3.0 ENVIRONMENTAL ANALYSIS

3.1 GEOLOGY

3.1.1 Geological Setting

The proposed Project is located in the Mississippi Alluvial Plain Section (Delhi, Louisiana, MP 0.0 to the eastern slope of the Mississippi River, approximate MP 37.0) and the East Gulf Coastal Plain Section (approximate MP 37.0 in western Mississippi to Coden, Alabama, terminating at MP 268.94) of the extensive Coastal Plain physiographic province. These two physiographic sections are located within the ancient and expansive Mississippi Embayment, a structural trough in which the underlying crust of the Earth forms a deep valley that plunges toward the Gulf of Mexico. Over time, massive deposits of sediments in the Mississippi Embayment have led to formation of sedimentary rocks, some of which have been reworked and deposited as formations that are more recent.

The Mississippi Alluvial Plain is characterized by a conspicuous band of alternating Pleistocene age (0.01 to 1.8 million years ago [mya]) and Holocene age (present to 0.01 mya) deposits. The surficial geology in this area is primarily alluvial, which has terrace deposits of sand, gravel, and clay with some loess (windblown) deposits east of the Mississippi River. In general, the thickness of these deposits range from 100 to 200 ft (U.S. Geological Survey [USGS] 1996). The irregularly striped pattern owes its origin to extensive and accelerated deposition by streams during interglacial phases of the Pleistocene followed by erosion of these materials by Holocene river systems (see Table 3.1.1-1).

The East Gulf Coastal Plain in the proposed Project area (MP 37.0 eastward) is characterized by unconsolidated or poorly consolidated sand, gravel, and clay deposits of Pliocene age (1.8 mya to 5.3 mya) and Late Miocene age (5.3 mya to 11.2 mya). These materials were deposited mostly in marine environments and were subsequently uplifted to the extent that they now tilt seaward (USGS 2006a). At the westernmost edge of the East Gulf Coastal Plain is an expansive "blanket" of partially consolidated loess, or windblown glacial silt, of Pleistocene age covering Miocene formations for 50 – 60 miles of the proposed Project alignment. This area is known as the Loess Hills Region and is characterized by steep vertical bluffs along stream banks where it is thickest at the westernmost edge. The deposit thins to the east, gradually feathering out halfway across Mississippi (see Table 3.1.1-1).

The proposed Project crosses seven geologic formations, including Braided Stream Terraces-Loess; Alluvium; Catahoula; Pascagoula/Hattiesburg; Citronelle; Miocene Undifferentiated; and Alluvial, Coastal, and Low Terrace Deposits. Refer to Table 3.1.1-1 for the cumulative surface distance for each geologic formation crossed by the proposed Project.

3.1.1.1 Topography

The topography of the proposed Project area is generally flat to moderately sloping terrain with the steepest terrain located in western Mississippi in the Loess Hills. Topographic elevations range from 85 ft above mean sea level (amsl) at Delhi, Louisiana, up to 500 ft amsl near New Hebron, Mississippi, and down to 15 ft amsl near Coden, Alabama. Some areas of moderately rugged topography associated with loess deposits east of the Mississippi River would be encountered along the proposed Project route.

TABLE 3.1.1-1
Geologic Units Underlying the Proposed SESH Project

Cumulative Length Crossed (miles)	Physiographic Province	Group/ Formation/Type	Description
0.17	Mississippi Alluvial Plain	Braided Stream Terraces-Loess	Tan to reddish brown massive silt with some clay and minor amounts of very fine sand (USGS 2006b).
36.9	Mississippi Alluvial Plain	Alluvium	Gray to brownish-gray clay and silty clay with some sand and gravel (NRCS 2006 and USGS 2006b).
52.1	East Gulf Coast Plain	Catahoula	Gray to white sandstone, loose quartz sands, tuffaceous sandstones, and brown sandy clay. In outcrop, the Catahoula formation consists of generally nonmarine to marginal marine (fluvial to deltic) partially carbonaceous, varicolored gravel, sand, silt, and clay (Heinrich 2001 and Tew 1992).
95.68	East Gulf Coast Plain	Pascagoula/ Hattiesburg	Gray-green and blue-green shale and clay, gray sand, and silt.
69.8	East Gulf Coast Plain	Citronelle	Brown, red, and orange gravelly sand that locally contains clay balls and partings and gray, orange, and brown lenses of sandy clay. The base of the formation is generally marked by ferruginous sandstone that contains quartz and minor amounts of chert gravel (Reed 1971).
3.32	East Gulf Coast Plain	Miocene Series Undifferentiated	Gray, orange, and red very fine to coarse-grained sand, ferruginous sandstone, and gray, olive, blue, and green sandy silty clay. In some exposures, beds of sand contain gravel and petrified plant fossils, and clays contain carbonized leaf remains (Reed 1971).
10.78	East Gulf Coast Plain	Alluvial, Coastal, and Low Terrace	Unconsolidated tan and gray sands with some silts and clays that locally contain quartz, chert pebbles, and fossils. Low Terrace Deposits are fluvial gravels, sands, and clays of Pleistocene and Holocene age.

NRCS = Natural Resources Conservation Service
USGS = U.S. Geological Survey

3.1.1.2 Bedrock

Unconsolidated or poorly consolidated materials are located at all proposed Project facilities where excavation is necessary. Consolidated bedrock is located at extreme depths relative to the proposed Project facilities and thus would not be encountered during construction. SESH would complete all excavation work with standard excavation equipment; they anticipate no bedrock blasting for the proposed Project.

The primary effect of pipeline construction on geology would be disturbances to the existing near-surface geology and topography along the construction right-of-way. As described in Section 2.3.1,

all areas disturbed during pipeline construction would be finish-graded and restored as closely as possible to pre-construction contours during cleanup and restoration. We believe that construction and operation of the proposed Project would not result in significant alterations or negative impacts to the topography or overall geologic setting occurring within the proposed Project area.

3.1.2 Mineral Resources

The surface mineral predominately mined in Louisiana is lignite and is found in the northwestern part of the state. Lignite mining does not occur within the proposed Project area (Louisiana Geological Survey [LGS] 2000). Sand and gravel rank first in sales among Mississippi's leading industrial commodities. Forty-four counties within the state have permitted gravel pits (Mississippi Department of Environmental Quality [MDEQ] 1995). Alabama also thrives on mineral mining. Stone, sand, gravel, and clay make up a multi-million dollar industry in Alabama (Geological Survey of Alabama 2006).

SESH used USGS topographic maps and field surveys to identify mining sites within a 0.25-mile radius of the proposed Project facilities. Three sand and gravel pits/quarries were identified within 0.25 mile of the Project (Table 3.1.2-1). The sand and gravel pit at MP 150.28 is located approximately 422 ft from the construction work area, so there should be no impacts associated with Project construction. A field survey indicated that the quarry at MP 200.03 is quite small and was probably used for farm/logging road maintenance with limited access. This quarry is located approximately 100 ft from the construction work area, so there should be no impact to this quarry. The proposed Project would directly cross the inactive sand quarry at MP 188.53; however, it would parallel the Enterprise pipeline which also crosses the inactive quarry. Construction of the proposed Project could affect the sand resource at the inactive quarry. However, SESH would obtain the necessary easement through the property to offset any potential loss of access to the resource.

Forty oil and gas wells currently in production are located within 0.25 mile of the proposed Project. Only one is in Louisiana (MP 3.42). The remaining wells occur largely in two clusters: the first from MP 114.0 to MP 118.0, about 4 miles southeast of New Hebron in Lawrence County, Mississippi; and the other from MP 129.0 to MP 137.0, in eastern Jefferson Davis and western Covington counties in Mississippi. SESH would solicit additional information regarding plugged and abandoned oil and gas wells within 150 ft of the construction right-of-way from local and state resource agencies. Generally, there is no surface evidence for abandoned well locations, but the potential exists for approximations or inaccuracies of latitude and longitude information obtained from database research. Abandoned wells with the potential to be affected by construction would be field-verified prior to construction.

TABLE 3.1.2-1
Mineral Resources within 0.25 Mile of the Proposed SESH Project

Facility	Milepost	Feature	Name	Distance from Construction Workspace (Feet)
Pipeline	150.28	Sand and Gravel	LUX PIT	422.40
Pipeline	188.53	Sand Quarry [a, b]	UNKNOWN	0.00
Pipeline	200.03	Quarry [a, c]	UNKNOWN	98.53

[a] Features were identified during ecological field surveys.
[b] Civil field surveys identified this area to be consistent with past quarry operations.
[c] Civil field surveys identified this area to be a quarry for farm/logging road maintenance and not commercial use due to the limited access.

If it were determined prior to construction that one of the abandoned oil or gas wells is located within or near the trench line, SESH would contact the FERC to request an alternative measure, as appropriate, to adjust the pipeline centerline slightly to avoid impact to the abandoned well casing. Any such adjustment request would be minor (generally a 10-ft centerline offset), and disturbance would be limited to the previously identified construction right-of-way. In the unlikely event that a non-reported abandoned gas/oil well is discovered during construction, the following steps would be taken:

- stop all work in the area;
- notify the EIs and SESH Management;
- contain any spill that may have occurred in accordance with the SESH SPCC Plan;
- erect warning signs and barricade the area;
- notify the Louisiana Department of Environmental Quality (LDEQ), MDEQ, or the Alabama Department of Environmental Management (ADEM) to identify the owner, who would then plug and abandon the well, as necessary;
- notify the Commission of the discovery, nature, and size of any spill and the actual plan to handle the discovery; and
- reroute the pipeline around the unanticipated discovery, if possible.

Construction and operation of the proposed Project is not expected to have an impact on exploitable oil and natural gas resources. The proposed pipeline route would avoid all existing well sites; therefore, impacts to any wells at and near the ground surface would be unlikely. Excavation of the pipeline trench would typically only extend to a depth of approximately 6.5 to 8 ft below the ground surface, and none of the proposed HDDs would exceed a depth greater than 100 ft below the ground surface. Current oil and gas extraction operations are conducted at thousands of feet below the ground surface and would not be affected by proposed Project-related construction. Furthermore, because new drilling operations would be conducted outside of the permanent right-of-way, the proposed Project would not directly affect future oil or gas field development.

Direct access to future development areas could be restricted by the presence of the proposed pipeline. This would most likely occur in isolated areas where the presence of access roads is restricted or in a situation where future exploration activity could occur on both sides of the proposed pipeline. The presence of a pipeline could potentially prevent access across the pipeline from one potential resource area to another. SESH would develop access agreements with property owners, as necessary, to allow for safe travel across the pipeline.

3.1.3 Paleontology

Large, shallow, tropical seas covered much of the central United States, including the proposed Project area, during the Tertiary age (1.8 to 65 mya). Marine invertebrates flourished in these shallow seas from the Devonian to Mississippian ages. After dying, individuals fell to the bottoms of these seas, where some became fossilized in chert as the Tertiary age sedimentary rock formed. In the late Tertiary Period, some of these fossil-rich deposits were eroded, and the deposited material contributed to the Citronelle Formation. The fossils are primarily associated with pebble-sized chert in this formation. In some areas, Citronelle Formation deposits have eroded and chert gravel containing fossils is associated with recent alluvial deposits (MDEQ 1995; USGS 2006b; and LGS 2001).

The proposed Project alignment crosses the Citronelle Formation 23 times for a cumulative distance of 69.8 miles (see Table 3.1.1-1). While construction could disturb deposits containing some fossil-containing chert, the impacts would be negligible in light of the massive quarrying of Citronelle Formation deposits throughout the proposed Project area. Although reporting is not required, in the event that a significant fossil discovery is made SESH would contact the Mississippi State Geological Survey, the LGS, or the Geological Survey of Alabama (GSA). Based on SESH's adherence to its procedure to inform the above agencies should it encounter paletontological resources, we believe that construction and operation of the proposed Project would not significantly affect paleontological resources.

3.1.4 Geologic Hazards

Geologic hazards are natural physical conditions that can, when active, result in impacts to the environment and man-made structures or present public safety concerns. Such hazards typically include seismicity, soil liquefaction, landslides, and subsidence and are discussed below.

3.1.4.1 Seismicity and Faults

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. The proposed Project area is not known for large earthquakes. Seismic events at the proposed Project facilities were not identified in a review of USGS-compiled seismic data on earthquakes in the central United States from 1699 to 2002 (USGS 2003).

Guidelines exist in today's building codes for new construction based on seismic risk. The Uniform Building Code (UBC) for the United States is divided into five zones, 0 to 4, where Zone 0 designates an area where seismic activity is not expected and Zone 4 designates an area of high probability of a damaging seismic event. Seismic zones are based on a statistical compilation of the number and magnitude of past earthquakes. This provides some indication of where the next earthquake may occur, how often, and at what magnitude. The proposed Project area is located in Zone 0 and Zone 1 (UBC 1997).

SESH would design and construct the proposed Project facilities in full accordance with the building codes for this seismic risk. Consequently, the potential for seismicity and faulting would not represent a significant risk to the proposed Project area.

3.1.4.2 Soil Liquefaction

Soil liquefaction is the process by which saturated, unconsolidated soil or sand is converted into a suspension due to a sudden change in pressure or repeated shock. Soil liquefaction can lead to landslides and earthflows, movement or failure of foundations and footings, and mobility of buried objects. For liquefaction to occur, a relatively shallow water table, rapid, strong ground motion, and non-cohesive soils must be present (University of Washington 2000).

The surface sediments within the proposed right-of-way have some cohesion and in some areas shallow water is present. Rapid, strong ground motion is closely related to seismic risk which is low in the Project area. Because of these conditions, the potential for soil liquefaction for the proposed Project area is low. Furthermore, the linear extent and ductile nature of pipelines generally make them less susceptible than other structures to the effects of soil liquefaction. Existing building codes and standards applicable to the proposed Project facilities should adequately address the low potential for soil liquefaction.

3.1.4.3 Slope Failures/Landslides

Slope failures/landslides occur when rock, sediments, soils, and debris move down steep slopes. Such gravity-induced flow is usually precipitated by heavy rains, erosion by rivers, earthquakes, or human activities (e.g., man-made structures or pilings of rock or ore). 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.

Landslide incidence is low in the proposed Project area (typically less than 1.5 percent of the area involved). The exception is the relatively steep, loess-covered terrain east of the Mississippi River. Here landslide incidence is moderate (1.5 to 15 percent of the area involved) (USGS 1978 and Champlin 2006). The geological composition and structure of loess makes it particularly susceptible to erosion. As a result, where exposed in road cuts, stream banks, gullies, excavations, or other exposures, loess forms steep vertical cliffs. SESH would reroute the pipeline, where possible, to avoid steeper topography should construction conditions reveal unforeseen difficulties in preventing landslides in response to pipeline installation.

Construction of the pipeline would be accomplished in accordance with SESH's Plan, which includes measures to minimize risks of landslides including controlling runoff and erosion. During construction, steps would be taken to minimize the potential risk due to landslides. SESH would install permanent trench breakers constructed of materials such as sand bags or polyurethane foam in the trench, over and around the pipe, in areas of slope with erosion potential. Trench plugs, usually composed of compacted earth or other suitable low-permeable material, would be used to isolate wet areas to minimize channeling of water along the ditch line.

When severe side slopes are encountered, the upslope side of the construction right-of-way would be cut during grading if necessary. The material removed from the cut would be used to fill the downslope edge of the right-of-way to provide a safe and level surface from which to operate heavy equipment. Side hills could require ATWSs down slope to accommodate the excavated material. During grade restoration, the spoil would be placed back in the cut and compacted to restore original contours. Water from any springs or seeps found in the cut would be carried down slope through drainpipes and/or gravel trench drains that would be installed as part of the cut restoration.

Once construction activities were completed, the grade and drainage patterns would be reestablished and permanent erosion controls would be installed to minimize post-construction erosion. Post-construction inspections would identify areas of risk, and continued monitoring along slopes would likely identify any significant landslide hazards before they develop. Based on the characteristics of the proposed Project area and SESH's adherence to its identified construction and monitoring measures, we believe that potential impacts from slope failures and landslides would be prevented or effectively minimized.

3.1.4.4 Subsidence

Ground subsidence is a lowering of the land-surface elevation that results from changes that take place underground. 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. 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. No areas of karst terrain or subsurface mines are located along the proposed Project area; thus, subsidence related to these conditions would not be expected to adversely affect the proposed Project.

No subsidence along the proposed Project is anticipated as there is no evidence of sinkholes or other indications of subsidence along the route. Even in Alabama, where coastal marshes have a stronger tendency towards subsidence, new sediment entering the system from fluvial and tidal flooding offsets the potential for subsidence (Schmid and Octvos 2006). Upon pipeline installation, route surveillance, as required by 49 CFR § 192.613, in conjunction with training of personnel responsible for identifying signs of soil movement or subsidence, would be used to monitor the pipeline right-of-way for subsidence. Should subsidence occur, the affected area would be exposed, repositioned, or replaced to a stress-free state and properly bedded and backfilled to restore the original state. 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. We believe 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 be unlikely to encounter bedrock along the pipeline route. However, SESH has 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 due to 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 effectively mitigated through use of special construction techniques and 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 by special construction techniques, restoration, and post-construction monitoring. Given the resources, level of impacts, and impact avoidance, minimization, and mitigation measures described above, we believe that the proposed Project would not have a significant impact on geological resources nor is there more than a negligible risk to the proposed pipeline from geologic hazards.

3.2 SOILS

3.2.1 Existing Soil Resources

Data were analyzed for the soils to be traversed by the proposed Project using NRCS soil survey databases and county and parish soil surveys. The soil association descriptions were compiled from information in the U.S. Department of Agriculture's (USDA's) soil surveys of Richland and Madison Parish, Louisiana; Warren, Claiborne, Copiah, Lawrence, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi; and Mobile County, Alabama, as well as the USDA NRCS soils website (www.soils.usda.gov). A summary of the soil associations crossed is presented in Appendix C.

3.2.2 Major Soil Characteristics

Several soil characteristics have the potential to affect, or be affected by, construction and operation of the proposed Project, including erosion hazard, drainage class, presence of hydric soils, compaction potential, presence of shallow bedrock, revegetation potential, and prime farmland designation. The characteristics of the various soil units crossed by the proposed pipeline are compiled in Appendix C.

3.2.2.1 Erosion Hazard

Erosion hazard is the potential for soil to erode when unprotected from erosive forces. Many factors influence the potential for erosion of soils, such as soil structure, drainage characteristics, texture, slope, climate, and vegetation. The NRCS provides an erosion hazard rating in its soil surveys. Soils are rated as having a low, low-moderate, moderate, moderate-high, high, or very high erosion hazard. The potential for soil erosion varies along the proposed pipeline route, but about 34 percent of the soils that would be traversed have a low erosion potential. Approximately 50 percent of the soil classifications have an erosion potential that ranges from low to high. However, about 13 percent of the soils are characterized as having an erosion potential of high to very high. These soils would generally be confined to areas of steep slopes, which occur along the proposed Project route in Copiah, Jefferson Davis, and Jones counties, Mississippi, and Mobile County, Alabama.

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 grain size and sorting. Well-sorted or coarse-grained soils have more pore space and thus are better-drained. Poorly-sorted or fine-grained soils have less pore space and prevent water from draining. Six classes of drainage, ranging from poorly-drained to excessively-drained, are used to describe the relative wetness of a soil. Approximately 48 percent of the soils that would be crossed are moderately well to well-drained (see Appendix C). Approximately 21 percent of the soils that would be crossed are somewhat poorly to poorly-drained, and approximately 2 percent of the soils that would be crossed are somewhat excessively to excessively-drained.

3.2.2.3 Presence of 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. 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. Hydric soils may also be prone to compaction and rutting. Approximately 35 percent of the soils that would be crossed by the proposed pipeline are classified as hydric. Approximately 24 percent of the land crossed by the proposed pipeline is both hydric and agricultural land. Consequently, some of the hydric soils crossed by the proposed pipeline route have likely been altered from their undisturbed state.

3.2.2.4 Compaction Potential

Compaction modifies the structure of soil and, as a result, alters its strength and drainage properties. 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 would 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. The liquid limit, which is the percent water content at which a soil changes from a plastic state to a liquid state, is a good indicator of susceptibility to compaction and is used here to approximate compaction potential. High liquid limits have greater compaction potential.

We assigned a compaction potential rating of low, low-moderate, moderate, moderate-high, or high to each of the soil types traversed by the proposed pipeline based on the liquid limit of those soils. Many of the soils that would be traversed by the proposed pipeline are somewhat prone to compaction; about 13 percent of the soils have a moderate compaction potential. Approximately 11 percent of the soils are characterized as having high compaction potential.

3.2.2.5 Presence of Shallow Bedrock

Rock could be introduced into surface layers of soil during various pipeline construction activities such as blasting and trenching. Such introductions could reduce moisture-holding capacity, thereby reducing soil productivity and creating poor revegetation potential. Additionally, some agricultural equipment could be damaged by contact with large rocks. The presence of shallow bedrock, which is defined as bedrock within 60 inches of the land surface, is often used as an indicator of the potential for introductions of rock to surface layers of soils. The soils that would be crossed by the proposed pipeline route do not contain shallow bedrock as defined above.

3.2.2.6 Revegetation Potential

Revegetation potential is a rating of the ability of a soil to support revegetation efforts following construction-related disturbance. The potential for revegetation of each soil type that would be affected by construction of the proposed pipeline was assessed based on such factors as soil texture, drainage properties, wetness, and slope. Considering these factors, four general classes were defined for revegetation potential ranging from low to good. Most of the soils that would be affected by pipeline construction are considered to have good (49 percent) or medium (28 percent) revegetation potential. Approximately 23 percent of the affected soils are considered to have revegetation concerns (i.e., low revegetation potential).

3.2.2.7 Prime Farmland Designation

The NRCS (NRCS 1993) 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." Soils classified as prime farmland have few or no rocks, a dependable water supply, and a favorable growing season and are not saturated for long periods of time, 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 units that have been surveyed, and this information is available directly from the soil survey databases. Approximately 41 percent of the soils crossed by the proposed pipeline are classified as prime farmland. Construction of the compressor and booster stations would temporarily affect approximately 67 acres of prime farmlands. Compressor and booster station operation would permanently affect approximately 63 acres of prime farmland.

3.2.2.8 Loess Soils

Loess soils are composed of fine, tightly packed, windblown sediments that have been described as unique because of their ability to maintain near vertical slopes, their occurrence in large deposits, and their high susceptibility to erosion. In the proposed Project area, loess deposits are found east of the Mississippi River in Warren and Claiborne counties, Mississippi. Through consultation with local NRCS offices, SESH has been able to identify the areas where the proposed project would cross loess soils. The proposed pipeline would cross these deposits for 5.17 miles in Warren County and 15.33 miles in Claiborne County. The 20.5 miles of loess soils extend from MP 39.5 to MP 60 and represent about 7.6 percent of the total pipeline length.

The majority of the construction area containing loess soils would be crossed using two-tone construction techniques as described in Section 2.3.2.7. Adherence to the impact avoidance, minimization, and mitigation measures outlined in the SESH Plan and described below should minimize impacts to loess soils. However, based on agency concerns regarding the unique qualities of loess soils, we recognize that additional measures could further minimize impacts. SESH is consulting with the NRCS to determine the need for additional measures that could be implemented and would further protect loess soils during construction and operation of the proposed Project. SESH has submitted a Loess Soil Management Plan dated June 11, 2007 to NRCS for their review and comment. Because that consultation has not yet been completed, **we recommend that:**

- **Prior to construction between MP 39.5 to MP 60.0, SESH should file with the Secretary a final Loess Soil Management Plan developed in consultation with the NRCS. This plan should indicate any NRCS recommendations to minimize or mitigate impacts to loess soils and whether SESH would implement these recommendations would and if not, explain why.**

The Loess Soil Management Plan submitted to NRCS for review and comment includes the following measures:

- Retention of a geotechnical engineer, experienced with construction and restoration in areas containing loess soils, to approve construction plans in advance and to monitor construction activities;

- Excavation of the trench to as near a vertical slope as possible and use of a berm or other obstacle to prevent water from entering the open trench;

- Use of both cool and warm season species for reseeding, including wheat, rye, bahia, and bermuda grasses; use of unhulled bahia and Bermuda grass seeds that would minimize seed decay prior to germination;

- Mulching of seeded areas at levels meeting or exceeding rates recommended by NRCS; and

- Monthly inspections of the restored areas for the first six months following restoration, and then inspections every two months for the following year; problems such as poorly revegetated areas, evidence of erosion, or loss of mulch would be immediately addressed.

We believe that the implementation and adherence to the impact avoidance, minimization and mitigation measures described in the Loess Soil Management Plan and SESH's Plan as described below would effectively minimize impacts to loess soils.

3.2.3 General Impacts and Mitigation

Construction activities associated with the proposed Project, such as clearing, grading, trenching, and backfilling, have the potential to affect soil resources through multiple mechanisms. The most significant effects include potential increases in soil erosion and compaction and the loss of soil productivity and fertility by mixing topsoil and subsoil horizons and changing drainage patterns. Removing vegetative cover increases the possibility of erosion by wind and water. Mixing topsoil with subsoil and compaction caused by passage of heavy construction equipment can adversely affect revegetation potential and agricultural productivity. Alteration of the surface topography can affect hydrology, influencing stormwater runoff and soil drainage patterns.

To minimize and mitigate the impacts to soils resources described above, SESH would adopt and follow the guidelines described in its Plan during construction and operation of the proposed Project. The intent of this Plan is to identify baseline mitigation measures for minimizing erosion and enhancing revegetation in upland areas. Mitigation measures identified in SESH's Plan 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. The more important aspects of this Plan regarding erosion control are summarized below.

- At least one third-party 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.

- Project-related ground disturbance would be limited to the construction right-of-way, ATWSs, pipeyards/wareyards, 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, and other areas at the landowner's or land managing agency's request.

- Temporary erosion controls would usually be installed after vegetative clearing but prior to excavation. 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.

- Sediment barriers would be installed (such as silt fences, 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, with the exception of residential areas where grass would be resodded. Topsoil in areas where resodding occurs would not be tested for compaction. 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.

SESH would also develop and implement an SWPPP in compliance with federal and state regulations, if required for the proposed Project. The SWPPP would incorporate the requirements for mitigating upland erosion and revegetation described in SESH's 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.

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. During construction, SESH would implement a SPCC Plan to prevent and contain, if necessary, accidental spills of any material that could contaminate soils and to ensure that inadvertent spills of fuels, lubricants, or solvents would be contained and cleaned up in an appropriate manner. SESH has prepared a SPCC Plan (filed with application), which describes the management of hazardous materials, such as fuels, lubricants, and coolants, that would be used during construction.

Contaminated soils could also be encountered during construction activities along the proposed construction right-of-way or extra workspace areas. If contaminated soils were encountered during construction, SESH would implement procedures from the Contamination Contingency Plan, filed in the application to FERC, to identify and properly manage the contamination.

3.2.4 Site-Specific Impacts and Mitigation

SESH has developed its own Plan and Procedures. Faithful implementation of these procedures would help ensure compliance with applicable SESH specifications, federal regulations and guidelines, and the specific requirements of any required permits.

During construction, SESH proposes to make every reasonable attempt to minimize the quantity and duration of soil exposure. Erosion-control structures, temporary seeding and revegetation, and erosion-control fabrics would be used, as needed, to protect exposed soil. To ensure the continued productivity of agricultural land, SESH would excavate topsoil from construction areas prior to trenching and segregate it from the trench spoil. This segregated topsoil would be returned to the ditch following backfilling of the trench with the subsurface spoil. Given this treatment, the approximately 57 miles of active cropland crossed by the pipeline would be expected to return to full agricultural use and productivity after completion of construction.

After construction is complete, the right-of-way would be returned to its preconstruction contours. SESH would minimize erosion by re-grading and reseeding these disturbed areas as soon as possible according to recommendations by NRCS local offices or landowner requests. Active drainage tiles, culverts, and other items affected during construction would be repaired or replaced to preconstruction conditions. Following restoration, SESH would monitor the disturbed areas to ensure the functionality of erosion control structures and would repair any developing erosion until final stabilization is achieved.

Soil susceptibility to erosion varies along the proposed pipeline route and is a function of variables such as soil type, topography, vegetation, and climate. Approximately 34 percent of the soils that would be traversed have a low erosion potential (see Appendix C). Approximately 50 percent of the soil classifications have an erosion potential that ranges from low to high. However, about 13 percent of the soils are characterized as having an erosion potential of high to very high. These soils are generally confined to areas of steep slopes, which occur along the proposed Project route in Copiah, Jefferson Davis, and Jones counties, Mississippi, and Mobile County, Alabama. Several phases of pipeline construction, including vegetation and pavement clearing/removing, grading, topsoil segregation, open trenching, and backfilling, would destabilize the soil material and make it susceptible to water and wind

erosion. Soils would be most susceptible to erosion after vegetation is removed and before reestablishment of a vegetative cover after the pipeline is installed. Soil erosion would also result from off-road vehicle traffic on the right-of-way following construction.

SESH should reduce soil erosion with both temporary and permanent erosion control practices. As SESH's Plan describes, the temporary and permanent erosion control practices would be implemented during construction and operation of the proposed Project. Temporary erosion controls would be installed immediately after the initial soil disturbance and, in areas with steep slopes, erosion control devices would be installed at closer intervals than required for more moderately sloped areas. Wherever possible, contours would be returned to their approximate preconstruction condition and revegetated to stabilize the slope. SESH would initiate vegetation restoration efforts and final grading as soon as weather and soil conditions permit. Revegetation measures are described further below. Although there could be some short-term increase in erosion in sloped areas, these slopes eventually would be stabilized and permanent erosion control devices would be installed to avoid long-term erosion problems. Therefore, we do not anticipate that significant long-term soil erosion impacts would result from construction and operation of the proposed Project.

As required by its Plan, SESH would take measures to control unauthorized vehicle access to the proposed pipeline right-of-way during construction and operation. These measures could include signs, fences with locking gates, slash and timber barriers, or appropriate trees or shrubs planted to block access to the right-of-way. SESH would coordinate with affected landowners regarding the installation of access barriers on their property.

3.2.4.1 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, soils may be made more susceptible to erosion, and natural drainage may be altered. In general, about one-half of the soils that would be crossed by the proposed pipeline are considered prone to compaction due to the prevalence of hydric soils and soils with poor drainage. Use of the construction right-of-way, extra workspaces, and access roads by heavy construction equipment would, therefore, result in 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 its Plan and Procedures, SESH would use measures such as restricting vehicular traffic, reducing loads, employing lower ground-pressure equipment, and rescheduling certain activities when soil moisture is high to avoid and minimize compaction and rutting.

In agricultural, residential, and wetland areas, 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. Due to construction-related activities, some topsoil and subsoil located along the working side of the construction right-of-way would be compacted. These areas would be tested and, if either the subsoil or topsoil is severely compacted, a paraplow or other deep tillage device would be used to break up the soils. However, during cleanup and restoration activities, the topsoil and subsoils in all agricultural areas would be tested for compaction at regular intervals, using penetrometers or other appropriate devices in accordance with SESH's Plan. Any severely compacted areas would be plowed with a paraplow or other deep tillage device. In areas where the topsoil was segregated, the subsoil would also be plowed before replacing the segregated topsoil. These measures would ensure that any soil compaction resulting from construction of the proposed pipeline would be only temporary, and significant or long-term impacts to soil resources associated with compaction would not be anticipated.

SESH does not anticipate the need for compaction testing or mitigation in residential areas because topsoil segregation or topsoil replacement would be implemented. Therefore, SESH proposes an alternative measure to Section VI.C.1 of the FERC Plan that requires compaction testing in residential areas disturbed by construction. In accordance with SESH's Plan VI.C.3, we believe this alternative measure is acceptable.

3.2.4.2 Revegetation Potential

As the majority of soils that would be disturbed during construction have medium (28 percent) to good (49 percent) revegetation potential, vegetation restoration should not be of concern across most of the proposed pipeline route. However, a small percentage (23 percent) of the soils that would be disturbed during construction is characterized as having low revegetation potential. Revegetation would be necessary for the stabilization and restoration of the construction right-of-way, extra workspaces, and areas adjacent to access roads. Revegetation potential could be inhibited by soil erosion; loss of soil productivity through soil compaction; damage to soil structure; loss of soil fertility; damage to drainage systems; and unsuitable seed selection, methods, or planting conditions. To avoid or minimize these conditions described above, SESH would return the construction right-of-way and extra work areas to preconstruction contours to the extent feasible, control erosion by implementing the procedures in its Plan, segregate and loosen compacted soils and spread topsoil on the right-of-way during final cleanup, repair any damaged drainage systems, place soil nutrients and lime in upland areas, and seed all disturbed areas. Furthermore, SESH would consult with the local soil conservation authorities to determine the appropriate seed mixtures for stabilization and permanent erosion control.

SESH would be responsible for successful revegetation of all disturbed areas and would follow its Plan to ensure all mitigation is sufficient. SESH would conduct at least 2 years of post-construction monitoring of all work areas to verify successful revegetation or determine the need for additional restoration. In accordance with SESH's Plan, revegetation would be considered successful if the density and cover of non-nuisance vegetation were similar in density and cover to adjacent undisturbed lands. If vegetation cover and density were not similar or there were excessive noxious weeds after two full growing seasons, a professional agronomist would determine the need for additional restoration measurements. In agricultural areas, SESH would monitor crop yields to ensure that those yields in areas affected by construction were similar to yields in adjacent, undisturbed areas.

Heavy equipment traffic and trenching along the construction right-of-way would 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. SESH indicates that no known drainage structures would be crossed by the proposed Project; however, SESH would work with property owners to identify locations of existing drainage structures that would be damaged during construction. If active drainage tiles, culverts, or other drainage facilities were damaged during construction, SESH would replace or repair them to a condition that is equal to or better than their preconstruction condition. Additionally, SESH would be responsible for ensuring that all areas affected by construction activities are 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 SESH would avoid or minimize any long-term impacts.

3.2.4.3 Prime Farmlands

Approximately 41 percent of the lands crossed by the proposed pipeline contain soils classified as prime farmland soils. As described above, SESH would implement the measures included in its Plan to minimize and mitigate any impacts to prime farmland soils. Additionally, 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 right-of-ways would largely revert to their preconstruction uses, such as agriculture, following restoration.

Table 3.2.2-1 identifies and quantifies the actual and relative acreage of prime farmland that would be affected during construction (temporary) and operation (permanent) of individual aboveground facilities. Approximately 67 acres of prime farmland soils (73 percent of the total) would be affected during construction and approximately 63 acres of prime farmland soils (75 percent of the total) would be affected during operation of the five major aboveground facilities combined. However, only 5.53 acres of the prime farmland soils affected during operation of the five major aboveground facilities are in active agricultural use.

NRCS has jurisdiction over prime farmland conversion. SESH initiated consultation with the NRCS offices that serve all 16 counties across the proposed Project area regarding potential impacts to prime farmland. SESH also consulted with the NRCS offices in Louisiana, Mississippi, and Alabama concerning recommended seed mixes. To date, all NRCS offices have replied with recommended seed mixes or concurrence with proposed seed mixes. SESH would comply with their recommendations unless a landowner requests otherwise.

As described above, SESH would coordinate with the NRCS regarding the proposed Project impacts to prime farmland soils and gain all necessary approvals for their permanent conversion to non-agricultural uses. These consultations and approvals would ensure that permanent impacts to prime farmland soils associated with construction and operation of the proposed Project aboveground facilities would be minor.

TABLE 3.2.2-1
Soil Series Affected by Major Aboveground Facilities for the Proposed SESH Project

Project Component	Soil Series	Prime Farmland (Y/N)	Total Property Temporarily Affected (acres/percent)	Total Property Permanently Affected (acres/percent)
Delhi Compressor Station	Grenada (Gr)	Y	4.18/29	4.18/29
	Grenada (Gs)	Y	0.85/6	0.85/6
	Calhoun-Calloway (Cc)	Y	9.25/65	9.25/65
	Total Prime Farmland/Total % Prime Farmland		**14.28/100**	**14.28/100**
Gwinville Compressor Station	Smithdale (Sm)	N	0.11/1	0.11/1
	Ora (Or)	Y	8.69/46	8.69/46
	Smithdale (Sme)	N	10.1/53	10.1/53
	Total Prime Farmland/Total % Prime Farmland		**8.69/46**	**8.69/46**
Collins Booster Station	Boswell-Savannah (BsC)	Y	2.27/11	2.27/11
	Pheba (Ph)	Y	17.46/89	17.46/89
	Total Prime Farmland/Total % Prime Farmland		**19.73/100**	**19.73/100**
Petal Booster Station	Benndale (Be)	Y	1.02/6	1.02/6
	Heidel (He)	N	0.57/3	0.57/3
	McLaurin (Mb)	Y	15.15/91	15.15/91
	Total Prime Farmland/Total % Prime Farmland		**16.17/97**	**16.17/97**
Lucedale Compressor Station	Susquehanna-Benndale (SxE)	N	4.60/21	2.57/18
	Benndale (Bn)	Y	0.04/0	0.00/0
	Cahaba (Ca)	N	9.09/41	7.59/52
	McLaurin (Ml)	Y	8.55/38	4.43/30
	Total Prime Farmland/Total % Prime Farmland		**8.59/38**	**4.43/30**
	Total Combined Prime Farmland/ Total Combined % Prime Farmland		**67.46/73**	**63.30/75**

3.3 WATER RESOURCES

3.3.1 Groundwater

3.3.1.1 Existing Groundwater Resources

The proposed Project is wholly located within the extent of two major aquifer systems: the Mississippi River Valley Alluvial Aquifer System and the Coastal Lowlands Aquifer System (called the Sand and Gravel Aquifer in Alabama). The State of Louisiana recognizes the portion of the aquifer underlying the state's portion of the Project area as the Mississippi River Valley Alluvial Aquifer (LDEQ 2006b). The State of Mississippi also recognizes the Mississippi River Valley Alluvial Aquifer, as well as two sub-units of the Coastal Lowlands system, the Miocene Aquifer (equivalent to lower Zone C through Zone E) and the Citronelle System (equivalent to upper Zone C, (MDEQ 2006f)). Additionally, within the Coastal Lowlands Aquifer System is the Southern Hills Aquifer System, an EPA-designated sole-source aquifer. In the Project area, this aquifer is designated in portions of Mississippi only and is bound to the west by the Mississippi River and to the east by the Pearl River. Alabama identifies the portion of the Coastal Lowlands system aquifer in the Project area as the Miocene/Pliocene Aquifer. Figure 3.3.1-1 illustrates the locations of these aquifers in relation to the proposed pipeline route.

Mississippi River Valley Alluvial Aquifer System

The Mississippi River Valley Alluvial System underlies the proposed pipeline route from MP 0.0 to MP 40.0 in Richland and Madison Parishes, Louisiana, and the very western portion of Warren County, Mississippi. The portion of this system in the proposed Project area consists of Quaternary age deposits of sand, gravel, silt, and minor clay, which are further divided into two hydrogeologic units: the upper confining layer and the lower coarse aquifer. The upper confining layer consists of silt, clay, and The overall depth of the aquifer system (upper confining layer and lower aquifer) in the proposed Project area is approximately 100 to 150 ft below ground surface. Wells screened in the lower confined aquifer typically yield 500 gallons per minute (gpm) with some yielding as much as 5,000 gpm (USGS 1998). An average of 354 million gallons per day (mgd) of water is withdrawn from the Mississippi River Valley Alluvial Aquifer System.

Coastal Lowlands Aquifer System in Louisiana and Mississippi

The Coastal Lowlands aquifer system underlies the proposed pipeline route from MP 40.0 to the terminus at MP 270.0. This aquifer consists of permeable sedimentary rocks of Holocene and Upper Pleistocene age containing deposits of interbedded sand and clay (USGS 1998). This system extends and thickens toward the Gulf of Mexico (GOM) and is deepest (approximately 14,000 ft) in southern Louisiana and adjacent offshore areas. It is approximately 1,000 to 3,000 ft deep in the proposed Project area and deepens toward the coast.

The Coastal Lowlands aquifer has been divided into five hydraulically connected units, A (uppermost) through E (deepest), based largely on differences in hydraulic conductivity and depth. The two youngest zones (Zones A and B) are not found in the proposed Project area, which is largely underlain by Permeable Zones C and D and by a portion of Zone E in Claiborne and Warren counties, Mississippi. Zone C is comprised of deposits from the early Pliocene to late Miocene age and Zone D is made up of deposits from the middle Miocene age; together these zones make up the Miocene aquifer system in southern Mississippi. Zone E consist of deposits from the early Miocene to late Oligocene age and is referred to as the Oligocene aquifer system. The Coastal Lowlands aquifer zones outcrop in bands across the northern end of the overall aquifer system and increase in thickness to the south until terminating into the Vicksburg-Jackson Confining Unit. Wells screened in Zone C yield an average of 1,000 to 3,000 gpm; wells screened in Zone D yield an average of 300 and 1,000 gpm. No information is available for wells screened in Zone E (USGS 1998).

Coastal Lowlands Aquifer System in Alabama

The Coastal Lowlands Aquifer is also known as the Sand and Gravel Aquifer in Alabama. The aquifer underlies the southern portion of Mobile, Baldwin, and Escambia counties, Alabama, and extends into the Florida panhandle. The proposed Project would be constructed in the southern portion of Mobile County, where the aquifer is about 1,400 ft thick. The water table ranges from a few feet in low-lying areas to about 50 ft below land surface under hills and ridges. In most places, the aquifer can be divided into two high-permeability zones, the upper surficial and lower main producing zones, separated by a less permeable sand and clay unit. The upper zone is mostly fine- to medium-grained sand, with gravel beds and lenses, and contains water that is mostly unconfined. This zone is recharged directly by precipitation, and groundwater moves laterally for the most part. The upper zone is used for water supply in southern Mobile County.

Yields are highly variable, but as much as 1,000 gpm have been reported. In 1985, about 30 million gpd were withdrawn from the aquifer in Mobile County (USGS 1990). The Alabama Geological Survey (AGS) monitors water level depths across Alabama. The nearest wells to the proposed Project area are in Baldwin County across Mobile Bay from Mobile County.

NON-INTERNET PUBLIC

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED SOUTHEAST SUPPLY HEADER PIPELINE PROJECT
Docket No. CP07-44-000 and CP07-45-000

Page 3-18
Section 3.3.1
Figure 3.3.1-1
Aquifer Systems

Public Access for the above information is available only through the Public Reference Room, or by e-mail at
public.referenceroom@ferc.gov

Groundwater Quality and Use

In general, groundwater quality in the proposed Project area is good. Within the vicinity of the proposed pipeline and aboveground facilities, groundwater is primarily used for agriculture, livestock, public supply, aquaculture, and industry. Table 3.3-1 summarizes groundwater quality parameters for each aquifer crossed.

