4.0 ENVIRONMENTAL ANALYSIS

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

In this section, we discuss the affected environment, general construction and operational impacts, and proposed mitigation for each resource. KMLP, as part of its proposal, agreed to implement certain measures to reduce impacts, and we evaluated the proposed mitigation measures to determine whether or not additional measures would be necessary to further reduce impacts. These additional mitigation measures that we have identified appear as bulleted, boldface paragraphs in the text. We are recommending that these measures be included as specific conditions to the Certificate that the FERC may issue to KMLP for the Project.

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

- KMLP would comply with all applicable laws and regulations;
- The facilities would be constructed as described in section 2.0 of this draft EIS; and
- KMLP would implement the mitigation measures identified in its application and supplemental filings to the FERC.

This section of the draft EIS is organized by environmental resource. For most resources, the scope of our analysis includes the construction and operation of the facilities, which are limited to the pipelines, their support facilities, workspaces extra to the pipelines' rights-of-way, interconnect sites, access roads, and yards for pipe storage and contractor use during the construction phase. The draft EIS also includes detailed discussion of natural gas pipeline reliability and safety (see section 4.13) and the cumulative impacts of the Project and other projects in the area (see section 4.11).

4.1 GEOLOGIC RESOURCES

4.1.1 Affected Environment

Geologic Setting

The entire state of Louisiana is within the physiographic section referred to as the Coastal Plain Province by the USGS. The surface of this region is underlain by geologically young sediments deposited in or adjacent to rivers and deltas in a coastal plain setting. Below the surface sediments are Tertiary rocks at a depth of thousands of feet. The KMLP Project begins in the Holocene coastal marshes of Cameron Parish and extends across the Pleistocene terraces of Calcasieu, Jefferson Davis, Acadia, and Evangeline Parishes (table 4.1.1-1). The Holocene coastal marshes are alluvium deposits associated with major rivers and tributaries along with coastal deposits of marine sediments, and account for approximately 55 percent of the surface in Louisiana. The Pleistocene terraces consist of sand, gravel,

TABLE 4.1.1-1

Geology Along the Proposed KMLP Project

Epoch	Map Unit			Cumulative Length Crossed (Miles)
	Symbol	Name	Description	
Holocene	HsM	Small river meander-belt deposits	Point-bar and associated overbank deposits underlying meander belts of the Sabine River. The surface of the meander-belt is characterized by ridge and swale topography. These deposits typically consist of gray to reddish brown sand, silt, silty clay, and sandy clay.	7.8
Holocene	Hm	Mermentau Alloformation	Complex interfingering and interbedded, dark-colored marine muds, sandy and shelly beach deposits, organic marsh clays, and lacustrine and bay muds. These deposits bury the surfaces of the Prairie and Deweyville Allogroups. The Louisiana chenier plain forms the surface of the Mermentau Alloformation. The unit extends westward along the coast into Texas as far west as Galveston Bay. Eastward, it extends almost to the west shore of Vermilion Bay, where it interfingers with deltaic sediments of the Teche delta lobe. Seaward of the shoreline, the Mermentau Alloformation grades laterally into unnamed marine sediments.	12.3
Holocene	Hs	Small river deposits, undifferentiated	Undifferentiated alluvium of small coastal rivers, consisting of recognizable but unmapped channel and overbank deposits within the Calcasieu River Valley.	1.5
Holocene	Hua	Undifferentiated alluvium of small upland streams	Alluvial deposits of minor streams and creeks filling valleys cut into older deposits. The modern floodplain within these valleys constitutes the surface of the deposits. The lithology of these alluvial deposits reflects the reworked lithology of their adjacent source.	6.4
Pleistocene	Ppbe	Beaumont Alloformation	Coastal plain deposits of late-to-middle-Pleistocene streams: the oldest and topographically highest surface of the Prairie Allogroup units of southwestern Louisiana. It exhibits the relict channels of the Red and Calcasieu rivers, and includes deposits of the Ingleside barrier trend to the southwest of the Ville Platte quadrangle.	86.1
Pleistocene	Pper	Relict Pleistocene coastal ridges	Low-lying ridges delineated on the surface of the Beaumont Alloformation. Some of these ridges are coast-parallel and others trend obliquely to the coast and radiate from the end of the known meander-belts. Limited drilling indicates that these ridges are either meander-belt ridges or deltaic distributaries of differing ages. The origins of other coastal ridges developed on the Beaumont surface to the west of the Crowley quadrangle remain undetermined.	4.6

and mud deposits and were formed as remnants of pre-existing floodplains tilted in response to the down-wrapping of the crustal floor of the Gulf of Mexico. The Pleistocene terraces account for approximately 25 percent of the surface in Louisiana (Louisiana Geological Survey 2006).

Permeable Quarternary sedimentary deposits overlie sedimentary rock formations at depths of at least 5,000 feet along the northernmost reaches of the Project, and increase to over 10,000 feet near the coastline (Renken 1998). There is no bedrock exposure within 50 miles of the pipeline.

The topography throughout the Project area is characterized by low elevation and relief. Slopes are generally flat to gentle except for river/stream banks, man-made levees, roadways, and areas of fill. The beginning of the Project in the vicinity of Sabine Lake has an elevation at sea level. Elevation rises to 65 feet above sea level at the end of the Project in Acadia Parish.

Cheniers can be found along the Gulf Coast and within the vicinity of the Project. Cheniers are geomorphological formations consisting of ridges and low-lying marshes formed by alternating high and low sediment supply periods. The ridges are typically 1 to 3 feet above adjacent areas and provide elevated land for commercial and residential development. They support maritime forests typically of live oak, which provide important habitat for birds and mammals amongst the marshes of coastal Louisiana. The State of Louisiana provides special protection to chenier formations, requiring that "surface alterations which have high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated cheniers, isolated natural ridges or levees, or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes" (Louisiana Administrative Code Title 43, Part I, Subchapter B, Coastal Use Guidelines, Section 711 (I)).

Mineral Resources

Mineral resources currently exploited or potentially exploitable in the region where the KMLP Project would be located include oil, gas, coal, salt, sand and gravel, gypsum, lime, and stone.

Southern Louisiana is an active area for oil and gas production. Oil and gas wells in the vicinity of the KMLP Project were identified using maps and ownership databases obtained from the Louisiana Oil Spill Coordinators Office (LAOSCO). According to these data, there are 218 oil and gas wells within ¼ mile of the pipeline. Of those 218 wells, 21 are within 150 feet of the pipeline and 9 wells are within the construction work area. The approximate locations and status of these 21 wells are listed in table 4.1.1-2.

The closest major salt mine, Texas Brine Corp. in northern Jefferson County, Texas, is about 25 miles west of the pipeline. No brine wells or other salt recovery operations have been found within the construction workspace of the KMLP Project.

Sand and gravel operations are present in Calcasieu, Jefferson Davis, and Evangeline Parishes. The closest major sand and gravel operations are located in northwest Jefferson Davis Parish, about 10 miles north of the Project (National Atlas 2006). Two borrow pits are located in the vicinity of the pipeline. One is located completely across the construction right-of-way at approximately MP 52.7. The other is located about 200 feet away from the pipeline with its entrance road at approximately MP 66.0.

TABLE 4.1.1-2

Oil and Gas Wells Within 150 feet of the KMLP Project

MP	Parish	Owner/Operator	Oil and Gas Field	Distance from Proposed Pipeline (feet)	Within Construction Right-of-Way?	Status
1.2	Cameron	Sabine Pass Terminal SWD	Johnsons Bayou, West	52.2	Yes	Salt Water Disposal
40.5	Calcasieu	MGGT-GL	Wildcat – So. LA Lafayette Dist.	122.5	No	Permit Expired
48.4	Calcasieu	Grady Mayeaux	Wildcat – So. LA Lk. Charles Dist.	41.3	No	Dry and Plugged
49.5	Calcasieu	M CAM RE SUA; SL 11524	Moss Lake, East	4.5	Yes	Plugged and Abandoned
49.5	Calcasieu	William T. Burton IND Inc.	Wildcat – So. LA Lafayette Dist.	5.8	Yes	Plugged and Abandoned
57.5	Calcasieu	Walker Unit A	Lake Charles, South	135.8	No	Dry and Plugged
67.9	Calcasieu	Humoris Spears	Manchester	28.7	Yes	Dry and Plugged
69.3	Calcasieu	Farmers Land and Canal Company	Manchester	0.6	Yes	Permit Expired
84.0	Jefferson Davis	William E. Trimble	Welsh, North	120.1	No	Dry and Plugged
104.9	Acadia	Phillip Klumpp	Wildcat – So. LA Lafayette Dist.	35.3	No	Dry and Plugged
106.9	Acadia	T. Ortego A SU; BNKHD Fruge	Tepetate	94.2	No	Plugged and Abandoned
107.0	Acadia	Theogene Ortego	Tepetate	134.3	No	Plugged and Abandoned
107.4	Acadia	T. Ortego A SU; L L Welch A	Tepetate	63.3	No	Plugged and Abandoned
107.5	Acadia	L. L. Welch A	Tepetate	42.5	Yes	Plugged and Abandoned
108.3	Acadia	J. R. Jones	Tepetate	115.5	No	Dry and Plugged
109.5	Acadia	M. L. Vincent Jr.	Tepetate, North	30.5	Yes	Plugged and Abandoned
109.8	Acadia	M. L. Vincent	Tepetate, North	104.4	No	Plugged and Abandoned
109.8	Acadia	HMSKR B SUF; M L Vincent Jr.	Tepetate, North	104.4	No	Plugged and Abandoned
109.8	Acadia	M. L. Vincent Jr.	Tepetate, North	104.4	No	Plugged and Abandoned
112.2	Acadia	M. R. Jenkins Estate	Wildcat – So. LA Lafayette Dist.	44.9	Yes	Dry and Plugged
112.2	Acadia	Mark Jenkins Estate	Basile	44.9	Yes	Plugged and Abandoned

4.1.2 Impacts and Mitigation

The primary effect of pipeline construction on geology would be disturbances to the existing topography along the construction right-of-way. As described in section 2.3, all areas disturbed during pipeline construction would be graded and restored as closely as possible to preconstruction contours during cleanup and restoration. Additionally, blasting is not anticipated because the Project would be unlikely to encounter bedrock exposures. For these reasons, we believe that construction, maintenance, and operation of the Project would be unlikely to result in significant alterations of the topography or geological resources of the Project area.

The Project would cross the western-most portion of a chenier known as Garrison Ridge. This crossing would be done by HDD to avoid impacts to this chenier. Maintenance and operation of the pipeline would not disturb the chenier. There are two other cheniers, Saunders Ridge and Blue Buck Ridge, in the vicinity, but they would not be crossed by the Project.

Mineral Resources

As noted above, 9 oil and gas wells are reported to be within the construction right-of-way. However, no wells within the construction right-of-way were actually observed in locations where survey permission had been granted. Some wells may have been plugged and abandoned and surface features may no longer remain. The centerline has not been adjusted to miss these recorded well locations. The reported location of the well may be incorrect and moving the line could move it to the actual location of the well, or with the high level of oil and gas production in the area, could interfere with another well. To confirm the existence of active or plugged/abandoned wells within the pipeline construction right-of-way, and minimize impacts on those wells that could be affected, KMLP would:

- Conduct a pre-construction physical survey using a magnetometer (or equivalent instrumentation) to identify non-reported or abandoned oil or gas wells, and to confirm the location of reported wells, in those areas along the right-of-way where wells are reported to be within ¼ mile of the pipeline;

- In the event a well is found, determine a safe buffer zone around the well for each construction procedure based on the size and current condition of the well, in consultation with the owner of the well;

- Adjust the pipeline centerline, if necessary, to ensure that the pipe trench excavation would not interfere with the integrity of the well (generally, a minimum separation distance of 50 feet would be maintained between the pipeline and the well);

- Reduce the construction workspace, as necessary, to keep stockpiled spoil and associated equipment a safe distance from the well;

- Flag wells within the construction right-of-way and place barricades at the edge of the buffer zone to exclude construction equipment and personnel;

- Document the condition of each well before construction and repair any damage caused by pipeline construction activities to surface facilities or the well casing, as appropriate; and

- Follow the safety precautions similar to those maintained while crossing foreign pipelines (e.g., no mechanized equipment within a prescribed distance, no open flames or smoking, and

monitoring for detection of 25 percent of the lower explosive limit of natural gas in the air) in the vicinity of oil and gas wells, as appropriate.

Minor route changes to reduce impacts on existing mineral resources, such as oil and gas production wells, may result in impacts to additional landowners or may affect other resources. If this occurs, KMLP would contact the FERC for any route realignments. Construction, operation, and maintenance of the Project would not affect future recovery of oil and gas, and nearby oil and gas wells would not affect the Project. The Project is limited to near-surface disturbance over a relatively small area that would not restrict access to oil and gas resources that are typically located at depths of more than 1,000 feet.

There are no salt or brine operations identified near the Project area. The nearest salt mine is about 25 miles west of the Project. No major sand and gravel mining operations are located near the project area. The nearest one is located at about 10 miles away. However, two borrow pits are located along Leg 1 near MP 52.7 and MP 66.0. The borrow pit near MP 52.7 would be crossed by Leg 1 and KMLP plans to cross this pit using HDD. KMLP has indicated the landowner/owner of the pit may receive inert highway demolition material for disposal to fill the pit in the future. KMLP has not provided any documentation of consultation with the owner of the pit. KMLP believes that since the pipeline would be installed by HDD and be separated from the bottom of the pit by a distance determined to be safe by KMLP engineering analysis, no impact to the integrity of the pipeline is anticipated nor would it cause any disruption to the disposal operations. However, in order to minimize impact to the borrow pit at MP 52.7, **we recommend that:**

- **Prior to the closing of the draft EIS comment period, KMLP file with the Secretary a letter from the borrow pit owner addressing the existing and future use of this resource.**

Upon completion of pipeline construction, no excavations would be allowed within the operating pipeline right-of-way to recover sand or gravel. These resources are relatively abundant throughout the area so the Project would have no adverse effect on the future commercial use of sand and gravel if limited areas are excluded from mining.

Based on this analysis, we believe the Project would have an inconsequential effect on mineral resources in the area.

Seismicity and Faulting

Hazards associated with seismicity and faulting include ground shaking, surface rupture of faults, and offset along normal, reverse, or strike-slip faults. These are especially hazardous to linear, rigid structures, such as pipelines, in which the ground is not moving the same distance or in the same direction. According to seismic hazard maps of the United States and Louisiana, the Project would be located in a region of low seismic risk (USGS 2006c). The Gulf Coast, including the Project area, is within Seismic Zone 0, the lowest seismic hazard category, according to the Uniform Building Code's Seismic Risk Map (International Conference of Building Officials 1997). The peak ground acceleration (PGA) with 10 percent probability of exceedance over 50 years (i.e., annual frequency of exceedance of 0.002) in the vicinity of the Project is estimated to be extremely low at between 1 and 2 percent of the gravity acceleration. An earthquake with PGA between 1 and 2 percent of the gravity acceleration would not result in damage to the pipeline.

There are numerous growth faults located throughout the Gulf Coast Region, but they present little risk of earthquakes since no earthquakes have been definitely attributed to any of the specific mapped fault systems (McCulloh 2001). The pipeline likely crosses several growth faults. However,

movement along these growth faults, if active, would be a slow creep, measured in a few millimeters or fractions of millimeters per year. The minimum wall thickness proposed for the KMLP Project would be sufficient to withstand any expected ground movement associated with these growth faults.

Based on the low historic seismicity and the slow creep of the faults in the area, we believe seismicity and faulting would not present a significant risk to the Project. Further, construction and operation of the Project would not change the local seismic and faulting conditions.

Soil Liquefaction

Soil liquefaction is a condition that occurs when loosely packed deposits change from a solid to a liquid state because of increased pressure and reduced stress resulted from seismic shaking or other events. The horizontal PGA required to induce soil liquefaction is typically more than 10 percent of the gravity acceleration (Youd and Idriss 2001). Since the PGA in the vicinity of the Project is only 1 to 2 percent of the gravity acceleration, the potential for soil liquefaction would be very low.

Subsidence

Subsidence is lowering of the land surface from changes that take place underground such as dissolution of limestone in karst terrain areas, mining or extraction of underground resources, and consolidation of sedimentary deposits. There is no karst terrain or underground mines in the Project area. Extraction of oil and gas and the consolidation of sedimentary deposits are known to cause ground subsidence in southern Louisiana. However, since this type of subsidence is a gradual movement of the land surface over generally large areas, with little or no localized differential settlement, the potential for subsidence to occur and affect the KMLP facilities is low. At the same time, the construction and operation of the KMLP facilities would not increase subsidence in the area.

Flooding from Hurricanes and Other Major Storms

Coastal areas of Louisiana are subject to flooding and shoreline erosion from storm surge and heavy precipitation associated with hurricanes, tropical storms, and other major storms. Most of the Project in Cameron and Calcasieu Parishes would be located in the 100-year floodplain as defined by the Federal Emergency Management Agency (FEMA). The northeast sections are primarily out of the floodplain except where it crosses lowlands associated with bayous and other waterbodies. In total, 55 miles of the 132 miles (about 42 percent) of Leg 1 of the Project would be within the 100-year floodplain.

After construction, the original grade would be restored. Construction, operation, and maintenance would not significantly alter the floodplain. Flooding could increase the buoyancy of the pipelines, causing them to rise to the surface and become exposed. In areas that are saturated or could become saturated with water, KMLP proposes to use concrete weight-coated pipe to counteract buoyancy. Major waterbodies would be crossed by HDD, which would place the pipe at least 20 feet below the waterbody and minimize the chance that the pipeline would be exposed due to scour by fast moving water and debris. Regular maintenance activities along the right-of-way would identify areas of soil erosion, exposed pipe, or other flood-related damage. KMLP would use terrace repair or backfill replacement in areas of concern.

Based on these precautions, the potential for the project to increase the frequency or magnitude of flooding is very low.

Slope Stability

Impacts to slope stability include landslides, debris flows, and rock falls, which are generally associated with steep slopes and can be instigated by cutting slopes, the use of heavy equipment, and/or unusually heavy precipitation. Topography along the Project is characterized as flat to gently sloping where slope failure would not be expected. Steeper slopes are present at some navigation and stream channel banks, flood control levees, and construction excavation and fill areas such as where Leg 1 crosses Bayou Cannes near MP 124.7. These areas are relatively short in length and therefore any sliding would not result in any damage to the pipe integrity. Pipeline construction would be accomplished in accordance with our Plan, which includes measures to control runoff and erosion and to minimize the potential for slope failures. With these measures, construction, operation, and maintenance of the Project would not affect slope stability.

KMLP proposed an alternative measure to item V.A.5 of our Plan, which requires land surfaces to be restored to pre-construction contours, unless such contours threaten the integrity of the pipeline. While we agree with this concept, KMLP did not provide sufficient justification for the alternative measure either for the Project as a whole or for any particular sites. Therefore, **we recommend that:**

- **KMLP comply with the requirements of item V.A.5 of our Plan. If KMLP identifies a location(s) where it can not implement item V.A.5, KMLP should file with the Secretary for review and written approval by the Director of OEP, any alternative measures that it would use to ensure pre-construction contours are restored without compromising pipeline integrity.**

4.2 SOILS

4.2.1 Affected Environment

The Project would cross three Major Land Resource Areas (MLRAs), as designated by NRCS (2006a). The Project would originate in the Gulf Coast Marsh MLRA, which is generally dominated by Saprist and Aquent soils. These are hydric soils susceptible to frequent flooding because the water table is at or above the surface most of the time. This area supports marsh vegetation and is primarily used for wildlife habitat. The Project would cross the Gulf Coast Prairies MLRA where Aqualfs are the dominant soils. The area naturally drains poorly and in the past it supported forest vegetation. At present this area is primarily artificially drained and farmed for hay, soybeans, grain, cotton, corn, and rice. The Project would terminate in the Western Gulf Coast Flatwoods MLRA in which Aqualfs, Udalfs, and Udults are the dominant soils. These soils range from poorly drained to moderately well drained. About 72 percent of the Western Gulf Coast Flatwoods MRLA is managed for harvest of pine and hardwoods.

Table 4.2.1-1 presents basic characteristics of the soil series along the Project that could affect pipeline construction or maintenance, including the soil series or complex name (and corresponding soil map unit), soil texture, presence of hydric soils, drainage class, flooding frequency and duration, presence of prime farmland, erosion factor, and compaction potential. All of the soils present at the interconnect sites are crossed by the pipeline with the addition of one map unit, Aquents (AN), and one soil complex, Hackberry-Mermentau (Hm). These characteristics were identified using data from NRCS's online Soil Survey Geographic Database (NRCS 2006b and 2006c).

Soil characteristics determine its susceptibility to erosion, flooding, and compaction, or make it suitable for agricultural uses. The erosion factor of a soil represents the likelihood of the soil to erode as determined by soil detachment and water infiltration properties. In general, the soils that would be crossed by the Project are low to moderately susceptible to erosion with erosion factors ranging from 0.24 to 0.49. The majority of soils that would be crossed by the Project drain somewhat poorly to very poorly. The majority of soils also experience frequent and long duration flooding events and are characterized as hydric soils. Drainage properties, frequency and duration of flooding events, or the classification as hydric soils are all indicators of the relative wetness of the soil under natural conditions. Soil compaction can modify the structure and natural properties of the soil and affect hydrology, erodibility, and revegetation. Approximately 50 miles of the Project would cross soils with a severe compaction potential. None of the soils crossed have shallow bedrock and no blasting would be required during pipeline construction. All of the soils have a good revegetation potential after construction disturbance. Approximately two-thirds of the Project would cross through soils designated as prime farmland by NRCS. Soils designated as prime farmland provide the highest crop yield per unit energy expended due to the favorable conditions of the soils for agricultural production.

4.2.2 Impacts and Mitigation

4.2.2.1 Construction Impacts

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

TABLE 4.2.1-1

Soils Crossed by the Proposed KMLP Pipeline

Cumulative Length Crossed (miles)	Map Unit	Soil Series or Complex Name[a]	Soil Texture	Hydric Soil?	Drainage Class	Flooding Frequency and Duration	Prime Farmland	Erosion Factor (0 to 0.69)	Severe Compaction Potential?
1.3	AcB	Acadia	Silt loam	No	Somewhat Poorly	N/A	Yes	0.49	Yes
1.5	AdB	Acadiana	Silt loam	No	Moderately Well	None	Yes	0.49	Yes
1.2	AN	Aquents	Silty clay loam/silty clay/clay	n/a	Very Poorly	Frequent	No	n/a	n/a
0.9	BA	Bancker	Muck	Yes	Very Poorly	Frequent, Very Long	No	0.28	No
0.8	BSA	Basile and Brule	Silt loam/silty clay loam	Yes	Poorly (Basile), Moderately Well (Brule)	Frequent, Long	No	0.43	No
0.1	BEA	Basile and Cascilla	Silt loam	Yes	Poorly	Frequent, Very Long	No	0.43	No
0.7	Bw	Basilen-Wrightsville	Silt loam	Yes	Poorly	Frequent, Long	No	0.43	No
1.8	CO	Clovelly	Muck	Yes	Very Poorly	Frequent, Very Long	No	0.28	No
1.2	CR	Creole	Mucky clay	Yes	Very Poorly	Frequent, Very Long	No	0.29	No
6.5	Cr, CrA, CrB,	Crowley	Silt loam	No	Somewhat Poorly	None	Yes	0.49	Yes
30.7	Cv	Crowley-Vidrine	Silt loam	No	Poorly, Somewhat Poorly	N/A	Yes	0.49	Yes
0.1	FrA	Frost	Silt loam	Yes	Poorly	Occasional, Brief	Yes	0.49	No
1.1	GB	Ged	Clay	Yes	Very Poorly	Frequent, Long	No	0.28	Yes
3.1	GC	Gentilly	Muck	Yes	Very Poorly	Frequent, Very Long	No	0.37	No
0.1	IoD	Iota	Silt loam	No	Well	N/A	No	0.49	No
0.9	Je	Jeanerette	Silt loam	No	Poorly	N/A	Yes	0.49	No

TABLE 4.2.1-1 (continued)

Soils Crossed by the Proposed KMLP Pipeline

Cumulative Length Crossed (miles)	Map Unit	Soil Series or Complex Name[a]	Soil Texture	Hydric Soil?	Drainage Class	Flooding Frequency and Duration	Prime Farmland	Erosion Factor (0 to 0.69)	Severe Compaction Potential?
1.7	Ju	Judice	Silty clay loam	Yes	Poorly	Rare, Brief	Yes	0.32	Yes
4.2	KpA, KpB	Kaplan	Silt loam	No	Somewhat Poorly	N/A	Yes	0.43	No
4.3	KvA	Kinder-Vidrine	Silt loam	Yes	Poorly	N/A	Yes	0.43 – 0.49	Yes
4.9	Lt, LeA	Leton	Silt loam	Yes	Poorly	Rare, Brief	Yes	0.43	No
0.4	MaB	Mamou	Silt loam	No	Somewhat Poorly	N/A	Yes	0.49	No
0.1	ME	Mermentau	Clay	Yes	Poorly	Frequent, Brief	No	0.28	Yes
0.7	Mn, MdA	Midland	Silty clay loam/silt loam	Yes	Poorly	Rare, Brief	Yes	0.43	Yes
11.9	Mr	Morey	Loam	No	Poorly	Rare, Brief	Yes	0.37	No
5.0	Mt, MtA	Mowata	Silt loam	Yes	Poorly	N/A	Yes	0.49	Yes
14.7	Mt, MwA	Mowata-Vidrine	Silt loam	Yes	Poorly	N/A	Yes	0.49	Yes
0.6	Pc	Patoutville-Crowelly	Silt loam	No	Somewhat Poorly	N/A	Yes	0.49	No
1.9	SC	Scatlake	Mucky clay	Yes	Very Poorly	Frequent, Very Long	No	0.24	No
12.6	UA, UD	Udifluvents, varies	Varies	No	N/A	None	No	N/A	N/A
0.1	Up	Urban Land	N/A	No	N/A	None	No	N/A	N/A
16.7	W	Water, Large	N/A	n/a	N/A	None	N/A	N/A	N/A
5.5	Wv	Wrightsville-Vidrine	Silt loam	Yes	Poorly and Somewhat Poorly	N/A	Yes	0.49	Yes

[a] Soil series descriptions are from the Official Soil Series Descriptions (OSD) maintained by NRCS

potential and agricultural productivity. Alteration of the surface topography can affect hydrology, influencing stormwater runoff and soil drainage patterns.

In general, the above impacts would be avoided or minimized through implementation of our Plan. The Plan is intended to identify baseline mitigation measures for minimizing erosion and enhancing revegetation. These measures include erosion controls, reducing soil disturbance, and reestablishing preconstruction contours and vegetative cover as soon as practicable. Some of the relevant aspects of our Plan include:

- segregate a maximum of 12 inches of topsoil in all actively cultivated or rotated croplands, pastures, residential areas, hayfields, and at other areas at the request of the landowner or land management agency;

- provide temporary erosion and sediment control measures such as silt fences, straw bales, slope breakers, seeding, mulch, and erosion control fabric to minimize any impacts related to soil erosion and sedimentation that may result from precipitation runoff;

- mitigate soil compaction following construction and right-of-way restoration activities, as described below;

- ensure revegetation of all areas disturbed by project-related activities; disturbed upland areas would be seeded in accordance with written recommendations from local conservation authorities or as requested by the landowner;

- provide post-construction monitoring of mitigation practices to ensure their success; and

- utilize EIs to ensure implementation of the practices outlined above.

Erosion

The soils affected by the Project have a low to moderate susceptibility to erosion, and construction activities would remove vegetative cover and expose soils to erosive forces. Without mitigative measures, soil erosion can degrade soil quality, adversely affect nearby waterbodies, and impair revegetation efforts. KMLP would implement erosion control practices during construction and operation of the Project. Temporary control measures would be installed immediately after initial soil disturbance. Disturbed areas would be restored to their original contours and revegetation efforts would begin within six days of final grading, weather and soil conditions permitting. With the implementation of the above measures, we believe impacts associated with soil erosion would be minimized.

Soil Compaction

Soil compaction during construction is caused by heavy construction equipment or other unauthorized vehicles. Soil compaction damages the structure of the soil and reduces transport of air and water to plant roots. Compacted soils may have lower productivity, slower plant growth, increased erosion, and change natural drainage of water. Approximately 50 miles of the Project and 11 of the interconnect sites would affect soils with a high soil compaction potential. In these areas, use of heavy equipment would result in compaction. Some of these impacts would be avoided by the use of HDD especially under waterbodies. In other areas, board roads or low-ground pressure equipment would be used to prevent severe compaction. The heavy equipment that would be used to construct the Project are

tracked vehicles, with a ground pressure (i.e., pounds per square foot) similar to or less than the large four-wheel-drive tractors commonly used for rice farming in the region.

In areas with compaction potential, KMLP would implement the measures specified in our Plan, as appropriate for the site-specific conditions, such as the use of a para-plow or other deep tillage equipment. Alternatively, KMLP may plant and plow under a green manure crop (a growing crop that is plowed under) to decrease soil density, with landowner approval.

In rice fields and crawfish ponds, KMLP would attempt to schedule construction when fields are not normally flooded or negotiate with landowners to defer flooding so that construction would occur when the soils are dry. Drier soil conditions would allow KMLP to ensure that a reasonable degree of compaction at near-optimum moisture content can be achieved when backfilling the pipe trench. KMLP would ensure that the low permeability layer underlying the field is re-installed to near pre-construction conditions in order to contain water during subsequent flooding for crop production. With these measures, we believe impacts associated with soil compaction would be minor and temporary.

Hydric Soils

Hydric soils are formed under conditions of saturation, flooding, or ponding long enough to cause anaerobic conditions. Hydric soils are poorly drained soils, and may still be considered hydric if artificially drained or protected from flooding. The status of hydric soils is part of the definition used by the COE to determine wetland status. The majority of soils that would be affected by the Project are hydric soils. Construction activities can cause compaction and rutting of hydric soils. Due to the unique condition of these wetland soils, special construction techniques would be used for construction in wetland areas, as described in section 2.3.1.2, to minimize impacts. Following construction, KMLP would restore these areas to their pre-construction conditions including restoring drainage systems and original contours. With these measures, we believe KMLP would minimize impacts to hydric soils.

Revegetation

All of the soils that would be affected by the Project have a moderate to good revegetation potential. KMLP would restore affected areas to preconstruction conditions as practicable in accordance with our Plan and Procedures. For example, in upland areas, an herbaceaous layer would be re-established by seeding. The type of seed would be selected to match adjacent cover or as requested by the landowner, management agency, or county extension agent. In agricultural areas, revegetation would be considered successful if crop yields are similar to adjacent undisturbed portions of the same field. In wetlands, revegetation would occur by the transplantation of similar mature specimens from adjacent areas or temporary nurseries. Revegetation efforts in wetlands would be monitored by KMLP until a cover similar to 80 percent of adjacent areas is achieved. If revegetation efforts in wetlands are not successful at the end of 3 years, KMLP would develop and implement a remedial revegetation plan to actively revegetate the wetland. Revegetation in wetlands would also be controlled according to a project-specific Aquatic Resources Mitigation Plan that KMLP would finalize in consultation with COE, FWS, and NOAA Fisheries Service (see section 4.4.2). Forested areas would also be recovered in a similar manner, except for in the permanent right-of-way where shrubs and small trees are not allowed. The areas inside interconnections would be permanently converted to an industrial use and covered with crushed rock around piping and equipment or reseeded with an easily maintained grass.

Soil Contamination

A potential impact 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. As discussed in section 2.3, KMLP would develop and implement a project-specific SWPPP and SPRP that provide a description of the containment and cleanup procedures that would be employed in the event of a spill or a leak of hazardous materials. In section 2.3 we are recommending these project-specific plans be filed with the Secretary for review and approval prior to construction.

There are no known contaminated soils in the Project area. KMLP searched the National Priorities List (EPA 2006a), Leaking Underground Storage Tanks database (LDEQ 2006a), and Louisiana Department of Environmental Quality (LDEQ) Voluntary Remediation Program (LDEQ 2006b) and found no known contaminated sites within 0.25 miles of the Project. Further, no contaminated soils were identified during field studies. Although the potential to encounter contaminated soils during pipeline construction is relatively low, KMLP's application proposed several steps that would be followed in the event contaminated soils are encountered, including immediately stopping working in the vicinity, restricting access to the suspected area, engaging qualified contractors to determine the nature and extent of contamination, notifying applicable environmental authorities, and devising site-specific plans for cleanup, risk minimization, and continued construction. To ensure that such steps are actually developed and implemented, and that they also address contaminated groundwater that may be associated with the soils, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary for review and written approval by the Director of OEP, a Plan for the Discovery and Management of Contaminated Soils and Groundwater.**

With the use of KMLP's proposed measures and our recommendation, we believe the risks associated with soil contamination would be minimized.

Prime Farmland

The USDA defines prime farmland as "land that is best suited to food, feed, fiber, and oilseed crops" (USDA 1993). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., artificial drainage).

Approximately 79 percent (1,437 acres) of the soils that would be affected during construction by the KMLP project are considered prime farmland. Impacts on prime farmland from construction of the proposed pipelines could include interference with agricultural drainage (if present), mixing of topsoil and subsoil, and compacting and rutting. These impacts would result primarily from trench excavating and backfilling, and vehicular traffic along the construction right-of-way.

KMLP would minimize impacts on prime farmland by constructing the pipelines in accordance with our Plan and Procedures. Mitigation measures employed to minimize impacts on prime farmland would include topsoil segregation, compaction relief, removal of excess rock, and restoration of agricultural drainage systems. Any drain tiles, culverts, or other items damaged during construction would be repaired or replaced to preconstruction conditions. Adherence to these measures would minimize impacts on prime farmland and other agricultural land and would promote the long-term productivity of the soil. In addition, impacts caused by the pipeline faculties would be temporary and would not result in permanent conversion of prime farmland to non-agricultural uses.

However, at the nine interconnect sites with soils designated as prime farmland, the operation of these sites would result in the permanent conversion of approximately 7.7 acres of prime farmland to industrial land.

4.2.2.2 Operation Impacts

Operation activities are not expected to result in further impacts to soil resources. The SWPPP and SPRP would remain effective during operation of the pipeline to minimize and mitigate impacts of soil contamination. Monitoring activities would include surveys for soil erosion or other conditions that may expose or harm the pipeline, or indicate a leak in the pipeline.

4.3 WATER RESOURCES

4.3.1 Groundwater

Although the depth to groundwater is variable along the proposed pipeline route, it is often found at or near the ground surface. In all five parishes crossed by the KMLP Project, groundwater is the primary or only source of public water supply (LDOTD 2002). Four of the parishes crossed by the proposed pipeline utilize groundwater for the majority of their total water usage. In these parishes, groundwater is primarily used in the irrigation of rice fields (Jefferson Davis, Acadia, and Evangeline Parishes), for industrial purposes (Calcasieu Parish), and as a public water supply. Information regarding the groundwater resources located along the proposed pipeline route, including aquifers, Sole Source and primary source aquifers, wellhead protection areas, wells and springs, and contaminated groundwater, is presented below.

