHPO on June 14, 2007, and requested concurrence with their findings. A response from the Louisiana SHPO was received by the Companies on September 28, 2007. The SHPO concurred with the findings in the Louisiana Phase I report. An addendum report which presents the results of cultural surveys completed within Louisiana since the submittal of the initial Phase I cultural resources survey report was submitted to the Louisiana SHPO on January 14, 2008. The Companies requested concurrence with the reports findings and a response from the Louisiana SHPO is pending.

### **3.10.1.4 Mississippi**

The survey within the Mississippi portion of the proposed Project identified no unrecorded prehistoric sites. There is one previously recorded prehistoric site in the Mississippi portion of the proposed Project. The site was not assessed for listing in the NRHP, but would not be affected by the proposed Project.

No previously unrecorded historic sites or previously recorded historic sites were located within the Mississippi portion of the proposed Project.

Cultural resource surveys for the Mississippi Loop were conducted by Gulf South for its East Texas to Mississippi Expansion Project, with which the proposed Project will be collocated. Gulf South submitted a copy of the Mississippi Phase I survey report to the Mississippi SHPO on November 13, 2006, and requested concurrence with their findings. A response from the Mississippi SHPO concurring with the report's findings was received on January 16, 2007.

### **3.10.2 Unanticipated Discoveries Plan**

The Companies developed an Unanticipated Discoveries Plan for each state crossed by the Project that outlines the procedures that would be followed in the event that unanticipated cultural resources or human remains were encountered during construction of the proposed Project. Each plan has been submitted with the appropriate cultural resource survey report for each state. Updated Unanticipated Discoveries Plans have been filed with the Mississippi and Oklahoma SHPOs. Copies of the plan would be kept onsite during construction, and construction management and environmental inspectors would be trained on its contents.

### **3.10.3 Native American Consultation**

The Companies contacted seven Native American groups regarding the proposed Project. The groups contacted include the Chickasaw Nation, the Quapaw Tribe of Oklahoma, the Caddo Nation of Oklahoma, the Choctaw Nation of Oklahoma, the Cherokee Nation of Oklahoma, the Tunica-Biloxi Tribe of Louisiana, the Jena Band of Choctaw Indians, the Wichita and Affiliated Tribes, and the Mississippi Band of Choctaw Indians. Consultation letters were sent to representatives of each of first seven tribes listed in November 2006, requesting comments on the proposed Project and identification of any cultural or religious sites significant to the tribe. After additional consultation with Oklahoma and Mississippi SHPOs, letters were also sent to the Wichita and Affiliated Tribes in January 2007 and the Mississippi Band of Choctaw Indians in April 2007. Copies of the cultural resources reports, as well as copies of the addendum cultural resources survey reports, were sent to the four tribes who commented, as described below.

Response letters were received from the Choctaw Nation of Oklahoma requesting that the Companies conduct a cultural resources inventory of the portion of the Project located in Bryan County, Oklahoma. The tribe also stated that the Tribal Historic Preservation Office should be contacted if cultural materials are uncovered during pipeline construction. In a December 12, 2007 letter, the tribe signified that they had reviewed the reports and indicated that the Project would have no adverse effects on historic properties.

A response from the Caddo Nation of Oklahoma stated that it wanted to be a consulting party on the Project. The tribe also requested that they be informed of any proposed changes to the Project and that the tribe is allowed to comment and consult on the eligibility determination of cultural resources identified during the Project. The tribe also requested copies (once completed) of the Oklahoma, Louisiana, and Mississippi Phase I Cultural Resource Inventory reports and to allow the tribe 30 days to comment on the survey reports from the date that they are received.

A response from the Chickasaw Nation stated that the Bryan County, Oklahoma, portion of the Project is situated within the historical boundaries of the Chickasaw Nation; thus, the tribe wanted to be a consulting party for the Project and requested that they be kept them informed concerning Project activities.

A response from the Quapaw Tribe of Oklahoma included a list of counties and parishes in Texas, Oklahoma, Louisiana, and Mississippi (as well as other states) that represented the ancestral and historic territory of the Quapaw Tribe of Oklahoma. All of the counties and parishes (with the exception of Copiah and Simpson counties, Mississippi) crossed by the proposed Project are included on the list provided by the tribe.

### 3.10.4 General Impacts and Mitigation

The Companies have not completed surveys to all areas of the proposed Project. The remaining survey areas consist of recently adopted route variations and access roads in which surveys are anticipated to be completed by March 2008. The completion of surveys and evaluations within these areas, as well as comments from the Texas, Oklahoma, Louisiana, and Mississippi SHPOs would be required to complete the process of compliance with Section 106 of the NHPA.

To ensure that required cultural resources studies and consultation are completed for all proposed Project components and that the FERC's responsibilities under Section 106 of the NHPA are met, we **recommend that:**

- **The Companies should defer implementation of any treatment plans/measures (including archaeological data recovery); construction of facilities; and use of all staging, storage, or temporary work areas and new or to-be-improved access roads until:**
  - a. **The Companies file with the Secretary cultural resources survey and evaluation reports; any necessary treatment plans; and the Texas, Oklahoma, Louisiana, and Mississippi SHPO comments on the reports and plans; and**
  - b. **The Director of OEP reviews and approves all cultural resources survey reports and plans, and notifies the Companies in writing that treatment plans/procedures may be implemented and/or construction may proceed.**

**All material filed with the Secretary containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION – DO NOT RELEASE."**

## 3.11 AIR QUALITY AND NOISE

### 3.11.1 Air Quality

Air quality would be affected by construction and operation of the proposed Project. Though air emissions would be generated by operation of equipment during construction of the pipeline and aboveground facilities proposed by Gulf Crossing, most air emissions associated with the proposed Project would result from the long-term operation of the proposed and modified compressor stations.

Gulf Crossing proposes to construct the Sherman Compressor Station 2-1/2 miles west of Ambrose in Grayson County, Texas; to construct the Paris Compressor Station 1 mile southwest of Howland in Lamar County, Texas; to construct the Mira Compressor Station 1-1/2 mile southwest of Mira in Caddo Parish, Louisiana; to construct the Sterlington Compressor Station 1/2 mile south of Sterlington in Ouachita Parish, Louisiana; and to expand Gulf South's Harrisville Compressor Station located 5 miles northwest of Harrisville in Simpson County, Mississippi.

At the Sherman Compressor Station, Gulf Crossing proposes to install two Solar Taurus 70 gas turbines rated at 10,302 horsepower (hp) each, one natural gas fired engine rated at 4,735 hp, one natural gas fired backup generator engine rated at 805 hp, a 4,200-gallon condensate tank, a 0.85 MMBtu/hour heater, truck loading equipment, and a piping blowdown stack.

At the Paris Compressor Station, Gulf Crossing proposes to install two Solar Taurus 60 gas turbines rated at 7,800 hp each, one Solar Taurus 70 gas turbine rated at 10,302 hp, one natural gas fired engine rated at 3,550 hp, one natural gas fired backup generator engine rated at 503 hp, a 4,200-gallon condensate tank, a 0.5 MMBtu/hour heater, truck loading equipment, and a piping blowdown stack.

At the Mira Compressor Station, Gulf Crossing proposes to install two Solar Taurus 70 gas turbines rated at 10,302 hp each, one natural gas fired auxiliary generator engine rated at 503 hp, a 4,200-gallon condensate tank, a 0.6 MMBtu/hour heater, truck loading equipment, turbine start gas vent, and a piping blowdown stack.

At the Sterlington Compressor Station, Gulf Crossing proposes two Solar Taurus 70 gas turbines rated at 10,302 horsepower (hp) each, one natural gas fired engine rated at 4,735 hp, one natural gas fired backup generator engine rated at 503 hp, a 4,200-gallon condensate tank, a 0.85 MMBtu/hour heater, truck loading equipment, turbine start gas vent, and a piping blowdown stack.

At the Harrisville Compressor Station, Gulf South proposes to add two Solar Mars 100 gas turbines rated at 15,000 hp each, turbine start gas vent emissions, and a piping blowdown stack emissions.

### **3.11.1.1 Existing Air Quality**

The proposed Project would be constructed in portions of Grayson, Fannin, Lamar, Delta, Hopkins, Franklin, Titus, Morris, and Cass Counties in Texas; Caddo, Bossier, Webster, Claiborne, Lincoln, Union, Ouachita, Morehouse, Richland, and Madison Parishes in Louisiana; and Bryan County in Oklahoma. The proposed Project would also involve construction through the Gulf South subsidiary in Hinds, Copiah, and Simpson Counties in Mississippi. These counties and parishes are characterized by a temperate climate. Rainfall at Sherman, Texas, located near the western end of the proposed pipeline route, averages 42.04 inches annually (Weather.com 2007). May is the wettest month in Sherman, averaging 5.41 inches of precipitation; and January is the driest month, averaging 2.11 inches. The warmest month is July, with an average high temperature of 93° Fahrenheit (F) and an average low temperature of 73° F. January is the coldest month, with an average high temperature of 51° F and an average low temperature of 32° F. Rainfall at Shreveport, Louisiana, located near the middle of the proposed pipeline route, averages 51.30 inches annually (Weather.com 2006a). May is the wettest month in Shreveport, averaging 5.25 inches of precipitation; and August is the driest month, averaging 2.71 inches. The warmest month is July, with an average high temperature of 93° Fahrenheit (F) and an average low temperature of 73° F. January is the coldest month, with an average high temperature of 56° F and an average low temperature of 36° F. Rainfall at Vicksburg, Mississippi, located near the eastern end of the proposed pipeline route, averages 57.99 inches annually (Weather.com 2006b). March is the wettest month in Vicksburg, averaging 6.40 inches of precipitation; and August is the driest month, averaging 3.12 inches. The warmest month is July, with an average high temperature of 92° F and an average low temperature of 71° F. January is the coldest month, with an average high temperature of 59° F and an average low temperature of 35° F.

The Clean Air Act (CAA) designates six pollutants as criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) are promulgated. The NAAQS for sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), particulate matter with an aerodynamic diameter less than 10 microns (PM<sub>10</sub>), particulate matter with an aerodynamic diameter less than 2.5 microns (PM<sub>2.5</sub>), carbon monoxide (CO), ozone (O<sub>3</sub>), and lead were set to protect human health (primary standards) and human welfare (secondary standards). State air quality standards cannot be less stringent than the NAAQS. Texas, Mississippi, Louisiana, and Oklahoma have adopted the NAAQS, as defined in 40 CFR 50; these standards are summarized in Table 3.11.1-1.

## Air Quality Control Regions and Attainment Status

Air quality control regions (AQCRs) are areas established for air quality planning purposes in which implementation plans describe how ambient air quality standards will be achieved and maintained. AQCRs were established by the EPA and local agencies, in accordance with Section 107 of the CAA, as a means to implement the CAA and comply with the NAAQS through state implementation plans. The AQCRs are intra- and interstate regions such as large metropolitan areas where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or portion thereof, is designated based on compliance with the NAAQS. AQCR designations fall under three categories as follows: “attainment” (areas in compliance with the NAAQS); “nonattainment” (areas not in compliance with the NAAQS); or “unclassified”, which refers to areas with insufficient data to make a determination. The counties and parishes in which the proposed Project would be located are designated as “attainment” or “unclassifiable” for all criteria pollutants.

**TABLE 3.11.1-1  
National Ambient Air Quality Standards**

Pollutant	Time Frame	Primary	Secondary
Particulate matter less than 10 microns in diameter	24-hour <sup>a</sup>	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
Particulate matter less than 2.5 microns in diameter	Annual <sup>b</sup>	15 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
	24-hour <sup>c</sup>	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>
Sulfur dioxide	Annual	0.030 ppm (80 µg/m <sup>3</sup> )	N/A
	24-hour <sup>a</sup>	0.14 ppm (365 µg/m <sup>3</sup> )	N/A
Carbon monoxide	3-hour <sup>a</sup>	N/A	0.5 ppm (1,300 µg/m <sup>3</sup> )
	8-hour <sup>a</sup>	9 ppm (10,000 µg/m <sup>3</sup> )	None
Nitrogen dioxide	1-hour <sup>a</sup>	35 ppm (40,000 µg/m <sup>3</sup> )	None
	Annual	0.053 ppm (100 µg/m <sup>3</sup> )	0.053 ppm
Ozone	8-hour <sup>d</sup>	0.08 ppm (157 µg/m <sup>3</sup> )	0.08 ppm
Lead	Quarterly	1.5 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>

NOTES:

µg = Microgram(s)  
m<sup>3</sup> = Cubic meter(s)  
NA = Not applicable  
ppm = Part(s) per million

<sup>a</sup> Not to be exceeded more than once per year.

<sup>b</sup> To attain this standard, the 3-year average of the weighted annual mean particulate matter less than 2.5 microns in diameter concentrations from single or multiple community-oriented monitors, must not exceed 15.0 µg/m<sup>3</sup>.

<sup>c</sup> The PM<sub>2.5</sub> standard was revised from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> in December 2006.

<sup>d</sup> To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations, measured at each monitor within an area over each year, must not exceed 0.08 ppm.

### 3.11.1.2 Regulatory Requirements

#### Federal Regulations

The CAA, 42 USC 7401 et seq. amended in 1977 and 1990, and 40 CFR Parts 50 through 99 are the basic federal statutes governing air pollution. The provisions of the CAA that are potentially relevant to the proposed Project include the following:

- New Source Review (NSR)/Prevention of Significant Deterioration (PSD);
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP);
- Title V operating permits; and
- General Conformity.

#### New Source Review/ Prevention of Significant Deterioration

New Source Review refers to the preconstruction permitting programs under Parts C and D of the CAA that must be satisfied before construction can begin on new major sources or major modifications to existing major sources located in attainment or unclassified areas. This review may include a PSD review. This review process is intended to keep new air emission sources from causing existing air quality to deteriorate beyond acceptable levels codified in the federal regulations. For sources located in non-attainment areas the Nonattainment New Source Review (NNSR) program is implemented for the pollutants for which the area is classified as nonattainment. The proposed Project would be located in attainment areas. Consequently, NNSR is not applicable to the proposed Project.

The PSD review regulations apply to proposed new major sources or major modifications to existing major sources located in an attainment area. The PSD regulations (40 CFR 52.21) define a “major source” as any source type belonging to a list of named source categories that emit or have the potential to emit 100 tons per year (tpy) or more of any regulated pollutant. A major source under PSD can also be defined as any source not on the list of named source categories with the potential to emit such pollutants in amounts equal to or greater than 250 tpy. Modifications to existing major sources have lower emission thresholds, called “significant emission increases”; amounts over these thresholds trigger PSD review. The proposed Project would not include facilities or operations included on the list of named source categories to which the 100-tpy trigger applies. Also, the proposed Project does not include any existing major sources under the PSD program; therefore the existing Harrisville Compressor Station and the proposed new Sherman, Paris, Mira, and Sterlington Compressor Stations are all subject to the 250-tpy threshold.

The PSD review evaluates existing ambient air quality and the potential impacts of the proposed source on ambient air quality (noting in particular whether the source would contribute to any violation of the NAAQS), and reviews the best available control technology (BACT) in order to minimize emissions. The PSD regulations contain restrictions on the degree of ambient air quality deterioration that would be allowed. These increments for criteria pollutants are based on the PSD review classification of the area.

None of the new facilities or additions to existing facilities would exceed emissions of 250 tpy of any criteria pollutant (see Tables 3.11.1-2 through 3.11.1-6 and the discussion under “Operations Emissions”). Therefore, PSD permitting is not applicable to the proposed Harrisville, Mira, Paris, and Sherman Compressor Stations. The Gulf Crossing Sterlington Compressor Station is located near the Gulf South Sterlington Compressor Station. Due to the proximity of the two stations, similarity of

business conducted, and ownership relationship, it was determined during a September 19, 2007 meeting between the Companies and the LDEQ that the installation of the new compressor station adjacent to the existing Gulf South compressor station would require a PSD permit. Gulf Crossing submitted a PSD/Title V permit application for the proposed Sterlington Compressor Station.