TABLE 3.3-1
Summary of Aquifers Crossed by the Project

Aquifer[d]	State	Parameters						
		TDS (mg/L)	Hardness (mg/L)	Specific Conductance (µS/cm)	pH (SU)	color (PCU)	iron (mg/L)	nitrate (mg/L)
Mississippi River Valley Alluvial Aquifer	LA [a]	506	325.6	862	7.0	52.3	6.01	0.63
	MS [b]	344	290.0	580	7.2	5	5.40	0.20
Miocene Aquifer	MS [b]	192	11.0	340	8.0	7	0.03	0.30
Citronelle Aquifer	MS [b]	50	9.0	40	5.4	5	0.02	1.50
Miocene/Pliocene	AL [c]	49	17.0	32	5.7	n/a	0.16	1.50

[a] Mean observed values during the fiscal year 2002; Source: LDEQ 2006a
[b] Median of observed values from screened wells; Source: MDEQ 2006f
[c] Mean observed values from screened wells; Source: ADEM 2006e
[d] State aquifer name
mg/L = milligrams per Liter
µS/cm = micro-Siemens per centimeter
PCU = platinum-color units
SU = standard units

Contaminated Groundwater

Several sites containing potentially contaminated groundwater have been identified along the proposed pipeline route. Consultation with the LDEQ indicated that an underground storage tank (UST) lies 218 ft south of MP 17.0 where the groundwater has been affected; however, construction of the proposed pipeline would be unlikely to affect this groundwater due to location and depth. Consultation with MDEQ indicated that a solid waste disposal facility (SWDF) lies approximately 931 ft north of MP 164.82 and that two USTs are located approximately 0.14 mile south of MP 219.21 and 0.20 mile south of MP 227.55. The SWDF is an active facility that only accepts vegetation and concrete waste. It is highly unlikely that this facility has affected underlying groundwater resources. The UST at MP 219.21 is a closed tank with no recorded leaks or violations, while the UST at MP 227.55 is an open tank, also with no reported leaks or violations. Neither tank is expected to have affected any groundwater resources in the Project area.

Sole Source Aquifers

Sole-source aquifers are defined by the EPA as those aquifers that contribute more than 50 percent of the drinking water to a specific area and for which there are no reasonably available alternative sources of water should the aquifer become contaminated. Review of the EPA's designated sole source aquifers in Regions 4 and 6 indicates that a portion of the Project is located over the Southern Hills Aquifer System which was designated as a sole-source aquifer in 1988 (EPA 2006a). As described previously, the Southern Hills Aquifer System underlies the proposed Project in portions of Mississippi.

Approximately 290 million gallons are pumped from the Southern Hills Aquifer per day and are used for public supply (49 percent), industry (39 percent), rural domestic (6 percent), power generation (5 percent), and other uses (1 percent) (USGS 2002 and LADOT 2002).

Water Supply Wells and Wellhead Protection Areas

Six private water supply wells are located within proposed construction work areas and three private water supply wells are located within 150 ft of proposed construction work areas. Detailed data, including MP, distance from construction work area, and type/use of each well, are provided in Table 3.3.1-2.

TABLE 3.3.1-2
Water Supply Wells Located Within 150 Feet of Proposed SESH Project Construction Work Areas

MP	Location	Distance from Construction Work Area (ft)	Well Type
13.83	Madison Parish, LA	0	Private
13.83	Madison Parish, LA	0	Private
17.05	Madison Parish, LA	97.8	Private
26.19	Madison Parish, LA	45.57	Private
27.12	Madison Parish, LA	0	Private
27.69	Madison Parish, LA	0	Private
29.86	Madison Parish, LA	39.5	Private
218.23	George County, MS	0	Private
228.73	George County, MS	0	Private

ft = foot/feet
MP = milepost

Three wellhead protection areas occur along the proposed pipeline route in Mississippi. Well head protection areas are designated by states to protect the surface and subsurface areas surrounding groundwater drinking water wells. No wellhead protection areas occur in the vicinity of the proposed pipeline or aboveground facilities in Louisiana or Alabama. Table 3.3.1-3 identifies the location and description of each wellhead protection area that would be crossed by the proposed pipeline.

3.3.1.2 General Groundwater Impacts and Mitigation

Groundwater quality, quantity, flow and recharge potential could be affected by construction of the proposed Project. However, impacts to groundwater due primarily to the placement of the proposed pipeline well above major groundwater resources would have little to no impacts on the deep aquifer. Impacts to the first shallow aquifer would be temporary with the exception of potential impacts to groundwater flow and recharge potential, which could be permanent. Additionally, groundwater quality could be affected if construction of the proposed pipeline and its operation resulted in the contamination of groundwater.

TABLE 3.3.1-3
Wellhead and Surface Water Protection Areas

Facility Name	Location	Groundwater or Surface Water Protection Area	Type of System	Contact Information
Louisiana				
No groundwater protection areas				
No waterbodies identified for public water supply[a]				
Mississippi				
Pipeline	MP 85.15	Groundwater	Public supply well protection area	MDEQ
Pipeline	MP 107.71	Groundwater	Public supply well protection area	MDEQ
Lucedale Pipe Yard	MP 218.32	Groundwater	Public Supply well protection area	MDEQ
No waterbodies designated for public water supply[b]				
Alabama				
No groundwater protection areas				
No waterbodies designated for public water supply[a]				

[a] Groundwater protection areas within one-half mile of the Project Area and source water protection areas within three miles of the Project area
[b] Obtained from state water quality regulations for designated uses
MDEQ = Mississippi Department of Environmental Quality
MP = milepost

Further impacts to groundwater quality, quantity and flow could also result from:

- the pipeline trench acting as a preferential pathway for groundwater flow in areas where it intersects the water table, thus potentially altering the existing groundwater flow patterns within shallow saturated zones;

- the operation of heavy construction equipment and the storage of construction materials and spoils resulting in the compaction of underlying soils; and

- dewatering of the pipeline trench in areas with a high water table or after a heavy rain resulting in a temporary fluctuation in localized groundwater levels.

Recharge of aquifers could also be affected by installation of impervious surfaces; however, given the relatively small area of graveled and paved surfaces planned across the entire Project area, it is unlikely the proposed Project would result in any significant changes in groundwater recharge.

During construction of the proposed Project, SESH would implement measures described in its Plan and SPCC Plan to protect groundwater quality, quantity, flow and recharge potential and to minimize spills or leaks of hazardous liquids resulting from the refueling of construction vehicles and/or the storage of fuel, oil, or other potentially hazardous fluids. Some of the preventive measures proposed by SESH include:

- installation of trench breakers such as sand bags or polyurethane foam at intervals along the pipeline trench to slow the flow of subsurface water along the trench, allowing the groundwater to flow away from the pipeline;

- segregation of topsoil in selected areas, minimizing soil compaction in those areas;

- testing of soils for compaction at regular intervals in agricultural areas and mitigating appropriately;
- discharging of trench water into a well-vegetated upland area through properly constructed dewatering structures or dissipation devices such as hay bales structures or filter bags;
- overall structuring of operations to reduce the risk of accidental spills or exposure of fuels or other hazardous materials into the environment;
- proper training of employees handling fuels and other hazardous materials;
- regular inspection of all equipment to ensure it is in good operating order;
- provision of the necessary tools, equipment, and supplies to contain and recover spilled materials at the job site; and
- prompt reporting of any spills to the appropriate agencies.

In addition to these preventive measures, signs would be posted at identified water supply wells in the vicinity of the Project area prohibiting overnight parking of equipment and refueling. To further protect groundwater resources underlying aboveground facilities, SESH's hazardous material storage units would be designed with respect to applicable engineering, safety, and environmental standards. Each unit would include leak detection and spill containment structures commensurate with the quantity of materials stored and would otherwise comply with applicable state and federal regulations and permits.

3.3.1.3 Site-Specific Impacts and Mitigation

Per landowner request or approval, wells within 150 ft of the proposed pipeline would be tested for functionality, water quality, and depth to water table prior to commencing construction and after final cleanup. These tests would be used to determine whether any construction-related impacts have occurred to the wells themselves or to the quality of the water they supply. If it is determined that any private water supply is damaged or affected as a result of construction, SESH would ensure that a temporary source of water is provided until the well is restored to its former capabilities and supplies water of acceptable quality.

The Southern Hills Aquifer System, an EPA designated sole-source aquifer, would not be impacted by construction and operation of the proposed Project due to the absence of withdrawal wells in the vicinity of proposed pipeline facilities and SESH's measures to prevent and minimize impacts to groundwater.

The three wellhead protection areas are in the vicinity of the proposed pipeline could be affected by construction activities; however, since these areas are all located at least 400 ft away from proposed construction work areas, construction and operation of the proposed Project would not significantly affect them.

3.3.2 Surface Water Resources

Waterbody Crossings

The proposed pipeline would cross 654 waterbodies including 175 perennial and 462 intermittent waterbodies and 17 ponds or lakes. Numerous surface waterbodies that would be crossed by the proposed

pipeline have been assigned state-designated water quality classifications that characterize the best-intended use(s) of that waterbody. Common water quality classifications crossed by the proposed pipeline include primary contact recreation, secondary contact recreation, and fish and wildlife use and propagation. Appendix D identifies affected waterbodies, their location by MP, width of crossing, waterbody classification, and proposed crossing method.

Major and Navigable Waters

Major waterbodies are those greater than 100 ft wide at the time of crossing. The proposed Project would cross the following major waterbodies: Macon Bayou (MP 0.32), Tensas River (MP 10.84), Mississippi River (MP 35.40), Pearl River (MP 101.40), Tallahala River (MP 170.59), Chickasawhay River (MP 209.06), and the Escatawpa River (MP 235.54). Additionally, the proposed Project would cross ponds and lakes that are greater than 100 ft wide at the crossing location including Despair Lake (MP 12.12), Oxbow Lake (MP 18.09), ponded water (MP 44.35), and unnamed ponds at MPs 32.29, 62.14, 83.67, 119.54, 215.26, and 221.49.

According to 33 CFR Part 329, navigable waters of the United States "are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce." The navigable waters crossed by the proposed Project include Tensas River (MP 10.84), Mississippi River (MP 35.40), Big Black River (MP 44.63), Bayou Pierre (MP 55.97), Pearl River (MP 101.40), and Escatawpa River (MP 235.54) (COE 2003, 2006).

3.3.2.1 Sensitive Waterbodies

Sensitive waterbodies include those streams designated as 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. Sensitive waterbodies are identified in Table 3.3.2-2.

The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) has indicated that the Escatawpa River will be listed by 2007 in the state's Scenic Rivers program. Inclusion in the State of Mississippi's Scenic Rivers Program would require the use of best management practices for timber production activities near listed waterbodies (MDWFP 2006b).

NPS designates waterbodies on a National Rivers Inventory (NRI) that are believed to possess "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. No waterbodies crossed by the Project in Louisiana or Alabama are identified on the NRI. However, the following waterbodies crossed in Mississippi have NRI designation (NPS 2006b):

- Big Black River, MP 44.63;
- Bayou Pierre, MPs 55.97 and 62.26;
- Pearl River, MP 101.40;
- Okatoma Creek, MP 150. 89;
- Bowie Creek, MP 127.61;
- Leaf River, MP 157.94; and

- Chickasawhay River, MP 209.06.

Waterbodies identified as sensitive due to the actual or potential presence of listed threatened and endangered species are identified in Table 3.3.2-2 and include the Mississippi River, Bayou Pierre, Turkey Creek, Pearl River, and Escatawpa River. Threatened and endangered species are further discussed in Section 3.7.

The proposed Project would also cross numerous waterbodies that feed into known waterbodies supporting threatened and endangered species or are believed to provide suitable habitat for threatened and endangered species. Choctaw, Dry, and Long Creek are tributaries to Bayou Pierre. Crumps Creek and the East and West Prongs of Silver Creek drain into the Pearl River. Shelton Creek is a reference stream for the MDEQ and a major tributary to Okatoma Creek. Thompson and Gaines Creek drain into the Leaf River. Degradation of water quality in these tributaries may negatively impact water quality in downstream sensitive waterbodies and indirectly impact threatened and endangered species. The MDWFP has expressed concerns about potential impacts to these waterbodies and the downstream resources and requested HDD crossing of each of the tributaries. However, SESH plans to open-cut these waterbodies. Based on the potential that these waterbodies do contain suitable habitat for threatened and endangered species and agency concerns regarding the potential impacts to downstream resources resulting from implementation of the proposed crossing methods, **we recommend that:**

- **SESH should use a dry crossing method to cross the Choctaw, Crump, Dry, Gaines, Long, Shelton, and Thompson Creeks, or as an alternate, SESH should investigate the feasibility of crossing these creeks using the HDD method. SESH should file site-specific crossing plans for its proposed dry crossing method, for review and written approval by the Director of OEP prior to construction at each waterbody.**

None of the waterbodies that would be crossed by the proposed Project are designated as drinking water supply or public water supply. In addition, the proposed route does not cross within three miles of any surface water withdrawal locations in Louisiana, Mississippi, or Alabama.

In Louisiana, three waterbody segments that would be crossed by the proposed Project are listed on the 2004 state 303(d) list of impaired waters: Bayou Macon, Joe's Bayou, and the Tensas River. Bayou Macon is listed as impaired from dichloro-diphenyl-trichloroethane (DDT), total suspended solids, and turbidity from crop production as well as fecal coliform contamination from septic and other decentralized treatment systems. Joe's Bayou is listed as impaired from elevated levels of carbonfuran, DDT, total suspended solids and turbidity from crop production, as well as elevated nitrate/nitrite levels, low dissolved oxygen levels, and elevated levels of total phosphorus from unknown sources. The Tensas River is listed as impaired from elevated levels of carbonfuran, DDT, nitrate/nitrite, total suspended solids, total phosphorus, toxaphene, turbidity, and low levels of dissolved oxygen from crop production (LDEQ 2005).

In Mississippi, nine waterbody segments that would be crossed by the proposed Project are listed on the state 303(d) list for 2004: the Big Black River, Bayou Pierre, Pearl River, Bowie Creek, Okatoma Creek, Leaf River, Tallahala Creek (also called Tallahala River), Chickasawhay River, and Escatawpa River. Big Black River is listed as impaired from sedimentation/siltation and pesticides. Bayou Pierre is listed as impaired for aquatic life support due to nutrients, organic enrichment, low dissolved oxygen, pesticides, and sediment/siltation. Pearl River is listed as impaired due to high nutrient and pesticide levels, organic enrichment, low dissolved oxygen levels, and high levels of sediment/siltation. Bowie Creek is listed as impaired due to organic enrichment, low dissolved oxygen levels, elevated levels of nutrients, and sediment/siltation. Okatoma Creek is listed as impaired due to elevated levels of nutrients

TABLE 3.3.2-2
Sensitive Surface Waterbodies Crossed by the Proposed SESH Project

MP	Field ID	Name	State WQ Classification	Sensitive Water Classification	Crossing Method
0.32	SA239-2	Macon Bayou	A,B,C	303(d)	HDD
1.74	SA245-1	Joe's Bayou	A,B,C	303(d)	HDD
10.84	SA173	Tensas River	A,B,C	303(d)	HDD
35.40	SA247	Mississippi River	A,B,C (LA); F&W (MS)	T&E Habitat (Listed habitat for interior least tern, pallid sturgeon, Alabama red-bellied turtle)	HDD
44.63	SA297-1	Big Black River	F&W	NRI, 303(d)	HDD
55.97	SD216	Bayou Pierre	REC, F&W	NRI, T&E (Bayou darter listed and observed habitat, crystal darter)	HDD
62.26	SA367	Bayou Pierre	F&W	NRI, T&E (Bayou darter listed and observed habitat, crystal darter)	HDD
72.69	SA123	Turkey Creek	REC, F&W	T&E (Bayou darter [listed and observed habitat])	HDD
101.40	SB164	Pearl River	REC, F&W	NRI, 303(d), T&E (delicate spike, gulf sturgeon, crystal darter, frecklebelly madton, ringed map turtle	HDD
127.61	SF113-1	Bowie Creek	REC, F&W	NRI, 303(d)	HDD
150.89	SB129	Okatoma Creek	REC, F&W	NRI, 303(d)	HDD
157.94	SF117	Leaf River	F&W	NRI, 303(d)	HDD
170.59	SG161	Tallahala River	F&W	303(d)	HDD
209.06	SC235	Chickasawhay River	F&W	NRI, 303(d)	HDD
235.54	SR106-1	Escatawpa River	F&W	303(d), T&E (Alabama red-bellied turtle and yellow blocked map turtle listed habitat)	HDD

Notes:
A = Primary Contact Recreation
B = Secondary Contact Recreation
C = Fish and Wildlife
F&W = Fish and Wildlife
HDD = horizontal directional drill
MP = milepost
NRI = Nationwide Rivers Inventory
REC = Recreation
T&E = threatened and endangered
WQ = water quality

and pesticides, organic enrichment, low dissolved oxygen levels, high levels of sediment/siltation, and presence of pathogens. Leaf River is listed as impaired due to high levels of nutrients and sediment/siltation. Tallahala Creek is listed due to biological impairment. The cause of the Chickasawhay River listing is unknown. The Escatawpa River is listed due to elevated levels of mercury, metals, total

toxics, organic nutrients, chlorine, organic enrichment, suspended solids, turbidity, pH, pathogens and low dissolved oxygen (MDEQ 2005).

No river segments crossed by the Project in Alabama were found on that state's 303(d) list for 2004 (ADEM 2006).

3.3.2.2 Waterbody Construction Methods and Procedures

As described in Section 2.0, SESH would construct the proposed pipeline through waterbodies using either open-cut or HDD methods. Appendix D identifies the proposed crossing method for each waterbody.

To minimize the potential impacts to waterbodies resulting from construction of the proposed pipeline, SESH would adhere to all federal, state, and local regulations and permit requirements and would implement measures described in its Plan and Procedures. These measures include, but are not limited to:

- obtaining all necessary permits from the COE and state agencies prior to construction and notifying applicable state agencies at least 48 hours before commencing with in-stream trenching;
- using EIs during construction;
- limiting the use of equipment within the waterbody to that necessary to construct the crossing and using equipment bridges for passage of other construction equipment;
- placing spoil at least 10 ft away from the water's edge or top of the bank with installation of sediment barriers to prevent the flow of spoil or silt-laden water to the waterbody;
- preserving as many existing trees on wooded stream banks as possible, while considering safety and other construction conditions, and allowing reestablishment except for a 30-ft-wide corridor centered over the pipeline;
- completing all in-stream construction activity, including stabilization and recontouring of banks, within 24 hours for minor waterbody crossings and 48 hours for intermediate waterbody crossings;
- using temporary erosion and sediment control measures such as sediment barriers and trench plugs, and installing permanent sediment controls (e.g., slope breakers) as necessary; and
- conducting restoration activities including restoring preconstruction bank contours, installing slope breakers, and revegetating disturbed riparian areas with suitable grasses and legumes to stabilize the banks.

Alternative Measures to Our Procedures

SESH proposes alternative measures to Sections IV.A.1.d, V.B.1, V.B.2.a, and V.B.3 of our Procedures. Section IV.A.1.d states that all equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. SESH proposes to conducted fueling within 100 feet of a waterbody or wetland boundary if the fueling is conducted on a paved road. Section V.B.1 relates to when in-stream construction could occur. SESH proposes to

construct through waterbodies during a time within its construction schedule. Section V.B.2.a states that all extra work areas should be located at least 50 feet from a waterbody's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. In Section 3.4, Table 3.4.2-1 identifies ATWS located within 50 feet of a waterbody or wetland boundary. Section V.B.3 relates to general crossing procedures. SESH proposes that the EI, in consultation as necessary with the construction inspector, environmental coordinator and appropriate agencies, and other SESH inspectors, identify or approve the appropriate construction method for each location based on site-specific conditions at the time of construction.

The prohibition of fueling within 100 feet of a waterbody or wetland boundary was designed to reduce the potential contamination of sensitive resources that could result from fueling activities. In order to grant a measure of flexibility, this section also states that the EI in specific situations may allow refueling activities to occur closer than 100 feet to a waterbody or wetlands boundary. Since flexibility is provided for in our Procedures, SESH's alternative measure is not necessary, and therefore we do not approve this alternative measure to Section IV.A.1.d of our Procedures.

The restricting of in-stream construction to certain time windows was designed to limit the potential adverse impacts to fisheries resulting from construction of a proposed pipeline. Since SESH has consulted with the appropriate agencies regarding these time windows and received approval to construct outside these windows, we have determined that its alternative measure to Section V.B.1 of our Procedures is acceptable.

As described in Section 2.0, we are recommending that SESH reduce the size of its proposed ATWSs. Additionally, as outlined in SESH's procedures, SESH would file prior to construction site-specific plans for each ATWS within 50 feet of waterbodies. Based on our review of these ATWSs, our recommendation in Section 2.0, and SESH's commitment to file site-specific construction plans as described above and in its Procedures, we have determined that the proposed alternative measure to Section V.B.2.a of our Procedures is acceptable.

General crossing procedures were developed to guide construction activities while ensuring that waterbodies crossed by a proposed Project were adequately protected and impacts to them minimized to the extent possible. We believe that SESH's proposed alternative measure to Section V.B.3 of our Procedures would not adequately ensure the protection and minimization of impacts to waterbodies; therefore, we do not approve this alternative measure to Section V.B.3 of our Procedures.

3.3.2.3 General Impacts and Mitigation

The proposed construction activities (clearing, excavation, and backfilling) could result in the following, which, in turn, could adversely affect water quality and in-stream habitat:

- increased runoff, erosion, and associated sedimentation of streams;
- increased turbidity in the waterbody, leading to reduced photosynthetic activity and levels of dissolved oxygen in the water;
- increased water temperature due to the removal of riparian vegetation and loss of associated shading;
- disturbance of contaminated soils and sediments; and

- introduction of chemical contaminants, such as fuels and lubricants, into surface waters from operation of heavy equipment or other vehicles in and near surface waterbodies or from accidental spills during construction.

To avoid impacts to waterbodies resulting from the disturbance of contaminated sediments and waters, SESH proposes to cross all impaired waters using the HDD method.

Maintenance of the proposed permanent right-of-way would result in a relatively small, but potentially long-term, impact to waterbodies. The maintenance of a permanent right-of-way adjacent to waterbodies would result in the loss of taller vegetation (e.g., trees and shrubs) which would remove some habitat and could increase water temperatures.

3.3.2.4 Site-Specific Impacts and Mitigation

HDD Crossings

Numerous waterbodies would be crossed using HDDs. As described in Section 2.0, HDD is a trenchless crossing method that may be used to avoid direct impacts to waterbodies by directionally drilling beneath them. In addition to major waterbodies, SESH would also use HDD at the crossing of waterbodies that are classified as impaired and those listed on the NRI. If an HDD crossing failed or an HDD crossing was determined not to be feasible, SESH would contact FERC and other relevant resource agencies. In the event that a HDD failed and drilling fluid was released inadvertently into the waterbody or on land or a frac-out occurred, SESH would implement the measures outlined below. A frac-out occurs when drilling fluid escapes the drill borehole and is forced through the subsurface substrate to the ground surface. SESH would not use any synthetic or potentially toxic drilling fluid additives. During HDD operations, a frac-out would cause turbidity and sedimentation if released in a waterbody. Potential impacts from increased turbidity would include decreased water quality and compromised aquatic habitat integrity. As suspended materials settle out of the water column, sedimentation would partially or entirely cover the waterbody substrate and any sessile, benthic organisms.

- **Measures to Contain a Release of Drilling Fluid in a Waterway:** If a release of drilling fluid occurs within a major waterway, appropriate federal and state agencies would be contacted immediately. Drilling fluid pressure would be reduced and operations suspended to assess the extent of the release and to implement other possible corrective actions. If reducing the drilling fluid pressure does not seal or stop the release, then drilling fluid circulation pumps would be turned off. This measure would be taken as a last resort because of the potential for drill-hole collapse resulting from loss of down-hole pressure.

- **Measures to Contain a Release of Drilling Fluid on Land:** If a land release was detected, the drilling crew would take immediate corrective action to contain the release and to prevent migration off-site. Pits and/or berms would be constructed around the borehole entry point to contain drilling fluids and returns. Containment equipment, including earth-moving equipment, portable pumps, hand tools, sand bags, silt fencing, and lumber, would be stored and readily available at the drilling site. If the amount of drilling fluid from an on-land release does not allow practicable collection, the drilling fluid would be diluted with fresh water and allowed to dry. Steps would be taken (such as berms, silt fence, and/or hay bale installation) to prevent silt-laden water from escaping the affected area. If hand tools cannot contain a small on-land release, small collection sumps (less than 5 cubic yards) could be constructed to pump the release material into the drilling fluid process. Any drilling fluid seepage would be removed using sump pumps or a vacuum truck and then transported to an approved disposal site.

Since SESH has not filed as HDD contingency plans that describe the procedures that would be implemented to monitor for, contain, and clean up any inadvertent releases of drilling fluids during HDD operations, **we recommend that**:

- **Prior to construction, SESH shall file with the Secretary, for review and written approval by the Director of OEP, a detailed HDD Contingency Plan for the Project (e.g. alternative construction measures, agency and emergency contact information, required equipment and materials) the contingency plan shall address how SESH:**

  a. will handle any inadvertent release of drilling mud into the waterbody or areas adjacent to the waterbody, including procedures to contain inadvertent releases;
  b. will seal the abandoned drill hole; and
  c. clean up any inadvertent releases.

- **SESH shall not begin an open-cut crossing of any of the waterbodies proposed to be crossed using HDD until the HDD attempt has failed and it files an amended crossing plan for review and written approval by the Director of OEP. The amended crossing plan shall include site-specific drawings identifying all areas that would be disturbed using the proposed alternate crossing method. SESH shall file the amended crossing plan concurrent with the appropriate state and federal applications required for implementation of the plan. (Section 3.3.2.4)**

3.3.2.5 Hydrostatic Testing

Hydrostatic Testing Protocol

Hydrostatic testing verifies the integrity of pipeline segments. Pipeline integrity is tested by capping the pipeline segments with test manifolds and filling the capped segments with water. The pipeline and associated facilities would be filled with water and pressurized to a pressure that is typically one and a half times higher than the maximum pressure at which the pipeline would be operated. The water would be maintained at the prescribed pressure for a minimum of 8 hours to verify the strength and integrity of the new facilities. Hydrostatic testing would be conducted in a manner that meets or exceeds the DOT's "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards" at 49 CFR Part 192.

SESH does not anticipate using chemicals for testing or for drying the pipeline following hydrostatic testing. Water quality monitoring would be conducted during discharge, per the requirements of NPDES and state permits, to identify and address any potential impacts to water quality.

Details regarding hydrostatic testing for the Project, such as the number of segments, sources, discharge locations by MP, rate of discharge, and final volumes, are pending the finalization of detailed profile designs and DOT class locations. In general, SESH would require the use of multiple sources of water for conducting hydrostatic testing of the pipeline. Sources could include public and private surface and well supplies and, potentially, municipal water supplies. SESH would correspond with all appropriate agencies and obtain any necessary permits for withdrawal from any surface, well, or municipal water supply prior to water withdrawal as well as obtain any necessary discharge permit. To date, SESH has not provided detailed hydrostatic testing information including the water sources proposed for use. Therefore, **we recommend that:**

- **Prior to any hydrostatic testing SESH should file for review and written approval by the Director of OEP, a detailed report of all water sources proposed for hydrostatic**

testing including the project component or facility to be tested, the corresponding water source, withdrawal and discharge locations by MP, and estimated volumes of withdrawal required.

Hydrostatic testing has the potential to impact the withdrawal and receiving waters used for obtaining or releasing the hydrostatic test water. Withdrawal of large amounts of water for hydrostatic testing of pipeline segments could affect or limit other uses of rivers and streams including water supply, recreation, and aquatic habitat, particularly during low flow and drought conditions, or if the withdrawal was large relative to overall flow. Other impacts would include increased water temperatures, reduced levels of dissolved oxygen, and entrainment of aquatic organisms. 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. Unregulated discharges could also result in erosion of upland areas or stream banks and increased sedimentation or turbidity in streams.

Hydrostatic test water withdrawal and discharge would be conducted in accordance with SESH's Procedures and any federal and state permit conditions. Environmental impacts resulting from withdrawal and discharge of test water would be minimized by using the measures described in SESH's Procedures as follows:

- locate hydrostatic test manifolds outside of wetlands and riparian areas to the extent practicable;
- withdraw from and discharge to water sources in compliance with appropriate agency requirements that consider the protection of fishery resources on a case-by-case basis;
- comply with all appropriate permit requirements;
- screen the intake to minimize entrainment of fish;
- maintain adequate streamflow rates to protect aquatic life and provide for all designated uses as well as downstream withdrawals by existing users;
- anchor the discharge pipe for safety;
- discharge test water against a splash plate or other energy-dissipating device to a suitable receiving body of water to prevent erosion, stream bank scour, suspension of sediments, and excessive streamflows;
- alternately, discharge test water to a well-vegetated upland area, through a filter bag or hay bale structure, or into an erosion-control barrier to prevent erosion of the adjacent upland and sedimentation of the waterbody; and
- control the rate of discharge to prevent flooding or erosion.

Conclusion Regarding Impacts to Water Resources

Based on the characteristics of the identified water resources, SESH's proposed construction measures, its Plan and Procedures, the impacts to these resources and SESH's adherence to our recommendations; we believe that impacts to water resources resulting from construction and operation of the proposed Project would not be significant.

3.4 WETLANDS

Wetlands are areas that are inundated or saturated by 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 perform a number of valuable functions, including flood flow attenuation, sediment retention, nutrient retention, provision of wildlife habitat, groundwater recharge and discharge, recreation, and erosion control.

Section 404 of the CWA of 1972 established standards to minimize impacts to wetlands. These standards, which are enforced by the COE, require the avoidance of wetlands, where possible and to the degree practical, or the minimization of disturbance to wetlands where unavoidable. All wetland disturbances and crossings are subject to review and approval by the Vicksburg and Mobile Districts of the COE.

3.4.1 Existing Wetland Resources

Using the methodology described in the 1987 COE *Wetland Delineation Manual*, SESH completed comprehensive field surveys to identify, delineate, and classify each wetland potentially affected by the proposed Project. Appendix E summarizes each wetland crossing, specifically the locations, field identification numbers, crossing distances, FWS National Wetland Inventory (NWI) classifications, and construction and operation impacts (including wetlands conversion and loss).

Based on SESH's field delineations and the FWS NWI classification system, three types of wetlands occur along and near the proposed Project facilities: palustrine forested (PFO), palustrine shrub-scrub (PSS), and palustrine emergent (PEM). Construction of the proposed Project would affect 187 PFO wetlands, 24 PSS wetlands, and 56 PEM wetlands.

The vegetative component of the PFO wetland type generally consists of a diverse, multi-story assemblage of hard- and softwood trees, shrubs, and grasses. By definition, tree species in this wetland type are at least 20 ft tall. PFO wetlands can be dominated by one tree species or several species. This wetland type can consist of the following vegetative species near the proposed Project: Drummond's maple (*Acer rubrum* var. *drummondii*), red maple (*Acer rubrum* var. *trilobum*), yellow-poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), redbay (*Persea borbonia*), spruce pine (*Pinus glabra*), American sycamore (*Platanus occidentalis*), overcup oak (*Quercus lyrata*), swamp chestnut oak (*Quercus michauxii*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), winged elm (*Ulmus alata*), American elm (*Ulmus americana*), water hickory (*Carya aquatica*), green ash (*Fraxinus pennsylvanica*), water tupelo (*Nyssa aquatica*), swamp tupelo (*Nyssa biflora*), black willow (*Salix nigra*), and bald cypress (*Taxodium distichum*).

The vegetative component of the PSS wetland type generally consists of shrubs and grasses. By definition, this wetland type is dominated by woody vegetation that is less than 20 ft tall. The overstory of this wetland type can consist of the following vegetative species near the proposed Project: boxelder (*Acer negundo*), silver maple (*Acer saccharinum*), hazel alder (*Alnus serrulata*), river birch (*Betula nigra*), large gallberry (*Ilex coriacea*), gallberry (*Ilex glabra*), Virginia- (*Itea virginica*), buttonbush (*Cephalanthus occidentalis*), redbay (*Persea borbonia*), roughleaf dogwood (*Cornus drummondii*), swampprivet (*Forestiera acuminata*), Carolina ash (*Fraxinus caroliniana*), deciduous holly (*Ilex decidua*), privet (*Ligustrum sinense*), southern magnolia (*Magnolia grandiflora*), wax myrtle (*Myrica cerifera*), red mulberry (*Morus rubra*), diamondleaf oak (*Quercus laurifolia*), willow oak (*Quercus phellos*), cherrybark oak (*Quercus pagoda*), water oak (*Quercus nigra*), black willow (*Salix nigra*), elderberry (*Sambucus canadensis*), and Chinese tallow (*Triadica sebifera*). The understory of this wetland type can consist of the following vegetative species: peppervine (*Ampelopsis arborea*),

switchcane (*Arundinaria gigantea*), false nettle (*Boehmeria cylindrica*), ladies-eardrops (*Brunnichia ovata*), sedge (*Carex spp.* and *Cyperus spp.*), Indian sea oats (*Chasmanthium latifolium*), dayflower (*Commelina spp.*), leathery rush (*Juncus coriaceus*), rush (*Juncus effusus*), needlepod rush (*Juncus scirpoides*), climbing hempvine (*Mikania scandens*), royal fern (*Osmunda regalis*), Virginia creeper (*Parthenocissus quinquefolia*), swamp smartweed (*Polygonum hydropiperoides*), water pepper (*Polygonum hydropiper*), pinkweed (*Polygonum pensylvanicum*), jumpseed (*Polygonum virginianum*), blackberry (*Rubus spp.*), greenbrier (*Smilax spp.*), dwarf palmetto (*Sabal minor*), and lizard's tail (*Saururus cernuus*).

The vegetative component of the PEM wetland type is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This wetland type can consist of the following vegetative species near the proposed Project: alligatorweed (*Alternanthera philoxeroides*), broomsedge (*Andropogon virginicus*), beggartick (*Bidens laevis*), watershield (*Brasenia schreberi*), sedges (*Carex spp.* and *Cyperus spp.*), spikerush (*Eleocharis spp.*), mallow (*Hibiscus spp.*), smooth hydrolea (*Hydrolea uniflora*), rush (*Juncus effusus*), sprangle-top (*Leptochloa filiformis*), duckweed (*Lemna spp.*), swamp smartweed (*Polygonum hydropiperoides*), slender beaksedge (*Rhynchospora gracilenta*), white top sedge (*Rhynchospora colorata*), colicroot (*Aletris farinosa*), yellow pitcher plant (*Sarracenia alata*), hooded pitcherplant (*Sarracenia minor*), pink sundew (*Drosera capillaris*), orange milkweed (*Polygala lutea*), cattail (*Typha latifolia*), cockleburr (*Xanthium strumarium*), yelloweyed grass (*Xyris spp.*), and buttonbush (*Cephalanthus occidentalis*).

3.4.1.1 High Quality, Sensitive, or Special Status Wetlands

The proposed Project would cross high quality, sensitive and special status wetlands. The determination of these wetlands was based on comments provided by the states of Mississippi and Alabama as well as comments provided by the NRCS. These wetlands either exhibit unique biological characteristics or have been designated by a federal or state entity for additional management.

Pitcher Plant Bogs

Pitcher plant bogs are a unique and sensitive type of emergent wetland that has been recognized by the states of Mississippi and Alabama as valuable. Pitcher plant bogs have been generally described as sandy or mucky seepage areas that can occur in a variety of sizes, landscapes, and slope positions and, due to their wetness and exposure to fire, remain treeless. Pitcher plant bogs, though dominated by pitcher plants, can also consist of a variety of forbs and grasses. Approximately 97 percent of pitcher plant bogs along the Gulf Coast have been lost. Today, there are approximately 10,000 acres of pitcher plant bogs remaining in southeast Mississippi.

Both the MDWFP and the ADCNR NHP expressed concerns about the impacts to pitcher plant bogs resulting from the crossing of these unique and sensitive wetlands during construction and operation of the proposed pipeline. Based on wetlands surveys of the proposed Project route no pitcher plant bogs were identified in Mississippi; however, one pine savanna wetland exhibiting pitcher plant bog characteristics was identified in Alabama and based on agency consultations the presence of additional bogs is likely.

Wetlands Reserve Program

The proposed Project would cross lands entered into, and actively managed under, the NRCS-sponsored Wetland Reserve Program (WRP) in Madison Parish, Louisiana. According to the NRCS, all lands entered into the WRP are jurisdictional wetlands. The WRP, as described in more detail in Section 3.8, is generally designed and managed to protect, improve, and restore wetlands. The general quality and function of wetlands in the WRP ranges from low/recently restored to high/fully functional.

3.4.2 Wetlands Construction Methods and Procedures

Construction Methods

As described in Section 2.0, SESH would use four general construction methods to install the proposed pipeline across wetlands:

- Crossing Method 1: Conventional wetlands construction in unsaturated soils. This method would be used in wetlands where the soils are dry and stable enough to support construction equipment without sinking. Topsoil would be segregated and timber mats would generally not be used.

- Crossing Method 2: Conventional wetlands construction in saturated soils. This method would be used in wetlands where the soils are too wet to support mainline construction equipment, such as permanently or semi-permanently saturated soils. Topsoil would not be segregated and timber mats would be used as necessary to support construction equipment.

- Crossing Method 3: Push/pull wetlands construction. This method would be used in wetlands where standing water is present at the time of construction. Topsoil would not be segregated and timber mats would be used as necessary to support construction equipment.

- Crossing Method 4: Horizontal Directional Drilling. This method would be used and considered for the crossing of high-quality, sensitive, or special-status wetlands.

All wetlands crossings would use a nominal 75-ft-wide construction right-of-way.

Wetlands Procedures

SESH has developed several measures as described in its Procedures to minimize and mitigate potential affects to wetlands resulting from construction and operation of the proposed Project. These measures include but are not limited to:

- clearly marking wetland boundaries and buffers in the field until construction is complete;
- limiting tree stump removal and grading to the area directly over the pipeline, unless it is determined that safety-related construction constraints require grading or removal of tree stumps from under the working side of the construction right-of-way;
- stripping topsoil from the area directly over the trench line to a maximum depth of 12 inches in unsaturated soils;
- minimizing the amount of time that topsoil is segregated and the trench is open;
- using sediment barriers to prevent sediment flow into wetlands;

- de-watering trenches in a way that does not cause sedimentation into a wetland;
- using trench breakers to ensure maintenance of the original wetland hydrology;
- prohibiting the storage of hazardous materials and re-fueling within 100 ft of a wetland;
- restoring preconstruction contours; and
- monitoring post-construction.

SESH would adhere to these Procedures during construction and operation of the proposed Project except where alternatives to its Certificate are requested and granted due to site-specific conditions or applicable permit conditions.

Alternative Measures to Our Procedures

SESH proposes alternative measures to Sections VI.A.6, VI.B.1.a and VI.C.4 of our Procedures. Section VI.A.6 states that aboveground facilities should not be located in any wetland, except where the location of such facilities would prohibit compliance with DOT regulations. SESH proposes to place permanent aboveground facilities in wetlands which would result in the permanent conversion of 5.49 acres of PFO wetlands to uplands. Section VI.B.1.a states that all extra work areas should be located at least 50 ft outside of identified wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. SESH proposes to place numerous ATWSs in and within 50 ft of wetlands. The locations and justifications for these workspaces are identified in Table 3.4.2-1. Section VI.C.4 of our Procedures relates to the preparation of a project-specific wetland restoration plan and outlines consultation with the appropriate land management or state agencies to assist in the development of this plan. SESH proposes to accomplish the restoration of wetlands by allowing them to naturally revegetate.

As stated above, the construction of aboveground facilities at the terminus of the proposed pipeline would result in the permanent conversion of 5.49 acres of wetlands to uplands. The location of the proposed aboveground facilities is an area that is relatively developed, containing numerous other natural gas and industrial facilities. On June 7, 2007 SESH filed with FERC a site-specific plan for constructing and installing the proposed aboveground facilities in wetlands. By co-locating certain parts of the proposed aboveground facilities with those of other companies' existing facilities, SESH was able to reduce the amount of wetlands permanent converted from 6.60 acres to 5.49 acres. Based on the overall location of the proposed aboveground facilities', surrounding land uses, their collocation with existing facilities, SESH's adherence to applicable measures of its Procedures, and its compliance with the terms and conditions of any Section 404 authorization issued by the COE, we believe that locating these facilities in wetlands would result in a substantial, but not adverse impact and is environmentally acceptable.

As described in Section 2.0, we are recommending that SESH reduce the size of its proposed ATWSs. Additionally, as outlined in SESH's procedures, prior to construction SESH would file site-specific plans for each extra work area in and within 50 ft of wetland boundaries. Based on our review of SESH's proposed ATWSs, our recommendation in Section 2.0, and SESH's commitment to file site-specific construction plans as described above and in its Procedures, we have determined that its proposed alternative measure to place ATWS in and within 50 ft of wetlands is acceptable. Based on the characteristics of the identified wetland vegetative species, our previous experience with wetlands revegetation in the southeast, SESH's proposed Procedures, and its compliance with terms and conditions of any Section 404 authorization issued by the COE, we have determined that SESH's proposed alternative measure regarding the preparation of a wetlands restoration plan is acceptable and would adequately allow for the restoration of wetlands.