4.3.1.1 Affected Environment

According to the USGS, the Project is underlain by the Coastal Lowlands Aquifer System (USGS 1998) which extends from coastal counties in Texas eastward into the Coastal Plain of Louisiana, Mississippi, and to a smaller extent southern Alabama and the western part of the Florida panhandle. Groundwater derived from the Coastal Lowlands Aquifer System is used for agricultural, public supply, commercial, and industrial purposes. This system is divided into five permeable zones (A–E) consisting of discontinuous beds of sand, silt, and clay. Permeable Zone A has also been referred to as the top layer of the Chicot Aquifer. The Chicot Aquifer underlies about 9,900 square miles of Louisiana, extending west from the Atchafalaya River into southern Texas and south to the Gulf of Mexico. The landward boundary of the aquifer consists of outcrop areas where the aquifer system feathers out at a point of contact with the underlying Vicksburg-Jackson confining unit (Lovelace et al. 2004). The Gulf-ward boundary is near the coastline where the water becomes increasingly saline and the upper boundary is the land surface (Ryder 1996). The Chicot Aquifer is the most heavily pumped aquifer system in southwestern Louisiana and provides approximately 800 million gallons of water per day for a variety of uses. The primary use is for agriculture (68 percent), in particular, rice irrigation. Other uses include public water supply (11 percent), industrial (9 percent), aquaculture (8 percent), power generation (2 percent), and other (2 percent) (LSU AgCenter 2001). The Chicot Aquifer ranges from 50 to 1,050 feet in thickness and is composed of Pleistocene interbedded sands, silt, gravel, and clay deposited in fluvial, deltaic, and near-shore marine environments.

Sole Source and Primary Source Aquifers

In southwestern Louisiana, the Chicot Aquifer is designated as an EPA Sole Source Aquifer (USEPA 2006b). A Sole Source or primary source aquifer is defined by the EPA as an aquifer that supplies a minimum of 50 percent of the drinking water used in the area overlying the aquifer. The areas served by these aquifers may not have readily available alternate water sources. In southwestern Louisiana, the Chicot Aquifer is designated as an EPA Sole Source Aquifer (USEPA 2006b). All five parishes crossed by the KMLP Project utilize the Chicot Aquifer.

Wellhead Protection Areas

Wellhead protection areas are designated to protect drinking water supplies obtained from municipal or community wells. KMLP identified 10 wellhead protection areas that would be crossed by the Project. The locations of these wellhead protection areas are listed in table 4.3.1.1-1.

TABLE 4.3.1.1-1

Drinking Water Wellhead Protection Areas That Would be Crossed by the KMLP Project

Aquifer	Parish	Begin MP	End MP
Chicot Aquifer	Calcasieu Parish	50.8	52.4
Chicot Aquifer	Calcasieu Parish	51.0	52.8
Chicot Aquifer	Calcasieu Parish	53.5	54.3
Chicot Aquifer	Calcasieu Parish	56.2	57.2
Chicot Aquifer	Calcasieu Parish	58.0	59.1
Chicot Aquifer	Calcasieu Parish	59.8	61.3
Chicot Aquifer	Calcasieu Parish	73.8	74.7
Chicot Aquifer	Jefferson Davis Parish	75.6	77.8
Chicot Aquifer	Jefferson Davis Parish	95.7	96.9
Evangeline Aquifer	Evangeline Parish	119.6	121.7

Wells and Springs

Based on information provided by the Louisiana Department of Transportation and Development, 28 wells would be located within 150 feet of the construction right-of-way, including eight domestic supply wells (two of which are either abandoned or plugged), two industrial wells, nine irrigation wells, four monitoring wells (all four are plugged), and five rig supply wells (three of which are plugged). These wells and their locations relative to the Project are listed in table 4.3.1.1-2. Because the locations of these wells are not precise, KMLP would confirm actual well locations in the field prior to construction and provide us with that information. In addition to the wells identified within 150 feet of the construction right-of-way listed in table 4.3.1.1-2, there are three wells located within 400 feet of proposed construction work areas. These include two domestic supply wells located approximately 194 feet from the construction workspace near MP 104.2. There is also one rural public supply well located approximately 314 feet from the construction workspace near MP 120.7.

No springs have been identified within the vicinity of the Project and therefore, construction and operation of the proposed project would not affect springs.

Contaminated Groundwater

No instances of contaminated groundwater have been identified within the vicinity of the Project.

4.3.1.2 Impacts and Mitigation

Construction of the proposed pipeline would result in several effects to groundwater resources including the Chicot Aquifer, which has been designated by the EPA as a Sole Source aquifer and wellhead protection area. Effects resulting from construction include temporary and permanent changes to infiltration/recharge rates, groundwater flow, and groundwater quality. Specifically, construction activities such as clearing and grading would alter local infiltration/recharge rates, which would affect the quality and quantity of groundwater resources within the immediate vicinity of the Project. Additionally, trenching, trench dewatering, and backfilling would alter infiltration/recharge rates and groundwater flow,

TABLE 4.3.1.1-2

Wells Located Within 150 Feet of the KMLP Project[a]

Well Type	Parish	Approximate MP[b]	Approximate Well Depth (feet)	Approximate Distance from Centerline (feet)	Approximate Distance from Construction Workspace (feet)
Rig Supply	Calcasieu	31.1	606	88.0	13.0
Industrial	Calcasieu	34.3	603	155.0	120.0
Industrial	Calcasieu	34.3	780	82.2	47.2
Monitoring	Calcasieu	44.8	16	8.6	0.0
Monitoring	Calcasieu	44.8	77	8.6	0.0
Monitoring	Calcasieu	44.9	38	80.8	0.0
Monitoring	Calcasieu	44.9	38	80.8	0.0
Rig Supply	Calcasieu	48.4	242	29.9	0.0
Rig Supply	Calcasieu	49.6	265	14.7	0.0
Domestic	Calcasieu	54.1	245	102.0	67.0
Domestic	Calcasieu	55.5	249	36.6	0.0
Irrigation	Calcasieu	61.6	0	214.8	124.8
Domestic	Calcasieu	62.6	205	8.3	0.0
Irrigation	Calcasieu	65.1	30	148.3	113.3
Rig Supply	Calcasieu	69.3	240	154.2	64.2
Domestic	Calcasieu	71.0	215	234.9	144.9
Domestic	Jefferson Davis	87.8	145	96.0	0.0
Domestic	Jefferson Davis	87.8	145	96.0	0.0
Irrigation	Jefferson Davis	90.0	296	188.8	128.8
Irrigation	Jefferson Davis	91.4	0	139.3	95.6
Irrigation	Jefferson Davis	91.4	311	10.4	0.0
Rig Supply	Jefferson Davis	91.4	251	10.4	0.0
Irrigation	Jefferson Davis	94.3	260	53.1	18.1
Domestic	Acadia	106.8	168	32.0	0.0
Irrigation	Evangeline	121.6	275	68.4	0.0
Domestic	Evangeline	124.9	0	48.6	13.6
Irrigation	Evangeline	127.1	235	39.3	4.3
Irrigation	Cameron	0.6	255	200.3	114.2

[a] Actual well locations may vary by as much as 100 feet due to the level of accuracy associated with well coordinate data. KMLP would confirm the actual location of the wells prior to construction.

[b] All MPs are on Leg 1 except for the last row (MP 0.6), which is on the FGT Lateral.

which would also result in changes to the quality and quantity of groundwater resources within the immediate vicinity of the Project. The disturbance of unknown contaminants and/or an inadvertent release of fuel and/or equipment-related fluids during construction could also affect groundwater quality.

In order to minimize effects to groundwater resources resulting from construction of the Project, KMLP would implement groundwater-related measures described in our Procedures, including

stormwater management measures, spill prevention and response procedures, and minimization measures related to the discharge of trench water and trench breakers. We are recommending that KMLP develop a plan for the Discovery and Management of Contaminated Soil and Groundwater to address encounters with unanticipated groundwater and soil contamination during construction (see section 4.2.2.1). Implementation of this plan would ensure that any previously existing groundwater contamination that may be encountered during construction would be managed in accordance with applicable regulatory requirements. Following construction, KMLP would also restore contours and manage the revegetation of affected lands, both of which would minimize effects to groundwater resources resulting from construction of the Project.

Additionally, in order to minimize potential adverse effects to wells resulting from construction of the Project, KMLP would notify landowners in the general vicinity of the proposed construction right-of-way of their ability to request well testing and monitoring prior to and after construction. This monitoring would include water quality and well yield. KMLP has not stated the steps it would take if impaired water quality or well yield were observed; therefore, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary a statement that if water quality or yield were found to be impaired due to the Project, KMLP would provide a temporary water supply and re-test the well within 30 days. In addition, KMLP should replace any potable water supply system that it damages during construction and cannot repair to its former capacity and quality. KMLP should identify in its report to the Secretary all potable water supply systems damaged by construction and how they were repaired.**

In general, operation of the Project would not significantly affect groundwater resources; however, the development of impervious surfaces and structures in association with the proposed aboveground facilities would result in minor effects to groundwater resources due to the alteration of infiltration/recharge rates.

Based on the characteristics of the identified groundwater resources, KMLP's proposed construction methods and operations procedures, and its implementation of groundwater-related measures described in our Procedures, as well as the acceptance of our recommendations, we believe that impacts to groundwater resources resulting from construction and operation of the Project would be temporary and localized, and would not significantly affect overall groundwater quantity and quality.

4.3.2 Surface Water

This section identifies the waterbodies that would be affected by the Project, and describes them and the impacts to them resulting from construction and operation of the Project. All affected waterbodies, with the exception of Sabine Lake and the Calcaseiu River which are addressed individually in section 4.3.2.3, are addressed in the following sections.

4.3.2.1 Affected Environment

Construction of the proposed pipeline would require 310 waterbody crossings. Appendix G identifies each of these crossings, their location, the proposed crossing method, the width of crossing, the waterbody type, and the impairment status and significance to fisheries/potable water sources, if applicable.

In Louisiana, waterbodies have been designated by LDEQ which has developed a series of standards to maintain water quality, consistent with the associated goals of protecting public health, conserving fish and wildlife, and enhancing economic development, in accordance with a use(s) that

characterizes the best intended use(s) of that waterbody. These designated uses include primary contact recreation; secondary contact recreation; fish and wildlife propagation; limited aquatic life and wildlife use; drinking water supply; oyster propagation; agriculture; outstanding natural resource waters; and no quality/use. With the exception of 12 waterbodies which account for 18 waterbody crossings, all of the identified waterbodies crossed by the proposed pipeline have been designated "no water quality/use." The designated uses of the 12 waterbodies with uses other than "no water quality/use" are provided in table 4.3.2.1-1.

TABLE 4.3.2.1-1

Water Quality/Use Designations Other Than No Quality/Use

Waterbody Name	Designated Use[a]	Number of Crossings
Sabine Lake	ABCE	1
Sabine River	ABC	4
Burton Shell Slip	ABC	1
Black Bay Cutoff	ABC	1
GIWW	ABC	2
Vinton Drainage Canal	ABC	1
Bayou Choupique	ABC	1
Calcasieu River	ABCE	1
East Bayou Lacassine	ABCF	2
Gum Gully	AB	1
Bayou Nezpique	ABCF	1
Bayou des Cannes	ABCF	2

[a] Designated use codes for affected waterbodies: A - Primary Contact Recreation; B - Secondary Contact Recreation; C - Fish and Wildlife Propagation; E - Oyster Propagation; F – Agriculture.

The proposed pipeline would also cross 13 major waterbodies (16 waterbody crossings): Sabine Lake, Sabine River, Black Bay Cutoff, GIWW, Vinton Drainage Canal, Bayou Choupique, Calcasieu River, Calcasieu Tributary, Calcasieu Tributary (swamp), two unnamed waterbodies, Bayou Nezpique, and Tiger Point Gulley. Major waterbodies are those that are larger than 100 feet in width at the point of crossing. There is no official list of navigable waters in Louisiana, but numerous waterbodies that would be affected by the Project have been characterized as navigable, including Sabine Lake, Sabine River, Black Bay Cutoff, GIWW, and Calcasieu River.

Sensitive Waterbodies

Sensitive waterbodies generally include waterbodies that do not meet designated water quality standards; have been designated for intensified water quality management and improvement; contain threatened and endangered species or critical habitat; would be crossed less than three miles upstream of potable water intake structures; are classified as outstanding or exceptional quality waterbodies; are waters of particular ecological and recreational importance; are located in sensitive and protected watershed areas; have steep banks, potentially unstable soils, high-volume flows, and actively eroding banks; have associated important riparian areas; and are on or designated to be added to the Nationwide Rivers Inventory or a state river inventory.

Sensitive waterbodies that have identified water quality impairments are identified in table 4.3.2.1-2. Sensitive waterbodies containing EFH and commercial and/or recreational fisheries are addressed in section 4.6. All other sensitive waterbodies are addressed as appropriate in sections 4.5 – 4.8. As mentioned previously, Sabine Lake and the Calcasieu River are addressed in section 4.3.2.3.

TABLE 4.3.2.1-2

Sensitive Waterbodies Affected by the Proposed Project

Waterbody Name	MP of Crossing	Impairment
Vinton Drainage Canal	32.2 (Leg 1)	Turbidity
Bayou Choupique	44.3 (Leg 1)	Dissolved oxygen
East Bayou Lacassine	84.9 and 88.5 (Leg 1)	Dissolved oxygen
Bayou Nezpique	99.4 (Leg 1)	Nitrate/nitrite, dissolved oxygen, sedimentation/siltation, total fecal coliform, total phosphorus, total suspended solids (TSS), and turbidity
Bayou des Cannes	124.7 (Leg 1) and 1.57 (FGT Lateral)	Carbofuran, fipronil, mercury, nitrate/nitrite, dissolved oxygen, sedimentation/siltation, total fecal coliform, total phosphorus, TSS, and turbidity

Waterbody Crossing Methods

As described in section 2.3.1.3 and listed in appendix G, waterbody crossings would be conducted using conventional open-cut construction methods, flumes, boring techniques, and HDDs. Of the 310 waterbody crossings that would be required for construction of the proposed pipeline, 133 would be completed using open-cut methods, three would be completed using flumes, 147 would be completed using boring techniques, 24 would be completed using HDDs, and 3 would be completed using a combination of open-cut methods and HHDs.

Waterbody crossings that would be completed using HDDs are listed in table 4.3.2.1-3.

TABLE 4.3.2.1-3[a]

Features Crossed Using HDD Along the Kinder Morgan Louisiana Pipeline

Directional Drill Number	Approximate Entry MP	Approximate Exit MP	Length of Drill (feet)	Features Crossed
1	3.9	4.8	4,752	Big Forge Bayou; Wetlands; Southern Bank of Sabine Lake[b]
2	18.0	18.6	3,485	Northern Bank of Sabine Lake; Wetlands; Mouth of Sabine River[b,c]
3	18.6	19.4	4,171	Sabine River;[b,c] Wetlands
4	19.4	20.0	3,168	Sabine River;[b,c] Wetlands
5	21.2	22.1	4,963	Sabine River;[b,c] Wetlands
6	22.1	22.7	3,168	Sabine River;[b,c] Pipelines; Wetlands; Canal
7	23.4	24.0	2,640	Burton Shell Slip; Pipelines; Wetlands
8	25.3	26.0	4,066	Pipelines; Wetlands
9	26.0	26.8	4,066	Pipelines; Wetlands

TABLE 4.3.2.1-3[a] (cont'd)

Features Crossed Using HDD Along the Kinder Morgan Louisiana Pipeline

Directional Drill Number	Approximate Entry MP	Approximate Exit MP	Length of Drill (feet)	Features Crossed
10	30.4	31.5	5,808	Canal; Black Bay Cutoff;[b] GIWW;[b] Pipelines
11	31.5	32.4	5,069	Vinton Drainage Canal;[b] Wetlands; Pipelines
12	43.7	44.5	4,171	Bayou Choupique;[b] Wetlands
13	49.6	50.5	4,646	Calcasieu River;[b] Pond; Dredge Spoil Area
14	50.5	51.3	4,488	Canal; Calcasieu Tributary;[b] Marina
15	51.8	52.4	3,115	Industrial Area; Road
16	52.4	53.1	3,590	Calcasieu Tributary (swamp);[b] Forest; Unnamed Waterbody; Borrow Pit
17	77.7	78.4	3,960	Agricultural Waterbodies;[b,d] Interstate-10
18	99.0	99.8	3,907	Bayou Nezpique;[b] Wetlands

[a] Table includes three HDDs (Numbers 8, 9, and 15) not associated with a waterbody crossing.
[b] Waterbodies greater than 100-feet wide at the proposed crossing.
[c] Temporary construction areas limited to barges and flotation areas for HDD strings would extend into the Sabine River.
[d] HDD 14 crosses 7 different agricultural waterbodies, 2 of which are greater than 100-feet wide.

KMLP has proposed to file with the Secretary prior to construction site-specific construction plans for all areas disturbed by construction at each major waterbody crossing; however, the site-specific construction plans for the major waterbody crossings filed by KMLP in its application are incomplete; therefore, to fully assess the potential impacts associated with these crossings, **we recommend that:**

- **KMLP file with the Secretary a site-specific construction plan for the crossing of each waterbody proposed as a HDD crossing. These site-specific plans should include scaled drawings identifying all areas that would be disturbed by construction. KMLP should file these plans for review and written approval by the Director of the OEP along with the COE permit prior to construction across those waterbodies.**

With one exception, all major waterbodies would be crossed using HDDs. Tiger Point Gulley is the only major waterbody that KMLP has not proposed to cross using a HDD. However, the FWS, COE, and the LDWF have recommended that Tiger Point Gulley along with Bayou Barwick and Bayou des Cannes be crossed using HDDs to avoid and minimize impacts to these waterbodies and adjacent resources; therefore **we recommend that**:

- **KMLP evaluate the feasibility of using the HDD method to cross Tiger Point Gulley at MP 113.3 and Bayou Barwick at MP 109.2 along Leg 1 and Bayou des Cannes along the FGT Lateral at MP 1.57, and develop a site-specific construction plan for each of these crossings in coordination with FWS and LDWF that clearly identifies all construction work areas including the laydown area for the pipe string if the HDD method is determined to be feasible. KMLP should file the results of its evaluation, the site-**

specific construction plans, and any agreed-upon mitigation measures to minimize impacts on riparian areas and the associated forested wetlands. KMLP should file the above information with the Secretary for review and written approval by the Director of OEP prior to the close of the comment period on this draft EIS.

Additionally, the use of three new access roads would require the crossing of three waterbodies. Two of the new access roads, Access Roads 15 and 19 at MPs 52.3 and 61.4 of Leg 1, respectively, would cross roadside drainage ditches, and the third access road would cross a minor tributary of Bayou des Cannes (Access Road FGT-2 at MP 2.3 of the FGT Lateral). KMLP has stated that access road improvements would include grading, placement of gravel for stability, replacing or installing culverts, and clearing of overhead vegetation; however, it does not specify how these waterbodies would be crossed and the COE has indicated that drainage ditches in this region function as flowing waters (COE, 2006) and must be protected as waterbodies; therefore, **we recommend that:**

- **Prior to construction of Access Roads 15, 19, and FGT-2, KMLP reroute these access roads to avoid crossing drainage ditches at MPs 52.3 and 61.4 of Leg 1, and avoid crossing Bayou des Cannes Tributary at MP 2.3 of the FGT Lateral. KMLP should file with the Secretary the reroutes for these access roads, copies of the revised alignment sheets, and necessary environmental information for review and written approval by the Director of OEP.**

  If any of these access roads can not be rerouted, KMLP should provide:

  a. justification why rerouting is infeasible;
  b. documentation of consultation with COE, including proposed mitigation measures;
  c. construction plans for these access roads;
  d. copies of necessary permits/approvals; and
  e. landowner concurrences.

  KMLP should not use these access roads until the Director or OEP notifies KMLP in writing that it may proceed.

Minimization Measures

In order to minimize potential impacts to waterbodies resulting from the construction of the proposed pipeline, KMLP would implement the measures described in our Procedures, which include:

- a requirement to obtain all necessary permits from the COE and state agencies prior to construction and notify applicable state agencies at least 48 hours before commencing with instream trenching;

- use of EIs during construction;

- routing the proposed pipeline as close to perpendicular to the axis of the waterbody as practicable and minimize the number of individual crossings where waterbodies meander or have multiple channels;

- limiting the use of equipment within the waterbody to that necessary to construct the crossing, and utilize equipment bridges for passage of other construction equipment;

- placing spoil at least 10 feet away from the water's edge with installation of sediment barriers to prevent the flow of spoil or silt-laden water into the waterbody;

- completing all instream construction activity, including stabilization and re-contouring 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

- restoration activities including restoration of preconstruction bank contours, installation of slope breakers, and revegetation of disturbed riparian areas.

The use of an HDD could result in an inadvertent release of drilling mud that could return to the surface or enter a waterbody. This inadvertent release is commonly referred to as a "frac-out." To minimize the effects of potential frac-outs occurring during HDD operations, KMLP would conduct geotechnical evaluations prior to construction to determine the potential for a frac-out to occur at a proposed HDD crossing and adjust its crossing plan accordingly. Should a frac-out occur during HDD operations, KMLP would implement measures outlined in its HDD Contingency Plan which describes how inadvertent releases of drilling fluids would be prevented or mitigated if a release of drilling fluids were to occur. A draft of KMLP's HDD Contingency Plan is provided in appendix I.

In addition to implementing these and other measures, KMLP would consult with state and federal resource agencies to finalize construction methods. As discussed in the beginning of section 2.3, KMLP would also develop and implement a SWPPP and SPRP to prevent and contain, if necessary, accidental equipment-related spills.

4.3.2.2 Impacts and Mitigation

Construction of the proposed pipeline through waterbodies using open-cut construction methods would result in several impacts to these waterbodies including changes to water quality and in-stream habitat. Construction activities including the clearing and grading of stream banks, in-stream trenching, trench dewatering, and backfilling of the in-stream trench would result in increased turbidity and sedimentation, decreased dissolved oxygen (DO) levels, modifications to aquatic habitat, and increased stream water temperatures. The removal of riparian vegetation associated with open-cut construction methods would also result in increased surface runoff, an increased erosion potential, and elevated water temperatures. In addition, the disturbance of unidentified contaminated soils and/or sediments could result in adverse impacts to water quality and aquatic resources. Operation of heavy equipment or other vehicles in and near surface waterbodies could also introduce chemical contaminants, such as fuels and lubricants, into surface waters or result in accidental spills during construction that would result in decreased water quality. The use of flumes during construction would result in impacts similar to those resulting from the use of open-cut construction methods; however, the use of flumes would significantly minimize these impacts especially the increases in turbidity and sedimentation commonly associated within pipeline crossings.

Construction of the proposed pipeline through waterbodies using bores and HDDs would also significantly reduce impacts to crossed waterbodies. However, the use of an HDD could result in drilling mud entering a waterbody due to a frac-out. A frac-out would result in increased turbidity and sedimentation, which would decrease water quality and in-stream habitat integrity. Because drilling mud is primarily composed of freshwater, a small release would likely dissipate and would not be expected to adversely affect water quality beyond a temporary increase in turbidity. In larger quantities, the release of

drilling fluid could negatively affect fisheries and/or vegetation, although impacts would generally be less than those associated with an open-cut crossing.

Operation of the Project would not affect surface water resources.

Sensitive Waterbodies

Impacts to the Vinton Drainage Canal, Bayou Choupique, and Bayou Nezpique would be minimized by crossing these waterbodies using HDDs. As described above, the use of HDDs to cross these waterbodies would significantly reduce impacts to them. Impacts to Bayou des Cannes would be minimized by using a flume. Impacts to East Bayou Lacassine resulting from the two crossings of the waterbody would be minimized by using a flume at the crossing at MP 84.9. East Bayou Lacassine at MP 88.5 would be crossed by open-cut, but we do not believe impacts resulting from this crossing would significantly contribute to the water's DO impairment that has been created by adjacent agricultural operations.

Hydrostatic Testing

KMLP would hydrostatically test the pipeline after installation to ensure structural integrity in compliance with the DOT pipeline safety regulations identified in 49 CFR Part 192. The proposed hydrostatic test water sources, withdrawal locations, and estimated volumes of water required are identified in table 4.3.2.2-1.

KMLP has indicated that all hydrostatic test waters would be discharged overland at the original source, discharged directly to the original source, or managed in compliance with applicable NPDES permit conditions. As described in section 2.3.1.1, KMLP would use energy dissipation devices at all discharge points to reduce discharge velocities and thereby prevent or minimize associated erosion and sedimentation. Additionally, no chemical additives would be used in hydrostatic test water.

KMLP would minimize potential effects to waterbodies resulting from hydrostatic testing by implementing our Procedures, which include, but are not limited to the following measures:

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

With the implementation of our Procedures and the above measures, we believe that the surface water impacts associated with hydrostatic testing of the pipeline would be temporary.

TABLE 4.3.2.2-1

Hydrostatic Test Water Source and Discharge Locations

Pipeline	Withdrawal Source/Discharge	Approximate Withdrawal Location (MP)	Approximate Volume (gallons)[a]
Leg 1	Calcasieu River	49.6	18,837,000
Leg 1	Calcasieu River	49.6	31,384,000
Leg 1	Sabine Lake	4.8	684,000
Leg 1	Sabine Lake	18.0	502,000
Leg 1	Sabine River/GIWW	18.6	600,000
Leg 1	Sabine River/GIWW	20.0	456,000
Leg 1	Sabine River/GIWW	21.2	714,000
Leg 1	Sabine River/GIWW	22.1	456,000
Leg 1	Sabine River/GIWW	23.5	562,000
Leg 1	Sabine River/GIWW	23.9	365,000
Leg 1	Sabine River/GIWW	25.3	585,000
Leg 1	Sabine River/GIWW	26.8	585,000
Leg 1	Black Bayou Cutoff	30.6	836,000
Leg 1	GIWW	32.4	730,000
Leg 1	Bayou Choupique	43.4	600,000
Leg 1	Calcasieu River	49.6	707,000
Leg 1	LNG Terminal Channel	51.1	646,000
Leg 1	LNG Terminal Channel	51.1	448,000
Leg 1	LNG Terminal Channel	51.1	517,000
Leg 1	Louisiana Irrigation Canal	76.0	570,000
Leg 1	Bayou Nezpique	99.4	562,000
Leg 2	Sabine Pass	0.0	339,000
FGT Lateral	Bayou des Cannes	2.3	285,000

[a] HDD segments, which include all but the first two rows listed above for Leg 1, would be tested three times: (1) before installation; (2) after installation; and (3) with the entire pipeline system.

Based on the characteristics of the identified waterbodies, KMLP's proposed construction methods and operations procedures, its implementation of waterbody-related measures described in our Procedures, and our recommended measures, we believe that effects to surface waters resulting from construction and operation of the proposed project would be temporary and localized.

4.3.2.3 The Sabine Lake and Calcasieu River Crossings

Sabine Lake

Sabine Lake is an estuarine waterbody located on the Texas/Louisiana border and connected to the Gulf of Mexico via the Sabine Pass. The lake has an average depth of 2.0 feet and covers a surface area of approximately 94 square miles. The land surrounding Sabine Lake is covered, in large part, by

sensitive wetland areas that include EFH and provide habitat for a diversity of wildlife. The lake itself has been designated as supporting primary and secondary contact recreation, fish and wildlife propagation, and oyster propagation. Additionally, Sabine Lake supports both commercial and recreational fisheries and is a public harvesting area for oysters. No water quality impairments or contaminated sediments are reported for Sabine Lake.

KMLP proposes to cross Sabine Lake via the HDD method at the lake's southern and northern shorelines and via the open-cut construction method requiring the use of spud barges across the lake's open water. Impacts to the southern bank of Sabine Lake, including riparian vegetation and nearshore oyster resources, would be avoided by using an HDD that would enter on land and exit within Sabine Lake at MP 4.8. From MP 4.8 to MP 17.9 of Leg 1, the open-cut construction method would be used. The crossing would be accomplished using a shallow draft spud barge with pipe supply barges connected in a line to form the lay barge spread. To accommodate vessel drafts, excavation of a floatation channel would be required in water depths of less than 8 feet. Where the floatation channel is needed, a 300-foot-wide construction right-of-way would also be required to accommodate the floatation channel, pipeline trench, and spoil pile. In water depths greater than 8 feet, the floatation channel would not be necessary and the construction right-of-way would be reduced to a width of 200 feet. The use of HDD would resume at MP 17.9 within Sabine Lake, exiting on land at MP 18.6, avoiding sensitive wetland habitats on the northern bank. A detailed description of the crossing methods through Sabine Lake is provided in section 2.3.1.3.

KMLP conducted a shallow hazards survey over a 3,000-foot corridor centered on the proposed pipeline route through Sabine Lake to identify the locations of foreign pipelines and obstructions that could affect construction, as well as the locations of any submerged cultural resources. At locations where potential obstructions or significant cultural resources were found, KMLP adjusted the centerline route for avoidance. Where adjustments of the pipeline were deemed infeasible, locations of potential obstructions or cultural resources would be further investigated and regulatory agencies consulted as discussed in section 4.10 of this draft EIS.

Major route alternatives and route variations were also considered. Three major route alternatives involved construction through Sabine Lake while two major route alternatives took a southern route, avoiding the lake altogether. As discussed in section 3.3, we did not consider the two southern routes to be environmentally preferable. Within Sabine Lake, the Blue Buck Point route variation was considered to potentially avoid marsh areas south of the lake. It was determined that although this route variation would cause fewer impacts to the marsh, it would cause greater impacts to oysters. Therefore, this route variation was not adopted (see section 3.4.1).

The use of the HDD crossing method at the northern and southern banks of Sabine Lake would avoid impacts to sensitive vegetation, EFH, and other wildlife habitat, while also avoiding shoreline erosion. Open-cut construction would adversely affect water quality during construction, causing sediment resuspension and related impacts in the water column as discussed in section 4.3.2.2. Impacts to oyster resources and fishes within Sabine Lake are discussed in section 4.6.3 and impacts to vessel traffic through spoil pile placement are discussed in section 4.8.3.2.

KMLP has proposed to allow refueling activities within Sabine Lake and the Sabine River. As discussed in section 4.4.1, we believe that this measure as well as an additional measure to allow certain extra workspaces within 50 feet of waterbodies is acceptable and would result in minimal effects to the environment. To minimize impacts to Sabine Lake during construction, KMLP would utilize BMPs developed with the construction contractor as part of the SWPPP prior to construction to address hazardous materials handling and storage, as well as spill prevention and response.

Calcasieu River

Calcasieu River is a freshwater river that drains a rural forest and bayou complex that connects to the estuarine Calcasieu Lake. The river has been designated as supporting primary and secondary contact recreation, fish and wildlife propagation, and oyster propagation. Additionally, the lake supports both commercial and recreational fisheries (see section 4.6.2.1). As described in section 4.6.2.2, the lower Calcasieu watershed contained areas of probable concern (APCs) in 1997; however, later surveys indicated that those APCs are no longer present, although some areas still contained contaminated sediments.

KMLP would install the pipeline across Calcasieu River between MP 49.6 and MP 51.1 of Leg 1. Back-to-back HDDs are proposed for the crossing of the main shipping channel of Calcasieu River and the major tributary that serves as a ship channel to the Trunkline LNG Terminal. The proposed route would cross under a marina on the east bank of the river and a COE dredge spoil area, and one of the HDD pull strings would lie across this dredge spoil area. KMLP is currently consulting with the COE regarding potential effects to the disposal area. Since these consultations are still ongoing, **we recommend that:**

- **Prior to construction, KMLP file the following environmental information with the Secretary for review and written approval by the Director of OEP:**
  - **a. site-specific construction plan for the HDD crossing of the Calcasieu River and marina between MP 49.6 and MP 51.1 along Leg 1; and**
  - **b. documentation of consultation with COE for the HDD crossing of the Calcasieu River and use of the COE dredge spoil area located at MP 50.0.**

Crossing the Calcasieu River by the HDD method would eliminate impacts from the resuspension of potentially contaminated sediments and the removal of riparian vegetation.

4.4 WETLANDS

4.4.1 Affected Environment

Wetlands are defined by the COE and the EPA as 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 generally include swamps, marshes, bogs, and similar areas. Wetlands provide a number of valuable functions including flood flow attenuation, sediment retention, nutrient retention, wildlife habitat, groundwater recharge and discharge, recreation, and erosion control.

KMLP conducted wetland delineations within the proposed pipeline construction right-of-way, as well as within the proposed locations for the pipe storage/contractor yards, access roads, aboveground facilities, and extra workspaces in accordance with the COE Wetland Delineation Manual (USACE 1987). In areas where land access has not yet been granted (approximately 8.3 miles along the proposed route), NWI maps and aerial photographs were used to determine the presence of wetlands.

A total of 352 wetlands, covering approximately 504.2 acres, would be affected by construction of the Project. The COE has yet to validate KMLP's wetland delineations; therefore, the acreage of wetlands affected by the Project may change. The location, wetland classification, and affected acreage for each wetland that would be affected by construction and operation of the Project are listed in appendix H, table H-2. Wetland vegetative species found along the pipeline route are listed in table 4.4.1-1 according to the wetland type. The FWS wetland Cowardin classification system (described in appendix H, table H-1) was used to classify the wetlands that would be affected by the Project (Cowardin et al. 1979). According to the Cowardin classification, the wetlands crossed by the Project are classified as:

- estuarine emergent (E2EM);
- estuarine scrub-shrub (E2SS);
- palustrine emergent (PEM);
- palustrine scrub-shrub (PSS); and
- palustrine forested (PFO).

Estuarine wetlands are tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, with ocean-derived water at least occasionally diluted by freshwater runoff from the land. The upstream and landward limit is where ocean-derived salts measure less than 0.5 parts per thousand (ppt) during the period of average annual low flow.