**TABLE 3.11.1-2  
Existing and Proposed Emissions for the Harrisville Compressor Station**

<b>Emission Source</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>CO (tpy)</b>	<b>VOC (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>	<b>PM<sub>2.5</sub> (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>HAPs (tpy)</b>
<b>New sources</b>							
Turbine #1 (Mars 100)	29.38	29.81	17.07	3.55	3.55	1.83	1.72
Turbine #2 (Mars 100)	29.38	29.81	17.07	3.55	3.55	1.83	1.72
New Blowdown Stack	0.00	0.00	6.29	0.00	0.00	0.00	0.32
Piping components (fugitives)	0.00	0.00	1.64	0.00	0.00	0.00	0.01
Turbine Gas Start Vent	0.00	0.00	11.63	0.00	0.00	0.00	0.59
Subtotal new sources:	58.76	59.62	53.70	7.10	7.10	3.66	4.36
<b>Existing sources</b>							
Reciprocating Engine #1 (Superior 12)	32.01	6.86	8.07	1.41	1.41	0.08	4.25
Reciprocating Engine #2 (Superior 12)	32.01	6.86	8.07	1.41	1.41	0.08	4.25
Reciprocating Engine #3 (Superior 12)	32.01	6.86	8.07	1.41	1.41	0.08	4.25
Reciprocating Engine #4 (Superior 16)	32.01	6.86	8.07	1.41	1.41	0.08	4.25
Emergency Generator (revised)	1.67	1.12	0.48	0.02	0.02	<0.01	0.18
Fuel Gas Heater (revised est.)	0.66	0.55	0.04	0.05	0.05	<0.01	0.01
Condensate Tank	0.00	0.00	5.62	0.00	0.00	0.00	0.39
Truck loading of condensate	0.00	0.00	1.31	0.00	0.00	0.00	0.19
Piping components	0.00	0.00	3.27	0.00	0.00	0.00	0.01
Unpaved roads	0.00	0.00	0.00	0.47	0.05	0.00	0.00
Blowdown stack	0.00	0.00	6.29	0.00	0.00	0.00	0.32
Area releases	0.00	0.00	5.33	0.00	0.00	0.00	0.27
Subtotal existing sources:	130.37	29.11	54.62	6.18	5.76	0.32	18.37
<b>Total new and existing sources</b>	<b>189.13</b>	<b>88.73</b>	<b>108.32</b>	<b>13.28</b>	<b>12.86</b>	<b>3.98</b>	<b>22.73</b>

<b>TABLE 3.11.1-3 Proposed Emissions for the Mira Compressor Station</b>							
<b>Emission Source</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>CO (tpy)</b>	<b>VOC (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>	<b>PM<sub>2.5</sub> (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>HAPs (tpy)</b>
Turbine #1 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Turbine #2 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Emergency generator #1	0.55	0.53	0.22	0.01	0.01	<0.01	0.07
Fuel Heater	0.26	0.22	0.01	0.02	0.02	<0.01	<0.01
Condensate Tank	0.00	0.00	5.62	0.00	0.00	0.00	0.39
Truck loading of condensate	0.00	0.00	1.31	0.00	0.00	0.00	0.19
Piping components	0.00	0.00	3.27	0.00	0.00	0.00	0.01
Unpaved roads	0.00	0.00	0.00	0.47	0.05	0.00	0.00
Blowdown stack	0.00	0.00	6.29	0.00	0.00	0.00	0.32
Area releases	0.00	0.00	5.33	0.00	0.00	0.00	0.27
Turbine Start Gas Vent	0.00	0.00	11.63	0.00	0.00	0.00	0.59
<b>Subtotal new sources:</b>	<b>40.25</b>	<b>40.77</b>	<b>56.60</b>	<b>5.08</b>	<b>4.66</b>	<b>2.36</b>	<b>4.06</b>

<b>TABLE 3.11.1-4 Proposed Emissions for the Paris Compressor Station</b>							
<b>Emission Source</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>CO (tpy)</b>	<b>VOC (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>	<b>PM<sub>2.5</sub> (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>HAPs (tpy)</b>
Turbine #1 (Taurus 60)	16.02	16.26	9.31	1.85	1.85	0.95	0.90
Turbine #2 (Taurus 60)	16.02	16.26	9.31	1.85	1.85	0.95	0.90
Turbine #3 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Compressor Engine	24.00	5.14	6.05	1.06	1.06	0.06	3.19
Emergency generator #1	0.55	0.53	0.22	0.01	0.01	<0.01	0.07
Fuel Heater	0.22	0.18	0.01	0.02	0.02	<0.01	<0.01
Condensate Tank	0.00	0.00	5.62	0.00	0.00	0.00	0.39
Truck loading of condensate	0.00	0.00	0.39	0.00	0.00	0.00	0.06
Piping components	0.00	0.00	1.04	0.00	0.00	0.00	0.01
Unpaved roads	0.00	0.00	0.00	0.47	0.05	0.00	0.00
Blowdown stack	0.00	0.00	3.67	0.00	0.00	0.00	0.19
Area releases	0.00	0.00	5.33	0.00	0.00	0.00	0.27
<b>Subtotal new sources:</b>	<b>76.53</b>	<b>58.38</b>	<b>52.41</b>	<b>7.55</b>	<b>7.13</b>	<b>3.14</b>	<b>7.09</b>

<b>TABLE 3.11.1-5 Proposed Emissions for the Sherman Compressor Station</b>							
<b>Emission Source</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>CO (tpy)</b>	<b>VOC (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>	<b>PM<sub>2.5</sub> (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>HAPs (tpy)</b>
Turbine #1 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Turbine #2 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Compressor Engine	32.01	6.86	8.07	1.41	1.41	0.08	4.25
Emergency generator #1	0.89	0.75	0.35	0.02	0.02	<0.01	0.11
Fuel Heater	0.37	0.31	0.02	0.03	0.03	<0.01	0.01
Condensate Tank	0.00	0.00	5.62	0.00	0.00	0.00	0.39
Truck loading of condensate	0.00	0.00	0.39	0.00	0.00	0.00	0.06
Piping components	0.00	0.00	1.04	0.00	0.00	0.00	0.01
Unpaved roads	0.00	0.00	0.00	0.47	0.05	0.00	0.00
Blowdown stack	0.00	0.00	3.67	0.00	0.00	0.00	0.19
Area releases	0.00	0.00	5.33	0.00	0.00	0.00	0.27
<b>Subtotal new sources:</b>	<b>72.71</b>	<b>47.94</b>	<b>47.41</b>	<b>6.51</b>	<b>6.09</b>	<b>2.44</b>	<b>7.51</b>

<b>TABLE 3.11.1-6 Proposed Emissions for the Sterlington Compressor Station</b>							
<b>Emission Source</b>	<b>NO<sub>x</sub> (tpy)</b>	<b>CO (tpy)</b>	<b>VOC (tpy)</b>	<b>PM<sub>10</sub> (tpy)</b>	<b>PM<sub>2.5</sub> (tpy)</b>	<b>SO<sub>2</sub> (tpy)</b>	<b>HAPs (tpy)</b>
Existing Compressor Station – Facility Wide Total	642.76	999.88	41.62	1.22	1.22	0.07	5.82
Proposed New Compressor Station							
Turbine #1 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Turbine #2 (Taurus 70)	19.72	20.01	11.46	2.29	2.29	1.18	1.11
Compressor Engine	32.01	6.86	8.07	1.41	1.41	0.08	4.25
Emergency generator #1	0.55	0.53	0.22	0.01	0.01	<0.01	0.07
Fuel Heater	0.37	0.31	0.02	0.03	0.03	<0.01	0.01
Condensate Tank	0.00	0.00	5.62	0.00	0.00	0.00	0.39
Truck loading of condensate	0.00	0.00	1.31	0.00	0.00	0.00	0.19
Piping components	0.00	0.00	3.27	0.00	0.00	0.00	0.01
Unpaved roads	0.00	0.00	0.00	0.47	0.05	0.00	0.00
Blowdown stack	0.00	0.00	6.29	0.00	0.00	0.00	0.32
Area releases	0.00	0.00	5.33	0.00	0.00	0.00	0.27
Turbine Start Gas Vent	0.00	0.00	17.44	0.00	0.00	0.00	0.89
<b>Subtotal new sources:</b>	<b>72.37</b>	<b>47.72</b>	<b>70.49</b>	<b>6.50</b>	<b>6.08</b>	<b>2.44</b>	<b>8.62</b>

## *Air Quality Control Regions and PSD*

AQCRs are categorized as Class I, Class II, or Class III. Class I areas are designated specifically as pristine natural areas or areas of natural significance and have the lowest increment of permissible deterioration, which essentially precludes development near these areas. Class III designations, intended for heavily industrialized zones, can be made only on request and must meet all requirements outlined in 40 CFR 51.166. The remainder of the United States is classified as Class II. Class II areas are designed to allow moderate, controlled growth. The proposed Project would be located in a Class II area. The nearest Class I area is the Caney Creek Wilderness located southeast of Mena, Arkansas, about 84 miles north of the portion of the proposed Project near Naples, Texas. This is the point at which the project is closest to the Caney Creek Wilderness. Special analysis may be done for any sources within 100 kilometers (62 miles) of any Class I area. There are no Class I areas located within 62 miles of any of the proposed compressor station locations.

### New Source Performance Standards

The NSPS, codified in 40 CFR 60 and incorporated by reference in 30 Texas Administrative Code (TAC) Rule 101.20, Louisiana Administrative Code (LAC) 33.III.3303, and the Oklahoma Administrative Code (OAC) 252:100-2-1 establish requirements for new, modified, or reconstructed units in specific source categories. NSPS requirements include emission limits, monitoring, reporting, and record keeping. The following NSPS requirements were identified as potentially applicable to the specified sources at the compressor stations.

Subpart Kb of 40 CFR 60, Standards of Performance for Volatile Organic Liquid Storage Vessels, lists affected emission sources as storage vessels containing volatile organic liquids. Regulatory applicability is dependent on the construction date, size, and vapor pressure of the storage vessel and its contents. Subpart Kb applies to new tanks, unless otherwise exempted, that have a storage capacity between 75 m<sup>3</sup> (19,813 gallons) and 151 m<sup>3</sup> (39,890 gallons) and contain volatile organic compounds (VOCs) with a maximum true vapor pressure greater than or equal to 15.0 kilopascals (kPa). Subpart Kb also applies to tanks that have a storage capacity greater than or equal to 151 m<sup>3</sup> and contain VOCs with a maximum true vapor pressure greater than or equal to 3.5 kPa. Each proposed compressor station would be equipped with a 4,200 gallon (100 barrel) condensate tank, 500 gallon lube oil tank, 500 gallon used oil tank, and an oily water tank up to 10,000 gallon capacity, all of which are below the regulated capacity. Therefore, the proposed Project would not be subject to NSPS Subpart Kb standards.

On February 18, 2005, EPA proposed a new NSPS for stationary combustion turbines (Subpart KKKK) which received final approval on October 2, 2006. Stationary combustion turbines of 1 megawatt (MW) and larger installed after February 18, 2005, are covered by Subpart KKKK. Each of the compressor stations would have at least one turbine greater than 1 MW. The proposed standard imposes 1.0 pound NO<sub>x</sub> per MW-hour and 0.58 pound SO<sub>2</sub> per MW-hour emission limits on turbine operations. The proposed Project would comply with all applicable standards of the rule.

At 71 FR 33804 published June 12, 2006 EPA proposed a new NSPS (Subpart JJJJ) for spark ignition internal combustion engines (SI ICE). The proposed rule would have emission limits for non-emergency engines and emergency limits of all sizes. The Project proposes non-emergency engines greater than 500 horsepower. Owners and operators of such engines manufactured after July 1, 2007 must meet new emission limits for NO<sub>x</sub>, CO, and VOC. It is likely that the non-emergency engines installed for the Project will be manufactured after July 1, 2007 and will be required to be operated to meet the new standards. The Project proposes emergency use generator engines. Owner and operators of such engines of all sizes manufactured after January 1, 2009 must meet new emission limits for NO<sub>x</sub>, CO,

and VOC. It is likely that the emergency engines installed for the Project will be manufactured before January 1, 2009 and will not be subject to the new standards.

No other NSPSs are applicable to the proposed Project.

#### National Emission Standards for Hazardous Air Pollutants

The NESHAP, codified in 40 CFR Parts 61 and 63, regulates hazardous air pollutant (HAP) emissions. Part 61 was promulgated prior to the 1990 Clean Air Act Amendments (CAAA) and regulates only eight types of hazardous substances (asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride).

The 1990 CAAA established a list of 189 HAPs, resulting in the promulgation of Part 63. Part 63, also known as the Maximum Achievable Control Technology (MACT) standards, regulates HAP emissions from major sources of HAP emissions and specific source categories that emit HAPs. Part 63 defines a major source of HAPs as any source that has the potential to emit 10-tpy of any single HAP or 25 tpy of HAPs in aggregate. MACT standards are intended to reduce emissions of air toxics or HAPs through installation of control equipment rather than enforcement of risk-based emission limits. The total of HAP emissions from all equipment at Harrisville Station is 22.73 tpy (as shown in Table 3.11.1-2), and total emissions of formaldehyde (the HAP emitted in the greatest amount) are 10.56 tpy. Harrisville exceeds the 10 tpy level of a single HAP and is a major HAP source. Harrisville Compressor Station will be subject to 40 CFR 63 Subparts YYYY for stationary combustion turbines and ZZZZ for stationary reciprocating internal combustion engines.

The proposed Mira, Paris, and Sherman Compressor Stations each would emit less than 10 tpy of total HAPs, as shown in Tables 3.11.1-3, 3.11.1-4, and 3.11.1-5. Potential HAP emissions resulting from the proposed Project would be below the 10/25 tpy thresholds; therefore, MACT is not generally applicable at these compressor stations. The Sterlington Compressor Station would not generally be subject to the MACT standards requirements since the total potential hazardous air pollutant (HAP) emissions from existing and new compressor stations would be below the 10/25 TPY regulatory limits, as shown in Table 3.11.1-6. Emissions of formaldehyde, the largest HAP component at Sterlington Compressor Station, would be 3.88 tpy and total HAP emissions would be 14.44 tpy. At 71 FR 33804 published June 12, 2006 EPA proposed extending the scope of Subpart ZZZZ to include reciprocating internal combustion engines (RICE) at area sources of HAPs. Area sources are HAP sources that are not major sources. The proposed regulation would cover existing, new, and reconstructed RICE. Therefore if the proposed regulation becomes finalized in its current form, RICE at Mira, Paris, Sherman, and Sterlington Compressor Stations would be subject to Subpart ZZZZ.

#### Title V Permitting

The Title V permit program, as described in 40 CFR 70, requires sources of air emissions with criteria pollutant emissions that reach or exceed major source levels to obtain federal operating permits. These permits list all applicable air regulations and include a compliance demonstration for each applicable requirement. The major source threshold level in attainment areas is 100 tpy of nitrogen oxides (NO<sub>x</sub>), SO<sub>2</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub>, and VOC. Any source that has the potential to emit 10-tpy of any single HAP or 25 tpy of HAPs in aggregate is also a major source under Title V. Emissions of NO<sub>x</sub> and VOC at the Harrisville Compressor Station would exceed the 100-tpy criteria pollutant threshold, as shown in Table 3.11.1-2. Harrisville Compressor Station also exceeds the 10 tpy emission level for the HAP formaldehyde. Therefore, the Harrisville Compressor Station would require a Title V permit. None of the criteria pollutants would be emitted at the 100-tpy level and HAPs are not emitted at the 10/25 tpy level at the Mira, Paris, or Sherman Compressor Stations. Title V permits would not be required for those

facilities. Gulf Crossing has submitted a Title V permit application for the proposed Sterlington Compressor Station.

### General Conformity

Title 40 CFR parts 51 and 93 define the requirements for determining conformity for federal actions to state or federal implementation plans. A conformity analysis is required for each criteria pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a federal action would equal or exceed any of the rates specified in the applicable implementation plan. No portions of the pipeline or any of the aboveground facilities would be located in a nonattainment area; therefore, the general conformity requirements do not apply to the proposed Project.

### **State Regulations**

In addition to the federal regulations described above, Texas, Louisiana, and Oklahoma have state air quality regulations. The TCEQ manages air quality issues in Texas, the LDEQ manages air quality issues in Louisiana, the ODEQ manages air quality issues in Oklahoma, and the MDEQ manages air quality in Mississippi. Subject to EPA approval, these agencies manage the statewide air permitting, compliance, and enforcement programs. The Paris Compressor Station and Sherman Compressor Station would be authorized under TCEQ's Standard Permit for Oil and Gas Operations at 30TAC116.620. The Mira Compressor Station would be authorized under a LDEQ minor source permit. The Sterlington Compressor Station would be authorized under a PSD permit. The Harrisville Compressor Station modification will be permitted with MDEQ as a revision to a new major source.

### **3.11.1.3 General Impacts and Mitigation**

#### **Construction Emissions**

Construction of the pipeline and access roads would generate air emissions during grading, trenching, backfilling, and operation of construction vehicles along unpaved areas. The proposed Project would use existing roads to the extent possible. Some roads used for access would be improved during construction by widening or adding drain pipes, gravel, or grading; and some new roads and road extensions would be constructed. The roads would remain after construction to provide access to the pipeline for maintenance purposes. These activities could generate dust and particulate emissions from earth-moving activities and construction equipment engine exhaust. In addition, Gulf Crossing may use open burning to dispose of woody debris in accordance with state and local burning requirements.

Construction of the compressor stations would be performed with mobile equipment similar to that typically used for pipeline and road construction. In addition to the compressor stations, Gulf Crossing would construct other aboveground facilities consisting of seven meter and regulation stations and 26 valve or launching/receiving stations.