TABLE 3.4.2-1
Summary of Proposed ATWS in or within 50 Feet of Wetlands and Waterbodies

Facility	Milepost	Length/ Size	Wetland/Waterbody Identifier	Distance from Wetland/Waterbody	Applicable FERC Procedures Section	Basis for Alternative
SESH Pipeline						
Wetland	4.22	50’ x 150’	WA158	0	VI.B.1.a	ATWS for drill workspace
Wetland	33.17	475’ x 377’ 450’ x 377’	WD178	0	VI.B.1a	ATWS for overland levee crossing
Wetland	35.14	58’ x 50’ 50’ x 50’	WA158	0	VI.B.1a	ATWS needed in large wetland
Wetland	35.3	25’ x 200’ 50’ x 200’	WD178	0	VI.B.1.a	ATWS for drill workspace
Wetland	44.3	10’ x2 00’	WA297	40	VI.B.1.a	ATWS for drill workspace
Stream	52.00	35’ x 86’	SX101	25	VI.B.1a	ATWS for Road Bore
Stream	85.01	15’ x 100’	SX107	0	VI.B.1a	ATWS for road bore
Wetland	97.0	25’ x 100’	SB148	30	VI.B.1.a	ATWS for foreign pipeline crossing
Wetland	127.4	50’ x 200’ 25’ x 200’	WF113	0	VI.B.1.a	ATWS for drill workspace
Wetland	127.8	50’ x 200’ 25’ x 200’	WF113	0	VI.B.1.a	ATWS for drill workspace
Wetland	130.69	25’ x 100’	WA312	30	VI.B.1a	ATWS for road bore
Wetland	158.9	50’ x 249’ 25’ x 200’	WF118	0	VI.B.1.a	ATWS for road bore
Stream	163.59	15’ x 100’	SF137	0	VI.B.1a	ATWS for road bore
Wetland/Waterbody	200.8	15’ x 117’ 45 ’x 35’	WC140/SC152-1	0	VI.B.1.a	ATWS for road bore workspace
Wetland	203.2	15’ x 100’ 35’ x 244’	WC156	0	VI.B.1.a	ATWS for road bore
Wetland	208.09	25’ x 332’	WH135	0	VI.B.1a	ATWS for pipe bending

TABLE 3.4.2-1
Summary of Proposed ATWS in or within 50 Feet of Wetlands and Waterbodies

Facility	Milepost	Length/ Size	Wetland/Waterbody Identifier	Distance from Wetland/Waterbody	Applicable FERC Procedures Section	Basis for Alternative
Stream	208.23	40' x 125'	SH135-1	5	VI.B.1a	ATWS for wetland crossing
Stream	208.30	35' x 125'	SH135-1	0	VI.B.1a	ATWS for pipe bending
Wetland	214.91	50' x 175'	WC187	0	VI.B.1a	ATWS for multiple foreign pipeline crossings
Wetland	217.0	15'x116' 35'x100'	WC197	0	VI.B.1.a	ATWS for railroad bore
Wetland	235.37	50'x 200' 50'x 200'	WD262	0	VI.B.1.a	ATWS for Drill Workspace
Wetland	235.73	50'x 200' 25'x 200'	WD262	0	VI.B.1.a	ATWS for drill workspace
Wetland	248.10	15'x108'	WG103	20	VI.B.1.a	ATWS for road bore
Wetland	248.12	25'x100'	WE128	0	VI.B.1.a	ATWS for road bore/foreign pipeline crossing
Wetland	262.45	50'x107' 50'x100' 50'x100' 50'x106'	WE137	0	VI.B.1.a	ATWS for road bore
Wetland	266.75	150'x100' 35'x125'	WE118	0	VI.B.1.a	ATWS for road bore
Wetland	268.97	25'x145' 50'x100'	WE119	0	VI.B.1.a	ATWS for road bore
Wetland	268.98	25'x100' 50'x145'	WE124	0	VI.B.1.a	ATWS for road bore
Rock Road Lateral						
Wetland	0.24	25'x305' 25'x190'	WE124	0	VI.B.1.a	ATWS for multiple foreign pipeline crossings

TABLE 3.4.2-1
Summary of Proposed ATWS in or within 50 Feet of Wetlands and Waterbodies

Facility	Milepost	Length/ Size	Wetland/Waterbody Identifier	Distance from Wetland/Waterbody	Applicable FERC Procedures Section	Basis for Alternative
Wetland	0.35	25'x100' 25'x287'	WE124	0	VI.B.1.a	ATWS for multiple foreign pipeline crossings
Wetland	0.86	25'x144' 25'x100' 25'x100' 25'x144'	WE124	0	VI.B.1.a	ATWS for foreign pipeline crossing
Wetland	1.04	25'x144' 25'x100' 25'x144'	WE124	0	VI.B.1.a	ATWS for foreign pipeline crossing

Note:
ATWS = additional temporary workspace

Wetland Restoration

Wetlands restoration would be conducted in accordance with SESH's Procedures. In general, wetlands restoration would include the establishment of a suitable substrate, restoration of original contours and hydrology, and revegetation of affected wetlands through seeding and natural processes. Specifically, as applicable during restoration, previously segregated topsoil would be replaced over the trench line and wetland contours and drainage patterns would be restored to as near original conditions as possible. In addition, SESH would conduct post-construction monitoring of affected wetlands to assess the condition of vegetation and the success of restoration.

3.4.3 Wetlands Impacts and Mitigation

3.4.3.1 Wetlands Impacts

General Impacts

As demonstrated in Table 3.4.3-1, construction of the proposed pipeline and associated aboveground facilities would affect 238.76 acres of wetlands, including 159.85 acres of PFO wetlands, 74.68 acres of PSS wetlands, and 4.23 acres of PEM wetlands.

Construction activities, including clearing, trenching, installation, and restoration, would affect the three identified wetland types and the functions they provide. The removal of vegetation during clearing would result in the displacement of wildlife and loss of wildlife habitat and increase the potential for erosion and could affect soil characteristics. The disturbance of soils during trenching and installation would result in an increased potential for erosion and compaction and could alter soil characteristics and subsequent revegetation efforts. Clearing, trenching, and installation would also affect groundwater and

TABLE 3.4.3-1
Summary of Wetland Impacts for the Proposed SESH Project (all data in acres)

Facility Type	NWI Classification	Center-line Crossing Length (miles)	Construction Impact[a] (acres)	Operation Impact[b]				
				Vegetation Conversion (acres)				Permanent Fill Impact (acres)
				PFO Conversion to PEM or PSS[c]			PSS Conversion to PEM[d] (acres)	
				Total PFO Conversion	PFO to PSS	PFO to PEM		
Pipeline	PEM	1.56	4.23	NA	NA	NA	NA	0.00
	PSS	8.39	74.68	NA	NA	NA	10.23	0.00
	PFO	12.83	153.25	54.29	36.19	18.10	NA	0.00
	Subtotal	*22.78*	*232.16*	*54.29*	*36.19*	*18.10*	*10.23*	*0.00*
Aboveground Facilities[e]	PEM	NA	0.00	0.00	0.00	0.00	NA	0.00
	PSS	NA	0.00	0.00	0.00	0.00	0.00	0.00
	PFO*	NA	6.60	0.00	0.00	0.00	NA	6.60
	Subtotal	*NA*	*6.60*	*0.00*	*0.00*	*0.00*	*0.00*	*6.60*
Project Total		**22.78**	**238.76**	**54.29**	**36.19**	**18.10**	**10.23**	**6.60**

a Construction impacts include all temporary work areas and permanent easement areas.

b Operation impacts include only the permanent easement or the permanent fenced boundary of aboveground facilities.

c Conversion calculated based on a 30-ft strip that would be maintained according to FERC guidelines. The inner 10 ft would be maintained free of woody vegetation (i.e., maintained as PEM vegetation), while the outer 20 ft (10 ft on each side) would be allowed to regenerate shrubs (PSS vegetation) but not trees (PFO vegetation).

d PSS conversion calculated based on a 10 foot strip centered over the pipeline centerline.

e As stated in the text, SESH would evaluate ways to reduce the permanent impact area of aboveground facilities in wetlands. This acreage also includes acreage for permanent access road (PAR)–RRL1.

FERC = Federal Energy Regulatory Commission

ft = foot/feet

National Wetland Inventory (NWI) classifications: PEM = palustrine emergent wetland, PSS = palustrine shrub-scrub wetland, PFO = palustrine forested wetland.

NA = not applicable

* = 6.60 acres of PFO was reduced to 5.49 acres by SESH's in response to FERC's DEIS condition.

surface water movement. Collectively, construction activities would affect a wetland's ability to regulate water flow, control erosion, and provide habitat for terrestrial and aquatic wildlife species.

Operation of the proposed Project would also affect wetlands. Vegetation maintenance (mowing) would result in the displacement of wildlife and a decrease in the quality of wildlife habitat.

Construction and operation activities would result in the conversion of wetland types. Portions of crossed forested wetlands would be converted, temporarily and permanently, to emergent and scrub-shrub wetlands, and scrub-shrub wetlands would be converted, temporarily, to emergent wetlands.

Construction and operation of the proposed Project would also result in the permanent conversion of wetlands and associated wetland functions. Specifically, the installation of aboveground facilities in Alabama would require the clearing and filling of 5.49 acres of forested wetlands (WE124) resulting in the permanent conversion of these wetlands to uplands. These facilities would include a pig receiver on Gulfstream's meter station site, PAR-RRL1, and the Rock Road meter site located at the end of the Rock Road lateral. As described above, SESH filed with FERC a site-specific plan for constructing and

installing the proposed aboveground facilities in wetlands. By collocating certain proposed aboveground facilities with those of other companies' existing facilities, SESH was able to reduce the amount of wetlands permanent converted to uplands from 6.60 acres to 5.49 acres. Additionally, SESH's site-specific plan included site-specific drawings illustrating the aboveground facilities' locations in relation to the wetland and a description of measures that SESH would implement to reduce the amount of wetlands lost. The plan also described potential facility alternative sites that SESH considered during its planning of the aboveground facilities. We reviewed the plan and find it acceptable.

With the exception of the proposed aboveground facilities that would permanently affect wetland WE124, most impacts to wetlands would be temporary. As indicated in Table 3.4-1, 4.23 acres of PEM wetlands and 74.68 acres of PSS wetlands would be temporarily affected by construction of the proposed Project. Specifically, 4.23 acres of PEM wetlands and 64.45 acres of PSS wetlands would be seeded and restored once the pipeline is installed, subsequently returning them to pre-construction conditions. The remaining 10.23 acres of PSS wetlands affected by the proposed Project would be located in the 10-ft-wide strip over the pipeline centerline where shrub regeneration would not be allowed and would remain in PEM status over the operational lifetime of the pipeline.

Impacts to forested wetlands resulting from construction and operation of the proposed Project would be long-term and permanent. As indicated in Table 3.4.3-1, approximately 159.85 acres of PFO wetlands would be affected by construction of the proposed Project. Specifically, approximately 86.2 acres of PFO wetlands affected by construction would be allowed to naturally revert to pre-construction conditions; however, this process would take 20 to 30 years. 36.2 acres of PFO wetlands affected by construction would be permanently converted to PSS wetlands, and 18.1 acres of PFO wetlands would be located in the 10-ft-wide strip over the pipeline centerline, where shrub regeneration would not be allowed, and would remain in PEM status over the lifetime of the pipeline.

Site-Specific Impacts

Pitcher Plant Bogs

One identified pitcher plant bog would be crossed by the proposed Project. Impacts to this bog resulting from construction of the proposed pipeline would be similar to the wetlands impacts described above, except that impacts to them would be longer in duration and could be permanent due to the unique vegetative, hydrological, and soil characteristics of these wetlands.

Impacts to pitcher plant bogs resulting from maintenance of the proposed Project, specifically the loss of vegetation due to mowing, and the compaction of soils created by the use of light and heavy equipment, in conjunction with similar impacts resulting from construction, could be significant. Therefore, based on agency concerns regarding these unique wetlands, the likely presence of additional pitcher plant bogs along the proposed pipeline route, and to ensure that SESH adequately minimizes and mitigates impacts to these areas, **we recommend that:**

- **Prior to construction, SESH should develop a Pitcher Plant Bog Mitigation Plan for review and written approval by the Director of OEP, developed in consultation with the MDWFP and ADCNR NHP that describes how SESH would avoid pitcher plant bog communities during construction, and the measures, in addition to those in SESH's Procedures, SESH would implement to minimize impacts to these areas.**

Wetland Reserve Program

Construction and operation of the proposed project through WRP wetlands would result in temporary impacts similar to those described in the previous section. Future management of these wetlands by the NRCS, including restoration and improvement efforts, would be affected as wetland types would be temporarily and permanently converted and wetlands within the permanent right-of-way would be maintained as PSS and PEM wetlands. Additional WRP restoration measures and our recommendation to minimize impacts to WRP lands are described in Section 3.8.5.

3.4.3.2 Wetlands Mitigation

In addition to guiding the construction and operation of the proposed Project, SESH's Procedures also describe and serve as mitigation plans for wetland impacts.

To mitigate impacts to high quality, sensitive, and special-status wetlands, we are recommending in this section as well as Section 3.8 that SESH consult with the MDWFP, ADCNR NHP, and the NRCS to prepare plans that identify and minimize impacts to these wetlands. As required by the COE, SESH has applied for permits pertaining to unavoidable wetland impacts resulting from construction and operation of the proposed Project.

As part of the permitting process, the COE would require the use of best management practices and minimization measures during construction and compensatory mitigation for unavoidable wetlands impacts. SESH would fully comply with the conditions established in its COE-issued permits, including any off-site mitigation, conservation, enhancement, and on-site mitigation.

3.4.4 Conclusions Regarding Impacts to Wetlands

Based on the characteristics of the wetlands that would be affected by construction and operation of the proposed Project, including high quality, sensitive and special-status wetlands, SESH's proposed construction methods and Procedures, impacts to these wetlands, identified minimization measures and mitigation, and SESH's adherence to our recommendations in this section and throughout this document, SESH's adherence to our recommendations in this section and throughout this document, and its compliance with the terms and conditions of any Section 404 authorization issued by the COE, we believe that the proposed Project would not significantly affect wetlands.

3.5 VEGETATION

3.5.1 Existing Vegetation Resources

Construction and operation of the proposed Project would affect seven classified vegetative communities: agricultural, forest, pine plantation, open land, residential, industrial/commercial, and open water. The vegetative communities crossed by the proposed Project and representative species are described and listed in Table 3.5-1. Forested areas include upland and bottomland forest and forested wetlands. Open land areas include scrub-shrub wetlands. Wetland vegetation resources, impacts, restoration, and mitigation are discussed in detail in Section 3.4.

Pipeline Facilities

Relatively large areas of forest, agricultural, and open lands would be crossed by construction of the proposed pipeline and associated ATWSs. The approximately 3,580 acres that would be contained within the pipeline construction right-of-way and ATWSs consist of forested areas (50 percent),

agricultural areas (23 percent), and open lands (15 percent). Approximately 319 acres of pine plantations (9 percent) would be affected during construction. Residential, industrial/commercial, and open water vegetative communities would account for the remaining 3 percent of areas that would be crossed.

Temporary pipeyards/wareyards that would be used to support construction of the proposed Project would temporarily encumber approximately 330 acres. Of this area needed for pipe storage facilities and temporary contractor use, approximately 71 percent would occur in open lands and approximately 26 percent in agricultural fields. These areas primarily consist of lands currently used for open space and pastures.

Aboveground Facilities

The proposed aboveground facilities include three new compressor stations, two new booster stations, as well as M&R facilities, pig launchers and receivers, mainline valves, and other ancillary facilities. Forest, pine plantation, and agricultural lands are the dominant existing vegetation cover types at the proposed compressor station and booster stations. All pig launchers and receivers and mainline valves would be contained within the proposed permanent pipeline right-of-way and would not result in impacts to vegetation beyond that required for the proposed pipeline corridor.

Access Roads

SESH indicates that construction of the proposed pipeline and aboveground facilities would require the use of 236 existing temporary access roads of varying lengths (see Table F-2, Appendix F). SESH reports that the aboveground facilities would require nine permanent access roads. Of the nine permanent access roads, one is an existing road, whereas the remaining eight are proposed new roads. The one permanent access road (PAR) that is already in existence is PAR-72.37 in Copiah County, Mississippi. This road is the proposed way of access for the TETLP M&R Station. The two [PAR-(-0.03)] access roads in Richland Parish, Louisiana, have an agricultural vegetative cover and would be the access roads for the CEGT CenterPoint M&R Station and the Gulf South Mississippi Expansion M&R Station. The proposed Delhi Compressor Station access road, PAR-0.26, is primarily agricultural and is located in Richland Parish, Louisiana. The proposed Collins Booster Station road, PAR-138.37, in Covington County, Mississippi, has both forest and developed land cover types. The proposed Petal Booster Station road, PAR-166.54, in Forrest County has a forest and commercial /industrial land cover type. The proposed PAR-212.42 in George County, Mississippi, is primarily pine plantation and would be the access road for the Lucedale Compressor Station. PAR-RRL1 and PAR-RRL2 are primarily forested areas. They would be access roads to the Rock Road Lateral located in Mobile County, Alabama. Approximately 46 percent of the total 7.40 acres encompassing new permanent access roads would be within the open land vegetation category and most of the remainder of the acreage would be composed of agriculture (25 percent).

Vegetative Communities of Special Concern or Value

SESH reviewed maps and other available information, conducted field surveys, and consulted with resource agencies to identify areas containing vegetation of special concern or value and identified easement lands held by The Nature Conservancy, in the Pascagoula Wildlife Management Area (WMA), and by the FSA's CRP, CREP, and NRCS's WRP. The TNC, FSA and NRCS-administered programs for vegetation resources, impacts, restoration, and mitigation are discussed in detail in Section 3.8. Through the planting of native grasses, trees, and other cover, these easements are designed to reduce soil erosion and 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.

TABLE 3.5.1-1
Vegetation Cover Types Occurring along the Proposed SESH Project

Vegetation Cover Type	General Description	Common Species
Agricultural	Active cropland, including hayfields	Cotton (*Gossypium* spp.), soybeans (*Glycine* spp.), corn (*Zea* spp.), rice (*Oryza sativa*), orchards and vineyards
Forest	Tracts of upland and bottomland forest and forested wetlands[a]	Red maple (*Acer rubrum*), mockernut hickory (*Carya tomentosa*), water oak (*Quercus nigra*), tuliptree (*Liriodendron tulipifera*), pecan (*Carya illinoinensis*), water hickory (*Carya aquatica)*, and bald cypress (*Taxodium distichum)*
Pine plantation	Pine plantation includes varying age stands of loblolly pine that are planted, managed, and periodically cut for timber production	Loblolly pine as a canopy species, with an understory of sweet gum (*Liquidambar styraciflua*), blackberry (*Rubus* spp.*),* greenbrier (*Smilax* spp.), and yaupon holly (*Ilex vomitoria*)
Open Lands	Scrub/shrub areas, fields and pastures, and other areas such as maintained rights-of-way	Yaupon holly (*Ilex vomitoria*), blackberry (*Rubus* spp.*),* bahiagrass (*Paspalum notatum*), woolly croton hogwort (*Croton capitatus*), and clover (*Trifolium* spp.)
Residential	Residential lots, subdivisions, and planned developments	Mainly consists of maintained lawns and ornamental landscaping
Industrial/commercial	Manufacturing plants, landfills, commercial and retail facilities	Substantial amounts of non-vegetated surfaces, pavement, and gravel
Open water	Major waterbodies and ponds	Not Applicable

[a] Wetland forest resources, impacts, restoration, and mitigation are discussed in detail in Section 3.4.

Based on a review of maps, field surveys, and available information, and on consultations with the resource agencies, two vegetative communities of special concern or value could be present within or near the proposed construction work areas: pitcher plant bogs and longleaf pine ecosystems. The Alabama Department of Conservation and Natural Resources Natural Heritage Program (ADCNR NHP) expressed concerns for a "healthy whitetop pitcher plant (*Sarracenia leucophylla*) community" that could be within the proposed Project area. The MDWFP did not identify any vegetative communities of special concern. For additional information on pitcher plant bogs see Section 3.4.1.1. According to SESH, telephone consultations with the FWS-Alabama (FWS-AL) and FWS-Mississippi (FWS-MS) resulted in the FWS requesting a map of the proposed Project and recommending field surveys be performed to identify longleaf pine (*Pinus palustris*) ecosystems.

Extensive Forested Tracts

Based on a review of aerial photographs and field surveys conducted by SESH, several areas of large, relatively non-fragmented forested tracts were identified that would be crossed by the proposed

pipeline. The operational impacts, location of these tracts, and the length of the associated crossings are identified in Table 3.5.1-2. These areas are relatively non-fragmented tracts, consisting primarily of mixed late succession growth, that do not appear to be actively managed. SESH indicates that many of these tracts are interspersed between areas of agricultural lands and managed timber stands.

3.5.2 General Impacts and Mitigation

General Impacts

The primary impacts of the proposed Project on the identified vegetative communities would arise from the removal of vegetation along the proposed pipeline route and at aboveground facility sites during construction and routine maintenance. Cutting or removal of vegetation for Project 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 an HDD would be used to cross special features such as waterbodies, wetlands, or roads, SESH proposes to use hand-laid electric-grid guide wires to assist guidance of the drill bit along the proposed route. A small pathway approximately 2- to 3-feet-wide may be cut, using hand tools in heavily vegetated areas, in order to position these guide wires. This activity would result in minimal disturbance to vegetation along the path of the HDD and no large trees would be cut as part of this process.

The proposed 50-foot wide, permanent right-of-way would be mowed or otherwise maintained every three years and 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 re-growth of forested vegetative communities and would result in regular disturbance of vegetation. Construction of the aboveground facility sites would result in permanent conversion of some vegetated areas to a non-vegetated industrial/commercial use, either as standing structures or associated facilities such as parking and storage areas.

The severity of the impacts described above 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 4,021.20 acres of vegetation during construction. Vegetated areas would be primarily impacted by the proposed pipeline and ATWSs. The anticipated impacts to vegetation types associated with specific Project components are listed and enumerated in Table 3.5.2-1. Relatively large amounts of agricultural, forested, and open land would be affected by construction and operation of the proposed pipeline. Smaller impacts would result from construction of the aboveground facilities, modification of access roads, and use of pipeyards/wareyards.

TABLE 3.5.1-2
Extensively Forested Tracts Crossed by the Proposed SESH Project

Operation Impacts (acres)	Begin Milepost	End Milepost	Crossing Length (miles)
9.31	37.07	39.20	1.54
18.24	39.85	42.87	3.02
46.45	45.05	53.39	7.68
13.75	58.64	60.93	2.27
4.06	61.57	62.24	0.67
10.00	73.06	74.75	1.65
32.64	88.50	99.95	5.40
35.57	101.51	108.01	5.88
8.88	111.63	113.34	1.47
3.57	119.06	119.65	0.59
22.25	123.97	127.91	3.68
11.16	176.04	179.25	1.84
23.48	195.23	201.01	3.88
4.14	229.49	230.18	0.68
15.07	233.49	238.15	2.49
16.35	243.07	245.83	2.70
12.62	266.74	268.83	2.09
Total 287.52			**47.54**

Most impacts to agricultural and open lands would be short term, as these areas typically would return to their herbaceous or shrub status within one to two years following construction, cleanup, and restoration. Areas planted with field crops are typically disturbed by periodic agricultural practices and would be replanted in the next growing season. It is also anticipated that pastures and other shrubby or herbaceous areas would revegetate within one or two growing seasons, given the abundant rainfall and long growing season in the proposed Project region.

Impacts to pine plantations and forests within the temporary construction right-of-way would be long term, as re-growth to preconstruction condition would take 30 years or more. Impacts resulting from construction and operation of the proposed Project would include a change in vegetative strata, appearance, conversion of community type, and loss of habitat.

Maintenance of the permanent right-of-way would have a much greater impact on the area's forest vegetation than on agricultural areas and open lands. Pine plantation would also be permanently impacted by operation and maintenance of the permanent pipeline right-of-way. These impacts would represent a marked, permanent change from forested vegetation to herbaceous or shrubby vegetation. Although agricultural and open lands would also occur within the permanent pipeline right-of-way, the vegetative strata in those areas would not be significantly changed compared to preconstruction conditions.

Mitigation

To minimize Project-related effects to vegetative communities, SESH would implement measures in its Plan, which include baseline mitigation procedures for minimizing erosion and enhancing revegetation in upland areas. Implementation of its 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 in its Plan are:

- use of at least one EI per construction spread, who would ensure compliance with the 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, its 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. SESH indicates that consultations with state and federal agencies regarding appropriate vegetative restoration practices have been completed and would be implemented during final clean up activity.

Project impacts to vegetative communities would vary depending upon disturbance duration, magnitude, and vegetation cover type. As described above, approximately 50 percent of the disturbed vegetation would be forested. Due to the nature of forest re-growth, the clearing of these areas may result in long-term to permanent effects in these areas. These long-term and permanent impacts to forested areas would be minimized by the measures described above. Additionally, SESH avoids forested areas to the extent possible through selective routing and minimizes impacts to vegetation through collocation with existing rights-of-way. Impacts to agricultural and open-lands would be minimal and limited primarily to the construction phase. Based on SESH's proposed measures to avoid and minimize impacts to forested areas, the relatively minor impacts to agricultural areas and open lands, and the implementation of SESH's Plan, we believe that impacts to general vegetative communities would be minimized.

Impacts to Vegetation Communities of Special Concern or Value

Most of the general construction impacts described above are applicable to specially designated vegetation types or conservation program areas depending on the vegetation present. These specially designated areas include those managed/owned/leased by The Nature Conservancy, CRP, CREP, and WRP lands (which may be grassed or forested), NWR and WMA lands, large forested tracts, pitcher plant bogs and longleaf pine ecosystems.

TABLE 3.5.2-1
Vegetative Cover Types by Acreage Affected for the Proposed SESH Project

Facility	Agricultural		Forest		Pine Plantation		Open Land		Residential		Industrial/ Commercial		Open Water	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
Pipeline (and Laterals)	765.83	336.76	1,679.48	811.64	302.79	150.24	501.90	243.05	16.23	8.33	85.13	50.18	3.34	1.44
ATWS	41.57	0	110.83	0	15.71	0	33.14	0	2.83	0	20.81	0	0	0
Aboveground Facilities	21.90	15.78	36.04	34.18	22.28	14.59	16.80	17.58	5.93	5.93	0	0	0	0
Access Roads[a]	1.82	1.82	1.15	1.15	0.51	0.51	3.39	3.39	0.06	0.06	0.47	0.47	0	0
Pipeyards/Wareyards	86.53	0	4.12	0	0	0	236.04	0	0.09	0	3.70	0	0	0
Total	917.65	354.36	1,831.62	846.97	341.29	165.34	792.05	264.02	25.14	14.32	110.11	50.65	3.34	1.44

Notes:
Const. = Construction Impacts include all temporary workspace impacts due to construction and permanent easement operation areas.
Oper. = Operation Impacts include permanent easements.
[a] Only land use impacts due to the construction of new permanent access roads are detailed, excluding PAR RRL2, which is included in the calculations for aboveground facilities.

SESH is currently in consultations with The Nature Conservancy, FSA and NRCS-administered programs (CRP, CREP, and WRP) to minimize impacts and coordinate easement agreements for the crossings of these areas. Vegetative communities such as hardwood and pine forests and native grasses would be affected by the proposed Project. Potential impacts and recommendations are discussed in more detail in Section 3.8.

SESH rerouted the pipeline alignment to avoid impacts to the Tensas River NWR; however, the pipeline would cross fee title land and conservation easements managed by the NWR. Potential impacts and recommendations are discussed in more detail in Section 3.8.

The large forested tracts present along the proposed route would be affected by clearing of the construction right-of-way and routine mowing, cutting, and trimming along the proposed 50-foot-wide permanent pipeline right-of-way. Cleared, forested areas located outside of the permanent right-of-way would be allowed to revegetate; but effects to those areas would be long term, as vegetative strata would be altered for up to 30 years or more until mature trees replace the early herbaceous, shrub, and sapling succession strata. Forested areas within the 50-foot-wide permanent pipeline right-of-way would be permanently impacted and replaced by herbaceous and shrubby areas. Although these areas are relatively non-fragmented, many of these tracts contain some roads or other corridors and are subject to periodic tree harvests or thinning, thereby reducing their overall quality. Through selective routing and collocation with other rights-of-way, SESH minimizes impacts related to fragmentation and disturbance of large forested areas. The Department of Interior and MDWFP both commented the need to preserve bottomland hardwood tracts, forested wetlands, and habitat connectivity. The FERC requested additional information on the sites from SESH in the DEIS. Our evaluation concluded that preservation of the resources was worthwhile if feasible. Therefore, **we recommend that:**

- **Prior to construction, in the area between MPs 108.8 and 117.7, SESH should file with the Secretary for review and written approval by the Director of OEP, a plan for crossing of the East and West Prongs of Silver Creek that minimizes or avoids the cutting of adjacent hardwood forest. The plan shall evaluate the feasibility of performing an HDD.**

Field surveys have revealed that the proposed Project crosses a pine savannah exhibiting characteristics of a pitcher plant bog community in Alabama. As proposed by SESH, these pitcher plant bogs would be permitted like other wetlands along the route and avoidance and minimization measures would be implemented as appropriate. However, we are recommending special mitigation measures for pitcher plant bogs in Section 3.4.3.

Longleaf pine stands are an increasingly rare plant community in the southeast, especially those managed by prescribed burning. Typical commercial timber practices do not include the slow-growing longleaf pine, opting for faster-growing loblolly and slash pine that reach saw timber size in 25-30 years. Wildlife species associated with the longleaf pine are also becoming rare and many are special status species (see Section 3.7). Surveys identified an extensive tract of longleaf pine with a fire-suppressed open mid-story in Mobile County, Alabama between MPs 244 and 246. The proposed SESH corridor will remove only a small width of longleaf pine owing to the fact that the proposed corridor is aligned contiguous to an existing pipeline corridor. Since an existing pipeline is adjacent to the tract of longleaf pine with a fire history, it is assumed that the SESH Project will also not affect or interfere with the landowner's ability to conduct prescribed burning on the adjacent property. The FWS-AL and FWS-MS requested a map of the Project and recommended that field surveys be performed to identify potential longleaf pine ecosystems. We concur with FWS comments to identify these rare vegetative communities and believe that additional mitigation measures should be implemented in these areas when identified; therefore **we recommend that:**

- **Prior to construction, SESH should file with the Secretary for review and written approval by the Director of OEP, a Longleaf Pine Vegetative Community Plan, developed in consultation with the FWS that describes how SESH would identify longleaf pine vegetative communities during construction, and the measures, in addition to those in SESH's Plan and Procedures, SESH would implement to minimize impacts to these areas.**

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 long-term or permanent. Adherence to the mitigation measures as described in Section 3.5.2 would minimize any impacts to specially designated lands that contain sensitive or specially protected vegetative communities. In addition to the implementation of its Plan, selective routing, right-of way reduction and collocation with existing rights-of-way, as well as avoidance of some sensitive vegetative communities through the use of HDD, would further minimize potential Project impacts to vegetation in specially designated areas and we believe that impacts would be minor overall.

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. Several exotic and/or invasive plant species are listed as potentially present in the proposed Project area. They include Chinese tallow tree (*Triadica sebifera*), Brazilian satintail (*Imperata brasiliensis*), cogongrass (*Imperata cylindrica*), giant salvinia (*Salvinia molesta*), hydrilla (*Hydrilla verticillata*), itchgrass (*Rottboellia cochinchinensis*), kudzu (*Pueraria montana* var. *lovata*), tropical soda apple (*Solanum viarum*), Chinese/European privet (*Ligustrum sinense*), Japanese climbing fern (*Lygodium japonicum*), Japanese honeysuckle (*Lonicera japonica*), multiflora rose (*Rosa multiflora*), Cherokee rose (*Rosa laevigata*), and Macartney rose (*Rosa bracteata*). The FWS and NRCS both identified cogongrass as an invasive species of potential concern in all states crossed by the proposed Project.

In order to minimize the impacts of exotic and invasive species, SESH would implement its Plan, which includes measures to reduce erosion such as topsoil stripping and specific vegetation restoration measures. Further, locally prescribed seed mixes and post-construction monitoring would be implemented to further minimize the spread of exotics to and within the Project area.

SESH proposes to mitigate for infestation of the right-of-way by invasive and exotic species (beyond conditions observed prior to construction) by applying agency-recommended seed-mixes, following prescribed revegetation plans during restoration, and conducting ongoing surveillance during operation and maintenance activities. Consultations with the respective NRCS offices and other relevant natural resource managing agencies regarding control/mitigation of invasive species, particularly cogongrass, are ongoing. Agencies from each of the states affected by this proposed Project and FWS commented during meetings with FERC the serious challenge of controlling invasive and exotic species in the region, specifically cogongrass. Our evaluation of the issue concluded that the linear nature of the proposed Project warranted additional mitigation; therefore, **we recommend that:**

- **Prior to construction, SESH should file with the Secretary, for review and written approval by the Director of OEP, an Exotic and Invasive Species Control Plan developed in consultation with the FWS, LDWF, MDWFP, and ADCNR. This plan should identify the specific measures that SESH would implement during construction and operation to control exotic and invasive species.**

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 encountered and crossed by the proposed Project. Habitats are found along the proposed route in upland forests, agricultural fields, pasture, open lands, wetlands, and open waters. Sections 3.4 and 3.5 describe the vegetative components of these habitats. Wildlife species commonly associated with these habitats are listed in Table 3.6.1-1. In addition to the wildlife habitats and species described below, Section 3.7 describes federal- and state-listed threatened and endangered species occurring in the Project area.

Upland Forest

Mixed hardwood/pine forest, pine plantation, and slope hardwood upland forest provide wildlife species with a variety of foraging, rearing, nesting, and cover habitats. The canopy of mixed hardwood/pine forest is typically composed of a significant hardwood component with at least 20 percent of the stand comprised of loblolly pine. Hardwoods present vary depending on soil type, moisture regime, and slope. Although hardwood/pine forests may also have an understory of small shrub species and herbaceous growth, the understory would naturally trend toward hardwood dominance without periodic fire suppression. Slope hardwood forests are found on the slopes of small stream floodplains. Both of these upland forest habitat types offer significant cover and forage for a variety of wildlife species.

Wildlife use of pine plantation habitat varies according to the wildlife species' life stage, the season, and the 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 bird, mammal, and reptile species. Early and intermediate successional stages are most used by wildlife. 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.

Agricultural Fields

Row crops and other agricultural areas provide a small amount of cover and foraging opportunities for birds, deer, and small mammal species, especially for those species tolerant of periodic disturbance.

Pasture

Pastures are areas that are primarily used for livestock grazing or hay production. These areas are dominated by Bermuda grass and crabgrasses that provide grazing opportunities for wildlife such as white-tailed deer, but typically foraging opportunities are somewhat low overall. Pastures do not provide significant cover habitat for most wildlife species.

TABLE 3.6.1-1
Common Wildlife Species That Occur Along the Proposed SESH Project

Common Name	Scientific Name	Upland Forest			Wetlands			
		Mixed Loblolly/ Hardwood Forests	Slope Hardwood Forest	Pine Plantation	Forested (PFO) and Scrub-Shrub (PSS) Wetlands	Emergent Wetlands (PEM)	Open Water	Open Land, Agriculture, and Pasture
Pine warbler	*Dendroica pinus*	X	X	X				
Brown-headed nuthatch	*Sitta pusilla*	X	X	X				
Red-headed woodpecker	*Melanerpes erythrocephalus*	X			X			
Wild turkey	*Meleagris gallopavo*	X	X	X				X
Mourning dove	*Zenaida macroura*	X	X					
Northern bobwhite	*Colinus virginianus*	X		X				X
Wood duck	*Aix sponsa*				X	X		
Louisiana waterthrush	*Seiurus motacilla*				X			
Green heron	*Butorides virescens*				X	X	X	
Red-tailed hawk	*Buteo jamaicensis*	X	X	X				X
Mississippi kite	*Ictinia mississippiensis*	X	X		X	X		X
Red-winged blackbird	*Agelaius phoeniceus*				X	X		X
White-Tailed deer	*Odocoileus virginianus*	X	X	X	X	X		
Cottontail rabbit	*Sylvilagus* spp.	X	X					
White-footed mouse	*Peromyscus leucopus*	X	X	X				
Hispid cotton rat	*Sigmodon hispidus*	X	X	X				
Opossum	*Didelphidae*	X	X	X				
Raccoon	*Procyon* spp.	X	X	X	X	X		
Gray squirrel	*Sciurus carolinensis*	X	X					
Nine-banded armadillo	*Dasypus novemcinctus*	X	X	X				X
River otter	*Lontra canadensis*				X	X	X	
Nutria	*Myocastor coypus*				X	X	X	
Three-toed box turtle	*Terrapene carolina triunguis*	X	X					X
Western cottonmouth	*Agkistrodon piscivorus leucostoma*				X	X	X	
Bullfrog	*Rana catesbeiana*				X	X	X	
Southern leopard frog	*Rana sphenocephala*				X	X		
Green tree frog	*Hyla cinerea*				X	X		

PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub

Open Lands

Open lands include maintained utility rights-of-way, upland shrub areas, and other non-agricultural herbaceous areas. 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.

Forested Wetlands

Forested wetlands are dominated by woody vegetation that is at least 20 ft 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, reptile and amphibian species, and mammal species. During winter flooding periods, this habitat also provides migratory waterfowl wintering habitat.

Scrub-Shrub Wetlands

Like their upland scrub-shrub counterpart, 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.

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. Additionally, migratory birds may use emergent wetland habitats as resting sites.

Open Water

Open water habitats, including some wetlands, are characterized by a lack of emergent vegetation within water depths that would normally be suitable for wetland plant growth. Within the proposed Project area, these open water habitats are generally found in larger stream and river crossings, shallow man-made impoundments, and beaver ponds. Like the other wet 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.

3.6.1.2 Sensitive or Managed Wildlife Habitats

As shown in Table 3.6.1-2, the proposed Project would cross lands managed by the FWS, WRP lands managed by the NRCS, CRP and CREP lands managed by the FSA, lands managed by the Mississippi Chapter of TNC, and large forested tracts.

National Wildlife Refuge-Managed Lands

The proposed Project would cross lands managed by the Tensas River NWR between MP 0.4 to MP 0.9 and MP 5.6 to 7.0. Tensas River National Wildlife Refuge lands are located within a quarter mile of either side of the centerline of the proposed pipeline corridor. Tracts of land that are crossed by the proposed Project are managed by the Tensas River NWR but are not a part of the designated NWR. For

the proposed Project to cross these lands, all negotiations would have to be approved by the Tensas NWR Manager and the FWS would have to provide a compatibility determination for the use of these lands for a utility right-of-way. These tracts include fee title property at MP 0.4 to MP 0.9, a conservation easement at MP 5.6 to MP 6.0, and NWR lands at MP 6.0 to MP 7.0.

Natural Resource Conservation Service- and Farm Service Agency-Managed Lands

The proposed Project would affect WRP, CRP, and CREP tracts of land. The WRP is a voluntary conservation easement program administered by the NRCS offering landowners the opportunity to protect, restore, and enhance wetlands and wildlife habitat on their property on a long-term basis. A bird rookery has been identified on WRP land near MP 18.19 The CRP and CREP lands are managed by the FSA, which assists farmers and ranchers in complying with federal, state, and tribal environmental laws and encourages environmental enhancement.

The Nature Conservancy-Managed Lands

The proposed Project would cross land that is currently managed by the Mississippi Chapter of TNC. The mission of TNC is to preserve the plants, animals, and natural communities on the adjacent Pascagoula Wildlife Management Area.

Large Forested Tracts

Seventeen large, relatively intact, forested tracts would be affected by construction and operation of the proposed Project. The proposed pipeline would pass through 47.5 miles of large forested tracts. Many of the large forested tracts are used primarily for silviculture and their quality as undisturbed forest habitat has been reduced by existing roads and rights-of-way, but they are not fragmented by any other open-land-use type. Some forest interior species, such as many songbirds, exclusively use or nest in relatively large forested areas to avoid disturbed 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.

3.6.1.3 Unique and Sensitive Wildlife Species

Unique or sensitive wildlife species, such as colonial nesting waterbirds and migratory birds, may occur within the vicinity of the proposed Project.

Migratory Birds

The *Migratory Bird Treaty Act of 1918* (MBTA), as amended, protects migratory birds by regulating the taking of them or otherwise affecting them. Over 175 migratory bird species potentially occur along the proposed pipeline route. Migratory birds would be expected to occur, at least as transients, in the proposed Project area throughout the year.

Colonial Nesting Waterbirds

"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 nesting seasons. Rookeries are found in permanently flooded wetland habitat with some shrubs and/or trees to support the nests. Rookeries are not stationary features and often do not occur in the same location from year to year.

TABLE 3.6.1-2
Sensitive or Managed Wildlife Habitats for the SESH Project

County, State	Mileposts	Name of Area
Richland Parish, LA	0.32	Macon Bayou [Designated Use and Impaired Water]
Madison Parish, LA	0.4 - 0.9	Tensas River National Wildlife Refuge fee title property
Madison Parish, LA	1.8 – 3.0	CRP Lands
Madison Parish, LA	3.1 - 9.1	WRP Lands
Madison Parish, LA	5.6 - 6.0	Tensas River National Wildlife Refuge conservation easement
Madison Parish, LA	6.0 - 7.0	Tensas River National Wildlife Refuge
Madison Parish, LA	9.1 – 10.8	CRP Lands
Madison Parish, LA	14.7 - 15.0	WRP Lands
Madison Parish, LA	17.9 - 18.9	WRP Lands and Bird Rookery
Madison Parish, LA	22.6 - 23.3	WRP Lands
Madison Parish, LA	31.6 - 32.7	WRP Lands
Madison Parish, LA	33.1	Levee for Mississippi River
Warren County, MS	37.07 – 39.20	Large Relatively-Intact Forested Tract
Warren County, MS	37.9 – 38.4	CRP Lands
Warren County, MS	39.85 – 42.87	Large Relatively-Intact Forested Tract
Warren County, MS	44.2 – 45.1	CRP Lands
Claiborne County, MS	45.05 – 53.39	Large Relatively-Intact Forested Tract
Claiborne County, MS	52.0 - 52.2	Natchez Trace Parkway
Claiborne and Copiah County, MS	58.64 – 60.93	Large Relatively-Intact Forested Tract
Copiah County, MS	61.1 – 61.3	CRP Lands
Copiah County, MS	61.57 – 62.24	Large Relatively-Intact Forested Tract
Copiah County, MS	66.3 – 66.6	CRP Lands
Copiah County, MS	66.9 – 67.7	CRP Lands
Copiah County, MS	71.9– 72.2	CRP Lands
Copiah County, MS	73.06 – 74.75	Large Relatively-Intact Forested Tract
Copiah County, MS	79.61 – 79.3	CRP Lands
Copiah County, MS	79.7 – 79.8	CRP Lands
Copiah County, MS	83.6 – 83.9	CRP Lands
Copiah County, MS	88.50 – 99.95	Large Relatively-Intact Forested Tract
Copiah County, MS	96.4 – 97.0	CRP Lands
Lawrence County, MS	101.51 – 108.01	Large Relatively-Intact Forested Tract
Jefferson Davis County, MS	111.63 – 113.34	Large Relatively-Intact Forested Tract
Jefferson Davis County, MS	119.06 – 119.65	Large Relatively-Intact Forested Tract
Jefferson Davis County, MS	123.97 – 127.91	Large Relatively-Intact Forested Tract
Perry County, MS	176.04 - 179.25	Large Relatively-Intact Forested Tract
Greene County, MS	195.23 – 201.01	Large Relatively-Intact Forested Tract
Greene County, MS	209.1 - 210.5	The Nature Conservancy
George County, MS	229.49 – 230.18	Large Relatively-Intact Forested Tract
George County, MS	233.49 – 238.15	Large Relatively-Intact Forested Tract
Jackson County, MS	236.2 - 239.5	Mississippi Coastal Zone Management Area
Mobile County, AL	243.07 – 245.83	Large Relatively-Intact Forested Tract
Mobile County, AL	266.74 – 268.83	Large Relatively-Intact Forested Tract

CRP = Conservation Reserve Program
WRP = Wetland Reserve Program

Field surveys identified a bird rookery at MP 18.19 in Louisiana. At the time of the survey, the rookery contained hundreds of birds including the following species: great egret (*Ardea alba*), snowy egret (*Egretta thula*), cattle egret (*Bubulcus ibis*), great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), and anhinga (*Anhinga anhinga*). These species usually begin nesting in late February to early March.

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, creation of additional edge habitat, and species displacement. As discussed in Sections 3.5 and 3.8, a total of 4,021.20 acres of land would be temporarily disturbed and 1,697.10 acres of land would be permanently affected by the proposed Project. The extent and duration of impacts to wildlife and their habitats resulting from construction and operation of the proposed Project would depend on the species present in each habitat type and its individual life history requirements.