Palustrine wetlands are nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens with salinities less than 5 ppt. A palustrine system can exist directly adjacent to or within an estuarine system. (Osmond et al. 1995)

TABLE 4.4.1-1

Common Wetland Species Identified Within the KMLP Project Area

Common Name	Scientific Name	Common Name	Scientific Name
Estuarine Emergent Wetlands			
marsh elder	*Iva fructescens*	Cattail	*Typha latifolia*
black rush	*Juncus roemerianus*	Bulrush	*Scirpus litoralis*
salt meadow cordgrass	*Spartina patens*		
Estuarine Scrub-Shrub Wetlands			
wax-myrtle	*Myrica cerifera*	Cattail	*Typha latifolia*
marsh elder	*Iva fructescens*	Bulrush	*Scirpus litoralis*
riverhemp	*Sesbania sp.*	black rush	*Juncus roemerianus*
Chinese tallow	*Triadica sebifera*	salt meadow cordgrass	*Spartina patens*
Palustrine Emergent Wetlands			
alligatorweed	*Alternanthera philoxeroides*	Sedges	*Carex spp.* and *Cyperus spp.*
bushy bluestem	*Andropogon glomeratus*	Bermudagrass	*Cynodon sp.*
broomsedge bluestem	*Andropogon virginicus*	Spikesedges	*Eleocharis spp.*
spadeleaf	*Centella asiatica*	carolina geranium	*Geranium carolinianum*
pennyworts	*Hydrocotyle spp.*	soft rush	*Juncus effusus*
smartweeds	*Polygonum spp*.	Cattail	*Typha latifolia*
Palustrine Scrub-Shrub Wetlands			
sweetgum	*Liquidambar styraciflua*	saltwater false willow	*Baccharis angustifolia*
elderberry	*Sambucus sp*.	eastern baccharis	*Baccharis halimifolia*
Chinese tallow	*Triadica sebifera*	Buttonbush	*Cephalanthus occidentalis*
giant cane	*Arundinaria gigantea*	marsh elder	*Iva fructescens*
southern dewberry	*Rubus trivialis*	wax myrtle	*Myrica cerifera*
dwarf palmetto	*Sabal minor*	Cherokee rose	*Rosa laevigata*
Palustrine Forested Wetlands			
sweetgum	*Liquidambar styraciflua*	Chinese tallow	*Triadica sebifera*
water oak	*Quercus nigra*	poison ivy	*Toxicodendron radicans*
American elm	*Ulmus Americana*	Greenbriers	*Smilax spp*.
winged elm	*Ulmus alata*	Raspberries	*Rubus spp.*
hackberry	*Celtis sp*.	Violets	*Violaceae*
Chinese privet	*Ligustrum sinense*	bald cypress	*Taxodium distichum*
tupelo gum	*Nyssa aquatica*	swamp blackgum	*N. sylvatica* var. *biflora*
swamp red maple	*Acer rubrum* var. *drummondii*	black willow	*Salix nigra*
pumpkin ash	*Fraxinus profunda*	green ash	*Fraxinus pennsylvanica*
water elm	*Planera aquatica*	water locust	*Gleditsia aquatica*
Virginia willow	*Itea virginica*	Buttonbush	*Cephalanthus occidentalis*

Table 4.4.1-2 summarizes impacts to wetlands from construction and operation of the Project, including impacts from access roads, rights-of-way, pipe storage/contractor yards, extra workspaces, and aboveground facilities.

TABLE 4.4.1-2

Summary of Wetlands Affected by the KMLP Project

Wetland Type	Number of Wetlands Crossed	Estimated Crossing Length (miles)[a]	Construction Impacts (acres)[a,b]	Operation Impacts (acres)[a,c]
E2EM	27	6.5	89.3	47.1
E2SS	11	1.3	11.1	6.5
PEM	197	20.7	296.2	114.2
PSS	62	5.0	79.3	23.1
Subtotal of Non-Forested	297	33.5	475.9	190.9
PFO	55	3.4	28.3	14.9
Total Wetlands	352	36.9	504.2	205.8

E2EM = estuarine emergent
E2SS = estuarine scrub-shrub
PEM = palustrine emergent
PSS = palustrine scrub-shrub
PFO = palustrine forested

[a] Acreages shown do not account for the wetlands that would be crossed by the HDD construction method and would not be affected by construction or operation of the Project.

[b] Wetland impact calculations are based on a 125-foot-wide construction right-of-way in areas where the crossing distance is greater than 100 feet, and a 100-foot-wide construction right-of-way where the width of crossing is less than 100 feet.

[c] Operation impacts for the pipeline facilities are based on a 50-foot-wide, permanent right-of-way.

Temporary impacts to wetlands resulting from installation of all of the facilities including extra workspaces associated with the Project would include approximately 28.3 acres of forested wetlands and 475.9 acres of non-forested wetlands. The pipeline facilities would result in the conversion of 14.9 acres of forested wetlands within the operational right-of-way to emergent or scrub-shrub wetlands and permanent impact to 0.8 acres of E2EM, 1.3 acres of PEM, and 0.6 acres of PSS wetlands resulting from the installation and operation of aboveground facilities.

Prior-converted wetlands are wetlands that have been altered so that they no longer have potential to provide valuable wetland functions. Of the 504.2 acres of wetlands that would be impacted by construction of the Project, 182.8 acres have been classified as prior-converted.

KMLP has identified several locations where proposed extra workspaces are located entirely or partially within wetlands. The use of these extra workspaces would temporarily affect 50.2 acres of non-forested wetlands and 1.1 acres of forested wetlands during construction. Three of the 14 interconnect sites would be located in wetlands and impact 2.7 acres of non-forested wetlands. In addition, three of the 12 proposed pipe storage and contractor yards would be located in wetlands and impact 62.6 acres of non-forested wetlands. The Project would also require the construction of three new roads (Access Roads 2, 3, and 4-5) and improvement of seven existing access roads in wetlands (Access Roads 1, 4-1, 6, 7, 10-1,

13-1, and 16) for access to rights-of-way and workspaces that would impact 9.3 acres of non-forested wetlands and 0.1 acres of forested wetlands.

NOAA Fisheries Service (2006a) has indicated that aquatic and tidally influenced wetland habitats in the Project area have been designated as EFH for various species of fish and invertebrates. Construction through the first 50 miles of the pipeline route would impact approximately 99.5 acres of EFH wetlands along the northern and southern banks of Sabine Lake, Shell Island, the Sabine and Calcasieu Rivers, and the GIWW. KMLP has routed the pipeline through Sabine Lake to avoid/minimize impacts to EFH wetlands and it would install the pipeline using HDD at the north and south shores of Sabine Lake. KMLP would also minimize impacts to EFH wetlands by using a combination of HDD and open-cut methods along the Sabine River/GIWW, and by using low-ground-pressure equipment, board roads, and marsh buggies during construction activities in saturated estuarine areas. Additional discussion of EFH wetlands is provided in section 4.6.3.

Significant forested wetlands crossed by the Project include forested wetlands from MP 99.0 to 99.7, in the vicinity of Bayou Nezpique, and a forested wetland from MP 1.3 to 1.6 along the FGT Lateral in the vicinity of Bayou des Cannes. Bayou Nezpique would be crossed by HDD, avoiding impacts to approximately 1.6 acres of forested wetlands. The FGT Lateral would be collocated with an existing right-of-way through a large forested area. Although collocation is generally acceptable as a way to minimize impacts to an area, this particular area is a quality forested wetland that would be disrupted by the clearing of the right-of-way and by widening the right-of-way through the area. FWS, COE, and LDWF have requested HDD through this area to minimize impact to forested wetland. Therefore, in section 4.3.2.1, we are recommending that the FGT Lateral cross Bayou des Cannes and associated wetlands by HDD.

Wetland Construction Procedures

KMLP would use wetland construction methods described in section 2.3 of this draft EIS, and applicable permit conditions to avoid or minimize impacts to wetlands.

KMLP would cross numerous wetlands along the pipeline rights-of-way using the HDD method to avoid the need to clear or otherwise disturb about 7.0 acres of forested wetlands and 100.8 acres of non-forested wetlands. Use of HDD would minimize disturbance of the surface between the entry and exit points of the HDD. The disturbance would be limited to the deployment of telemetry cable. However, KMLP has not explained how it would clear the vegetation to facilitate deployment of telemetry cable. The COE has expressed concern that the mechanized clearing could result in greater impacts to wetland vegetation and prefers the use of hand clearing. Therefore, **we recommend that:**

- **KMLP use hand clearing methods for clearing vegetation in the path of HDDs in wetland areas.**

KMLP would also use the push-pull method and marsh buggies for construction through coastal estuarine herbaceous marsh that is tidally influenced and mostly submerged. This construction method, as described in section 2.3, is generally used in large wetland areas with suitable hydrology and topography (i.e., flooded or saturated soils and minimal local relief). Push-pull construction generally requires a narrower right-of-way and minimizes the operation of construction equipment within wetlands. This method offers environmental advantages over conventional wetland construction approaches. Because of the potential environmental advantages of the push-pull construction method, Item VI.B.2.c in our Procedures requires that this method be used where sufficient water is present in the trench and other site conditions allow. KMLP proposes to cross approximately 63.7 acres of wetland using the push-pull

method. Locations where the push-pull (typical submerged marsh) construction method would be used are listed in appendix E.

In order to minimize construction-related impacts to wetlands, KMLP would implement measures outlined in our Procedures that include, but are not limited to, the following requirements:

- Construction equipment operating within the right-of-way would be limited to that equipment necessary for clearing, excavation, pipe installation, backfilling, and restoration activities. All nonessential equipment would use upland access roads to the maximum extent practicable.

- Equipment operating within saturated wetlands would be low-ground-weight equipment or would operate from timber or board mats.

- Temporary erosion and sedimentation control measures would be installed immediately after the initial disturbance of wetland soils and would be inspected and maintained regularly until final stabilization.

- Sedimentation controls would be installed across the construction right-of-way, as needed, within wetlands to contain trench spoil.

- Grading and pulling of tree stumps would be limited to the area directly over the trenchline unless additional grading or stump removal is required for worker safety.

- In unsaturated wetlands, the uppermost 12 inches of topsoil along the pipeline trench would be segregated from the underlying subsoil.

- Project-specific restoration plans would be developed based on consultations with appropriate land management or state agencies. The wetland restoration plan should include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of undesirable exotic species, and measures for monitoring the success of the revegetation and weed control efforts.

- Monitoring of wetlands would be conducted for a minimum of three years post-construction to ensure the success of wetland revegetation. If revegetation is not successful after three years, a remedial revegetation plan would be developed and implemented.

Requested Alternative Measures to Our Procedures

KMLP has requested alternative measures to certain items in our Procedures. Items pertaining to wetlands and waterbodies are discussed below and summarized in table 4.4.1-3.

Item IV.A.1.d of our Procedures requires that all equipment be 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 unless the EI finds, in advance, no reasonable alternative, and appropriate steps are taken to prevent and provide for prompt cleanup of spills. Item IV.A.1.e requires that hazardous materials (e.g., chemicals, fuels, lubricants) not be stored within 100 feet of a wetland or waterbody unless the location is designated for such use by a government authority. KMLP has requested alternative measures to these requirements based on site-specific circumstances and proposed construction methods. We have reviewed the Project

TABLE 4.4.1-3

Acceptance or Denial of Requested Alternative Measures from our Procedures

MP	Applicable Item in our Procedures[a]	Reason for Request	Accepted/ Denied	Basis for Acceptance/Denial
Various	IV.A.1.d & e	Refueling activities in waterbodies	Accepted	This alternative measure is accepted for use only in Sabine Lake and the Sabine River as in-lake construction provides no practicable alternative to refueling from barges within the lake
Various	VI.A.3	A typical temporary construction right-of-way width of 125 feet in wetlands where the crossing length exceeds 100 feet and a right-of-way width of 100 feet in wetlands where the crossing length is less than 100 feet (see specific MP locations in appendix D)	Accepted only along Leg 1	This alternative measure is accepted because larger equipment and soil limitations require a larger right-of-way to assure a safe work site and space for spoil storage
28.24 of Leg 1 and 1.23 of the FGT Lateral	VI.A.6	Two aboveground facilities located within jurisdictional wetlands (see specific MP locations in appendix D)	Accepted	Locations of interconnects dictated by intersection of the proposed pipeline and existing pipelines and by the location of the Sabine Pass LNG Terminal
Various	VI.B.1.e	A portion of Access Roads 2 and 3 constructed in wetlands	Accepted	Access is required from the GIWW to reach the HDD workspace needed to minimize impacts to wetlands
Various	VI.B.1.a	Some extra workspaces located within 50 feet of wetland boundaries (see specific MP locations in appendix D)	Accepted	Accepted only for specific sites listed in appendix D based on lack of practicable locations with 50-foot setbacks; also some sites are to facilitate HDD or other methods designed to reduce impacts (see appendix D)
Various	V.B.2.a	Some extra workspaces located within 50 feet of water's edge (see specific MP locations in appendix D)	Accepted	Accepted only for specific sites listed in appendix D, Table D-3 based on lack of practicable locations with 50-foot setbacks; also some sites are to facilitate HDD or other methods designed to reduce impacts (see appendix D)

[a] Requirements specified in the referenced Procedure items are summarized below:

IV.A.1.d and e: Requires a 100-foot minimum setback from a waterbody or wetland for equipment parking, fueling, and hazardous materials storage;
VI.A.3: Limits construction right-of-way width in wetlands to 75 feet;
VI.A.6: Prohibits the location of aboveground facilities in wetlands except when in compliance with DOT;
VI.B.1.a: Requires a 50-foot setback from water's edge for all extra work areas (except where adjacent land is actively cultivated or rotated cropland or other disturbed land); and
VI.B.1.e: Prohibits the use of access roads in wetlands without Director approval unless those access roads are existing and require no modification or impact to wetlands.

and have determined that the alternative measures are justified within Sabine Lake and the Sabine River due to the use of spud barges during construction and a lack of practicable refueling options.

Item VI.A.3 of our Procedures requires that the construction right-of-way width in wetlands be limited to 75 feet. KMLP proposes to use a 125-foot construction right-of-way within wetlands where the

crossing length would exceed 100 feet. KMLP states that the 125-foot right-of-way is necessary to accommodate installation of the 42-inch-diameter pipeline, due to the unstable and saturated soil conditions, larger pipe-installation equipment, wider ditches, and non-cohesive spoil piles during construction. KMLP also stresses the need for safe construction practices that meet OSHA requirements and minimize the environmental impact. Milepost locations where a 125-foot construction right-of-way is requested for wetland crossings are given in appendix D. We believe that the justification KMLP has provided is adequate and reasonable for areas where the push-pull method is not viable; therefore, we accept the request for a construction right-of-way of 125 feet at the specific milepost locations listed in appendix D.

Item VI.A.6 of our Procedures prohibits the location of aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with DOT regulations. KMLP proposes to construct three aboveground facilities in wetlands:

- The NGPL Interconnect Site (MP 1.2) is an industrial wetland area within the Sabine Pass LNG Terminal where no available upland areas were identified in the vicinity.

- The Southwest Loop Delivery Point is proposed at MP 28.2, within the Black Bayou Hydrologic Restoration Project boundaries. KMLP states that the nearest upland area in this vicinity is located approximately 800 feet north of the proposed site, along the banks of the GIWW, and would require installation of the connecting pipeline under a major pipeline corridor.

- KMLP has stated that the TGTPL interconnect site (MP 87.5) is within a rice field.

We have reviewed the proposed locations for these interconnect sites and have determined that there are no practicable alternatives to locate these aboveground facilities outside of wetland areas. Therefore, we concur with KMLP.

Item VI.B.1.e of our Procedures states that the only access roads, other than the construction right-of-way, which can be used in wetlands without Director approval are those existing roads that can be used with no modification and no impact on the wetlands. Portions of Access Roads 2 and 3 would cross wetlands in order to provide access from the GIWW to the HDD workspaces for HDD equipment and construction access. The construction of these two access roads would temporarily impact approximately 0.9 acres of non-forested wetland, and the use of HDD at these two access points would avoid approximately 25.3 acres of wetlands as well as riparian areas and waterbodies. We believe that use of HDD would minimize impacts to wetlands; therefore, we accept the use of KMLP's alternative measure to construct portions of Access Roads 2 and 3 within wetlands. KMLP also proposes to construct a portion of Access Road 4-5 within wetlands, but has not provided any justification for such construction in wetlands. Therefore, **we recommend that:**

- **KMLP evaluate alternative routes for Access Road 4-5 or provide justification for the wetland impacts associated with its construction in wetlands. Any revision to the route of Access Road 4-5 should be shown on revised alignment sheets. KMLP should file with the Secretary results of its evaluation and copies of the revised alignment sheets for review and written approval by the Director of OEP prior to the close of the comment period on the draft EIS.**

Items VI.B.1.a and V.B.2 of our Procedures require that all extra workspaces such as staging areas and additional spoil storage areas be located at least 50 feet from water's edge or wetland

boundaries, respectively, except where the adjacent upland consists of cropland or other disturbed land. KMLP proposes to locate 164 extra work areas within 50 feet of water's edge or wetland boundaries. A list of the proposed extra workspaces requiring alternative measures is in appendix D along with the milepost location and justification for each. The justifications provided by KMLP for these alternative measures are adequate; therefore, we accept the use of each of the extra workspaces listed in appendix D.

Wetland Restoration Projects

There are seven Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA) projects in the Project vicinity; each of these projects is described in table 4.4.1-4. Only two of the seven CWPPRA projects would be crossed by the Project.

TABLE 4.4.1-4

The Coastal Wetlands Planning, Protection, and Restoration Act Projects in the Vicinity of the KMLP Project

Project Name	Location	Sponsor(s)	Purpose	Relationship to Project	Impact (acres)
Black Bayou Hydrologic Restoration Project (CS-27)	MP 22.3 - 30.7	NOAA Fisheries and LDNR	Restore coastal marsh habitat and slow the conversion of wetlands to shallow, open water	7.6-mile crossing	153.5
Perry Ridge Shore Protection Project (CS-24)	MP 30.8-32.2	NRCS and LDNR	Reduce erosion at the GIWW shoreline and at the spoil banks protecting nearby marshes	1.4-mile crossing	25.9
East Sabine Lake Hydrologic Restoration (CS-32)	MP 15	FWS, NRCS, and LDNR	Restore the hydrologic regime within the Sabine NWR	2.6 miles east of MP 15	No impact
Plowed Terraces Demonstration (CS-25)	MP 33	NRCS and LDNR	Construct earthen terraces in shallow open water to allow the establishment of emergent vegetation	1,000 feet south of MP 33	No impact
Perry Ridge West Bank Stabilization (CS-30)	MP 27	NRCS and LDNR	Construct riprap terraces along the GIWW to reduce wave fetch and allow the recovery of marshes	1,000 feet north of MP 27	No impact
Clear Marais Bank Protection (CS-22)	MP 40	COE and LDNR	Prevent further erosion to a levee preventing encroachment of the GIWW into marshes	1,000 feet north of MP 40	No impact
Black Bayou Culverts Hydrologic Restoration (CS-29)	MP 55	NRCS and LDNR	Prevent saltwater intrusion, excessive water levels, and erosion in areas near Calcasieu Lake	500 feet north of MP 55	No impact

Source: LaCoast 2006a,b.

Black Bayou Hydrologic Restoration Project

The Black Bayou Hydrologic Restoration Project, sponsored by NOAA Fisheries Service and LDNR, is a 25,529-acre wetland located in Cameron and Calcasieu Parishes, Louisiana. Bordered by the GIWW, Sabine Lake, Black Bayou, and Gum Cove Ridge, the restoration area consists of tidally influenced intermediate and brackish marshes. The goal of the Black Bayou Hydrologic Restoration Project is to restore coastal marsh habitat and to slow the conversion of wetlands to shallow, open water. The restoration projects are designed to limit the amount of saltwater intrusion into the surrounding marshes and reduce erosion caused by wave action from nearby boats and tides (LaCoast 2006a). The KMLP Project would traverse this restoration project area between MP 22.3 and MP 30.7. The Project would affect approximately 153.5 acres of the Black Bayou Hydrologic Restoration Project, much of which would be crossed by the HDD method. Of these 153.5 acres, 60.0 acres are comprised of nonforested wetlands and 2.8 acres of forested wetlands would be crossed by open-cut construction. During operations, 35.6 acres of non-forested and 1.8 acres of forested wetlands within the permanent right-of-way would be maintained in an herbaceous state. Because the objective of this project is to restore coastal marsh habitat and slow the conversion of wetlands to shallow open waters, impacts from the KMLP Project could temporarily delay any progress made in this restoration area.

NOAA Fisheries Service expressed concern that the pipeline construction in the Black Bayou Hydrologic Restoration Project would interfere with future construction and maintenance activities for rock structures at various locations (e.g., MPs 23.9 and 30.7) and near Burton Shell Slip at MP 23.8. They also stated that KMLP and NOAA Fisheries Service would need to enter into an agreement that would allow KMLP to access and maintain the pipeline in a manner that would not damage any rock structures within the Black Bayou Hydrologic Restoration Project. Because several existing pipelines stretch through the Black Bayou Hydrologic Restoration Project area, KMLP proposes to install its pipeline using two HDDs (MPs 25.3 to 26.8). We believe use of the HDD method of construction would minimize disturbance to these rock structures and minimize impact to restoration activities in the Black Bayou Hydrologic Restoration Project (see sections 2.3.1.3 and 4.3.2.1 for more discussion).

Perry Ridge Shore Protection Project

The crossing of the Perry Ridge Shore Protection Project, sponsored by the NRCS and LDNR, would traverse the restoration area between MP 30.8 and 32.2. The construction right-of-way through this area would affect approximately 25.9 acres of land, including approximately 18.5 acres of fresh-to-intermediate marsh and open water habitats. Operation of the Project would impact approximately 0.06 acres of similar habitat.

At the recommendation of various resource agencies, KMLP developed a pipeline route that avoids most of the Perry Ridge Shore Protection Project by staying on the southern bank of the GIWW until MP 30.7. In addition, most surface disturbance to the Perry Ridge Shore Protection Project would be avoided by installing the pipeline by two successive HDDs between MPs 30.4 and 32.4. Where conditions allow, approximately 0.2 miles of the pipeline within the Perry Ridge Shore Protection Project would be installed using the conventional method. The resulting impact to the Perry Ridge Shore Protection Project would be short-term, but would temporarily delay progress made within the protection area, in this case, affecting progress on the minimization of erosion along the GIWW and the associated impacts of that erosion to adjacent habitats.

Areas within the permanent right-of-way within the Perry Ridge Shore Protection Project and the Black Bayou Hydrologic Restoration Project would be maintained in an herbaceous state for the life of the KMLP Project. KMLP has stated that a site-specific construction and restoration plan for the Black Bayou Hydrologic Restoration Project and the Perry Ridge Shore Protection Project would be developed

in cooperation with LDNR, NOAA Fisheries Service, and FWS. To ensure that this plan addresses agency concerns, **we recommend that:**

- **KMLP consult with LDNR, NOAA Fisheries Service, and FWS, and develop site-specific construction and restoration plans for crossing the Black Bayou Hydrologic Restoration Project and Perry Ridge Shore Protection Project. KMLP should file with the Secretary copies of its consultation, along with construction and restoration plans, for review and written approval by the Director of OEP prior to the completion of the final EIS.**

Conservation Reserve Program Lands

The CRP is a voluntary program, administered by the Farm Service Agency (FSA) and planned and implemented by the NRCS. The goal of the CRP is to reduce soil erosion, protect the Nation's ability to produce food and fiber, reduce sedimentation in streams and lakes, improve water quality, establish wildlife habitat, and enhance forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive areas to vegetative cover, such as native grasses, wildlife plantings, trees, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract (NRCS 2006b).

Within the Parishes crossed by the Project, Acadia, Evangeline, and Jefferson Davis are known to contain several CRP lands (FSA 2006a), but according to local FSA offices, CRP lands in Acadia and Evangeline Parishes are located at least 0.3 miles away from the Project and therefore no impacts are expected from construction (Haller 2006, USDA 2006). Consultations are ongoing with regard to CRP locations in Jefferson Davis Parish.

Should any CRP lands be crossed by the Project, the enrolled landowners would no longer be eligible to participate in the CRP and would lose the income provided by the NRCS. Additionally, KMLP would be required to obtain Compatible-Use Permits from the NRCS authorizing the crossing of any lands enrolled in the CRP. Therefore, **we recommend that:**

- **KMLP continue consultations with the FSA and NRCS to identify the extent and location of all CRP lands within Jefferson Davis Parish that would be affected by construction and operation of the Project. In addition, KMLP should file with the Secretary prior to construction, copies of its consultation and documentation of any stipulations or recommendations to avoid and minimize impacts to any CRP lands that would be affected.**

4.4.2 Impacts and Mitigation

The COE requires that all appropriate and practicable actions be taken to avoid or minimize wetland impacts, pursuant to its section 404(b)(1) guidelines, which restrict discharges of dredged or fill material where a less environmentally damaging and practicable alternative exists. All wetland crossings would be subject to review by the COE to ensure that wetland impacts are fully identified and appropriate wetland restoration and mitigation measures are implemented.

Construction Impacts

Construction activities have the potential to diminish the value of wetlands through clearing, trenching, spoil placement, equipment passage, and related construction disturbances. Wetland functions

such as erosion control, buffering and flood flow attenuation, sediment retention, and nutrient retention would also be affected by construction. These effects would typically be greatest during and immediately following construction, resulting in a temporary impact. Clearing of wetland vegetation would result in both short- and long-term loss of wetland wildlife habitat and some wetland functions, with the duration of the impact varying by habitat type. Forested wetlands would require as much as 30 years or more to recover from clearing and would be subjected to more stages of succession, ensuring the slow, but continuous alteration of available habitat until the land has been restored to a pre-construction state. Impacts to scrub-shrub wetlands would be mostly short-term, as restoration would likely occur within three years. Emergent wetlands, which can restore rapidly, would typically experience only short-term impacts, and may re-establish in one or two growing seasons.

Excavation of the pipeline trench, installation of the pipe, and backfill of the trench would affect the rate and direction of water movement within wetlands. In addition, excavation activities may alter perched water tables by disturbing impermeable soil layers. This would adversely affect wetland hydrology and revegetation by creating soil conditions that might not support wetland communities and hydric vegetation at pre-construction levels. Failure to properly segregate soils during construction would result in mixed soil layers, which would alter biological components of the wetland and affect the reestablishment of native wetland vegetation. Temporary stockpiling of soil and the movement of heavy machinery across wetlands would lead to inadvertent compaction and furrowing of soils, which would alter natural hydrologic patterns, inhibit seed germination, and increase seedling mortality. Altered surface drainage patterns, stormwater runoff, runoff from the trench, accidental spills, and discharge of hydrostatic test water would also negatively affect water quality by increasing the potential for siltation and turbidity resulting from construction activities.

KMLP would minimize impacts to wetlands by implementing our Procedures, as modified with accepted alternative measures, as discussed above. In accordance with our Procedures, KMLP would install sediment barriers across the entire construction right-of-way, as needed, within wetlands as well as along the edge of the construction right-of-way, when adjacent to wetlands, in order to prevent sediment flow into wetlands. Additionally, energy dissipating devices would be used to discharge hydrostatic test water to further minimize sedimentation in wetlands. Section 2.3.1 describes the specialized pipeline construction procedures that KMLP would implement to minimize impacts to wetlands, including the use of the push-pull method through wetlands where possible. Within the construction right-of-way, KMLP would grade tree stumps, but would only remove them within 15 feet of the proposed pipeline, and install erosion control devices to minimize sediment flow into the wetland. KMLP would reduce the maintained portion of the permanent pipeline right-of-way to 10 feet in wetlands, rather then the 50-foot width proposed for uplands.

KMLP has stated that no shallow bedrock occurs at or near the surface of the pipeline route; therefore, no perched water tables are expected to be present. Soil segregation along the Project would occur in unsaturated wetlands but would not be practical in saturated and submerged wetlands. In unsaturated wetlands where rutting or mixing of the topsoil can occur, KMLP would use low-ground-pressure equipment or temporary board roads for passage through the area. If the crossing length of an unsaturated wetland would be less than 100 feet, the spoil would be moved to adjacent upland areas located within the right-of-way, avoiding soil disturbance in the wetland. Board mats would also be used for passage through saturated wetlands. KMLP has stated that it would also disc any over-compacted soils found after construction.

The proposed pipeline route is located adjacent to existing rights-of-way to the extent practical so that the construction right-of-way would overlap with existing permanent rights-of-way. The amount of overlap would be limited to 15 feet to minimize wetland impacts.

Of the 18 proposed HDDs, 17 would cross waterbodies and/or wetlands (table 4.3.2.1-3). Through the use of HDD, KMLP would avoid impacts to approximately 87.8 acres of herbaceous wetlands (E2EM and PEM), 13.0 acres of scrub-shrub wetlands (E2SS and PSS), and 7.0 acres of forested wetlands. This includes the extensive bottomland forest located in Jefferson Davis Parish near Bayou Nezpique. Additionally, KMLP would avoid impacts to wetlands along the shores of Sabine Lake by routing the proposed pipeline through the open water as opposed to along the shoreline, where sensitive wetlands occur.

KMLP has stated that all emergent and scrub-shrub wetlands impacted by construction would be restored to original contours, revegetated as appropriate, and monitored to ensure a successful recovery. Forested wetlands would be allowed to naturally revegetate with the exception of a 10-foot-wide corridor over the pipeline that would be maintained in an herbaceous state. Wetland recovery would be considered successful when native species cover at least 80 percent of the wetland.

Sensitive or Unique Wetlands

KMLP would minimize impacts to EFH wetlands by using a combination of HDD and open-cut construction methods along the Sabine River/GIWW, and by using low-ground-pressure equipment, board roads, and marsh buggies during construction activities in saturated estuarine areas. Wetlands designated as EFH are discussed in section 4.6.4 with regard to their importance as a habitat to federally managed fishes and invertebrates.

Bayou Nezpique would be crossed by HDD, avoiding impacts to approximately 7.0 acres of forested wetlands.

The FGT Lateral would be collocated with an existing right-of-way through a large forested area adjacent to Bayou des Cannes. Although collocation is generally acceptable as a way to minimize impacts, this particular area is considered a quality forested wetland that would be impacted by the widening of the existing right-of-way. Therefore, we are recommending in section 4.3.2.1 that KMLP evaluate the feasibility of the FGT Lateral to cross Bayou des Cannes and associated wetlands by HDD.

Operation Impacts

Operation of the pipeline would require 190.9 acres of non-forested wetlands to be maintained in an herbaceous state. Operation of the Southwest Loop Delivery Point and the NGPL and TGTPL interconnect sites would permanently convert 2.7 acres of non-forested wetlands to industrial land. Additionally, 14.9 acres of forested wetlands would be converted to herbaceous wetland for the life of the Project.

KMLP would maintain a 10-foot-wide strip centered over the pipeline in a herbaceous state. Additionally, trees that are within 15 feet of the pipeline and greater than 15 feet in height would be cut and removed. These activities would not affect PEM wetlands. However, mowing, clearing, and tree removal would affect PSS and PFO wetlands along the permanent right-of-way, causing constant disruption to natural successional growth and increasing the chance of invasion by non-native species. Functions associated with these wetland types would be altered because forested or scrub-shrub wetlands within the maintained portion of the permanent pipeline right-of-way would be permanently converted to an herbaceous state.

All emergent and scrub-shrub wetlands impacted by construction would be restored to pre-construction contours. KMLP would consult with the appropriate state and federal agencies to develop project-specific measures for re-establishing herbaceous and/or woody species. In accordance with our

Procedures, KMLP would monitor the recovery of wetlands for a minimum of three years post-construction to ensure the success of revegetation. If revegetation is not successful at the end of three years, a remedial revegetation plan would be developed and implemented in consultation with a professional wetland ecologist. The remedial revegetation plan would serve as a guide to actively revegetate the wetland with native wetland herbaceous and woody plant species. Revegetation efforts would be continued until revegetation was considered successful.

Wetland Protection Measures

We believe the implementation of our Procedures with the accepted alternative measures, along with the use of HDDs, existing access roads, mitigation, and avoidance of PFO wetlands to the extent practical, KMLP would have adequately avoided, minimized, and mitigated impacts to wetlands.

Avoidance

KMLP would avoid impacts to wetlands through the use of HDD crossing methods and the routing of the Project through less sensitive areas such as Sabine Lake in order to avoid the shoreline where sensitive EFH wetlands occur. Additional areas of avoidance include areas of collocation where the width of construction rights-of-way could be reduced by utilizing existing operational and maintained areas.

Minimization

KMLP would minimize impacts to wetlands through a variety of methods, including the use of:

- The Aquatic Resources Mitigation Plan (appendix H);
- BMPs to control erosion and sedimentation;
- Routing that avoids wetlands to the extent practical; and
- The push-pull construction method where feasible, which would avoid the need for access canal excavation.

Mitigation

KMLP would implement its Aquatic Resources Mitigation Plan to ensure that wetlands within the construction right-of-way would experience no net loss in functional value. Temporary impacts would be mitigated by full restoration, with the exception of forested wetlands within the permanent right-of-way, after construction has been completed. KMLP is evaluating wetland mitigation banking options (Dorsey 2007) and is developing its draft Aquatic Resources Mitigation Plan in consultation with COE, FWS, NOAA Fisheries Service, LDNR, and LDWF; therefore, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary a copy of the finalized Aquatic Resources Mitigation Plan developed in consultation with COE, NOAA Fisheries Service, FWS, LDNR, and LDWF.**

4.5 VEGETATION

The vegetative communities that would be crossed by the Project can be generally grouped into uplands and wetlands. This section identifies and describes the vegetation types composing the two general vegetative communities and describes the impacts to these communities resulting from construction and operation of the Project. This section also addresses vegetation types of special concern, and exotic/invasive plant species. Section 4.4 addresses vegetation in wetlands.

4.5.1 Affected Environment

The upland vegetative community consists of several vegetation types: agricultural, upland forest, rangeland, and developed. The agricultural vegetation type consists of common crops and pasture grasses. The upland forest vegetation type consists of deciduous, evergreen, and mixed forests including managed pine forests. The rangeland vegetation type consists of common scrub-brush, herbaceous, and mixed vegetative species. The developed vegetative type consists of common grasses and shrubs associated with commercial, residential, and industrial lands as well as utility rights-of-way. The upland vegetative types crossed by the Project, as well as representative species occurring in each cover type, are listed in table 4.5.1-1.