Construction would be expected to cause a temporary impact to local ambient air quality as a result of fugitive dust and combustion emissions generated by construction equipment. Criteria pollutant emissions during operation of the fossil-fueled construction equipment would occur from combustion products resulting from the use of gasoline and diesel fuels, primarily NO<sub>2</sub>, CO, VOCs, PM<sub>10</sub>, small amounts of SO<sub>2</sub>, and small amounts of HAPs (e.g., formaldehyde, benzene, toluene, and xylene) produced by the construction equipment engines. Impacts from construction equipment would be temporary and would be expected to result in an insignificant impact on air quality.

The TCEQ regulates the emissions of particulate matter arising from unpaved streets, access roads, construction activities, and similar facilities through 30TAC111.141. The rule applies only to certain areas in El Paso and Harris Counties and is therefore not applicable to the proposed Project. LDEQ regulates these types of fugitive dust emissions through LAC33.III.1305, which requires application of water or dust-retardant chemicals, or paving of roadways. The MDEQ does not have a specific regulation for fugitive dust from roadways. The ODEQ regulates fugitive dust from construction activities in areas that are non-attainment for particulate matter or are maintenance areas for particulate matter through OAC 252:100-29-3(1). There are no particulate matter non-attainment areas or maintenance areas in Oklahoma. Gulf Crossing indicates that if fugitive dust becomes a problem it would use proven construction practices such as applying water to roadways, mulching bare areas, installing fencing to reduce wind velocity, and revegetation to control fugitive dust. Water sprays have provided sufficient control to ensure protection of air quality during construction of projects similar to the proposed Project. Construction emissions for the compressor stations are shown in Table 3.11.1-7.

<b>TABLE 3.11.1-7 Construction Emissions for the Proposed Compressor Stations</b>						
<b>Emission Source</b>	<b>NO<sub>x</sub> (tons)</b>	<b>CO (tons)</b>	<b>VOC (tons)</b>	<b>PM<sub>10</sub> (tons)</b>	<b>PM<sub>2.5</sub> (tons)</b>	<b>SO<sub>2</sub> (tons)</b>
Sherman CS	6.66	1.43	0.53	2.21	0.21	0.44
Paris CS	6.66	1.43	0.53	2.21	0.21	0.44
Mira CS	6.66	1.43	0.53	2.21	0.21	0.44
Sterlington CS	6.66	1.43	0.53	2.21	0.21	0.44
Harrisville CS	6.66	1.43	0.53	2.21	0.21	0.44

### **Operations Emissions**

Emissions from the turbines at all locations would be controlled with Solar's SoLoNOx technology and the exclusive use of natural gas which reduced the formation of NO<sub>x</sub> in the exhaust gas.

The compressor driver internal combustion engines at Sherman Compressor Station, Paris Compressor Station, and Sterlington Compressor Station would be equipped with oxidation catalyst emission control.

Each compressor station would include an emergency shut down (ESD or blowdown) system, pursuant to DOT requirements. Activation of the ESD system would vent the piping (expel the natural gas) to the atmosphere in case of an emergency. The ESD would be used only in the event of an emergency. Compressor unit blowdowns would occur as needed to relieve pressure when a unit is taken offline. Natural gas blowdowns are not part of routine operation.

Gulf Crossing prepared SCREEN3 analyses of NO<sub>2</sub> and CO emissions for the Mira, Sherman, and Sterlington Compressor Stations. SCREEN3 is a screening level dispersion model that is capable of considering one emission source. A conservative estimate of the impact of multiple emission sources can be performed by adding individual SCREEN3 results for multiple sources. The result is conservative because all the emission sources are not co-located and dispersion due to the spacing between emission sources results in lower pollutant concentrations. In addition to the onsite emission sources, a background concentration obtained from representative ambient air monitoring stations is added to the results produced by SCREEN3. The total provides a conservative estimate of pollutant concentrations due to emissions from the Project plus existing background pollutant levels. Table 3.11.1-8 reports the results of

the SCREEN3 model plus background concentration for each compressor station. Total modeled results plus background concentration are less than the respective NAAQS for each pollutant and averaging period; therefore no significant impacts are predicted by the modeling.

<b>TABLE 3.11.1-8 SCREEN3 Modeling Results</b>			
<b>Compressor Station</b>	<b>Max. Annual NO<sub>2</sub> Concentration (µg/m<sup>3</sup>)</b>	<b>Max. 1-hour CO Concentration (µg/m<sup>3</sup>)</b>	<b>Max. 8-hour CO Concentration (µg/m<sup>3</sup>)</b>
Mira	27.49	333	233
Background	13.20 <sup>a</sup>	4,667	4,111
<b>Total</b>	<b>40.69</b>	<b>5,000</b>	<b>4,344</b>
Sherman	39.29	397	278
Background	18.87 <sup>b</sup>	4,667 <sup>c</sup>	4,111 <sup>c</sup>
<b>Total</b>	<b>58.16</b>	<b>5,064</b>	<b>4,389</b>
Sterlington	34.24	357	250
Background	13.201	4,667	4,111
<b>Total</b>	<b>47.44</b>	<b>5,024</b>	<b>4,361</b>
<b>NAAQS</b>	<b>100.00</b>	<b>40,000</b>	<b>10,000</b>

Notes:

Background air monitors for CO and NO<sub>2</sub> are not as widely distributed as for other pollutants. NO<sub>2</sub> values from Longview, Texas are expected to be more representative of the Mira and Sterlington Compressor Stations locations in Louisiana than values from the Baton Rouge ozone non-attainment area. Similarly, CO values from Dallas are lower than values from Baton Rouge and are expected to be more representative of rural Louisiana.

<sup>a</sup> Background NO<sub>2</sub> concentration from monitor 481830001 in Longview, Texas.

<sup>b</sup> Background NO<sub>2</sub> concentration from monitor 481210034 in Denton, Texas.

<sup>c</sup> Background CO concentrations from monitor 481130069 in Dallas, Texas.

The refined air dispersion model AERMOD was used to evaluate NO<sub>2</sub>, CO, and PM<sub>2.5</sub> impacts from the Harrisville Compressor Station. Table 3.11.1-9 shows the results of the analysis. AERMOD was also used to evaluate NO<sub>2</sub> and CO impacts from the Paris Compressor Station and results are shown in Table 3.11.1-10. Where the modeled impact from project emissions is less than the significant impact level (SIL), impacts are deemed to be insignificant and no further analysis is necessary. Where the modeled impact from project emissions exceeds the SIL, measured ambient background concentrations are added to the modeled result and the total is compared to the NAAQS. There are currently no approved SILs for PM<sub>2.5</sub>. Table 3.11.1-8 shows modeled project impacts and measured background concentrations for PM<sub>2.5</sub>. The modeled CO impacts do not exceed the respective SILs and CO impacts are deemed to be minor. Modeled NO<sub>2</sub> and PM<sub>2.5</sub> impacts plus measured background concentrations do not exceed the NAAQS and impacts are deemed to be minor at Harrisville Compressor Station.

At Paris Compressor Station NO<sub>2</sub> modeled project impacts exceeded the SIL. Due to the proximity of NGPL Station 802, emissions from both Paris Compressor Station and NGPL Station 802 were modeled and added to background concentration. The resulting total concentration did not exceed the NAAQS and NO<sub>2</sub> impacts are deemed to be minor at Paris Compressor Station. The modeled CO impacts do not exceed the respective SILs and CO impacts are deemed to be minor.

**TABLE 3.11.1-9  
Harrisville Compressor Station NAAQS Analysis**

Averaging Period	Meteorology Data Year	Max. Modeled		Significant (yes/no)	Modeled Impact For Comparison ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )		
		Impact ( $\mu\text{g}/\text{m}^3$ )	SIL ( $\mu\text{g}/\text{m}^3$ )							
NO <sub>2</sub>	Annual	1991	14.0	1	Yes	14.0	15.1 <sup>a</sup>	29.1	100	
		1992	14.0			14.0		29.1		
		1993	14.7			14.7		29.8		
		1994	13.5			13.5		28.6		
		1995	17.6			17.6		32.7		
CO	1-hour	1991	474.5	2000	No				40,000	
		1992	478.1							
		1993	479.7							
		1994	473.9							
		1995	477.1							
	8-hour	1991	236.0	500	No				10,000	
		1992	241.3							
		1993	234.8							
		1994	196.2							
		1995	260.8							
PM <sub>2.5</sub>	24-hour	1991	6.4	NA	NA	4.9 <sup>c</sup>	27.67 <sup>b</sup>	32.6	35	
		1992	5.9			4.2		31.9		
		1993	6.2			4.4		32.1		
		1994	5.7			3.3		31.0		
		1995	6.8			4.7		32.4		
	Annual	1991	0.6	NA	NA		12.2 <sup>b</sup>	12.8	15	
		1992	0.6					0.6		12.8
		1993	0.7					0.7		12.9
		1994	0.6					0.6		12.8
		1995	0.8					0.8		13.0

NOTES:

<sup>a</sup> From monitor number 280590006 in Pascagoula, Jackson County, MS. Highest annual average 2004 – 2006.

<sup>b</sup> From monitor number 281230001 in Scott County, MS. 3-year average 2003 – 2005 for annual value.

<sup>c</sup> 24-hour PM<sub>2.5</sub> compliance based on 98<sup>th</sup> percentile of collected data, not on maximum value. 8<sup>th</sup> high modeled result used.

**TABLE 3.11.1-10  
Paris Compressor Station NAAQS Analysis**

	<b>Averaging Period</b>	<b>Meteorology Data Year</b>	<b>Max. Modeled Impact (µg/m<sup>3</sup>)</b>	<b>SIL (µg/m<sup>3</sup>)</b>	<b>Significant (yes/no)</b>	<b>Modeled Impact of Project Plus NGPL Station802 (µg/m<sup>3</sup>)</b>	<b>Background (µg/m<sup>3</sup>)</b>	<b>Total (µg/m<sup>3</sup>)</b>	<b>NAAQS (µg/m<sup>3</sup>)</b>
NO <sub>2</sub>	Annual	1989	1.56	1	Yes	9.04	18.87 <sup>a</sup>	27.91	100
CO	1-hour	1989	92.17	2000	No	NA	NA	NA	40,000
	8-hour	1989	40.94	500	No	NA	NA	NA	10,000

NOTES:

<sup>a</sup> Background NO<sub>2</sub> concentration from monitor 481210034 in Denton, Texas. highest 2004 – 2006.

Operation of the aboveground meter stations and block valves would not result in substantial air emissions under normal operating conditions. Typically, only minor emissions of natural gas, called “fugitive emissions,” occur from small connections at meter station and valve sites; because such emissions are very small, they are not regulated by permit or source-specific requirements.

Use of the access roads for maintenance would generate occasional, minor, and short-term increases in dust similar to that generated on other unpaved roads in the area. Use of these roads by maintenance and operation personnel would have a negligible effect on air quality; however, residents near the road may experience short elevated dust levels.

**Greenhouse Gas Emissions**

We received several comments regarding the emissions of Greenhouse Gases from the Project. The principle Greenhouse Gases (GHG) are methane, carbon dioxide (CO<sub>2</sub>) and nitrous oxide (N<sub>2</sub>O) and various fluorinated gases which trap heat in the atmosphere and are the primary drivers of the increase in global mean temperature, known as global warming. No fluorinated gases would be emitted by the project so we need only look at N<sub>2</sub>O, methane and CO<sub>2</sub>. There are no Federal regulations at this time limiting the emissions of CO<sub>2</sub>; however emissions of N<sub>2</sub>O are regulated through limitations of NO<sub>x</sub> emissions under NSPS and Federal Permits. Methane emissions are limited by valve and pipe leak standards. Estimated Greenhouse Gas emissions from operations are presented in Table 3.11.1-11.

<b>TABLE 3.11.1-11 Estimated Greenhouse Gas Emissions from Operation<sup>a</sup></b>	
<b>Compressor Station</b>	<b>Tons of CO<sub>2</sub> Equivalent Annually</b>
Sherman	140,000
Paris	59,800
Mira	84,500
Sterlington	102,000
Harrisville <sup>b</sup>	125,000
Notes:	
<sup>a</sup>	Turbines and heaters estimated from the US EPA AP-42 emission factors, reciprocating engine emissions estimated from the US Greenhouse Gas Inventory, Annex 3.
<sup>b</sup>	New sources only. Estimated cumulative CO <sub>2</sub> equivalent emissions from the Harrisville Station approximately 185,000 annually.

Emissions of greenhouse gas are typically estimated as carbon equivalents, or carbon dioxide equivalents. The greenhouse gases are ranked by their global warming potential (GWP). The GWP is a ratio relative to CO<sub>2</sub> which is based on the properties of the greenhouse gases to absorb solar radiation as well as the residence time within the atmosphere (IPCC AR4, 2007). This CO<sub>2</sub> has a GWP of 1, Methane has a GWP of approximately 21 and N<sub>2</sub>O has a GWP of approximately 310 (EPA). We estimated the emissions of N<sub>2</sub>O, methane, and CO<sub>2</sub> from the project. Gulf Crossing has estimated that construction of the compressor stations is estimated to emit a approximately 1,235 tons and operations would emit and estimated 511,300 tons of CO<sub>2</sub>. It should be noted that we do not have estimates of the emissions due to pipeline construction and thus the emissions of CO<sub>2</sub> from construction of the project would be much

larger. Although the greenhouse gas emissions appear large, the operational emissions are less than 1/100<sup>th</sup> of 1 percent the 2005 US Greenhouse Gas Inventory (EPA 2007c) of 7.1 Gigatons.

Construction of the proposed Project would be expected to result in temporary minor impacts to air quality. Operation of the proposed Project would be expected to result in long-term minor impacts to air quality at Mira, Paris, Sherman, Harrisville, and Sterlington Compressor Stations.

### **3.11.2 Noise Quality**

Noise quality can be affected both during construction and operation of pipeline projects. The magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the week, in part due to changing weather conditions and the effects of seasonal vegetative cover. Two measures used by federal agencies to relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level ( $L_{eq}$ ) and day-night sound level ( $L_{dn}$ ). The  $L_{eq}$  is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, as averaged over a 24-hour period. The  $L_{dn}$  is the  $L_{eq}$  with 10 decibels on the A-weighted scale (dBA) added to nighttime sound levels between the hours of 10 p.m. and 7 a.m. to account for people's greater sensitivity to sound during nighttime hours. The A-weighted scale is used because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA, 6 dBA is noticeable to the human ear and 10 dBA is perceived as a doubling of noise.

#### **3.11.2.1 Regulatory Requirements**

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has determined that an  $L_{dn}$  of 55 dBA protects the public from indoor and outdoor activity noise interference. We have adopted this criterion and use it to evaluate the potential noise impact from operation of the compressor facilities.

Texas, Mississippi, Oklahoma, and Louisiana do not regulate noise at the state level. Similarly, none of the counties crossed by the proposed Project in Texas, Oklahoma, and Mississippi have existing regulations governing noise from construction or industrial activities. Bossier Parish in Louisiana requires noise from engines to pass through a muffler (Bossier Parish Ordinance 46.31(b)(7)). Madison and Claiborne Parishes in Louisiana have general prohibitions on nuisance noise.

#### **3.11.2.2 Existing Noise Levels**

Impacts are determined at receptors known as noise-sensitive areas (NSAs). NSAs include residences, schools and daycare facilities, hospitals, long-term care facilities, places of worship, libraries, and parks and recreational areas specifically known for their solitude and tranquility such as wilderness areas. The following NSAs and background noise levels have been evaluated at each compressor station.

Harrisville Compressor Station is located 5 miles northwest of Harrisville in Simpson County, Mississippi. The land surrounding the site consists primarily of forest. The nearest NSA (NSA #4) is a wilderness camp about 2,600 feet northwest of the compressor station. Other NSAs include a residence 4,200 feet east-northeast (NSA #1), 5,600 feet southeast (NSA #2), and 4,800 feet northwest (NSA #3) of the proposed compressor station. Other NSAs in the camp facility are cabins 3,700 feet north-northwest (NSA #5), and a ropes course 4,000 feet north-northwest (NSA #6) of the compressor station. On September 20, 2006, Gulf South conducted an ambient sound-level survey at NSAs #1-3. Noise sources

during the sound-level survey included traffic on local roads, insects, and birds, wind, noise from a distant logging operation, and noise from distant farm equipment. Measured noise at NSA #1 was 37.1 dBA, with a calculated  $L_{dn}$  of 43.5 dBA. Measured noise at NSA #2 was 42.1 dBA, with a calculated  $L_{dn}$  of 48.5 dBA. Measured noise at NSA #3 was 38.2 dBA, with a calculated  $L_{dn}$  of 44.6 dBA. Noise was not measured at NSAs 4 – 6 but was assumed to be similar to noise at NSA #3.