Pipeline Facilities

The clearing of vegetation in the pipeline construction right-of-way and extra workspaces would reduce cover, nesting, and foraging habitat for some wildlife until construction is complete and vegetation is reestablished along the right-of-way. During construction, more mobile species would be temporarily displaced from the construction right-of-way and surrounding areas to similar habitats nearby. Some wildlife species disturbed or displaced by construction may be able to return to adjacent, undisturbed habitats soon after completion of construction. Less mobile species, such as small mammals, reptiles, amphibians, and birds nesting in the right-of-way, could be affected by construction activities due to direct mortality or permanent displacement, potentially affecting reproduction, recruitment, and survival.

Non-forested habitats that would be affected by construction and operation of the proposed Project include open lands, agriculture, scrub-shrub and emergent wetlands, and open water. The impacts on these habitats and associated wildlife species would be relatively minor and either temporary or short-term. Due to the rapid pace of pipeline installation, these areas could be naturally recolonized within 1 growing season or within 3 years after construction for scrub-shrub habitats. Temporary alterations to these non-forested habitats would not have a significant or long-term impact on their value as wildlife habitat.

Effects to wildlife using forested habitats would be more severe than that to wildlife inhabiting other open habitat types, as vegetative strata in forested areas would undergo a more marked change. Potential impacts to wildlife would include not only the broader loss of habitat in general, but also potential losses of den or nesting sites. A total of 2,172.91 acres of forested lands (1831.62 acres of forest and 341.29 acres of pine plantation) would be affected during construction, and approximately 44 percent of that acreage (961.88 acres) would be permanently affected by maintenance of the pipeline right-of-way during operation. Disturbed forested 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, thus representing a long-term impact.

Forest interior species would avoid cleared areas and edge habitats, which could potentially affect migratory patterns. However, those species that depend upon a forest-open land interface (edge habitat) for feeding opportunities could actually benefit from openings associated with right-of-way maintenance.

Construction during fall and early winter could conflict with hunting seasons. Construction could interfere with hunting activities through noise disturbance or by affecting wildlife movement patterns, but these impacts would affect a small area for a relatively short period during construction.

Aboveground Facilities, Pipeyards and Wareyards, and Access Roads

Construction of the aboveground facilities would permanently affect several types of wildlife habitats and associated species, but we anticipate that these impacts would be minor overall. The construction and operation of aboveground facilities would affect only a small percentage of the land area and wildlife habitats affected by the proposed Project, but wildlife occurring in these areas would suffer mortality or be permanently displaced. Construction of aboveground facilities and access roads would remove 50.43 acres of forest and pine lands, 17.58 acres of open land habitat, and 15.78 acres of agricultural land. All disturbed areas associated with the aboveground facilities that do not contain infrastructure such as buildings and other enclosures would be finish-graded and seeded or covered with gravel, as appropriate. All roads and parking areas would be graveled. Thus, construction of the aboveground facility sites would result in the permanent conversion of some existing wildlife habitat into primarily non-vegetated industrial/commercial uses.

SESH is proposing to use existing pipeyards and warehouses in commercial and industrial areas as pipe storage and contractor yards for the proposed Project to the extent possible, to avoid impacts to wildlife habitat associated with those construction-related activities. However, four pipeyards/wareyards would not be located in open, commercial- or industrial-use areas. The Letourneau, Lucedale 1, and Mobile yards would temporarily affect 86.53 acres of agricultural land; and the Highway 11 and Mobile yards would temporarily affect 4.12 acres of forested land.

Improvement and use of existing access roads would potentially affect a small amount of wildlife habitat. The new permanent access roads would affect 1.82 acres of agricultural land, 1.15 acres of forest land, 0.51 acres of pine plantation, 3.39 acres of open land, 0.06 acres residential land, and 0.47 acres of industrial/commercial land.

Lands permanently converted due to operation of aboveground facilities would only be 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 potentially result in the loss and permanent conversion of some existing wildlife habitat into non-vegetated industrial/commercial uses.

Impact Minimization and Mitigation Measures

SESH would minimize impacts to wildlife and wildlife habitats through selective routing, collocation with existing rights-of-way, aboveground site selection, and other measures described in its Plan and Procedures. The proposed route would be collocated within or parallel to existing utility rights-of-way, where possible, thereby minimizing impacts upon previously undisturbed vegetation and wildlife habitats.

Along the pipeline, non-forested areas would generally be restored within 1 growing season for herbaceous habitats and within 3 years after construction for scrub-shrub habitats found in open lands. SESH would further reduce impacts to aquatic and riparian habitats used by terrestrial wildlife by crossing sensitive streams using HDDs.

Due to the rapid pace of pipeline installation and the vegetation restoration measures included in SESH's Plan and Procedures, we believe that impacts to wildlife species during construction would be minimal. Right-of-way maintenance would affect a relatively small percentage of the forested habitat relative to the total amount of forested land areas in the general vicinity of the proposed Project. Operational maintenance of the right-of-way would be relatively infrequent and performed in accordance with SESH's Plan and Procedures; therefore, we believe that the anticipated impacts to wildlife resulting from operation of the proposed Project would not be significant.

3.6.1.5 Sensitive or Managed Wildlife Habitats and Species Effects and Mitigation

The proposed Project would affect NWR and FWS-managed properties, TNC managed lands, large forested tracts, and WRP, CRP, and CREP lands.

SESH has coordinated with the FWS-Louisiana (FWS-LA) and FWS-MS to develop a plan for construction and restoration of the right-of-way to minimize impacts to Louisiana black bear den sites (see Section 3.7) and other wildlife habitats managed by the FWS-MS.

Impacts to wildlife resulting from construction and operation of the proposed pipeline in large forested tracts would be diverse and either long-term or permanent. These impacts would include loss of forest interior habitat and displacement of wildlife; increased stress and mortality; increased rates of nest predation, parasitism, or inter-specific competition; inhibition of migration, dispersal, foraging, and other movements of forest interior species that are hesitant to cross openings; and potential increase of non-native or invasive plant and/or animal species. Although fragmentation could cause long-term and adverse effects to wildlife that use large forested tracts, the proposed Project would be collocated for approximately 58 miles of its length to minimize the effects of fragmentation. The prevention of excessive fragmentation would also minimize increased species competition, loss of higher quality habitat access, and increased edge effects. Additionally, construction of the proposed Project actually would benefit many wildlife species, such as white-tailed deer, wild turkey, certain raptors, and foxes, which use forest edge and open habitats. Given the measures to avoid and minimize impacts to large forested areas and current disturbances in large forested tracts as a result of commercial timber operations, we believe that impacts to wildlife from disturbance of these areas would be relatively minor.

Except in wooded areas, impacts to WRP, CRP, and CREP lands would be temporary. SESH is coordinating with the NRCS and FSA to develop acceptable plans for crossing these lands. Through use of these plans and SESH's Plan and Procedures, and our analysis in Section 3.8, impacts to WRP, CRP, and CREP lands would be minor.

Colonial nesting waterbirds could be affected by construction if their habitats or nests were damaged or disturbed during construction. Consultations with federal and state agencies regarding this rookery indicated that construction of the pipeline should occur during the non-nesting season, September 1 to February 15. These agencies also stipulated that if construction is scheduled during the nesting season, a qualified biologist should conduct rookery surveys 2 weeks prior to construction. If the rookery is actively being used, SESH would maintain a 400-meter (1,312-ft) avoidance radius until both the LDWF and the FWS-LA could be consulted. The LDWF further suggests that if construction must occur near the beginning of nesting season (February 15), vegetation could be cleared for construction well in advance of the nesting season to increase the odds of a rookery not establishing in the immediate area. If the rookery was not actively being used, then construction could proceed without restriction; therefore, **we recommend that:**

- **If construction is anticipated during the colonial nesting bird rookery time restrictions (February 16 to September 1), SESH should perform a pre-construction survey to**

determine if the rookery at MP 18.19 occupied during the construction period. If colonial nesting birds are observed at the rookery, SESH should contact the MDWFP to determine what measures would be prudent for use at the time of construction.

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 either temporary or 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. Based on the characteristics of identified wildlife and wildlife habitats, anticipated impacts to them, measures proposed by SESH to avoid or minimize these impacts and our recommendations, we believe that construction and operation of the proposed Project would not significantly impact wildlife and wildlife habitats.

3.6.2 AQUATIC RESOURCES

3.6.2.1 Existing Aquatic Resources

The proposed Project would cross 175 perennial streams, 462 intermittent streams, and 17 ponds/lakes. Thirty-three of the perennial streams are intermediate crossings (8 by HDD), 17 are major (10 by HDD), and the remaining 140 are minor crossings. All of the intermittent streams are classified as minor crossings (< 25 ft). A table identifying the waterbodies crossed or otherwise affected by the proposed Project, as well as their width, location along the proposed route, state waterbody classification, and proposed crossing method, is included in Appendix D. Waterbodies crossed or otherwise affected by the proposed Project are discussed in more detail in Section 3.3.2.

Table 3.6.2-1 is a list of commonly occurring fish species in the streams along the proposed Project route. The proposed Project would be located in an inland area where marine and estuarine fishes do not occur. There is no known significant spawning or rearing area for anadromous species, or commercially important species, near the proposed Project. However, some fish spawning and rearing undoubtedly occurs in the streams and rivers that would be affected by the proposed Project. Many of the major and intermediate stream crossings are recreationally important streams and rivers including the Big Black River, Bayou Pierre, Pearl River, Bowie Creek, Okatoma Creek, Turkey Creek, Leaf River, Tallahala Creek, Bogue Homo, Chickasawhay River, and Escatawpa River. The Mississippi state record striped bass (37.82 pounds) was caught on Bowie Creek. The Okatoma Creek is one of Mississippi's most popular canoe/float streams.

Fisheries of Special Concern

Fisheries of special concern include surface waters containing fisheries of exceptional recreational or commercial value, such as those that support coldwater fisheries through natural reproduction, those that provide habitat for protected species, i.e. those listed as essential fish habitat (EFH), or those that are covered by special state fishery management regulations. Other special-concern fisheries include those where economic investments, such as clean-up or stocking programs, have been implemented or those that support commercial or tribal harvests.

The proposed Project would not be likely to affect areas designated as EFH or areas supporting federally managed fisheries under the jurisdiction of the National Marine Fisheries Service. Of the federally protected fisheries managed in the Gulf of Mexico region by the NOAA Protected Resources Division, only the Gulf sturgeon would likely be present in the area of the proposed Project. The Pearl River provides critical habitat for the Gulf sturgeon, a federally threatened anadromous fish.

The Big Black River, Bayou Pierre, Pearl River, Bowie Creek, Okatoma River, Leaf River, and Chickasawhay River are listed not only for their scenic and recreational value, but also for their F&W habitat. Additional information for these waterbodies is provided in Section 3.3.

State-Designated Waters

In Louisiana, the proposed Project would cross portions of the Ouachita River and Mississippi River Basins. Waterbodies with designated uses that would be crossed by the proposed Project are Macon Bayou, Joe's Bayou, the Tensas River in the Ouachita River Basin, and the Mississippi River in the Mississippi River Basin. All three streams in the Ouachita River Basin are designated for Primary Contact Recreation, Secondary Contact Recreation, and F&W propagation for the segments crossed. In addition, all three streams are on the state 303(d) list, a list of impaired waters that do not meet the state's designated use. Bayou Macon is not fully supporting primary contact recreation and F&W propagation (pesticides, bacteria, and sediment/siltation), while Joe's Bayou and the Tensas River are not supporting F&W propagation (pesticides, nutrients, and sediment/siltation). The Mississippi River is designated for primary contact recreation, secondary contact recreation, and F&W propagation, and is identified as fully supporting all of these designated uses.

Table 3.6.2-1
Typical Fish Species in Waterbodies Crossed by the Proposed SESH Project

Common Name	Scientific Name
White bass	*Morone chrysops*
Largemouth bass	*Micropterus salmoides*
Black crappie	*Pomoxis nigromaculatus*
White crappie	*Pomoxis anularis*
Bluegill sunfish	*Lepomis macrochirus*
Pickerel	*Esox niger*
Longear sunfish	*Lepomis megalotis*
Channel catfish	*Ictalurus punctatus*
Dusky darter	*Percina sciera*
Red shiner	*Cyprinella lutrensis*
Spotted sucker	*Minytrema melanops*

In Mississippi, the proposed Project would cross the Big Black River Basin, the South Independent Streams Basin, the Pearl River Basin, and the Pascagoula River Basin. According to state water-quality regulations, all waters in these basins are classified for F&W. The following rivers would be crossed by the proposed Project (all included in Mississippi's 303(d) list) and do not fully support aquatic life: Big Black River (pesticides and sediment/siltation), Pearl River (nutrients), Leaf River (nutrients), Chickasawhay River (nutrients), and the Escatawpa River (dissolved oxygen). Additionally, the Escatawpa River is listed as impaired for fish consumption due to mercury.

In Alabama, the proposed Project would cross the Escatawpa River Basin and the Mobile River Basin. According to Alabama state water quality regulations, each waterbody that would be crossed is designated for F&W use unless it is demonstrated that such a designation is not appropriate (e.g., an intermittent stream that does not contain suitable habitat for sustaining fish or wildlife).

3.6.2.2 General Impacts and Mitigation

SESH's proposed crossing methods for pipe installation across each identified waterbody are listed in Appendix D. The crossing methods are described in Sections 2.3.2. Impacts to water quality and aquatic habitats that would be 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 dissolved oxygen levels, and the introduction of contaminants.

The proposed waterbody crossing techniques include wet open-cut, dry open-cut, bore, and HDD, depending on the size of the waterbody, use classification, and type of fishery resource. The use of the open-cut crossing method would result in several temporary impacts to aquatic resources including plankton, aquatic vegetation, amphibians, fish, and aquatic invertebrates (including mussels). With the exception of potential impacts resulting from a frac-out, the use of the HDD crossing method would result in the avoidance of some impacts to aquatic resources. However, the withdrawal of hydrostatic test water from the source waterbodies to facilitate the HDD crossing method and testing of pipeline integrity could result in the entrainment of fish and other aquatic organisms and a disruption of stream flow.

Pipeline construction using open-cut methods would result in sedimentation and turbidity in surface waters and aquatic habitats, as described in Section 3.3. Benthic macroinvertebrates, which typically provide a key food source for fishes and fish spawning sites, could be buried under accumulated sediments. In addition to altering fish habitat and food sources, sedimentation could also affect mussel species by eliminating habitat or causing direct mortality through burial by sediments. However, stream gradients tend to be relatively low in much of the proposed Project area; thus, stream velocities would also tend to be low. Under these conditions, suspended sediments within these streams would only be transported over short distances and would likely have a limited impact on aquatic species and their associated habitats. Further, reduced levels of dissolved oxygen arising from increased turbidity could 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 an HDD would significantly minimize impacts to waterbodies and aquatic species. However, HDD methods are not without risk and a release of non-toxic drilling fluids (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 in-stream 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 portion of a much longer stream feature.

Introduction of pollutants into waterbodies and aquatic habitats could occur through disturbance of contaminated soils or sediments, accidental spills, and inadvertent releases of drilling fluids during HDD and open-cut operations. 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 re-suspension of contaminated soils and sediments would result in adverse impacts to water quality and in-stream habitat. Although there are no known contaminated sediments in waterbodies along the proposed Project route, SESH is proposing to cross all waterbodies listed as impaired (303(d)) with an HDD technique to prevent potential release of

contaminated sediments. Further, implementation of SESH's Plan and Procedures would control erosion and would limit the flow of any contaminated sediments into waterways. Given the lack of contaminated sediments and pollutants near the proposed Project area and sediment erosion control measures included in SESH's Plan and Procedures, the risk to water quality and aquatic species from contaminated soils and sediments is low.

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 warmwater species that occur in the waterbodies that would be 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 have an impact on in-stream conditions, but would be localized and relatively minor over the length of the waterbody. Waterbodies would be restored to preconstruction contours and banks would be stabilized and allowed to revegetate. Operation of the proposed Project would not significantly affect aquatic species and habitats.

3.6.2.3 Site-Specific Impacts and Mitigation

In many instances, the HDD method would be used to avoid and minimize impacts to aquatic resources. HDD is a trenchless crossing method that avoids direct impacts to waterbodies and aquatic habitats by directionally drilling beneath them. A successful HDD would result in little or no impact to the waterbody or aquatic habitats being crossed. Waterbodies proposed to be crossed using the HDD include major and/or navigable streams, those on the state 303(d) list, and NRI-listed rivers and waterbodies most likely to contain habitat for listed species.

The feasibility of each proposed HDD crossing would be evaluated based on the results of ongoing geotechnical studies. Although these geotechnical analyses are not yet complete, the experience of SESH and its sub-contractors in performing other HDD crossings near the proposed Project maximizes the expectation of success. In the event of an HDD failure, the crossing would be re-drilled in approximately the same location. If the re-drill fails, the pipeline would be installed across the waterbody using the open-cut construction method after obtaining the necessary permits and approvals from the appropriate state and federal agencies. An amended plan would be developed in consultation with applicable agencies prior to initiating an open-cut crossing of any of the waterbodies proposed to be crossed using HDD.

Each of the proposed HDD waterbody crossings would be constructed in accordance with SESH's Plan and Procedures, SPCC Plan, and the terms of applicable federal or state permits. Additionally, through implementation of procedures, SESH would monitor for and address any advertent releases of non-toxic drilling fluids. These factors, combined with the additional mitigation measures recommended, would effectively minimize the potential for adverse environmental impacts associated with the proposed HDD crossings.

Based on the measures to avoid or minimize proposed Project effects on fisheries, other aquatic life, and associated habitats, the construction and operation of the proposed Project would not have a significant negative impact on aquatic resources.

3.7 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Federally and state-listed threatened and endangered species, as well as special status species, occur within and near proposed Project facilities. Table 3.7-1 identifies these species, their listing status or other designation, and their known location(s).

3.7.1 Federally Listed Threatened and Endangered Species

Section 7 of the 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 threatened and endangered species or result in the destruction or adverse modification of the designated critical habitat for any federally listed species.

The FERC, as the lead federal agency in the review of the proposed Project, is required to consult with the FWS to determine whether federally listed or proposed species, or their designated critical habitat, may occur in the proposed Project area and to determine the proposed action's potential effects on these species and critical habitats. The FWS does not require consultation regarding impacts to candidate species; however, the FWS encourages the avoidance of activities that may adversely affect candidate species. 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).

Based on consultation with the FWS, 14 federally listed threatened and endangered species and 2 candidate species occur or potentially occur within the proposed Project area. These species and known locations of occurrences are listed in Table 3.7-1. A description of these species, their preferred habitats, and potential for occurrence, as well as our assessment of potential effects to them resulting from construction and operation of the proposed Project, is provided below.

Based on our review of these species, we have determined that construction and operation of the proposed project is not likely to adversely affect the Louisiana quillwort, Louisiana black bear, red cockaded woodpecker, interior least tern, bald eagle, yellow blotched map turtle, ringed map turtle, Alabama red-bellied turtle, gulf sturgeon, pallid sturgeon, bayou darter, Mississippi gopher frog, eastern indigo snake; may affect the gopher tortoise; and would not significantly affect the pearl dater or the black pine snake.

With the issuance of the DEIS on April 27, 2007, we requested that the FWS accept the DEIS as our BA and requested the initiation of formal consultation as required by Section 7 of the ESA. In a letter dated May 4, 2007 to the Commission, the FWS Jackson Field Office acknowledged the receipt of the DEIS and accepted our request for initiation of formal consultation. Based on its review of the proposed Project and the BA provided by Staff, the FWS issued a Biological Opinion (BO) on July 19, 2007. In its BO the FWS concurred with our determinations of "is not likely to adversely affect" and determined that the proposed Project is not likely to jeopardize the continued existence of the gopher tortoise, is not likely to adversely modify designated gopher tortoise critical habitat and issued an incidental take statement for gopher tortoises. The FWS also identified several non-discretionary terms and conditions applicable to the gopher tortoise which must be adhered to in order to be exempt from prohibitions of Section 9 of the ESA. Additionally, three discretionary conservation recommendations were made by the FWS to further protect the gopher tortoise and its habitat. These non-discretionary terms and conditions and conservation recommendations have been incorporated into the gopher tortoise species description below.

TABLE 3.7-1
Threatened, Endangered, and Special Status Species
Potentially Occurring in the Proposed Project Area

Common Name	Scientific Name	Federal Status	Louisiana Status	Mississippi Status	Alabama Status	Known Locations (County/Parish)
Plants						
Louisiana Quillwort	*Isoetes louisianensis*	E	-	-	-	MS: Jones, Forrest, Perry, Greene, George and Jackson; AL: Mobile
Mussels						
Delicate Spike	*Elliptio arctata*	NL	-	E	-	MS: Copiah, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, Lawrence and Jackson
White heelsplitter	*Lasmigona complanata*	NL	S1	-	-	LA: Madison
Fish						
Pallid Sturgeon	*Scaphirhynchus albus*	E	E	-	-	LA: Madison; MS: Warren, Claiborne
Bayou Darter	*Etheostoma rubrum*	T	-	E	-	MS: Claiborne, Copiah
Gulf Sturgeon	*Acipenser oxyrhynchus desotoi*	T	-	E	-	MS: Copiah, Lawrence, Greene, George, Jackson
Pearl Darter	*Percina aurora*	C	-	E	-	MS: Jones, Forrest, Perry, Greene, George, Jackson
Crystal Darter	*Crystallaria asprella*	NL	-	E	-	MS: Copiah and Claiborne
Frecklebelly Madtom	*Noturus minitus*	NL	-	E	-	MS: Lawrence
Amphibians						
MS Gopher Frog	*Rana capito sevosa*	E	-	-	-	MS: Jackson
Reptiles						
Ringed Map Turtle	*Graptemys oculifera*	T	-	E	-	MS: Copiah, Lawrence
Gopher Tortoise	*Gopherus polyphemus*	T	-	E	P	MS: Covington, Jones, Forrest, Perry, Greene, George, Jackson and Jefferson Davis; AL: Mobile
Yellow-blotched Map Turtle	*Graptemys flavimaculata*	T	-	E	-	MS: Jones, Forrest, Perry, Greene, George, Jackson
Eastern indigo Snake	*Drymarchon corais couperi*	T	-	-	P	MS: Jones, Forrest, Perry, Greene, George, Jackson; AL: Mobile
Black Pine Snake	*Pituophis melanoleucus ssp. lodingi*	C	-	E	P	MS: Jones, Forrest, Perry, George; AL: Mobile
Alabama Red-bellied Turtle	*Pseudemys alabamensis*	E	-	E	P	MS: Jackson; AL: Mobile

TABLE 3.7-1
Threatened, Endangered, and Special Status Species
Potentially Occurring in the Proposed Project Area

Common Name	Scientific Name	Federal Status	Louisiana Status	Mississippi Status	Alabama Status	Known Locations (County/Parish)
Delta Map Turtle	*Graptemys nigrinoda delticola*	NL	-	-	P	AL: Mobile
Alligator Snapping Turtle	*Macrochelys temminckii*	NL	-	-	P	AL: Mobile
Mississippi Diamondback Terrapin	*Malaclemys terrapin pileata*	NL	-	-	P	AL: Mobile
Gulf Salt Marsh Snake	*Nerodia fasciata clarkii*	NL	-	-	P	AL: Mobile
Rainbow Snake	*Farancia erytrogramma*	NL	-	E	-	MS: Copiah, Forrest, Jackson
Birds						
Bald Eagle	*Haliaeetus leucocephalus*	DL	T	-	-	LA: Richland; MS: Warren, Claiborne, Copiah, Lawrence, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, Jackson; AL: Mobile
Interior Least Tern	*Sterna antillarum*	E	E	-	-	LA: Madison; MS: Warren, Claiborne; AL: Mobile
Red-cockaded Woodpecker	*Picoides borealis*	E	-	-	-	MS: Copiah, Jones, Forrest, Perry, Greene, George, Jackson; AL: Mobile
Wilson's Plover	*Charadrius wilsonia*	NL	-	-	P	AL: Mobile
Reddish Egret	*Egretta rufescens*	NL	-	-	P	AL: Mobile
American Oystercatcher	*Haematopus palliates*	NL	-	-	P	AL: Mobile
Osprey	*Pandion haliaetus*	NL	-	-	P	AL: Mobile
Gull-billed Tern	*Sterna nilotica*	NL	-	-	P	AL: Mobile
Mammals						
Louisiana Black Bear	*Ursus americanus luteolus*	T	T	E	-	LA: Richland, Madison; MS: Warren, Claiborne, Copiah, Lawrence, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, Jackson

Notes:
ADCNR = Alabama Department of Environmental Management
E = Endangered
T = Threatened
C = Candidate species proposed for federal listing
NL = Not listed
P = State protected species (ADCNR does not rank by threatened or endangered.)
S1= Critically imperiled
DL = recently delisted

Since the issuance of the BO, SESH has indicated route variations are being developed for the final project alignment. Modifications to the proposed project alignment, identification any new access roads or additional temporary workspace, unsurveyed tracts (where previous access was denied), have not been reviewed by the FWS for the presence or absence of federally-listed species and habitats, **therefore we recommend that:**

- **SESH should not begin construction of the newly identified variations and any tracts of land that have not been surveyed due to landowner denial of access activities until:**

  a. the staff completes Section 7 consultations with the FWS; and

  b. SESH has received written notification from the Director of OEP that construction or use of mitigation may begin.

3.7.1.1 Louisiana Quillwort

The Louisiana quillwort (*Isoetes louisianensis*) is a federally listed endangered plant species that occurs in Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi, and in Mobile County, Alabama. The Louisiana quillwort is a non-flowering grasslike plant that lives in wetland or aquatic habitats. Mature plants are 6 to 10 inches long and generally grow in groups of 5 to 10 or more.

Based on the absence of observations during field surveys and SESH's commitment to cease operations and contact the FWS should they encounter this species during construction, we have determined that construction and operation of the proposed Project may affect the Louisiana quillwort, but it is not likely that the effect would be adverse.

3.7.1.2 Pallid Sturgeon

The pallid sturgeon (*Scaphirhynchus albus*), a federally listed endangered fish species that occurs near the proposed Project, occurs primarily within the Mississippi River in Warren and Claiborne counties, Mississippi, and in Madison Parish, Louisiana. This species prefers large, turbid, free-flowing rivers and inhabits strong currents over firm gravel or sandy substrate. The pallid sturgeon spawns primarily from July to August and preys on aquatic insects, crustaceans, mollusks, annelids, eggs of other fish, and sometimes other fish.

SESH proposes to cross the Mississippi River using an HDD. We are recommending that, prior to construction, SESH file an HDD contingency plan that includes measures to contain potential frac-outs (see Section 3.3). We have determined that construction and operation of the proposed Project may affect the pallid sturgeon, but it is not likely that the effect would be adverse.

3.7.1.3 Bayou Darter

The bayou darter (*Etheostoma rubrum*) is a federally listed threatened fish species that occurs in Claiborne and Copiah counties, Mississippi. Specifically, the bayou darter is found in Bayou Pierre and three of its tributaries: White Oak Creek, Foster Creek, and Turkey Creek. This species may occur in Dry Creek and the Leaf and Chickasawhay rivers. The bayou darter typically inhabits creeks and small- to medium-sized rivers, preferring stable, moderately swift riffles flowing over large gravel and rock.

SESH proposes to cross Bayou Pierre, Turkey Creek, and the Leaf and Chickasawhay rivers using HDDs and Dry Creek using the open-cut crossing method. The proposed Project would not cross White Oak and Foster creeks.

Use of HDDs would significantly minimize potential impacts to the bayou darter. Our recommendation that SESH file an HDD contingency plan that includes measures to contain potential frac-outs would further minimize impacts to this species. Additionally, we are recommending in Section 3.3 that SESH construct dry crossings and evaluate the feasibility of using HDD methods regarding the crossing of several sensitive tributaries to the Bayou Pierre, including Dry Creek, Choctaw Creek, Mill Creek, and Long Creek.

Based on the characteristics of this species including its mobility; SESH's proposed construction methods; general impacts to waterbodies resulting from construction activities; and adherence to our recommendations, we believe that construction and operation of the proposed Project may affect the bayou darter, but it is not likely that the effect would be adverse.

3.7.1.4 Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) is a federally listed threatened fish species that occurs in Copiah, Lawrence, Greene, George, and Jackson counties, Mississippi. Specifically, the Gulf sturgeon is found in the Pearl and Leaf rivers and may occur in the Chickasawhay River. The Gulf sturgeon is a bottom feeder that preys on insects, crustaceans, mollusks, annelids, and small fish.

This anadromous species migrates into coastal rivers beginning in early spring and continuing into May. Spawning begins soon after arrival in freshwater, typically occurring over bottoms of hard clay, rubble, gravel, or shell. Individuals spend their first two years in riverine habitats where they are often found near the mouths of rivers in winter and spring. Downstream migration of adults and subadults begins in late September or October.

SESH is proposing to cross the Pearl, Leaf, and Chickasawhay rivers using HDDs. We are recommending that, prior to construction, SESH file an HDD contingency plan that includes measures to contain potential frac-outs (see Section 3.3). We have determined that construction and operation of the proposed project may affect the Gulf sturgeon, but the effect is not likely to be adverse.

3.7.1.5 Pearl Darter

The pearl darter (*Percina aurora*) is a candidate for the endangered species list. The pearl darter occurs within the Pascagoula River System in Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi. It is typically found at the lower ends of riffles or at the edges of deep channels in large creeks and rivers. During spawning, pearl darters move into slower currents of pools to lay eggs on scattered rubble substrates.

Several tributaries of the Pascagoula River, which provide suitable habitat for the pearl darter, would be crossed during construction of the proposed Project. According to the FWS, the pearl darter historically occurred in Okatoma Creek and the Leaf, Bowie, and Chickasawhay rivers. Suitable pearl darter habitat is also believed to be present in Bowie, Thompson, Gaines, and Atkinson creeks as well as the Bogue Homo and Tallahala rivers.

SESH proposes to cross Bowie, Okatoma, and Atkinson creeks as well as the Leaf, Chickasawhay, Bogue Homo, and Tallahala rivers using HDDs. SESH also proposes to cross Thompson and Gaines creeks using the open-cut crossing methods, however, we are recommending in Section 3.3 that SESH construct dry crossings and evaluate the feasibility of using HDD methods to cross these two waterbodies. The proposed Project would not cross the Bowie River.

Based on SESH's proposed HDD crossings, known occurrences of this species, its relative mobility, general impacts to waterbodies resulting from construction activities, and adherence to our previous recommendation concerning waterbody crossings, we believe that construction and operation of the proposed Project would not significantly affect the pearl darter.

3.7.1.6 Mississippi Gopher Frog

The Mississippi gopher frog (*Rana capita sevosa*) is a federally listed endangered species that occurs in Jackson County, Mississippi; however, the only known population in Jackson County is located several miles from any proposed Project facilities. Based on that information, we have determined that construction and operation of the proposed Project would not affect this species.

3.7.1.7 Ringed Map Turtle

The ringed map turtle (*Graptemys oculifera*) is a federally listed threatened species that occurs in Copiah and Lawrence counties, Mississippi. Specifically, the ringed map turtle occurs in the Pearl River. The ringed map turtle is a medium-sized turtle, ranging from 3 to 8 inches long, with a dark olive-green shell. Male shells possess black, spine-like projections on the dorsal keel. The ringed map turtle lives in clean, high quality rivers that have a moderate to fast current, an open canopy, and numerous nesting beaches and basking logs. These turtles lay eggs in nests dug in sandy beaches or gravel bars. Ideal beaches for nesting are islands composed of clean, fine-grain sand with minimum vegetative cover at 3 to 10 ft above river level.

SESH is proposing to cross the Pearl River using an HDD. We are recommending that, prior to construction, SESH file an HDD contingency plan that includes measures to contain potential frac-outs. We have determined that construction and operation of the proposed project may affect the ringed map turtle, but it is not likely that the effect would be adverse.

3.7.1.8 Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is a federally listed threatened species that occurs in Covington, Jones, Forrest, Perry, Greene, George, Jefferson Davis, and Jackson counties, Mississippi, and in Mobile County, Alabama. The gopher tortoise is a medium-sized turtle, ranging from 9 to 11 inches long and 6 to 10 inches wide and weighing 8 to 10 pounds, with a dark brown to grayish-black colored carapace. Typical gopher tortoise habitat consists of well-drained, sandy soils that provide abundant herbaceous vegetation for food and plentiful sunlit areas for nesting and foraging. Gopher tortoises excavate burrows in open landscapes such as roadsides, fence-rows, old fields, and the edges of overgrown uplands. The size of gopher tortoise burrows varies depending on the size of the turtle; however, burrows are generally about 15 ft long and 6 ft deep with the entrance shaped in the form of a half moon. Gopher tortoises are territorial with well-defined home ranges that increase in size with age. Gopher tortoises also occur in colonies of two or more active burrows that are typically located within 600 ft of each other. Gopher tortoises mate between May and July, with nesting taking place from mid-April through mid-July.

Construction of the proposed Project, including clearing and trenching, would adversely affect gopher tortoises and gopher tortoise habitat found within the temporary construction right-of-way. Specifically, as described in Appendix J, prior to construction SESH would resurvey for gopher tortoise burrows and conduct a burrow assessment. SESH would displace gopher tortoises by capturing, holding, and then releasing those tortoises back to the construction right-of-way after construction. SESH's proposed capture and release efforts would result in stress to gopher tortoises and could lead to injury and/or mortality. Following the capture of gopher tortoises, SESH would construct the proposed pipeline

that would result in the permanent removal of existing gopher tortoise burrows and would temporarily affect gopher tortoise habitat by removing vegetation and disturbing soils.

Operation of the proposed Project, including inspection and maintenance (e.g., mowing) activities that would require the use of light and heavy equipment, could adversely affect gopher tortoises. The general use of equipment could result in stress to gopher tortoises or modification of their habitat. Conversely, construction and operation of the proposed project would also beneficially affect gopher tortoises by creating and maintaining habitat that gopher tortoises find favorable.

To minimize potential adverse impacts to gopher tortoises during construction and operation of the proposed Project, SESH has developed a conservation strategy based on information provided by the FWS. SESH's proposed conservation strategy is described in detail in Appendix J and includes measures to resurvey for gopher tortoises prior to, during, and following construction; capture, hold, and release gopher tortoises; educate construction personnel; protect gopher tortoises adjacent to proposed construction areas; and monitor and report on these efforts. Based on known gopher tortoise characteristics, habitat requirements, proposed construction and operation measures and procedures, and SESH's proposed conservation strategy, we determined that the proposed Project may affect this species, and as required by Section 7 of the ESA we initiated formal consultation with the FWS regarding this species. As described above, the FWS determined in its BO that the proposed Project is not likely to jeopardize the continued existence of the gopher tortoise, is not likely to adversely modify designated critical habitat, and issued an incidental take statement. Additionally, the FWS also provided the following non-discretionary terms and conditions regarding tortoise relocation efforts:

a. All tortoise burrows found within the 100 foot construction ROW, regardless of activity status (active, inactive or abandoned) will be scoped first, then excavated using the backhoe method described in the BA to definitively determine that the burrow is unoccupied.

b. Tortoises that cannot be released into adjacent unoccupied burrows will be temporarily penned for a minimum of two weeks.

c. If landowners refuse to allow the relocation of tortoises onto adjacent lands, then tortoises will be relocated to the closest colony along the pipeline and will be penned for a minimum of two weeks.

d. If a tortoise moves outside of its original colony range within the first month after its release into an unoccupied burrow (or after the two week penning period) that tortoise will be recaptured and temporary penned for two weeks.

e. In addition to the radio telemetry monitoring proposed in the BA, tortoises will be checked at least once a month during the dormant season (October 1 through April 1).

f. Tortoises collected between October 1 and October 15 will require these additional measures:

    i. Tortoises will be relocated into suitable inactive or abandoned burrows unoccupied by another tortoise, and enclosed by a suitable pen for the duration of the dormant season, until April 1.

    ii. Tortoises will be monitored late in the afternoon when the predicted night time low temperature will be below 60 degrees. Monitoring will be conducted for

each of the first five nights when such low temperatures are predicted. Monitoring will identify any tortoise located above ground outside the burrow. The air temperature at ground level will be recorded at the time any above-ground tortoise is observed. Also, the behavior of any above-ground tortoises will be recorded, noting whether animals are moving within the enclosure, digging at the enclosure walls, or whether they are stationary at the mouth of the burrow.

iii. Monitoring will continue after sundown to determine if any above-ground tortoises observed during late afternoon have taken shelter in their burrow, or if they remain above ground, or if they periodically emerge above-ground after sundown. If any tortoise is found above-ground, its behavior will be observed and recorded with the measured air temperature at ground level. If any tortoise is observed above ground at or after sundown, the animal will be pushed into the burrow and the burrow will be staked to prevent the tortoise from emerging. Stakes will be removed the following morning by 10:00 AM. Monitors will observe special precautions to approach the burrows and enclosures quietly, so as not to disturb tortoises or alter their behavior due to the monitors' presence.

iv. Whenever a tortoise has been observed above-ground after sundown during such monitoring, the MS Field Office will be contacted the next day to report and evaluate the observed incident. One of three options will be implemented with concurrence of the MS Field Office.

1. The first option will be a continuation of monitoring, as previously described.

2. The second option will be to stake the entrance of the burrow closed with survey stakes during the late afternoon to prevent the tortoise from leaving the burrow at night, regardless if the animal is within the burrow when the opening is staked. Stakes will be removed during the day, from 10 AM to 4 PM, to allow for normal basking behavior. On any day following a night when the burrow was staked closed, the behavior of the tortoise will be monitored and the air ground temperature recorded. If the tortoise remains above ground the following night when temperatures are below 60 degrees, the tortoise will be placed in the burrow and the opening staked closed again. The MS Field Office must be contacted the next day to determine which of these options to continue.

3. The third option will be a continuation of monitoring, but if the tortoise is observed above-ground again, it will be hand-captured from within the enclosure and removed to temporary captivity in a climate controlled indoor facility. Tortoises must be transported in a suitable contained (not a wire cage) within the vehicle to the facility. The Service must approve the facility and the procedures for captive care for the duration of the dormant season. After March 31, any captive tortoises will be transported and released at the site as described by the BA.

The FWS has also provided the following discretionary conservation recommendations to minimize or avoid adverse effects of the proposed action on listed species and critical habitats, and to help carry out recovery plans or to develop additional species information.

1. Avoid identifying gopher tortoise burrow locations to the public. Undue public attention to gopher tortoise colonies may increase the risk of human harassment, injury and/or capture.

2. Develop a management plan for controlling cogongrass along the new ROW. The plan should include the following:

    a. SESH maintenance personnel will be trained to identify cogongrass

    b. Mowing equipment will be cleaned after mowing cogongrass infected areas

    c. Cogongrass areas will be treated using appropriate herbicide treatments

3. Conduct a gopher tortoise burrow inventory of all SESH ROWs within the range of the federally protected gopher tortoise. This inventory should be completed on a 3-5 year rotation and the results should be sent to the Service and the Mississippi Museum of Natural Science for inclusion into the states tracking database.

To ensure that the gopher tortoise is sufficiently protected and compliance with the FWS terms and conditions, **we recommend that:**

- **SESH should adhere to all non-discretionary terms and conditions as well as conservation recommendations 1, 2, and 3 as identified in the FWS Biological Opinion issued July 19, 2007 for the proposed Southeast Supply Header Project.**

3.7.1.9 Yellow-Blotched Map Turtle

The yellow-blotched map turtle (*Graptemys flavimaculata*) is a federally listed threatened species that occurs in Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi. Specifically, this species occurs in the Leaf, Chickasawhay, Pascagoula, and Escatawpa rivers. In addition, yellow-blotched map turtle habitat may exist in Gaines and Thompson creeks. The yellow-blotched turtle is a medium-sized turtle, ranging from 3 to 7 inches long, with an olive to brown shell with yellow to orange blotches. Suitable habitat for this species is found in relatively wide rivers, with moderate currents, that have sand and clay bottoms and an abundance of sand bars or rocky bottoms with limestone ledges along the banks. Yellow-blotched map turtles bask in areas with tangled tree roots or logs. They nest on sandbars or in small clearings from mid- to late-May through early- to mid-August.

SESH proposes to cross the Leaf, Chickasawhay, and Escatawpa rivers using HDDs. Gaines and Thompson creeks would be crossed using open-cut crossing methods, however, we are recommending in Section 3.3 that SESH construct dry crossings and evaluate the feasibility of using HDD methods to cross these two waterbodies. The Pascagoula River would not be crossed by the proposed Project.

Based on the known characteristics of the species including habitat requirements, SESH's proposed HDD crossings, our consultation with the FWS, adherence to our previous recommendation concerning waterbody crossings, general impacts to waterbodies resulting from construction activities, and adherence to our recommendation concerning an HDD contingency plan, we believe that construction and operation of the proposed Project may affect the yellow-blotched map turtle, but the effect is not likely to be adverse.

3.7.1.10 Alabama Red-Bellied Turtle

The Alabama red-bellied turtle (*Pseudemys alabamensis*) is a federally listed endangered species that occurs in Jackson County, Mississippi, and Mobile County, Alabama. In Mississippi, it inhabits the lower Pascagoula River and its tributaries, Bluff Creek and the Escatawpa River. In Alabama, this species is most abundant in the upper backwaters of Mobile Bay. There are no records of this species within 3 miles of the proposed Project.

Based on known occurrences of this species and agency consultations, we have determined that construction and operation of the proposed Project may affect the Alabama red-bellied turtle, but the effect is not likely to be adverse.

3.7.1.11 Eastern Indigo Snake

The eastern indigo snake (*Drymarchon corais couperi*) is a federally listed threatened species that could occur in Forrest, George, Greene, Jackson, Jones, and Perry counties, Mississippi, and is known to occur in Mobile County, Alabama near the proposed Project. The eastern indigo snake is typically associated with inactive gopher tortoise burrows. The eastern indigo snake is generally believed to be extirpated from the proposed Project area; however, because gopher tortoise burrows have been identified within and near the proposed Project, **we recommend that:**

- **SESH should adhere to the following eastern indigo snake protection measures:**

  a. If an eastern indigo snake is sighted during construction, the contractor will be required to cease all operation(s) that might cause harm to the snake.

  b. If the snake does not move away from the construction area, a state or federal snake expert will be contacted to capture and relocate the snake to suitable habitat either adjacent to the Project area or off-site to an acceptable donor site.

  c. If an eastern indigo snake is killed or found dead within the construction area, the snake should be frozen and the FWS Jackson Field Office notified immediately for transport and evaluation.

Based on the lack of known occurrences of this species, SESH's adherence to our recommended eastern indigo snake protection measures, and SESH's commitment to contact the FWS if the species is encountered during construction, we have determined that construction and operation of the proposed Project may affect the eastern indigo snake, but the effect is not likely to be adverse.

3.7.1.12 Black Pine Snake

The black pine snake (*Pituophis melanoleucus ssp. lodingi*) is a candidate for the endangered species list. The black pine snake occurs in Jones, Forrest, Perry, and George counties, Mississippi, and Mobile County, Alabama. Typical habitat for this species consists of hills, ridges, sandy well-drained soils, and forests with an overstory of longleaf pine, a fire suppressed mid-story, and dense herbaceous ground cover. Individuals spend most of their time underground in the trunks or root channels of rotting pine stumps. Reproduction takes place in the spring, and the eggs are laid in burrows or under large rocks or logs. The black pine snake mainly eats small mammals such as cotton rats, mice, and young rabbits as well as some birds and bird eggs. Agency records indicate that this sub-species has been found as close as 2 miles to the proposed Project alignment.