TABLE 4.5.1-1

Upland Vegetation Types Crossed by the KMLP Project

Vegetation Cover Type	General Description	Common Species
Agricultural	Cropland and pasture	Rice (*Oryza sativa*), soybeans (*Glycine* spp.), corn (*Zea* spp.), sugar cane (*Saccharum officinarum*), turf grass, and sweet potatoes (*Ipomoea batatas*).
Upland Forest	Deciduous, evergreen, and mixed forests	Red Maple (*Acer rubrum*), Ironwood (*Carpinus carolinianum*), hickories (*Carya* spp.), Hackberry (*Celtis occidentalis*), Sugarberry (*C. laevigata*), Yaupon Holly (*Ilex vomitoria*), Chinese Privet (*Ligustrum sinense*, invasive non-native), Sweetgum (*Liquidambar styraciflua*), Red Mulberry (*Morus rubra*), Loblolly Pine (*Pinus taeda*), White Oak (*Quercus alba*), Water oak (*Q. nigra*), Live Oak (*Quercus virginiana*), Chinese Tallow (*Sapium sabiferum* = *Triadica sebifera*, invasive non-native), Winged Elm (*Ulmus alata*), American Elm (*Ulmus americana*), Japanese Honeysuckle (*Lonicera japonica*, invasive non-native), greenbriers (*Smilax* spp.), Poison Ivy (*Toxicodendron radicans*), sedges (*Carex* spp.), and Carolina Violet (*Viola villosa*).
Rangeland	Scrub-brush, herbaceous, and mixed rangelands	Giant Ragweed (*Ambrosia trifida*), sedges (*Carex* spp.), Bermudagrass (*Cynodon dactylon*), grasses in the genus *Paspalum*, Curly Dock (*Rumex crispus*), Chinese Tallow (invasive, non-native), Eastern Baccharis (*Baccharis halimifolia*), American Holly (*Ilex opaca*), Yaupon Holly, Marsh Elder (*Iva frutescens*), Chinese Privet (invasive non-native), Japanese Honeysuckle (invasive non-native), Osage Orange (*Maclura pomifera*), Virginia creeper (*Parthenocissus quinquefolia*), Smooth Sumac (*Rhus glabra*), Cherokee Rose (*Rosa laevigata*), Field Blackberry (*Rubus arvensis*) and other *Rubus* spp., Elderberry (*Sambucus canadensis*), Rattlebox (*Sesbania drummondii*), and Poison Ivy.
Developed	Commercial, industrial, residential, rights-of-way	Grasses and small shrubs.

Vegetation Types of Special Concern

Based on field surveys and consultations with LDWF, no critically imperiled plant species have been identified within 0.5 miles of the Project. Additionally, no unique communities or communities of special concern are located within 0.5 miles of the Project.

Several wetland and hydrologic restoration projects that have vegetative components occur in the vicinity of the Project and are addressed in sections 4.4 and 4.8.

4.5.2 Impacts and Mitigation

4.5.2.1 Primary Impact to Vegetative Cover Types

Construction of the Project, including the pipeline, aboveground facilities, access roads, pipe storage/contractor yards, and extra work spaces would require the clearing of 1,463.4 acres of agricultural land, 115.4 acres of upland forest, 134.4 acres of rangeland, and 130.2 acres of developed land.

Operation of the Project would require approximately 522.8 acres of upland vegetation, including 43.8 acres of upland forest, to be converted to permanently maintained pipeline right-of-way, aboveground facilities, or permanent access roads. Table 4.5.2.1-1 identifies the number of acres of vegetation temporarily and permanently impacted by construction and operation of the Project.

TABLE 4.5.2.1-1

Upland Vegetation Cover Types Affected by the KMLP Project

	Pipeline[a]		Ancillary Facilities[b]	
Vegetation Cover Type	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)	Temporary Construction Impact (acres)	Permanent Operations Impact (acres)
Agricultural[c]	1,178.5	415.8	284.9	7.9
Upland Forest	114.9	43.8	0.6	0.0
Rangeland	95.0	28.3	39.3	0.5
Developed Land	56.4	18.5	73.7	8.1
Total	1,444.8	506.3	398.5	16.5

[a] Temporary construction acreages reflect a nominal 125-foot-wide construction right-of-way and temporary extra workspaces. The permanent operations acreages reflect a 50-foot-wide permanent easement that would be maintained in upland areas following construction.

[b] For the purpose of this table, ancillary facilities include acres affected for interconnect sites, access roads, pipe storage/contractor yards..

[c] The acres of agricultural land reported above differs from acreage reported in section 4.8. This is because section 4.8 includes in agricultural land a category of "other" which is land without vegetative cover. Land without vegetative cover is excluded from the analysis of vegetation.

The majority of construction-related clearing would be temporary and cleared vegetation would be able to return to natural conditions after construction, with the exception of the permanent pipeline right-of-way that would be maintained in an herbaceous state throughout the life of the Project. The loss of vegetation along the pipeline route would result in forest fragmentation and the loss or conversion of wildlife habitat. Other impacts resulting from the removal of vegetation include increased erosion,

sediment runoff, altered soil chemistry, modified infiltration and groundwater recharge rates, and an increased susceptibility to colonization by invasive and/or exotic plant species. Additionally, the removal of trees on the right-of-way could expose formerly interior trees growing adjacent to the newly cleared areas to higher levels of wind, which may increase the risk of blow downs.

The severity of these impacts would depend on the specific vegetation type affected and the time that it takes the vegetation type to return to pre-construction conditions. Specifically, most impacts to agricultural lands and rangelands would be short term as these vegetation types would return to their herbaceous or shrub-covered status within one to three growing seasons after the completion of construction activities, cleanup, and restoration. Areas planted with field crops are typically disturbed by periodic agricultural practices and would be replanted in the next growing season. The clearing of upland forest would result in a long-term impact as upland forests can take up to 30 years or more to return to pre-construction conditions. Impacts to upland forested areas constitute the most significant change in vegetative strata, appearance, and habitat, as mature trees would be replaced for a period of years by herbaceous plants, shrubs, saplings, and other successional species. Impacts to previously developed lands such as industrial areas and linear transportation corridors would result in short-term impacts due to the existing maintained or disturbed condition.

In order to minimize impacts to affected vegetation types, KMLP would implement measures outlined in our Plan as described below and further discussed in section 2.3. Our Plan includes measures for minimizing erosion and enhancing revegetation in upland areas. To further minimize effects on vegetation, especially upland forests, KMLP proposed a pipeline route that would be collocated with existing rights-of-way to the extent practicable. Approximately 54 percent (73.7 miles) of the combined Leg 1, Leg 2, and FGT Lateral rights-of-way would be located adjacent to existing rights-of-way. By following existing rights-of-way, KMLP would avoid further segmentation of a relatively unfragmented forested area at MP 108.6, limiting the habitat disruption to a widening of the corridor that would need to be maintained. KMLP would also avoid impacts to many riparian areas located throughout the Project area through the use of HDD.

Based on the characteristics of the identified vegetation types, the expected impacts to vegetation and KMLP's described construction, restoration, and mitigation measures including the implementation of our Plan and Procedures, we believe that construction and operation of the Project would not significantly affect vegetation.

4.5.2.2 Exotic/Invasive Plant Species

Federal agencies are required to prevent the introduction and spread of invasive species, and to minimize the impacts that such species would cause by implementing feasible and prudent measures.

Invasive species are generally characterized by their hardiness and a relatively increased ability to reproduce and spread. Invasive species are also commonly exotic species which are non-native species of trees, shrubs, and flowering or non-flowering plants. Within the project area, exotic and invasive plant species out-compete native plant species and decrease the amount of available habitat for wildlife that depend on native plants for nesting and feeding (GBEP 2006). Exotic and invasive species found in the project area include the Chinese tallow tree (*Triadica sebifera*) and the Chinese privet (*Ligustrum sinese*).

The Chinese tallow tree is a small, rapidly growing tree found in every parish in Louisiana. The Chinese tallow tree is considered problematic in bottomlands, coastal prairies, and riparian areas. Until recently, the Chinese tallow was not considered a threat to upland forests because it grows poorly in the shade; however, its appearance in the understory of closed canopy forests and undisturbed sites has raised

concerns about its potential to dominate gaps created by construction activities and operations maintenance and to prevent the regeneration of desirable plant species.

The Chinese privet plant is considered to be one of the worst forest invaders in the Southeast because of its ability to dominate the understory, midstory, and edges of forests and to impede regeneration of desirable plants, including canopy trees. The Chinese privet grows easily under a variety of soil and light conditions, is bothered by relatively few pests, and is difficult to remove once established.

The spread of any invasive species during construction and operation of the Project would displace native species and negatively alter the appearance, composition, and habitat value of the affected area.

In order to minimize the spread of exotic and invasive species, KMLP would implement related measures in our Plan and Procedures. Specifically, KMLP would monitor the success of revegetation and weed control efforts. Additionally, our Plan and Procedures require post-construction monitoring for the first and second growing seasons in uplands, and for three years in wetlands, to evaluate the success of revegetation. As part of this monitoring program, KMLP would be required to examine the right-of-way for the presence of invasive species. 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. Similarly, wetland revegetation would be considered successful if the cover and destruction of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent areas that were not disturbed by construction.

KMLP has also developed an Invasive Species Control Plan as part of their draft Aquatic Resources Mitigation Plan (see appendix J) that would help control the spread of the Chinese tallow during construction and operation of the Project. In accordance with this plan, field personnel would be trained to identify Chinese tallow and would be registered to purchase and use regulated herbicides. Additionally, older trees would be controlled by mechanical cutting and chemical treatment while saplings would be removed by hand or machine. Each incidence of control activities would be documented and reported to the FERC and COE after the completion of the 3-year monitoring period.

Based on our consultations with federal and state agencies, we believe that the measures outlined in KMLP's Invasive Species Control Plan and those identified in our Plan and Procedures would be sufficient to control the spread of invasive species during construction and operation of the Project.

4.6 WILDLIFE AND AQUATIC RESOURCES

This section describes the existing wildlife, aquatic habitats, and biological communities along the Project route with emphasis on wetland habitat, unique or sensitive habitats, and the biological communities associated with those habitats. In addition, the discussion includes general and specific impacts that would occur during construction and operation, and the measures to avoid and minimize those impacts.

4.6.1 Terrestrial Wildlife Resources

A variety of habitat types would be crossed by the KMLP Project. These habitat types include agricultural lands, forested wetlands, non-forested wetlands, upland forests, rangeland, and developed land. Table 4.6.1-1 lists species commonly associated with these habitat types. Descriptions of the vegetation found in these habitats are provided in sections 4.4 and 4.5. Federal- and state-listed threatened and endangered species are discussed separately in section 4.7.

4.6.1.1 Affected Environment

Agricultural lands include actively harvested cropland, idle cropland, and open pasture. Within the Project area, the agricultural land is predominantly used for pasture, rice production, and crawfish farming (see section 4.8.3.1). Agricultural lands provide cover and foraging opportunities for wildlife species within the crops or pastures themselves, or within the small areas of natural vegetation, such as vegetation along streams or small forested patches, that sometimes occur within agricultural lands. Species found in these areas include those that prefer disturbed habitats and edge habitats between forested and open areas. Flooded rice fields and crawfish ponds provide important habitat for shorebirds, wading birds, and waterfowl. Wading birds and crustaceans are often found in irrigation ditches, while fencerows can serve as breeding areas for some song birds.

Detailed discussion of wetland habitats potentially impacted by the Project is provided in section 4.4. Forested wetlands in the project area include bottomland hardwood forests and cypress-tupelo-blackgum swamps which have been generally characterized as highly productive and providing an abundance of natural cover for numerous species. Bottomland hardwood forests are found along major waterbodies and are dominated by mature trees and shrubs. In general, bottomland forests provide high quality habitat, attracting a variety of birds, mammals, reptiles, and amphibians. Throughout their natural range, cypress-tupelo-blackgum swamps are forested, alluvial swamps growing on intermittently exposed soils. They are found along rivers, streams, and in back swamp depressions and swales. The vegetative community has low species diversity, but is generally co-dominated by bald cypress and tupelo gum. The undergrowth in these areas is generally sparse due to low light intensity and the long periods of soil inundation.

Non-forested wetlands include estuarine and palustrine wetlands. Estuarine wetlands include salt marsh, brackish marsh, intermediate marsh, and freshwater marsh. Changes in salinity can cause the wildlife and vegetative species to change as the marsh becomes more saline or fresh. Marshes are typically interspersed with small ponds and pools, providing habitats for a diverse assemblage of birds, mammals, fishes, and reptiles. These habitats are important breeding and feeding grounds for many recreationally and commercially important species such as fish, crustaceans, fur-bearers, and waterfowl. The coastal marshes in Louisiana are part of the Mississippi Flyway and provide wintering grounds for over 20 species of ducks and geese.

TABLE 4.6.1-1

Habitats and Typical Non-Fish Wildlife Species Found within the Project Area

Habitat/Common Name (*Scientific Name*)	Habitat/Common Name (*Scientific Name*)
Agriculture eastern bluebirds (*Sialia sialis*) northern bobwhite (*Colinus virginianus*) rusty blackbird (*Euphagus carolinus*) white-tailed deer (*Odocoileus virginianus*) wood duck (*Aix sponsa*) woodcock (*Scolopax minor*)	**Forested Wetlands** black bear (*Ursus americanus*) blue jay (*Cyanocitta cristata*) box turtle (*Terrapene sp.*) Chuck Will's widow (*Caprimulgus carolinensis*) common raccoon (*Procyon spp.*) coral snake (*Micrurus fulvius*) eastern diamondback (*Crotalus adamanteus*) eastern gray squirrel (*Sciurus carolinensis*) mink (*Mustela vison*) mud turtle (*Kinosternon sp.*) northern cardinal (*Cardinalis cardinalis*) river otter (*Lutra canadensis*) striped skunk (*Mephitis mephitis*) vireos (*Vireo spp.*) western cottonmouth (*Agkistrodon piscivorus leucostoma*) white-tailed deer (*Odocoileus virginianus*) wild turkey (*Meleagris gallopavo*) wood duck (*Aix sponsa*) woodcock (*Scolopax minor*)
Non-Forested Wetlands alligators (*Alligator mississippiensis*) American bittern (*Botaurus lentiginosus*) American wigeon (*Anas Americana*) beaver (*Castor canadensis*) diamondback water snake (*Nerodia rhombifer*) eastern narrowmoth toad (*Gastrophryne carolinensis*) marsh hawk (*Circus cyaneus*) marsh rice rat (*Oryzomys palustris*) mink (*Mustela vison*) Missouri slider (*Pseudemys floridana hoyi*) muskrat (*Ondatra zibethicus*) nutria (*Myocastor coypus*) red-winged blackbird (*Agelaius phoeniceus*) river otter (*Lutra canadensis*) southeastern myotis (*Myotis austroriparius*) Wilson's snipe (*Gallinago gallinago*) Woodhouse's toad (*Bufo woodhousii*)	**Upland Forests** bobwhite (*Colinus sp.*) common raccoon (*Procyon sp.*) coyote (*Canis latrans*) flying squirrel (*Glaucomys sp.*) nine-banded armadillo (*Dasypus novemcinctus*) Virginia opossum (*Didelphis virginiana*) white-tailed deer (*Odocoileus virginianus*) wild turkey (*Meleagris gallopavo*)
Rangeland bobwhite (*Colinus sp.*) common raccoon (*Procyon spp.*) coyote (*Canis latrans*) flying squirrel (*Glaucomys sp.*) nine-banded armadillo (*Dasypus novemcinctus*) Virginia opossum (*Didelphis virginiana*) white-tailed deer (*Odocoileus virginianus*) wild turkey (*Meleagris gallopavo*)	**Developed Land** Species that utilize the vegetated areas of developed land are likely to include species that inhabit agricultural land, rangeland, and forest edge habitat.

Palustrine wetlands are inland freshwater marshes and swamps. Wildlife generally uses these areas for breeding and foraging. These wetlands also serve as habitats for migratory species. Emergent wetlands consist primarily of grasses. Scrub-shrub wetlands consist of saplings and low-lying vegetation.

Emergent and scrub-shrub wetlands supply breeding and foraging habitat, along with resting areas for migratory species.

Upland forests consist of deciduous forests, evergreen forests, and forests of mixed evergreen and deciduous trees. Upland forests provide both interior and edge habitats that often attract different species based on their habitat preferences. Interior forested habitats are secluded, wetter, and more stable whereas edge habitats are more volatile, experiencing more dramatic environmental change. They are sunnier, drier, and windier, and are more prone to disturbance (LandOwner Resource Center 2005).

Rangeland ecosystems are dominated by grasses, grass-like plants, forbs, or shrubs and other herbaceous species. Rangeland habitats are classified as shrub and brush, herbaceous, or mixed. Shrub and brush rangeland are dominated by woody vegetation. Herbaceous rangelands are dominated by naturally occurring grasses and or forbs, or are those lands that have been modified to include such vegetation as their natural cover. Mixed rangelands are those where more than one-third of the land is a mixture of herbaceous and shrub and brush rangeland species (NASA 1996).

Developed lands are generally a mixture of paved and/or graveled areas, but may contain vegetated strata as well. Species utilizing developed land may include species that inhabit other grassy or shrub-covered areas although these areas are not expected to be a primary habitat.

These terrestrial and aquatic habitats support various species of wild game. The American alligator, nutria, muskrat, river otter, raccoon, red swamp crawfish, red fox, and gray fox have an economic benefit for local trappers. Whitetail deer, fox squirrel, gray squirrel, swamp rabbit, eastern cottontail rabbit, waterfowl, northern bobwhite, eastern wild turkey, woodcock, rails, mourning dove, and Wilson's snipe are important recreational species in the area.

Unique or Sensitive Wildlife Habitats

The SNWR is a 124,511-acre coastal marsh administered by FWS. The primary objective of this NWR is to preserve a large area of coastal wetlands for wintering and migratory waterfowl, and it is known as an internationally important bird area. The SNWR is also a major nursery area for many estuarine-dependant marine species as well as home for alligators and other reptiles, mammals, and various species of wading, water, and marsh birds. Recreational activities available within the refuge include hunting, fishing, boating, and hiking (FWS no date a). The Project would not cross the SNWR, and at the closest point would pass approximately 0.25 miles from it.

The Lacassine National Wildlife Refuge (LNWR), also administered by the FWS, is nearly 35,000 acres, most of which is freshwater marsh habitat. The refuge preserves a major wintering site for waterfowl and provides habitat for nesting colonies of wading birds, alligators, mink, otter, and raccoon, among various other species. Threatened species such as the bald eagle and the Louisiana black bear have also been found residing in this refuge. The LNWR supports recreational activities such as hunting, fishing, bird-watching, and hiking (FWS no date b). The main unit of the LNWR would be approximately 15 miles southeast of the Project. The smaller Vidrine unit is the closest unit and the pipeline would be located approximately two miles southwest of this unit.

The Project would impact two tracts of land included in the CWPPRA program. This program was implemented to create, protect, and enhance wetlands in Louisiana. Impacts to these specific tracts of land are discussed in section 4.4.

In addition to specific tracts of sensitive land, forests and wetlands in Louisiana provide quality habitat for migratory waterfowl and colonial-nesting waterbirds, which are protected by the Migratory Bird Act.

Louisiana, including the Project area, is an important stopover for migratory birds along the Mississippi Flyway, which extends from Alaska and central Canada along the Mississippi River drainage into central and South America. Forests, including riparian habitat, provide important stopover habitat for migratory birds.

Colonial nesting birds share two general traits; they gather into large assemblages, called colonies, during the nesting season, and they obtain all or most of their food from the water. Colonial wading birds include the following: herons, egrets, night-herons, ibis, roseate spoonbills, anhingas, and/or cormorants. The Natural Heritage Program (NHP) of LDWF database indicates the presence of rookeries for the roseate spoonbill, a state-listed species of concern, and other colonial nesters in coastal Louisiana. The roseate spoonbill and other federal- and state-listed species are discussed in section 4.7.

4.6.1.2 Impacts and Mitigation

Construction Impacts

Construction of the Project, including the pipeline, aboveground facilities, extra workspaces, access roads, and pipe storage and contractor yards would temporarily affect approximately 2,417.9 (total construction impacts less the following land types: open water, beaches, and other) acres of upland and wetland habitat suitable for wildlife. Of that, 16.5 acres of upland and 2.7 acres of wetland habitats within the footprint of aboveground facilities and access roads would be permanently converted to industrial areas. Following construction, extra workspaces and non-forested portions of the permanent right-of-way would be allowed to revert to pre-construction conditions. Portions of the permanent right-of-way in forested lands would be maintained in an herbaceous state in accordance with our Plan and Procedures (and approved alternative measures) to facilitate pipeline maintenance. Approximately 14.9 acres of forested wetland and 40.6 acres of upland forest located within the permanent right-of-way would be converted to an herbaceous state for the life of the Project.

Impacts to wildlife species and habitats resulting from construction and operation of the Project would depend on the vegetation type affected, the mobility and habitat requirements of affected wildlife species as well as the amount of adjacent wildlife habitat. Specifically, construction activities including increased noise and habitat disruption would impact wildlife by displacing, stressing, injuring or leading to the mortality of wildlife. Species typically move away from inhospitable environments, utilizing nearby suitable habitats until the disruption has passed. Less mobile species may experience direct mortality from habitat clearing and the passing construction spreads if unable to escape the area. Disruption of any habitat type could cause alterations in the breeding, feeding, nesting, and rearing activities of species that actively use those habitats. Impacts to habitats are often related to the growth rates of the vegetation species found there.

Forested lands would require as much as 30 years or more to recover from clearing and would be subjected to more stages of succession, ensuring the slow, but continuous alteration of available habitat until the land has been restored to a pre-construction state. Impacts to wildlife from construction and operation in large forested tracts would be diverse and long-term or permanent. These impacts would include the loss of forest interior habitat, displacement of wildlife, inhibition of the migrations and foraging habits of forest interior species, invasion of non-native plant or animal species, and increased stress and mortality to local wildlife.

Although the Project would cross through several forested areas, few of these would be considered forest interior habitat. The exceptions occur at approximately MP 99.1 and MP 108.6. One bottomland forested area located in Jefferson Davis Parish begins at MP 99.1 and ends at MP 99.7. This forested habitat includes Bayou Nezpique, and this habitat would be avoided using HDD. Another relatively large forested tract begins at approximately MP 108.6 in Acadia Parish, stretching for slightly less than a mile. Although this forest is relatively large, the pipeline route follows an existing right-of-way. This limits the habitat disruption to widening of an existing corridor and would not increase fragmentation of interior forest habitat. Two additional forested areas of concern are located in Evangeline and Acadia Parishes. In Evangeline Parish, the pipeline would enter a large, relatively unfragmented forested area, associated with Tiger Point Gulley, crossing for approximately 0.4 miles. Although there are nearby rights-of-way transecting this area, the pipeline route would cause further fragmentation, decreasing its value as a wildlife habitat. In Acadia Parish, the FGT Lateral would be collocated with an existing right-of-way through a large forested area associated with Bayou des Cannes. Although collocation is generally acceptable as a way to minimize impacts to an area, this particular area provides quality wildlife habitat that would be disrupted by widening the right-of-way through quality forest habitat. Therefore, in section 4.3.2.1, we are recommending that KMLP consult with LDWF, FWS, and COE regarding the appropriate crossing methods and collocation through the forested areas near MP 113.1 of Leg 1 and MP 1.4 of the FGT Lateral.

KMLP has also proposed to use a total of 18 HDDs to cross a variety of habitats consisting mainly of waterbodies and wetlands. HDD crossing methods would reduce impacts to these streams as well as to the adjacent wetlands, riparian areas, and bottomland hardwood communities. KMLP has provided potential opportunities for the mitigation and/or compensation of wetland losses in the draft Aquatic Resources Mitigation Plan (appendix J), but is still finalizing the plan in consultation with the relevant agencies. Therefore, in section 4.4, we are recommending that prior to construction, KMLP develop an Aquatic Resources Mitigation Plan developed in consultation with and approved by the COE, NMFS, FWS, LDNR, and LDWF.

Operation Impacts

To minimize impacts on wildlife and wildlife habitats, the affected areas would be revegetated and maintained according to our Plan and Procedures. Routine maintenance would be periodically conducted to maintain the permanent right-of-way in an herbaceous state. Along cropland, pasture, and emergent wetlands, no routine maintenance would be necessary. However, in forested areas including forested wetlands, routine mowing would be conducted to allow inspection of the pipeline corridor. Our Plan does not allow routine vegetative maintenance to occur more frequently than every three years, except along a 10-foot-wide corridor centered over the pipeline that can be maintained annually.

Based on the characteristics of the affected wildlife habitats, the known habitat requirements of wildlife identified within proposed project areas, the anticipated impacts to wildlife and their habitats, KMLP's stated construction measures, and its adherence to our Plan and Procedures with modified alternative measures; we believe that construction and operation of the project would not significantly affect wildlife resources.

Waterbirds

The Project route could include suitable habitat for migratory waterfowl and nesting habitat for various species of colonial wading birds. Although the closest known wading bird nesting colony is approximately 1 mile from the footprint of the Project, the NHP of LDWF cautions that rookeries may move from year to year, potentially placing them closer to, or within, the Project right-of-way.

Noise and construction activities occurring in the vicinity of colonial waterbird rookeries have the potential to displace birds during active construction. In addition, displacement could result in the birds leaving the area. This displacement could disrupt breeding and nesting activities of the waterbirds within the Project area.

KMLP has stated that it would employ a qualified biologist to survey the work area during the 2007 nesting season, and again immediately prior to construction (in areas where construction occurred during the nesting season) to determine the presence of colonial waterbird rookeries. In accordance with recommendations given by FWS and the NHP of LDWF, the survey would notate any colony of wading birds (herons, egrets, night-herons, ibis, roseate spoonbills, anhinga, and/or cormorants) within 1,000 feet of the work area, as well as any colony of nesting gulls, terns, and/or black skimmers within 1,312 feet of the work area. KMLP would further consult with FWS and the NHP of LDWF in order to determine mitigation measures to minimize potential impacts to these nesting areas, should they be found.

4.6.2 Freshwater Aquatic Resources

This section discusses freshwater aquatic resources. Estuarine waterbodies are discussed in section 4.6.3. A table identifying all waterbodies crossed by the Project, as well as their width, state waterbody classification, crossing location, and crossing method is included as appendix G of this EIS.

4.6.2.1 Affected Environment

The Project would cross a total of 298 freshwater waterbodies, each of which supports warmwater fisheries. Aside from the potential utilization of the Calcasieu River by some estuarine species in seasons of high salinity, the Project would cross only freshwater aquatic habitats after entering Calcasieu Parish. Freshwater fishes common within affected waterbodies are listed in table 4.6.2.1-1.

TABLE 4.6.2.1-1

Freshwater Aquatic Species Occurring Within Waterbodies Crossed by the Proposed KMLP Project

	Common Name	Scientific Name
Fish	Gars	Lepisosteidae
	Bowfins	Amiidae
	Catfishes	Ictaluridae
	Eels	Anguillidae
	Carps and Minnows	Cyprinidae
	Sunfishes, Basses, and Crappies	Centrarchidae
	Creek Chubsucker	*Erimyzon oblongus*
	Inland Silverside	*Menidia beryllina*
	Red-eared Sunfish	*Lepomis microlophus*
	Swamp Darter	*Etheostoma fusiforme*
	Mosquitofish	*Gambusia affinis*
Crustaceans	Red Swamp Crawfish	*Procambarus clarkia*
	White River Crawfish	*Procambarus zonangulus*

Fisheries of special concern include areas containing exceptional recreational or commercial fisheries, specially designated streams or rivers, and waterbodies supporting rare or endangered aquatic species. Potential impacts to threatened and endangered species are discussed in section 4.7. No freshwater waterbodies that have been designated as fisheries of special concern would be crossed by the Project. However, eight waterbodies - the Black Bayou Cutoff, GIWW, Vinton Drainage Canal, Bayou Choupique, Calcasieu River, East Bayou Lacassine, Bayou Nezpique, and Bayou des Cannes - that would be crossed by the Project are designated to support fish and wildlife propagation. These waterbodies provide aquatic habitat, food, resting and reproductive opportunities, and/or travel corridors to aquatic species.

Commercial and Recreational Fisheries

Each of the waterbodies identified as supporting fish and wildlife propagation also supports recreational and/or commercial fisheries with crappie and catfish being the main catch. The Calcasieu River is further designated for oyster propagation. According to the LDWF, due to recent hurricane activity no recreational fishery is present in Bayou Lacassine. Although the Calcasieu River and the GIWW are considered primarily freshwater waterbodies, they do support a number of commercial estuarine species including brown and white shrimp, and recreational fisheries for spotted seatrout, red drum, and southern flounder.

Crawfish are also an important fishery within Louisiana, both recreationally and commercially. In the south, the fishery is dominated by just two species, the red swamp crawfish and the white river crawfish (LSU Ag Center 2006). Crawfish farming was the most valuable aquaculture crop in Louisiana for 2005; however, the wild-caught crawfish are preferred by many consumers due to its larger size. The volume of wild crawfish harvest is almost completely constrained by the timing and duration of the annual floodwater event in the Atchafalaya Basin (LSU Ag Center 2005). East of the Calcasieu River, significant numbers of crawfish farms occur along the route. See section 4.8 for a discussion on land use with regard to crawfish farms.

4.6.2.2 Impacts and Mitigation

Construction Impacts

The crossing methods proposed for each waterbody are identified in appendix G of this draft EIS. Depending on the construction method used, direct and indirect impacts could occur to the aquatic habitats and the species that utilize them. Open-cut and flume crossing methods would directly impact crossed waterbodies whereas the use of HDDs or bores would generally avoid impacts. As proposed, 56 percent of minor and intermediate waterbodies would be crossed by either HDD or bore; the remaining 44 percent would be crossed by open-cut or flume methods. Each of the 10 major waterbodies would be crossed by HDD.

Of the eight waterbodies supporting commercial and/or recreational fisheries, all but two would be crossed by HDD, avoiding impacts to the fisheries. The exceptions, Bayou des Cannes and Bayou Lacassine, would be crossed by flume and/or open-cut. Construction through the approximately 108 crawfish ponds along the route would be accomplished by typical upland construction methods, including clearing and trenching. KMLP has stated that it would try to schedule construction through these areas during times when the fields and ponds are not normally flooded, or negotiate with the landowners so that flooding of the crawfish ponds would be deferred for the season.

Pipeline construction using open-cut methods would cause an increase in the turbidity and sedimentation of a given waterbody. The suspension of sediments decreases the amount of light that

penetrates through the water. With a decrease in light, photosynthetic organisms produce less oxygen, thereby decreasing the amount of DO available for uptake by fish and other aquatic species. Additionally, organic materials resuspended with the sediment can increase the BOD, further decreasing the available DO. During periods of low DO, fewer organisms can be supported in a particular area. Those individuals that are not displaced can experience stress, decreased food availability, and mortality. Sedimentation can also cause increased mortality to relatively immobile benthic organisms and fish eggs as they are covered by the falling sediment. Loss of these organisms can cause a decrease in the prey species available for various species of fish and aquatic organisms.

The flume crossing method would be used for three waterbody crossings; one crossing of East Bayou Lacassine (MP 84.9), and two crossings of Bayou des Cannes (MP 124.7 of Leg 1 and MP 1.6 of the FGT Lateral). The water in these streams would be routed so that trenching activities would be done in relatively dry conditions. This method would reduce the amount of turbidity and sedimentation associated with a conventional open-cut crossing. To further reduce the potential for impacts within Bayou des Cannes at the FGT Lateral crossing, we include a recommendation in section 4.3.2 that KMLP evaluate the feasibility of the FGT Lateral crossing Bayou des Cannes by HDD.

In both the open-cut and flume methods, removal of vegetation from riparian areas along the waterbodies would be necessary, causing an increase in surface runoff and erosion, contributing to the impacts mentioned above. Additionally, loss of riparian vegetation would result in a slight increase in water temperature from increased exposure to the sun.

Impacts of erosion would be minimized by use of our Procedures, which require the use of temporary and permanent erosion controls such as silt fences and slope breakers. Temporary erosion controls would be required immediately after the initial disturbance of the waterbody or adjacent upland area has occurred and would remain until either replaced by permanent erosion controls or restoration of the adjacent upland has been completed. Additionally, trees and shrubs would be allowed to reestablish themselves on the waterbody banks with the exception of a 10-foot-wide corridor that must be maintained in an herbaceous state, helping to curb both erosion and temperature elevation.

Our Procedures also require that minor and intermediate waterbodies generally be crossed in 24 and 48 hours, respectively, resulting in a limited period of elevated turbidity. The rapid construction through these waterbodies, along with the mitigation measures mentioned in our Plan and Procedures, would reduce the impacts of turbidity and sedimentation to fish and other aquatic species. Overall impacts to freshwater aquatic species would be localized and short-term as only a small area of a crossed waterbody would be affected.

KMLP proposes a total of 18 HDDs for pipeline installation across waterbodies (see table 4.3.2.1-3). An additional 147 crossings of intermediate and minor waterbodies would be made by horizontal bore, which like HDD, typically avoids habitat impacts. While HDD is the preferred crossing method for sensitive or important habitats because the method avoids or minimizes impacts to these areas, they are not without risk and can affect the habitat by release of drilling fluid or a frac-out. Frac-outs and releases of drilling fluid would increase turbidity and sedimentation, contributing to the impacts mentioned above. A draft HDD Contingency Plan is provided in appendix I and details the procedures KMLP would implement if release of drilling fluid or a frac-out occurred.

Hydrostatic testing of the pipeline would require the withdrawal of large volumes of water from certain waterbodies as listed in table 4.3.2.2-1 to test the structural integrity of the pipeline. Water would be withdrawn from eight freshwater waterbodies, three of which support recreational and/or commercial fisheries. Significant withdrawals of water from any one waterbody could cause a reduction in flow or an overall decrease in volume, disrupting microhabitats as the water level drops below the boundary that is

normally inundated. The intake of water would cause the mortality of non-motile species, or species unable to avoid the flow field, as they are impinged upon the screen or entrained through it. Discharge of the test water could cause the erosion of stream banks and their vegetation or scouring of the waterbody bottom substrate. Erosion and scouring would increase the turbidity and sedimentation at the discharge point, causing stress to individuals and decreasing their ability to detect prey and predators. Increased turbidity, withdrawal of oxygen-rich waters, and discharge of the organic material created by the entrained individuals would decrease the amount of DO remaining in the waterbody. KMLP would prevent or limit these impacts from hydrostatic testing by implementing our Procedures which include measures that require the screening of intake hoses to prevent the entrainment of larger fish and maintaining adequate flow rates for the protection of aquatic life.

During construction, water pollutants also could be introduced into waterbodies by releases of fuel and oil spills from construction equipment, herbicides, and disturbance of contaminated sediments. The introduction of pollutants to aquatic species can cause acute or chronic toxicity, mortality, an increase in stress, and decreases in reproduction, growth, recruitment, and predator/prey detection abilities. As discussed in section 2.3, KMLP would develop and implement a project-specific SWPPP and SPRP that describes the containment and cleanup procedures that would be employed in the event of a spill or a leak of hazardous materials. To avoid contamination within waterbodies, KMLP has stated that BMPs addressing hazardous materials handling and storage, and spill prevention and response, would be developed as part of the SWPPP prior to construction. KMLP would also adhere to our Plan and Procedures.

Disturbance and resuspension of contaminated soils and sediments would result in adverse impacts to water quality and instream habitat. As indicated in the EPA's National Sediment Quality Survey report of 1997, the lower Calcasieu watershed contained APCs indicating that the areas would likely have adverse effects on aquatic and human life (EPA 1997). Later surveys indicated that those APCs are no longer present, although some areas still contained contaminated sediments (EPA 2004). KMLP has proposed the HDD crossing method for the Calcasieu River, which would avoid contact and disturbance of contaminated sediments. HDD frac-outs could impact local species through increased turbidity and sedimentation, but that would not cause chemical contamination in the affected waterbody. In case unidentified contaminated soils are discovered during construction, we are recommending in section 4.2.2.1 that KMLP develop a Plan for the Discovery and Management of Contaminated Soils and Groundwater. This plan would minimize the risk of adverse effects to aquatic species through the resuspendion of contaminated soils and sediments.