Mira Compressor Station would be 1-1/2 mile southwest of Mira in Caddo Parish, Louisiana. The land surrounding the site consists of forest with scattered residences and a chapel located on Atlanta Mira Road and Munneryn Chapel Road. The nearest NSAs are residences 1,900 feet northwest (NSA #1), and 2,300 feet west (NSA #2) of the proposed station. On May 10, 2007, Gulf Crossing conducted an ambient sound-level survey at the NSAs. Noise sources during the sound-level survey included traffic on local roads, birds, wind, and distant thunder. Measured noise at NSA #1 ranged from 36.3 to 37.2 dBA, with a calculated  $L_{dn}$  of 42.9 dBA. At NSA #2, measured noise ranged from 36.0 to 38.8 dBA, with a calculated  $L_{dn}$  of 43.5 dBA.

Paris Compressor Station would be 1 mile southwest of Howland in Lamar County, Texas. The land surrounding the site consists of cleared area with scattered residences located along nearby roadways. The nearest NSAs are residences 2,000 feet northeast (NSA #1), and 2,300 feet west-southwest (NSA #2) of the proposed station. On May 9, 2007, Gulf Crossing conducted an ambient sound-level survey at the NSAs. Noise sources during the sound-level survey included noise from NGPL Compressor Station 802, insects, birds, and wind. Measured noise at NSA #1 ranged from 37.1 to 41.1 dBA, with a calculated  $L_{dn}$  of 45.3 dBA. At NSA #2 measured noise ranged from 39.8 to 40.3 dBA, with a calculated  $L_{dn}$  of 46.0 dBA.

Sherman Compressor Station would be 2-1/2 miles west of Ambrose in Grayson County, Texas. The land surrounding the site consists of forested valleys and cleared uplands with scattered residences located along nearby roadways. The nearest NSAs are residences 2,800 feet north-northeast (NSA #1), 3,000 feet east-northeast (NSA #2), and 3,500 feet west (NSA #3) of the proposed station. On May 9, 2007, Gulf Crossing conducted an ambient sound-level survey at the NSAs. Noise sources during the sound-level survey included traffic on local roads, insects, birds, wind, distant dogs barking, and distant aircraft. Measured noise at NSA #1 ranged from 32.5 to 33.2 dBA, with a calculated  $L_{dn}$  of 39.2 dBA. At NSA #2 measured noise ranged from 35.0 to 35.4 dBA, with a calculated  $L_{dn}$  of 41.4 dBA. At NSA #3 measured noise ranged from 31.9 to 32.7 dBA, with a calculated  $L_{dn}$  of 38.1 dBA.

Sterlington Compressor Station ½ mile south of Sterlington in Ouachita Parish, Louisiana. The land surrounding the site consists cleared area and marsh with residences located along nearby roadways. The nearest NSAs are residences 400 feet southwest (NSA #1), and 1,100 feet northwest (NSA #2) of the proposed station. On May 11, 2007, Gulf Crossing conducted an ambient sound-level survey at the NSAs. Noise sources during the sound-level survey included noise from the Gulf South Sterlington Station, insects, birds, wind, and distant aircraft. Measured noise at NSA #1 ranged from 49.9 to 50.8 dBA, with a calculated  $L_{dn}$  of 56.8 dBA. At NSA #2 measured noise ranged from 49.0 to 51.6 dBA, with a calculated  $L_{dn}$  of 56.6 dBA.

### **3.11.2.3 General Impacts and Mitigation**

#### **Construction Noise**

Construction of the proposed Project is expected to be typical of other pipeline projects in terms of schedule, equipment used, and types of activities. Construction would increase sound levels in the vicinity of proposed Project activities; and the sound levels would vary during the construction period, depending on the construction phase. Pipeline construction generally would proceed at rates ranging

from several hundred feet to 1 mile per day. However, due to the assembly-line method of construction, construction activities in any one area could last from several weeks to several months on an intermittent basis. Construction and modifications at the compressor stations would be concentrated in the vicinity of the construction activity. Construction equipment would be operated on an as-needed basis during those periods and would be maintained to manufacturers' specifications to minimize noise impacts.

Nighttime noise levels would normally be unaffected because most pipeline construction would take place only during daylight hours. The possible exceptions would be at the HDD sites (e.g., at the crossings of waterbodies and highways). At HDD locations, drilling equipment may operate on a 24-hour-per-day basis. In addition to the EPA's 55 dBA standard, noise level changes are categorized as follows: a 3 dBA increase is considered noticeable, a 6 dBA increase is considered clearly noticeable, and a 10 dBA increase is considered significantly noticeable. An acoustical assessment was prepared for all of the planned HDD sites with NSAs within 0.5 mile of HDD locations to show existing sound levels at each site location and the project levels from HDD activity. Predicted noise impacts on NSAs indicate that sound levels could exceed 55 dBA at 12 of the 33 evaluated HDD entry and exit sites due to HDD operations. However at the #33 exit site at Joes Bayou pre-existing ambient noise exceeds 55dB and the predicted increase is an imperceptible 1.5 dB. Predicted sound levels ranged from 56.2 to 69.0 dBA at the other 11 sites, as shown in Table 3.11.2-1.

HDD Site	HDD Location	Ambient Noise	Calculated L <sub>dn</sub> due to HDD Activity (dBA)	Total Noise Impacts due to HDD Activity (L <sub>dn</sub> , dBA)	Noise Increase with no Noise Mitigation (L <sub>dn</sub> , dBA)	Estimated Noise Increase due to HDD Activity with Noise Mitigation (dBA)
#23 entry	Bayou De Siard	49.3	61.3	61.6	12.3	5.4
#24 entry	Little Boeuf Bayou	49.6	69.0	69.1	19.5	4.6
#26 entry	Bayou Lafourche & Mott Rd.	48.4	58.4	58.5	10.1	4.0
#29 entry	Boeuf River	45.2	58.5	58.7	13.5	6.5
#30 entry	Cypress Creek	47.8	56.2	56.8	9.0	3.3
#31 entry	Big Colewa Creek	48.3	61.7	61.9	13.6	6.4
#32 entry	Macon Bayou	51.2	60.6	61.1	9.9	3.9
#33 entry	Joes Bayou	49.2	62.9	63.1	13.9	6.7
#34 entry	Tensas Bayou 1	49.4	65.1	65.3	15.9	2.6
#37 entry	Lake Despair	47.0	57.1	57.5	10.5	4.3
Interstate 55 entry	Mississippi Loop	55.9	58.1	60.1	4.2	1.0

NOTES:  
HDD= Horizontal directional drilling

To ensure that NSAs are not exposed to excessive noise during nighttime drilling operations, Gulf Crossing proposes temporary noise barriers and use of residential grade mufflers for the 11 HDD operations that have the potential to exceed 55 dBA  $L_{dn}$  or increase the background noise level by greater than 9 dB. The noise levels due to HDD operations without corrective action, and with temporary noise barriers at these sites are listed in Table 3.11.2-1. The Companies propose to construct temporary noise barriers, consisting of 16-foot-high ¾-inch plywood sound walls at these sites, and to install residential-grade mufflers on any diesel engines that do not move while they are operating as an initial measure. The temporary sound barrier is predicted to reduce noise to less than 55 dBA  $L_{dn}$  at the nearest NSA at all locations listed in Table 3.11.2-1. Noise measurements would be conducted at the first HDD site operated to check the adequacy of the proposed mitigation and further refine the mitigation design. If additional noise mitigation is required the Companies propose to relocate equipment, install a secondary partial sound barrier around the hydraulic power unit, and/or limit HDD activities to daytime only. The Companies may also propose temporary relocation at a local motel or monetary compensation to residents at affected NSAs in lieu of using noise mitigation. These are calculated impacts; actual impacts may vary due to numerous factors, including operation of mobile equipment that would not be within the protection of the sound barrier. Sites predicted to be controlled to 55 dBA  $L_{dn}$  may or may not achieve that level of control in practice. Additionally, one site (#22 exit) is predicted to have noise levels near the 55 dBA  $L_{dn}$  level and two sites (#14 entry and #35 exit) are predicted to have noise increases near the 10 dBA level. In practice noise levels at these three sites could exceed the trigger levels and noise control measures could be indicated. To ensure that there are no significant adverse noise impacts to residents, **we recommend that:**

- **Prior to the start of construction, the Companies should file with the Secretary, for review and approval by the Director of OEP, a finalized noise mitigation plan for the HDD #14 Entry, HDD #22 Exit, and HDD #35 Exit. This plan should identify all noise mitigation which the Companies would implement during drilling activity to reduce noise at the NSAs. Specifically, during HDD operations the Companies should monitor noise and make all reasonable efforts to restrict noise increases from HDD operations to no more than 10 dBA above ambient if the resulting impact is above 55 dBA  $L_{dn}$ . In addition, the Companies should file a finalized Noise Mitigation Plan for the HDD sites identified in Table 3.11.2-1 demonstrating that they will meet the mitigated noise levels.**

## **Operational Noise**

During operation of the proposed Project, potential noise impacts would be limited to the vicinity of the new compressor stations. We received comments from affected landowners during the pre-filing process expressing concern about noise generated during operation of the proposed compressor stations. Principal noise sources would include the air inlet, exhaust, and casing of the turbines. Secondary noise sources would include yard piping and valves. Noise from the relief valves, blowdown stacks, and emergency electrical generation equipment would be infrequent.

All compressor stations would include design measures to minimize sound generation. Silencers or mufflers would be installed on the turbine exhausts, and acoustically absorptive material would be used on exhaust ducting. Engine exhaust systems would be similarly equipped. The walls and roof of each compressor building would be comprised of acoustical panels consisting of a 22-gauge metal outer skin and 4 - 6 inches of fiberglass insulation with a perforated metal liner. Personnel entry doors should be a type having STC-36 sound rating and large access doors should be sound insulated type that seal tightly when closed. The building ventilation system fans would be equipped with silencing equipment and vents would be equipped with acoustical liners. Acoustically insulating material would be used on aboveground piping located outside and near the compressor buildings. Sterlington Compressor Station would also require some additional noise controls such as turbine and engine intake silencers.

Table 3.11.2-2 shows the existing and projected noise levels for the Harrisville Compressor Station. The expected  $L_{dn}$  at NSA #1 near the expanded Harrisville Compressor Station would be 39.3 dBA due to sound generated by the existing and new equipment at the station. When combined with the existing ambient noise level, the  $L_{dn}$  would be about 44.9 dBA at NSA #1, as shown in Table 3.11.2-2. The expected noise level at NSA #2 would be 35.8 dBA  $L_{dn}$  due to station noise and 48.7 dBA  $L_{dn}$  when combined with the existing ambient noise level. The expected noise level at NSA #3 would be 37.8 dBA  $L_{dn}$  due to station noise and 45.4 dBA  $L_{dn}$  when combined with the existing ambient noise level. The expected noise level at NSA #4 would be 45.1 dBA  $L_{dn}$  due to station noise and 47.9 dBA  $L_{dn}$  when combined with the existing ambient noise level. The expected noise level at NSA #5 would be 40.8 dBA  $L_{dn}$  due to station noise and 46.1 dBA  $L_{dn}$  when combined with the existing ambient noise level. The expected noise level at NSA #6 would be 40.0 dBA  $L_{dn}$  due to station noise and 45.9 dBA  $L_{dn}$  when combined with the existing ambient noise level. Predicted noise at all NSAs is below the FERC specification of 55 dBA. Noise from blowdown events was estimated at 70 dBA at a distance of 300 feet from the blowdown vent. Blowdown noise at the NSA #4 was estimated at 41 dBA and would be less at the other NSAs. As a result, there would not be a significant impact on the noise environment near the Harrisville Compressor Station.

TABLE 3.11.2-2 Predicted Noise Level Contribution of the Harrisville Compressor Station at NSAs							
Measurement Location/ NSA	Distance/ Direction of NSA to Compressor Building (feet)	Calculated Ambient $L_{dn}$ (dBA)	Estimated $L_{dn}$ for Original Gulf South Station Equipment (dBA)	Estimated $L_{dn}$ for Expansion Project Equipment (dBA)	Estimated $L_{dn}$ for All Station Equipment (dBA) <sup>a</sup>	Total Estimated (Station Noise Plus Survey Levels) $L_{dn}$ (dBA) <sup>b</sup>	Potential Noise Increase from All Station Equipment (dBA) <sup>c</sup>
NSA #1/ residence	4,200 / ENE	43.5	36.9	35.5	39.3	44.9	1.4
NSA #2/ residence	5,600 / SE	48.5	33.6	31.8	35.8	48.7	0.2
NSA #3/ residence	4,800 / NW	44.6	35.5	33.8	37.8	45.4	0.8
NSA #4/ wilderness camp	2,600 / NNW	44.6	42.4	41.7	45.1	47.9	3.3
NSA #5/ cabins	3,700 / NNW	44.6	38.4	37.1	40.8	46.1	1.5
NSA #6/ ropes course	4,000 / NNW	44.6	37.6	36.2	40.0	45.9	1.3

NOTES:

dBA = A-weighted decibel scale  
 $L_{dn}$  = Day-night sound level  
NSA = Noise-sensitive area

<sup>a</sup> Estimated Project  $L_{dn}$  sound levels are from operation of original Gulf South Harrisville Station and expansion project equipment, with noise control measures installed as recommended.

<sup>b</sup> Estimated total  $L_{dn} = 10 \log (10^{(Ambient L_{dn}/10)} + 10^{(Predicted L_{dn}/10)})$

<sup>c</sup> Estimated increase in the ambient  $L_{dn}$  sound levels due to operation of original Gulf South Harrisville Station and expansion project equipment.

Table 3.11.2-3 shows the existing and projected noise levels for the Mira Compressor Station. The expected  $L_{dn}$  at NSA #1 would be 45.7 dBA due to sound generated by the new station. When combined with the existing ambient noise level, the  $L_{dn}$  would be about 47.5 dBA at NSA #1. Expected

noise at NSA #2 would be 43.5 dBA due to sound generated by the new station and 46.5 dBA when combined with the existing ambient noise level. Predicted noise at the NSAs is below the FERC specification of 55 dBA. Noise from blowdown events was estimated at 70 dBA, at a distance of 300 feet from the blowdown vent. Blowdown noise at NSA #1 was estimated at 46 dBA and would be less at NSA #2. Consequently, there would not be a significant impact on the noise environment near the Mira Compressor Station.

**TABLE 3.11.2-3  
Predicted Noise Level Contribution  
of the Mira Compressor Station at Nearby NSAs**

Measurement Location/NSA	Distance/Direction of NSA to Compressor Building (feet)	Calculated Ambient L <sub>dn</sub> (dBA)	Estimated Project L <sub>dn</sub> (dBA) <sup>a</sup>	Total Estimated L <sub>dn</sub> (dBA) <sup>b</sup>	Potential Noise Increase (dBA) <sup>c</sup>
NSA #1 / residence	1,900 / NW	42.9	45.7	47.5	4.6
NSA #2 / residence	2,300 / W	43.5	43.5	46.5	3.0

NOTES:

dBA = A-weighted decibel scale  
L<sub>dn</sub> = Day-night sound level  
NSA = Noise-sensitive area

<sup>a</sup> Estimated L<sub>dn</sub> sound levels from the proposed Mira Compressor Station, with noise control measures installed as recommended.

<sup>b</sup> Estimated total L<sub>dn</sub>=10 log (10<sup>(Ambient L<sub>dn</sub> /10)</sup> + 10<sup>(Predicted L<sub>dn</sub> /10)</sup>)

<sup>c</sup> Estimated increase of the ambient L<sub>dn</sub> sound levels due to operation of the proposed Mira Compressor Station.

Table 3.11.2-4 shows the existing and projected noise levels for the Paris Compressor Station. The expected L<sub>dn</sub> at NSA #1 would be 48.4 dBA due to sound generated by the new station and 50.1 dBA when combined with the higher existing ambient noise level including noise from the existing NGPL 802 Compressor Station. Expected noise at NSA #2 would be 46.7 dBA due to sound generated by the new station. When combined with the higher existing ambient noise level at NSA #2, the L<sub>dn</sub> would be about 49.4 dBA. Predicted noise levels at NSAs #1 and #2 would be below the FERC specification of 55 dBA. Noise from blowdown events was estimated at 70 dBA at a distance of 300 feet from the blowdown vent. Blowdown noise at the NSA #1 was estimated at 46 dBA and would be less at NSAs #2. Consequently, there would not be a significant impact on the noise environment near the Paris Compressor Station.