Because a significant portion of SESH's proposed construction activities would occur in the winter and we have recommended that SESH develop a longleaf pine ecosystem construction plan that would further minimize impacts to this species, we believe that construction and operation of the proposed Project would not significantly affect the black pine snake.

3.7.1.13 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a recently federally delisted species that occurs statewide in Louisiana and Mississippi and is found primarily near seacoasts, rivers, and large lakes. Bald eagles are large and distinctive birds, with wingspans of close to 7 ft and a body length of approximately 35 inches. Adult bald eagles have white heads and tails; yellow bills, feet, and legs; and dark brown bodies. Immature birds are brown and lack the white head and tail of the adults. Bald eagles are opportunistic foragers and their diet varies based on available prey species.

The bald eagle nests in tall trees or on cliffs near water between September and mid-May. Breeding bald eagles occupy "territories" that they will defend against intrusion by other eagles and that they likely return to each year. A territory may include one or more alternate nests that the eagles build and maintain; however, they may not use the nests for nesting in a given year. Potential nest trees within a nesting territory may provide important alternative bald eagle nest sites.

The bald eagle has recently been removed from the ESA list of federally protected threatened or endangered species (delisted) in the lower 48 states, following a comment period it will be official on August 8, 2007. However, two other federal laws still protect the bald eagle, the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA), The BGEPA and MBTA, known collectively as the "Eagle Act", prohibit "disturbance" of eagles, their nests or eggs. Currently, guidelines are provided by the FWS to avoid disturbing eagles and violating the Eagle Act, with recommendations including regional, seasonal distance restrictions and landscape buffer zones around eagles and their nests during the breeding season.

No individual bald eagles or bald eagle nests have been identified within the proposed Project area. However, the FWS states that, should the proposed Project or associated work activities encroach within 660 ft of an eagle nest during nesting season (September through May), further consultation with the Service would be necessary. Therefore, to ensure that the bald eagle is sufficiently protected, **we recommend that**:

- **SESH should immediately notify the FERC staff and the FWS if bald eagles or their nests are observed within 660 feet of work activities prior to or during construction and should cease such construction activities until notified by FERC to proceed.**

Based on habitat requirements, known occurrences, consultation with the FWS, SESH's commitment to train contract workers regarding bald eagles and their habitats, and SESH's adherence to our recommendation regarding bald eagles, we have determined that construction and operation of the proposed Project may affect the bald eagle, but the effect is not likely to be adverse.

3.7.1.14 Interior Least Tern

The interior least tern (*Sterna antillarum*) is a federally listed endangered, migratory shorebird that occurs in Madison Parish, Louisiana; Warren and Claiborne counties, Mississippi; and Mobile County, Alabama. The interior least tern generally rests and loafs on sandy beaches and mudflats, preferring open habitats and avoiding thick vegetation and narrow beaches. The tern nests from April to early June in colonies. Nests range from 10 to 30 ft apart and occur on bare or sparsely vegetated sand,

shell, and gravel beaches; sandbars; islands; and salt flats associated with shallow water areas in rivers and reservoirs. The size of nesting areas depends on water levels and the extent of associated sandbars and beaches.

On the lower Mississippi River, the interior least tern population is concentrated within approximately 500 river miles between its confluence with the Ohio River at Cairo, Illinois, and Vicksburg, Mississippi. In Louisiana, the bird historically occurred along the Mississippi River north of Baton Rouge. To ensure that interior least terns are sufficiently protected, **we recommend that**:

- **SESH should immediately notify the FERC staff and the FWS if interior least terns are observed within 650 feet of proposed waterbody crossings prior to or during construction and should cease crossing activity until notified by FERC to proceed.**

Based on the characteristics of this species including its mobility, its habitat requirements, known occurrences, consultation with the FWS, SESH's commitment to train contract workers regarding interior least terns, and SESH's adherence to our recommendation regarding interior least terns, we have determined that construction and operation of the proposed Project may affect the interior least tern, but the effect is not likely to be adverse.

3.7.1.15 Red Cockaded Woodpecker

The RCW (*Picoides borealis*) is a federally listed endangered species that occurs in Copiah, Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi, and in Mobile County, Alabama. It nests in older, mature pine or pine-hardwood forests (greater than 60 years old) and prefers longleaf pine species. It will also nest in shortleaf and loblolly species and mixed pine-hardwood upland forests, all with little to no hardwood midstory. The RCW excavates cavities exclusively in living pine trees. It prefers older pines and trees that suffer from a fungus called red heart disease, which attacks the center of the trunk, causing the inner wood to become soft for ease in creating cavities. The average cavity tree age ranges from 60 to 126 years for longleaf pine, 70 to 90 years for loblolly pine, and 75 to 149 years for shortleaf pine. Clusters of cavities associated with an RCW breeding group may have 1 to 20 or more cavity trees on 3 to 60 acres. The average area required for a breeding group is about 10 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.

In April 2007, pine plantations along the SESH corridor were identified using aerial photographs and verified visually in the field. The silviculture rotation common in most of the pine stands does not provide potential RCW habitat. One large stand of long-leaf pine in Mobile County, Alabama near MP 244 to MP 246 potentially provides RCW habitat and was traversed on foot. No evidence of RCW nesting activity was observed. The loss of foraging habitat from the permanent corridor was determined to be minimal based on the size of the stand. Based on the results of this survey, and concurrence by the FWS through consultations, the SESH project may affect but is not likely to adversely affect the RCW.

Based on the lack of known occurrences of this species, SESH's adherence to our recommendation to develop a longleaf pine ecosystem construction plan that would further minimize impacts to this species, we believe that construction and operation of the proposed Project may affect the RCW, but the effect is not likely to be adverse.

3.7.1.16 Louisiana Black Bear

The Louisiana black bear (*Ursus americanus luteolus*) is a federally threatened listed species that occurs in Richland and Madison parishes, Louisiana, and Warren, Claiborne, Copiah, Lawrence, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi. Although individuals are known to occur in Mississippi, whether any breeding populations occur outside of Louisiana is unknown. Black bear habitat is primarily associated with forested wetlands; however, bears may use a variety of habitat types including marsh, spoil banks, and upland forests. In upland forests, black bears use 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. The FWS also noted that bears may become habituated to human food sources, especially garbage, when activities encroach on their habitat. Such habituation can cause nuisance behavior by black bears, which can be very difficult to control and may require removal of the animal from the wild or the animal being euthanized, thereby affecting 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. 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 being located along a waterbody.

One bear and bear tracks were identified along the proposed pipeline route; however, no den trees were observed near either sighting.

The FWS indicates that it is concerned with construction- and operation-related impacts to potential habitat located within the vicinity of the Tensas NWR. To minimize potential impacts to this species, SESH has developed a Louisiana Black Bear Management Plan based on FWS recommendations. The management plan proposes conservation techniques to protect the potential migration corridor so that bears could utilize both northern and southern tracts within the Tensas NWR and prevent isolation of existing subpopulations. Conservation techniques proposed to avoid and minimize impacts to bears between MPs 0.4 – 0.9 and 5.6 – 7.0 include: monitoring of clearing activities that occur within bear habitat during denning season; surveying for signs of denning bears prior to mechanized clearing; communicating activities with FWS Lafayette Office; leaving stumps and roots in place (except over pipeline) to promote revegetation; returning the topography of the corridor to pre-construction contours; and restoring trees and shrubs on Wetland Reserve Program easement lands.

Based on the characteristics of this species including habitat requirements; the identification of potential habitat, known occurrences, SESH's commitment to train contract workers regarding Louisiana black bears and their habitat, and SESH's adherence to FWS recommendations regarding Louisiana black bears, we have determined that construction and operation of the proposed Project may affect the Louisiana black bear, but the effect is not likely to be adverse.

3.7.2 State-Listed Species

Louisiana and Mississippi have implemented state endangered species acts for listed animal species; plants are also listed but are not afforded regulatory protection. Louisiana and Mississippi

statutes protect animals considered by the states to be threatened or endangered. Alabama has not implemented a state endangered species act; there is no regulatory protection afforded to state-listed species in Alabama, However, the ADCNR NHP maintains lists of nongame species it considers endangered, threatened, of special concern, or poorly known. State-listed species identified through consultation with the respective state agencies are provided in Table 3.7-1.

3.7.2.1 Louisiana

State-listed species in the Louisiana portion of the proposed Project area, as identified by the Louisiana Department of Wildlife and Fisheries (LDWF), are the pallid sturgeon, bald eagle, interior least tern, and Louisiana black bear. These species are also federally listed and discussed in Section 3.7.1.

A single state-protected species that is not federally listed in the Louisiana portion of the proposed Project area, as identified by the LDWF, is the white heelsplitter *(Lasmigona complanata).* The white heelsplitter is listed as a critically imperiled freshwater mussel that has been identified in the Bayou Mothiglam. This species prefers narrow and shallow rivers, streams, or pools and are typically found buried deep within a substrate of sand, gravel, or mud.

3.7.2.2 Mississippi

Federally listed and candidate species that are also listed by the state include bayou darter, pearl darter, gulf sturgeon, Alabama red-bellied turtle, gopher tortoise, ringed map turtle, yellow-blotched map turtle, black pine snake, and Louisiana black bear. The species' respective habitats were discussed in Section 3.7.1.

Species listed by the state only include the delicate spike (*Elliptio arctata*), crystal darter (*Crystallaria asprella*), frecklebelly madtom (*Noturus minitus*), and rainbow snake (*Farancia erytrogramma*).

The delicate spike is listed in Mississippi as an endangered freshwater mussel and inhabits moderate to large rivers with moderate to swift currents. They prefer riffle or shoal areas with stable sandy gravel or gravel bottoms.

The crystal darter is listed in Mississippi as an endangered fish. According to the MDWFP, it is found in Bayou Pierre and the Pearl River, is a big river fish, and is likely found only in the main stems of these rivers.

The frecklebelly madtom is listed in Mississippi as an endangered freshwater catfish with known occurrences in Lawrence County. The species is also found in the Pearl River system, both main stems and large tributaries. This species typically occurs in firm, stable gravel or rubble riffles with swift currents and is also often associated with in-stream cover such as logs, sticks, and leaf packs.

The rainbow snake is listed in Mississippi as an endangered species and is known to occur in Forrest, Jackson, and Copiah counties. Its upper surface is shiny blue or blue-black with three narrow red stripes running the length of its body. The belly is red with two rows of black spots running length-wise, and its side is yellow. This snake is aquatic and is found in rivers, streams, springs, ponds, and lakes associated with soils that are sandy enough to allow it to burrow. It is seldom encountered and is presumed to burrow in sandy soils or mats of aquatic vegetation.

3.7.2.3 Alabama

The federally listed gopher tortoise, eastern indigo snake, black pine snake, and Alabama red-bellied turtle are also on the state protected list in Alabama. These species' respective habitats and anticipated impacts of the proposed Project were discussed in Section 3.7.1.

State-protected species that are not federally listed in the Alabama portion of the proposed Project area, as identified by the ANHP, are the alligator snapping turtle (*Macrochelys temminckii*), Wilson's plover (*Charadrius wilsonia*), reddish egret (*Egretta rufescens*), osprey (*Pandion haliaetus*), and the gull-billed tern (*Sterna nilotica*). Some state-protected species identified by ANHP were considered not relevant to the proposed Project alignment including the delta map turtle (*Graptemys nigrinoda delticola*), Mississippi diamondback terrapin (*Malaclemys terrapin pileata*), gulf marsh snake (*Nerodia fasciata clarkii*), and American oystercatcher (*Haematopus palliates*). Habitats for these species were either coastal or distant from the proposed Project.

The alligator snapping turtle is a protected species in Alabama. It is usually found traveling slowly on the bottom of rivers and tributaries with slow flow rates, but can also be found in brackish waters with aquatic vegetation. Only during nesting will this turtle be seen out of water. Nesting occurs about 2 months after mating in the late spring. Potential habitat for the alligator snapping turtle exists in the proposed Project area. If individuals are present, they are highly mobile and will likely vacate the proposed Project area during construction.

Wilson's plover is an Alabama state-protected migratory bird that winters along the Gulf Coast from Florida to Texas. They can be found in Alabama during the winter months along shorelines, beaches with mud flats, and sandy flats of coastlines with sparse vegetation. Biological surveys determined that no suitable habitat for this species exists within the proposed Project area.

The reddish egret is a state-protected species that inhabits shallow saltwater habitats such as lagoons and tidal flats. This species will nest in groups, often on sandy beaches in thorn brush. In Florida, the reddish egret has been known to build platform nests from 3 to 15 ft above ground.

The osprey is an Alabama-protected species of migratory bird that travels from North America to South America. It inhabits areas along coasts, lakes, rivers, and reservoirs and can be found near rock walls and cliffs. This species typically nests in the spring, near water, and usually aboveground in trees, cliffs, and utility poles. Ospreys will return to the same nest site each year, adding new nest materials to the old nest. The offspring typically remain close to the nest through late fall when the annual migration begins. Populations of ospreys typically increase during the winter in the proposed Project area as individuals migrate south from northern nesting grounds. This species is likely to occur near some of the major waterbodies crossed by the proposed Project.

The gull-billed tern is a state-protected migratory bird that will inhabit coastal areas along sandy beaches, tidal flats, and estuaries of the Atlantic and Gulf coasts. This species will nest in sandy dunes and saltwater marshes with sparse vegetation. They can be found in smaller quantities around lakes, rivers, and freshwater marshes. No suitable nesting habitat was identified within the proposed Project area for this species. Any foraging gull-billed tern would likely move out of the proposed Project area during construction.

3.7.2.4 Potential Impacts and Mitigation

Species listed by the states only would be temporarily affected by the construction and operation of the proposed Project. Impacts would be similar to those described for terrestrial and aquatic wildlife.

Appropriate waterbody crossing methods and rapid deployment of crossings would avoid and minimize potential impacts to aquatic species such as the delicate spike, white heelsplitter, crystal darter, frecklebelly madtom, rainbow snake, and alligator snapping turtle. Seasonal awareness of nesting and migratory birds would avoid potential impacts to Wilson's plover, reddish egret, osprey, and gull-billed tern. To minimize these potential impacts, SESH would implement several measures including erosion and sedimentation control, as described in its plan and procedures to mitigate construction impacts. However, in order to ensure that state-listed species are adequately protected, **we recommend that:**

- **Prior to construction, SESH should consult further with the LDWF, MDWFP and the ADCNR regarding the need for additional surveys or mitigation to further minimize or avoid potential impacts to state-listed species. SESH should file the results of its consultation, and indicate whether it would adopt any mitigation measures recommended by the agencies, and, as applicable, explain why measures were not adopted.**

Based on our review of state-listed species; the characteristics of these species including habitat requirements; proposed construction and operation techniques and methods; SESH's plan, procedures, and other mitigation efforts; agency consultation; and SESH's adherence to our recommendation regarding further consultation; we believe that construction and operation of the proposed Project would not significantly affect state-listed species.

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

3.8.1 Land Use

As described in Section 2.1, the proposed SESH Project would consist of approximately 269 miles of 36- and 42-inch-diameter interstate natural gas pipeline, approximately 1.7 miles of 6-, 16-, 20-, 24-, and 42-inch-diameter laterals, three new compressor stations, two booster stations, and associated ancillary facilities. In this section, we further quantify the land requirements for construction and operation of the proposed Project, describe the current use of those lands, and evaluate the significance of the proposed Project-related impacts to those lands.

3.8.1.1 Land Requirements and Existing Cover Types

The land-use types crossed by the proposed pipeline route and located at the proposed aboveground facility sites are agricultural, forest, pine plantation, open land, residential, industrial/ commercial, and open water. Table 3.8.1-1 summarizes the current land uses that would be affected by construction and operation of the proposed Project.

Construction of the proposed Project would affect 4,021.20 acres (see Table 3.8.1-1). Approximately 46 percent of the land that would be affected during construction is characterized as forest land, 23 percent is agricultural land, 20 percent is open land, and 8 percent is pine plantation. The remaining land uses each represent less than 3 percent of the proposed construction acreage. Following construction, all land temporarily used for extra work areas (construction access roads, ATWSs, and pipeyards/wareyards) would be allowed to revert to their original use and cover type.

Operation of the proposed Project, the permanent pipeline right-of-way, and the aboveground facilities and permanent access roads would affect 1,697.10 acres. Approximately 50 percent of the land that would be affected during operation is currently classified as forest, 21 percent is agricultural, 16 percent is open land, 10 percent is pine plantation, and 3 percent is industrial/commercial. The remaining land-use categories represent less than 1 percent of the acreage required during operation.

Approximately 92 percent (3,458.43 acres) of the total acreage would be contained within the pipeline construction right-of-way and construction areas associated with the proposed aboveground facilities.

Pipeline Facilities

For the mainline pipeline in upland areas, SESH has proposed a construction right-of-way width of 125 ft for 42-inch-diameter pipeline (the first 104 miles of the Project) and 100 ft for the 36-inch-diameter pipeline (the remaining 165 miles of the Project; however, FERC is recommending SESH reduce its nominal right-of-way for the 42-inch-diameter pipeline to 100 ft. (see Section 2.2.1). In wetland areas, the construction right-of-way width would be 75 ft unless site-specific alternatives were approved. The construction right-of-way for the proposed pipeline laterals would be 75 ft. As detailed in Section 2.2, ATWSs would be required for construction at road, railroad, and utility crossings; steep slope areas; wetland and waterbody crossings; and other areas where specialized construction techniques would be required (see Table F-1 of Appendix F).

Approximately 73 percent of the 3,354.70 acres of mainline pipeline and laterals construction right-of-way consists of agricultural and forest land. Pine plantations and open lands account for an additional 24 percent of this acreage. Following construction, SESH would maintain a 50-ft-wide permanent right-of-way centered over the pipeline. In wetland areas, the maintained portion of the permanent pipeline right-of-way would be reduced to 30 ft wide. Areas disturbed by construction of the pipeline, but not retained as permanent right-of-way, would be allowed to revert to preconstruction use. 1,601.64 acres would be retained as permanent right-of-way for the operation of the proposed mainline pipeline and laterals. Approximately 72 percent of the permanent right-of-way would consist of agricultural and forest land. Pine plantations and open lands would account for an additional 25 percent of the permanent right-of-way.

Aboveground Facilities

The proposed Project would include construction and operation of 3 mainline compressor stations, 2 booster stations, 13 M&R stations, 18 mainline valves, and 3 pig launcher and/or receiver facilities. A pig launcher would be located within the fenced perimeter of the Delhi Compressor Station site. One pig launcher and receiver facility would be located approximately 11 miles northwest of the Gwinville Compressor Station site at MP 104.08 and the remaining pig receiver facility would be located near the end of the proposed Project, adjacent to the Gulfstream M&R Station at MP 269.08. Two of the mainline valves would be within the Delhi Compressor Station and the Collins Booster Station and would not result in additional land requirements beyond that noted for those facilities. The remaining 16 mainline valve sites would be installed in 25-ft by 25-ft areas within the permanent right-of-way of the pipeline. Thus, construction and operation of mainline valves would not result in land requirements beyond that already noted for the permanent pipeline right-of-way.

Table 3.8.1-1 details the land use that would be affected by construction and operation of the proposed aboveground facilities and the locations of the various aboveground facilities are depicted in maps provided in Appendix B of this EIS. Construction and operation of the proposed aboveground facilities would result in a conversion of those land uses to industrial/commercial for the life of the Project.

Access Roads

Where feasible, SESH would use existing public and private roadways including paved, graveled, and field roads, or the pipeline right-of-way itself to gain access during construction and operation of the proposed Project. SESH has indicated that construction of the proposed pipeline would require the

temporary use of 236 existing roads (see Table F-2 of Appendix F). Improvements to private roads including tree trimming, grading, and placement of gravel would be performed as needed to ensure safe access of construction-related equipment. All temporary access roads used for construction would be restored in accordance with landowner agreements and permit requirements.

No new access roads would be built for the construction or operation of the pipeline; however, nine permanent access roads would be required for operations of the proposed aboveground facilities. All new permanent access roads would be between 10 and 50 ft wide and the lengths of the roads would vary from 85 ft to 2,224 ft. Of the nine proposed permanent access roads, one is an existing road to the Texas Eastern meter station. Three of the new permanent access roads would be constructed on land currently classified as agricultural, affecting 1.82 acres. The roads would serve the Delhi Compressor Station and two meter stations, respectively. The new permanent access road to the Lucedale Compressor Station would affect 0.51 acre of land currently classified as pine plantation. The new permanent access road to the Collins Booster Station would require permanent impacts to 0.82 acre of land currently classified as forest (0.49 acre), industrial/commercial (0.27 acre), and residential (0.06 acre). The new permanent access road to the Petal Booster Station would require permanent impacts to 0.51 acre of land currently classified as forest and industrial/commercial. Two new permanent access roads would be constructed for the Rock Road lateral, affecting a total of 0.61 acre of forested lands. To minimize impacts, SESH would route all proposed new access roads through previously cleared or disturbed areas to the extent practicable. These proposed new permanent access roads are also depicted on the facility location maps provided in Appendix B of this EIS.

Pipeyards/Wareyards

SESH has proposed the temporary use of 10 pipeyards/wareyards during construction. Most of these pipeyards/wareyards would be located in land currently classified as open land or agricultural with other land-use categories comprising smaller amounts. The land requirements for these facilities would total 330.48 acres (see Table 3.8.1-1), and the general locations of these facilities are depicted in the facility location maps provided in Appendix B of this EIS. All pipeyards/wareyards would be leased from willing landowners and, upon completion of construction activities, would be returned to their preconstruction condition in accordance with landowner agreements. No permanent land-use impacts are anticipated from the use of the pipeyards/wareyards. If additional pipeyards/wareyards were required, SESH has indicated that it would use previously disturbed and/or industrial lands for those facilities to the extent practicable.

TABLE 3.8.1-1
Acreage Affected by the Proposed SESH Project

Facility	County, State	Agricultural		Forest		Pine Plantation		Open Land		Residential		Industrial/ Commercial		Open Water		Total	
		Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Pipeline																	
Pipeline	Various	765.43	336.36	1664.17	802.63	302.79	150.24	501.90	243.05	16.23	8.33	84.89	50.02	3.34	1.44	3,338.75	1,592.07
M&R Station Header Lateral	Richland, LA	0.40	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0.40	0.40
SONAT Lateral	Jefferson Davis, MS	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0.70
Transco Williams Lateral	Covington, MS	0	0	0.29	0.20	0	0	0	0	0	0	0.24	0.16	0	0	0.53	0.36
Tennessee Gas Lateral	Forrest, MS	0	0	0	0.48	0	0	0	0	0	0	0	0	0	0	0	0.48
Rock Road Lateral	Mobile, AL	0	0	13.48	6.61	0	0	0	0	0	0	0	0	0	0	13.48	6.61
Mobile Gas Services Lateral	Mobile, AL	0	0	0.64	0.42	0	0	0	0	0	0	0	0	0	0	0.64	0.42
Transco (South) Lateral	Mobile, AL	0	0	0.60	0.40	0	0	0	0	0	0	0	0	0	0	0.60	0.40
Gulf South (South) Lateral	Mobile, AL	0	0	0.30	0.20	0	0	0	0	0	0	0	0	0	0	0.30	0.20
Subtotal	----	765.83	336.76	1679.48	811.64	302.79	150.24	501.90	243.05	16.23	8.33	85.13	50.18	3.34	1.44	3354.70	1601.64
ATWS																	
ATWS	Various	41.57	0	110.83	0	15.71	0	33.14	0	2.83	0	20.81	0	0	0	224.89	0
Aboveground Facilities																	
CEGT CP Expansion M&R Station	Richland, LA	0	0	0	0	0	0	0.92	0.92	0	0	0	0	0	0	0.92	0.92
Gulf South Mississippi Expansion M&R Station	Richland, LA	0.92	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0.92	0.92
Columbia Gulf M&R Station	Richland, LA	0.92	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0.92	0.92

TABLE 3.8.1-1
Acreage Affected by the Proposed SESH Project

Facility	County, State	Agricultural		Forest		Pine Plantation		Open Land		Residential		Industrial/ Commercial		Open Water		Total	
		Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
CEGT 24-inch M&R Station	Richland, LA	0.92	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0.92	0.92
Delhi Compressor Station[a]	Richland, LA	5.53	5.53	2.82	2.82	0	0	0	0	5.93	5.93	0	0	0	0	14.28	14.28
Texas Eastern M&R Station	Claiborne, MS	0	0	0	0	0	0	0.95	0.95	0	0	0	0	0	0	0.95	0.95
Pig Receiver & Launcher	Lawrence, MS	0	0	0.92	0.35	0	0	0	0	0	0	0	0	0	0	0.92	0.35
Gwinville Compressor Station[a]	Jefferson Davis, MS	0	0	18.90	18.90	0	0	0	0	0	0	0	0	0	0	18.90	18.90
Collins Booster Station [a]	Covington, MS	0	0	4.02	4.02	0	0	15.71	15.71	0	0	0	0	0	0	19.73	19.73
Petal Booster Station [a]	Forrest, MS	13.61	7.49	3.13	1.84	0	0	0	0	0	0	0	0	0	0	16.74	9.33
Future Interconnect Tap [b]	George, MS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lucedale Compressor Station [a]	George, MS	0	0	0	0	22.28	14.59	0	0	0	0	0	0	0	0	22.28	14.59
Future Interconnect Tap [b]	Mobile, AL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Gulfstream M&R Station and Pig Receiver	Mobile, AL	0	0	1.44	1.44	0	0	0	0	0	0	0	0	0	0	1.44	1.44
Rock Road Meter Site[d]	Mobile, AL	0	0	4.81	4.81	0	0	0	0	0	0	0	0	0	0	4.81	4.81
Mainline Valves[b]	Various	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Subtotal	---	21.90	15.78	36.04	34.18	22.28	14.59	17.58	17.58	5.93	5.93	0	0	0	0	103.73	88.06

TABLE 3.8.1-1
Acreage Affected by the Proposed SESH Project

Facility	County, State	Agricultural		Forest		Pine Plantation		Open Land		Residential		Industrial/ Commercial		Open Water		Total	
		Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Access Roads																	
Access Roads[c]	Various	1.82	1.82	1.15	1.15	0.51	0.51	3.39	3.39	0.06	0.06	0.47	0.47	0	0	7.40	7.40
Pipeyards/Wareyards																	
Tallulah	Madison, LA	0	0	0	0	0	0	51.31	0	0	0	0	0	0	0	51.31	0
Letourneau	Warren, MS	36.10	0	0	0	0	0	0	0	0	0	0	0	0	0	36.10	0
Wesson	Copiah, MS	0	0	0	0	0	0	0	0	0	0	3.35	0	0	0	3.35	0
Georgetown	Copiah, MS	0	0	0	0	0	0	66.18	0	0	0	0	0	0	0	66.18	0
New Hebron	Jefferson Davis, MS	0	0	0	0	0	0	9.68	0	0	0	0	0	0	0	9.68	0
Hwy 11	Forrest, MS	0	0	2.02	0	0	0	19.81	0	0.09	0	0	0	0	0	21.92	0
Hwy 98	Perry, MS	0	0	0	0	0	0	6.24	0	0	0	0	0	0	0	6.24	0
Lucedale 1	George, MS	35.01	0	0	0	0	0	0	0	0	0	0	0	0	0	35.01	0
Lucedale 2	George, MS	0	0	0	0	0	0	60.84	0	0	0	0	0	0	0	60.84	0
Mobile	Mobile, AL	15.42	0	2.10	0	0	0	21.98	0	0	0	0.35	0	0	0	39.85	0
Subtotal	---	86.53	0	4.12	0	0	0	236.04	0	0.09	0	3.70	0	0	0	330.48	0
	TOTAL	917.65	354.36	1,831.62	846.97	341.29	165.34	792.05	264.02	25.14	14.32	110.11	50.65	3.34	1.44	4,021.20	1,697.10

[a] Acreage impacts calculated for these facilities include the impacts for collocated pigging facilities, interconnects/M&R stations, and mainline valves. Facilities that are collocated within these areas are discussed in the filed application.

[b] Impacts are included in the pipeline construction and operation impacts.

[c] Only land-use impacts due to the construction of new temporary or permanent access roads are detailed.
[d] The Rock Road meter site includes acreage impacts for the Mobile Gas Services, Transco (South), and Gulf South (South) M&R Stations, PAR-RRL2, and the filter separator.
ATWS = additional temporary workspace
CEGT = CenterPoint Energy Gas Transmission Company
Const = Construction
CP = Carthage to Perryville Project
M&R = meter/regulator
Oper = Operation

3.8.2 Easement Process

During the pre-filing and scoping periods, we received several comments regarding the easement acquisition process for the proposed Project. Prior to initiating construction, SESH would secure an easement to convey both temporary (for construction) and permanent (for operation) right-of-way. The easement acquisition process is designed to provide compensation to the landowners for the right to use the property for pipeline construction and operation. The easement agreement between the company and landowner typically specifies 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. During negotiations, SESH and affected landowners would address

- 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 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 is certificated by the FERC, SESH 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 ATWS areas. The company would still be required to compensate the landowner for the right-of-way and for any damages incurred during construction. However, a court would determine the level of compensation if a Certificate were issued. In either case, the landowner would be compensated for the use of the land. Eminent domain would not apply to lands under federal ownership.

3.8.2.1 General Impacts and Mitigation

The general impacts to land use from construction of the Project would be a function of the construction methods employed, the restoration measures implemented once construction has been completed, and the nature of the land use affected. Section 2.3 provides a detailed discussion of the proposed construction methods and post-construction restoration measures for the proposed Project.

Following construction, areas outside the permanent pipeline right-of-way disturbed by construction would be returned as near as possible to the original grade, seeded, and stabilized with temporary or permanent erosion-control devices as required. These areas would be allowed to revert to preconstruction conditions, except where individual landowner agreements negotiated during the easement acquisition process dictate other acceptable restoration measures. As a result, land-use impacts to these areas would be temporary. Because non-woody vegetation would be expected to return to preconstruction conditions within two growing seasons, impacts to areas currently classified as agricultural, commercial/industrial, or open land and located outside the permanent pipeline right-of-way would be short-term and minor. Forested/pine plantations cleared within the temporary construction right-of-way and ATWS areas would be allowed to revert to preconstruction conditions. However, this process would take years, with the duration of recovery dependent on the types and ages of trees removed. As a result, impacts to areas classified as forest and pine plantation located outside the permanent right-of-way would be long-term. However, given the prevalence of these land uses and cover types within the affected counties and parishes, such impacts would not be significant. Additional discussion of general impacts and mitigation measures that would be implemented to minimize impacts to forested areas is provided in Sections 3.4 and 3.5.

Permanent land-use changes would occur to those lands contained within the permanent pipeline right-of-way where reversion to the preconstruction cover type would not be compatible with operation of the proposed Project facilities. Land uses not allowed in the permanent pipeline right-of-way would include aboveground construction, belowground construction, and the growth, planting, or cultivation of trees. Forest and pine plantations would, therefore, be precluded from the permanent pipeline right-of-way. Allowable land uses generally permitted within the permanent right-of-way would include use of farming equipment, cultivation of row crops, and use as pastureland. Additional discussion of general impacts and mitigation measures that would be implemented to restore the permanent right-of-way is provided in Section 2.0. The construction of aboveground facilities and permanent access roads would result in the conversion of existing land uses to commercial/industrial land use for the life of the Project. Although these impacts would be permanent, the impacts would not be significant given the limited acreage involved.

In general, we believe that the impacts to land-use types would not be significant. However, we also believe that in some, more sensitive areas containing undisturbed forested tracts and unique or sensitive vegetative communities, it may be possible to reduce the impacts. An examination of information filed by SESH indicates that in some areas it may be possible to reduce the construction right-of-way to reduce the amount of clearing.

3.8.2.2 Site-Specific Impacts and Mitigation

Agricultural, Forest, and Pine Plantation

Construction could affect the productivity of agricultural and timberland within the areas disturbed by construction. SESH would work with landowners prior to construction to establish compensation agreements for crop damages and for loss of growing time. In accordance with SESH's Plan, SESH would also implement special construction procedures in agricultural areas to minimize potential impacts and restore the right-of-way to approximately preconstruction conditions (see Sections 2.3 and 3.2). Crop yields would also be monitored for two growing seasons following construction to ensure that yields in areas affected by construction are similar to yields in adjacent, undisturbed areas as described in Section 3.2.

As discussed in Section 3.8.1.1, impacts to forest land and land used as pine plantation would range from long-term in areas outside the permanent right-of-way to permanent for areas within the permanent right-of-way. As such, timber production within the construction and permanent right-of-way would be temporarily reduced or permanently precluded. As described in Section 3.9, compensation for any losses or limitations on future timber production within the construction and permanent pipeline right-of-way would be addressed during easement negotiations.

3.8.3 Existing Residences and Planned Developments

The proposed pipeline would traverse primarily rural, unincorporated areas. During the planning stages for the proposed Project, SESH consulted with county and parish planning agencies to identify currently filed proposals for residential or commercial developments within 0.25 mile of the proposed construction right-of-way or associated aboveground facilities. No such developments were identified. Six residences would be located within 50 ft of the proposed construction work area (see Table 3.8.3-1). One residential property (MP 0.26) is located at the proposed location of the Delhi Compressor Station. A mobile home at MP 35.38 is located near the Mississippi River. One abandoned mobile home near MP 230.10 is located approximately 28 ft from a construction work area. Two houses and one travel trailer will be within the construction right-of-way near MP 261.9.

TABLE 3.8.3-1
Residences Within 50 Feet of the Construction Work Area for the Proposed SESH Project

Facility	County, State	MP	Number of Residences/ Structures	Distance from Construction Work Area (ft)	Distance from Pipeline Centerline (ft)	Description
Delhi Compressor Station	Richland, LA	0.26	1	0	N/A	House[a]
Pipeline	Madison, LA	35.38	1	41	63	Mobile Home
Pipeline	George, MS	230.1	1	28	93	Abandoned Mobile Home
Pipeline	Mobile, AL	261.9	1	9	74	House
Pipeline	Mobile, AL	261.9	1	0	81	Travel Trailer
Pipeline	Mobile, AL	261.9	1	0	71	House

Notes:

[a] House is located on property SESH intends to purchase for its proposed Delhi Compressor Station site.
ft = foot/feet
MP = milepost

3.8.3.1 General Impacts and Mitigation

The general impacts of construction and operation of the proposed Project on residences could include impacts from the noise and dust; 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. In addition, the landowner would be precluded from the construction of aboveground structures and septic system leach fields and the planting or cultivation of trees or orchards on the permanent right-of-way.

To minimize disruptions to residential areas near construction work areas, SESH 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, SESH 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;
- attempt to leave mature trees and landscaping within the temporary right-of-way (especially near the outer edge) as safety and construction requirements allow;
- 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.

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. Additionally, the FERC staff is interested in ensuring that landowner issues are resolved in an effective and timely manner. Therefore, SESH would be required to develop and implement an environmental complaint resolution procedure that provides landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the proposed Project and restoration of the right-of-way (see Section 5.2).

3.8.3.2 Site-Specific Mitigation

SESH has entered into an agreement to purchase one residential property (MP 0.26) from the landowner that would be permanently converted from land classified as residential to the industrial/commercial land classification for construction and operation of the Delhi Compressor Station. The mobile home at MP 35.38 would be avoided during the crossing of the Mississippi River by HDD. Avoidance of a former SWDF located at MP 261.8 would place three residences at MP 261.9 within or less than 10 ft from the construction work area. The proximity to these three structures was required due the constraints of the former landfill on the west side of the right-of-way and several residential structures on the east side of the right-of-way. To reduce the impacts to these residences during construction, **we recommend that:**

- **Prior to construction, SESH should file a site-specific plan for the residences at MP 261.9. The plan should include:**

    a. **a description of construction techniques to be used (such as reduced pipeline separation, centerline adjustment, use of stove-pipe or drag-section techniques, working over existing pipelines, pipeline crossover, bore, etc.), and include a dimensioned site plan that shows:**

        i. **the location of the residence in relation to the new pipeline and, where appropriate, the existing pipelines;**
        ii. **the edge of the construction work area;**
        iii. **the edge of the new permanent right-of-way; and**
        iv. **other nearby residences, structures, roads, or waterbodies;**

    b. **a description of how SESH will ensure the trench is not excavated until the pipe is ready for installation and the trench is backfilled immediately after pipe installation; and**

    c. **evidence of landowner concurrence if the construction work area and fencing will be located within 10 feet of a residence.**

3.8.4 Transportation

Construction of the proposed Project could have two effects on transportation. First, transportation could be affected if the volume of construction-related vehicles resulted in delays. Second, transportation could be affected if construction resulted in road closures or lane blockages.

The Project area is a predominately low-density, rural area. As such, existing transportation infrastructure in the area consists mainly of rural roads and highways. SESH has consulted with the

counties and parishes crossed by the Project and determined that roadways in the area have the capacity to support normal traffic volumes and construction-related traffic. In addition, SESH reports that the majority of construction-related traffic would occur in the early morning and late evening, outside the normal times of expected peak traffic. As such, congestion-related delays would not be anticipated in association with construction of the proposed Project.

The proposed pipeline route would cross approximately 30 major state, U.S., and interstate highways including Interstates 55, 59, and 10. In addition, approximately 124 paved, secondary roads and 36 dirt or gravel, lightly traveled, rural roads would also be crossed by the Project. As described in Section 2.3, all major highways and interstates would be crossed using subsurface boring techniques to avoid road and lane closures. Pipeline crossings of lightly traveled, paved and rural roads would typically be accomplished via open-cut installation, which could require temporary lane blockages, closures and implementation of detours where feasible. In the absence of a reasonable detour, construction across the roadway would be staged to allow at least one lane of traffic to remain open except for the limited periods required for installing the pipeline. Efforts would also be made to schedule lane closures outside of peak traffic periods.

Construction across all roadway features would be accomplished in accordance with SESH's Plan and Procedures 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 would be expected during operation of the proposed Project.

3.8.5 Recreation and Special Interest Areas, Impacts and Mitigation

Recreation and special interest areas are defined to include lands administered or managed by federal, state, county, or local agencies; lands of historic or cultural significance; designated environmentally sensitive areas; national or state scenic rivers; and designated scenic areas or roads. This section describes the recreation and special interest areas that would be traversed by the proposed Project route.

Nationwide Rivers Inventory (NRI)

The NRI is managed by the National Park Service (NPS). Waterbodies included in the NRI are considered to possess "outstandingly remarkable natural or cultural values judged to be of more than local or regional significance." Under a 1979 Presidential Directive and related CEQ procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect any NRI segments. Waterbodies identified on the NRI meet eligibility requirements with the potential to attract visitors for their recreational use. River-related opportunities may include activities such as sightseeing, wildlife viewing, hiking and camping, boating and fishing, or swimming.

The proposed Project would cross seven waterbodies identified on the NRI: the Big Black River, Bayou Pierre, Pearl River, Okatoma River, Bowie Creek, Leaf River, and Chickasawhay River. SESH has proposed to cross all of these rivers with HDD technology; therefore, no impacts to the waterways are expected during construction or operation.

In addition, SESH has not identified any Wild and Scenic rivers, as designated by the NPS, which would be crossed by the Project.

National Wildlife Refuges (NWR)

The pipeline construction right-of-way for the proposed Project would cross the Tensas River NWR fee title property between MP 0.4 to 0.9 and pass within 80 ft of the Tensas River NWR and the NWR conservation easement between MP 5.6 to 7.0. The refuge consists of nearly 70,000 acres of bottomland hardwoods and oxbow lakes. The public uses the wildlife refuges for the following primary wildlife-dependent recreational uses as defined by the FWS: hunting, fishing, wildlife observation, photography, environmental education, and interpretation. SESH rerouted the proposed pipeline right-of-way to avoid crossing the NWR; however, the Project would cross fee title land and conservation easements managed by the refuge. At this time, SESH has not filed a plan for crossing these properties managed by the FWS and the FWS has not indicated its concerns with the crossing. Therefore, **we recommend that:**

- **SESH should file with its Project Implementation Plan the status of the special-use permit for the fee title and conservation easement lands crossed.**

The Nature Conservancy Lands (TNC)

The Project would cross 1.42 miles of land currently managed by the Mississippi Chapter of TNC between MP 209.1 and MP 210.5. The Chapter purchased approximately 3,000 acres that are adjacent to the Pascagoula WMA in 1999 and currently manages a portion of these lands as a wetland mitigation bank for the Mississippi Department of Transportation (MSDOT). Groups and the public use TNC lands for a variety of outdoor activities such as hiking, bicycling, wildlife viewing, outdoor photography, and educational activities. SESH is currently in consultation with TNC to minimize impacts to these lands. Therefore, **we recommend that:**

- **SESH should file with its Project Implementation Plan, the plan developed in consultation with The Nature Conservancy, to cross the property between MP 209.1 and MP 210.5**.

Natchez Trace Parkway

The proposed pipeline route would cross the Natchez Trace Parkway near parkway milepost 52.1. The Parkway is a National Scenic Byway and All-American Road that extends 444 miles between Natchez, Mississippi, and Nashville, Tennessee. The Parkway commemorates an ancient trail used by American Indian tribes to travel between the Mississippi River floodplain and central Tennessee. The NPS has requested that an environmental analysis be conducted for the crossing of the parkway. The site-specific environmental analysis for the crossing of the Natchez Trace Parkway is presented in Appendix G. The NPS concludes that, based on the selected route and crossing location of the Parkway; the resources present; potential impacts, including cumulative impacts; and mitigation measures, construction and operation of the proposal would not have a significant effect on the Natchez Trace Parkway.

Old Spanish Trail (Highway 90)

The proposed Project would cross Highway 90 in Mobile County, Alabama. The history of the highway is preserved by the Old Spanish Trail Association. The highway represents one of the original cross-continental highways from Florida to California with many historical sites along the route. Modern-day Interstate 10 has reduced traffic on, and significance of, the road. Alabama is the beginning of the trail and is the shortest and least preserved section of the highway. SESH proposes to cross the roadway using a road-bore technique thus avoiding any significant impacts to the road.

Conservation Reserve (CRP), Conservation Reserve Enhancement (CREP), and Wetland Reserve Program (WRP) Lands

The CRP, CREP, and WRP are voluntary programs administered by the Farm Services Agency (FSA) - CRP and CREP and Natural Resources Conservation Service (NRCS) - WRP. The CRP and CREP allow owners of agricultural land to conserve those lands with financial assistance from the federal government through planting of grasses, trees, and other cover. Typically, these areas remove 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. The program attempts to improve wetland function and wildlife habitat and to promote long-term conservation through technical and financial assistance.