Operation Impacts

Impacts to fisheries and aquatic habitats resulting from maintenance of the permanent right-of-way would be relatively minor. Our Procedures require that a riparian strip at least 25 feet wide be allowed to revegetate to preconstruction conditions along all waterbodies, with the exception of the permanent right-of-way that may be permanently maintained in an herbaceous state to facilitate pipeline surveys. Contamination could occur during operations by spills from vehicles used to survey the pipeline route or from herbicide use to curb excessive growth along the pipeline right-of-way.

Our Procedures include measures to avoid using herbicides or pesticides within 100 feet of a waterbody (unless authorized by a land manager or state agency). In addition, the SWPPP, SPRP, and BMPs to be implemented by KMLP address hazardous materials handling and storage, and spill prevention, and response measures. Therefore, we believe that these measures would minimize adverse impacts on aquatic resources.

4.6.3 Marine Fishery Resources

4.6.3.1 Affected Environment

The Project would cross a total of 12 estuarine waterbodies, each of which contains warmwater fisheries. Of the 12 estuarine waterbody crossings, five are major waterbodies and seven are intermediate waterbodies. All but two of these waterbodies are perennial. A table identifying all waterbodies crossed by the Project, as well as their width, state waterbody classification, crossing location, and crossing method is included as appendix G of this draft EIS. Marine species common along the route are listed in table 4.6.3.1-1.

TABLE 4.6.3.1-1

Marine Species Occurring Within Waterbodies Crossed by the Proposed KMLP Project

	Common Name	Scientific Name
Fish	Sand Seatrout	*Cynocion arenarius*
	Threadfin Shad	*Dorosoma petenense*
	Gizzard Shad	*Dorosoma cepedianum*
	Bowfin	*Amia calva*
	Spotted Gar	*Lepisosteus oculatus*
	Southern Flounder	*Paralichthus lethostigma*
	Spanish Mackerel	*Scomberomorus maculatus*
	Black Drum	*Pogonias cromis*
	Red Drum	*Sciaenops occellatus*
	Atlantic Croaker	*Micropogonias undulates*
	Bay Anchovy	*Anchoa mitchilli*
	Spot	*Leiostomus xanthurus*
	Spotted Seatrout	*Cynoscion nebulosus*
	Sheepshead	*Archosargus probatocephalus*
	Gafftopsail Catfish	*Bagre marinus*
	Gulf Menhaden	*Brevoortia patronus*
Mollusks	Atlantic Rangia	*Rangia cuneata*
Crustaceans	Brown Shrimp	*Penaeus aztecus*
	White Shrimp	*Penaeus setiferus*
	Blue Crab	*Callinectes sapidus*

Fisheries of special concern within the estuarine systems of the Project area include Sabine Lake and the Sabine and Calcasieu Rivers, each of which contains EFH for various species of marine fishes. The Calcasieu River, although considered freshwater for the purposes of this draft EIS, is part of an estuarine system that also contains EFH for various species. Impacts to these waterbodies and the managed species that occur within them are discussed in detail in section 4.6.4. Three of the waterbodies that would be crossed by the Project are designated to support fish and wildlife propagation, and therefore potentially contain spawning locations for commercial and recreational fisheries. Additionally, LDWF (2006a) has indicated that adult paddlefish migrate up into Bayou Nezpique to spawn from January through April.

The commercial and recreational fisheries found within the estuaries crossed by the Project include oysters, shrimp, crab, and various fish. Sabine Lake is the major waterbody that supports these fisheries.

Sabine Lake

Sabine Lake is designated by the Louisiana Administrative Code (Title 33, Part 6) to support oyster propagation. The designation indicates that Sabine Lake supports economically important species of clams, oysters, mussels, or other mollusks. Eastern oysters are an important commercial species in Louisiana. In 2004, 55 percent of the landings of eastern oyster within the Gulf of Mexico came from Louisiana. Oysters require some hard substrate, or cultch, to settle on. They may eventually build large reefs, or may occur singly or in clumps on any manmade or natural structures with hard surface. Shell reefs also provide a habitat for a variety of species for foraging and cover. Impacts to oyster reefs or substrate suitable for settlement could decrease the socioeconomic and ecological value of these areas.

Sabine Lake is considered to be a public oyster seed ground and public oyster tonging area. Activities affecting productive public oyster areas require a CUP that can be obtained by the applicant after a water bottom assessment is provided to LDWF and approved. The LDWF requires that impacts to the water bottoms of the public oyster areas associated with construction activities be compensated. Compensation may be in the form of replacing impacted habitat using oyster cultch material (limestone, crushed concrete, oyster shell, etc.) or by making a payment directly to the Public Oyster Seed Ground Development Account (LDNR 2006).

KMLP conducted a bottom survey of Sabine Lake in March and April of 2006 to determine the extent of suitable habitat for oysters. The survey was conducted in compliance with guidelines developed by LDWF for sampling in oyster seed grounds, seed reservations, and tonging areas in order to characterize and quantify the different substrate types and to determine the presence, quantity, condition, and demography of oyster reefs within the area of interest. The survey corridor, approximately 3,000 feet wide and centered over the pipeline route, was subjected to a side scan sonar with sub-bottom profiling and then ground-truthed by manual poling. A ponar dredge was also used to collect samples and identify species in the surveyed areas.

From the results of this survey, the bottom substrate of Sabine Lake was broken into three main categories: Types I, II, and III, pertaining to the suitability as oyster substrate, and seven subcategories specifying the substrate type (see table 4.6.3.1-2). The assessment identified 522.8 acres of oyster reefs and cultch substrate (Types II and III) within the survey corridor. Current conditions within the survey

TABLE 4.6.3.1-2

Bottom Substrate Crossed by the KMLP Project within Sabine Lake

Substrate	Acreage within Survey Corridor	Percentage of Survey Corridor
Soft mud with buried shell (Type I)	4,552.2	87.9
Firm mud (Type II)	187.6	3.6
Soft mud with exposed scattered shell (Type II)	172.1	3.3
Moderately firm mud (Type II)	151.8	2.9
Soft mud (Type I)	105.5	2.0
Reef (Type III)	5.9	0.1
Exposed shell (Type III)	5.4	0.1

corridor result in 0.0 marketable sacks per acre of water bottom; however, seed and spat data indicate that 70.8 marketable sacks of oysters would be available in the future from the reef areas found within the survey corridor.

The mollusks or shells present were generally found within the bottom substrates designated as reef and exposed shell (Type III substrates), equating to a total area of 11.3 acres of bottom substrate suitable for or containing mollusks. The majority of the oyster resources were found at the southern shore of Sabine Lake, which would be avoided by the HDD construction method, although isolated patches occurred within the survey corridor out to approximately 3.5 miles from shore, the closest being approximately 500 feet away from the proposed pipeline right-of-way. The mollusk species noted most often along the corridor was the Atlantic rangia, an estuarine bivalve; only one eastern oyster was found during dredge sampling.

Sabine Lake also supports both recreational and commercial fisheries for shrimp, crab, and various fish. The Sabine River and Burton Shell Slip support only recreational fisheries, but the species would likely be the same as all three waterbodies are part of the same estuarine system. The LDWF marine fisheries manager described the fishery in Sabine Lake as including recreational fishing for spotted seatrout, red drum, black drum, and southern flounder (LDWF 2006a). Incidental catch may also include croaker and hardhead. The recreational fisheries of the Sabine River and the Burton Shell Slip would be expected to include the same species, although fishing effort may be lower, as all three waterbodies are part of the same estuarine system. The inshore fishing seasons are typically from mid-May to early-July and again from mid-August to December.

4.6.3.2 Impacts and Mitigation

Construction Impacts

The crossing methods proposed for each estuarine waterbody are identified in appendix G of this draft EIS. Depending on the construction method used, direct and indirect impacts could occur to the aquatic habitats and the species that utilize them. Open-cut methods would directly impact crossed waterbodies whereas the use of HDDs would generally avoid impacts. Of the waterbodies supporting marine fisheries – Sabine Lake, the Sabine River, and the Burton Shell Slip – the Burton Shell Slip would be crossed by HDD, avoiding impacts to the fisheries. The Sabine River would not be crossed by the pipeline route, but temporary extra workspaces would protrude into the river at four places with only minor, temporary effects. The crossing of Sabine River and Sabine Lake would be accomplished by a combination of HDD and open-cut methods, causing direct impacts to the waterbody and the species that utilize it. Crossing methods of Sabine Lake and the Sabine River are described in section 2.3.

General impacts to fishes and crustaceans through open-cut crossing methods and hydrostatic test water withdrawal and discharge include waterbody contamination, loss of habitat, and increased turbidity and sedimentation. These are described under section 4.6.2.2 on freshwater aquatic resources and are identical to impacts in estuarine environments.

As discussed in section 4.6.3.1, the southern portion of Sabine Lake supports the majority of oyster resources found along the pipeline route. Isolated patches of oyster resources also occur within 1,500 feet of the pipeline route, the closest being less than 500 feet away. As the majority of bottom substrate along the pipeline survey corridor is relatively soft bottom with no structure, the loss of any oyster resources would impact a variety of estuarine species that use the hard bottom area for foraging and cover. KMLP proposes to avoid impacts to the nearshore oyster resources by use of an HDD that would exit at MP 4.82 within the open water of Sabine Lake. Open-cut construction through Sabine Lake

would require a 200- to 300-foot-wide construction right-of-way and require excavation of a pipe trench as well as a floatation channel for spud barges in waters less then 8 feet deep. These construction procedures would place spoil piles within 350 feet of oyster resources, increasing turbidity and sedimentation in the area.

Oyster resources occurring in the project area such as rangia are filter-feeders and require low levels of sedimentation and adequate water movement to supply them with food and remove wastes. Similar to other mollusks, oysters can tolerate thin layers of sediment or partial burial. Complete burial by gradual, natural sedimentation or dredge material disposal would cause mortality (Britton and Morton 1989).

The proposed construction through Sabine Lake would result in a temporary loss of soft bottom habitat due to the placement of the spoil piles, which would temporarily cover the habitat at that location. Due to the expanse of soft bottom habitat in Sabine Lake, mobile species utilizing this habitat would be expected to be temporarily displaced; however, less mobile species, such as the benthic invertebrates that utilize soft bottom habitat, would be smothered and experience mortality through placement of the spoil piles.

KMLP states that it will compensate LDWF for the disturbance of each bottom type within Sabine Lake that occurs as a direct result of pipeline construction. The LDWF indicated that compensation for impacts to public oyster seed grounds shall be in the form of planting cultch material (i.e., crushed concrete, limestone, oyster shell, etc.) at the rate of one cubic yard per acre of impacted area for barren, non-supportive areas of the seed grounds, 50 cubic yards for supportive areas, and 187 cubic yards for reef areas plus the value of any living oyster resources destroyed (LDWF 2005). KMLP reports that there are no active oyster leases along the proposed route. In addition, KMLP conducted an oyster survey and the proposed route would largely avoid oyster resources. The primary area along the proposed route with marketable oysters was near the HDD exit pit at MP 4.82. KMLP has agreed to compensate LDWF for oysters lost due to sedimentation on the reefs within 1,500 feet of this HDD exit pit based on existing information or pre- and post-construction surveys.

Operation Impacts

The operational impacts for marine fisheries resources would be the same as those discussed under freshwater aquatic resources in section 4.6.2.2.

Thus, there would be no significant impacts to marine fishery resources during construction or operation of the Project.

4.6.4 Essential Fish Habitat

EFH was defined by the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSA granted NOAA Fisheries Service legislative authority for fisheries regulation in the United States within a jurisdictional area between 3 and 200 miles offshore. NOAA Fisheries Service was also granted legislative authority to establish eight regional fishery management councils, each responsible for the proper management and harvest of finfish and shellfish resources within their respective geographic areas. The statute includes a mandate that federal agencies must consult with the Secretary of Commerce on all activities or proposed actions that are authorized, funded, or undertaken by the agency that might adversely affect EFH. NOAA Fisheries Service recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA or the ESA (50 CFR 600.920[e][I]) to reduce duplication and improve efficiency. The mandatory contents of an EFH Assessment are detailed in 50 CFR 600.920(e)(3).

The estuarine waters within the Project area are within the jurisdiction of the Gulf of Mexico Fishery Management Council (GMFMC), which has designated all estuarine habitat as EFH, including: emergent and mangrove wetlands; submerged aquatic vegetation (SAV); algal flats; mud, sand, shell, and rock substrates; and the water column. The GMFMC manages approximately 450 species within the Gulf, grouped into seven Fishery Management Plans (FMPs). Five of these FMPs (including the red drum, reef fish, coastal migratory pelagic, shrimp, and stone crab FMPs) have designated all estuarine systems on the Gulf coast as EFH. The estuarine systems crossed by the KMLP Project would include Sabine Lake and the Sabine and Calcasieu Rivers.

The EFH within Sabine Lake, Sabine River, and Calcasieu River include emergent wetlands, mud bottom substrate, shell reefs, and the water column itself. Estuarine emergent wetlands are among the most productive ecosystems on earth (Teal and Teal 1969, Odum et al. 1982). They are integral parts of the estuarine system, serving as nursery habitats for the larval stages of many fish and invertebrate species. Estuarine wetlands are also important in the removal of contaminants, and a buffer to reduce the erosion of inland areas. The mud bottom substrates of these waterbodies provide a habitat for various invertebrates, which in turn creates foraging habitat for other invertebrates and fishes. Shell reefs are generally composed of an upper zone consisting of live oysters and associated species, over a core of buried shell and mud (Bahr and Lancer 1981). This provides a structural complexity to the aquatic habitat that is used for feeding, breeding, and growth by a variety of species, managed or otherwise.

We have incorporated EFH consultations for the KMLP Project with the interagency coordination procedures required under NEPA. **For purposes of reviewing this Project under NEPA, FERC is the lead federal agency. As such, FERC requests that NOAA Fisheries Service consider this document as notification of initiation of EFH consultation. An assessment of potential effects of the Project is included below.**

4.6.4.1 Affected Federally Managed Species

Of the species with EFH designations in estuarine waterbodies, the brown and white shrimp, red drum, Gulf stone crab, and dog and lane snappers have EFH designations within the region of the Project (NOAA 2006b). NOAA Fisheries Service also indicated in written correspondence that waters in the Project area have been designated as EFH for the late juvenile, subadult, and adult stages of the bonnethead shark. Although none of these species is considered to be threatened or endangered, the red drum population is classified as overfished, or below the desired threshold, in the Gulf of Mexico. Table 4.6.4.1-1 lists the species and life stages within the EFH occurring in the Project area. Table 4.6.4.1-2 summarizes seasonal abundance data of each of the managed species that occur in the Project area.

Brown Shrimp

Brown shrimp are found in a range of habitats from estuaries to offshore depths of approximately 360 feet. Spawning occurs offshore with the pelagic larvae migrating to the estuaries and becoming bottom-oriented (GMFMC 2004). Postlarvae and juveniles are associated with shallow vegetated habitats, silty sand, and non-vegetated bottoms. The density of these stages are highest in marsh edge habitat and SAV, followed by tidal creeks, inner marsh, shallow open water, and oyster reefs (GMFMC 2004). Larvae initially consume planktonic algae and zooplankton, but become opportunistic as they age, feeding upon detritus, plants, and small fish and invertebrates (Darnell 1958, Perez-Farfante 1969).

TABLE 4.6.4.1-1

Summary of EFH Categories Potentially Used by Specific Life Stages of Federally Managed Species

Species/Life Stage	EFH Categories			
	Water Column	Emergent Wetlands	Mud Bottom Substrates	Shell Reefs
Brown Shrimp				
Larvae/Postlarvae	X	X	X	X
Juvenile		X	X	X
White Shrimp				
Larvae/Postlarvae	X	X	X	
Juvenile		X	X	
Red Drum				
Larvae/Postlarvae	X	X	X	
Juvenile		X	X	
Adult	X	X	X	X
Gulf Stone Crab				
Eggs			X	
Larvae/Postlarvae	X		X	X
Juvenile		X	X	X
Dog Snapper				
Juvenile		X		
Lane Snapper				
Larvae				
Juvenile			X	
Bonnethead Shark				
Late Juvenile	X			
Subadult	X			
Adult	X			

Source: NOAA 2006b.

White Shrimp

Similar to the brown shrimp, white shrimp habitats range from estuaries to offshore depths of approximately 130 feet. This species is known to spawn offshore and have pelagic larvae that migrate to the estuaries and become bottom-oriented. Postlarvae and juveniles generally utilize mud and peat bottoms with large amounts of detritus or vegetative cover (GMFMC 2004). Larvae of white shrimp also consume planktonic algae and zooplankton, but as juveniles have been reported to feed on sand, detritus, mollusk fragments, and small invertebrates (Darnell 1958).

TABLE 4.6.4.1-2

Relative Abundance of Managed Species within the Project Area

Species	Life Stage[a]	Relative Abundance			
		Low Salinity (March-May)	Increasing Salinity (June-July)	High Salinity (Aug-Oct)	Decreasing Salinity (Nov-Feb)
Brown Shrimp	Adult	C	C	C/R	R
	Juvenile	A	A	A	C
White Shrimp	Adult	C	C	HA	HA
	Juvenile	HA	HA	HA	HA
Red Drum	Adult	R	C/R	C/R	C/R
	Juvenile	C	C	C	C
Gulf Stone Crab	Adult	R	R	R	R
	Juvenile	R	R	R	R
Dog Snapper	Adult	NA	NA	NA	NA
	Juvenile	NA	NA	NA	NA
Lane Snapper	Adult	NA	NA	NA	NA
	Juvenile	NA	NA	NA	NA
Bonnethead Shark	Adult	NA	NA	NA	NA
	Juvenile	NA	NA	NA	NA

[a] Life stages for which EFH is mapped include only adults and juveniles.

[b] EFH habitat for this life stage is noted as reefs and submerged aquatic vegetation not occurring within the Project area.

C = Common, R = Rare, A=Abundant, HA = Highly Abundant, NA = Not Available

Source: NOAA 1998.

Red Drum

Red drum commonly occur in the Gulf of Mexico, from offshore waters to very shallow estuarine waters. They occur in virtually all of the Gulf's estuaries over a variety of substrates including seagrass, sand, mud, and oyster reefs. Spawning occurs in the mouths of bays, inlets, and on the Gulf side of the barrier islands, after which, larvae are transported into the estuaries. Estuarine wetlands are especially important EFH for larvae, juvenile, and subadult stages. Common prey species of red drum include several species that are also estuarine dependant such as shrimp, blue crab, striped mullet, and pinfish. Larval drum eat small prey species such as mysids and amphipods (GMFMC 2004).

Gulf Stone Crab

Adult stone crabs are benthic organisms that can be found on a variety of hard substrates and seagrass beds from the shoreline to depths of 200 feet (GMFMC 2004). Although larvae generally utilize the pelagic waters of the estuaries, all other life stages utilize sand/shell bottoms, oyster reefs, and/or soft bottom habitats (GMFMC 2003). Stone crabs are primarily carnivorous at each life stage, with larvae feeding primarily on plankton, juveniles on invertebrates and mollusks, and adults on mollusks, carrion, and other stone crabs. The species is basically dependant on the prey produced in the estuaries and seagrass beds where freshwater runoff results in higher phytoplankton productivity (GMFMC 2004).

Dog Snapper

Adult dog snapper may use submerged aquatic vegetation within estuaries as feeding areas, but generally occur within the coastal and offshore areas of the Gulf and are most commonly found on coral reefs (GMFMC 2004). Early juveniles, however, are found on shallow water seagrass beds of coastal waters and estuaries, as well as in estuarine emergent marshes, and may enter rivers (GMFMC 2003, GMFMC 2004). The region of the Project contains nursery habitat for early and late stage juveniles, which are known to utilize emergent marshes for growth (GMFMC 2003).

Lane Snapper

The lane snapper is demersal, occurring over all bottom types although it is most common in coral reef and sandy bottom areas. Nursery habitat includes mangrove and grassy estuarine areas in southern Texas and Florida as well as shallow areas with sandy and muddy bottoms off each of the Gulf states (GMFMC 2004). Early and late juvenile stages utilize sand/shell and soft bottom substrates in estuaries for feeding and growth (GMFMC 2003).

Bonnethead Shark

The bonnethead shark is the smallest member of the hammerhead family. It inhabits sandy or muddy bottoms of shallow coastal waters, feeding primarily on crabs, shrimp, mollusks, and small fishes (FWRI no date). This species is relatively resistant to overfishing due to a fast growth-rate, annual reproduction, and lack of a commercial fishery (NOAA 2006b).

4.6.4.2 Impacts and Mitigation

Sabine Lake, Sabine River, and Calcasieu River support EFH that includes emergent wetlands, mud bottom substrates, shell reefs, and water column habitats. The Calcasieu River would be crossed by HDD; thus, avoiding impacts to the EFH and the managed species that occur there. The Sabine River would not be crossed by the pipeline, but temporary extra workspaces associated with HDD operations would protrude into the river at four locations. These temporary extra workspaces would have a minor, temporary impact to EFH in the Sabine River. The crossing of Sabine Lake would be accomplished by a combination of HDD and open-cut methods, causing direct impacts to the lake and the species that utilize it.

Construction through the first 50 miles of the pipeline route would impact approximately 99.5 acres of EFH wetlands. Impacted areas are located at the northern and southern ends of Sabine Lake, on Shell Island, and along Sabine and Calcasieu Rivers and the GIWW. Disturbance of these habitats would temporarily reduce the amount of foraging habitat and cover available to these species. Disturbance of these wetlands would also temporarily decrease the habitat available for recruitment, leaving new recruits susceptible to increased predation as they search for alternative habitat or remain in open waters. The use of tracked vehicles through estuarine wetlands has the potential to permanently impact wetlands designated as EFH. In order to avoid permanent impacts, low-ground-pressure equipment or temporary board roads would be used. Marsh buggies would be used in saturated EFH wetlands where the use of board roads would not be practical (MP 1.5 to MP 3.9 and from MP 32.3 to MP 35.2).

The proposed construction through Sabine Lake would result in a temporary loss of soft bottom habitat due to the placement of the spoil piles, which would cover the habitat at that location. Due to the expanse of soft bottom habitat in Sabine Lake, the more mobile managed species utilizing this habitat would be expected to be temporarily displaced; however, less mobile stages of managed species that

utilize soft bottom habitat could be smothered and experience mortality through placement of the spoil piles.

The southern portion of Sabine Lake supports the majority of oyster resources found along the pipeline route and would be avoided by HDD. Isolated patches of oyster resources also occur within 1,500 feet of the pipeline route, the closest being less than 500 feet away. As the majority of bottom substrate along the pipeline survey corridor is relatively soft bottom with no structure, the loss of any oyster resources would impact managed species for which shell reefs are considered EFH. KMLP would compensate LDWF for any oyster resources lost during pipeline construction as described in section 4.6.3.2.

Disturbance of the water column would occur in Sabine Lake during trenching activities. The managed species are mobile and would likely avoid the area during construction and return shortly after the completion of construction. The increased turbidity and sedimentation, disruption of wetlands, hydrostatic test water withdrawal, and other impacts from Project construction may displace or cause the mortality of prey species of managed species. Some of these species serve as prey for other fish species managed by NOAA Fisheries Service and the GMFMC. The wetlands within Sabine Lake also produce nutrients and detritus, important components of the aquatic food web, which contribute to the overall productivity of the Sabine estuary system as well as of the near-shore environments of the Gulf of Mexico.

KMLP states that it would implement a variety of mitigation measures in addition to following our Procedures in order to minimize impacts to aquatic habitats and the species that utilize them. These include:

- *Waterbody restoration*. KMLP would re-establish original contours and monitor affected waterbodies following construction, as well as restore any levees or barriers that were removed as part of the construction activities.

- *Erosion and sedimentation control.* KMLP would implement BMPs to control erosion and sediment as part of a project-specific SWPPP.

- *Riparian restoration*. Maintenance of the permanent right-of-way would be limited to a 10-foot-wide corridor, allowing the stream bank to revegetate to pre-construction conditions.

- *Contamination control*. Herbicides would not be used within 100 feet of any waterbody without the consent of the land manager or a state agency.

There would be no need for operation right-of-way clearing within Sabine Lake, Sabine River, and Calcasieu River, eliminating impacts to the EFH categories within it. Maintenance-related operational impacts to EFH would be limited to a 10-foot-wide right-of-way within estuarine wetlands. Trees in excess of 15 feet in height, should they occur within 15 feet of the pipeline right-of-way, may be cut and removed. The estuarine wetlands would be subjected to a site-specific monitoring plan based on recommendations given by NOAA Fisheries Service. With regard to these recommendations, and as stated in the draft Aquatic Resources Mitigation Plan (appendix J), monitoring would be primarily photographic in nature and would be taken from the ground at the work sites. These activities would take place pre-construction, immediately post-construction, and one growing season post-construction with photos of all work sites. The photos would be taken every 500 feet (with pictures taken in both directions) with the location recorded on GPS to allow a return to the exact site, and the exact location

and direction of the photo would be recorded in a tabular form and referenced to an aerial photo documenting photo numbers.

4.6.4.3 Conclusions

We believe that the Project would have minimal impacts on EFH with implementation of our Procedures, a finalized Aquatic Resources Mitigation Plan developed in coordination with federal and state agencies, and the approved alternative measures to our Procedures (as discussed in this draft EIS). These measures would reduce the potential for unanticipated long-term impacts, and the resulting impacts of the Project would be insignificant and short term.

4.7 THREATENED AND ENDANGERED SPECIES

To comply with section 7 of the ESA, Kinder Morgan consulted with the FWS and NOAA Fisheries Service regarding the presence of federally listed or proposed threatened or endangered species and their critical habitats in the project area. Kinder Morgan, as the FERC's non-federal representative for the purposes of complying with the ESA, has been assisting the FERC in meeting its section 7 obligations by conducting informal consultation with the FWS and NOAA Fisheries Service. We also contacted and consulted with the FWS and NOAA Fisheries Service about which species under their respective jurisdictions would be potentially affected by the project. In addition to these consultations, Kinder Morgan consulted with the Natural Heritage Program (NHP) of LDWF to obtain a list of state-listed special status species in the project area.

4.7.1 Federally Listed Threatened and Endangered Species

The FWS and NOAA Fisheries Service have identified 12 federally listed threatened or endangered species in southern Louisiana that should be considered when determining the potential effects of the KMLP Project. According to FWS (2006a), the West Indian manatee, piping plover, Gulf sturgeon, and the green, leatherback, loggerhead, Kemp's ridley, and hawksbill sea turtles are not known to occur in the Project area and therefore no further consultation with FWS is required for these species unless the scope or location of the Project changes. NOAA Fisheries Service concurred that the Gulf sturgeon is rarely found as far west as the Project site and stated that neither the Gulf sturgeon nor the smalltooth sawfish (due to low area abundance) require further consultation (NOAA 2006c). The West Indian manatee, piping plover, Gulf sturgeon, and smalltooth sawfish have thus been eliminated from further consideration in this EIS. Although FWS has determined that no further consultation is needed regarding four of the five species of sea turtles, NOAA Fisheries Service has joint jurisdiction over the five species of sea turtles known to occur in the Gulf of Mexico and has requested that these species be assessed with regard to potential impacts from the Project. Each of the eight remaining species are discussed below and shown in table 4.7.1-1 with regard to their protected status and our determination of impact.

Sea Turtles

The only threatened or endangered reptiles known to exist in the Project area are sea turtles. NOAA Fisheries Service is generally responsible for marine threatened and endangered sea turtles and FWS is responsible for sea turtles that are coming ashore to nest. No critical habitat is designated for the green, hawksbill, loggerhead, Kemp's ridley, or leatherback sea turtles in the Project area.

Leatherback Sea Turtle

The leatherback sea turtle is primarily a pelagic species, although it will forage in coastal waters, and is distributed in temperate and tropical waters worldwide (NOAA and FWS 1992). It is the largest, deepest-diving, and widest-ranging sea turtle; the species has been federally listed as endangered since 1970 (FWS 2002a). Leatherbacks undergo extensive migrations from feeding grounds to nesting beaches (NOAA 2002a). Although southeast Florida only supports minor nesting colonies, the area represents the most significant nesting activity within the continental United States (NOAA no date), with the nesting period extending from March through July (FWS 2002a). Leatherback sea turtles feed primarily on jellyfish, but also on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed (FWS 2002a). Significant threats to the species include incidental capture in fishing gear and harvest of adults and eggs (NOAA no date).

TABLE 4.7.1-1

Federally Listed Species Potentially Occurring in the KMLP Project Area

Species	Federal Status	State Status	Parish	Preferred Habitat	Determination
Reptiles					
Leatherback Sea Turtle (*Dermochelys coriacea*)	E	E	Cameron	Open sea and coastal waters. Prefer sandy beaches with deepwater approach for nesting.	Not likely to adversely affect
Loggerhead Sea Turtle (*Caretta caretta*)	T	T	Cameron	Tropical and temperate waters with temperatures above 10°C.	Not likely to adversely affect
Hawksbill Sea Turtle (*Eretmochelys imbricate*)	E	E	Cameron	Tropical and subtropical seas, including southern Florida and the northern Gulf of Mexico. Coral reefs, rocky outcrops, high energy shoals.	Not likely to adversely affect
Green Sea Turtle (*Chelonia mydas*)	T/E	T	Cameron	Lagoons, bays, inlets, shoals, and estuaries, as well as coral reefs, rocky outcrops, and high-energy beaches. Found throughout the Gulf of Mexico and adjoining beaches where the seawater temperature is above 25°C.	Not likely to adversely affect
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	E	E	Cameron	Shallow coastal waters, tidal rivers, estuaries, and seagrass beds with substrates of sand and mud.	Not likely to adversely affect
Birds					
Brown Pelican (*Pelecanus occidentalis*)	E	E	Cameron	Shallow coastal waters within 20 miles or less of the shoreline and in depths up to 80 feet. Breeds on small coastal islands and forages for fish along coastal and inland waterways.	Not likely to adversely affect
Bald Eagle (*Haliaeetus leucocephalus*)	T	E	Cameron, Calcasieu	Areas with abundant sources of large open waterways such as lakes, reservoirs, seacoasts, and large rivers. In addition to waterways, the availability of perches, usually tall trees or cliffs, adjacent to foraging and nesting areas. Occasional transient on rivers for foraging or feeding.	Not likely to adversely affect
Red-cockaded Woodpecker (*Picoides borealis)*	E	E	Calcasieu, Evangeline	Open pine forests with large, widely spaces trees. Nests in large, old pines (60+ years). Forages in pine or pine-hardwood stands that are greater than 30 years of age.	Determination pending

Loggerhead Sea Turtle

The loggerhead sea turtle is the most abundant sea turtle in the Gulf of Mexico, although it is still federally listed as threatened. Loggerhead turtles are a cosmopolitan species, inhabiting temperate and tropical waters in the estuaries and continental shelves of both hemispheres (NOAA 2002b). Within the eastern Gulf of Mexico, the species is usually found in water depths of less than 65 feet (Fritts et al. 1983; Lohoefener et al. 1990; Hildebrand 1982).

In the southeastern United States, females nest from late April through early September (NOAA and FWS 1991). Nesting occurs primarily on barrier islands adjacent to continental landmasses in warm-temperate and sub-tropical waters. Nest sites are typically located on open sandy beaches, above the mean high tide, and seaward of well-developed dunes. In Louisiana, this species has been found throughout the coastal region but nesting has only been recorded from the Chandeleur Islands, which is over 250 miles east of the potential habitat (Sabine Lake) within the Project area (LDWF 2005). Adults occupy a variety of habitats, ranging from turbid bays to clear waters of reefs, whereas subadults occur mainly in nearshore and estuarine waters. Hatchlings move directly to sea after hatching, and often float in masses of Sargassum. The loggerhead diet consists of a wide variety of benthic and pelagic food items, including conches, shellfish, horseshoe crabs, prawns and other crustacean, squid, sponges, jellyfish, basket stars, fish, and hatchling loggerheads. The most significant threats to the loggerhead populations are coastal development, commercial fisheries (especially shrimping), and pollution.

Hawksbill Sea Turtle

The hawksbill sea turtle is primarily coastal and is seldom seen in waters deeper than 65 feet (FWS 2002b). It inhabits rocky areas, coral reefs, lagoons, oceanic islands, shallow coastal areas, and narrow creeks and passes (FWS 2002b). Hawksbill sea turtles are found in tropical and subtropical waters in the Atlantic, Pacific, and Indian Oceans (FWS 2002b) and have been federally listed as endangered throughout their range since 1970 (FWS 2002b). The nesting season for this species generally occurs between April and November (FWS 2002b). Nesting occurs on undisturbed deep-sand beaches which range from high energy beaches to tiny pocket beaches several meters wide bounded by crevices of cliff walls. These beaches are normally low-energy, with woody vegetation near the waterline.

Hawksbill turtles are the least common sea turtle in the Gulf of Mexico (MMS 2002), although they have been recorded in waters of all the states along the Gulf of Mexico (NOAA and FWS 1991). Adults usually forage around coral reefs and other hard bottom habitats (NOAA 2002a), and primarily eat sponges (FWS 2002b). This diet and their dependence on hard bottom communities make the species especially vulnerable to deteriorating conditions on coral reefs. Due to the lack of suitable foraging habitat, there is low probability of this species occurring within the Project area.

Green Sea Turtle

The green sea turtle is generally listed as threatened with the exception being the breeding colony populations in Florida and on the Pacific Coast of Mexico, which are federally listed as endangered. This species nests in tropical and subtropical waters worldwide and inhabits shallow waters (except when migrating) inside reefs, bays, and inlets. Within the southeastern U.S., green turtles generally nest between June and September (FWS 2002c). Hatchlings eat a variety of plants and animals (FWS 2002c) and forage in areas such as coral reefs, emergent rocky bottom, *Sargassum* mats, lagoons, and bays (MMS 2001). The adults feed on seagrass and marine algae, including species of *Cymodocea*, *Thalassia*, and *Zostera* (FWS 2002c). Feeding grounds in the Gulf of Mexico include inshore south Texas waters, the upper west coast of Florida, and the northwestern coast of the Yucatan Peninsula in Mexico.

Incidental capture in fishing gear and, in some areas of the world, the harvest of eggs and adults affect the recovery of the green sea turtle population. Nesting within the Project area is highly unlikely, as green sea turtles prefer to nest on high energy beaches with deep sand and little organic content.