<b>TABLE 3.11.2-4 Predicted Noise Level Contribution of the Paris Compressor Station at Nearby NSAs</b>					
Measurement Location/NSA	Distance/Direction of NSA to Compressor Building (feet)	Calculated Ambient L <sub>dn</sub> (dBA)	Estimated Project L <sub>dn</sub> (dBA) <sup>a</sup>	Total Estimated L <sub>dn</sub> (dBA) <sup>b</sup>	Potential Noise Increase (dBA) <sup>c</sup>
NSA #1 / residence	2,000 / NE	45.3	48.4	50.1	4.8
NSA #2 / residence	2,300 / WSW	46.0	46.7	49.4	3.4
NOTES:					
dBA = A-weighted decibel scale					
L <sub>dn</sub> = Day-night sound level					
NSA = Noise-sensitive area					
<sup>a</sup> Estimated L <sub>dn</sub> sound levels from the proposed Paris Compressor Station with noise control measures installed as recommended.					
<sup>b</sup> Estimated total L <sub>dn</sub> = 10 log (10 <sup>(Ambient L<sub>dn</sub> /10)</sup> + 10 <sup>(Predicted L<sub>dn</sub> /10)</sup> )					
<sup>c</sup> Estimated increase of the ambient L <sub>dn</sub> sound levels due to operation of the proposed Paris Compressor Station.					

Table 3.11.2-5 shows the existing and projected noise levels for the Sherman Compressor Station. The expected L<sub>dn</sub> at NSA #1 would be 42.0 dBA due to sound generated by the new station. When combined with the existing ambient noise level, the L<sub>dn</sub> would be about 43.8 dBA at NSA #1. Expected noise at NSA #2 would be 41.2 dBA due to sound generated by the new station and 44.3 dBA when combined with the existing ambient noise level. Expected noise at NSA #3 would be 39.4 dBA due to sound generated by the new station and 41.8 dBA when combined with the existing ambient noise level. Predicted noise at the NSAs is below the FERC specification of 55 dBA. Noise from blowdown events was estimated at 70 dBA, at a distance of 300 feet from the blowdown vent. Blowdown noise at NSA #1 was estimated at 41 dBA and would be less at NSA #2 and #3. There are 59 NSAs located 2,800 feet to 1 mile from the proposed compressor station site. Noise impacts at the other 56 NSAs were assessed at 4,500 feet and 5,280 feet from the proposed compressor station site as shown in Table 3.11.2-5. Impacts at these more distant NSAs are lower than at NSA#1 – NSA#3. Consequently, there would not be a significant impact on the noise environment near the Sherman Compressor Station.

TABLE 3.11.2-5 Predicted Noise Level Contribution of the Sherman Compressor Station at Nearby NSAs						
Measurement Location/NSA	Distance/Direction of NSA to Compressor Building (feet)	Calculated Ambient L <sub>dn</sub> (dBA)	Estimated Project L <sub>dn</sub> (dBA) <sup>a</sup>	Total Estimated L <sub>dn</sub> (dBA) <sup>b</sup>	Potential Noise Increase (dBA) <sup>c</sup>	
NSA #1 / residence	2,800 / NNE	39.2	42.0	43.8	4.6	
NSA #2 / residence	3,000 / ENE	41.4	41.2	44.3	2.9	
NSA #3 / residence	3,500 / W	38.1	39.4	41.8	3.7	
NSAs	4,500	38.1 <sup>d</sup>	36.4	40.3	2.2	
NSAs	5,280	38.1 <sup>d</sup>	34.4	39.6	1.5	

NOTES:

dBA = A-weighted decibel scale  
L<sub>dn</sub> = Day-night sound level  
NSA = Noise-sensitive area

<sup>a</sup> Estimated L<sub>dn</sub> sound levels from the proposed Sherman Compressor Station, with noise control measures installed as recommended.

<sup>b</sup> Estimated total L<sub>dn</sub> = 10 log (10<sup>(Ambient L<sub>dn</sub> / 10)</sup> + 10<sup>(Predicted L<sub>dn</sub> / 10)</sup>)

<sup>c</sup> Estimated increase of the ambient L<sub>dn</sub> sound levels due to operation of the proposed Sherman Compressor Station.

<sup>d</sup> Ambient noise assumed to be equal to the lowest measured value at NSA#1 – NSA#3.

Table 3.11.2-6 shows the existing and projected noise levels for the Sterlington Compressor Station. The expected L<sub>dn</sub> at NSA #1 would be 54.5 dBA due to sound generated by the new station. When combined with the higher existing ambient noise level, the L<sub>dn</sub> would be about 58.8 dBA at NSA #1. Expected noise at NSA #2 would be 44.7 dBA due to sound generated by the new station and 56.9 dBA when combined with the higher existing ambient noise level. Predicted noise at the NSAs is above the FERC specification of 55 dBA due to previously existing ambient noise levels that are higher than 55 dBA. Expected noise increases of 2 dBA or less would be below the perception threshold. Noise contribution due to the proposed station is less than 55 dBA L<sub>dn</sub>. Noise from blowdown events was estimated at 60 dBA, at a distance of 300 feet from the blowdown vent. Blowdown noise at NSA #1 was estimated at 55 dBA and would be less at NSA #2. Consequently, there would not be a significant impact on the noise environment near the Sterlington Compressor Station.

TABLE 3.11.2-6 Predicted Noise Level Contribution of the Sterlington Compressor Station at Nearby NSAs						
Measurement Location/NSA	Distance/Direction of NSA to Compressor Building (feet)	Calculated Ambient L <sub>dn</sub> (dBA)	Estimated Project L <sub>dn</sub> (dBA) <sup>a</sup>	Total Estimated L <sub>dn</sub> (dBA) <sup>b</sup>	Potential Noise Increase (dBA) <sup>c</sup>	
NSA #1 / residence	400 / SW	56.8	54.5	58.8	2.0	
NSA #2 / residence	1,100 / NW	56.6	44.7	56.9	0.3	

NOTES:

dBA = A-weighted decibel scale  
L<sub>dn</sub> = Day-night sound level  
NSA = Noise-sensitive area

<sup>a</sup> Estimated L<sub>dn</sub> sound levels from the proposed Sterlington Compressor Station, with noise control measures installed as recommended.

<sup>b</sup> Estimated total L<sub>dn</sub> = 10 log (10<sup>(Ambient L<sub>dn</sub> /10)</sup> + 10<sup>(Predicted L<sub>dn</sub> /10)</sup>)

<sup>c</sup> Estimated increase of the ambient L<sub>dn</sub> sound levels due to operation of the proposed Sterlington Compressor Station.

During operation of the proposed Project, the potential noise impacts from the pipeline would be limited to the vicinity of the new valve and M/R stations. Principal noise sources would include gas flow through valves and M/R equipment. Four M/R stations would be located on the grounds of the Sherman and Paris compressor Stations and Gulf South’s Tallulah Compressor Station. The M/R stations located at compressor stations would have a negligible impact on the nearest NSA. The Enogex, Texas Gas and CGT M/R stations would be located in rural areas 2250 – 2700 feet from the nearest NSA. Calculated noise levels at the NSAs nearest each of the three M/R stations would be less than 55 dBA, and the maximum noise increase is calculated to be 2.5 dBA at the NSA located 2250 feet west-southwest of the Texas Gas M/R station. Noise differences less than 3 dBA are considered to be non-detectable. Noise impacts from the M/R stations would be less than significant. Minor short-term noise impacts are expected during the proposed Project construction, provided that equipment is maintained to the manufacturers’ specifications to minimize noise. This assessment assumes that temporary noise barriers would be installed at the HDD sites listed in Table 3.11.2-1, that residential-grade mufflers would be installed on engines that do not move while operating at HDD sites listed in Table 3.11.2-1, and that temporary housing would be offered to residents of NSAs if noise mitigation measures do not reduce the L<sub>dn</sub> to 55 dBA or less.

Minor long-term noise impacts are expected from compressor station operation during the life of the proposed Project and would not result in a significant effect on the noise environment. These minor impacts would result from the normal operation of compressor station equipment, as well as from blowdown events.

To ensure that noise levels from operation of the Project facilities do not adversely impact surrounding areas, **we recommend that:**

- **Gulf South should file with the Secretary no later than 60 days after placing the authorized units at the Harrisville Compressor Station into service compressor station noise surveys. If the noise attributable to the operation of the authorized facilities exceeds an L<sub>dn</sub> of 55 dBA at any nearby NSAs, Gulf South should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. Gulf South should confirm compliance with the**

**above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

- **Gulf Crossing should file with the Secretary no later than 60 days after placing the Sherman, Paris, Mira, and Sterlington Compressor Stations into service compressor station noise surveys. If the noise attributable to the operation of the Sherman, Paris, Mira, or Sterlington Compressor Stations at full load exceeds an  $L_{dn}$  of 55 dBA at any nearby NSAs, Gulf Crossing should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. Gulf Crossing should confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

### **3.12 RELIABILITY AND SAFETY**

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Methane has an ignition temperature of 1,000°F and is flammable at concentrations between 5 and 15 percent in air. Unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

#### **3.12.1 Safety Standards**

The DOT is mandated to provide pipeline safety under Title 49, USC Chapter 601. The Pipeline and Hazardous Materials Safety Administration's (PHMSA's) Office of Pipeline Safety (OPS) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act (NGPSA) provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents.

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993, between DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's

regulations require that an Applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection, or shall certify that it has been granted a waiver of the requirements of the safety standards by the DOT in accordance with Section 3(e) of the NGPSA. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert DOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to a pipeline under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines whether proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the proposed Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined as follows:

- |         |                                                                                                                                                                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Class 1 | Location with 10 or fewer buildings intended for human occupancy.                                                                                                                                                                                            |
| Class 2 | Location with more than 10 but less than 46 buildings intended for human occupancy.                                                                                                                                                                          |
| Class 3 | Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period. |
| Class 4 | Location where buildings with four or more stories aboveground are prevalent.                                                                                                                                                                                |

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, MAOP, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Preliminary class locations for the proposed Project have been developed based on the relationship of the proposed pipeline centerline to other nearby structures and manmade features. Gulf

Crossing reported that 13 segments of the proposed pipeline would be designated as Class 2. The Class 2 areas include:

- MP 51.3 to 52.2 (4,752 feet);
- MP 61.0 to 61.9 (4,435 feet);
- MP 75.5 to BH76.5 (5,280 feet);
- MP 113.5 to 114.3 (4,224 feet);
- MP 133.7 to 134.6 (4,752 feet);
- MP 210.7 to 212.8 (11,088 feet);
- MP 234.2 to 234.7 (2,534 feet);
- MP 239.4 to 240.3 (4,488 feet);
- MP 261.1 to 262.1 (5,597 feet);
- MP 273.9 to 274.7 (4,382 feet);
- MP 294.4 to 295.2 (4,488 feet);
- MP AR297.0 to AR297.8 (4,224 feet); and
- MP 332.8 to BX333.9 (5,808 feet).

One Class 3 area would be crossed between MP 234.7 to 235.9 (6,336 feet). The remaining 342.6 miles of the proposed pipeline, including the entire Mississippi Loop, would be designated as Class 1.

If a subsequent increase in population density adjacent to the right-of-way indicates a change in class location for the pipeline, the Companies would reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness, if required to comply with the DOT code of regulations for the new class location.

In 2002, Congress passed an act to strengthen the Nation's pipeline safety laws. The Pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and signed into law by the President in December 2002. No later than December 17, 2004, gas transmission operators were required to develop and follow a written integrity management program that contains all the elements described in §192.911 and addresses the risks on each covered transmission pipeline segment. Specifically, the law establishes an integrity management program, which applies to all high consequence areas (HCAs). The DOT (68 FR 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in §192.903 of the DOT regulations.

OPS published a series of rules from August 6, 2002, to May 26, 2004, (69 FR 29903) that defines HCAs where a gas pipeline accident would cause considerable harm to people and their property, and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate in 49 USC 60109 for OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method, an HCA includes:

- current Class 3 and 4 locations;
- any area in Class 1 or 2 where the potential impact radius<sup>1</sup> is greater than 660 feet and 20 or more buildings are intended for human occupancy within the potential impact circle<sup>2</sup>; or
- any area in Class 1 or 2 where the potential impact circle includes an identified site<sup>3</sup>.

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The DOT regulations specify the requirements for the integrity management plan at § 192.911. The HCAs have been determined based on the relationship of the pipeline centerline to other nearby structures and identified sites. The Companies report that 14 HCAs would be present along the proposed route, corresponding to the Class 2 and Class 3 areas described previously. The pipeline integrity management rule for HCAs requires inspection of the entire pipeline every 7 years to determine the presence of HCAs.

Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under Part 192.615, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency shutdown of the system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

Part 192 requires that each operator must establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also

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<sup>1</sup> The potential impact radius is calculated as the product of 0.69 and the square root of the MAOP of the pipeline in psi multiplied by the pipeline diameter in inches.

<sup>2</sup> The potential impact circle is a circle of radius equal to the potential impact radius.

<sup>3</sup> An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. The Companies would provide the appropriate training to local emergency service personnel before the pipeline is placed in service. No additional specialized local fire protection equipment would be required to handle pipeline emergencies.

The Companies would also operate a gas control center in Houston, Texas to monitor facility pressure, flows, and deliveries. If pressures fall outside of a predetermined range, an alarm notifies safety personnel and appropriate Company responders would be dispatched to investigate the pressure alarm.

### **3.12.2 Pipeline Accident Data**

Since February 9, 1970, 49 CFR Part 191 has required all operators of transmission and gathering systems to notify the DOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization;
- required taking any segment of transmission line out of service;
- resulted in gas ignition;
- caused estimated damage to the property of the operator, or others, or both, of a total of \$5,000 or more;
- required immediate repair on a transmission line;
- occurred while testing with gas or another medium; or
- in the judgment of the operator was significant, even though it did not meet the above criteria.

The DOT changed reporting requirements after June 1984 to reduce the amount of data collected. Since that date, operators must only report incidents that involve property damage of more than \$50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. Table 3.12.2-1 presents a summary of incident data for the 1970 to 1984 period, as well as more recent incident data for 1986 through 2005, recognizing the difference in reporting requirements. The 14.5-year period from 1970 through June 1984, which provides a larger universe of data and more basic report information than subsequent years, has been subject to detailed analysis, as discussed in the following Sections.<sup>4</sup>

During the 14.5-year period, 5,862 service incidents were reported over the more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, have remained fairly constant over this period, with no clear upward or downward trend in annual totals. In addition, 2,013 test failures were reported. Correction of test failures removed defects from the pipeline before operation (Jones et al. 1986).

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 3.12.2-2 provides a percentage distribution of the causal factors as well as the annual frequency of each factor per 1,000 miles of pipeline in service (Jones et al. 1986). Data presented for the period extending from mid-1986 through 2003 were gathered from the DOT's OPS.

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<sup>4</sup> Jones, D. J., G. S. Kramer, D. N. Gideon, and R. J. Eiber. 1986. An Analysis of Reportable Incidents for Natural Gas Transportation and Gathering Lines 1970 through June 1984. (NG-18 Report No. 158.) Pipeline Research Committee of the American Gas Association.

<b>TABLE 3.12.2-1 Natural Gas Service Incidents by Cause<sup>a</sup></b>		
<b>Cause</b>	<b>Incidents per 1,000 Miles of Pipeline (Percent Distribution)</b>	
	<b>1970 through 1984</b>	<b>1986 through 2005</b>
Outside forces	0.7 (53.8)	0.1 (38.5)
Corrosion	0.2 (16.9)	0.1 (23.1)
Construction or material defect	0.3 (20.8)	0.0 (15.4)
Other	0.1 (8.5)	0.1 (23.1)
<b>Total</b>	<b>1.3</b>	<b>0.3</b>

NOTE:  
<sup>a</sup> Sources: Jones et al. 1986, DOT OPS 2006.

<b>TABLE 3.12.2-2 Outside Forces Incidents by Cause (1970 through 1984)<sup>a</sup></b>	
<b>Cause</b>	<b>Percent</b>
Equipment operated by outside party	67.1
Equipment operated by or for operator	7.3
Earth movement	13.3
Weather	10.8
Other	1.5

NOTE:  
<sup>a</sup> Source: Jones et al. 1986.

The dominant incident cause is outside forces, constituting 53.8 percent of all service incidents. Outside forces incidents result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 3.12.2-2 shows that human error in equipment usage was responsible for approximately 75 percent of outside forces incidents. Since April 1982, operators have been required to participate in “One Call” public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The “One Call” program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. The 1986 through 2005 data show that the portion of incidents caused by outside forces has decreased to 38.5 percent.

The pipelines included in the data set in Table 3.12.2-1 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller-diameter pipelines, which have a greater rate of outside forces incidents. Small-diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

Table 3.12.2-3 clearly demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to unprotected or partially protected pipe. The data show that bare, cathodically protected pipe actually has a higher corrosion rate than unprotected pipe. This anomaly reflects the retrofitting of cathodic protection to actively corroding spots on pipes.