CRP, CREP, and WRP lands could be crossed by the proposed pipeline route. However, the exact location and extent of these areas would not be determined until easement negotiations with potentially affected landowners are conducted. SESH has consulted with the FSA to determine the requirements for crossing of CRP and CREP lands and consulted with the NRCS for the requirements of crossing WRP lands. Upon disturbance caused by construction of the proposed Project, landowners may no longer be eligible to participate in the programs or be able to receive the payments that they currently obtain from the FSA or NRCS. Therefore, **we recommend that:**

- **SESH should file with its Project Implementation Plan the plans developed in consultation with the FSA for crossing CRP and CREP lands. These plans should indicate any avoidance, minimization, and mitigation measures identified by the FSA.**

- **SESH should file with its Project Implementation Plan the status of the subordination agreements with the NRCS for WRP tracts crossed.**

Levee Crossings

The proposed Project would cross a flood-control levee administered by the Corps of Engineers (COE), Vicksburg District, located west of and associated with the Mississippi River in Madison Parish, Louisiana. This levee provides flood control and augments Louisiana's system of waterborne recreation and transportation. The COE has requested the levee be crossed aboveground so that the levee's integrity would not be compromised. SESH has agreed to construct an aboveground pipeline crossing of the levee.

Coastal Zone Management Areas

The proposed Project would cross Coastal Zone Management Areas (CZMAs) in Jackson County, Mississippi, between MP 236.2 and MP 239.5, and in Mobile County, Alabama, between MP 267.1 and MP 268.9. In addition, the Transco (South) M&R Station, Gulf South (South) M&R Station, Gulfstream M&R Station, and pig receiver at MP 268.94 would be located within CZMAs. SESH is in consultation with the Mississippi Department of Marine Resources (MDMR), and the ADEM to determine the requirements of the coastal zone consistency determinations and to minimize impacts to these areas. **We recommend that:**

- **SESH should file documentation of concurrence from the MDMR and the ADEM that the proposed Project is consistent with the Mississippi and Alabama Coastal Zone Management Plans prior to construction in each state**

Sixteenth Section Lands

Sixteenth Section Lands are lands whose titles are held by the state of Mississippi in trust to support public education. Sixteenth Section Lands provide income to local school districts through the use or lease of lands for silviculture, agriculture, residential use, and/or hunting activities.

The Mississippi Secretary of State's Office, as the designated supervisory trustee for these areas, indicated a desire to minimize pipeline crossings of Sixteenth Section Lands to the extent practical. Impacts to these properties from pipeline crossings would result in a loss of land-use flexibility, preventing certain future property uses within permanent easements. The state requested that, if it were deemed that these properties could not be avoided, crossings occur near parcel boundaries to prevent land-use fragmentation on these lands.

The proposed Project would cross 20 Sixteenth Section Lands (see Table 3.8.5-1). Three of these Sixteenth Section Lands would not be included in the permanent pipeline right-of-way. 6.25 miles of the permanent right-of-way would cross the remaining properties. Due to these tracts' extensive size, avoidance of these lands would not be feasible. Deviation from the Project alignment through these parcels would result in the clearing of new corridors, resulting in increased wildlife habitat and vegetative community fragmentation. Thus far, no Mississippi School Boards have requested reroutes on their property.

3.8.6 Hazardous Waste Sites

SESH reviewed the LDEQ, MDEQ, and EPA websites to identify any known hazardous waste sites, including sites on the National Priority List, within 0.25 mile of the proposed Project right-of-way, but none was identified. One underground storage tank (UST) was identified in Louisiana near MP 17.8, and two USTs were identified in Mississippi, near MP 219.2 and MP 227.5. A former solid waste disposal facility (SWDF) was identified near MP 261.8. SESH has proposed to use an alternative route to avoid this inactive landfill. In the event that a hazardous waste site is discovered during the construction of the proposed Project, in accordance with the Contamination Contingency Plan and SPCC Plan as recommended in Section 3.2.3, SESH indicates that it would stop work, notify the appropriate state and federal agencies, and proceed in accordance with local, state, and federal regulations.

3.8.7 Visual Resources

Visual resources refer to the composite of basic terrain, geologic features, hydrologic features, vegetative patterns, and anthropogenic features that influence the visual appeal an area may have for residents or visitors. The proposed Project could alter existing visual resources in three ways: construction activity and equipment may temporarily alter viewscapes, construction and right-of-way maintenance would alter existing vegetation patterns, and aboveground facilities would represent permanent alterations to the viewscape. The significance of these visual impacts would be primarily dependent upon the quality of the current viewshed, the degree of alteration of that view, the number of potential viewers, and the perspective of the viewer.

TABLE 3.8.5-1
Sixteenth Section Lands Crossed by the Proposed SESH Project

Begin MP	End MP	State	County/ Parish	Township	Range	Section	Owner/Grantor
57.56	57.67	MS	Claiborne	12N	5E	19	Claiborne County School Board of Education
88.56	88.63	MS	Copiah	10N	9E	16	Hazlehurst School District
88.65	88.66	MS	Copiah	10N	9E	16	Board of Trustees of the Hazlehurst City School District
88.86	89.18	MS	Copiah	10N	9E	16	Board of Trustees of the Hazlehurst City School District
101.36	102.25	MS	Lawrence	9N	21W	16	Lawrence County School District
121.34	121.78	MS	Jefferson Davis	8N	18W	16	Board of Trustees of Jefferson Davis School District
143.79	144.38	MS	Covington	6N	15W	16	Covington County Board of Education
163.86	163.91	MS	Forrest	5N	12W	16	Petal Municipal Seperate School Board
163.91	164.2	MS	Forrest	5N	12W	16	Petal School District
164.12	164.28	MS	Forrest	5N	12W	16	George S. McLemore & Sharon F. McLemore
164.28	164.66	MS	Forrest	5N	12W	16	Petal Municipal Seperate School Board
164.66	164.73	MS	Forrest	5N	12W	16	Petal School District
164.73	164.87	MS	Forrest	5N	12W	16	Forrest County, Mississippi
178.6	179.22	MS	Perry	4N	10W	16	Richland School Board of Education
187.75	188.79	MS	Perry	3N	9W	16	Perry County Schools
212.8	213.85	MS	George	1S	7W	16	Tom Creek Hunting Club (Lessee)
219.15	219.17	MS	George	2S	7W	11	George County School District

Notes:
MP = milepost

3.8.7.1 Current Viewshed

Most of the proposed Project would extend through primarily rural areas that consist of pine plantation, forest lands, and agricultural lands with scattered residences. Most areas along the route do not provide long-range, unobstructed views, in part because of the topography, and because much of the land adjacent to the proposed route is forested. However, public viewpoints are present along some of the

roadways in the proposed Project area. SESH would locate aboveground facilities near existing pipeline or industrial/commercial areas to the maximum extent possible. Other aboveground facilities would be located in remote areas and within forested regions. Areas of forest land would be left standing around the facilities, where possible, to create visual buffers to the facilities.

3.8.7.2 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 would likely 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 proposed Project area.

After completion of construction, the temporary right-of-way would be restored to approximately preconstruction contours and allowed to revert to preconstruction uses and cover type. About 38 percent of the proposed pipeline route would traverse agricultural 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, recovery in affected forested areas outside the permanent pipeline right-of-way could take many years, and forestland within the permanent right-of-way would be maintained in a condition free of woody vegetation for the life of the proposed Project. To reduce visual impacts related to the permanent pipeline corridor, SESH's proposed route would be collocated with or parallel to existing utility right-of-way where possible, thereby minimizing impacts to previously undisturbed vegetation. The proposed pipeline route would parallel existing right-of-way for 58.51 miles. 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 collocate with existing right-of-way, would generally be limited to a relatively small number of individuals and brief observations afforded in areas where the corridor intersects roadways. As a result, the visual impact of the permanent pipeline corridor would be minor.

SESH has avoided crossing state and federally managed lands to the extent possible and has also avoided most scenic vistas. However, as described in Section 3.1.5, the proposed Project route would cross seven NRI-listed waterbodies, lands adjacent to and managed by the Tensas River NWR, and lands adjacent to and managed by TNC. All of the NRI-listed waterbodies are proposed to be crossed via HDD technology so long-term impacts would be minimized. Although impacts to visual quality would be long-term, due to the presence of the permanent pipeline right-of-way through the Tensas River NWR-managed land and through lands managed by TNC, SESH would continue consultations with these land-management agencies and implement any plans to address additional mitigation measures they may recommend.

Aboveground Facilities

The proposed Project would include construction and operation of 3 compressor stations, 2 booster stations, 13 M&R stations, 18 mainline valves, and 3 pig launcher/receiver facilities. Most of the aboveground facilities would either be constructed in areas where existing view sheds contain similar features or where views would be obstructed either 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 right-of-way or industrial facilities as a group, the aboveground facilities

would represent a minor visual alteration that would persist for the life of the proposed Project. The potential site-specific visual impacts of each aboveground facility are described below.

Compressor Stations and Booster Stations

Each of the proposed compressor station sites would contain two main buildings: one insulated building housing a compressor unit and associated equipment and another building housing control and auxiliary 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.

The Delhi Compressor Station would be located at MP 0.22 in Richland Parish, Louisiana. The proposed site is 14.28 acres including 5.53 acres of agricultural land, 2.82 acres of forest land, and 5.93 acres of residential land. SESH has entered into an agreement with the landowner to purchase the residential property that would be converted into industrial/commercial use.

The Gwinville Compressor Station would be located at MP 115.70 in Jefferson Davis County, Mississippi. The proposed site would permanently affect 18.9 acres of forestland for operation of the facility.

The Lucedale Compressor Station would be located at MP 212.34 in George County, Mississippi. The proposed site would permanently affect 14.59 acres of pine plantation for operation of the facility.

The Collins Booster Station would be located at MP 138.22 in Covington County, Mississippi. The booster station would be collocated with the Transco M&R Station. The proposed site would permanently affect 19.73 acres of open land and forest for construction and operation of the facility.

The Petal Booster Station would be located at MP 166.54 in Forrest County, Mississippi. The booster station would be collocated with the Tennessee Gas M&R Station and the Tennessee Gas lateral. The proposed site would permanently affect 16.74 acres of agricultural land and forest for construction and 9.33 acres for operation.

Mainline Valve Sites

Two of the 18 proposed mainline valves would be located within the Delhi Compressor Stations and Collins Booster Station and would not result in additional visual impacts beyond that noted for those facilities. The remaining mainline valve sites would consist of 25-ft by 25-ft areas surrounded by chain-link fence within the confines of the permanent pipeline right-of-way.

Meter/Regulator Stations

Thirteen M&R stations would be constructed at various locations along the pipeline right-of-way to meter the flow and adjust the pressure of natural gas received from or delivered to other systems. Eight of the M&R stations are collocated at compressor and booster stations. Three of the M&R stations are located at the terminus of the proposed Project in Coden, Alabama, near the Gulfstream Compressor Station. The remaining two M&R stations are stand-alone facilities located within the permanent pipeline easement.

3.8.8 Conclusions Regarding Impacts to Land Use, Recreation and Special Interest Areas, and Visual Resources

The proposed Project would affect multiple land-use types. Impacts to non-forested areas temporarily disturbed by construction would be temporary and short-term, for the most part. The impacts to forested areas temporarily disturbed by construction would be long-term, because of the slow growth rate of trees. The impacts from the permanent right-of-way may be short-term in non-forested areas and long-term or permanent in forested areas. Aboveground facilities would permanently affect the land use within their footprints.

However, these impacts would not be significant, overall, given the large amount of forested lands near the proposed Project. Additionally, most of the impacts to other land-use types would not result in a permanent conversion of use. Several special interest areas and specially managed lands would also be affected by the Project, but based on SESH's proposed mitigation measures and plans, ongoing consultations with managing authorities, and our recommendations, we believe that potential impacts would be minimized.

3.9 SOCIOECONOMICS

3.9.1 Region of Influence

The proposed Project would consist of approximately 269 miles of 42-inch- and 36-inch-diameter natural gas pipeline and approximately 1.7 miles of pipeline laterals through 2 parishes in Louisiana, 13 counties in Mississippi, and 1 county in Alabama (see Table 3.9.1-1). The proposed Project would involve the addition of three new compressor stations in Richland Parish, Louisiana, and Jefferson Davis and George counties, Mississippi. In addition to the compressor stations, there would be construction of two new field booster stations in Covington and Forrest counties, Mississippi. For the purposes of this socioeconomic analysis, all of these counties and parishes are defined as the region of influence for the proposed Project.

Several potential socioeconomic effects would manifest themselves within the region of influence. Temporary effects during construction of the proposed Project would include alteration of population levels or local demographics, increased demand for housing and/or public services, and increased employment opportunities. In addition, construction would result in increased government revenue associated with sales and payroll taxes.

Potential socioeconomic impacts associated with long-term 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 3.9.1-1 reports populations and selected demographic characteristics in the states, counties, and parishes that would be traversed by the proposed Project. Based on census data for the year 2000, the total population in these counties and parishes is 922,871. The proposed Project area as a whole has sustained a population increase between the years 1990 to 2000 with only Jefferson Davis County, Mississippi, experiencing a (minimal) decline over this 10-year period. Population growth in several counties (Madison Parish, Louisiana, and Simpson, Covington, and Greene counties, Mississippi) far exceeded the statewide average. (U.S. Census Bureau [USCB] 2005)

Population densities in the region of influence range from a low of 18.7 persons per square mile in Greene County, Mississippi, to a high of 324.3 persons per square mile in Mobile County, Alabama. These densities are relatively low compared to urban area densities that typically range from 3,000 to 6,000 persons per square mile and are consistent with an area that is predominately rural and agricultural (FERC 2006).

The number of residents within the region of influence would increase temporarily during construction, which would occur for approximately 6 to 8 months (November 2007 to June 2008), as proposed (see Table 3.9.2-1). The peak construction workforce would be 2,450 workers, of which about 60 percent (1,470) would be local (Duke Energy 2006). Assuming 0.8 family members would accompany each non-local worker (980) (FERC 2006), total construction-related immigration would be approximately 1,764 persons (see Table 3.9.2-1). SESH indicates that construction of the pipeline would entail the simultaneous activity of three individual construction spreads over the proposed Project route. Additional work crews would also be employed at each of the proposed aboveground facilities. As such, these workers would be distributed along the length of the proposed Project route and throughout the region of influence, thereby minimizing the potential population level and demographic effects to any individual county or parish.

TABLE 3.9.1-1
Population and Demographics in the Region of Influence for the Proposed SESH Project

State, County, Parish	2005 Population[a]	Population Change since 1990 (%)	2002 Population Density[b]	White, non Hispanic[c] (%)	Black or African American[c] (%)	Hispanic[c] (%)	Asian[c] (%)	Native American[c] (%)
LOUISIANA	4,523,628	5.9	102.6	61.8	33.0	2.8	1.4	0.6
Richland Parish	20,526	1.7	37.6	60.7	37.7	1.3	0.2	0.1
Madison Parish	12,457	10.2	22.0	35.7	61.8	2.4	0.3	0.1
MISSISSIPPI	2,921,088	10.5	60.6	59.9	36.8	1.7	0.7	0.5
Warren County	49,131	3.7	84.6	52.2	45.1	1.2	0.8	0.2
Claiborne County	11,492	4.1	24.3	15.0	84.2	0.8	0.3	0.0
Copiah County	29,164	4.2	37.0	47.9	50.5	1.3	0.2	0.1
Simpson County	27,944	15.4	46.9	63.3	34.8	1.4	0.1	0.1
Lawrence County	13,502	6.4	30.8	66.5	32.2	0.8	0.4	0.2
Jefferson Davis County	13,158	-0.6	34.2	41.1	57.8	1.0	0.3	0.1
Covington County	20,273	17.4	46.9	62.6	36.1	1.0	0.1	0.1
Jones County	66,160	4.7	93.6	68.6	27.2	3.3	0.4	0.5
Forrest County	75,095	6.3	155.6	62.0	34.7	1.4	0.9	0.3
Perry County	12,160	11.7	18.8	75.4	23.0	1.1	0.2	0.4
Greene County	13,183	30.1	18.7	72.6	26.2	0.8	0.1	0.3
George County	21,259	14.8	40.0	87.3	9.2	2.4	0.2	0.4
Jackson County	135,940	14.0	180.8	72.4	21.7	2.5	1.8	0.4
ALABAMA	4,557,808	10.1	87.6	69.5	26.4	2.2	0.8	0.5
Mobile County	401,427	5.6	324.3	61.2	34.4	1.3	1.6	0.7

a USCB 2005
b USCB 2002
c Poverty Status of Families (USCB 2004)

As depicted in Table 3.9.2-1, construction-related immigration would increase the population in the region of influence by about 0.2 percent. This would represent only a minor, temporary population increase confined to the proposed Project's period of construction. The FERC does not believe the work force would have a significantly different demographic profile than that observed within the region of influence. As such, changes to local demographics are not anticipated to result from construction of the proposed Project. During operation, SESH estimates that the proposed Project would employ approximately 12 full-time workers. This would represent only a negligible long-term population and demographic alteration.

The proportion of residents that belong to minority groups within the region of influence is higher than the proportions reported in the states of Louisiana, Mississippi, and Alabama by approximately 2, 3 and 11 percent, respectively (see Table 3.9.1-1). The mix of minority groups in the region of influence contains a greater percentage of persons describing themselves as black or African-American and a lower percentage of Hispanic, Asian, and Native American persons relative to the state-level statistics. As discussed in Section 3.9.3, per capita income in the region of influence is lower than the states as a whole, while the proportion of persons below the poverty level and unemployment rates are higher.

The proposed Project would have negligible to minor effects on socioeconomic characteristics and economies of the region, and many of the project-related effects would be positive. As discussed throughout this EIS, environmental effects associated with the proposed Project would be minimized

TABLE 3.9.2-1
Estimated Maximum Population Change in the Region of Influence for the SESH Project

County/ Parish	Pipeline Workforce	Compressor Stations Workforce	Field Booster Station Workforce	Total Workforce	Non-Local Workforce	Family Members	Population Change (Number)	Population Percent Change
LOUISIANA								
Richland Parish	100	250		350	140	112	252	1.23
Madison Parish	100			100	40	32	72	0.58
MISSISSIPPI								
Warren County	100			100	40	32	72	0.15
Claiborne County	100			100	40	32	72	0.63
Copiah County	100			100	40	32	72	0.25
Simpson County	83			83	33	27	60	0.21
Lawrence County	83			83	33	27	60	0.44
Jefferson Davis County	83	250		333	133	107	240	1.82
Covington County	83		100	183	73	59	132	0.65
Jones County	83			83	33	27	60	0.09
Forrest County	84		100	184	74	59	132	0.18
Perry County	100			100	40	32	72	0.59
Greene County	100			100	40	32	72	0.55
George County	100	250		350	140	112	252	1.19
Jackson County	100			100	40	32	72	0.05
ALABAMA								
Mobile County	100			100	40	32	72	0.02
Totals	1,500	750	200	2,450	980	784	1,764	

Source: Duke Energy 2006

and/or mitigated, as applicable. Further, the proposed Project would be located in rural areas of low population density. There is, therefore, no evidence that the proposed Project would have 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 a pipeline failure. Section 3.12 discusses the risks and associated impacts 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 route of the proposed Project through rural, sparsely populated areas would 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 groups.

The public review and comment process that the FERC implemented in association with the environmental review of the proposed Project is discussed in Section 1.4. In addition to the public review and comment process implemented by the FERC, SESH has communicated directly with the property owners that would be affected by the proposed Project, irrespective of minority or income status, regarding the proposed route and the results of archaeological and environmental surveys of their property. Future landowner contacts may include open houses, communications via local newspapers, mailings to all property owners, and continued discussions with those parties whose interests would be affected by the proposed Project, again without regard to minority or income status. Therefore, all groups have been provided appropriate opportunities to participate in the EIS process.

3.9.3 Economy and Employment

The civilian labor force within the region of influence includes 416,000 individuals whose major employment sectors are manufacturing, healthcare, and social services. On average, the counties and parishes within the region of influence report that unemployment is slightly higher, except for Mobile County, Alabama, and per capita income is slightly lower than the state-level values reported for Louisiana, Mississippi, and Alabama. Mobile County, the only county affected in Alabama, has an unemployment rate that is almost one-half that of the region of influence (see Table 3.9.3-1).

Construction of the proposed Project would result in the hiring of approximately 1,470 local workers. Additional jobs would also be created because of secondary activities associated with construction of the proposed Project, as purchases made by non-local workers on food, clothing, lodging, gasoline, and entertainment would have a temporary, stimulatory effect on the local economy. These jobs would represent a temporary, moderate increase in employment opportunities within the region of influence. During operation, the proposed Project would create 12 full-time positions. This would represent a minor, permanent increase in the number of employment opportunities within the region of influence.

3.9.4 Housing

Table 3.9.4-1 reports selected housing statistics for the region of influence. Within this region, there are approximately 15,600 rental units and units used for seasonal, recreational, or occasional use. Approximately 14,802 hotel or motel rooms supplement this potential housing stock.

TABLE 3.9.3-1
Current Income and Employment within the Region of Influence for the Proposed SESH Project

County/Parish	1999 Per Capita Income ($)[a]	2003 Population Below Poverty Level (%)[a]	Civilian Labor Force[b]	Unemployment Rate (%)[b]	Major Industry
LOUISIANA	16,912	18.1	NA	7.1	NA
Richland Parish	12,479	23.4	8,603	7.8	Health care and social services, manufacturing and retail trade
Madison Parish	10,114	28.5	4,685	9.7	Health care and social services, retail trade, accommodation and food services
MISSISSIPPI	15,853	18.3	NA	7.9	NA
Warren County	17,527	17.6	23,448	7.6	Wood manufacturing, accommodation and food services, retail trade, and health and social services
Claiborne County	11,244	25.5	3,821	12.3	Health care and social services and retail trade
Copiah County	12,408	21.2	12,958	8.4	Food manufacturing, health care and social services
Simpson County	13,344	19.7	12,352	6.5	Health care and social services, retail trade
Lawrence County	14,469	17.5	5,259	8.6	Paper manufacturing, retail trade, health and social services
Jefferson Davis County	11,974	22.9	5,370	10.1	Health care and social services, retail trade
Covington County	14,506	19.3	9,007	7.0	Food manufacturing, retail trade, health care and social services
Jones County	14,820	18.7	30,895	6.1	Manufacturing, retail trade and health care and social services
Forrest County	15,160	20.4	36,640	6.5	Health care and social services, retail trade and manufacturing
Perry County	12,837	18.3	5,359	8.6	Manufacturing, retail trade, health and social services
Greene County	11,868	19.8	4,865	10.0	Retail/wholesale trade, health care and social services
George County	14,337	16.1	8,621	9.3	Retail trade, health care and social services, accommodation and food services
Jackson County	17,768	15.0	63,498	10.1	Manufacturing, professional, scientific and technical services, retail trade and health care and social services
ALABAMA	18,189	15.2	NA	4.0	NA
Mobile County	17,178	18.5	180,978	4.5	Health care and social services, and retail trade

a Poverty Status in 1999 of Families (USCB 2000)
b USCB 2005
NA = Not applicable

TABLE 3.9.4-1
Temporary Housing Units Available within the Region of Influence for the Proposed SESH Project

County/Parish	Rental Units[a]	Rental Vacancy Rate (%)[b]	Units for Seasonal, Recreational, or Occasional Use[a]	Number of Hotel/Motel Rooms	Total Units
LOUISIANA	**54,185**	**9.3**	**39,578**	**NA**	**NA**
Richland Parish	159	7.1	246	160	406
Madison Parish	104	5.8	167	92	259
MISSISSIPPI	**29,486**	**9.2**	**21,845**	**NA**	**NA**
Warren County	822	12.1	199	1,218	1,417
Claiborne County	68	8.5	149	4	153
Copiah County	191	8.6	176	43	219
Simpson County	161	7.8	202	90	292
Lawrence County	72	8.3	241	30	271
Jefferson Davis County	78	8.9	124	NA	124
Covington County	124	10.4	121	93	214
Jones County	614	9.8	249	844	1,093
Forrest County	1,205	10.0	175	1,887	2,062
Perry County	109	13.8	142	NA	142
Greene County	70	11.6	265	4	269
George County	119	11.3	191	NA	191
Jackson County	1,367	10.1	613	6,427	7,040
ALABAMA	**64,091**	**11.8**	**47,205**	**NA**	**NA**
Mobile County	5,316	10.2	1,757	3,910	5,667
Total	**10,579**	**9.3**	**5,017**	**14,802**	**19,819**

Source: USBC(http://www.census.gov/)
a Denotes 2005 data
b Denotes 2002 data
NA= Not applicable

At its peak, construction of the proposed Project would require 1,764 non-local workers, together with family members as described in Section 3.9.2. If each worker required his or her own housing unit, the non-local work force would occupy about 8.0 percent of the temporary housing within the region of influence. Thus, the temporary housing available within the region of influence would be capable of meeting the temporary and moderate increased demand for housing resulting from construction of the proposed Project. Housing demand for the 12 permanent positions generated by operation of the proposed Project would represent a permanent but minor increase in housing demand.

3.9.5 Property Values

During the pre-filing period for the proposed Project, we received several comments regarding the proposed Project's impact on property values and related economic considerations. These concerns generally centered on four topics: devaluation of property if encumbered by a pipeline easement, the

responsible party for property taxes within a pipeline easement, the potential for Project-effects on landowner insurance premiums, and economic effects resulting from lost timber production values.

The impact that a natural gas project could have on the value of any land parcel depends on many factors. These include the size of the parcel, the parcel's current value and land use, and the value of other nearby properties. However, subjective valuation is generally not considered in appraisals. This is not to say that the proposed Project would not affect resale values. Potential purchasers may make a decision based on intended future use and, if the presence of the proposed Project would make that use infeasible, it is possible that that potential purchaser would not acquire the parcel. However, each potential purchaser has differing criteria and means.

Landowners are responsible for all property taxes levied against parcels, and this responsibility would be independent of the existence of any related pipeline easement for the proposed Project. However, if a landowner felt that the proposed Project, should it be constructed, would reduce the value of their property, he or she could appeal the assessment and subsequent property taxation to the local property taxation agency. If the parcel were re-appraised, the landowner would then be responsible for property taxes based upon an appraisal that directly incorporated the pipeline easement.

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 pipeline facilities would not have an impact on homeowner insurance rates (FERC 2004). As such, the FERC believes that homeowners' insurance rates would be unlikely to change because of construction and operation of the proposed Project facilities.

3.9.6 Government Revenue

Table 3.9.6-1 reports the total government revenue of the counties and parishes that would be crossed by the proposed Project. A portion of the estimated $235-million proposed Project construction payroll would be spent locally for the purchase of housing, food, gasoline, and entertainment during construction. The exact amount would be dependent upon the proportion of the workforce that was local, the behavior of individual workers, and the duration of their stay. Most of the materials for construction of the proposed Project would be purchased from a national vendor; however, common supplies, such as welding rods, would be purchased from vendors within the proposed Project counties. The majority of construction-related expenditures would be subject to Louisiana's, Mississippi's, or Alabama's state sales taxes of 4, 7, and 4 percent, respectively. This increase in sales tax would represent a minor, short-term increase in government revenues.

Table 3.9.6-1 contains SESH estimates 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 a less than 1 percent change of the counties' total revenues. Thus, operation of the proposed Project would provide a permanent but minor increase in government revenues.

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 923,000 people (Section 3.9.2).

Construction of the proposed Project would temporarily increase demand for medical, police, and fire protection services. SESH has determined that sufficient public services exist to meet proposed Project-related needs. Further, SESH would work with local law enforcement and emergency response

TABLE 3.9.6-1
County/Parish Revenue and Estimated Annual Tax Payments for the Proposed SESH Project

County/Parish	Total Revenue (thousands)[a]	Estimated Annual Tax Payments by SESH[b]	Percent Change
LOUISIANA	$27,387,749	NA	NA
Richland Parish	$87,389	$838,645	0.96
Madison Parish	$39,768	$1,911,222	4.81
MISSISSIPPI	$15,905,116	NA	NA
Warren County	$127,301	$136,807	0.11
Claiborne County	$37,588	$222,032	0.59
Copiah County	$85,614	0	0.0
Simpson County	$44,027	0	0.0
Lawrence County	$27,983	$213,045	0.76
Jefferson Davis County	$28,704	$519,364	1.81
Covington County	$47,760	$464,515	0.97
Jones County	$209,448	$117,759	0.06
Forrest County	$410,179	$345,916	0.08
Perry County	$70,576	$402,080	0.57
Greene County	$18,897	$707,367	3.74
George County	$50,358	$746,354	1.48
Jackson County	$444,230	$262,549	0.06
ALABAMA	$24,112,550	NA	NA
Mobile County	$1,032,297	$1,098,205	0.01
Total	$2,762,119	$9,031,678	0.03

Source: [a] U.S. Department of Commerce, Bureau of the Census, Census 2000 online database. (http://www.census.gov/)
[b] Duke Energy 2006
NA= Not Applicable

agencies to coordinate effective emergency procedures for the proposed Project during construction and operation (see Section 3.12.1).

We note that construction of the proposed Project would occur during the school year, and a significant influx of students would place considerable strain on the region's approximately 21,200 education workers. However, due to the nature of the proposed construction and its relatively short duration (6 to 8 months), non-local workers are not expected to be accompanied by substantive numbers of children. Thus, any impact would be minor and temporary.

Twelve operations workers and their associated family members would represent a minor, permanent increase in the demand for the provision of public services. However, this increased demand would be offset by the proposed Project-related increase in government revenues associated with operation.

TABLE 3.9.7-1
Existing Educational, Medical, Police, and Fire Full-time Equivalents within the Region of Influence for the Proposed SESH Project

County/Parish	Education	Health & Hospitals	Police Protection	Fire Protection	Total Full-time Equivalent
LOUISIANA	101,050	13,675	11,791	4,280	130,796
Richland Parish	600	403	21	4	1,028
Madison Parish	386	0	1	0	387
MISSISSIPPI	69,336	17,885	7,094	3,164	99,747
Warren County	1,112	1	165	150	1,428
Claiborne County	287	63	34	15	399
Copiah County	791	141	58	15	1005
Simpson County	655	53	51	0	759
Lawrence County	391	131	17	4	543
Jefferson Davis County	355	177	21	5	558
Covington County	500	136	22	3	661
Jones County	2,156	1,057	145	69	3,427
Forrest County	1,631	2,747	235	114	4,727
Perry County	281	201	34	1	517
Greene County	264	2	6	1	273
George County	453	5	34	3	495
Jackson County	3,293	9	323	159	3784
ALABAMA	92,029	27,240	10,605	4,838	134,712
Mobile County	8,065	399	1,096	522	10,082
PROJECT AREA TOTAL	21,220	5,525	2,263	1,065	29,773

Source: www.harvester.census.gov, 2006
NA= Not Applicable

3.9.8 Transportation

Construction of the proposed Project could have two distinct effects on transportation. First, transportation could be affected if the volume of construction-related vehicles resulted in delays or other inconveniences. Second, transportation could be affected if construction resulted in road closures or lane blockages.

Construction of the proposed Project would result in minor, short-term negative impacts on the transportation network in the Project area. Major highways, railroads, and some paved roads would be crossed by boring techniques under the road, thus avoiding impacts to traffic flow or damage to the rails or road surfaces. Unpaved roads generally would be crossed by the open-cut method, which takes approximately one day to complete. To minimize traffic delays, SESH would establish detours before open cutting these roads. If no reasonable detour is feasible, at least one traffic lane would be left open except for the brief period when road closure is required to lay the pipeline. During the brief period when a road may be completely cut, steel plates would be available on-site as needed to cover the open area and permit travel by emergency vehicles. The state or county highway/road departments would issue permits for roads to be open cut and bored. These permits typically include provisions to minimize traffic disruption that SESH would vigorously implement.

The movement of construction equipment and materials to and from pipe yards/ware yards and the construction work area would result in modest, incremental, short-term impacts on the transportation network. Several construction-related trips would be made each day on each spread. This level of traffic

would remain more or less consistent throughout the construction period and would typically occur during the early morning and evening hours. To ensure safe conditions, SESH would direct its construction contractors to enforce local weight restrictions and related limitations on its vehicles. When it is necessary for heavy equipment to cross roads, mats and other appropriate measures (e.g., sweeping) would be used to reduce and remove any deposited soil and mud. Once equipment and materials reach the construction work area, construction traffic would remain on the right-of-way except to cross roads.

The daily commuting of workers to and from the construction work areas would also result in slight increases in traffic volumes. The potential for traffic congestion caused by construction workers commuting to and from work would be greatest if each worker used a personal vehicle and most travel took place during peak traffic hours. Pipeline construction work is typically scheduled to take advantage of daylight hours (typically starting at 7:00 a.m. and finishing at 6:00 p.m., 6 days a week); therefore, most workers would commute to and from the construction right-of-way during off-peak hours. Appropriate traffic control measures, such as flagmen and signs, would be used to ensure safety of local traffic. To minimize the volume of worker traffic, SESH and its contractors would encourage construction workers to leave their personal vehicles at pipe yards/ware yards or other mobilization areas and share rides to the construction right-of-way. As necessary to avoid congestion, contractors would provide buses to move workers from common parking areas to the construction work area.

Because pipeline construction would move sequentially along the pipeline route, any local traffic flow impacts that do arise would be temporary (i.e., several days to one week) at any particular location. During construction of aboveground facilities, traffic flow impacts would be of somewhat longer duration but would be temporary. Given the remote, rural locations of the compressor and booster stations, no measurable impacts to roadway traffic are anticipated. Operation and maintenance of the proposed Project facilities would result in negligible impacts on transportation since the number of workers would be very small.

Prior to construction, SESH would consult with relevant agencies in each county and parish crossed by the proposed Project to obtain any necessary road crossing and related permits. These permits typically include provisions to minimize traffic disruption that SESH would vigorously implement. SESH would also consult with the counties and parishes where major aboveground facilities are to be located to initiate permitting activities and identify any traffic concerns that might require implementation of special traffic control measures.

Road detours and traffic congestion associated with the movement of large construction vehicles and the crossings of roads by the pipeline could increase the workload of local police. Although the number of on-the-job accidents is expected to be small, such occurrences would intermittently increase the demand for police, fire, and medical services. SESH would require its contractors to have a safety program in place to minimize the potential for on-the-job accidents. In any regard, the anticipated demand for police, fire, and medical services would not be expected to exceed the existing capability of the infrastructure in the proposed Project area (see Table 3.9.7-1).

3.9.9 Impact on Specific Economic Sectors

The potential for the proposed Project to result in significant effects to agriculture and forestry economic sectors is considered in this section. These sectors are defined to include activities associated with harvested crops, timber production, livestock pasturing, and/or dairy production. This analysis focuses on the effects of potential land-use changes (e.g., the incorporation of commercial forestry lands into the construction or permanent rights-of-way) on regional economic sectors. Additional discussion of

the potential for project-related effects to the agricultural and commercial forestry lands that would be crossed by the proposed pipeline route is provided in Section 3.8 of this document.

The vast majority of the land in all three states affected by the proposed Project is either forested or agricultural (approximately 77 percent in Louisiana, 85 percent in Mississippi, and 79 percent in Alabama (USDA 1997 and NRCS 1997). In Louisiana, 47 percent of the land is in forest, 9 percent in pasture, and 21 percent in cropland. In Mississippi, 55 percent of the land is in forest, 18 percent in pasture, and 12 percent in cropland. In Alabama, 58 percent of the land is in forest, 8 percent in pasture, and 13 percent in cropland.

As described in Section 3.8, construction and operation of the proposed Project would permanently affect 358.36 acres of agricultural land and 165.34 acres of lands currently used for commercial forestry practices, as these areas would be contained within the permanent pipeline right-of-way. Agricultural operations within the vast majority of permanent pipeline right-of-way would not be precluded during operations. No significant effect to that economic sector would be anticipated in association with construction and operation of the proposed Project as affected agricultural lands would largely return to their preconstruction condition and use. Commercial forestry practices would be permanently precluded within the permanent pipeline right-of-way. However, given the magnitude of the land potentially affected relative to the total amount of land dedicated to sector production, no quantifiable impacts to the forestry economic sector would be expected.

3.10 CULTURAL RESOURCES

Section 106 of the 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 NRHP and to provide the ACHP an opportunity to comment on the undertaking. SESH, as a non-federal party, is assisting the FERC in meeting its obligations under Section 106 of the NHPA by conducting the field surveys and evaluations required by ACHP regulations in 36 CFR Part 800.

3.10.1 Results of Cultural Resources Survey

SESH conducted a cultural resource survey between June 2006 and March 2007 for the proposed pipeline, laterals, associated aboveground facilities, access roads, and pipeyards and wareyards of the proposed Project route through Louisiana, Mississippi, and Alabama. SESH conducted surveys for historic structures where construction of aboveground facilities or vegetation clearing could affect the viewshed of any structure eligible for the NRHP. The survey area for historic structures was 0.5 mile from the proposed pipeline corridor and aboveground facilities.

3.10.1.1 Louisiana

The initial, approximately 36 miles of the total 269-mile proposed Project route would be within Louisiana. SESH conducted a cultural resource survey in Louisiana for the pipeline corridor, 16 miles of access roads, 18 acres of aboveground facilities, and 51 acres of pipeyards and wareyards. Five miles of access roads have not yet been surveyed. Survey of these roads and subsequent consultation with the Louisiana State Historic Preservation Office (SHPO) regarding potential impacts to important cultural resources would be completed prior to any construction or improvement activities occurring on these roads.

During the survey conducted within Louisiana, SESH identified 14 archaeological sites and 1 isolated prehistoric artifact. One previously recorded site, a Mississippi Period mound complex, is considered eligible for listing on the NRHP. SESH would reroute the pipeline to avoid this site. Another

previously recorded site is considered potentially eligible. SESH would avoid this site by extending an HDD at Despair Lake, which is adjacent to the site, to continue under and past the site. Three newly recorded sites were considered potentially eligible for the NRHP. These three sites have undergone archaeological test excavations to determine their NRHP eligibility status. The eligibility of two of the sites could not be determined based on the deposits present in the Project right-of-way. SESH would avoid these two sites by fencing off portions of the right-of-way as construction "exclusion zones." Based on testing data, the third site is eligible for the NRHP. SESH would consult with FERC and the Louisiana SHPO to develop measures to mitigate the impacts to this site. The remaining nine sites and the isolated artifact are considered not eligible for listing in the NRHP, and no further work is recommended.

SESH did not identify any historic structures meeting the criteria for NRHP eligibility within the area of potential effect (APE) for the proposed Project in Louisiana, which includes the viewshed from access roads and aboveground facilities. No cemeteries were identified in the proposed Project APE in Louisiana.

SESH submitted the initial cultural resources survey report to the Louisiana Department of Culture, Recreation, and Tourism's Division of Archaeology and Historic Preservation, which functions as the SHPO in Louisiana, on December 15, 2006, and requested concurrence with these findings. The Louisiana SHPO responded on March 7, 2007 with concurrence on the survey report findings. SESH also submitted an Addendum Phase I Survey letter report for the supplemental Project facilities in Louisiana to the Louisiana SHPO in March 2007. SESH submitted the results of Phase II testing to the Louisiana SHPO in March 2007 for review and concurrence. SESH would consult with the Louisiana SHPO regarding proposed avoidance or mitigation measures.

3.10.1.2 Mississippi

Approximately 204 miles of the total 269-mile proposed Project route is within Mississippi. SESH conducted a cultural resource survey in Mississippi for the pipeline corridor, 0.25 miles of lateral, 28 miles of access roads, 79 acres of aboveground facilities, and 239 acres of pipeyards and wareyards. Thirty-nine miles of access roads have not yet been surveyed. Survey of these roads and subsequent consultation with the Mississippi SHPO regarding potential impacts to important cultural resources would be completed prior to any construction or improvement activities occurring on these roads.

The survey conducted within Mississippi identified 52 archaeological sites and 28 isolated prehistoric artifacts. Three archaeological sites were considered potentially eligible for listing in the NRHP. SESH would avoid one site by a reroute. SESH conducted Phase II archaeological testing excavations on the second site. This site is determined eligible for the NRHP; however, the portion within the Project right-of-way does not contribute to the site's significance. There would be no adverse impact to the site if all construction activities were restricted to the right-of-way. SESH is evaluating avoidance options for the third site. The remaining 49 sites and 28 isolated artifacts are considered not eligible for listing in the NRHP, and no further work is recommended.

SESH identified one historic structure that is potentially eligible for NRHP-listing. The Richton Lookout Tower is located 600 ft north of the proposed pipeline corridor. However, another pipeline and a transmission line are found in the area of the tower and the addition of the SESH pipeline right-of-way would not significantly affect the viewshed of the tower. No cemeteries were identified in the proposed Project APE in Mississippi.

SESH submitted the initial cultural resources survey report to the Mississippi Department of Archives and History, which functions as the SHPO in Mississippi, on December 15, 2006, and requested concurrence with these findings. The Mississippi SHPO responded on January 22, 2007, with

concurrence on the survey report findings. SESH submitted an Addendum Phase I Survey letter report for the supplemental Project facilities in Mississippi to the Mississippi SHPO in March 2007. SESH submitted the results of Phase II testing to the Mississippi SHPO on February 21, 2007, for review and concurrence. SESH would consult with the Mississippi SHPO regarding proposed avoidance or mitigation measures.

3.10.1.3 Alabama

Approximately 29 miles of the total 269-mile proposed Project route is within Alabama. SESH conducted a cultural resource survey in Alabama for the pipeline corridor, 1.32 miles of lateral, 0.5 mile of access road, and 40 acres of pipeyards and wareyards. Six miles of access roads have not yet been surveyed. Survey of these roads and subsequent consultation with the Alabama SHPO regarding potential impacts to important cultural resources would be completed prior to any construction or improvement activities occurring on these roads.

The survey conducted within Alabama identified one archaeological site. This site is considered not eligible for listing on the NRHP, and no further work is recommended.

SESH did not identify any historic structures meeting the criteria for NRHP eligibility within the APE for the proposed Project in Alabama, which includes the viewshed from access roads and aboveground facilities. No cemeteries were identified in the proposed Project APE in Alabama.

SESH submitted the cultural resources survey report to the Alabama Historical Commission, which functions as the SHPO in Alabama, on December 15, 2006, and requested concurrence with these findings. The Alabama SHPO responded on January 11, 2007, with concurrence on the survey report findings. SESH submitted an Addendum Phase I Survey letter report for the supplemental Project facilities in Alabama to the Alabama SHPO in March 2007. SESH would consult with the Alabama SHPO regarding proposed avoidance or mitigation measures.

3.10.2 Unanticipated Discoveries Plan

SESH submitted Unanticipated Discoveries Plans to the Louisiana, Mississippi, and Alabama SHPOs on December 15, 2006. The Plans outline the procedures that would be followed in the event that unanticipated cultural resources or human remains are encountered during construction of the proposed Project.

3.10.3 Native American Consultation

SESH contacted 12 Native American groups resident in, or with traditional ties to, the areas that would be affected by the proposed Project. Those groups contacted include the Alabama-Coushatta Tribe of Texas, the Caddo Nation, the Chitimacha Tribe of Louisiana, the Coushatta Tribe of Louisiana, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, the Muscogee Creek Nation of Oklahoma, the Poarch Band of Creek Indians, the Quapaw Tribe of Oklahoma, the Seminole Nation of Oklahoma, the Seminole Tribe of Florida, and the Tunica-Biloxi Indian Tribe of Louisiana. Letters were sent to representatives of each of these tribes on June 1, 2006 requesting comments on the proposed Project and the identification of any cultural or religious sites significant to the tribe. On June 5, 2006, the Jena Band of Choctaw Indians responded that they have no concerns with the proposed Project. On June 6, 2005, the Chitimacha Tribe of Louisiana responded that they have no concerns. On September 8, 2006, the Seminole Nation of Oklahoma responded that they have no concerns.