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle is an endangered species that occurs mainly in the coastal areas of the Gulf of Mexico and northwestern Atlantic Ocean. Nesting occurs mainly in Mexico from April to June, but Kemp's ridley turtles also nest in small numbers along the Gulf coast. Juveniles and sub-adults occupy shallow, coastal regions and are commonly associated with crab-laden, sandy, or muddy water bottoms. Small turtles are generally found in nearshore areas of the Louisiana coast from May through October. Adults may be abundant near the mouth of the Mississippi River in the winter. Between the east Gulf coast of Texas and the Mississippi River Delta, Kemp's ridleys can be found in nearshore waters, ocean sides of jetties, small boat passageways through jetties, and dredged and nondredged channels. They have been observed within both Sabine and Calcasieu Lakes. No sightings have been reported in the Project area Major threats to this species include over-exploitation on their nesting beaches, drowning in fishing nets, and pollution. (FWS 2006a).

Sea Turtle Impacts

Sea turtles are vulnerable to adverse impacts from many of the construction activities that would occur in Sabine Lake including: increased noise; pile driving; increased vessel traffic; and habitat degradation associated with trenching activities. Potential responses to noises generated during construction activities could cause avoidance behavior in sea turtles, as well as disorientation and behavioral disturbance. Pile-driving activities often involve loud, repetitive noises that could cause a temporary reduction in hearing sensitivity or a temporary threshold shift (TTS) in sea turtles.

Potential effects on sea turtles from construction of the Project could include avoidance of the area due to noise and activity, alteration or loss of habitat, effects on prey species composition and abundance, and changes in water quality. Increased traffic and project activities may result in the temporary displacement of sea turtles from foraging and resting habitats due to increased water turbidity. These impacts are expected to be temporary, localized and minor, and as such adverse impacts on foraging and nesting sea turtles is not expected.

Local noise levels would be increased due to passage and use of construction equipment. Pile-driving would be used only to situate the signs marking the spoil piles for boater safety.

Increased construction traffic in an area increases the likelihood of vessel/sea turtle interaction. Sea turtles can experience mortality and injury from collision with vessels. KMLP proposes to excavate both a trench through Sabine Lake for the pipeline and, in places where the water is less than eight feet deep, an excavation channel for the spud barges. Individuals coming into contact with construction equipment may be killed or injured. In a letter dated April 15, 2006, NOAA Fisheries Service provided their standard construction guidelines for projects occurring in areas inhabited by sea turtles, entitled "Sea Turtle and Smalltooth Sawfish Construction Conditions" and "Vessel Strike Avoidance Measures and Injured or Dead Species Reporting." These measures are provided in appendix K. KMLP has stated that it would implement these guidelines during construction of the Project. With the implementation of these measures the construction of the Project is not likely to adversely affect sea turtles.

Birds

Brown Pelican

The brown pelicans is found along the Atlantic and Gulf of Mexico coasts, inshore to usually no more than 20 miles out from shore. They are federally listed as endangered in the U.S. except along the Atlantic coast, Alabama, and Florida where they have been delisted due to recovery (FWS 1995). Sand spits and offshore sand bars are used extensively as daily loafing and nocturnal roost areas. The preferred nesting sites are small coastal islands which provide protection from predators and sufficient elevation to prevent flooding of the nests (FWS 1995). In southwestern Louisiana, brown pelicans are currently known to nest on Rabbit Island in Calcasieu Lake. Although no brown pelican nesting sites are known to occur in the Project area, they may use the area and surrounding habitat for feeding and/or loafing. Brown pelicans feed in shallow estuarine waters (e.g., Sabine Lake) using sand spits and offshore sand bars as rest and roost areas (FWS 2006a). Brown pelican are asynchronous nesters. The nesting season can extend from January through October, although peak egg laying usually occurs in March or April and often through June (NPS 2006a). Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance. There is no critical habitat listed for the brown pelican.

Brown pelicans are known to use the habitat types that occur within the Project vicinity and could use Sabine Lake for feeding and loafing. The known nesting colony on Rabbit Island in Calcasieu Lake is approximately 18 miles from the pipeline and would not be disturbed during construction or operation of the Project. Although feeding and loafing pelicans may be temporarily displaced by construction activities, we have determined that the Project is not likely to adversely affect the brown pelican.

Bald Eagle

The bald eagle nests in Louisiana from October through mid-May. Eagles typically nest in bald cypress trees near fresh to intermediate marshes or open water in the southeastern parishes. Areas with high numbers of nests include the Lake Verret Basin south to Houma, the southern marsh/ridge complex from Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also winter and infrequently nest near large lakes in central, southwestern, and northern Louisiana (FWS 2006a). The population of bald eagles began declining prior to 1940 due to a decline in prey species, loss of habitat, direct killing, and later, from DDT use, but has recovered to the point that it is being proposed for delisting (FWS no date c). Currently the population is considered threatened throughout the continental U.S. and Alaska. No critical habitat has been designated for the bald eagle.

Breeding bald eagles occupy "territories" that they will typically defend against intrusion by other eagles, and that they are likely to return to each year. A territory may include one or more alternate nests that are built and maintained by the eagles, but may not be used for nesting in a given year. Potential nest trees within a nesting territory may, therefore, provide important alternative bald eagle nest sites. In forested areas, bald eagles often select the tallest trees with limbs strong enough to support a nest that may weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water or area where the eagles usually forage. Shoreline trees or snags located near large waterbodies provide the visibility and accessibility needed to locate aquatic prey (FWS 2006a).

Bald eagles are most vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding (roughly the first 12 weeks of the nesting cycle). Disturbance during this critical period may lead to nest abandonment, cracked and chilled eggs, and exposure of small young to the elements. Human activity near a nest late in the nesting cycle may also cause flightless birds to jump from the nest tree, thus reducing their chance of survival (FWS 2006a). Although the general area of high nest occurrence would not be impacted by the Project, the pipeline route would cross numerous

freshwater and intermediate marshes and open water areas along the first portion of Leg 1. Bald eagles nesting in these areas could be disturbed by passage of the construction spreads.

KMLP did not identify any bald eagle nests during field surveys conducted along the pipeline route. Should a bald eagle nest be encountered during construction and the construction workspace encroach within 1,500 feet of the nest, KMLP states that the Lafayette, Louisiana FWS office would be consulted to establish measures to mitigate potential impacts during the nesting season. During operation of the Project, KMLP has stated that no right-of-way maintenance would occur within 1,500 feet of a known bald eagle nests during the nesting season. Due to the absence of nests along the route, the consultation proposed for nests seen at a later date, and the elimination of right-of-way maintenance within 1,500 feet of known nests, we have determined that the construction and operation of the Project is not likely to adversely affect bald eagles.

Red-cockaded Woodpecker

The red-cockaded woodpecker (RCW) is federally listed as endangered. Historically, its range occurred from east Texas and Oklahoma to Florida, and north to New Jersey and Maryland. The populations have since been extirpated from Missouri, Maryland, Tennessee, Kentucky, and New Jersey, with the remaining populations fragmented (FWS 1983). The preferred habitat consists of longleaf pine although other species of southern pine are also used. The RCW excavates cavities in large (i.e., 10 inches or greater in diameter at breast height) living pines that are often suffering from red heart disease that causes the inner wood to become soft (FWS 2006a; FWS 1983). Nesting occurs in mature (greater than 60 years old) pine trees containing little hardwood understory or midstory (FWS 2006a); RCWs are intolerant of dense hardwood midstories resulting from fire suppression. The cavity trees and the foraging area within 200 feet of those trees are known as a cluster. Foraging habitat is defined as pine and pine-hardwood stands (i.e., 50 percent or more of the dominant trees are pines) over 30 years of age that are located contiguous to and within one-half mile of the cluster (FWS 2006a). The decline of the RCW is attributed primarily to the reduction of pine forest and to the encroachment of hardwood midstory due to fire suppression (FWS 1983). There is no critical habitat designated for this species.

KMLP has stated that if suitable habitat exists along the remaining portion of the pipeline route, all suitable nesting habitat within a 0.5-mile radius of the Project boundary would be surveyed by a qualified biologist for the presence of RCW clusters in accordance with the RCW recovery plan (FWS 2003) survey protocol, as requested by FWS (2006b). FWS has also requested that KMLP provide a determination of the age of pine stands along the pipeline route to determine if they are greater than 30 years of age. KMLP has been unable to obtain access from some landowners to complete surveys of all potentially suitable habitat areas for RCW. Landowners have the right to deny access to their property. However, if KMLP is issued a Certificate by the Commission, KMLP would have the authority to access the portions of the property within 0.5 mile of the project boundaries to complete any required surveys including RCW surveys.

At this time, FWS has not received a RCW survey report from KMLP confirming the locations and/or results of surveys or habitat assessments. For this reason, we do not have adequate information to allow for a complete review of potential Project impacts on this species. Therefore, **we recommend that:**

- **KMLP consult with the FWS to determine the need for and methodology of additional surveys for red cockaded woodpecker (RCW) along the pipeline route or provide concurrence from the FWS that the project is not likely to adversely affect the RCW. The results of consultation with the FWS, any additional survey reports, and FWS comments on the survey should be filed with the Secretary as soon as they become**

available before the close of the comment period for this draft EIS. Survey reports should include the following information:

a. name(s) and qualifications of the person(s) conducting the survey;

b. method(s) used to conduct the survey;

c. date(s) of the survey

d. area surveyed (include the mileposts surveyed); and

e. proposed mitigation that would substantially minimize or avoid the potential impacts.

4.7.2 State-Sensitive Species

The NHP of LDWF has identified the following 10 state species of concern that may occur in the Project area.

Birds

Roseate Spoonbill

The roseate spoonbill is considered rare in the state of Louisiana and is a species of special concern. It is found throughout the entire Gulf of Mexico coastline, south to Central America, South America, and the West Indies. From March through October, roseate spoonbills prefer the bays, marshes, and estuaries along the Gulf Coast, with the mating season beginning in March and ending in June. Nests are built in thick vegetation above water, and are well-built and deeply cupped. In winter, most roseate spoonbills migrate to Central and South America. (NPS 2006b)

The roseate spoonbill is a colonial wading bird and could experience nesting site disturbance by passage of the construction spreads. Although there are no known nesting sites in the project area, KMLP has stated that it would employ a qualified biologist to survey the proposed work area during the 2007 nesting season and immediately prior to construction scheduled during the nesting season to determine the presence of colonial waterbird rookeries. In accordance with recommendations given by FWS and the NHP of LDWF, the survey would notate any colony of wading birds, including the roseate spoonbill, within 1,000 feet of the work area. KMLP has stated that it would further consult with FWS and NHP of LDWF in order to determine mitigation measures to minimize potential impacts to these nesting areas, should they be found. Operational impacts to the roseate spoonbill would be limited to temporary displacement during maintenance of the permanent right-of-way.

Crested Caracara

The crested caracara is considered critically imperiled in Louisiana and is limited to the southwestern corner of the state. It is a vulture-sized bird that spends much of its time on the ground hunting snakes, rodents, and other available prey. Preferred habitat for this species includes mixed coastal prairie and marshes that have been recognized as ecologically significant and in need of conservation efforts, as well as open country habitat such as pasturelands, cultivated land, and semi-desert. Nesting occurs from late-December to early-April and the nests are typically located in trees, rock ledges, or on the ground in secluded areas. The species is non-migrating and the nests will often be reused from year to year. One of the main causes of decline is the loss of habitat due to development and agriculture, as well as illegal shooting and trapping (LDWF 2006b, c). The NHP of LDWF has recommended that KMLP use BMPs to minimize impacts to the coastal prairie and marsh habitats preferred by the crested caracara. While KMLP has not developed any project-specific BMPs for this

purpose, it would implement our Plan and Procedures with accepted variances to minimize impacts to the general habitats used by the crested caracara. These measures include the minimization of erosion/sedimentation and impacts to wetlands as well as the restoration of uplands and wetlands. We also recommend that KMLP further consult with the NHP of LDWF to determine if any additional BMPs are needed for the protection of the crested caracara. Operational impacts to the crested caracara would be limited to temporary displacement during maintenance of the permanent right-of-way.

Crustaceans

Old Prairie Crawfish

The old prairie crawfish is considered very rare globally and is imperiled in Louisiana due to its restricted range. It has been noted in the Project vicinity, occurring in roadside ditches flooded by heavy rains or in complex burrows carved into the sandy-clay soils of roadside ditches, with a home range that does not exceed 82 feet. It is non-migratory and males are reproductively active during January, July, and August. Little else is known about the life history of this species. Threats to the old prairie crawfish include residential, commercial, and petroleum development. (LDWF 2006a, b)

Maintenance of the permanent right-of-way would not be required in the roadside ditches that the old prairie crawfish would utilize; therefore, no impacts would be expected to occur to this species during operational maintenance. However, roadside ditches, the preferred habitat for the old prairie crawfish, would be crossed numerous times during construction of the Project and could cause direct mortality of any individuals that are residing in that particular ditch. LDWF has recommended that habitat for this species be protected (LDWF 2006b, c). KMLP has not proposed any measures for the protection of the old prairie crawfish. Therefore, **we recommend that:**

- **KMLP consult with the NHP of LDWF and develop mitigation measures to protect the old prairie crawfish during construction through roadside ditches. KMLP should file with the Secretary copies of its consultation prior to construction.**

Plants

Several of Louisiana's critically imperiled plant species and communities occur in the Project area. These include the saltflat-grass, wild coco, Oklahoma grass-pink, low nutrush, short-beaked baldsedge, Lindheimer's bee-balm, and remnants of coastal prairie. Coastal prairies are considered critically imperiled in the state of Louisiana and imperiled globally. This prairie region of southwestern Louisiana was once very extensive (about 2.5 million acres) but today is limited to small remnant parcels. On the southern edge of its range, the community may occur on "islands" or "ridges" surrounded by marsh (LDWF 2006b). None of these critically imperiled species, however, are located within 0.5 miles of the Project. The nearest coastal prairie remnant community is located 0.6 miles away from the Project.

4.7.3 Conclusions and Recommendations

A variety of measures have been proposed by KMLP that would limit impacts on federal- and state-listed species, including implementation of our Plan and Procedures. These measures would reduce the loss of vegetated habitats, minimize impacts to water quality, and result in restoration of areas temporarily disturbed during construction. Additionally, KMLP has committed to implementing measures to avoid and minimize potential impacts to federally listed species as identified in NOAA Fisheries Service' "Sea Turtle and Smalltooth Sawfish Construction Conditions" and "Vessel Strike Avoidance Measures and Injured or Dead Species Reporting." Based on the information provided to

date, we believe that except for RCW for which a determination is pending, the Project is not likely to adversely affect any federally listed threatened or endangered species.

We have not completed consultation with FWS and NOAA Fisheries Service. Therefore, **we recommend that:**

- **KMLP not begin construction activities until:**
  a. The FERC completes any necessary consultations with the FSW and NOAA Fisheries Service; and
  b. KMLP receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

4.8 LAND USE, RECREATION, AND VISUAL RESOURCES

In this section, we further identify and characterize the land requirements for construction and operation of the Project, describe the current land use or cover type of those lands (including special status lands), discuss how land needed for the Project would be acquired, evaluate visual resource impacts, and discuss the relevance of the Project to the Louisiana coastal zone management process. A detailed description of the pipeline facilities is provided in section 2.1.1 and facility maps are provided in appendix B.

4.8.1 Land Use

Table 4.8.1-1 summarizes the current land uses of the acreage that would be affected by construction and operation of the Project. Construction of the Project would affect a total of 3,030.7 acres, including 2,274.1 acres for construction rights-of-way, 291.5 acres for extra workspaces, 12.3 acres for aboveground facilities, 74.2 acres for access roads, and 378.7 acres for pipe storage and contractor yards. Of the 3,030.7 acres, about 821.7 acres would be maintained as permanent right-of-way and 19.2 acres permanently used for aboveground facilities and access roads. Of the acreage affected by construction, 1,472.1 acres (48.6 percent) would be agricultural land and 569.1 acres (18.8 percent) would be open water. The remaining land uses would include beaches, forest, developed land, open land, and other (including strip mines, quarries, and gravel pits) and would comprise approximately 989.5 acres (32.6 percent).

Following construction, all temporary workspaces would be allowed to revert to preconstruction condition. During operation, KMLP would maintain a 50-foot-wide permanent right-of-way, except where Leg 1 and Leg 2 are collocated it would maintain a 100-foot wide right-of-way. The permanent right-of-way and other facilities would encompass 427.0 acres of agricultural land (50.8 percent) and 107.0 acres of open water (12.7 percent), with the remaining 36.5 percent being composed of primarily forest, developed land, or open land.

KMLP has proposed a 125-foot-wide construction right-of way for Leg 1 when in upland terrain and for wetland crossings greater than 100 feet long. Further, as discussed in section 2.2.1, when working in saturated wetland crossings less than 100 feet long, rights-of-way would be 100-feet wide. In areas where Legs 1 and 2 are within 50 feet of each other, KMLP proposes a total combined right-of-way width of 155 feet. In addition, KMLP has proposed a 300-foot right-of-way when constructing in the open water of Sabine Lake with depths less than 8 feet. That right-of-way width would be reduced to 200-feet when water depths exceed 8 feet. Following construction, KMLP would generally maintain a 50-foot-wide permanent right-of-way centered over the pipeline.

Approximately 73.7 miles (54 percent) of the Project would parallel existing rights-of-way (table 4.8.1-2). To ensure safe distances are maintained between construction activity and in-service utilities and to avoid potentially negative impacts on adjacent pipelines, construction right-of-way overlap with existing rights-of-way would be limited to approximately 15 feet.

4.8.1.1 Temporary Extra Workspaces

As detailed in section 2.1.3, KMLP would use temporary extra workspaces at road crossings, railroad crossings, crossings of existing pipelines and utilities, wetland and waterbody crossings, and other areas where specialized construction techniques would be used. Approximately 291.5 acres would be affected by the use of temporary extra workspaces; 50.1 percent would be agricultural, 20.5 percent would be open water, and 22.5 percent would be open land. See appendix C for more details. Following

TABLE 4.8.1-1

Land Use Affected by Construction and Operation of the KMLP Project

	Agricultural (Acres)		Open Water (Acres)		Forest (Acres)		Developed Land (Acres)		Open Land (Acres)		Beaches (Acres)		Other (Acres)		Total (Acres)	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Leg 1																
Pipeline ROW	1,030.2	413.7	509.1	106.9	128.5	53.1	44.9	18.1	524.4	213.7	0.2	0.1	2.0	0.7	2,239.2	806.3
Workspaces	144.6	0.0	59.8	0.0	9.9	0.0	9.5	0.0	61.3	0.0	0.0	0.0	0.0	0.0	285.0	0.0
Aboveground Facilities[a]	7.5	7.5	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	0.0	0.0	0.0	0.0	9.4	9.4
Access Roads	0.1	0.1	0.0	0.0	0.6	0.0	70.9	6.4	1.0	0.0	0.0	0.0	0.0	0.0	72.6	6.4
P & C Yards	277.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	101.4	0.0	0.0	0.0	0.0	0.0	378.7	0.0
Leg 2																
Pipeline ROW	0.0	0.0	0.0	0.0	0.9	0.2	0.9	0.2	5.2	1.1	0.0	0.0	0.0	0.0	7.0	1.5
Workspaces	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	1.9	0.0	0.0	0.0	0.0	0.0	2.9	0.0
Aboveground Facilities[a]	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	0.8	0.8	0.0	0.0	0.0	0.0	2.6	2.6
FGT Lateral																
Pipeline ROW	10.9	5.4	0.2	0.1	10.6	5.4	0.3	0.1	5.9	2.9	0.0	0.0	0.0	0.0	27.9	13.9
Workspaces	1.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.3	0.0	0.0	0.0	0.0	0.0	3.6	0.0
Aboveground Facilities[a]	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.5	0.5	0.0	0.0	0.0	0.0	1.6	0.5
Total	1,472.1	427.0	569.1	107.0	150.6[b]	58.7[c]	130.2	26.6	706.6	221.0	0.2	0.1	2.0	0.7	3,030.7	840.9

[a] Represents areas affected outside of construction or permanent rights-of-way.

[b] This number includes 0.9 acres of Forested Wetland that KMLP reported as existing within the Sabine Pass LNG Terminal, but has since been cleared.

[c] This number includes 0.2 acres of Forested Wetland that KMLP reported as existing within the Sabine Pass LNG Terminal, but has since been cleared.

Notes: Due to rounding totals may not add up.

Agricultural includes cropland and pastureland.
Open Water includes estuaries and bays, lakes, streams, and canals.
Forest includes deciduous forest, evergreen forest, forested wetland, and mixed forestland.
Developed Land includes industrial, residential, and transportation/communication/utility right-of-way. Transportation/communication/utility right-of-way may include maintained wetlands and ditches.
Open Land includes rangeland, sandy (not beach) areas, transitional areas, and non-forested wetland.
Other includes strip mines, quarries, and gravel pits.

C= Construction; O = Operation; Pipeline ROW = Pipeline Rights-of-Way; Workspaces = Temporary Extra Workspaces; Facilities = Aboveground Facilities; P & C Yards = Pipe and Contractor Yards

TABLE 4.8.1-2

Existing Rights-of-Way Paralleled by the KMLP Project[a]

MP Begin	MP End	Approximate Length (Miles)	Existing Parallel Facility	Approximate Acreage
Leg 1 and 2				
0.8	1.9	1.1	NGPL Pipeline[b]	2.0
16.9	17.9	1.0	Foreign Pipeline	1.8
22.6	22.8	0.2	36” Colonial Pipeline	0.4
22.8	23.3	0.5	16” & 18” Sabine Pipeline	0.9
23.3	23.7	0.5	36” Colonial Pipeline	0.8
23.7	24.6	0.8	16” & 18” Sabine Pipeline	1.5
24.6	25.5	0.9	16” & 18” Sabine Pipeline	1.7
25.5	26.1	0.6	36” Colonial Pipeline	1.2
26.1	26.4	0.2	16” & 18” Sabine Pipeline	0.4
26.4	26.6	0.2	Shell Pipeline	0.3
26.6	30.1	3.5	Enterprise Sabine Pipeline	6.4
30.1	30.5	0.4	Strategic Pipeline	0.8
31.3	40.2	8.8	Enterprise Pipeline	16.1
44.3	45.3	1.0	4” Conoco Pipeline	1.7
56.1	59.8	3.6	30” Trunkline Pipeline	6.6
60.9	62.5	1.6	Gulf South Pipeline	2.9
66.2	72.5	6.3	16” Dynegy Pipeline	11.5
72.5	74.9	2.3	16” Texaco Petro-Chemical Pipeline	4.2
74.9	76.3	1.4	16” Texaco Petro-Chemical Pipeline	2.6
76.90	88.7	11.8	16” Texaco Petro-Chemical Pipeline	21.4
89.0	89.7	0.6	16” Texaco Petro-Chemical Pipeline	1.2
101.5	108.5	7.0	EHP Egan Pipeline	12.7
108.5	111.3	2.8	26” ANR Pipeline	5.1
112.0	112.4	0.5	30” ANR Pipeline	0.9
118.3	122.0	3.7	Targa Pipeline	6.7
122.0	131.9	9.9	30” Transco Pipeline	17.9
FGT Lateral				
0.0	0.1	0.1	26" ANR	0.1
0.1	2.3	2.2	24" FGT	4.1
	Total	73.7		133.9

[a] Construction right-of-way overlap with existing rights-of-way would be limited to approximately 15 feet.

[b] Represents the only existing right-of-way along that portion of the project where Legs 1 and 2 would parallel one another.

construction, all temporary extra workspaces would be allowed to revert to their preconstruction use and cover type.

4.8.1.2 Aboveground Facilities

KMLP would construct 14 aboveground facilities. Each of these facilities is an interconnect with an existing interstate or intrastate pipeline that would contain a mainline valve and a block valve. Typically, these facilities would be fenced and range in size from 0.3 to 1 acre (table 4.8.1.2-1). The total land requirements for the aboveground facilities would be 12.3 acres during construction and operation, the majority of which (63.4 percent) would be agricultural lands. All 12.3 acres would be permanently converted to commercial/industrial land use.

TABLE 4.8.1.2-1

Acres of Land Affected by Construction and Operation of the Aboveground Facilities

Pipeline Facility	MP	Land Disturbed During Construction (acres)	Land Required for Operation (acres)
Leg 1			
Southwest Loop Interconnect Site	28.2	0.92	0.92
Sabine Interconnect Site	61.4	0.92	0.92
TGTPL Interconnect Site	87.5	0.97	0.97
Trunkline Interconnect Site	91.5	0.94	0.94
TGT Interconnect Site	110.0	0.92	0.92
ANR #1 Interconnect Site	111.3	1.04	1.04
ANR #2 Interconnect Site	112.0	1.02	1.02
TET Interconnect Site	117.0	0.92	0.92
Transco Interconnect Site	122.1	0.80	0.80
CGT Interconnect Site	132.2	0.92	0.92
Leg 2			
NGPL Interconnect Site	1.2	0.84	0.84
Bridgeline Interconnect Site	N/A[a]	0.86	0.86
Southwest Loop Johnson's Bayou Delivery Point	N/A[a]	0.86	0.86
FGT Lateral			
FGT Interconnect Site	2.30	0.34	0.34
Total		**12.3**	**12.3**

[a] Located in Johnsons Bayou near the end of the existing UTOS system.

4.8.1.3 Access Roads

Appendix C lists the access roads, their location, modifications required, surface area potentially affected, and current land use of that area. Where feasible, KMLP would use existing public roadways, existing private roadways, and/or the pipeline right-of-way to gain access during construction and operation of the Project. KMLP has proposed the temporary use of 69 existing access roads of varying lengths. KMLP stated that 53 of the existing access roads, comprising a length of approximately 26.1 miles, would require modifications to support construction-related traffic and equipment. Modifications

may include grading and/or placement of additional gravel on the existing surface. Where possible, board matting would be used instead of constructing new roads. However, 6 new roads totaling 0.7 miles would be constructed. In total, the construction access roads would disturb a total of 74.2 acres. Following construction, 5 roads encompassing 6.9 acres would be maintained as permanent access roads. The remaining access roads would revert to their preconstruction uses.

4.8.1.4 Pipe Storage and Contractor Yards

KMLP has proposed the use of 12 pipe storage and contractor yards, encompassing 378.7 acres, during construction. Approximately 73.2 percent of this land would be agricultural and 26.8 percent would be open land. The general locations of these facilities are depicted in appendices B and C. All yards would be leased. Depending upon the condition of these yards and their current use, some surface grading, drainage improvements, placement of surface materials, and internal roadways may be required. Upon completion of construction activities, the pipe storage and contractor yards would be returned to their preconstruction condition or as specified by landowner agreement.

4.8.2 Acquisition of Land through Easements and Eminent Domain

KMLP would obtain easements from landowners to construct and operate the pipeline and associated facilities. The easements would give the company the right to construct, operate, and maintain the pipeline and establish a permanent right-of-way. In return, the company would compensate the landowner for use of the land. Easement agreements between the company and the landowner typically specify compensation for loss of use during construction, loss of non-renewable or other resources, and allowable uses and restrictions on the permanent right-of-way after construction. These terms can include restrictions on the construction of aboveground structures, including house additions, garages, patios, pools, or any other object not easily removable from the right-of-way, or the planting and cultivating of trees and orchards.

KMLP could be granted the right of eminent domain (section 7(h) of the NGA and the procedures set forth under the Federal Rules of Civic Procedure [Rule 71A]) if easement agreements cannot be negotiated. Under these conditions, the landowner could receive compensation, but the compensation would be determined by the courts.

4.8.3 Land Use Impacts and Mitigation

4.8.3.1 Agricultural Areas

The 1,472.1 acres of agricultural land affected by the Project would primarily include pastureland, land used for rice production, and areas used for crawfish production. The primary impact in these areas would be short-term loss of production due to construction-related activities. About 7.9 acres of agricultural land occupied by the aboveground facilities would be permanently converted to developed land. Agricultural land within the pipeline right-of-way would be allowed to revert to pre-construction conditions following construction.

In accordance with our Plan, KMLP would implement special construction procedures in agricultural areas to minimize potential impacts. Topsoil would be removed and stockpiled separately from excavated subsoils and the natural flow patterns of all fields would be maintained by providing breaks in topsoil and subsoil stockpiles. KMLP would also work with landowners prior to construction to identify irrigation lines and drainage improvements in order to minimize construction-related impacts. In addition, crop yields would be monitored following construction to ensure that yields in areas affected by construction were similar to that in adjacent, undisturbed areas, as described in section 2.3. Finally, the

owners of agricultural land would be compensated for the loss of agricultural production in accordance with the terms of landowner agreements. Therefore, we believe that impacts to agricultural land would be short term and offset by compensation agreed to during easement negotiations.

4.8.3.2 Open Water

Approximately 569.1 acres of open waters would be included in the construction right-of-way. The majority of that acreage would be in Sabine Lake (approximately 408.6 acres). Impacts to southern and northern shores of Sabine Lake would be avoided by use of HDD. Construction within the open-water portion of Sabine Lake would be conducted using shallow draft barges as described in section 2.3.1.3. This technique would require excavation of channels between existing navigation channels and the right-of-way and a channel along the right-of-way itself. To allow sufficient space for the storage of excavated spoil from the channels and pipe trenches, KMLP has requested a construction right-of-way width of 300 feet in water depths less than 8 feet and 200 feet in water depths greater than 8 feet.

To mitigate potential navigation impacts in Sabine Lake, KMLP has indicated that they would provide project-specific details to the U.S. Coast Guard such as the timing of and areas in which water-based construction would occur, as well as the types of vessels that would be utilized. In addition, spaces would be left between spoil piles and KMLP would install timber piles with navigational lights and warning signals to allow shallow draft vessels to pass over the open trench. KMLP would comply with all navigation rules and regulations in the Project vicinity. Following construction, acreage within both the construction and permanent right-of-way would revert to their previous use.

As discussed in section 4.6.3, Sabine Lake is a public oyster seed ground and public oyster tonging area in Louisiana. As such, KMLP has agreed to compensate LDWF for any construction-related impacts to oysters or shellfish in Sabine Lake.

Therefore, we believe that impacts related to the temporary utilization of open water for construction would be minor and short term.

4.8.3.3 Forest

The 150.6 acres of forest that would be affected by the Project include deciduous forest, evergreen forest, mixed forest, and forested wetland. There are no pine plantations or other silviculture crops within the 150.6 acres. As detailed in section 4.5.2, impacts to forested land would be minor but would persist for the life of the Project. A total of 58.7 acres of currently forested land would be converted to maintained pipeline right-of-way.

4.8.3.4 Developed Land

About 130.2 acres of developed land would be crossed by the Project, consisting of congested pipeline corridors, transportation corridors, a marina on the east bank of the Calcasieu River, and the southern edge of the Trunkline LNG facility. Standard upland construction methods would be used in most of these areas and measures included in our Plan would be incorporated to minimize impacts to such developed lands. From MP 51.8 to MP 52.4 (see table 4.3.2.1-3), KMLP proposes to HDD under the marina on the east bank of the Calcasieu River. However KMLP has not provided its site-specific construction plans. We are recommending in section 4.3.2.3 that KMLP file site-specific construction plans for this area.

4.8.3.5 Open Land, Beaches, and Other

The Project would affect 706.0 acres of open land, 0.2 acres of beaches, and 2.0 acres of other land uses within the construction right-of-way and temporary extra workspaces. In general, standard overland construction techniques would be used for installation of the pipeline and KMLP would use measures included in our Plan and Procedures to minimize impacts. Following construction, all open land, beach, and other acreage outside the permanent right-of-way would be allowed to revert to its preconstruction land use. The remaining 221.8 acres within the permanent right-of-way, primarily comprised of open land (221.0 acres), would be maintained as necessary for operation. With the use of our Plan and Procedures, impact to these areas would be minimal.

4.8.3.6 Residences and Planned Residential Developments

During pre-filing, a planned development called the South Forty Acre Subdivision was identified at approximately MP 114.0 of the Leg 1 route originally considered. As a result, KMLP modified the route to avoid this area as is further discussed in section 3.4.11 of this draft EIS). The currently proposed route would not impact any planned developments.

KMLP identified 14 structures within 50 feet of the construction right-of-way (table 4.8.3.6-1). None of these structures were identified as residences. However, 9 of the 14 structures have been generically identified as buildings. Therefore, **we recommend that:**

- **KMLP revise table 4.8.3.6-1 and explicitly identify all structures and residences within 50 feet of the construction work areas. KMLP should file the revised table with the Secretary prior to the close of the comment period on the draft EIS.**

To minimize potential disruptions to residential areas near construction work areas, KMLP 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, KMLP would implement the following measures on an as-needed basis:

- notify land owners of the need to remove fences and gates;
- install temporary safety fencing to control access and minimize the hazards associated with an open trench;
- notify affected landowners in advance of any scheduled disruption of household utilities and limit the duration of any interruption to the smallest time possible;
- repair any damages to residential property that result from construction activities or provide compensation at fair market value; and
- restore all areas disturbed by construction work areas to “as before or better” conditions.

As described in section 2.5, KMLP would be responsible for monitoring and ensuring compliance with all environmental mitigation measures required by the FERC Certificate. In fulfilling this responsibility, KMLP would be required to develop and implement an environmental complaint resolution procedure to provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. In addition, in section 4.12 we are recommending that KMLP develop a noise mitigation and compliance plan for HDD in residential areas.

TABLE 4.8.3.6-1

Structures Within 50 Feet of the Construction Work Areas

Structure	MP	Parish	Distance from Pipeline Centerline (feet)	Distance from the Construction Work Area (feet)
Building	38.3	Calcasieu	40	75
Barn	46.0	Calcasieu	25	100
Building	48.3	Calcasieu	0	100
Barn	48.4	Calcasieu	10	80
Building	51.1	Calcasieu	5	75
Building	51.1	Calcasieu	25	100
Building	52.2	Calcasieu	25	100
Building	52.2	Calcasieu	50	115
Cattle Loading Pen[a]	71.1	Calcasieu	0	20
Building	87.7	Jefferson Davis	10	85
Shed[a]	91.4	Jefferson Davis	0	5
Shed	121.6	Evangeline	50	125
Building	123.1	Evangeline	40	150
Building	123.2	Evangeline	25	175

[a] These structures, located entirely or partially within the construction workspace, would either be relocated or the landowner would be compensated accordingly.

With the implementation of above measures, impact to residential areas would be minimal and these impacts would generally be limited to the construction period.

4.8.3.7 Recreation and Special Use Areas

Recreation and special use areas in the vicinity of the Project are defined to include inshore open waters with recreational uses; National Wildlife Refuges; scenic byways; Wetland and Hydrologic Restoration Projects; Conservation Reserve and Wetland Reserve Program lands; FWS Conservation Easements; national or state scenic rivers; levee crossings; and hazardous waste sites. For a detailed discussion of the Black Bayou Hydrologic Restoration Project, the Perry Ridge Shore Protection Project, Conservation Reserve Program Lands, and FWS Conservation Easements, see section 4.4.