<b>TABLE 3.12.2-3</b>	
<b>External Corrosion by Level of Control (1970 through June 1984)<sup>a</sup></b>	
<b>Corrosion Control</b>	<b>Incidents per 1,000 Miles per Year</b>
None – bare pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11
NOTE:	
<sup>a</sup> Source: Jones et al. 1986.	

### 3.12.3 Impact on Public Safety

The service incident data summarized in Table 3.12.2-1 include pipeline failures of all magnitudes, with widely varying consequences. Approximately two-thirds of the incidents were classified as leaks; the remaining one-third classified as ruptures, implying a more serious failure.

Table 3.12.3-1 presents the average annual fatalities that occurred on natural gas transmission and gathering lines from 1970 to 2005. Fatalities between 1970 and June 1984 have been separated into employees and non-employees, to better identify a fatality rate experienced by the general public. Of the total 5.0 nationwide average, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and non-employees. However, the data show that the total annual average for the period 1984 through 2005 decreased to 3.6 fatalities per year. Subtracting two major offshore incidents in 1989, which do not reflect the risk to the onshore public, yields a total annual rate of 2.8 fatalities per year for this period.

Year	Employees	Non-employees	Total
1970 – June 1984	2.4	2.6	5.0
1984 – 2005 <sup>b</sup>	--	--	3.6
1984 – 2005 <sup>b</sup>	--	--	2.8 <sup>c</sup>

NOTES:

<sup>a</sup> Sources: Jones et al. 1986, DOT OPS 2006.

<sup>b</sup> Employee/non-employee breakdown not available after June 1984.

<sup>c</sup> Without 18 offshore fatalities occurring in 1989 (11 resulting from a fishing vessel striking an offshore pipeline and 7 from an explosion on an offshore production platform).

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in Table 3.12.3-2 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average 2.6 public fatalities per year is relatively small, considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is approximately two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornadoes, floods, and earthquakes.

Type of Accident	Fatalities
All accidents	90,523
Motor vehicle	43,649
Falls	14,985
Drowning	3,488
Poisoning	9,510
Fires and burns	3,791
Suffocation by ingested object	3,206
Tornado, flood, earthquake (1984 to 1993 average)	181
All liquid and gas pipelines <sup>b</sup> (1978 to 1987 average)	27
Gas transmission and gathering lines <sup>c</sup> (non-employees only, 1970 to 1984 average)	2.6

NOTES:

<sup>a</sup> Source: All data, unless otherwise noted, reflect 1996 statistics from the U.S. Department of Commerce, Bureau of the Census, "Statistical Abstract of the United States, 118<sup>th</sup> Edition."

<sup>b</sup> Source: DOT, "Annual Report on Pipeline Safety – Calendar Year 1987."

<sup>c</sup> Source: Jones et al. 1986.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 300,000 miles in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,000 miles of pipeline. Using this rate, the proposed Project might result in a public fatality every 270 years. This would represent a slight increase in risk to the nearby public.

### **3.12.4 Additional Security and Safety Issues**

#### **3.12.4.1 Terrorism**

Due to the various motivations and abilities of terrorist organizations in conjunction with the extensive natural gas infrastructure within the United States, the likelihood of future acts of terrorism occurring at the Project site is unpredictable. The FERC has taken measures to limit the distribution of information to the public regarding facility design to minimize the risk of sabotage. Facility design and location information is removed from the FERC's website to ensure that sensitive information filed under Critical Energy Infrastructure Information is not readily available. Further, the Commission, in cooperation with other federal agencies, industry trade groups, and interstate natural gas companies, is working to improve pipeline security practices, strengthen communications within the industry, and extend public outreach in an ongoing effort to secure pipeline infrastructure.

Despite the ongoing potential for terrorist acts along any of the nation's natural gas infrastructure, the continuing need for the construction of these facilities is not eliminated. Given the continued need for natural gas conveyance and the unpredictable nature of terrorist attacks, FERC, DOT, and the Office of Homeland Security's efforts to continually improve pipeline safety would minimize the risk of terrorist sabotage of the Project to the maximum extent practical, while still meeting the nation's natural gas needs.

### **3.13 CUMULATIVE IMPACTS**

In accordance with NEPA and FERC policy, we considered the cumulative impacts of the proposed Project and other projects in the general Project area. Cumulative impacts represent the incremental effects of the proposed action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a given period of time. The direct and indirect impacts of the proposed Project are discussed in other Sections of this EIS.

The purpose of this cumulative impact analysis is to identify and describe cumulative impacts that would potentially result from implementation of the proposed Project. This cumulative impact analysis generally follows the methodology set forth in relevant guidance (CEQ 1997b, EPA 1999). Under these guidelines, inclusion of other projects within the analysis is based on identifying commonalities of impacts from other projects to potential impacts that would result from the proposed Project. An action must meet the following three criteria to be included in the cumulative impacts analysis:

- impact a resource area potentially affected by the proposed Project;
- cause this impact within all, or part of, the proposed Project area; and
- cause this impact within all, or part of, the timespan for the potential impact from the proposed Project.

For the purposes of this cumulative impact analysis, we considered the Project area to be the counties and parishes traversed by the proposed Project.

The actions considered in the cumulative impact analysis may vary from the proposed Project in nature, magnitude, and duration. These actions are included based on the likelihood of completion, and only projects with either ongoing impacts or that are “reasonably foreseeable” future actions were evaluated. Existing or reasonably foreseeable actions that would be expected to affect similar resources during similar time periods as the proposed Project were considered further. The anticipated cumulative impacts of the proposed Project and these other actions are discussed below, as well as any pertinent mitigation actions. The anticipated cumulative impacts were based on NEPA documentation, agency and public input, and best professional judgment.

We identified three types of past, present, and reasonably foreseeable future projects that would potentially result in a cumulative impact when considered with the proposed Project. These are: (1) other natural gas pipeline projects; (2) facilities that would be associated with construction of the proposed Project but that are not under the FERC’s jurisdiction; and (3) unrelated projects that are either in place, are under construction in the vicinity of the proposed Project, or are proposed (Table 3.13-1).

<b>TABLE 3.13-1 Existing or Proposed Projects that would Cumulatively Impact Resources in the Gulf Crossing Project Area</b>			
Project	Description	Anticipated Construction Date	Counties/Parishes Affected within Gulf Crossing Project Area
<b>Natural Gas Pipeline Projects Subject to FERC Jurisdiction</b>			
Midcontinent Express Pipeline	Construct and operate a 41-mile-long, 30-inch-diameter; a 196-mile-long, 36-inch-diameter; and a 265-mile-long, 42-inch-diameter natural gas pipeline	2008	Bryan County, Oklahoma  Fannin, Lamar, Franklin, Titus, Morris, and Cass Counties, Texas  Caddo, Bossier, Webster, Claiborne, Lincoln, Union, Ouachita, Morehouse, Richland, and Madison Parishes, Louisiana  Hinds and Simpson Counties, Mississippi
Southeast Supply Header	Construct and operate a 269-mile-long, 36 and 42-inch-diameter natural gas pipeline	2007-2008	Richland and Madison Parishes, Louisiana  Copiah, and Simpson Counties, Mississippi
Southeast Expansion	Construct and operate a 111-mile-long, 42-inch-diameter natural gas pipeline	2007–2008	Richland Parish, Louisiana, Simpson County, Mississippi

**TABLE 3.13-1 (continued)**  
**Existing or Proposed Projects that would Cumulatively Impact**  
**Resources in the Gulf Crossing Project Area**

Project	Description	Anticipated Construction Date	Counties/Parishes Affected within Gulf Crossing Project Area
East Texas to Mississippi Expansion	Construct and operate a 240-mile-long, 42-inch-diameter; and a 3-mile-long, 36-inch-diameter natural gas pipeline	2007	Ouachita, Richland, and Madison Parishes, Louisiana  Hinds, Copiah, and Simpson Counties, Mississippi
Carthage to Perryville	Construct and operate a 172-mile-long, 42-inch-diameter natural gas pipeline	Completed in 2007	Ouachita and Richland Parish, Louisiana
<b>Natural Gas Pipeline Projects Not Subject to FERC Jurisdiction</b>			
Sherman Express Pipeline, LLC, an affiliate of Enterprise Texas L.P. (Enterprise)	Construct and operate a 178-mile, 30- and 36-inch diameter natural gas pipeline	2008	Grayson County, Texas (Interconnect Location MP 0.0)
Enogex Bennington Compressor Station	Construct and operate a 24,000 horsepower compressor station and associated pipelines	2008	Bryan County, Oklahoma (M/R Location BD 32.6)
Regency Pipeline	Construct and operate an 80-mile long, 30-inch-diameter intrastate natural gas pipeline and a 40-mile long, 24-inch-diameter natural gas pipeline loop	Completed in 2005	Richland Parish, Louisiana
<b>Unrelated Projects</b>			
Trans-Texas Corridor 69	Construct and operate an intermodal transportation corridor from Texarkana, Texas, to Mexico	N/A	Cass County, Texas
State Highway (SH) 289	Construct and operate a highway between SH 56 to FM 120 west of Sherman, Texas	N/A	Grayson County, Texas
<b>Unrelated Projects</b>			
Interstate 69 (SIU 14)	Construct and operate a highway between U.S. Highway 171 and Interstate Highway 20 as part of the Interstate 69 corridor that will link Indianapolis, Indiana to the lower Rio Grande Valley in Texas	N/A	Bossier, Webster, and Claiborne Parishes, Louisiana
U.S. Highway 167	Widen to four lanes Sections of U.S. Highway 167 from Alexandria, Louisiana to the Arkansas state line	2007–2010	Lincoln, Union, and Clairborne Parish, Louisiana
U.S. Highway 165	Widen to four lanes Sections of U.S. Highway 165 from Jennings, Louisiana to the Arkansas state line	2007–2010; work in proposed Project area completed	Ouachita, and Morehouse Parish, Louisiana

**TABLE 3.13-1 (continued)  
Existing or Proposed Projects that would Cumulatively Impact  
Resources in the Gulf Crossing Project Area**

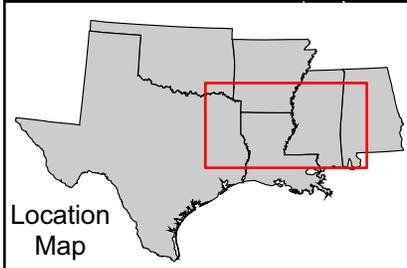
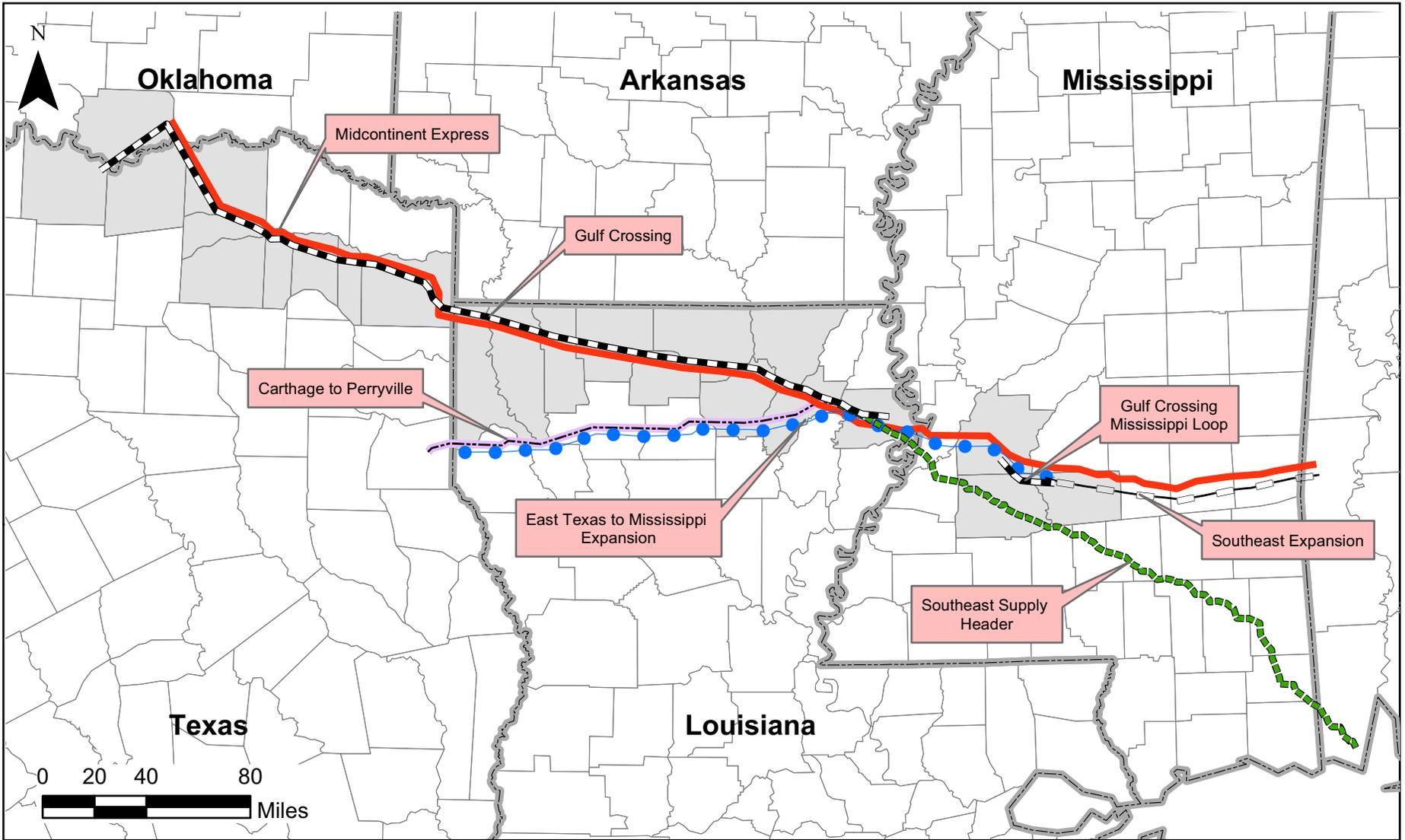
Project	Description	Anticipated Construction Date	Counties/Parishes Affected within Gulf Crossing Project Area
Clinton/Raymond Road Interchange	Interchange reconstruction, new bridge on Interstate 20, a new loop in the southwest quadrant, and widen U.S. Highway 80 to five lanes between Raymond Road to Springridge Road	October 2007	Hinds County, Mississippi
Stack Project (Interstate 20 / U.S. Highway 49)	Reconstruction of interchange, including additional lanes to both U.S. Highway 49 south and frontage roads.	Early 2008	Hinds County, Mississippi
Denbury Resources, Inc. Pipeline Project	Proposed construction of a new carbon dioxide pipeline.	2008	Madison and Richland Parishes, LA
Marvin Nichols Reservoir I and Dam	Construction of an approx. 72,000 acre reservoir and dam in Northeast Texas.	N/A	Franklin, Titus, and Morris Counties, Texas
NOTES			
N/A = Not available			

In addition to the proposed Gulf Crossing Project, the identified projects consist of two completed projects, three projects recently certificated and under construction, one proposed natural gas project, two proposed natural gas transmission pipelines not subject to FERC jurisdiction, seven transportation improvement projects, and one water resource related project. We identified these projects through scoping and independent research, as well as information provided by the Companies. While we did not specifically contact each county/parish, community, or other entity regarding new projects or plans for expansion, we did request information on other projects in the NOI. We have identified the tentative construction schedules of these projects, as available; but the actual construction schedules would depend on factors such as economic conditions, the availability of funds, and political considerations.

The potential impacts associated with these projects that are most likely to be cumulatively significant are related to wetlands and waterbodies, vegetation and wildlife (including federally and state-listed endangered and threatened species), land use, air quality, and noise.

### **3.13.1 Other Natural Gas Pipeline Projects**

The FERC issued a Certificate for CEGT's Carthage to Perryville Project and to Gulf South's East Texas to Mississippi Expansion Project, which is also located in northern Louisiana and is currently in the final phase of construction. In addition, the FERC issued a Certificate for Southeast Supply Header Project (SESH) and the Southeast Expansion project, both of which are located in eastern Louisiana and Mississippi and are currently under construction. The FERC is currently considering a proposal for one other natural gas pipeline project that would also traverse northern Louisiana and Mississippi, the Midcontinent Express Project (MEP). Interstate natural gas pipeline projects occurring in the counties and parishes affected by the proposed Gulf Crossing project are depicted in Figure 3.13-1. Environmental resources that would be affected by recent and proposed interstate natural gas pipeline projects are quantified in Table 3.13-2.



**Legend**

Gulf Crossing	Southeast Expansion
Southeast Supply Header	Carthage to Perryville
East Texas to Mississippi Expansion	Midcontinent Express

Note: Map depicts the approximate locations of interstate natural gas pipeline projects in Counties/Parishes Affected by the proposed Project.