Follow-up telephone calls were made to the remaining tribes in late July 2006 inquiring about the status of the initial consultation letter.

3.10.4 General Impacts and Mitigation

SESH has not completed cultural resources surveys on 49.67 miles of access roads. The completion of road surveys and evaluations, as well as receipt of comments from the Louisiana, Mississippi, and Alabama SHPOs on the Addendum Phase I survey reports, would be required to comply with Section 106 of the NHPA. For any NRHP-eligible resources that could not be avoided and would be affected by the proposed project, consultation between SESH, FERC, and the relevant SHPO would be required to develop appropriate mitigation measures.

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

- **SESH 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 in areas not previously evaluated of where access was denied <u>until</u>:**

    a. **SESH files with the Secretary cultural resources survey and evaluation reports; any necessary treatment plans; and the Louisiana, Mississippi, and Alabama 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 SESH in writing that treatment plans/measures may be implemented and/or construction may proceed.**

<u>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."</u>

3.11 AIR QUALITY AND NOISE

3.11.1 AIR QUALITY

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

SESH proposes to construct about 165 miles of 36-inch pipeline, 104 miles of 42-inch pipeline and 1.7 miles of various laterals (6-, 16-, 20-, 24- and 42-inch-diameter) that collectively span from Richland Parish, Louisiana, to the Gulfstream M&R Station in Mobile County, Alabama. In addition, SESH would construct the Delhi Compressor Station in Richland Parish, Louisiana; the Gwinville Compressor Station near Gwinville, Mississippi; the Collins Booster Station in Covington County, Mississippi; the Petal Booster Station in Forrest County, Mississippi; and the Lucedale Compressor Station near Lucedale, Mississippi.

At the Delhi Compressor Station, SESH proposes to install 2 new Solar Mars 100 gas-turbine compressor packages, each rated at 15,000 hp; an 880-hp standby generator; fuel gas heaters; 12 storage tanks; new buildings; and all necessary support infrastructure for these new compressor packages.

At the Gwinville Compressor Station, SESH proposes to install a new Solar Mars 100 gas-turbine compressor package rated at 15,000 hp, an 880-hp standby generator, fuel gas heaters, comfort heaters, nine storage tanks, new buildings, and all necessary support infrastructure for this new compressor.

At the Collins Booster Station, SESH proposes to install 2 new Caterpillar G3612 engines, each rated at 3,550 hp; 2 Ariel JGD/6 compressors; an 880-hp standby generator; fuel gas heaters; and 11 storage tanks.

At the Petal Booster Station, SESH proposes to install a new Caterpillar G3612 engine rated at 3,550 hp, an Ariel JGD/6 compressor, an 880-hp standby generator, fuel gas heaters, comfort heaters, and 11 storage tanks.

At the Lucedale Compressor station, SESH proposes to install 2 new Solar Mars 100 gas-turbine compressor packages, each rated at 15,000 hp; an 880-hp standby generator; fuel gas heaters; comfort heaters; nine storage tanks; new buildings; and all necessary support infrastructure for these new compressor packages.

3.11.1.1 Existing Air Quality

SESH would construct the proposed Project in portions of Richland Parish in Louisiana; Madison Parish in Louisiana; Warren, Claiborne, Copiah, Simpson, Lawrence, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, and Jackson counties in Mississippi; and a portion of Mobile County in Alabama. These counties and parishes are characterized by a temperate climate. On the far eastern end of the proposed pipeline, in Mobile County, Alabama, the average maximum temperature ranges from about 61 degrees Fahrenheit (°F) in January to about 90°F in July; the average minimum temperature ranges from about 43°F in January to 73°F in August. Average annual precipitation is about 62 inches, which varies from a monthly low of 3.4 inches in October to a monthly high of 8.1 inches in July. Snowfall in this region is very rare. On the far western end of the proposed pipeline, in Richland Parish, Louisiana, the average maximum temperature ranges from about 55°F in January to about 93°F in July; the average minimum temperature ranges from about 35°F in January to 72°F in July. Average annual precipitation is about 57 inches, which varies from a monthly low of 3.2 inches in August to a monthly high of 6.4 inches in March. Snowfall in this region is very rare (www.city-data.com).

The CAA designates seven pollutants as criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) are promulgated. The NAAQS for sulfur dioxide, nitrogen dioxide, particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), carbon monoxide, ozone, and lead were established to protect human health (primary standards) and human welfare (secondary standards). State air quality standards cannot be less stringent than the NAAQS. Alabama, Louisiana, and Mississippi have adopted the NAAQS, as defined in 40 CFR Part 50 and shown 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

TABLE 3.11.1-1
National Ambient Air Quality Standards

Pollutant	Time Frame	Primary	Secondary
Particulate matter less than 10 microns in diameter	Annual[a]	50 µg/m^3	50 µg/m^3
	24-hour[b]	N/A	N/A
Particulate matter less than 2.5 microns in diameter	Annual[c]	15 µg/m^3	15 µg/m^3
	24-hour[d]	35 µg/m^3	N/A
Sulfur dioxide	Annual	0.030 ppm (80 µg/m^3)	N/A
	24-hour[b]	0.014 ppm (365 µg/m^3)	N/A
	3-hour[b]	N/A	0.5 ppm (1,300 µg/m^3)
Carbon monoxide	8-hour[b]	9 ppm (10,000 µg/m^3)	None
	1-hour[b]	35 ppm (40,000 µg/m^3)	None
Nitrogen dioxide	Annual	0.053 ppm (100 µg/m^3)	0.053 ppm
Ozone	8-hour[e]	0.08 ppm (157 µg/m^3)	0.08 ppm
Lead	Quarterly	1.5 µg/m^3	1.5 µg/m^3

Notes:

a To attain this standard, the 3-year average of the weighted annual mean particulate matter less than 10 microns in diameter concentration at each monitor within an area must not exceed 50 µg/m3.

b Revoked on December 17, 2006

c 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/m3.

d To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m3.

e 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.

mg = microgram(s)

m3 = cubic meter(s)

N/A = not applicable

ppm = parts per million

means to implement the CAA and comply with the NAAQS through state implementation plans. The AQCRs are intrastate 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. There are four general designations for an AQCR: attainment, non-attainment, maintenance, and unclassifiable. An area thatsatisfies the NAAQS is designated as attainment, and an area that does not satisfy the NAAQS may be designated as non-attainment. An area that was once nonattainment but now satisfies the NAAQS may be designated as a maintenance area, and an area for which air monitor data is not available may be designated as unclassifiable. The counties and parishes in which the proposed Project would be located are designated as attainment or unclassifiable for all criteria pollutants.

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 that govern air pollution. The provisions of the CAA that are potentially relevant to the proposed Project include

- New Source Review (NSR)

- New Source Performance Standards (NSPS),
- National Emission Standards for Hazardous Air Pollutants (NESHAP),
- Title V permits, and
- General Conformity.

NSR/PSD

NSR refers to the preconstruction permit 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 ensure that new air emission sources do not cause existing air quality to deteriorate beyond acceptable levels codified in the federal regulations. For sources located in non-attainment areas, the Non-attainment New Source Review (NNSR) program is implemented for the pollutants for which the area is classified as non-attainment. The compressor and booster stations for the proposed Project would not be located in non-attainment areas. Consequently, an NNSR is not applicable to the proposed Project.

PSD review regulations apply to proposed new major sources or major modifications to existing major sources located in an attainment area. PSD regulations (40 CFR § 52.21) define a "major source" as any source type that belongs 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 also can 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 on the list of named source categories to which the 100-tpy trigger applies. The proposed Project compressor and booster stations are, therefore, subject to the 250-tpy threshold.

A PSD review evaluates existing ambient air quality and the potential impacts of the proposed source on ambient air quality and reviews the best available control technology (BACT) necessary 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.

Estimated annual emissions for each proposed compressor and booster station are shown in Tables 3.11.1-2 through 3.11.1-6. To mitigate criteria pollutant emissions, the Solar turbine compressors at the Delhi, Gwinville, and Lucedale sites would be equipped with the latest dry-low-NOx combustion equipment, and exhaust from the Caterpillar compressor engines at the Collins Booster Station would be routed through oxidation catalysts to reduce CO and HAP emissions. None of the proposed compressor or booster stations would exceed emissions of 250 tpy of any criteria pollutant; therefore, PSD permits are not applicable to the proposed Project.

AQCRs 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 air quality 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. Class II areas allow moderate controlled growth. The proposed Project

would be located in a Class II area. The nearest Class I area is the Breton National Wildlife Refuge located in the Gulf of Mexico, 64.3 miles south of the proposed Lucedale Compressor Station site. There are no Class I areas located within 62 miles of any of the proposed compressor or booster station locations.

New Source Performance Standards

NSPS, codified in 40 CFR Part 60 and incorporated by reference in Louisiana Administrative Code (LAC) 33.III.3303 and the Mississippi Commission on Environmental Quality (MCEQ) regulations APC-S-1, Section 6.3, 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 Part 60, "Standards of Performance for Volatile Organic Liquid Storage Vessels," lists affected emission sources as storage vessels that store volatile organic liquids. Subpart Kb does not apply to vessels with a storage capacity below 75 cubic meters (m^3) (19,813 gallons). The maximum capacity of any planned volatile organic liquid storage vessel is less than 75 m^3 (19,813 gallons); therefore, the proposed Project would not be subject to NSPS Subpart Kb.

- Subpart KKKK of 40 CFR Part 60 applies to natural-gas-fired turbine engines. Based on the date of construction, the turbines to be installed as part of this project would be subject to the recently promulgated Subpart KKKK. Subpart KKKK imposes a limit on the nitrogen oxide concentration of the turbine exhaust of 25 parts per million, volumetric dry (ppmvd), at 15 percent oxygen during normal operation and 150 ppmvd at ambient conditions of less than 0°F or operations at less than 75 percent of peak load. The gas-fired turbines selected for the SESH project would comply with this new regulation. Compliance with the nitrogen oxides limit would be established through periodic stack tests. Subpart KKKK also contains limits on sulfur dioxide, which will be satisfied using pipeline-quality natural gas. Compliance would be established by the valid tariff sheet with a fuel specification that limits the maximum total sulfur content to 20 grains sulfur or less per 100 cubic feet.

- The reciprocating engines to be installed at the booster stations and the stand-generator engines to be installed at the compressor and booster stations would potentially be subject to the recently proposed standard for spark ignition engines (Subpart JJJJ, 40 CFR Part 60, June 2006). The specific limits to which the engines will be subject are dependent on the type of engine, fuel used, and the date of engine manufacture. Assuming that all engines would use natural gas, the potential emission limits would be 2.0 grams/brake horsepower (BHP) for NO_x nitrogen oxides, 4.0 grams/BHP for carbon monoxide and 1.0 grams/BHP for non-methane hydrocarbons (NMHC). Based on the current facility designs, all units would satisfy the standard as currently proposed.

NESHAP

The NESHAP, codified in 40 CFR Parts 61 and 63, regulates hazardous air pollutant (HAP) emissions. Part 61 was promulgated prior to the 1990 CAA Amendments (CAAA) and regulates only eight types of hazardous substances (asbestos, benzene, beryllium, coke-oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride).

TABLE 3.11.1-2
Estimated Annual Air Emission Rates - Delhi Compressor Station

Sources	Tons per Year							
	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP Total	HAP Single
Turbine Compressor 1[a]	28.95	55.30	3.86	3.86	1.99	3.99	1.95	1.35
Turbine Compressor 2[b]	28.95	55.30	3.86	3.86	1.99	3.99	1.95	1.35
Fuel Heaters	2.25	1.85	0.22	0.22	0.02	0.16	0.05	0.00
Stand-By Generator[b]	0.97	0.85	0.02	0.02	0.001	0.36	0.22	0.16
Storage Tanks[c]	--	--	--	--	--	0.72	0.06	0.00
Fugitives[c]	--	--	--	--	--	25.89	2.76	0.00
Total	**61.11**	**113.30**	**7.96**	**7.96**	**4.00**	**35.5**	**7.00**	**2.86**
PSD Major Source Threshold	250	250	250	250	250	250	25	10

[a] Emissions of No_2, CO, and VOCs are based on a Solar Mars 100-class turbine. PM Emissions are based on EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.1, Tables 3.1-2a)

[b] Emissions of NO_2, CO, and VOCs are based on a Caterpillar 375-kV generator set. PM emissions factor source – EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.2, Tables 3.2-2). SO_2 emissions are based on fuel consumption and 0.5-grain/100CF

[c] Emissions estimates are based on engineering judgment.

CF = cubic feet
CO = carbon monoxide
EPA = U.S. Environmental Protection Agency
HAP = hazardous air pollutant
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
VOC = volatile organic compound

TABLE 3.11.1-3
Estimated Annual Air Emission Rates – Gwinville Compressor Station

Pollutant	Tons per Year							
	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP Total	HAP Single
Turbine Compressor[a]	28.9	55.30	3.86	3.86	1.99	3.99	1.95	1.35
Fuel Heaters	2.25	1.85	0.22	0.22	0.02	0.16	0.05	0.00
Standby Generator[b]	0.97	0.85	0.02	0.02	0.00	0.36	0.22	0.16
Storage Tanks[c]	--	--	--	--	--	0.72	0.06	0.00
Fugitives[c]	--	--	--	--	--	18.97	2.17	0.00
Total	**32.16**	**58.00**	**4.10**	**4.10**	**2.01**	**24.6**	**4.46**	**1.51**
PSD Major Source Threshold	250	250	250	250	250	250	25	10

[a] Emissions of No_2, CO, and VOCs are based on a Solar Mars 100-class turbine. PM Emissions are based on EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.1, Tables 3.1-2a)

[b] Emissions of NO_2, CO, and VOCs are based on a Caterpillar 375-kV generator set. PM emissions factor source – EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.2, Tables 3.2-2). SO_2 emissions are based on fuel consumption and 0.5-grain/100CF

[c] Emissions estimates are based on engineering judgment.

CF = cubic feet
CO = carbon monoxide
EPA = U.S. Environmental Protection Agency
HAP = hazardous air pollutant
NO2 = nitrogen dioxide
PM2.5 = particulate matter with an aerodynamic diameter of 2.5 microns or less
PM10 = particulate matter with an aerodynamic diameter of 10 microns or less
PSD = Prevention of Significant Deterioration
SO2 = sulfur dioxide
VOC = volatile organic compound

TABLE 3.11.1-4
Estimated Annual Air Emission Rates – Collins Booster Station

Pollutant	Tons per Year							
	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP Total	HAP Single
Booster 1[a]	24.0	6.86	1.17	1.17	0.07	8.46	1.15	0.61
Booster 2[a]	24.0	6.86	1.17	1.17	0.07	8.46	1.15	0.61
Fuel Heaters	1.81	1.49	0.18	0.18	0.01	0.13	0.05	0.04
Standby Generator	0.97	0.85	0.02	0.02	0.001	0.36	0.22	0.16
Storage Tanks	--	--	--	--	--	0.77	0.06	0.02
Fugitives[b]	--	--	--	--	--	34.4	3.49	1.10
Total	**51.2**	**16.4**	**2.57**	**2.57**	**0.16**	**53.0**	**6.12**	**1.38**
PSD Major Source Threshold	250	250	250	250	250	250	25	10

[a] Emissions of NO_2, CO, and VOCs are based on a Caterpillar 375-kV generator set. PM emissions factor source – EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.2, Tables 3.2-2). SO_2 emissions are based on fuel consumption and 0.5-grain/100CF

[b] Emissions estimates are based on engineering judgment

CO = carbon monoxide
EPA = U.S. Environmental Protection Agency
HAP = hazardous air pollutant
hp = horsepower
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
VOC = volatile organic compound

TABLE 3.11.1-5
Estimated Annual Air Emission Rates – Petal Booster Station

Pollutant	Tons per Year							
	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP Total	HAP Single
Booster 1[a]	24.0	85.70	1.17	1.17	0.07	16.9	10.4	7.57
Fuel Heaters	1.81	1.49	0.18	0.18	0.01	0.13	0.05	0.04
Standby Generator	0.97	0.85	0.02	0.02	0.001	0.36	0.22	0.16
Storage Tanks	--	--	--	--	--	0.77	0.06	0.02
Fugitives[b]	--	--	--	--	--	23.2	2.54	0.73
Total	**27.21**	**88.39**	**1.40**	**1.40**	**0.09**	**41.9**	**13.22**	**7.74**
PSD Major Source Threshold	250	250	250	250	250	250	25	10

[a] Emissions of NO_2, CO, and VOCs are based on a Caterpillar 375-kV generator set. PM emissions factor source – EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.2, Tables 3.2-2). SO_2 emissions are based on fuel consumption and 0.5-grain/100CF

[b] Emissions estimates are based on engineering judgment.

CO = carbon monoxide
EPA = U.S. Environmental Protection Agency
HAP = hazardous air pollutant
hp = horsepower
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
VOC = volatile organic compound

TABLE 3.11.1-6
Estimated Annual Air Emission Rates - Lucedale Compressor Station

Pollutant	Tons per Year							
	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP Total	HAP Single
Turbine Compressor 1[a]	28.9	55.30	3.86	3.86	1.99	3.99	1.95	1.34
Fuel Heaters	1.81	1.49	0.18	0.18	0.01	0.13	0.05	0.04
Emergency Generator[b]	0.97	0.85	0.02	0.02	0.001	0.36	0.22	0.16
Storage Tanks[c]	--	--	--	--	--	0.72	0.06	0.02
Fugitives[c]	--	--	--	--	--	19.0	2.17	0.64
Total	**32.16**	**58.0**	**4.10**	**4.10**	**2.01**	**24.61**	**4.46**	**1.51**
PSD Major Source Threshold	250	250	250	250	250	250	25	10

[a] Emissions of No_2, CO, and VOCs are based on a Solar Mars 100-class turbine. PM Emissions are based on EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.1, Tables 3.1-2a)

[b] Emissions of NO_2, CO, and VOCs are based on a Caterpillar 375-kV generator set. PM emissions factor source – EPA's Compilation of Air Pollution Emission Factors (AP-42, Section 3.2, Tables 3.2-2). SO_2 emissions are based on fuel consumption and 0.5-grain/100CF

[c] Emissions estimates are based on engineering judgment.

CO = carbon monoxide
EPA = U.S. Environmental Protection Agency
HAP = hazardous air pollutant
hp = horsepower
NO_2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
VOC = volatile organic compound

The 1990 CAAA established a list of 189 HAPs and the promulgation of Part 63 - Maximum Achievable Control Technology (MACT) standards. These standards regulate HAP emissions from major HAP emission sources 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 total. 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. Total HAP emissions at any new compressor or booster station would be below the major source thresholds; therefore, MACT standards would not apply.

Title V Permit Program

The Title V permit program, as described in 40 CFR Part 70, requires any source with regulated-pollutant emissions, including HAPs, that reach or exceed major source levels to obtain a federal operating permit. A Title V permit lists all applicable air regulations and includes a compliance demonstration for each applicable requirement. For the purpose of the Title V permit program, the major source threshold level in attainment areas is 100 tpy of nitrogen oxides, sulfur dioxide, carbon monoxide, PM_{10}, $PM_{2.5}$, and volatile organic compounds.

Estimated annual carbon monoxide emissions at the proposed Delhi Compressor Station would exceed the 100-tpy threshold and would require a Title V permit. None of the other proposed compressor or booster stations would require a Title V permit.

General Conformity

General Conformity is a review process codified in 40 CFR Parts 51 and 93, designed to ensure that federal actions in a non-attainment or maintenance area are consistent with the state implementation plan and the local clean air plan (if applicable). The process also ensures that the federal actions do not contribute to air quality degradation that would adversely affect state efforts to attain or maintain the NAAQS. The proposed Project would not be located in a nonattainment or maintenance area; therefore, the general conformity requirements do not apply.

State Regulations

In addition to the federal regulations described above, Louisiana and Mississippi have state air quality regulations. The LDEQ manages air quality issues in Louisiana, and the MDEQ manages air quality issues in Mississippi. Subject to EPA approval, these agencies manage the statewide air permit, compliance, and enforcement programs. Because the proposed Delhi Compressor Station would be a major source with respect to carbon monoxide for Title V, SESH will submit a Title V major source permit application to the LDEQ. A minor source permit application will be submitted to the MDEQ for each of the other proposed compressor and booster stations.

3.11.1.3 General Impacts and Mitigation

Construction Emissions

The movement and operation of construction equipment along unpaved surfaces would generate fugitive dust emissions while the areas are graded, trenched, and backfilled. Also, this equipment would be powered by combustion of diesel or gasoline fuels, which would produce criteria and HAP pollutant emissions. Indirect fugitive dust and tailpipe emissions would also be generated by mobile sources such as delivery trucks and worker commuter vehicles that routinely travel to the construction sites. All these emissions would contribute to a minor temporary reduction in local ambient air quality.

Fugitive dust includes particulate emissions that arise from unpaved streets, access roads, construction activities, and similar facilities. LDEQ regulates fugitive dust emissions through LAC33.III.1305, which requires that roadways be paved or water or dust-retardant chemicals be applied. MDEQ does not have a specific regulation for fugitive dust from roadways.

The most significant air quality impacts from construction would occur at the compressor station and booster station sites because construction would occur in the same localized area. SESH would employ proven construction practices, such as water sprays, to control fugitive dust emissions during construction. Water sprays have provided sufficient control to ensure protection of air quality during construction of projects similar to the proposed Project. Therefore, fugitive dust emissions during construction would be minor and would subside at the end of construction activities. Table 3.11.1-7 shows the estimated construction emissions for years 2007 and 2008.

Operations Emissions

Operation of the compressor stations would generate criteria pollutant emissions from the natural-gas-driven compressors at the compressor stations. Short-term emissions in terms of pounds per hour are based on normal operation at full load and an annual average ambient temperature of 64°F. Annual emissions expressed in tpy include emissions associated with startup and shutdown operations for 280 startup/shutdown hours per year. The total annual operations also include small increases in emissions

associated with operation at very low ambient temperatures (below 0°F) that occur for about 3 hours per year.

In addition to the primary compressors, criteria pollutant emissions would occur from natural-gas-fired emergency generators, heating devices, storage tanks, and miscellaneous fugitives. Emergency generators would be restricted through the air permit to operate 500 hours per year.

TABLE 3.11.1-7
Construction Emissions for Typical Compressor/Booster Station Construction

Activity	Year	NO_x (tons)	CO (tons)	SO_2 (tons)	VOC (tons)	PM (tons)	HAP (tons)
Delivery Vehicles	2007	0.058	0.015	<0.001	0.003	0.002	<0.001
	2008	0.053	0.013	<0.001	0.003	0.002	<0.001
Commuter Travel	2007	1.347	24.242	0.013	1.355	0.209	0.003
	2008	1.587	29.628	0.015	1.574	0.268	0.004
Construction Equipment	2007	14.137	5.796	1.848	1.030	0.645	0.049
	2008	38.364	13.960	5.057	2.747	1.791	0.018
Fugitive Dust	(2007–2008)	0	0	0	0	395	0
Annual Total	2007	15.542	30.053	1.861	2.388	107.15	0.052
Annual Total	2008	40.004	43.601	5.072	4.324	290.77	0.022

Notes:
PM_{10} and $PM_{2.5}$ emissions for delivery vehicles, commuter travel, and construction equipment are assumed to equal PM emissions.
PM emissions listed for fugitive dust represent total suspended particulates.
Emissions from delivery vehicles represent the sum of those for terminal and pipeline construction.
Emissions from commuter travel represent the sum of those for terminal and pipeline construction.
Fugitive dust emissions for terminal represents estimate of total over entire construction period.
CO = carbon monoxide
HAP = hazardous air pollutant
NO_2 = nitrogen dioxide
PM = particulate matter
SO_2 = sulfur dioxide
VOC = volatile organic compound

Each compressor station would include an emergency shut down (ESD) system as required by DOT requirements. ESD system activation would be triggered only by an emergency condition and would vent the contents of the pipeline to the atmosphere. Compressor unit blowdowns would occur as needed to relieve pressure when a compression unit is taken off line. Natural gas blowdowns are not part of routine operation.

The anticipated criteria and HAP emissions from the operation of the proposed compressor and booster stations are listed in Tables 3.11.1-2 through 3.11.1-6. SESH will submit the required permit application to the appropriate state authorities for each proposed compressor and booster station.

SESH applied the SCREEN3 dispersion model to assess the impacts of the primary emissions source at the each compressor and booster station. Each analysis was based on conservative assumptions and meteorology.

Delhi Compressor Station

The results indicate that Delhi Compressor Station emissions would produce an annual average $PM_{2.5}$ concentration of 1.19 micrograms per cubic meter ($\mu g/m^3$) near the source, which represents 7.9 percent of the NAAQS. Based on monitor data from Ouachita Parish in Louisiana, the average annual background concentration for $PM_{2.5}$, between years 2001 and 2005, was 11.68 $\mu g/m^3$, which represents about 77.8 percent of the NAAQS; therefore, the predicted annual average for $PM_{2.5}$ in the region would continue to satisfy the NAAQS as long as background levels remain steady. Nitrogen oxide concentrations would be 8.9 percent of the NAAQS. There were no monitors in the project area or conterminous counties with available, ambient nitrogen dioxide concentrations. Data from several monitors located throughout Louisiana indicate that nitrogen dioxide levels are well below the NAAQS, and the proposed project output added to the ambient levels would not contribute any violation of the nitrogen dioxide NAAQS. All other predicted pollutant concentrations would be below PSD significant impact levels (SILs) and well within the NAAQS.

Gwinville Compressor Station

The SCREEN3 assessment shows that Gwinville Compressor Station emissions would produce an annual average $PM_{2.5}$ concentration of 0.6 $\mu g/m^3$ near the source, which represents 4 percent of the NAAQS. Based on monitor data from Rankin, Jones, and Forrest counties in Mississippi, the average annual background concentration for $PM_{2.5}$ between years 2001 and 2005 was 13.17 $\mu g/m^3$, which represents about 77.9 percent of the NAAQS; therefore, the predicted annual average for $PM_{2.5}$ in the region would continue to satisfy the NAAQS as long as background levels remain steady. Nitrogen oxide concentrations would be 4.5 percent of the NAAQS. There were no monitors in the project area or conterminous counties with available, ambient nitrogen dioxide concentrations. Data from one monitor located in Mississippi indicate that nitrogen dioxide levels are well below the NAAQS and the proposed project added to the ambient would not contribute any violation of the nitrogen dioxide NAAQS. All predicted pollutant concentrations (except nitrogen oxides) would be below PSD SILs, and all pollutant concentrations would be well within the NAAQS.

Lucedale Compressor Station

The SCREEN3 assessment shows that Lucedale Compressor Station emissions would produce an annual average $PM_{2.5}$ concentration of 0.6 $\mu g/m^3$ near the source, representing 4.0 percent of the NAAQS. Based on monitor data from Jackson County in Mississippi, the average annual background concentration for $PM_{2.5}$ between years 2001 and 2006 was 12.53 $\mu g/m^3$, representing about 83.5 percent of the NAAQS; therefore, the predicted annual average for $PM_{2.5}$ in the region would continue to satisfy the NAAQS as long as background levels remain steady. Nitrogen oxide concentrations would be 4.5 percent of the NAAQS. There were no monitors in the project area with available ambient nitrogen dioxide concentrations. Data from one monitor located in Jackson County, Mississippi, indicates that nitrogen dioxide levels are well below the NAAQS and the proposed project added to the ambient would not contribute any violation of the nitrogen dioxide NAAQS. All other predicated pollutant concentrations were below the PSD SILs and are well within the NAAQS.

Collins Booster Station

The SCREEN3 assessment for the Collins Booster Station indicated that the additional NOx and $PM_{2.5}$ pollutants could potentially cause a violation of the NAAQS. Therefore, an EPA-approved refined analysis model (AERMOD) was applied to more accurately evaluate the impacts of these pollutants. The AEROMOD analysis was based on five years of measured meteorological data for the region. The AERMOD results show the maximum annual NO_x concentrations attributable to the Collins Booster

Station emissions was 9.67 µg/m^3 for NO_x, which represents less than 10 percent of the 100 µg/m^3 annual standard. There were no monitors in the project area or conterminous counties with available, ambient nitrogen dioxide concentrations; however, data from one monitor located in Mississippi indicates that nitrogen dioxide levels are well below the NAAQS; therefore, NO_x emissions would not contribute any violation of the nitrogen dioxide NAAQS.

Monitor data from the nearby Jones County for years 2001 through 2006 indicate the average annual background concentration of $PM_{2.5}$ is about 14.2 µg/m^3, which represents about 95 percent of the annual $PM_{2.5}$ standard and about 41% of the 24-hour $PM_{2.5}$ standard. The AERMOD analysis indicates the maximum $PM_{2.5}$ impacts attributable to the Collins Booster Station emissions are 0.47 µg/m^3 for the annual standard and 4.09 µg/m^3 for the 24-hour standard. Both estimated increases are less than the annual and 24-hour PSD SILs of 1 µg/m^3 and 5 µg/m^3, respectively and does not warrant further analysis. Also, the emissions would be in compliance with the NAAQS.

Petal Booster Station

The SCREEN3 assessment shows that NO_x emissions from Petal Booster Station would produce an annual average nitrogen dioxide concentration in the region that is 19.1 percent of the NOx annual standard of 100 µg/m^3. There were no monitors in the project area or conterminous counties with available, ambient nitrogen dioxide concentrations. Data from one monitor located in Mississippi indicates that nitrogen dioxide levels are well below the NAAQS and the proposed project output added to the ambient levels would not contribute any violation of the nitrogen dioxide NAAQS.

Based on the SCREEN3 assessment, emissions from Petal Booster Station would produce carbon monoxide concentrations that would exceed the applicable 8-hour SILs; however, no ambient carbon monoxide data is available for the entire state, and the predicted concentrations would consume only 6.1 percent of the NAAQS. Except for $PM_{2.5}$, all other predicted pollutant concentrations were below PSD SILs and are well within the NAAQS.

Monitor data from the nearby Forrest County for years 2001 through 2006 indicate the average annual background concentration of $PM_{2.5}$ is about 13.4 µg/m^3, which represents about 89.3 percent of the standard, and the average 24-hour concentration is about 30.4 µg/m^3, which represents about 86.9% of the standard. Because the regional background $PM_{2.5}$ levels approach the annual and 24-hour standards, SESH applied a refined analysis model (AERMOD) to evaluate the impacts of $PM_{2.5}$ emissions from the Petal Booster Station. The AERMOD analysis was based on five years of measured meteorological data for the region. The results indicate the maximum $PM_{2.5}$ concentrations attributable to the Petal Booster Station would be a 24-hour average of 1.26 µg/m^3 and an annual average of 0.12 µg/m^3. These contributions are below the PSD SILs of 5 µg/m^3 and 1 µg/m^3, respectively and do not warrant further analysis. Also, the $PM_{2.5}$ emissions from the Petal Booster Station would be in compliance with the NAAQS

Operation of the aboveground meter stations and block valves would not result in substantial air emissions under normal 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 fugitive 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.

Construction of the proposed project would be expected to result in temporary minor impacts to air quality. Overall, compressor and booster station operations would be the only long-term source of pollutant emissions associated with the project. Based on the recently revised $PM_{2.5}$ standards, emissions from compressor and booster station operations, combined with current background levels, would represent a substantial portion of the annual $PM_{2.5}$ NAAQS. However, the impact calculations were based on a conservative air model and conservative data assumptions, so the $PM_{2.5}$ impacts would likely be much lower than predicted by the conservative model. Additional evaluation with a refined air model was performed for the Collins and Petal stations to quantify the impacts more accurately. The results indicate the impacts are below and would not cause a violation of the NAAQS. Other pollutant emissions do not pose a threat of NAAQS violations. The proposed project would remain in compliance with the NAAQS for all pollutants.

3.11.2 Noise Quality

Construction and operation of the proposed pipeline could affect ambient noise levels in the region. Seasonal vegetation cover and weather conditions can influence ambient noise levels. For this reason, the magnitude and frequency of environmental noise could vary considerably over the course of the day and throughout the week. 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 the day-night sound level (L_{DN}). The L_{EQ} is the level of steady sound with the same total (equivalent) energy as the time-variable sound of interest, 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. This 10-dBA penalty accounts for increased human sensitivity to sound in the night hours. The A-weighted scale is used because human ears are less sensitive to low and high frequencies than mid-range frequencies. For most people, the threshold of perception for a change in noise level is about 3 dBA.

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 that state and local governments can use to develop their own ambient noise standards. EPA has determined that an L_{DN} of 55 dBA protects the public from indoor and outdoor activity interference. We have adopted this criterion and apply it to evaluate the potential noise impact from operation of the compressor facilities. Specifically, we require that noise attributable to compressor stations shall not exceed the 55-dBA L_{DN} level to limit impacts at any noise-sensitive area (NSA), such as a residence, school, or hospital; unless the NSA is developed after the compressor station is constructed.

Alabama, Louisiana, and Mississippi do not regulate noise at the state level. Similarly, none of the counties or local municipalities to be traversed by the proposed Project has existing regulations or ordinances that govern noise pollution from construction or industrial activities.

3.11.2.2 Existing Noise Levels

Noise impacts are determined at receptors known as NSAs. NSAs include residences, schools, 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. For this assessment, in addition to the overall ambient noise standard (an L_{DN} of 55 dBA), 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 twice as loud and therefore significantly noticeable. Existing noise levels at NSAs near the proposed compressor and booster stations are described below.

Delhi Compressor Station

Two sound measurement positions were established for the ambient sound survey of the Delhi Compressor Station. NSA#1 represents the homes on the west side of Highway 17, about 1,800 ft west of the proposed compressor station, and NSA#2 represents the homes located about 2,000 ft southwest of the proposed compressor station. Daytime ambient sound measurements were collected on September 28, 2006. Daytime noise sources that contributed to the measured sound levels included vehicle traffic along Highway 17 and equipment noise from the nearby Columbia Delhi Station. Other ambient noise sources included wind noise across nearby foliage and the activities of insects and birds. Based on these sources, nighttime noise levels at the nearby NSAs should be lower than those experienced during the daytime. The calculated L_{DN} values at NSA#1 and NSA#2 were 54.2 and 59.5 dBA, respectively.

Gwinville Compressor Station

Two sound measurement positions were established for the ambient sound survey of the proposed Gwinville Compressor Station. NSA#1 represents a home on Parkman Cemetery Road, located about 800 ft north-northwest of the proposed compressor station; NSA#2 represents a home located about 900 ft southwest of the compressor station. Daytime ambient sound measurements were collected on September 28 and October 26, 2006. Daytime noise sources that contributed to the measured sound levels included wind noise across nearby foliage, distant vehicle traffic, occasional farm equipment such as tractors, and the activities of insects and birds. Based on these sources, nighttime noise levels at the nearby NSAs should be similar to those experienced during the daytime. The calculated L_{DN} values at NSA#1 and NSA#2 were 46.2 and 49.0 dBA, respectively.

Collins Booster Station

Three sound measurement positions were established for the ambient sound survey of the proposed Collins Compressor Station. NSA#1 represents the homes on Smyrna Road, located about 1,000 ft southeast of the proposed compressor station; NSA#2 represents a home located about 1,200 ft east of the proposed compressor station; and NSA#3 represents the homes located about 1,900 ft northeast of the proposed compressor station. Daytime ambient sound measurements were collected on September 28, 2006. Daytime noise sources that contributed to the measured sound levels included equipment noise at a nearby compressor station, distant vehicular traffic, wind noise through foliage, occasional noise from distant construction activities, and activities of insects and birds. Based on these sources, nighttime noise levels at the nearby NSAs should be similar to those experienced during the daytime. The calculated L_{DN} values at NSA#1, NSA#2, and NSA#3 were 51.8, 62.6, and 51.1 dBA, respectively.

Petal Booster Station

Three sound measurement positions were established for the ambient sound survey of the proposed Petal Compressor Station. NSA#1 represents a home south of Old Richton Road, located about 1,300 ft north of the compressor station; NSA#2 represents a home located about 1,500 ft northeast of the compressor station; and NSA#3 represents a home located about 2,300 ft east of the compressor station. Daytime ambient sound measurements were collected on September 27, 2006. Daytime noise sources that contributed to the measured sound levels included noise from wind across trees and foliage, activities of insects and birds, vehicle traffic, and occasional distant aircraft. Based on these sources, nighttime noise levels at the nearby NSAs should be somewhat lower than those experienced during the daytime. The calculated L_{DN} values at NSA#1, NSA#2, and NSA#3 were 48.1, 48.1, and 53.7 dBA, respectively.

Lucedale Compressor Station

Three sound measurement positions were established for the ambient sound survey of the proposed Lucedale Compressor Station. NSA#1 represents a home on Pete Miles Road, located about 2,800 ft southeast of the proposed compressor station; NSA#2 represents a home located about 3,600 ft southeast of the proposed compressor station; and NSA#3 represents a home located about 4,200 ft northwest of the proposed compressor station. Daytime ambient sound measurements were collected on September 27, 2006. Daytime noise sources that contributed to the measured sound levels included noise from wind across trees and foliage, activities of insects and birds, and occasional distant vehicular traffic. Based on these sources, nighttime noise levels at the nearby NSAs should be similar to those experienced during the daytime. The calculated L_{DN} values at NSA#1, NSA#2, and NSA#3 were 35.3, 42.7, and 45.6 dBA, respectively.

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 near proposed Project activities, and the sound levels would vary during the construction period depending on the construction phase. The rate of pipeline construction would generally range from several hundred feet to one 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 near the construction activity. Construction equipment would be operated on an as-needed basis during those periods and would be maintained to manufacturer specifications to minimize noise impacts.

During construction of the Delhi Compressor Station, the L_{DN} for the nearest NSA would increase by only 1.4 dBA, from 54.2 dBA to 55.6 dBA, a negligible impact. During construction of the Gwinville Compressor Station, the L_{DN} for the nearest NSA would increase by 4.3 dBA, from 49.7 dBA to 54.0 dBA, a noticeable increase. During construction of the Collins Booster Station, the L_{DN} for the nearest NSA would increase by 7.1 dBA, from 51.8 dBA to 58.9 dBA, a significantly noticeable increase. During construction of the Petal Booster Station, the L_{DN} for the nearest NSA would increase by 0.6 dBA, from 53.7 dBA to 54.3 dBA, a negligible increase. During construction of the Lucedale Compressor Station, the L_{DN} for the nearest NSA would increase by 9.2 dBA, from 35.3 dBA to 44.5 dBA. This would be a significantly noticeable increase, but would still be rather quiet and would occur in the daytime.

Nighttime noise levels during construction would normally be unaffected because most pipeline construction would occur in daytime hours. The possible exceptions would be at the HDD sites (e.g., where the pipeline would cross a highway or waterbody). SESH has identified 20 sites where HDD activities would be performed, with an entrance and exit location for each site. At HDD locations, drill equipment may operate on a 24-hour-per-day basis. Accordingly, SESH performed a noise survey to evaluate the potential impact on NSAs within a half mile of each HDD site (entry or exit). Table 3.11.2.1 summarizes the unmitigated noise estimates levels due to HDD activities. Note that some HDD sites are more than a half mile away from any NSA, and are therefore not listed in the table. In addition, note that the ambient noise levels are greater than the 55 dBA at some HDD sites.

As Table 3.11.2.1 shows, in the absence of noise mitigation, the benchmark sound requirements may be exceeded at some HDD locations. Possible noise mitigation measures include the installation of temporary noise barriers constructed of ¾-in. thick plywood panels to a minimum height of 16 feet,

TABLE 3.11.2.1
Estimated Noise Impacts at NSAs Located within One-Half Mile of HDD Operations

HDD Number	Location of HDD Site	Entry or Exit	Distance (ft) and Direction of Nearest NSA	Calculated L_{DN} Due to HDD	Ambient L_{DN} (dBA)	Ambient + Calculated L_{DN} (dBA)	Sound Level Increase (dBA)
#1	Macon Bayou	Entry	900 (SW)	53.4	54.2	56.8	2.6
#3	Sutt Bayou/Hwy 577	Entry	930 (SE)	59.8	58.0	62.0	4.0
#3	Sutt Bayou/Hwy 577	Exit	860 (SSW)	50.8	58.0	58.8	0.8
#4	Tensas River	Entry	600 (SE)	61.2	52.3	61.7	9.4
#4	Tensas River	Exit	900 (SW)	48.6	52.3	53.8	1.5
#5	Despair Lake	Entry	2,200 (ENE)	46.7	58.2	58.5	0.3
#5	Despair Lake	Exit	240 (NE)	63.7	58.2	64.7	6.5
#7	Bird Rookery	Entry	2,300 (WNW)	46.2	54.1	54.8	0.7
#8	Mississippi River	Entry	250 (East)	75.2	52.7	75.2	22.5
#9	Big Black River	Entry	280 (NW)	74.1	50.6	74.2	23.6
#9	Big Black River	Exit	650 (SW)	49.9	47.2	51.8	4.6
#13	Pearl River	Entry	1,400 (West)	52.6	47.4	53.8	6.4
#14	Bowie Creek	Entry	1,900 (East)	49.4	44.9	50.7	5.8
#14	Bowie Creek	Exit	700 (North)	49.2	44.9	50.6	5.7
#15	Okatoma Creek	Entry	500 (NW)	63.9	47.3	64.0	16.7
#15	Okatoma Creek	Exit	1,700 (WSW)	39.3	47.3	47.9	0.6
#16	Leif River	Entry	1,400 (West)	52.6	53.0	55.8	2.8
#17	Tallahalla River	Entry	2,100 (West)	47.2	42.4	48.5	6.1
#17	Tallahalla River	Exit	1,700 (East)	39.3	51.4	51.7	0.3
#19	Chickasawhay River	Entry	1,600 (NW)	51.2	58.8	59.5	0.7
#20	Escatawpa River	Exit	1,900 (ESE)	38.1	51.5	51.7	0.2

Note: Noise levels based on peak operational conditions and no mitigation

TABLE 3.11.2.2
Mitigated Noise Impacts at HDD Sites That Could Otherwise Exceed Benchmark Levels

HDD Number	Location of HDD Site	Entry or Exit	Distance (ft) and Direction of Nearest NSA	Calculated L_{DN} Due to HDD	Ambient L_{DN} (dBA)	Ambient + Calculated L_{DN} (dBA)	Sound Level Increase (dBA)
#3	Sutt Bayou/Hwy 577	Entry	930 ft. (SE)	51.9	58.0	58.9	0.9
#4	Tensas River	Entry	600 ft. (SE)	53.2	52.3	55.8	3.5
#5	Despair Lake	Exit	240 ft. (NE)	53.6	58.2	59.5	1.3
#8	Mississippi River	Entry	250 ft. (East)	54.4	52.7	56.7	4.0
#9	Big Black River	Entry	280 ft. (NW)	53.4	50.6	55.2	4.6
#15	Okatoma Creek	Entry	500 ft. (NW)	53.0	47.3	54.0	6.7

temporary noise enclosures around the hydraulic power unit, the use of exhaust mufflers on diesel engines used to drive the generators and pumps, and efforts to remotely locate some of the HDD equipment. If noise levels cannot be reduced to target levels, other noise mitigation measures may be applied. These include limitations to perform HDD activities during daytime hours, or temporary relocation and monetary compensation for affected homeowners until noise levels return to allowable levels. However, the noise survey estimates indicate that target noise levels can be achieved through application of noise suppression measures. SESH has committed to employing mitigation measures at these locations to ensure noise levels are reduced to meet or exceed noise benchmarks. Table 3.11.2.2 shows the estimated noise impacts for HDD sites 3, 4, 5, 8, 9, and 15 based on application of noise suppression measures. These noise levels satisfy either the 55 dBA target, or for locations where the ambient level exceeds 55 dBA, the increase in noise level due to HDD activities would less than 7 dBA (less than significantly noticeable). In addition, HDD activities would be temporary.