Inshore Open Waters

Inshore waters of Louisiana, including Sabine Lake, provide recreational boating and fishing opportunities as well as means of transit to areas where these activities are pursued. Section 4.8.3.2 above summarizes the proposed construction methods in Sabine Lake along with the precautions that would be taken to avoid impacts to navigation.

Assuming the construction spread occupies all of the approximate 13 miles of the pipeline route through Sabine Lake, at the maximum construction right-of-way width (300 feet), the decrease in the surface area of Sabine Lake available to recreational boaters would be less than 1 percent. This decrease in availability would be temporary, lasting only as long as the construction activities across Sabine Lake.

Based on these factors, impacts to recreation on inshore waters are considered to be minor and short term.

National Wildlife Refuges

Sabine National Wildlife Refuge

The SNWR occupies approximately 125,000 acres of marshes between Calcasieu and Sabine Lakes in southwest Louisiana. According to the FWS, the refuge provides habitat for migratory waterfowl and other birds, and was designated an "Internationally Important Bird Area" due to the abundant year-round populations of wading, water, and marsh birds. There are also large concentrations of alligators, muskrats, nutria, raptors, blue crabs, and shrimp. Approximately 280,000 people visit the area each year for a variety of recreational and educational activities such as hiking, fishing, boating, camping, and hunting (FWS no date a).

The pipeline route does not cross the SNWR; at its closest points, between MP 15.0 and 17.0, the SNWR would be approximately 0.25 miles from the pipeline. During construction, noise associated with the installation of the pipeline may disturb wildlife; however, noise-related impacts would be short term and minor. Given the distance between the SNWR and the Project, construction and operation of the Project would not impact the SNWR.

Lacassine National Wildlife Refuge

The Lacassine National Wildlife Refuge (LNWR) encompasses about 35,000 acres, mostly freshwater marsh habitat that functions as a wintering site for waterfowl. Nesting colonies of wading birds, alligators, and furbearers such as mink, otter, and raccoon are found on the refuge. Threatened and endangered species that have used the refuge include bald eagles, peregrine falcons, and Louisiana black bears. The refuge is also used for recreational purposes, hunting and fishing being two of the most popular recreational activities (FWS no date b).

The Project pipeline would not cross the Lacassine NWR. At its closest point, the pipeline would be approximately 2 miles southeast of the Vidrine Unit and more than 15 miles northwest of the main unit. Given this distance, construction and operation of the Project would not affect either unit of the LNWR.

Scenic Byways

The 180-mile Creole Nature Trail National Scenic Byway takes visitors through three different wildlife refuges and a bird sanctuary and offers drivers and their passengers a view of Louisiana's environment and wildlife. The roads that comprise the trail, SHs 82, 27, and 14, cut through the marshlands of southern Calcasieu and Cameron Parishes and then hug the coast of the Gulf of Mexico (MilebyMile 2006).

The Project would cross the Creole Nature Trail National Scenic Byway at three locations: SH 82 at MP 1.5; SH 27 at MP 47.8; and SH 14 at MP 64.7. The Project would cross these roadways using HDD or conventional boring construction methods, which would not require road closures or open cutting of the roadways. Impacts would be limited to potential short-term traffic disruptions associated with the construction equipment and alterations to the viewshed. Because KMLP would be required to maintain safe and accessible conditions at road crossings in accordance with our Plan, traffic disruptions would be minimal. See section 4.8.4 for a discussion of the minor visual impacts to the Byway.

4.8.3.8 Wetland Restoration and Mitigation Projects

Section 4.4 discusses the potential impacts to the Black Bayou Hydrologic Restoration Project and the Perry Ridge Shore Protection Project located in the Project vicinity. Section 4.4 also discusses the potential impacts to CRP lands.

There would be no impacts to WRP lands because there are no such lands located in parishes that would be crossed by the Project.

The FWS works with private landowners that voluntarily restore wetlands or other valuable wildlife habitats on their property by providing financial assistance from the federal government (FWS 2006b). If such properties are along the route, KMLP would need to obtain a Compatible-Use Determination and ascertain the need for any Special Use Permit in association with the crossing of the conservation easement. Based on the most recent database currently available, which has not been updated since 1996, FWS indicates that there are no conservation easements in the project area (FWS 2007). However, given the lack of updated information, FWS states that KMLP should conduct further consultation to determine if the Project could affect any conservation easements. Therefore, **we recommend that:**

- **KMLP consult with the FWS to determine if FWS conservation easement properties are crossed by the Project. KMLP should file with the Secretary documentation of its consultation with FWS, including any recommended mitigation measures, for review and written approval by the Director of OEP prior to construction.**

4.8.3.9 Natural and Scenic Rivers

The Louisiana Natural and Scenic Rivers System was establish to preserve, protect, develop, retain, and enhance the wilderness qualities, scenic beauty, and ecological regime of certain streams or segments thereof. The program was also intended to preserve aesthetic, scenic, recreational, ecological, and other natural and physical features and resources found along these streams or segments thereof (LDWF 2006a). The Project would not cross any Natural or Scenic River.

4.8.3.10 Hazardous Waste Sites

During the pre-filing process, KMLP identified a Class C landfill approximately 990 feet north of the originally considered route. Subsequently, KMLP rerouted the pipeline route to avoid this facility (this route variation is discussed further in section 3.4.4 of this draft EIS). KMLP has reviewed both LDEQ and EPA websites to identify any known hazardous waste sites within 0.25 miles of the Project right-of-way. None have been identified. No sites were identified during environmental surveys of the Project route.

In the unexpected event that construction of the Project encroaches on a contaminated area, KMLP would stop work, notify the appropriate state and federal agencies, and proceed in accordance with local, state, and federal regulations. As discussed in section 4.2.2.1, we are recommending that that KMLP develop a Plan for the Discovery and Management of Contaminated Soil and Groundwater. Development and implementation of this plan would ensure that any previously existing contamination that may be encountered during construction would be managed in accordance with applicable regulatory requirements.

4.8.4 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 Project could alter existing visual resources in three ways: (1) construction activity and equipment may temporarily alter viewscapes; (2) construction and right-of-way maintenance would alter existing vegetation patterns; and (3) aboveground facilities would represent permanent alterations to the viewscape. The significance of these visual impacts 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.

Most of the Project would extend through open water and primarily rural areas that consist of agricultural lands and open lands with scattered residences. There are several existing pipelines in the vicinity of the Project, and the KMLP pipeline would parallel some of these existing rights-of-way. Many areas along the Project are either inaccessible or do not provide long-range unobstructed views, but public viewpoints are present along some of the roadways in the area.

4.8.4.1 Pipeline Facilities

Construction and operation of the pipeline may affect visual resources by altering the terrain and vegetation patterns during construction or right-of-way maintenance. The landscape setting along the pipeline route is generally flat, and views of the construction activities may extend for some distance. However, the construction work areas would be restored as near as possible to preconstruction contours and revegetated. Once revegetation is complete, there would be no significant alteration of the landscape of the region.

As discussed in section 4.8.3.7, the pipeline would cross the Creole Nature Trail National Scenic Byway at three locations: SH 82 at MP 1.5; SH 27 at MP 47.8; and SH 14 at MP 64.7. While there are no federal or state regulations that protect the viewshed of the byway, it is an area that offers viewing opportunities for visitors and residents. KMLP would cross the Byway using HDD or conventional boring construction methods. Visual impacts would generally be temporary and minor, similar to those described above.

4.8.4.2 Aboveground Facilities

Aboveground facilities would be located within or immediately adjacent to the pipeline right-of-way. Most would either be constructed in areas whose existing viewsheds contain similar features, within existing utility rights-of-way or industrial facilities, or in areas where views would be screened by existing vegetation and/or topography. When not screened from view, aboveground facilities would appear as a small fenced area within a cleared right-of-way corridor or open field. The Transco Interconnect (MP 122.1) would be located near residences and would likely have a direct view of the site. Therefore, **we recommend that:**

- **KMLP develop a site-screening plan for the Transco Interconnect site (MP 122.1) and file that plan with the Secretary for review and written approval by the Director of OEP prior to construction.**

4.8.5 Coastal Zone Management

The CZMA provides states the authority to review any project within that state's coastal zone if it has a federally approved CZM program. Projects that require federal licenses or permits must draft a "consistency certification" to assure the project meets the state's CZM program standards.

Portions of the Project (MPs 0.0 to 23.1) fall within Louisiana's coastal zone, which is managed by the Coastal Management Division (CMD) of the LDNR. KMLP has consulted with the CMD and will prepare and submit a Coastal-Use Permit application to the CMD as part of the Joint Permit Application with the COE. Upon receipt and review of that document, LDNR will determine if the Project is consistent with Louisiana's coastal zone management program. A determination from the LDNR that the Project is consistent with the laws and rules of the CZM program must be received before we issue a notice to proceed. Therefore, **we recommend that:**

- **KMLP not begin construction on any facilities associated with the Project until it files with the Secretary a copy of the CZM Program consistency determination issued by the LDNR.**

4.9 SOCIOECONOMIC RESOURCES

4.9.1 Region of Influence

The Project would traverse five parishes in Louisiana (Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline). For the purposes of our socioeconomic analysis, we define these parishes as the Project's region of influence. Although an extra workspace has also been identified in Orange County, Texas (see section 2.2), this county was not included in the region of influence because quantifiable socioeconomic impacts would not be expected to result from the 50-foot by 4,200-foot floating pre-fabrication site alongside Goat Island in this area (approximately MP 17.9 to 18.6).

4.9.2 Population

Table 4.9.2-1 reports populations and selected demographic characteristics for Louisiana and the five Parishes that would be traversed. Based on census data for the year 2000 (U.S. Census Bureau 2005a), the total population in these parishes is 321,341. Population levels were relatively stable between 2000 and 2005 with no parish having more than a 5 percent change in population over the five-year period.

TABLE 4.9.2-1

Population Conditions in the Vicinity of the Proposed Project

State/Parish		Population		Percent Change	Population Density	
		2000	2005		2000	2005
Louisiana		4,468,976	4,523,628	1.2%	102.6	103.8
	Cameron Parish	9,991	9,558	-4.3%	7.6	7.3
	Calcasieu Parish	183,577	185,419	1.0%	171.4	173.1
	Jefferson Davis Parish	31,435	31,272	-0.5%	48.2	48.0
	Acadia Parish	28,861	59,552	1.2%	89.8	90.9
	Evangeline Parish	35,434	35,540	0.3%	53.3	53.5

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Based on 601 relocating (231 non-local workers and 2.6 peps per HH)
0.21% pop change over project vicinity

Population densities in the region of influence range from a low of 7.3 persons per square mile in Cameron Parish to a high of 173.1 persons per square mile in Calcasieu Parish. These densities are relatively low compared to urban area densities that typically range from 3,000 to 6,000 persons per square mile (FERC 2003) but are consistent with an area that is predominately rural and agricultural.

Potential impacts to local populations from the Project would result from the influx of non-local workers for construction (temporary) and operation (permanent). As outlined in section 2.4. KMLP would make an effort to hire local workers where practical. This would mitigate any potential affects on population levels and or demographics.

Construction of the Project would occur between November 2007 and November 2008 (see table 4.9.2-2). The peak construction workforce is projected to be 385 workers. KMLP anticipates

TABLE 4.9.2-2

Estimated Workforce in the Vicinity of the Proposed Project

Project Component	Parish	Approximate Construction Dates		Estimated Workforce
Leg 1 Pipeline	See comment below	Nov 2007	Nov 2008	250
Leg 2 Pipeline	Cameron	Nov 2007	April 2008	19
FGT Lateral	Acadia	Sept 2008	Oct 2008	32
Southwest Loop Delivery Point	Calcasieu	March 2008	April 2008	18
Sabine Interconnect Site	Calcasieu	May 2008	June 2008	18
TGTPL Interconnect Site	Jefferson Davis	July 2008	Aug 2008	18
TLG Interconnect Site	Jefferson Davis	Sept 2008	Oct 2008	18
TGT Interconnect Site	Acadia	Aug 2008	Sept 2008	18
FGT Interconnect Site	Acadia	Oct 2008	Nov 2008	18
ANR Interconnect Site	Acadia	April 2008	May 2008	18
TET Interconnect Site	Evangeline	June 2008	July 2008	18
Transco Interconnect Site	Evangeline	Aug 2008	Sept 2008	18
CGT Interconnect Site	Evangeline	Oct 2008	Nov 2008	18
NGPL Interconnect Site	Cameron	Nov 2007	Dec 2007	18
Bridgeline Interconnect Site	Cameron	Jan 2008	Feb 2008	18
Southwest Loop Johnsons Bayou Delivery Point	Cameron	Jan 2008	Feb 2008	12

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Leg 1, a 42-inch-diameter pipeline, would run 132 miles traversing five parishes in Louisiana (Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline).

that about 60 percent (231 employees at the peak) of the construction workforce would be made up of non-local workers who would temporarily locate to the Project vicinity. Although the construction phase is relatively short, some families may accompany non-local workers. Based on the peak non-local workforce of 231 persons and applying the U.S. Census Bureau's 2000 statistic of 2.6 persons per household in Louisiana, as many as 601 people might temporarily relocate to the Project vicinity. If all workers were to reside in one parish at one time, moderate (up to 6 percent) population increases would occur. However, it is very unlikely that this would occur as KMLP has indicated that construction of the pipeline would entail the simultaneous activity of several individual construction spreads that would be distributed across the Project route. As such, workers would likely be distributed throughout the Project vicinity, resulting in negligible population and demographic alterations.

During operation, KMLP estimates that the Project would employ approximately four full-time equivalent workers. This would represent a negligible, long-term change in population.

4.9.3 Employment and Economy

The civilian labor force within the Project vicinity includes about 137,485 individuals. The major employment sector in four of the five Parishes is education, health and social services. The exception is in Cameron Parish where the major employment sectors are agriculture, forestry, fishing and hunting, and mining. On average, the parishes within the Project vicinity report slightly lower unemployment and per capita income than the state-level values reported for Louisiana (table 4.9.3-1).

TABLE 4.9.3-1

Employment Conditions in the Vicinity of the Proposed Project

State/Parish	Per Capita Income 1999	Civilian Labor Force 2000	Unemployment Rate (percent) 2000	Top Employment Industry 2000
Louisiana	$16,912	1,997,995	7.3	Educational, health, and social services
Cameron Parish	$15,348	4,384	4.6	Agriculture, forestry, fishing and hunting, and mining
Calcasieu Parish	$17,710	85,325	6.9	Educational, health, and social services
Jefferson Davis Parish	$13,398	12,597	7.9	Educational, health, and social services
Acadia Parish	$13,424	23,158	7.1	Educational, health, and social services
Evangeline Parish	$11,432	12,021	7.3	Educational, health, and social services

The actual workforce and proportion of local workers would depend on the capabilities of the contractor, available workforce, and maximized efficiencies. KMLP anticipates a total of 529 employment opportunities would be necessary to construct the pipeline and that the peak construction workforce at any given point in time would be 385 employees. As indicated in section 4.9.2, KMLP expects that 40 percent of the construction workforce would be hired from the local workforce (i.e., existing residents of the region of influence), and 60 percent would come from outside the region of influence. Additional jobs could also be created as a result of secondary activity associated with construction of the Project, as purchases made by non-local workers on food, clothing, lodging, gasoline, and entertainment will have a temporary, stimulatory effect on the local economy. These jobs would represent a temporary, moderate increase in employment opportunities in the region of influence.

During operation, four full-time equivalent positions would be created. Two of these positions would be stationed out the Sabine Pass LNG Terminal in Cameron Parish with the remaining serving as pipeline operators. These jobs would represent a negligible, permanent increase in the number of employment opportunities within the Project vicinity.

4.9.4 Housing

Tables 4.9.4-1 and 4.9.4-2 report selected housing statistics for Louisiana and the five parishes traversed by the pipeline. Table 4.9.4-1 reports total housing units, both occupied and unoccupied, median monthly rent rates and the rental vacancy rates. Table 4.9.4-2 provides further analysis of those units that are classified as unoccupied, or vacant, in 2000.

There are approximately 7,479 vacant rental units and units used for seasonal, recreational, or occasional use. Additional hotel or motel rooms supplement this potential housing stock. Four of the five parishes in the Project vicinity have rental vacancy rates that exceeded Louisiana's rental vacancy rate of 9.3 percent in 2000. Median monthly rent is typically lower than the state average. In 2000 the number of unoccupied units ranged from a low of 1,522 in Evangeline Parish to a high of 7,382 in Calcasieu Parish.

TABLE 4.9.4-1

General Housing Conditions in the Vicinity of the Proposed Project

State/Parish	Total Housing Units	Total Occupied Units	Total Occupied Rental Units	Total Unoccupied Units	Median Monthly Rent	Rental Vacancy Rate (percent)
Louisiana	1,847,181	1,656,053	530,918	191,128	$466	9.3
Cameron Parish	5,336	3,592	536	1,744	$412	18.4
Calcasieu Parish	75,995	68,613	19,507	7,382	$465	14.1
Jefferson Davis Parish	12,842	11,480	2,883	1,344	$353	9.9
Acadia Parish	23,209	21,142	5,882	2,067	$332	9.9
Evangeline Parish	14,258	12,736	3,902	1,522	$289	6.4

TABLE 4.9.4-2

Unoccupied Housing Characteristics in the Vicinity of the Proposed Project

State/Parish	Vacant Rental Units	Units for Sale	Units Rented or Sold, Not Occupied	Vacant for Seasonal, Recreational, or Occasional Use	Vacant for Migrant Workers	Other Vacant	Total Unoccupied Units
Louisiana	54,485	18,097	18,144	39,578	525	60,599	
Cameron Parish	121	52	57	1,331	0	183	1,744
Calcasieu Parish	3,191	849	607	684	27	2,024	7,382
Jefferson Davis Parish	317	210	189	223	8	397	1,344
Acadia Parish	648	177	142	243	12	845	2,067
Evangeline Parish	267	149	83	472	3	548	1,522
Total	4,544	1,437	1,078	2,953	50	3,997	14,059

At its peak, construction of the Project would require about 231 non-local workers, as described in section 4.9.2. If each worker required his or her own housing unit, the non-local work force would occupy about 16.4 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 this temporary and moderate increased demand for housing resulting from construction of the Project.

Housing demand for the four, permanent positions generated by operation of the Project would represent a permanent but negligible increase in housing demand.

4.9.5 Infrastructure and Public Services

Educational, medical, police, and fire protection employees in the counties and parishes traversed by the Project serve a population of approximately 320,000 people.

Construction of the Project could temporarily increase demand for medical, police, and fire protection associated with permit issuance, traffic control, and potential response to accidents during construction. KMLP would work with local law enforcement and emergency response agencies to coordinate effective emergency response for the Project during construction and operation (see section 4.13.1).

We note that construction would occur during the school year. However, due to the nature of the construction and its relatively short duration (about a year), non-local workers are not expected to be accompanied by substantial numbers of children.

Thus, any impact the provision of public services would be minor and temporary. The potential costs associated with this potential increase in demand would be offset by the Project-related increase in government revenues.

During operation, workers filling the four full time positions 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 Project-related increase in government revenues associated with operation.

4.9.6 Transportation and Traffic

4.9.6.1 Land Transportation

Potential short-term impacts to existing infrastructure would result from traffic delays due to deployment of equipment and construction personnel, and road crossings. The Project would primarily be accessed by SH 82, Route 27 and Interstate 10. Additional routes providing access to the pipeline off of Interstate 10 are SHs 397, 395, 385, 102, 101, 99, 97, 91, and 13. SHs 82 and 27 generally have light traffic levels given their rural location (FERC 2006b). Interstate 10 is subject to moderate levels of traffic with a 2001 average annual daily traffic count of 55,517 in the Lake Charles region (AA Roads 2006).

A substantial increase in road traffic associated with transportation of construction equipment and pipe to the Project vicinity would result in traffic delays. However, such delays would be temporary and short-term. Upon delivery of construction equipment and pipe to the respective laydown areas and road crossings, construction based traffic would be limited to the right of way.

Construction workers commuting to and from construction areas would likely have a minor impact on commuter traffic. Given the relatively short construction period, construction activities would utilize available daylight hours, resulting in off-peak hour commutes for workers. Further, construction workers would be dispersed across the pipeline right of way in five construction spreads, thus keeping disruptions in traffic to minor short-term impacts for any one location at any given time.

Construction of new access roads would be limited to less than three quarters of a mile in total length, occurring primarily in Calcasieu Parish. The Applicant has indicated that upon completion of the pipeline, newly constructed access roads would be removed, and the land restored to its original contours and use. Exceptions may occur where requested by individual landowners or where the access road is

required for ongoing maintenance of the pipeline right-of-way. This represents a short-term, negligible impact to the current land uses.

KMLP indicates that most paved roads and railroads would be crossed using the boring or HDD method to mitigate traffic disruptions and direct surface impacts. Alternatively, unpaved roads and one abandoned railroad (approximate MP 74.9) would be crossed using the open cut method. This method can cause temporary traffic delays. However, through the use of adequate signs, safety barriers, and pre-established detours KMLP would minimize these interruptions to road traffic. During pipe installation at road crossings, which typical take only a day, construction practices include keeping one lane of traffic open where no reasonable detours are feasible or where construction takes place during peak traffic hours.

KMLP has indicated that it would repair any significant damage done to transportation infrastructure that is a direct result of pipeline construction. Thus, impacts to land transportation facilities are expected to be minor and short-term.

4.9.6.2 Marine Transportation

Construction of the pipeline would cross Sabine lake, the Intracoastal Waterway, and the Calcasieu River. Potential impacts would be temporary impacts to commercial and recreational boats resulting from the construction activities associated with water crossings, as described in sections 4.8.3.2 and 4.8.3.7. Impacts would be due to project-related marine traffic, including pipe and material delivery barges and construction barges. Project related impacts would primarily affect barges and smaller recreational vessels.

In order to mitigate these potential impacts in Sabine Lake (approximate MP 4.8 to MP 18.0), KMLP has indicated that the pipeline would be installed using barges with anchor spuds. This procedure would minimize impacts resulting from construction operations. Furthermore, the Applicant has indicated that prior to construction it will provide project specific details to the U.S. Coast Guard such as the timing of, and areas in which, water-based construction would occur, as well as the types of vessels that would be utilized. The U.S. Coast Guard will then disseminate this information in a Notice to Mariners. In addition, construction practices within Sabine Lake would entail leaving spaces between spoil piles for navigational purposes. To facilitate passage through these areas KMLP would install timber piles with navigational lights and warning signals. Finally, the Applicant has indicated it would comply with all navigation rules and regulations in the Project vicinity.

The pipeline would also cross the waters of the Intracoastal Waterway and Calcasieu River. These waters are important navigational channels for both commercial and recreational purposes. Leg one of the pipeline would cross the Intracoastal Waterway at several locations including approximate MP 18.6 to MP 18.7, MP19.01 to MP 19.7, MP 21.4 to MP 22.0, and MP 30.7 to MP 31.0 and the Calcasieu River at approximate MP 49.6 to MP 49.8. These crossings would be accomplished using the HDD method, which will avoid or minimize potential impacts on vessel traffic in these areas.

The operation of the pipeline in the waters of Sabine Lake, the Intracoastal Waterway, and Calcasieu River would not impact vessel traffic as the pipeline would be buried beneath the lake or river bottom. Thus, the pipeline would not impede vessel passage.

4.9.7 Government Tax Revenue

Tax revenue would be generated by the Project for the State of Louisiana and the respective parishes within the region of influence. KMLP has estimated annual taxes payable to local governments in the region of influence range from 1.1 million to 5.4 million. On average, operations-related taxes

would represent approximately 2.0 percent of a parish's total revenues. Thus, operation of the Project would provide a permanent, minor increase in government revenues.

A portion of the estimated $65 million Project construction payroll would be spent locally for the purchase of housing, food, gasoline, and entertainment during construction by project employees. The exact amount spent would be dependent upon the proportion of the workforce that was local, the behavior of individual workers and the duration of their stay. In addition, KMLP has indicated that local suppliers would have the opportunity to submit proposals for Project-related work. To the extent that these local providers bid successfully, local expenditures during construction would increase. Construction-related expenditures made in Louisiana would be subject to Louisiana's state sales tax of 4 percent. This increase in sales tax would represent a minor, short-term increase in government revenues.

4.10 CULTURAL RESOURCES

Section 106 of the NHPA requires that the FERC take into account the effects of its undertakings (including the issuance of permits or certificates) on "historic properties," that is, properties listed on, or eligible for listing on, the NRHP. Section 106 also requires the FERC to provide the ACHP an opportunity to comment on the undertaking. KMLP, as a non-federal party, is assisting the FERC in meeting its obligations under section 106 and the implementing regulations in 36 CFR 800.

KMLP provided the Louisiana State Historic Preservation Office (SHPO) with a plan for identifying historic properties and involving Indian tribes. KMLP sent letters to Indian tribes summarizing the results of archaeological surveys and requesting information about these or other sites that may have religious and cultural significance. KMLP will provide the SHPO with detailed cultural resources survey reports and request concurrence on its evaluations of NRHP eligibility of identified properties. These consultation efforts are described in more detail below.

4.10.1 Consultation with Louisiana State Historic Preservation Officer

Consultation regarding the Project with the Louisiana SHPO was initiated in January 2006, when a cultural resource scope of work was submitted to the Louisiana SHPO. In February 2006, the SHPO accepted the proposed scope of work, including the definition of the area of potential effects (APE), proposed survey methodology, and Native American groups to be contacted. KMLP submitted State of Louisiana Site Record forms to the SHPO in September 2006. Once Louisiana site numbers are assigned, KMLP will incorporate these into the survey report and submit it for the SHPO's review and concurrence with eligibility evaluations.

4.10.2 Native American Consultation

KMLP submitted letters to the Alabama Coushatta Tribe of Texas, Caddo Nation, Chitimacha Tribe of Louisiana, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, Mississippi Band of Choctaw Indians, Quapaw Tribe of Oklahoma, and Tunica-Biloxi Indians of Louisiana. Two letters were sent to representatives of these tribes, in April and August of 2006, informing them about the Project, the results of the initial cultural resources surveys, and requesting that they communicate any potential concerns they might have with respect to possible impacts to traditional cultural properties and historic properties.

The Caddo Nation responded that it knows of no traditional cultural properties in the potentially affected parishes. The Nation requested notification and copies of reports, should any cultural resources or archaeological sites be discovered. The Chitimacha Tribe of Louisiana responded that Acadia Parish is part of the Chitimacha homeland. Their records and oral traditions do not indicate the presence of a specific Chitimacha archaeological site or traditional cultural property in the immediate vicinity of the Project. The Chitimacha requested notification to begin consultation if archaeological remains representing a village site or burial site are discovered during construction. Responses have not yet been received from the other tribes.

4.10.3 Results of Cultural Resources Survey

KMLP conducted background cartographic, archival, and archeological review, as well as pedestrian survey and systematic shovel testing of the proposed pipeline corridor and ancillary facility locations. The investigation also included an assessment of all standing structures 50 years old or older

that were located in the pipeline corridor, access roads, aboveground facilities, and pipe storage and contractor yards. The gathered information was used to assess NRHP eligibility of cultural resources.

A total of 122 miles of the pipeline were surveyed for cultural resources, consisting of 108.6 miles of terrestrial survey and 13.4 miles of underwater remote sensing. Ten interconnect sites that fell within the pipeline corridor were examined as part of the survey. Additionally, all 2.3 miles of the 24-inch FGT Lateral pipeline were surveyed, as well as 10 pipe storage and contractor yards, 66 access roads, the surface of four HDD locations, and 44 extra workspaces immediately adjacent to the construction right-of-way.

There remain 9.9 miles of the pipeline route, two pipe storage and contractor yards, four interconnect sites, and nine access road routes that have not been surveyed because permission from landowners to access these properties has not yet been obtained. KMLP has indicated that it will perform cultural resources surveys for the unsurveyed portions of the Project during subsequent investigations prior to construction. The surveys will include the inspection of the locations of three previously recorded archaeological sites that were not relocated during the initial survey, possibly because high water precluded thorough inspection.

In total, the survey identified 21 cultural resources within or adjacent to the APE: 11 locations where cultural materials were found on or under the ground, one submerged cultural resource, six historic standing structures, two previously recorded archaeological sites, and a single historic cemetery. KMLP archaeologists assessed all of these sites as ineligible for NRHP listing, and recommended no further work for these cultural resources. SHPO review of the survey report and concurrence with the eligibility assessments and recommendations is pending.

More specific information regarding the cultural resources survey results can be found in the sections below.

Pipeline Corridors

KMLP surveyed a 300-foot-wide corridor for the terrestrial portion of the pipeline route. A total of 15 cultural resources were discovered within the examined portion of the terrestrial section. In total, eight sites consisting of late nineteenth-century to early twentieth-century historic scatters, four early to mid-twentieth-century structures, and a single historic cemetery were encountered. Additionally, two previously recorded sites (16CM153 and 16CM154) between MP 4 and 5 were relocated and examined. Surveyors did not examine two previously recorded sites (16CM27 and 16CM59) between MPs 18 and 20 because HDD would avoid ground disturbance in these areas.

Because the pipeline corridor would be situated across an existing road from the cemetery, the historic cemetery would not be disturbed. KMLP proposes a HDD to avoid the two previously recorded archeological sites that were reexamined, as well as the two that were not reexamined.

KMLP surveyed a 3,000-foot-wide corridor extending through Sabine Lake for 13.4 miles. The underwater survey identified 15 targets for further analysis along the proposed pipeline route, only one of which was designated as a potential submerged cultural resource after consultation with archaeologists. This target (Target 6) is located more than 1,000 feet from the pipeline center. All other identified targets appear to represent either casually discarded or lost debris, or structures related to the oil and gas industry, and require no further action.

Gaps in data are present along the submerged pripeline route approximately 2,200 feet northeast of MP 6.0 near Tieline 401 and from approximately 900 feet north of MP 17 to landfall. Gaps are due

primarily to the hazards of shallow water and the practical impossibility of operating remote sensing instruments in these waters. Significant underwater cultural resources are not anticipated in these shallow waters.

KMLP archaeologists recommend either avoidance of Target 6 or further investigation in consultation with regulatory authorities.

No cultural resources were identified within the current assessment of the FGT Lateral.

Pipe Storage/Contractor Yards

Of the 10 locations surveyed, a total of three cultural resource locations were encountered. Two consisted of late nineteenth-century to early twentieth-century historic scatters, and one was an early to mid-twentieth century historic standing structure.

Aboveground Facilities

No cultural resources were found on the 10 of the 14 interconnect sites surveyed.

Access Roads

KMLP anticipates that 75 temporary access roads would be required during construction. Cultural resource surveys have been completed for 66 of these routes, totaling 31.1 miles. The remaining nine access roads have not been surveyed because landowner permission has yet to be obtained. Two cultural resource locations were identified along access roads. One was a scatter of late nineteenth- to early twentieth-century historic materials, and one was an early to mid-twentieth century historic standing structure.

4.10.4 General Impacts and Mitigation

The results of cultural resources investigations to date have identified no properties eligible for the NRHP, and consequently no adverse effects to historic properties. The distance between the historic cemetery and pipeline trench is sufficient to avoid any ground disturbance to the cemetery. Pending SHPO review, KMLP has proposed avoidance or further investigations of one underwater target that may be a cultural resource. KMLP has also proposed to use HDD to avoid two previously recorded archaeological sites even though they are considered ineligible for the NRHP.

KMLP has not yet completed cultural resources surveys for about 9.9 miles of the pipeline route, two potential pipe storage and contractor yards, four interconnect sites, and nine access road routes because landowner permission for access has not yet been obtained. The completion of surveys and evaluations within these areas, as well as review and concurrence from the Louisiana SHPO regarding NRHP eligibility and project effects, would be required to complete the process of compliance with section 106 of NHPA.

Once cultural resources surveys and evaluations are complete, the FERC, in consultation with the Louisiana SHPO, would make determinations of NRHP eligibility and project effects. If any historic properties would be affected by the Project, we would seek ways to minimize or avoid adverse effects.

KMLP has indicated that it would conduct the additional surveys required along the pipeline route and file appropriate reports prior to construction. To ensure that the Commission's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **KMLP defer construction and use of facilities and staging, storage, and temporary work areas and new or to be improved access until it files with the Secretary cultural resource reports, as appropriate, and the SHPO's comments; and the Director of OEP reviews and approves all reports and notifies KMLP in writing that it may proceed.**

  All material filed with the Commission 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."

4.10.5 Unanticipated Discovery Plan

As part of its application, KMLP provided its Unanticipated Discovery Plan to be used in the event that previously unidentified cultural resources such as archeological sites, historic features, or human remains are encountered during project construction. The Unanticipated Discovery Plan is acceptable.

4.11 CUMULATIVE IMPACTS

The CEQ (40 CFR 1508.7) defines a cumulative impact as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The purpose of this cumulative impacts analysis is to identify and describe cumulative impacts to environmental resources that would potentially result from the KMLP Project when added to the impacts of other projects. This cumulative impact analysis follows the methodology set forth in CEQ's guidance (CEQ 1997).

We defined the scope of the cumulative impact analysis by determining the environmental impact issues associated with the proposed action; establishing a geographic scope for the cumulative impacts project area; establishing the time frame for the analysis; and identifying other past, present, or future actions that have affected, or could affect, the resources of concern within the project area. Each of these factors is discussed in turn below.

With regard to the environmental impact issues to be evaluated, the scoping process conducted for the KMLP Project provided a useful means for determining the relevant cumulative impact issues associated with the KMLP Project and the surrounding area. We consulted with resource agencies and other interested parties to identify important environmental issues and resources within the project area, particularly those that could be affected by the KMLP Project. Through this process, we determined that water resources, wetlands, biological resources, and land use are especially important aspects of the affected environment from a cumulative impacts perspective. We also considered the cumulative effects of air quality, noise, socioeconomic, and shoreline erosion impacts.

With regard to the geographic scope of the analysis, we considered the area over which the KMLP Project would directly or indirectly impact water resources, wetlands, biological resources, air quality, and other elements of the human environment. According to the direct and indirect impact analysis conducted in this draft EIS, most of the Project's impacts would be localized, occurring in the immediate vicinity of the construction right-of-way. However, some impacts would extend beyond the construction right-of-way and temporary extra workspaces. Therefore, we used the boundaries of the watersheds crossed by the project to define the geographic area for the cumulative impacts analysis. Table 4.3.2.1-1 in section 4.3.2.1 of this draft EIS lists each watershed crossed by the KMLP Project,.

With regard to the timeframe for the cumulative impacts analysis, we considered the duration of impacts associated with the Project. The majority of the impacts to environmental resources resulting from the Project would occur during periods of active construction. Most impacts to environmental resources associated with other projects would also occur during periods of active construction with some long-term and permanent impacts resulting from changes in land use. Projects associated with the recovery efforts in the Gulf Coast Region are already under construction or will be in the immediate future. Since the environmental impacts of the KMLP Project and most other projects located within the project area would occur within the next five years or less, the temporal span for this cumulative impacts analysis includes a five-year time period, 2005 to 2010.