Gulf Crossing and Gulf South Pipeline Companies  
Proposed Gulf Crossing Project

**NATURAL GAS PIPELINE PROJECTS IN THE  
PROJECT AREA**

DATE: February 2008	Figure 3.13-1
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**TABLE 3.13-2  
Environmental Resources that would Be Affected During Construction and  
Operation of Recent and Proposed Interstate Natural Gas Pipeline Projects in the Vicinity of the  
Proposed Gulf Crossing Project**

<b>Project</b>	<b>Total Length/Length of Collocation (miles)</b>	<b>Total Land Disturbance (acres)</b>	<b>Proposed Permanent Right-of-way Width (feet)</b>	<b>Total Open-Cut Waterbody Crossings (number)</b>	<b>Total Wetlands Disturbed During Construction (number / acres)</b>	<b>Total Forested Wetlands Disturbed (acres)</b>	<b>Total Forested Land Cleared (acres)</b>	<b>Federally Listed Endangered, Threatened, or Candidate Species (number)</b>	<b>Total Residences Within 50 Feet (number)</b>	<b>Total Potential National Register of Historic Places Sites (number)</b>
East Texas to Mississippi Expansion Project	244 /181	3,763 (1,564 permanently)	60	170 perennial 647 intermittent	309 wetlands / 122 acres	84 acres	1,777 acres	11	4	1
Carthage to Perryville Project	172 /40	2,498 (1,248 permanently)	60	104 perennial 136 intermittent	154 wetlands / 128 acres	87 acres	1,425 acres	6	0	2
Southeast Supply Header Project	269 /0	3,417 (1,631 permanently)	50	177 perennial 448 intermittent	246 wetlands / 239 acres	249 acres	2,171 acres	19	6	6
Southeast Expansion Project	111 /73	1,954 (825 permanently)	60	92 perennial 159 intermittent	129 wetlands / 89 acres	48 acres	1,329 acres	9	18	9
Gulf Crossing Project	374 /200	6,109 (2,798 permanently)	60	159 perennial 647 intermittent	164 wetlands / 144 acres	107 acres	1,216 acres	16	12	8
Midcontinent Express Project	508 /260	8,394 (3,149 permanently)	50	195 perennial 758 intermittent	378 wetlands / 308 acres	203 acres	3, 522 acres	21	23	11

## **East Texas to Mississippi Expansion Project**

Gulf South has proposed construction of a new 36- and 42-inch diameter natural gas pipeline that would extend from Keatchie, Louisiana to Harrisville, Mississippi. The proposed East Texas to Mississippi Expansion Project would extend for approximately 129 miles through the region which would contain the Gulf Crossing Project, including Ouachita, Richland, and Madison Parishes, Louisiana, and Hinds, Copiah, and Simpson Counties, Mississippi. Total pipeline length would be approximately 244 miles, and 76 percent or approximately 185 miles of the proposed pipeline would be collocated with existing utility rights-of-way. The project would also include the modification and/or expansion of three compressor stations and the construction of two new compressor stations. The new compressor stations would be located in Madison and Ouachita Parishes, Louisiana.

A final EIS was issued for the proposed East Texas to Mississippi Expansion Project on May 25, 2007 and Gulf South was granted permission to proceed with construction on June 27, 2007. Detailed information regarding the environmental impacts that would be associated with construction and operation of the East Texas to Mississippi Expansion Project, including the final EIS, can be viewed on the FERC website under Docket No. CP06-466-000.

## **CEGT Carthage to Perryville Project**

CEGT is completing construction of the Carthage to Perryville Project, a new 42-inch-diameter natural gas pipeline system that would extend from Carthage in Panola County, Texas to near Delhi in Richland Parish, Louisiana. The project consists of 172 miles of pipeline and two compressor stations that would total 41,240 hp. The pipeline would connect multiple receiving points in east Texas with CenterPoint's Perryville Hub and four new interstate pipeline interconnections. The CEGT Project parallels the East Texas to Mississippi Expansion Project route for approximately 51.4 miles in Ouachita and Richland Parishes, Louisiana. The FERC issued CEGT its Certificate on October 2, 2006. Currently, construction of the Carthage to Perryville Project is complete and the project is in-service. Detailed information regarding the environmental impacts that would be associated with construction and operation of the CEGT Project are included in the EIS (FERC 2006) prepared by the FERC and can be viewed on the FERC website under Docket No. CP06-85-000.

## **Southeast Expansion Project**

Gulf South has proposed construction of a new 42-inch-diameter natural gas pipeline system that would extend approximately 111 miles from Simpson County, Mississippi to Choctaw County, Alabama. Approximately 29 miles of 42-inch-diameter pipeline would be located in one county (Simpson County) that would also be affected by the Gulf Crossing Project. The proposed Southeast Expansion Project would affect approximately 344 acres during construction and 207 acres during operation in Simpson County, Mississippi. In addition to the 111 miles of pipeline construction, the proposed Southeast Expansion Project would add three new compressor stations. Two of the new compressor stations would be located in the area affected by the proposed Gulf Crossing Expansion Project, the Delhi Compressor Station (10 acres disturbed during construction) in Richland Parish, Louisiana and the Harrisville Compressor Station (11 acres disturbed during construction), in Simpson County, Mississippi. Both of these proposed compressor stations would permanently affect 5 acres of land during operation.

Within the Simpson county region also affected by the proposed Gulf Crossing Project, the proposed Southeast Expansion Project would cross numerous waterbodies and forested lands, and would impact approximately 16 acres of wetlands during construction. Approximately 4 acres of forested wetlands would be permanently converted to herbaceous or scrub-shrub wetlands in this region. Based on the project scope, geographic location, and information that we have available, we anticipate that the

Southeast Expansion Project would result in environmental impacts similar to those of the proposed Project. A final EIS was issued for the proposed Southeast Expansion Project on August 3, 2007 and permission was granted to proceed with construction on September 28, 2007. Construction of the Southeast Expansion Project commenced in October of 2007. Detailed information regarding the environmental impacts that would be associated with construction and operation of the Southeast Expansion Project, including the final EIS, can be viewed on the FERC website under Docket No. CP07-32-000.

### **Southeast Supply Header Project**

Duke Energy Gas Transmission (DEGT) and CEGT have proposed construction of a new 36-inch-diameter and 42-inch-diameter natural gas pipeline system that would extend approximately 269 miles southeast from Delhi, Louisiana to near Coden, Alabama. Approximately 39 miles of 42-inch-diameter pipeline would be located in three parishes and counties that would also be affected by the Gulf Crossing Project including Richland and Madison Parishes, Louisiana and Copiah County, Mississippi. In addition to the 269 miles of pipeline construction, the SESH Project would add three new compressor stations. One of the new compressor stations would be located in Richland Parish, Louisiana. The pipeline would connect onshore gas supplies from Texas and Louisiana to the markets in the southeast, as well as interconnect with interstate systems in Mississippi and Alabama.

The SESH Project is considered here with respect to the potential for cumulative impacts to the natural and human environments of Louisiana and Mississippi. Within the four parish/county region also affected by the proposed Gulf Crossing Project, the proposed SESH Project would cross numerous waterbodies and forested lands, and would impact approximately 46 acres of wetlands during construction. Approximately 13 acres of forested wetlands would be permanently converted to herbaceous or scrub-shrub wetlands in this region. Based on the project scope, geographic location, and information that we have available, we anticipate that the SESH Project would result in environmental impacts similar to those of the proposed Project. A final EIS was issued on August 10, 2007, and permission was granted to proceed with construction on September 20, 2007. Actual construction of the SESH Project commenced in November 2007. The estimated in-service date is June 2008. Detailed information regarding the environmental impacts that would be associated with construction and operation of the SESH Project, including the final EIS, can be viewed on the FERC website under Docket No. CP07-44-000.

### **Midcontinent Express Project**

Midcontinent Express Pipeline Company, LLC (Midcontinent Express) has proposed construction of a new 30-inch-diameter, 36-inch-diameter, and 42-inch-diameter natural gas pipeline system that would extend approximately 508 miles from Bryan County, Oklahoma to Choctaw County, Alabama. The proposed MEP would extend through the region that would be affected by the proposed Gulf Crossing Project. Based on preliminary information, the proposed Midcontinent Express Project would be located near or collocated with the proposed Gulf Crossing Project from Bryan County, Oklahoma to Madison Parish, Louisiana approximately 325 miles. In addition to the 508 miles of pipeline construction, the proposed MEP would add four new compressor stations and one booster station, with one of the new compressor stations proposed for Lamar County, Texas. The pipeline would connect onshore gas supplies from Texas, Oklahoma, and Arkansas to the markets in the southeast, as well as interconnect with a variety of interstate natural gas transmission systems.

An application for the Midcontinent Express Project was filed with the FERC on October 9, 2007. While it is not certain if or when this action will occur, its similarity and proximity to the proposed Project merits further consideration. The MEP would involve construction and operation of

approximately 508 miles of pipeline and would affect approximately 8,394 acres during construction in the 19 parish/county region affected by the proposed Gulf Crossing Project. The proposed MEP would cross numerous waterbodies and forested lands, and would affect approximately 378 acres of wetlands during construction. Approximately 203 acres of forested wetlands would be impacted in this region. As noted above, the general impact of constructing multiple pipelines would be primarily additive. Based on the project scope, geographic location, and preliminary information, we anticipate that the MEP would result in environmental impacts similar to those of the proposed Project. The environmental impacts that would be associated with construction and operation of the project are evaluated in detail in the Draft EIS, which is available for review on the FERC website under Docket No. CP08-6-000.

### **3.13.2 Natural Gas Pipeline Projects Not Subject to FERC Jurisdiction**

#### **Regency Intrastate Pipeline**

Regency owns and operates a 280-mile-long, 30-inch-diameter intrastate pipeline system from Caddo Parish, Louisiana to Ruston, Louisiana. The Regency pipeline is interconnected at its western end with a 10-mile-long, 20-inch-diameter interstate gas pipeline that extends from Harrison County, Texas, to Caddo Parish, Louisiana (Regency 2006). In December 2005, Regency completed construction of the Regency Intrastate Enhancement Project. This expansion project included installation of 40 miles of 24-inch-diameter pipeline loop adjacent to the existing pipeline between Haughton, Louisiana and eastern Bienville Parish; construction of 80 miles of new 30-inch-diameter mainline pipeline between Bienville Parish and Winnsboro, Louisiana; and addition of approximately 10,000 hp of new compression at an existing compressor station in eastern Bienville Parish.

The Regency pipeline runs parallel to and generally south of portions of the proposed Project route. Because it is an intrastate pipeline, the FERC did not have jurisdictional authority over planning or construction of the Regency Intrastate Enhancement Project, and we therefore have only limited information on the design and environmental impacts associated with that project. Construction of the Regency Intrastate Enhancement Project temporarily impacted a total of 42 acres of wetlands and resulted in permanent conversion of approximately 14 acres of forested wetlands to emergent and scrub-shrub wetlands.

#### **Sherman Express Pipeline, LLC, an affiliate of Enterprise Texas L.P. (Enterprise)**

The Sherman Express Pipeline's Extension would consist of 30- and 36-inch diameter pipeline originating at a central delivery point on Enterprise's Texas intrastate pipeline system near Morgan Mill, Texas, and would extend 178 miles to Sherman, Texas in Grayson County (MP 0.0). The pipeline would connect at MP 0.0 with the proposed 42-inch Gulf Crossing pipeline. The Sherman Extension's construction and service efforts are anticipated for fourth quarter 2008. Detailed information regarding the environmental impacts that would be associated with construction and operation of the Sherman Express Pipeline Extension are not available.

#### **Enogex Bennington Compressor Station (Enogex)**

Enogex proposes to construct and operate its Bennington Compressor Station, a new 24,000 horsepower compressor station and associated pipeline facilities, in Bryan County, Oklahoma. The proposed 42-inch Gulf Crossing pipeline would construct its M/R station adjacent to the Bennington Compressor Station at milepost BD32.6. Construction of the Bennington Compressor Station is anticipated to commence March 2008.

Enogex filed an application for a limited jurisdiction certificate authorizing the lease of interstate capacity from the FERC on June 20, 2007. Subsequently, Enogex filed its Environmental Summary Report with the FERC on January 16, 2008. The Bennington Compressor Station would require 26.2 acres for construction and permanently affect 20.0 acres for operation. The associated 16-inch and 30-inch tie-in pipelines would be constructed adjacent and parallel within a 150-foot-wide corridor that would be maintained in a 75-foot-wide corridor during operations. The pipelines would extend for about 1,800 feet and affect 6.2 acres during construction and 3.1 acres during operations. The compressor station would include four electric motor-driven reciprocating compressor.

The compressor station and pipelines would be located in a pasture dominated by Bermuda grass. A pond used by livestock is located within the compressor station site; however, the pond would not be affected by construction or operations. One intermittent waterbody would be crossed twice in the construction of the associated pipelines. No cultural resources were documented from field surveys or consultations with the Oklahoma SHPO or associated Native American Tribes. No threatened or endangered species are expected to be impacted by the construction or operation of the Bennington Compressor Station and associated pipelines. No residences are located within 0.25 mile of the proposed compressor station site. The four electric compressors would not generate any emissions since no hydrocarbons would be burned as fuel. The stationary sources would produce minimal emissions of VOC. Calculated noise levels would not exceed the 55dBA threshold at the three nearest NSAs. More detailed information regarding the environmental impacts associated with construction and operation of the Bennington Compress Station project is available for review on the FERC website under Docket No. CP07-403-000.

### **3.13.3 Unrelated Projects**

#### **Trans-Texas Corridor 69**

A consortium of Texas state transportation planning agencies, including the Texas Department of Transportation (TxDOT) and the Texas Turnpike Authority have proposed the Trans-Texas Corridor (TTC) Project. The TTC Project would consist of a system of new and existing highways that would provide dedicated travel lanes for cars and heavy trucks, incorporate light and heavy rail and other transit modes, and provide infrastructure for pipelines and other linear utilities. Elements of the TTC would be evaluated, designed, and constructed over the next 50 years (TTC 2006).

One major component of the Project, TTC 69, would extend from Texarkana, Texas to Mexico. One Section of TTC 69 would be constructed in Panola County, Texas, in the general vicinity of the proposed Project route. An initial environmental study of TTC 69 will result in selection of a preferred 4-mile-wide corridor. That study is currently being conducted by TxDOT and is expected to be completed in 2007. If a preferred corridor is selected, potential route and design alternatives would be evaluated through an EIS conducted by the Federal Highway Administration (FHWA) and the Federal Transit Authority.

#### **State Highway 289**

The Texas Department of Transportation, as part of the 2007 Statewide Mobility Program, is constructing a new north-south thoroughfare that will connect SH 289 from SH 56 to FM 120. The pass through will consist of two-lanes on approximately 10 miles of new location. The thoroughfare will alleviate congestion from US 75 and provide alternate access to the Grayson County Airport. Bonds have been sold for the proposed project; however the current construction date is still pending.

## **Interstate Highway 69**

The Louisiana Department of Transportation and Development (LDOT), in cooperation with the FHWA, and Arkansas Highway Transportation Department (AHTD) is conducting an environmental and location study for a Section of Independent Utility (SIU) part 14 of the proposed Interstate Highway 69. SIU 14 would be located between Highway 20 near Haughton to US 82 near El Dorado, Arkansas (AHTD, 2007). If approved, this project would connect and provide a four-lane, limited access highway. The proposed highway segments are part of the 1,600 mile Interstate 69 corridor that would link Indianapolis, Indiana to the lower Rio Grande Valley in Texas (LDOT 2007a). The proposed pipeline would cross the highway segment SIU 14 in Claiborne Parish at MP 227.

## **U.S. Highway 167 Widening**

Under another component of the TIMED program, U.S. Highway 167 is being widened to four lanes along a 112-mile stretch between the Arkansas state line and Alexandria, Louisiana (LDOT 2007c). As of May 2007, construction of the U.S. Highway 167 widening was approximately 43 percent complete. The proposed Project route would intersect U.S. Highway 167 near MP 259.5 in Lincoln Parish, and this portion of U.S. Highway 167 is expected to be under construction between 2007 and 2010.

## **U.S. Highway 165 Widening**

LDOT also has plans to expand a 173-mile portion of U.S. Highway 165 to four lanes between the Arkansas state line and Jennings, Louisiana (LDOT 2007d). As of May 2007, construction of the U.S. Highway 165 widening was approximately 51 percent complete. The TIMED Project schedule indicates that all construction work on U.S. Highway 165 will start no later than mid-2007 and be completed by 2010. The proposed Project route would intersect U.S. Highway 165 near MP 297.5 in Ouachita Parish, but this portion of U.S. Highway 165 has already been constructed. Sections of U.S. Highway 165 located just north and south of the proposed pipeline route in Ouachita Parish would be under construction between 2007 and 2010.