Operational Noise

During operation of the proposed Project, potential noise impacts would be limited to the vicinity of the new compressor stations. Comments from affected landowners were received that expressed concern about noise generated by operation of the proposed compressor stations. Principal noise sources would include the air inlet, exhaust, and turbine casings. Secondary noise sources would include yard pipes and valves. Noise from the relief valves, blowdown stacks, and emergency electrical generation equipment would be infrequent.

The turbine at each compressor station and booster station would be installed inside a 18-gauge metal building with high-density insulated sides and roof. The buildings would not have windows, and all wall and roof penetrations would be sealed. Building ventilation vents would be equipped with acoustical louvers or duct silencers. The exhaust system for each new turbine would include a muffler system to provide dynamic sound insertion loss. Exhaust pipes outside the buildings would be covered with acoustical blanket material.

The impact of operational noise on NSAs near each compressor or booster station is summarized in Table 3.11.2-3. A discussion of these impacts is presented below.

Delhi Compressor Station

Based on full load operation for all continuously operated station equipment, the estimated station sound contribution from the Delhi Compressor Station at the closest property line (about 400 ft away) would be 55.4 dBA. At the two closest NSAs, predicted compressor station noise contributions at NSA# 1 and NSA#2 would be 46.5 and 45.3 dBA, respectively. Ambient noise levels at these NSAs are 54.2 and 59.5 dBA, and the total projected noise levels (i.e., ambient plus station contribution) would be 54.9 and 59.7 dBA, respectively. Accordingly, contributions of the station noise to total projected noise would be 0.7 and 0.2 dBA, respectively. Therefore, the impacts of compressor station operations on the nearest NSAs would be below the 55-dBA criterion and would cause a negligible increase in ambient sound.

The noise of a blowdown event is estimated to be about 63 to 64 dBA L_{DN} at the closest NSA. This estimate is higher than the target noise level at NSAs of 55 dBA L_{DN}; however, a unit blowdown event occurs infrequently and only for a short period of time, and unit blowdowns would generally be performed in the daytime. Therefore, the impact of unit blowdown to sensitive receptors would be minimal.

TABLE 3.11.2-3
Noise Quality Analysis for the SESH Compressor and Booster Stations

Closest NSAs	Distance & Direction of NSA from Site Center (ft)	Ambient Sound Level (L_{DN}) (dBA)	Predicted Level (L_{DN}) of Station (dBA)	Station Sound Level (L_{DN}) + Ambient Noise Level (L_{DN}) (dBA)	Potential Noise Increase (dBA)
Delhi Compressor Station					
NSA #1	1,800 (W)	54.2	46.5	54.9	0.7
NSA #2	2,000 (SW)	59.5	45.3	59.7	0.2
Gwinville Compressor Station					
NSA #1	800 (NNW)	46.2	52.5	53.4	7.2
NSA #2	900 (SW)	49.0	51.4	53.3	4.3
Collins Booster Station					
NSA #1	1,000 (ESE)	51.8	50.6	54.3	2.5
NSA #2	1,200 (E)	62.6	48.7	62.8	0.2
NSA #3	1,900 (NE)	51.1	43.6	51.8	0.7
Petal Booster Station					
NSA #1	1,300 (N)	48.1	47.8	51.0	2.9
NSA #2	1,500 (NE)	48.1	46.3	50.3	2.2
NSA #3	2,300 (E)	53.7	41.4	53.9	0.2
Lucedale Compressor Station					
NSA #1	2,800 (SE)	35.3	39.1	40.6	5.3
NSA #2	3,600 (ESE)	42.7	36.2	42.7	0.9
NSA #3	4,200 (WNW)	45.6	34.5	45.9	0.3

dBA = decibels on the A-weighted scale; ft = foot/feet; L_{DN} = day/night sound level; and NSA = noise-sensitive area

Gwinville Compressor Station

Based on full load operation for all continuously operated station equipment, the estimated station sound contribution from the Gwinville Compressor Station at the closest property line (about 500 ft away) would be 50.8 dBA. At NSA#1 and NSA#2, predicted compressor station noise contributions would be 46.2 and 49.0 dBA, respectively. Ambient noise levels at these NSAs are 52.5 and 51.4 dBA, and the total projected noise levels (i.e., ambient plus station contribution) would be 53.4, and 53.3 dBA. Accordingly, the noise level increases due to compressor station operations would be 7.2 and 4.3 dBA, respectively. Therefore, the impacts to sensitive receptors would be below the 55-dBA criterion and would cause negligible increases in ambient sound.

The noise of a blowdown event is estimated to be about 65 to 66 dBA L_{DN} at the closest NSA. This estimate exceeds the target noise level at NSAs of 55 dBA L_{DN}; however, a unit blowdown event occurs infrequently and only for a short period of time. Therefore, the impact of unit blowdown to sensitive receptors would be minimal.

Collins Booster Station

Based on full load operation for all continuously operated station equipment, the estimated station sound contribution from the Collins Compressor Station at the closest property line (about 500 ft away) would be 52.2 dBA. At NSA#1, NSA#2, and NSA#3, predicted compressor station noise contributions would be 50.6, 48.7, and 43.6 dBA, respectively. Ambient noise levels at these NSAs are 51.8, 62.6, and 51.1 dBA, and the total projected noise levels (i.e., ambient plus station contribution) would be 54.3, 62.8, and 51.8 dBA. Accordingly, the noise level increases due to compressor station operations would be 2.5, 0.2, and 0.7 dBA, respectively. Therefore, the impacts to sensitive receptors would be below the 55-dBA criterion and would cause negligible increases in ambient sound.

The noise of a blowdown event is estimated to be about 68 to 69 dBA L_{DN} at the closest NSA. This estimate exceeds the target noise level at NSAs of 55 dBA L_{DN}; however, a unit blowdown event occurs infrequently and only for a short period of time. Therefore, the impact of unit blowdown to sensitive receptors would be minimal.

Petal Booster Station

Based on full load operation for all continuously operated station equipment, the estimated station sound contribution from the Collins Compressor Station at the closest property line (about 500 ft away) would be 49.4 dBA. At NSA#1, NSA#2, and NSA#3, predicted compressor station noise contributions would be 40.5, 37.9, and 37.1 dBA, respectively. Ambient noise levels at these NSAs are 48.1, 48.1, and 53.7 dBA, and the total projected noise levels (i.e., ambient plus station contribution) would be 51.0, 50.3, and 53.9 dBA. Accordingly, the noise level increases due to compressor station operations would be 2.9, 2.2, and 0.2 dBA, respectively. Therefore, the impacts to sensitive receptors would be below the 55-dBA criterion and would cause negligible increases in ambient sound.

The noise of a blowdown event is estimated to be about 58 to 59 dBA L_{DN} at the closest NSA. This estimate exceeds the target noise level at NSAs of 55 dBA L_{DN}; however, a unit blowdown event occurs infrequently and only for a short period of time. Therefore, the impact of unit blowdown to sensitive receptors would be minimal.

Lucedale Compressor Station

Based on full load operation for all continuously operated station equipment, the estimated station sound contribution from the Lucedale Compressor Station at the closest property line (about 500 ft away) would be 53.0 dBA. At NSA#1, NSA#2, and NSA#3, predicted compressor station noise contributions would be 39.1, 36.2, and 34.5 dBA, respectively. Ambient noise levels at these NSAs are 35.3, 42.7, and 45.6 dBA, and the total projected noise levels (i.e., ambient plus station contribution) would be 40.6, 42.7, and 45.9 dBA. Accordingly, the noise level increases due to compressor station operations would be 5.3, 0.9, and 0.3 dBA, respectively. Although the noise level increase at NSA#1 would be noticeable, the overall noise level would remain well below the FERC noise standard. The noise levels at the other NSAs would not be noticeable. Therefore, the impacts to sensitive receptors would be below the 55-dBA criterion and would not cause a significant impact.

The noise of a blowdown event is estimated to be about 56 to 57 dBA L_{DN} at the closest NSA. This estimate exceeds the target noise level at NSAs of 55 dBA L_{DN}; however, a unit blowdown event occurs infrequently and only for a short period of time. Therefore, the impact of unit blowdown to sensitive receptors would be minimal.

Minor long-term noise impacts would be 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 and booster station equipment and from periodic blowdown events. To ensure that noise levels from operation of the Project facilities do not adversely impact surrounding areas, **we recommend that:**

- **SESH should make all reasonable efforts to assure its predicted noise levels from the Delhi Compressor Station, Petal Booster Station, and Lucedale Compressor Station are not exceeded at nearby (NSAs or noise-sensitive areas) and file noise surveys showing this with the Secretary no later than 60 days after placing the Delhi Compressor Station, Petal Booster Station, and Lucedale Compressor Station in service. Also, SESH should file noise surveys with the Secretary no later than 60 days after placing the Gwinville Compressor Station and Colllins Booster Station in service. If the noise attributable to the operation of the Delhi Compressor Station, Petal Booster Station, Lucedale Compressor Station, Gwinville Compressor Station or Colllins Booster Station at full load exceeds an L_{dn} of 55 dBA at any nearby NSAs, SESH should file a report on what changes are needed and should install additional noise controls to meet the level within 1 year of the in-service date. SESH should confirm compliance with this 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 damage caused by a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, tasteless, and lighter than air. It is not toxic, but is classified as a simple asphyxiate, posing a slight inhalation hazard. If methane is breathed in high concentration, oxygen deficiency can occur resulting in serious injury or death.

Methane has an ignition temperature of about 1,000 ºF and is flammable at concentrations between 5 and 15 percent in air. Unconfined mixtures of methane in air are not generally explosive. Methane 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. Under the *Pipeline Safety Improvement Act of 2002* (PISA), the Pipeline and Hazardous Materials Safety Administration's (PHMSA's), and the Office of Pipeline Safety (OPS), the DOT 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, and maintenance of, and emergency response to 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 49 CFR Parts 190-199. 49 CFR Part 192 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 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 pipeline under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee which determines if proposed safety regulations are reasonable, feasible, and practicable.

In addition, pipeline safety regulations set forth in the PISA use the concept of high consequence areas (HCAs) to identify specific locales and areas where a release could have the most significant adverse consequences. Once identified, operators are required to devote additional focus, efforts, and analysis in HCAs to ensure the integrity of pipelines. Following construction of the pipeline, SESH would conduct all necessary analyses to determine the locations of HCAs along the proposed Project and would comply accordingly with all necessary integrity measures.

The proposed facilities would be designed and constructed to meet or exceed the safety standards established by the DOT 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. The Project would be built in accordance with regulations that govern material selection and qualification, minimum design requirements, location adjacent to roads and railroads, and protection from internal, external, and atmospheric corrosion.

49 CFR Part 192 also defines area classifications based on population density near 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: Ten or fewer buildings intended for human occupancy.
- Class 2: More than 10, but less than 46 buildings intended for human occupancy.
- Class 3: Forty-six 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 per week for 10 weeks in any 12-month period.
- Class 4: A prevalence of buildings with four or more stories aboveground.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. In accordance with DOT requirements, 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. Pipelines in Class 2, 3, and 4 locations, as well as under drainage ditches of public roads and railroad crossings, must be installed with a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve: 10 miles in Class 1, 7.5 miles in Class 2, 4 miles in Class 3, and 2.5 miles in Class 4. Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Table 3.12.1-1 identifies the class locations for the proposed Project. The majority of the Project was identified by SESH as Class 1, totaling approximately 235 miles, while approximately 32 miles were identified as Class 2 and approximately 2 miles were identified as Class 3.

If a subsequent increase in population density adjacent to the right-of-way indicates a change in class location for the pipeline, SESH would reduce the maximum allowable operation pressure 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 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 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 (68 FR 69778, 69 FR 18228, and 69 FR 29903).

OPS published a series of rules from August 6, 2002, to May 26, 2004 (69 FR 29903) that define HCAs where a gas pipeline accident could do considerable harm to people and their property and where an integrity management program would be required 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[1] is greater than 660 ft and there are 20 or more buildings intended for human occupancy within the potential impact circle[2], or
- any area in Class 1 or 2 where the potential impact circle includes an identified site[3].

[1] 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.
[2] The potential impact circle is a circle of radius equal to the potential impact radius.
[3] 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.

TABLE 3.12.1-1
Area Class Locations for the Proposed SESH Project

Begin MP	End MP	Class	Length (miles)	Begin MP	End MP	Class	Length (miles)
0.00	25.83	1	25.83	172.36	173.47	1	1.11
25.83	26.93	2	1.10	173.47	174.26	2	0.79
26.93	35.08	1	8.15	174.26	176.00	1	1.74
35.08	35.97	2	0.89	176.00	176.38	2	0.38
35.97	36.38	3	0.41	176.38	190.34	1	13.96
36.38	43.70	1	7.32	190.34	191.20	2	0.86
43.70	44.13	2	0.43	191.20	213.80	1	22.60
44.13	59.78	1	15.65	213.80	215.49	2	1.69
59.78	60.16	2	0.38	215.49	218.00	1	2.51
60.16	67.82	1	7.66	218.00	218.90	2	0.90
67.82	68.94	2	1.12	218.90	219.30	3	0.40
68.94	78.24	1	9.30	219.30	220.50	2	1.20
78.24	78.71	2	0.47	220.50	222.80	1	2.30
78.71	80.88	1	2.17	222.80	225.00	2	2.20
80.88	81.37	3	0.49	225.00	229.20	1	4.20
81.37	86.84	1	5.47	229.20	231.95	2	2.75
86.84	88.38	2	1.54	231.95	236.05	1	4.10
88.38	152.61	1	64.23	236.05	236.98	2	0.93
152.61	154.09	2	1.48	236.98	245.80	1	8.82
154.09	154.66	1	0.57	245.80	246.80	2	1.00
154.66	157.60	2	2.94	246.80	247.14	1	0.34
157.60	158.74	1	1.14	247.14	248.23	2	1.09
158.74	159.20	3	0.46	248.23	252.90	1	4.67
159.20	161.00	1	1.80	252.90	253.50	2	0.60
161.00	162.28	2	1.28	253.50	256.33	1	2.83
162.28	165.12	1	2.84	256.33	257.00	2	0.67
165.12	165.60	2	0.48	257.00	259.39	1	2.39
165.60	169.26	1	3.66	259.39	260.10	2	0.71
169.26	170.07	2	0.81	260.10	261.63	1	1.53
170.07	171.00	1	0.93	261.63	263.43	2	1.80
171.00	172.36	2	1.36	263.43	268.98	1	5.51

Source: Spectra Energy 2007
MP = milepost

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. SESH would identify HCAs once the pipeline design has been undertaken to determine the pipeline centerline with respect to other

structures or identified sites. The pipeline integrity management rule for HCAs requires inspection of the entire pipeline's HCAs every 7 years.

49 CFR Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities including the requirement to establish a written plan governing these activities. Under § 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;
- initiating the emergency shutdown of 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.

49 CFR Part 192 requires that each operator 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 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. SESH 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.

SESH would register with the one-call system programs in Louisiana, Mississippi, and Alabama prior to operation of the proposed Project. Through these one-call system programs, SESH would be informed of planned third-party excavations, which would allow SESH to monitor activities around the right-of-way and to protect the pipeline.

SESH would create an emergency response plan prior to operation of the Project. In the event of an emergency, SESH's operating personnel would implement the appropriate emergency plan depending upon the facilities involved (i.e., compressor station, booster station, or pipeline). SESH's emergency plan would include:

- the local field headquarters to contact;
- a listing of company personnel, local police, and fire authorities to contact;
- a listing of equipment available at field locations;
- a description of the roles of field supervisors, gas control operators, field crews, and support personnel during an emergency;

- a description of the procedures to maintain communications between gas control operators and local fire, police, and government authorities;

- a description of the procedures for securing additional help from non-company resources if needed; and

- requirements for logging emergency events and responding to company and regulatory authorities.

The new compressor and booster stations would be designed and constructed to meet or exceed 49 CFR Part 192 requirements. Gas piping at the compressor stations, per DOT requirements, would be 0.5 design factor.

The compressor stations would be equipped with automatic detection and emergency shutdown systems. These systems would include:

- a flame detection system that uses ultraviolet sensors,

- a gas detection system for detecting flammable concentrations of natural gas,

- a heat detection system that uses infrared sensors,

- an emergency shutdown system to isolate and blowdown the gas piping and provide a means to shut down equipment and electrical circuits to eliminate sources of spark ignition, and

- individual unit shutdown systems in case of mechanical or electrical failure of a compressor unit system or component.

Compressor station piping would be protected from over-pressurization by means of relief valves and venting systems for safe blowdown of gas. Fire-fighting equipment would be maintained at the compressor station sites in the form of hand-held or wheeled dry chemical fire extinguishers, in accordance with National Fire Prevention Association's 17 Dry Chemical Extinguishing Systems (National Fire Prevention Association 2002).

Four affected property owners for the proposed Project, all in Copiah County, Mississippi, expressed concerns about safety of natural gas pipelines during the scoping process. SESH has attempted to address these issues with the individual landowners. In response to the DEIS, the EPA expressed concerns about the possibility of vaporized imported liquefied natural gas (LNG) transmission leading to degradation of pipeline seals and causing pipeline leaks. The Commission examined this issue in two different proceedings, Dominion Cove Point LNG's application to in Docket No. CP05-130-004, et al.[4] as well as AES Ocean Express, LLC complaint against Florida Gas Transmission Company in Docket No. RP04-249-001.[5]

Based upon the research and studies conducted by the parties in both of these proceedings, the Commission concluded the claim that vaporized LNG caused an increase in leaks in pipeline seals was based upon a flawed analysis.[6] The Commission also determined there is no evidence that vaporized LNG would have a detrimental effect on seals which had been properly maintained.[7] Further, the Commission

[4] Dominion Cove Point LNG, LP, 115 FERC ¶ 61,337 (2006) ("June 16 Order").
[5] AES Ocean Express, LLC v. Florida Gas Transmission Company, 119 FERC ¶ 61,075 (2007) ("April 20 Order").
[6] June 16 Order at PP 99-100.
[7] Dominion Cove Point LNG, LP, 118 FERC ¶ 61,007 (2007); at P 27.

concluded that none of the tests, studies or actual experiences have demonstrated that vaporized LNG that meets the proposed interchangeability standards will cause LDCs or their end users problems.[8] Therefore, based upon the extensive record developed in both the Dominion Cove Point LNG and AES proceedings, the FERC staff believes that the EPA's concern about pipeline seals is not a significant issue.

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
- was significant in the judgment of the operator 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, or 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 (Jones et al. 1986).[9]

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.

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.

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

[8] April 20 Order at P 206.

[9] 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.

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 near 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.

TABLE 3.12.2-1
Natural Gas Service Incidents by Cause

Cause	Incidents per 1,000 Miles of Pipeline (Percent Distribution)	
	1970 through 1984	1986 through 2005
Outside forces	0.70 (53.8)	0.10 (38.5)
Corrosion	0.22 (16.9)	0.06 (23.1)
Construction or Material Defect	0.27 (20.8)	0.04 (15.4)
Other	0.11 (8.5)	0.06 (23.1)
Total	1.30	0.26

Sources: Jones et al. 1986; DOT, OPS, http://ops.dot.gov/stats.htm.

TABLE 3.12.2-2
Outside Forces Incidents by Cause
(1970 through 1984)

Cause	Percent
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

Source: Jones et al. 1986

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 because 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.

TABLE 3.12.2-3
External Corrosion by Level of Control (1970 through June 1984)

Corrosion Control	Incidents per 1,000 Miles per Year
None – bare pipe	0.42
Cathodic protection only	0.97
Coated only	0.40
Coated and cathodic protection	0.11

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 and 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 5-fatality nationwide average, fatalities among the public averaged 2.6 per year. 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.

TABLE 3.12.3-1
Annual Average Fatalities
Natural Gas Transmission and Gathering System

Year	Employees	Non-employees	Total
1970 – June 1984	2.4	2.6	5.0
1984 – 2005[a]	-	-	3.6
1984 – 2005[a]	-	-	2.8[b]

Notes:
Sources: Jones et al. 1986; DOT, OPS, http://ops.dot.gov/stats.htm
[a]Employee/non-employee breakdown not available after June 1984
[b]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 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 of 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.

TABLE 3.12.3-2
Nationwide Accidental Deaths

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, etc. (1984 to 1993 average)	181
All liquid and gas pipelines[a] (1978 to 1987 average)	27
Gas transmission and gathering lines[b] (non-employees only, 1970 to 1984 average)	2.6

Notes:

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, 118th Edition."

[a]DOT, "Annual Report on Pipeline Safety – Calendar Year 1987"

[b]Jones et al. 1986

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on over 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 370 years. This would represent a slight increase in risk to the nearby public.

3.13 CUMULATIVE IMPACTS

In accordance with NEPA and FERC policy, we considered the cumulative impacts of the proposed SESH 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 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). Under these guidelines, inclusion of other projects within the analysis is based on identifying commonalties 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. The action must

- 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 time span 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 were included based on the likelihood of completion, and only projects with either ongoing impacts or that were "reasonably foreseeable" future actions were evaluated. Existing or reasonably foreseeable actions that would be expected to affect similar resources during similar times as the proposed Project were considered further. The anticipated cumulative impacts of the proposed Project and these other actions, as well as any pertinent mitigation actions, are discussed below.

3.13.1 Other Natural Gas Pipeline Projects

The FERC has applications for two other proposed natural gas pipeline projects that would traverse the same general areas as the proposed SESH Project in Louisiana, Mississippi, and Alabama. They include Gulf South's Southeast Expansion Project (SEE Project) and Gulf South's East Texas to Mississippi Expansion (ETM) Project. Construction of these projects is projected to occur between the years 2007 through 2009. In addition, construction was completed in May 2007 on the FERC-approved CEGT Carthage to Perryville Project in northern Louisiana. See Figure 3.13.1 and Tables 3.13.1-1 and 3.13.1-2 for the locations and comparative impacts of these three projects along with the proposed Project.

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.

While it is not certain if or when these actions will occur, their similarity and proximity to the proposed Project merits further consideration. The FERC (1989) considers that the general impacts of building multiple pipelines would be primarily additive. Based on the project scope, geographic location, and preliminary information, we anticipate that the Southeast Expansion and East Texas Expansion projects would result in environmental impacts similar to those of the proposed Project.

East Texas to Mississippi Expansion Project

The ETM Expansion Project, proposed by Gulf South, is an approximate 241.9-mile, 36-inch- and 42-inch-diameter natural gas pipeline. This project includes the addition of 40,302-hp of additional compression at one existing compressor station, two new compressor stations with 30,000 hp and 40,302 hp, and six new M&R stations. The ETM Expansion Project is located in Panola County, Texas;

NON-INTERNET PUBLIC

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED SOUTHEAST SUPPLY HEADER PIPELINE PROJECT
Docket Nos. CP07-44-000 and CP07-45-000

Page 3-136
Section 3.13
Figure 3.13-1
Natural Gas Pipeline Projects near the Proposed SESH Project

Public Access for the above information is available only through the Public Reference Room, or by e-mail at
public.referenceroom@ferc.gov

TABLE 3.13.1-1
Existing or Proposed Projects that Would Cumulatively Affect Resources in the Proposed SESH Project Area

Project	Description	Anticipated Construction Date	Counties/Parishes within Project Area
Natural Gas Pipeline Projects			
Carthage to Perryville Project	Construct and operate a 172-mile-long, 42-inch-diameter natural gas pipeline	2006–2007 (Construction complete)	Panola County, Texas Caddo, DeSoto, Red River, Bienville, Jackson, Ouachita, and Richland parishes, Louisiana
East Texas to Mississippi Expansion Project	Construct and operate a 261.9-mile-long, 42-inch-diameter natural gas pipeline	2007	DeSoto, Red River, Bienville, Jackson, Ouachita, Richland and Madison parishes, Louisiana, Warren, Hinds, Copiah and Simpson counties, Mississippi
Southeast Expansion Project	Construct and operate a 112-mile-long, 36-inch-diameter natural gas pipeline	2008	Smith, Jasper and Clark counties, Mississippi Choctaw County, Alabama
Southern Pines Energy Center and Expansion	Constructing natural gas storage caverns, a compressor and meter station, and approximately 3 miles of 24-inch-diameter pipeline	2006-2007	Greene County, Mississippi
	Constructing additional capacity of natural gas storage caverns, meter station, and 26 miles of dual 24-inch-diameter natural gas pipeline	2007-2008	Greene County, Mississippi Mobile County, Alabama
Southeast Supply Header Project	Construct and operate a 269-mile-long, 42-inch-diameter (104 miles) and 36-inch-diameter (165 miles) natural gas pipeline	2008	Richland and Madison parishes, Louisiana Warren, Claiborne, Hinds, Copiah, Lawrence, Jefferson Davis, Covington, Jones, Forrest, Perry, Greene, George, and Jackson counties, Mississippi Mobile County, Alabama
Unrelated Projects			
I-59 S-Curve Project, Laurel	Reconstruction and realignment of I-59	2006-2009	Jones County, Mississippi
State Route 42, East Petal	Perform 3 miles of paving on a 4-lane road	2006-2007	Forrest County, Mississippi
U.S. Highway 45/State Route 57 Bypass	Construct 5.3 miles of 4-lane road and bridge	2006-2007	Greene and Wayne counties, Mississippi
U.S. Highway 84, Waynesboro to Alabama State Line	Construct 4-lane bridge and upgrade 10 miles of road	2006-2008	Wayne County, Mississippi
State Route 63, Lucedale to Leaksville	Construct 14.1 miles of 4-lane road and bridge	2005-2007	George and Greene counties, Mississippi

TABLE 3.13.1-2
Environmental Resources That Would Be Cumulatively Affected During Construction and Operation of Projects in the Vicinity of the Proposed SESH Project[a]

Project (Anticipated Construction Date)	Total Length/ Length of Collocation (miles)	Total Land Disturbance (acres)	Pipeline Diameter and Proposed Permanent ROW Width	Open-Cut Waterbody Crossings	Wetlands Disturbed During Construction	Forested Wetlands Disturbed	Forest Land Cleared	Federally Listed Endangered, Threatened, or Candidate Species	Residences Within 50 Feet	Potential National Register of Historic Places Sites
Carthage to Perryville (2006-2007)	172/ 40	2,498 (1,248 permanently)	42-inch 60 feet	104 perennial 136 intermittent	127 wetlands 50 acres	86 acres	1,316 acres	6	0	2
East Texas to Mississippi Expansion Project (2007)	243/ 185	4,034 (1,542 permanently)	42-inch 50 feet	780	301 wetlands 115 acres	81 acres	1,838 acres	10	4	0
Southeast Supply Header Project (2008)	269/ 0	3,417 (1,631 permanently)	36-inch for 165 miles 42-inch for 104 miles 50 feet	177 perennial 448 intermittent	246 wetlands 239 acres	249 acres	2,171 acres	19	6	6
Southeast Expansion Project (2008)	111/ 73	1,954 (825 permanently)	42-inch 50 feet	92 perennial 159 intermittent	129 wetlands 89 acres	48 acres	1,329 acres	9	18	9

DeSoto, Red River, Bienville, Jackson, Ouachita, Richland, and Madison parishes, Louisiana; and Warren, Hinds, Copiah, Simpson, and Walthall counties, Mississippi. The terminus of the pipeline is Gulf South's existing Index 130, which is also the beginning of the proposed Southeast Expansion Project.

The ETM Expansion Project is considered here with respect to the potential for cumulative impacts to the natural and human environments in Louisiana (Delhi area) and Mississippi. The proposed project has been filed and a FEIS was issued on May 25, 2007. On June 18, 2007 the FERC issued an order granting the requested authorization to construct, subject to conditions. Gulf South indicated the project began construction July 5, 2007. The FERC (1989) concluded that the general impact of building more than one pipeline would be primarily additive, and the cumulative impact could be calculated by adding together the impact of each individual project. Based on the project scope, geographic location, and preliminary information, we anticipate that the ETM Expansion Project would result in environmental impacts similar to those of the proposed Project. The proposed Project will parallel the right-of-way utilized by the ETM Expansion Project in Madison Parish for approximately 10 miles (SESH MP 12.6 to MP 22.5). Detailed information regarding the environmental impacts that would be associated with construction and operation of the ETM Expansion Project can be viewed on the FERC website under Docket No. CP06-446-000.

Southeast Expansion Project

The Southeast Expansion Project, also proposed by Gulf South, is an approximate 110-mile-long, 36-inch-diameter natural gas pipeline from Gulf South's existing Index 130 transmission pipeline in Simpson County, Mississippi to an interconnection with Transco in Choctaw County, Alabama (Transco's Compressor Station 85). The beginning of the Southeast Expansion Project is at the end of the ETM Project. Gulf South has indicated that, if approved, the ETM Project would be constructed in 2007.

The Southeast Expansion Project is considered here with respect to the potential for cumulative impacts to the natural and human environments of Louisiana, Mississippi, and Alabama. The project has been filed. A DEIS was issued on April 13, 2007 and is being evaluated by the FERC. While it is not certain if or when this action will occur, its similarity and proximity to the proposed Project merits further consideration. The FERC (1989) concluded that the general impact of building more than one pipeline would be primarily additive, and the cumulative impact could be calculated by adding together the impact of each individual project. Based on the project scope, geographic location, and preliminary information, we anticipate that the Southeast Expansion Project would result in environmental impacts similar to those of the proposed Project. Detailed information regarding the environmental impacts that would be associated with construction and operation of the Southeast Expansion Project can be viewed on the FERC website under Docket No. CP07-32-000.

Southern Pines Energy Center and Expansion Projects

SG Resources, Mississippi, LLC is completing construction of its Southern Pines Energy Center in Greene County, Mississippi. The center includes two underground natural gas storage caverns (12 Bcf capacity), two injection and withdrawal wells, five raw water wells and five brine disposal wells; and associated pumping and piping systems. It also includes four compressors and two 3.13 mile-long, 24-inch diameter pipelines extending from the storage facility to an interconnection with the Destin Pipeline Company, LLC pipeline system, facility utilities and roadways.

In 2007, SG Resources, Mississippi, LLC was approved to double its storage capacity to 24 Bcf and to construct dual lateral pipelines to connect the center with the Florida Gas and Transco pipeline systems. Specifically, SG Resources, Mississippi, LLC requested approval to increase storage capacity by two storage caverns, develop a third storage cavern, construct two additional brine disposal wells and

construct 26 miles of dual 24-inch-diameter pipelines in Greene County, Mississippi, and Mobile County, Alabama. The construction of the Southern Pines Energy Center and Expansion Projects started in 2006 and will continue through 2008.

The Southern Pines Energy Center and Expansion Projects are considered here with respect to the potential for cumulative impacts to the natural and human environments of Mississippi and Alabama. Their similarity and the proximity of their pipeline components to the proposed Project merit further consideration. As noted above, the FERC (1989) considers that the general impacts of building multiple pipelines would be primarily additive. Based on the project scope, geographic location, and preliminary information, we anticipate that the Southern Pines Energy Center and Expansion Projects would result in environmental impacts similar to those of the proposed Project. Detailed information regarding the environmental impacts that would be associated with construction and operation of the Southern Pines Energy Center and Expansion Projects are included in the environmental assessment prepared by the FERC, which can be viewed on the FERC website under Docket No. CP02-229-000.

Midcontinent Express Project

Kinder Morgan has proposed construction of a new 24-inch- and 36 inch-diameter natural gas pipeline system that would extend approximately 475 miles southeast from Bryan County, Oklahoma, to Choctaw County, Alabama. The route would be collocated with the Gulf Crossing Project, then the ETM Expansion Project, and finally with the Southeast Expansion Project. Landowners along the proposed Project could be (or may have already been) approached by Kinder Morgan representatives regarding an additional easement on their land. If the Midcontinent Express Project were constructed as presently envisioned, this would represent a cumulative land-use effect along with the proposed Project's right-of-way in Louisiana, Mississippi and Alabama.

The Midcontinent Express Project is considered here with respect to the potential for cumulative impacts to the natural and human environments of Louisiana, Mississippi, and Alabama. The project is in the pre-filing stage (PF07-4-000) and is being evaluated by the FERC, but has not yet been approved. Detailed information regarding the environmental impacts that would be associated with construction and operation of the Midcontinent Express Project are not available at this time.

Gulf Crossing Project

Boardwalk Pipelines has proposed construction of a new 42-inch-diameter natural gas pipeline system that would extend approximately 351 miles southeast from Grayson County, Texas, to Madison Parish, Louisiana. Additionally, the Gulf Crossing Project would include 4.5 miles of 42-inch-diameter pipeline looping in Madison Parish, Louisiana, and 11.2 miles of 42-inch-diameter pipeline looping in Hinds, Copiah, and Simpson counties, Mississippi. The route would be collocated for 289 miles with the proposed Midcontinent Express Project.

The Gulf Crossing Project is considered here with respect to the potential for cumulative impacts to the natural and human environments of Louisiana. The project is in the pre-filing stage and is being evaluated by the FERC, but has not yet been approved. Detailed information regarding the environmental impacts that would be associated with construction and operation of the Gulf Crossing Project can be viewed on the FERC website under Docket No. PF07-1-000.

3.13.2 Unrelated Projects

Assorted Mississippi Road Projects

The MSDOT provides brief updates of projects throughout the state on its website: www.mdot.state.ms.us. According to the site, there are five projects within the counties along the proposed Project route. The U.S. Highway 84 project is located in Wayne County, which is adjacent (north) to Greene County where the proposed SESH Project route is located.

The largest road project in the SESH Project area is the Federal Highway Administration's I-59 S-Curve Project in Laurel, Mississippi. It involves the straightening of three-quarters of a mile of Interstate Highway in the city of Laurel. An environmental assessment was prepared for the project by the Federal Highway Administration and a Finding of No Significant Impact was issued in April 1988. Project construction began in October 2006 and is scheduled for completion in August 2009. A copy of the environmental assessment could not be obtained to evaluate the project's potential impacts; however, the project is being constructed in areas characterized as residential and commercial/industrial.

Four other projects are being constructed under the direction of the MSDOT. Three of the projects are on existing roads, and one is a new road (U.S Highway 45/State Route 57 Bypass). Construction is scheduled to be complete on three of the four projects during the beginning of construction of the SESH Project. Construction of the U.S. Highway 84 project will continue through the proposed SESH Project construction period (November 2007 to June 2008). Environmental documentation on these projects was not available; therefore, evaluations of environmental impacts could not be made.

3.13.3 Potential Cumulative Impacts of the Proposed Action

Impacts to wetlands, water bodies, vegetation, wildlife (including federally and state-listed endangered and threatened species), land use, and air quality and noise could contribute to larger cumulative impacts. See Tables 3.13-1 and 3.13-2 for a comparative summary of the proposed construction projects in the vicinity of the proposed Project.

The FERC has no authority over the permitting, licensing, funding, construction, or operation of the projects listed 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. The expansion or construction of interstate 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 water bodies, 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 SESH Project would result in both short-term and long-term impacts to water bodies 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 water bodies during operation of the proposed pipeline would be associated with routine right-of-way maintenance. All maintenance activities would comply with applicable federal regulations (see Section 2.6) and SESH's Plan and Procedures, but would continue throughout the life of the proposed Project.

If approved and constructed, the SESH Project and other reasonably foreseeable future projects would affect wetlands and would include the permanent loss or conversion of some existing wetlands (see Section 3.4). Elements of these projects that have the potential to affect wetlands and water bodies 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 water bodies would require appropriate mitigation. Construction of the proposed Project would affect 267 wetland areas resulting in a total of approximately 238.8 acres of wetland disturbance, including approximately 159.8 acres of forested wetland impacts. As noted in Section 3.4, SESH would fully comply with any mitigation conditions established in the permits, which could include off-site mitigation, conservation, enhancement, and on-site mitigation. Common off-site mitigation options include mitigation banking, conservation, and resource enhancement. Further, discharges to wetlands and other surface waters associated with construction and operation would require review, approval, and mitigation (if necessary) under the LDEQ, MDEQ, and ADEM stormwater discharge programs.

Construction of the proposed SESH Project would result in 654 individual waterbody crossings. SESH proposes to cross 31 of these waterbodies using the HDD technique, including 10 major waterbodies, 9 NRI rivers, and 10 impaired rivers. The use of HDD would avoid direct impacts to waterbodies and minimize impacts to riparian vegetation at those crossings. We have also provided recommendations to evaluate further avoidance and minimization opportunities associated with HDD installations that would require extra workspace areas in forested wetlands (see Section 3.4). Though 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 SESH's HDD Contingency Plan and SPCC Plan, respectively.

Because most of the projects listed in Table 3.13-1 are located within the same major watersheds 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 water bodies. However, because the SESH 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 SESH's Plan and Procedures and the recommendations included in this EIS. We conclude that the cumulative impacts of the SESH Project and the projects listed in Table 3.13-1 on wetlands and water bodies would be adequately minimized.

3.13.3.2 Vegetation and Wildlife

Construction of the proposed Project and other reasonably foreseeable future projects would have 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 affect native vegetative communities including approximately 1,831.6 acres of forest and 341.3 acres of pine plantation.

Cumulative impacts within a region, such as lost acreage of forestland, are additive. Further, 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 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. SESH's proposed route would parallel existing utility rights-of-way where possible, thereby minimizing impacts to previously undisturbed vegetation. The proposed pipeline route would parallel existing rights-of-way for approximately 58.5 miles, or about 22 percent of the proposed route. Additionally, approximately 36 percent of the proposed pipeline route would traverse agricultural and open lands that would typically experience rapid revegetation. Further, SESH would implement the mitigation measures outlined in its Plan and Procedures to encourage the regrowth of native vegetation and discourage the spread of exotic or noxious plant species.

Thirty threatened, endangered, or special-status wildlife and plant species were identified as potentially occurring within the Project Area. As described in Section 3.7, with implementation of our recommendations for mitigation to avoid and minimize impacts, we have determined that the proposed Project would not be likely to affect, adversely, any federally listed or special-status species. However, if other reasonably foreseeable future projects were to affect the same habitats as the proposed Project, cumulative impacts to these listed species would occur. Because the protection of threatened, endangered, and other special-status species is considered as part of federal and state permitting processes, impacts to such species would likely be reduced or eliminated through conservation and mitigation measures identified during those relevant 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 SESH 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 4,021.2 acres of land during construction. Approximately 8 percent of that land would be pine plantation, 45 percent would be forested land, and 23 percent would be agricultural land. Open land, residential, commercial/industrial, and open-water land cover and uses would be affected. While most of these impacts would be temporary, construction of the proposed Project would result in some permanent land-use changes, including conversion of approximately 165.3 acres of pine plantation and 847.0 acres of forested lands to maintained utility right-of-way. The Southern Pines Energy Center Project has initially converted approximately 4.2 acres of pine plantation, 6.5 acres of forested uplands, and 0.5 acre of wetlands.

Land-use impacts associated with the proposed ETM Expansion Project and Southeast Expansion Project include approximately 4,034 acres and 1,986 acres, respectively. However, land-use impacts associated with those projects would likely have 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 the I-59 S-Curve Project in Mississippi, which would permanently convert hundreds 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 condition 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 agricultural or open land would be short term and minor. Cleared forestland and pine plantation located outside of permanently maintained rights-of-way would take many years to return to preconstruction conditions, with the duration of recovery dependent on the types and ages of trees removed, resulting in long-term

impacts. However, given the prevalence of these land uses and cover types within the affected counties and parishes, significant cumulative effects would not be anticipated.

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 affect 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 SESH Project, the ETM Expansion and Southeast Expansion projects, and the Southern Pines Energy Center Expansion Project would all contribute ongoing air emissions associated with operation of compressor stations. In the Delhi, Louisiana area, the proposed Delhi Compressor Station would produce cumulative impacts in association with the existing Columbia Gas Transmission Compressor Station and the proposed Gulf South Delhi Compressor Station. The proposed or planned roadway improvements might also contribute to 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 air quality impacts. Air emissions from operations of portions of the proposed Project and the other projects listed in Table 3.13.1-1, with compressor stations located in the same AQCR, could present a cumulative impact. This impact would be additive because the compressor stations would discharge into a shared air basin. The Delhi Compressor Station is the only station that would be constructed in the same region as other compressor stations listed in Table 3.13.1-1. Initial screening modeling has been performed for the Delhi Compressor Station, and pollutant concentrations would be below thresholds requiring additional cumulative analysis. The counties and parishes in which the proposed Project would be constructed are in attainment for all NAAQS criteria pollutants. In addition, each of the projects listed in Table 3.13.1-1 would be required to meet all applicable federal and state air quality standards.

3.13.3.5 Noise

Potential noise impacts associated with the proposed Project and those projects listed in Table 3.13.1-1 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. Further, most construction activities would be limited to daylight hours, so few construction-related noise impacts would occur at night. Potential noise-related impacts during operation of the proposed Project and the other pipeline projects listed in Table 3.13.1-1 would be primarily limited to the vicinity of the associated compressor stations. As described in Section 3.11, the estimated noise that would be generated by the proposed Delhi, Gwinville, and Lucedale compressor stations and Collins and Petal booster stations would meet acceptable levels at the nearest NSA, but we are recommending monitoring to ensure no impacts occur.

Noise emissions from compressor and booster station operations may be additive with noise-generating elements of other reasonably foreseeable future projects if they are located near a common NSA; for example, in the Delhi, Louisiana, area where two new compressor stations are being proposed. However, both compressor stations would be required to comply with FERC standards for noise levels. A cumulative noise analysis is being performed at the NSAs in common for both compressor stations, which should identify any potential noise impacts at this location.

3.13.4 Conclusions

If the proposed Project and the ETM and Southeast Expansion Projects are certificated, along with the recently certificated Southern Pines Energy Center and Expansion and the recently constructed CenterPoint Carthage to Perryville Project , the projects would be constructed within the same general area, and the effects of these actions would overlap in time from 2006 to 2008. Additionally, the type of project, construction methods, and impacts would be similar. Although each of these unrelated projects would result in some temporary and minor effects during construction, each project would be designed to avoid or minimize impacts to wetlands, water bodies, 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 the avoidance or minimization of cumulative impacts. We, therefore, consider that the potential cumulative impacts of the three pipeline projects and one storage field project under our review have been or would be minimized.

We believe that impacts associated with the proposed Project would be relatively minor, and we have included numerous recommendations in this EIS to further reduce the environmental impacts associated with the Project. The environmental impacts associated with the proposed Project would be minimized by careful project routing, use 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.