## **Clinton/Raymond Road Interchange**

The Mississippi Department of Transportation's (MDOT's) Clinton/Raymond Road Interchange project is currently underway. The scheduled completion date is Winter 2007. The project includes complete reconstruction of the interchange, including a new bridge on Interstate 20 over Clinton/Raymond Road, a new loop in the southwest quadrant to improve access to the interstate for traffic southbound on Clinton/Raymond Road going eastbound on Interstate 20, improving U.S. Highway 80 to five lanes from Clinton/ Raymond Road to Springridge Road, and installation of signals at all interstate ramps and at the Clinton/ Raymond Road and U.S. Highway 80 intersections (MDOT 2007).

## **Stack Project (Interstate 20/U.S. Highway 49)**

MDOT's Phase III of the Stack Project is scheduled to be complete Spring 2008. This phase includes reconstruction of the Interstate 20/U.S. Highway 49 interchange, including adding lanes to both U.S. Highway 49 south and frontage roads on U.S. Highway 49. Phase IV of the Stack Project is scheduled to be let for construction bids in October 2007. This phase will include replacing the pavement on Interstate 20/Interstate 55 from Gallatin Street to the Pearl River. It also includes a new roadway from Gallatin Street to State Street (MDOT 2006).

## **Denbury Resources Carbon Dioxide Pipeline**

Denbury Resources, Inc. has proposed construction of a carbon dioxide pipeline extending west from its Tinsley Field in Mississippi to near Delhi, Louisiana. This proposed project would affect Madison and Richland Parishes, Louisiana, and other counties in Mississippi not affected by the proposed Gulf Crossing Project. As proposed, construction would be completed in 2008. Based on the anticipated project scope, geographic location, and preliminary information, we anticipate that the proposed Denbury Resources carbon dioxide pipeline project would result in environmental impacts similar to or somewhat less than those of the proposed Project.

## **Marvin Nichols Reservoir I and Dam**

The proposed Marvin Nichols I Reservoir and Dam (approximately 72,000 acres) has been designated as a unique reservoir site by the Texas Legislature. However, the designation does not imply that the reservoir would be constructed. According to the State Bill 3, there is a termination date on the designation for any reservoir whose project sponsor has not voted funding for permitting or construction by September 1, 2015. The proposed reservoir would serve as a municipal water source for the Dallas/Ft. Worth metropolitan area. The reservoir would be constructed in Red River, Titus, Morris, Franklin, and Bowie counties, on the Sulphur River in Northeast Texas.

Construction of the reservoir would result in impacts to approximately 30,000 acres of rare bottomland forest that would be destroyed from inundation. Specifically, inundation would occur in a portion of the Sulphur River Bottom West/Cuckoo Pond bottomland hardwoods area. This area has been designated as a Priority 1 area according to USFWS *Bottomland Hardwood Protection Plan*. A Priority 1 area is an “excellent quality bottomlands of high value to the key waterfowl species”. In addition, approximately 42,000 acres of mixed forest and farming communities would be impacted by the construction of the reservoir. Construction of the new reservoir and associated water pipelines would result in the loss of terrestrial wildlife habitat, negative impacts to the timber industry, alteration of the natural flow of the river and vegetation in the area, and a permanent loss of rare forested acreage. However, the reservoir would increase the amount of aquatic and waterfowl habitat.

## **Potential Cumulative Impacts of the Proposed Action**

Impacts to wetlands, waterbodies, vegetation, wildlife (including federally and state-listed endangered and threatened species), land use, and air quality and noise could contribute to larger cumulative impacts.

The FERC has no authority over permitting, licensing, funding, construction, or operation of the projects listed above in Section 3.13.2. Federal, state, and local agencies must review these projects for compliance with requirements for construction of facilities at sites or places where a governmental license or permit may be required. Expansion or construction of intrastate pipelines and highways would require state or federal permits and approvals to ensure compliance with Section 7 of the ESA; Sections 401, 402, and 404 of the CWA; and the CAA. Issuance of the necessary permits and approvals would reduce or avoid significant impacts from these facilities to wetlands and waterbodies, vegetation and wildlife (including threatened and endangered species), land use, and air quality and noise.

### **3.13.3.1 Wetlands and Waterbodies**

Construction and operation of the proposed Project would result in both short-term and long-term impacts to waterbodies and wetlands. The short-term impacts such as soil or sediment disturbance would dissipate over a period of weeks, while longer-term impacts, such as regrowth of forested wetlands within

the temporary construction rights-of-way, would persist for months or years. The primary impacts to wetlands and waterbodies during operation of the proposed pipeline would be associated with routine right-of-way maintenance. All maintenance activities would comply with applicable federal regulations and the Companies' Plan (see Section 3.2) and Procedures (see Sections 3.3 and 3.4), but would continue throughout the life of the proposed Project.

If approved and constructed, the proposed Project and other reasonably foreseeable future projects would impact wetlands and would include permanent loss or conversion of some existing wetlands (see Table 3.4.1-1). Elements of these projects with the potential to affect wetlands and waterbodies would be subject to review and approval under Section 404 of the CWA, as administered by the COE, as well as state and local wetland regulations (see Section 1.3). Any permanent or long-term impacts to wetlands and waterbodies would require appropriate mitigation. Construction of the proposed Project would affect 164 wetland areas, resulting in disturbance of a total of approximately 144 acres of wetlands, including approximately 107 acres of forested wetland impacts. Based on our recommendation in the draft EIS, the Companies developed site-specific wetland crossing plans in select areas to further minimize forested wetland effects. The Companies continue to consult with the COE and other agencies regarding compensatory mitigation for wetland impacts associated with the proposed Project.

Construction of the proposed Project would result in 896 individual waterbody crossings. The Companies propose to use HDD methods to avoid direct impacts to 59 waterbody crossings and to accomplish pipeline installation across 24 major/navigable waterbodies, two Louisiana Natural and Scenic Rivers (Bayou D'Arbonne and Bayou Dorcheat), and three NRI-listed streams (Bayou D'Arbonne, Blue River, and Pearl River). The use of HDD would avoid direct impacts to waterbodies and minimize impacts to riparian vegetation at those crossings. Although impacts to surface waters could occur during the HDD installation process, either through an inadvertent release of drilling fluids (frac-out) or through accidental fuel and chemical spills, the likelihood and potential damage associated with such events would be greatly reduced by the implementation of the Companies' HDD Contingency Plan and SPCC Plan.

Because most of the projects listed in Table 3.13-1 are located within the same major watersheds that would be crossed by the proposed Project pipeline, and because some of these projects would likely involve direct and indirect waterbody impacts, the proposed Project and other reasonably foreseeable future projects would result in some cumulative impacts to waterbodies. However, because the proposed Project would not involve construction of permanent diversions or dams, impacts to surface water quality would be temporary. These temporary impacts would include runoff from construction areas, temporary and localized increases in turbidity and sedimentation associated with in-water construction, and withdrawal and discharge of surface waters for hydrostatic testing of pipeline segments. As described in Section 3.3, these effects would be relatively minor and would be further minimized by implementation of the Companies' Plan and Procedures and our recommendations; therefore, we believe that cumulative impacts to wetlands and waterbodies would be relatively minor.

### **3.13.3.2 Vegetation and Wildlife**

Construction of the proposed Project and other reasonably foreseeable future projects would cause a cumulative impact on native vegetation and associated wildlife. These cumulative impacts would be most significant if the projects were constructed at or near the same time and within close proximity of one another. Either circumstance would increase the impacts and would lengthen the recovery time for affected vegetative communities. The proposed Project, if approved, would impact native vegetative communities during construction, including approximately 1,723 acres of upland forest (slope hardwood and loblolly pine-hardwood forest) and 260 acres of pine plantation. Impacts to forested land and other native vegetative communities from the Regency, CEGT, Southeast Expansion, SESH, East Texas to

Mississippi Expansion, Midcontinent Express, Sherman Extension, and Bennington Compressor Station Projects would likely result in a cumulative effect on vegetation and wildlife when considered in conjunction with proposed Project. The proposed roadway improvement projects listed in Table 3.13-1 are not likely to significantly impact forests or other native plant communities, as these projects would largely be sited within existing disturbed roadway rights-of-way. The proposed water resource project (Marvin Nichols I Reservoir and Dam) is expected to result in considerable cumulative effects on vegetation and wildlife when considered with the proposed project.

Cumulative impacts within a region, such as lost acreage of forestland, are additive. Furthermore, many wildlife species depend on mature contiguous tracts of forest to sustain their migratory and reproduction cycles. These species include dozens of migratory songbirds and terrestrial mammals that are not migratory but that require large tracts of forest to support their home ranges. The impacts of fragmentation can be immediate and significant because population levels for many such species are currently low and on the decline.

The extent and duration of cumulative wildlife habitat impacts associated with construction of the proposed Project and other future projects would be minimized by using existing, maintained rights-of-way and other disturbed areas as much as possible. The proposed route would be collocated with or parallel to existing utility rights-of-way where possible, thereby minimizing impacts to previously undisturbed vegetation. The proposed pipeline route would parallel existing utility rights-of-way for approximately 183.2 miles, or about 51 percent of the proposed mainline, and for the entire length of the Mississippi Loop. Additionally, approximately 45 percent of the proposed pipeline route's length would traverse agriculture and pasturelands that would typically experience rapid revegetation. Furthermore, the Companies would implement the mitigation measures outlined in their Plan and Procedures to encourage the regrowth of native vegetation and discourage the spread of exotic or noxious plant species.

Fifteen federally listed or candidate species and a number of state-listed threatened, endangered, and/or special-status species would be potentially impacted by construction activities associated with the proposed Project. As described in Section 3.7, with implementation of our recommendations for mitigation to avoid and minimize impacts, we believe that the proposed Project would not significantly affect federally listed species. However, if other reasonably foreseeable future projects were to impact the same habitats as the proposed Project route, cumulative impacts to these listed species would occur. Impacts to such species would likely be reduced or eliminated through conservation and mitigation measures identified during the permitting processes because protection of threatened, endangered and other special-status species is part of the federal and state permitting processes. Consequently, we believe that cumulative impacts to vegetation and wildlife resources would be relatively minor.

### **3.13.3.3 Land Use**

Construction of the proposed Project and other reasonably foreseeable future projects would result in temporary and permanent changes in land use within the Project area. The proposed Project would encumber a total of approximately 6,108.8 acres of land during construction. Approximately 43.3 percent of that land would be agricultural, 38.7 percent upland forest (including pine plantations), and 7.8 percent would be open land. Residential land, commercial/industrial land, and open water would also be affected. While many of these impacts would be temporary, construction of the proposed Project would result in some permanent land use changes, including conversion to maintained utility right-of-way of approximately 1,216.3 acres of forested uplands including pine plantations, 1,146.4 acres of agriculture, 267.8 acres of open land, and 107.3 acres of forested wetlands.

Land use impacts associated with the Carthage to Perryville Project include approximately 2,500 acres during construction and approximately 775 acres of permanent impacts to forested lands. The

Southeast Expansion and SESH Projects would impact approximately 1,329 and 2,171 acres of forested lands, respectively, in total during construction. The East Texas to Mississippi Expansion Project would have a permanent impact to approximately 1,838 acres of forested lands. MEP would impact 9,030 acres during construction, including 3,911 acres of impacts to forested lands. The construction and operational impacts of the Regency Intrastate Expansion also are not available at this time. Land use impacts associated with the pipeline projects would likely cause a cumulative effect when considered in conjunction with the proposed Project. Because these projects were constructed or are proposed to be constructed largely within or adjacent to existing maintained rights-of-way, the impact of land use changes would be reduced. Unlike roadway projects such as TTC 69, which would permanently convert thousands of acres of land to paved impervious surface, much of the land affected during construction of the proposed Project and the other pipeline projects would be restored and allowed to revert to preconstruction uses and conditions once pipeline installation was complete. Because non-woody vegetation would be expected to return to preconstruction conditions over the short term, impacts to acreage classified as agriculture, pastures, or open land would be short term and minor. Long-term impacts to cleared forestland located outside of permanently maintained rights-of-way would take many years to return to preconstruction conditions, with recovery time dependent on the types and ages of the trees removed. However, given the prevalence of these land uses and cover types within the affected counties and parishes, we believe that cumulative impacts to land use would be relatively minor.

The FERC considers a variety of factors when evaluating potential pipeline routes proposed by applicants. One of these factors, but not necessarily the predominant factor, is collocation with existing utility corridors. Selection of a route that is collocated with an existing and maintained right-of-way may have several advantages over a route in an undisturbed "greenfield" area. Some of these advantages include reduction in fragmentation of forested habitats, an expansion of an existing land use (i.e., maintained right-of-way) instead of introduction an entirely new one, less impacts to wildlife species found primarily in undisturbed habitats, and less visual impacts. However, we recognize that collocation with existing utility corridors may in some cases also have negative consequences to particular tracts such as small privately held properties or managed sites such as WRPs. Existing rights-of-way may appear attractive for routing of new projects and new rights-of-way may attract future projects. Although collocation may tend to reduce cumulative impacts overall, the cumulative impacts of two or more rights-of-way at individual properties or managed sites may be magnified. We have attempted to minimize the potential cumulative impacts for the proposed Project to the extent possible through our coordination with affected agencies and parties, our recommendation of impact avoidance, minimization, and mitigation measures, and our review of alternatives.

#### **3.13.3.4 Air Quality**

Air quality would be affected by construction and operation of the proposed Project and other reasonably foreseeable future projects. Construction of these projects would temporarily impact air quality by generating emissions from operation of fossil-fueled construction equipment and fugitive dust from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. However, the majority of impacts to air quality would occur during operation of these projects. The proposed Project, the proposed interstate natural gas projects, the certificated interstate natural gas projects, and the existing Regency pipeline all would contribute to ongoing air emissions associated with operation of compressor stations. The proposed or planned roadway improvements would also contribute increased levels of air emissions as a result of increased vehicular traffic.

Because construction-related air emissions would be temporary and localized, they would be unlikely to contribute significantly to cumulative long term air quality impacts. Air emissions from operations of the proposed Project and the other projects listed in Table 3.13-1 would be additive because they would be discharged into a shared air basin. However, all counties and parishes in which the

proposed Project would be constructed are in attainment for all NAAQS criteria pollutants. Furthermore, each of the projects listed in Table 3.13-1 would be required to meet all applicable federal and state air quality standards. For these reasons, we believe that cumulative impacts to air quality would be relatively minor.

### **3.13.3.5 Noise**

Potential noise impacts associated with the proposed Project and those projects listed in Table 3.13-1 would occur during construction and operation. Because of the linear nature of these projects, construction-related noise impacts would tend to be of short duration in a given area. Furthermore, because most construction activities would be limited to daylight hours, construction-related noise impacts would not occur at night for the most part. The proposed Project would cause potential impacts at NSAs near HDD sites, but we are recommending measures to mitigate this temporary effect including development of an updated HDD Noise Plan. Potential noise-related impacts during operation of the proposed Project and the other pipeline projects listed in Table 3.13-1 would primarily be limited to the vicinity of the associated compressor stations. As described in Section 3.11, the estimated noise that would be generated by the existing Harrisville Compressor Station and the proposed Sherman, Paris, Mira, and Sterlington Compressor Stations likely would meet acceptable levels at the nearest NSA, but we are recommending monitoring to ensure that no impacts occur.

Noise emissions from compressor station operations may be additive with noise-generating elements of other reasonably foreseeable future projects if they are located near a common NSA. However, no other compressor station, roadway improvement, or other noise-generating source for the identified projects would be located within 1 mile of any of the proposed compressor stations, therefore, we believe that cumulative impacts resulting from additional noise would be negligible.

### **3.13.4 Conclusions**

If the proposed Project and the Midcontinent Express Project are certificated, along with the under construction Southeast Expansion, SESH, East Texas to Mississippi Expansion, and the completed Carthage to Perryville Projects, the projects would be constructed within the same general area, and the effects of these actions could overlap in time. Additionally, the project scopes, construction methods, and overall impacts would be similar. Though the unrelated projects identified in our cumulative impact analysis are different from the proposed Project, they would affect similar resources. Although each of these unrelated projects would result in temporary and minor effects during construction, each project would be designed to avoid or minimize impacts to wetlands, waterbodies, protected and special-status species, and other sensitive resources. Additionally, significant unavoidable impacts to sensitive resources resulting from these projects would be mitigated. Mitigation generally leads to avoidance or minimization of cumulative impacts. We therefore consider that the potential cumulative impacts of the pipeline projects under our review have been or would be minimized.

We believe that impacts associated with the proposed Project would be relatively minor, and we are recommending additional measures to further reduce the environmental impacts associated with the proposed Project. The environmental impacts associated with the proposed Project would be minimized by careful project routing, utilization of HDD techniques to avoid and minimize impacts to some sensitive resources, and implementation of appropriate mitigation measures. Consequently, a small, but insignificant cumulative effect is anticipated when the impacts of the proposed Project are added to past, present, or reasonably foreseeable future projects in the area.