With regard to other past, present, or future actions to consider in this analysis, we included other actions based on their location in the project area and the likelihood that they would contribute impacts to environmental resources affected by the Project. Figure 4.11-1 shows existing and reasonably foreseeable gas pipeline and LNG projects in the cumulative impact analysis area. Consideration of past projects in a cumulative impacts analysis can assist in defining baseline conditions of the affected environment.

Non-Internet Public

DRAFT ENVIRONMENTAL IMPACT STATEMENT
KINDER MORGAN LOUISIANA PIPELINE PROJECT
Docket No. CP06-449-000

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Figure 4.11-1 Existing, Approved, or Proposed Gas Pipeline and LNG Projects that Could Contribute to Cumulative Impacts

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However, agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined (CEQ 2005). Baseline environmental conditions described in other sections of this draft EIS reflect the cumulative impacts of past projects. Table 4.11-1 lists ongoing and reasonably foreseeable future activities and projects that could contribute impacts to resources that would be affected by construction and operation of the KMLP Project within the same geographic area and a similar timeframe. Table 4.11-2 depicts the resources that would be affected by the construction and operation of the activities/projects listed in table 4.11-1. Construction and/or implementation schedules of future projects depend on factors such as economics, funding, and politics.

With the scope thus defined, the anticipated cumulative impacts of the Project and other projects and activities are discussed in the sections that follow. The analysis draws on table 4.11-3 which summarizes the cumulative impacts on waterbodies, wetlands, and forested areas resulting from the KMLP Project and other projects within the project area. These anticipated cumulative impacts are based on NEPA documentation, agency and public input, and best professional judgment.

4.11.1 Water Resources

Past and ongoing activities like agriculture, industrial operations, and the development of commercial, residential, energy, and transportation infrastructure have affected and will continue to affect water resources, wetlands, biological resources, and other elements of the environment within the project area. For example, Ruth (2006) reports that as much as 99% of the original prairies and grasslands in the Coastal Prairies Physiographic Province, which includes the project area, have been converted to agriculture.

Multiple projects in the area would result in 427 open-cut water body crossings and 23,064,684 cubic yards of required dredging. The KMLP Project accounts for 133 of the 427 (approximately 31%) open-cut waterbody crossings, but none of the required dredging. Impacts to water quality resulting from the KMLP Project and other projects would be temporary or short-term and minor, limited to the periods of construction within the water bodies. Most of the waterbodies crossed by the KMLP Project are not the same ones crossed by the other projects, and where the same waterbodies are crossed, the crossing points are usually miles apart.

The most significant cumulative impact would be associated with the combined crossing of Sabine Lake by both the Kinder Morgan pipeline and the Port Arthur pipeline. However, the construction schedule for these two projects would not overlap and the routes of these two pipelines across Sabine Lake are generally separated by more than 2.5 miles, although they would come within 1 mile of each other in the northernmost part of the lake. In both cases, the construction of the pipelines across Sabine Lake would result in temporary localized increases in turbidity, expected to be observed approximately 1,500 feet away from the construction activity and to dissipate in a few hours after the construction activity ceased. The increased turbidity would not result in long-term effects on water quality and the increased turbidity levels associated with the construction would not exceed naturally occurring levels during tropical storms.

Several projects included in the Long-Term Community Recovery Plan (Louisiana Speaks 2006) include construction activities that would cause similar impacts to water resources as those discussed above. Additionally, specific types of projects (e.g., roadways, buildings, parking lots, etc.) could also result in an increase in impervious cover that can reduce groundwater recharge and increase the volume and velocity of surface water runoff. Such projects can also indirectly introduce chemicals such as oil and grease into runoff that eventually enters surface water bodies and the aquatic environment. Other projects

TABLE 4.11-1

Existing, Approved, or Proposed Projects and Activities that Could Contribute to Cumulative Impacts with the KMLP Project

Activity/Project	Description	Timing/ Construction Schedule
Ongoing Activities/Projects		
Manufacturing/ Refining	Oil and gas extraction, processing, and transportation, both onshore and offshore.	Ongoing
Dredging	Maintenance dredging of various surface water bodies such as Sabine Lake, the Sabine River, the GIWW, and the Calcasieu Ship Channel.	Periodic
Recreation	Fishing, hunting, boating, and bird watching.	Ongoing
Shipping	Commercial ship traffic within waterbodies such as Sabine Lake, the Sabine River, the GIWW, and the Calcasieu Ship Channel.	Ongoing
Transportation Infrastructure	Construction and maintenance of roadway infrastructure like the repair of US Highway 82 damaged by the hurricanes. Projects include asphalt widening and overlays, bridge reconditioning, new bridge construction, intersection improvements, etc.	Ongoing
Utility Infrastructure	Construction and maintenance of new and existing utility infrastructure (e.g., powerlines).	Ongoing
Commercial and Residential Development	Business and housing construction projects like those associated with the reconstruction of Holly Beach.	Ongoing
Agriculture and Silviculture	Agricultural practices, including animal grazing, crawfish farming, rice farming, and pine plantations and associated management practices.	Ongoing
Environmental Restoration	Shoreline stabilization (e.g., Perry Ridge Shore Protection Project), hydrologic restoration (e.g., Black Bayou Hydrologic Restoration Project), and wetland mitigation banks (e.g., Gum Cove Mitigation Bank).	Ongoing
Louisiana Long-Term Community Recovery Plan Projects	In the aftermath of Hurricanes Katrina and Rita, federal and state efforts are culminating in plans and projects to help devastated parishes recover from the storms, and to be better prepared for future storms. Plans and projects vary from parish to parish, depending upon the most pressing needs in a given location.	Ongoing–Future
Sabine Pass LNG[a] Project	Construction of three LNG tanks along the Sabine Ship Channel with a nominal output of up to 2.6 Bcfd and a new 16-mile-long natural gas pipeline originating at the Sabine LNG Terminal and terminating near Johnsons Bayou in Cameron Parish, Louisiana.	2005-2007
Sabine Pass LNG[a] Project Expansion (Phase II)	Expansion of Sabine Pass LNG Project (Phase I) to include construction and operation of three additional LNG tanks to increase sendout output up to 4.0 Bcfd.	2006-2008
Golden Pass LNG[a] Project	Construction of up to five LNG storage tanks with a nominal output of 1 Bcfd for the first phase (three LNG tanks), increasing to 2 Bcfd in the second phase (five tanks) in Jefferson County, Texas, and about 122 miles of pipelines located in Jefferson, Orange, and Newton Counties, Texas, and Calcasieu Parish, Louisiana.	2006-2008
Trunkline LNG[a] Terminal Expansion	Expansion of an existing LNG terminal in Lake Charles, Louisiana. Includes an infrastructure enhancement project and a natural gas liquids extraction plant.	2005-2008

TABLE 4.11-1 (cont'd)

Existing, Approved, or Proposed Projects and Activities that Could Contribute to Cumulative Impacts with the KMLP Project

Activity/Project	Description	Timing/ Construction Schedule
Cameron (Hackberry) LNG Project	Construction and operation of an LNG terminal along the Calcasieu Ship Channel and associated 35.4-mile natural gas pipeline in Louisiana.	2005-2008
Liberty Gas Storage Project	Construction and operation of two natural gas storage caverns, four injection wells, and associated 24.6-mile pipeline in Louisiana.	2006-2007
Reasonably Foreseeable Future Activities/Projects		
Louisiana Long-Term Community Recovery Plan	See description for these projects under Ongoing Activities/Projects.	Ongoing–Future
Creole Trail Pipeline Segment 1 Amendment	Construction and operation of 18.1 miles of 42-inch-diameter high-pressure natural gas pipeline to interconnect the previously certificated Creole Trail and Sabine Pass pipeline systems in Cameron Parish, Louisiana.	2008-2009
Creole Trail LNG Project	Construction and operation of an LNG terminal at the mouth of the Calcasieu Ship Channel and an associated natural gas pipeline in Louisiana.	2007-2009
Cameron LNG Expansion Project	Expansion of Cameron (Hackberry) LNG Project (described above) to construct and operate one additional LNG storage tank and other modifications to increase sendout capacity to 2.65 Bcfd.	2007-2008
Port Arthur LNG[b] Project	Port Arthur LNG proposes to construct and operate an LNG terminal along the Sabine-Neches Canal and associated natural gas pipeline in Texas and Louisiana.	2007-2010
Starks Gas Storage[b] Pipeline Project	Construction of about 35.6 miles of 16-inch and 30-inch-diameter natural gas pipeline and about 1.9 miles of 10-inch-diameter brine pipeline in Calcasieu and Beauregard Parishes, Louisiana.	2006-2008

[a] Projects have been approved by the FERC and are under construction.

[b] Projects have been approved by the FERC but construction is pending.

TABLE 4.11-2

Resources of Concern that Could be Affected by Construction or Development of Existing, Approved, or Proposed Projects or Activities in the Vicinity of the KMLP Project

Activity/Project	Primary Environmental Impact									
	Water Resources	Wetlands	Wildlife/Vegetation	Aquatic Resources	Recreation	Socioeconomics	Land Use	Ship Traffic	Transportation	Air Quality/Noise
Present Projects or Activities										
Manufacturing/Refining	X			X		X	X	X	X	X
Dredging	X	X	X	X	X		X	X		X
Recreation	X		X		X	X			X	
Shipping	X			X				X	X	X
Transportation Infrastructure	X	X	X	X	X	X	X		X	X
Utility Infrastructure	X	X	X	X	X	X	X		X	
Commercial/Residential Development	X	X	X			X	X			X
Agriculture and Silviculture	X	X	X	X	X	X	X			
Environmental Restoration	X	X	X	X	X	X	X			
Louisiana Long-Term Community Recovery Plan Projects	X	X	X	X	X	X	X	X	X	X
Sabine Pass LNG Project	X	X	X	X	X	X	X	X	X	X
Sabine Pass LNG Project Expansion[a]	X	X						X	X	X
Golden Pass LNG Project	X	X	X	X	X	X	X	X	X	X
Trunkline LNG Terminal Expansion	X							X	X	X
Cameron (Hackberry) LNG Expansion Project	X	X	X	X	X	X	X	X	X	X
Liberty Gas Storage Project	X	X	X	X	X	X	X			
Reasonably Foreseeable Future Projects or Activities										
Louisiana Long-Term Community Recovery Plan	X	X	X	X	X	X	X	X	X	X
Creole Trail Pipeline Segment 1 Amendment	X	X	X	X	X	X	X			
Creole Trail LNG Project	X	X	X	X	X	X	X	X	X	X
Cameron LNG Expansion Project	X	X	X					X	X	X
Port Arthur LNG Project	X	X	X	X	X	X	X	X	X	X
Starks Gas Storage Pipeline Project	X	X	X	X	X	X	X			

[a] No other sources were considered regarding the Sabine Pass LNG Project Expansion because it would be within the same boundaries as the existing facility.

included in the Long-Term Community Recovery Plan include environmental restoration activities that would improve the quality of water resources within the project area.

4.11.2 Wetlands

From a wetlands perspective, the KMLP Project would be within the Western Gulf Coastal Plain ecoregion, which historically contained vast areas of freshwater and tidal wetlands, intermixed with upland prairie and forest. This ecoregion has undergone significant alterations in the last several decades. In particular, the area of freshwater wetlands has significantly decreased due to saltwater intrusion caused by development, dredging, channelization, land subsidence, and other factors (Ruth 2006). The presence and ongoing spread of non-native vegetation species have reduced the vegetative diversity and wildlife habitat quality of freshwater and tidal wetlands in this region.

The projects listed in table 4.11-3 would disturb a total of about 2,285 acres of wetlands during construction. The KMLP Project would disturb approximately 22% of the total wetlands impacted during construction. Including the KMLP Project, pipelines account for approximately 77% of the total acres of wetlands that would be disturbed during construction. To provide perspective, SNWR, which comprises a small portion of the project area, encompasses 124,511 acres of fresh, intermediate, and brackish marshes (FWS 2006c). The combined projects would result cumulatively in a short-term and minor impact associated with construction through emergent or scrub-shrub wetlands, which would revegetate quickly (generally within 1 to 3 years) after construction and right-of-way restoration. Construction through forested wetlands would contribute cumulatively to the long- term or permanent alteration of forested wetlands in southwest Louisiana and southeast Texas to shrub or emergent wetlands (although the KMLP Project would not contribute to wetland alteration in Texas).

The construction and operation of the Project, along with the other potential projects and activities, could result in a cumulative reduction in the amount of wetlands within the project area. However, mitigation for wetlands affected by the Project and the other projects listed would be required by the COE and could result in a net increase and/or improvement in the regional coastal marsh resource.

4.11.3 Biological Resources

When projects are constructed at or near the same time, the combination of construction activities could have a cumulative impact on vegetation, wildlife, and aquatic organisms living in the immediate area. Clearing, grading, and other construction activities associated with pipeline construction and other similar activities in the vicinity (e.g., road and transmission line construction, silvicultural practices) would result in the removal of vegetation, alteration of wildlife habitat, displacement of wildlife, and other secondary effects such as increased population stress, predation, forest fragmentation, and establishment of invasive plant species. Similarly, the construction of multiple large industrial projects at or near the same time can result in a significant amount of land clearing activities that could have a cumulative impact on forest resources in the immediate area of the projects. However, most of the large industrial sites proposed or currently under construction in the project area (e.g., LNG terminals) are largely devoid of large stands of trees other than Chinese Tallow, an invasive species.

About 598.9 miles of pipeline would be constructed for the projects listed in table 4.11-3 and would result in a total of about 9,074 acres of vegetation disturbance assuming a right-of-way width of 125 feet. The construction of the LNG terminals would add to the total area of vegetation disturbance. Although the total amount of vegetation that would be affected by the KMLP Project and other potential projects in the area may be considered substantial, much of this would occur in areas that have been previously disturbed by existing rights-of-way. Also, this disturbance, alteration, or loss of habitat would be relatively small compared to the abundance of similar resources in the project area, the majority of it would be allowed to return to pre-construction conditions.

TABLE 4.11-3

Cumulative Impacts to Environmental Resources Resulting from the Construction and Operation of Projects in the Vicinity of the KMLP Project

Project	Pipeline Length (miles)[b]	Number of Open-Cut Waterbody Crossings	Dredging Required (cubic yards)		Total Wetlands Disturbed During Construction (acres)		Forest Cleared (acres)[a]	
			Berth Area	Lake[c]	LNG Terminal	Pipeline	LNG Terminal	Pipeline
KMLP Project[d]								
Construction	135.5	133	NA	NA	NA	504.2	NA	150.6
Operations	NA	NA	NA	NA	NA	NA	NA	58.7
Cameron (Hackberry) LNG Project[e]								
Construction	35.4	97	4,900,000	NA	67.7	148.1	0.0	148.3
Operations	NA	NA	NA	NA	NA	NA	0.0	74.2
Cameron LNG Expansion[d]								
Construction	NA	0	20,000	NA	1.8	NA	0.0	0.0
Operations	NA	NA	NA	NA	NA	NA	0.0	0.0
Creole Trail Project[f]								
Construction	116.8	81	4,100,000	2,575,596	102.9	106.8	54.1	552.5
Operations	NA	NA	NA	NA	NA	NA	22.9	299.7
Creole Trail Segment 1 Pipeline Project[d]								
Construction	18.1	7	NA	NA	NA	216.9	NA	0.0
Operations	NA	NA	NA	NA	NA	NA	NA	0.0
Golden Pass LNG Project[e]								
Construction	122.4	54	5,700,000	NA	108.8	290.2	0.0	451.3
Operations	NA	NA	NA	NA	NA	NA	0.0	238.7
Liberty Pipeline Project[e]								
Construction	24.6	10	NA	NA	NA	40.9	NA	155.5
Operations	NA	NA	NA	NA	NA	NA	NA	82.4
Port Arthur LNG Project[f]								
Construction	73.0	34	820,000	310,088	82.5	308.3	0.0	201.0
Operations	NA	NA	NA	NA	NA	NA	0.0	87.2
Sabine Pass LNG and Pipeline Project[e]								
Construction	16.0	5	4,569,000	NA	56.4	99.4	0.7	2.3
Operations	NA	NA	NA	NA	NA	NA	0.7	0.8
Sabine Pass LNG Project Expansion								
Construction	NA	0	NA	NA	100.3	NA	0.0	0.0
Operations	NA	NA	NA	NA	NA	NA	0.0	0.0

TABLE 4.11-3 (cont'd)

Cumulative Impacts to Environmental Resources Resulting from the Construction and Operation of Projects in the Vicinity of the KMLP Project

Project	Pipeline Length (miles)[b]	Number of Open-Cut Waterbody Crossings	Dredging Required (cubic yards)		Total Wetlands Disturbed During Construction (acres)		Forest Cleared (acres)[a]	
			Berth Area	Lake[c]	LNG Terminal	Pipeline	LNG Terminal	Pipeline
Starks Gas Storage Pipeline Project[f]								
Construction	34.7	6	NA	NA	NA	49.8	NA	149.2
Operations	NA	NA	NA	NA	NA	NA	NA	90.3
Trunkline LNG Terminal Expansion[e]								
Construction	22.2	0	70,000	NA	0.0	NA	0.0	NA
Operations	NA	NA	NA	NA	NA	NA	0.0	NA
Cumulative Totals								
Construction	598.9	427	20,179,000	2,885,684	520.4	1764.6	54.8	1,810.7
Operations	NA	NA	NA	NA	NA	NA	23.6	932.0

[a] Includes forested wetlands.

[b] Includes mainlines, looplines, and laterals associated with the project.

[c] Dredging required in Sabine Lake (Port Arthur) and Calcasieu Lake (Creole Trail) for pipeline construction.

[d] Projects are currently under review by the FERC.

[e] Projects have been approved by the FERC and are under construction.

[f] Projects have been approved by the FERC but construction has not begun.

[g] Includes dual pipeline.

NA Not Applicable

Construction of the projects in table 4.11-3 would affect a total of about 1,865.5 acres of forested land (including forested wetlands), of which about 956 acres would be maintained in a non-forested condition during project operations. Some of these forest lands consist of stands of planted timber grown for commercial use. Landowners would be compensated for raw timber removed from construction work areas, and would be allowed to replant areas outside of the permanent right-of-way following completion of construction.

Although the total amount of forested land that would be affected by the KMLP Project and other potential projects in the project area may be considered substantial, the linear nature of the pipelines would not require clear cutting of large areas of timber. Additionally, where the pipelines would be parallel and adjacent to one another, additional forest impacts would be cumulative, but minimized by the overlapping rights-of-way. The loss of forested land in this area due to all of these projects would be relatively small compared to the abundance of similar resources in the project area.

4.11.4 Land Use, Recreation, and Visual Resources

Along the Project and other pipeline routes, most land uses would revert to prior uses following construction. Some land uses would be restricted or prohibited on the new permanent pipeline rights-of-way, to accommodate permanent aboveground structures and recurring maintenance activities.

Recreational activities, such as fishing, boating, and bird watching occur throughout the coastal marsh, Sabine Lake, and the Sabine River in the vicinity of the KMLP Project. Other projects included in this analysis would contribute to effects on users of Sabine Lake and the Sabine River and could negatively affect recreation, primarily during periods of active construction. The presence and movement of construction equipment, materials, and workers may be disruptive temporarily to users of the local recreation areas, particularly if more than one project is under construction at any one time in the project area. Recreation-related cumulative impacts are expected to be localized, short-term, and minor.

Construction and operation of the KMLP Project and other projects in the area may affect visual resources by altering the terrain and vegetation patterns during construction or right-of-way maintenance and through the installation of new aboveground facilities that change land use. However, the KMLP Project would result in minimal land use changes and would therefore not contribute significantly to adverse impacts on visual resources within the project area.

4.11.5 Socioeconomics

Present and reasonably foreseeable future projects and activities could cumulatively impact socioeconomic conditions in the project area. There may be both beneficial and detrimental effects on employment, housing, infrastructure, and public services. The Project would make a negligible contribution to these impacts.

Employment and Housing

In general, natural gas-related projects have a beneficial impact on local employment during the short construction period. Since the construction of the KMLP Project would overlap with the construction of other projects, the demand for workers could exceed the local supply of appropriately skilled labor. The increased demand for workers could reduce current unemployment and perhaps lead to higher wages for the duration of construction. Other indirect employment benefits could include temporary jobs in the local area (e.g., restaurants, motels, and convenience stores).

Damage caused by Hurricane Rita in 2005 increased the need for construction workers in the project area. Prior to the hurricane, the project area would have been able to accommodate temporary construction workers who preferred to live there. However, as a result of the hurricane, accommodating temporary construction workers is likely to be a regional priority for several years. Nevertheless, given the vacancy rates in the area and the number of hotel/motel rooms in larger population centers in the project area, construction crews should not encounter difficulties in finding temporary housing. The degree of cumulative impacts on housing resources would depend upon the number of other projects being constructed simultaneously and the season, specifically when construction coincides with periods of peak recreation and tourism activity. If construction occurs concurrently with other projects and during the peak recreation and tourism periods, temporary housing would still be available but may be more difficult to find and/or more expensive to secure. Regardless, these effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative effect on housing.

Vehicular Traffic

Since the construction of the KMLP Project would overlap with the construction of other projects, there could be increased congestion on local roads during the construction period. Kinder Morgan plans to cross most paved roads and railroads using the boring or HDD method to mitigate traffic disruptions and direct surface impacts. Alternatively, unpaved roads and one abandoned railroad would be crossed using the open cut method. This method can cause temporary traffic delays. However, the use of adequate signs, safety barriers, and pre-established detours would minimize these interruptions to road traffic. Pipe installation at road crossings typically takes a day to complete and includes construction practices that keep one lane of traffic open where no reasonable detours are feasible or during peak traffic hours. To the extent that construction occurs simultaneously in a given area, traffic impacts would be localized and short-term.

Infrastructure and Public Services

The cumulative impact of the KMLP Project and other activities in the project area on infrastructure and public services would depend on the number of projects under construction at one time. The small incremental demands of several projects occurring at the same time could become difficult for police, fire, and emergency service personnel to address. This problem would be temporary, and occur only for the length of construction. No long-term effects on infrastructure and public services are expected.

Marine Traffic

Once completed, other projects within the project area would cause an increase in marine traffic. The KMLP Project would cross Sabine Lake, enter the mouth of the Sabine River, and cross the GIWW and the Calcasieu River. Construction would temporarily impact commercial and recreational boats in these areas due to project-related marine traffic, including pipe and material delivery barges and construction barges. Project-related impacts would primarily affect barges and smaller recreational vessels and would only occur during periods of active construction in these areas. These impacts would result in a negligible contribution to the cumulative impacts on marine traffic when added to impacts of other projects in the area.

4.11.6 Shoreline Erosion

Average coastal erosion rates are 4.2 meters per year in Louisiana and 1.8 meters per year along the northern Gulf of Mexico shoreline. The most serious erosion and land loss are occurring in the eastern part of the coastal area, east of Atchafalaya Bay (USGS 2003). Marine traffic and the potential for shoreline erosion would increase as a result of other projects in the project area. Marine vessels associated with the KMLP Project would include barges used for material delivery and construction. The use of these vessels would be limited to periods of active construction. The KMLP Project would add negligible, if any, impacts to eroding shorelines within the area.

4.11.7 Air Quality and Noise

Ambient air quality in the project area is acceptable. The parishes crossed by the Project are in attainment for all criteria pollutants.

Construction of the KMLP Project and other projects in the area would involve the use of heavy equipment that produces noise, air contaminants, and dust. Use of the access roads for maintenance of the pipeline and appurtenances would generate occasional, minor, and short-term increases in dust similar to

that generated on other unpaved roads in the area. Construction of the KMLP Project and other projects in the project area would cause localized declines in ambient air quality.

During operations, the KMLP Project would result in fugitive emissions at the aboveground meter stations and block valves. Such emissions would be below any established regulatory thresholds and therefore would not require any type of permit. Other sources of air pollutants within the project area include new LNG terminals and ships using those terminals, refineries, etc. These sources emit PM_{10}, SO_2, NOx, CO, and VOCs. In turn, NOx and VOC emissions contribute to regional ozone concentrations. Ambient air quality could decline as a result of the operation of other projects located within the project area. However, a decline in ambient air quality would be minimal and the project area is anticipated to remain in attainment for all criteria pollutants.

Aside from noise associated with construction, pipeline projects do not typically result in elevated noise levels. Construction of the KMLP Project would increase sound levels in the vicinity of Project activities, and the sound levels would vary during the construction period, depending on the level of construction activity at any given time. Additional noise produced during construction of the KMLP Project and other projects could create short-term annoyances to nearby residences and could disrupt nesting birds and other wildlife in the project area. These noise impacts would be localized and would attenuate quickly as the distance from the noise source increases. Operation of the KMLP Project would not contribute to any increases in ambient noise levels within the project area.

4.11.8 Cumulative Impacts Conclusions

Environmental resources within the project area have experienced adverse impacts from oil and gas development, agriculture, silviculture, and a number of other human activities for decades. Human activity has resulted in a loss of ecologically significant habitat including coastal marsh and forested wetlands; introduced pesticides and other contaminants into surface water bodies and sediments; altered the hydrologic regime through channelization of surface water bodies and heavy groundwater withdrawals; and introduced invasive plants into the ecosystem. To mitigate the effects of these adverse impacts, many environmental restoration projects have been implemented within the project area (see section 4.8). Such projects have provided beneficial environmental effects such as restoring the functions and values of thousands of acres of wetlands and stabilizing eroding shorelines.

The KMLP Project and other projects and activities within the project area would cumulatively impact water resources, wetlands, biological resources, land use, air quality, and other environmental resources. However, we believe that impacts associated with the KMLP Project would be relatively minor, and we have included numerous recommendations in this draft EIS to further reduce the environmental impacts associated with the Project. The environmental impacts associated with the Project would be minimized by careful project routing, utilization of HDD techniques to avoid and minimize impacts to sensitive resources, and implementation of appropriate mitigation measures. Based on the analysis conducted in this draft EIS, the impacts of the KMLP Project, when added to the impacts of other projects and activities, would not be expected to alter any environmental resource beyond its ability to return to a near-baseline condition.

4.12 AIR QUALITY AND NOISE

4.12.1 Air Quality

4.12.1.1 Affected Environment

The region between Cameron Parish, Louisiana and Evangeline Parish, Louisiana is characteristic of subtropical regions, with short mild winters and warm humid summers. The Gulf of Mexico plays an important part in moderating the local weather by producing a pronounced sea breeze effect in the summer and tempering the effects of polar outbreaks. Tropical cyclones (hurricanes) are not unusual for the Project area.

The prevailing winds are generally from offshore to onshore from the south to south-southwest, except during winter months when passing cold fronts bring prevailing winds from the north to north-northeast. Wind speeds average 9 miles per hour throughout the year.

Rainfall in Saint Charles, Louisiana, located at approximately the midpoint of the pipeline route, averages 57.19 inches annually. June is the wettest month averaging 6.07 inches, and February is the driest month averaging 3.28 inches. The warmest months are July and August with an average high temperature of 91°F and average low temperature of 74°F. January is the coldest month with an average high temperature of 61°F and average low temperature of 41°F.

4.12.1.2 Regulatory Requirements

The Clean Air Act of 1970 (CAA) designates six pollutants as criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) are promulgated. The NAAQS for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), 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 (CO), ozone (O_3), and lead were set to protect human health (primary standards) and human welfare (secondary standards). State air quality standards cannot be less stringent than the NAAQS. Louisiana has adopted the NAAQS, as defined in 40 CFR 50; these standards are summarized in table 4.12.1.2-1. In addition to the NAAQS shown in table 4.12.1.2-1, Louisiana has adopted secondary CO standards that are equal to the primary NAAQS for CO. Areas where the ambient air quality is better than the NAAQS are designated as attainment areas and areas exceeding the NAAQS are designated non-attainment. The parishes in which the Project would be located are in attainment for all criteria pollutants.

The CAA, 42 USC 7401 et seq. amended in 1977 and 1990, is the basic federal statute governing air pollution. The provisions of the CAA that are potentially relevant to the Project include the following and are discussed further below:

- New source review (NSR);
- Prevention of significant deterioration (PSD);
- New source performance standards (NSPS);
- Maximum achievable control technology (MACT) standards; and
- Title V operating permits.

In addition, the Project would be subject to applicable Louisiana state regulations that are more stringent than federal regulations.

TABLE 4.12.1.2-1

National Ambient Air Quality Standards

Pollutant	Time Frame	Primary	Secondary
Particulate matter less than 10 microns in diameter	Annual[a]	50 µg/m3	50 µg/m3
	24-hour[b]	150 µg/m^3	150 µg/m^3
Particulate matter less than 2.5 microns in diameter	Annual[c]	15 µg/m^3	15 µg/m^3
	24-hour[d]	65 µg/m^3	65 µg/m^3
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

_____

µg = Microgram(s).
m^3 = Cubic meter(s).
NA = Not applicable.
ppm = Part(s) per million.

[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/m^3.

[b] Not to be exceeded more than once per year.

[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 µg/m^3.

[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/m^3.

[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.

New Source Review

NSR refers to the preconstruction permitting programs under Parts C and D of the CAA that must be satisfied before construction can begin on new major sources or major modifications to existing major sources. The PSD program is the NSR permitting program for sources located in attainment areas and in areas for which there is insufficient information to determine attainment status (unclassified areas). For sources located in non-attainment areas, the applicable permitting program is the Nonattainment New Source Review (NNSR) program. NNSR is required for major sources locating or expanding in non-attainment areas. Since the Project would be located in an attainment area, NNSR is not applicable to the Project.

Prevention of Significant Deterioration

The PSD review regulations apply to proposed new major sources or major modifications to existing major sources located in an attainment area. The PSD regulations (40 CFR 52.21) define a major source as any source type belonging to a list of named source categories that emit or have the potential to

emit 100 tons per year (tpy) or more of any regulated pollutant. A major source under PSD 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 any of these thresholds trigger PSD review.

The PSD review evaluates existing ambient air quality and the potential impacts of the proposed source on ambient air quality (noting in particular whether the source would contribute to any violation of the NAAQS), and reviews the best available control technology (BACT) in order to minimize emissions. The PSD regulations contain restrictions on the degree of ambient air quality deterioration that would be allowed. These increments for criteria pollutants are based on the PSD review classification of the area. Air Quality Control Regions (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. Class III designations, intended for heavily industrialized zones, can be made only on request and must meet all requirements outlined in 40 CFR 51.166. The remainder of the United States is classified as Class II. The 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 east of New Orleans, Louisiana approximately 218 miles east of the Project.

The Project would not include facilities or operations included on the list of named source categories to which the 100-tpy trigger applies. The Project would have only negligible fugitive emissions and would not exceed emissions of 250 tpy of any criteria pollutant. Therefore, PSD permitting is not applicable to the Project.

New Source Performance Standards

NSPS regulations, which are codified at 40 CFR 60 and incorporated by reference in the Louisiana Administrative Code (LAC) 33.III.3303, establish requirements for new, modified, or reconstructed units in specific source categories. NSPS requirements include emission limits, monitoring, reporting, and record keeping. There are no NSPS requirements identified as potentially applicable to the Project.

Maximum Achievable Control Technology Standards

MACT standards are intended to reduce emissions of air toxics or hazardous air pollutants (HAPs) through installation of control equipment rather than enforcement of risk-based emission limits. Applicability is triggered if potential emissions are greater than 10 tpy of any single listed HAP or greater than 25 tpy combined total of listed HAPs. As potential HAP emissions resulting from the Project would be well below these thresholds, the MACT is not applicable. The Project would not have sources of HAP emissions so MACT is not applicable.

Title V Permitting

The Title V permit program, as described in 40 CFR 70, requires sources of air emissions with criteria pollutant emissions that reach or exceed major source levels to obtain federal operating permits. These permits list all applicable air regulations and include a compliance demonstration for each applicable requirement. The major source threshold level in attainment areas is 100 tpy of NO_x, SO_2, CO, PM_{10}, $PM_{2.5}$, and volatile organic compound (VOC). The Project would have only negligible fugitive emissions and would not exceed the 100-tpy criterion pollutant threshold. Therefore, the Project would not require a Title V permit.

State Regulations

In addition to the Federal regulations described above, Louisiana also has state air quality regulations. The LDEQ manages air quality issues in Louisiana. Subject to EPA approval, these agencies manage the statewide air permitting, compliance, and enforcement programs. The Project would be authorized under a LDEQ minor source permit or exemption.

LDEQ regulates emissions of particulate matter arising from unpaved streets, access roads, construction, and similar facilities through LAC33.III.1305, which requires application of water or dust retardant chemicals or paving of roadways. KMLP indicates that if fugitive dust becomes a problem, it would employ LDEQ required practices, such as water sprays, to control fugitive dust. Water sprays have provided sufficient control to ensure protection of air quality during construction of similar pipeline projects.

4.12.1.3 General Impacts and Mitigation

Construction Emissions

Construction of the pipeline and access roads would generate air emissions during grading, trenching, and backfilling, and while driving construction vehicles along unpaved areas. Use of existing roads would be maximized and facilities would be constructed adjacent to existing roads. New road construction would be limited to driveways from existing roads to new facilities. Where possible, permanent roadways would be avoided by installing temporary, removable wooden mats to protect the underlying surface. These activities could generate dust and particulate emissions from earth moving activities and construction equipment engine exhaust. Construction would be expected to cause a minor and temporary reduction in local ambient air quality as a result of fugitive dust and combustion emissions generated by construction equipment. Criteria pollutant emissions during the operation of the fossil-fueled construction equipment would occur from combustion products resulting from use of gasoline and diesel fuels, primarily NO_2, CO, VOCs, PM_{10}, small amounts of SO_2 and small amounts of HAPs (e.g., formaldehyde, benzene, toluene, and xylene) produced by the construction equipment engines. Impacts from construction equipment would be temporary, would be distributed along the length of the pipeline, and would be expected to result in an insignificant impact on air quality. Emissions of criteria pollutants during construction are shown in table 4.12.1.3-1.

TABLE 4.12.1.3-1

Emission from Construction Activities

NOx Emissions (tpy)	CO Emissions (tpy)	VOC Emissions (tpy)	PM_{10} Emissions (tpy)	SO_2 Emissions (tpy)
319.62	169.91	42.78	33.55	25.12

Operations Emissions

Heaters would be installed to raise the temperature of the transported gas at 14 interconnect sites. The capacities of the heaters would range from 10 MMBtu/hour to 70 MMBtu/hour. Emissions from the heaters were calculated based on AP-42 chapter 1.4 factors and for NO_x, CO, and VOC emission factors more conservative than AP-42 were used. Table 4.12.1.3-2 shows calculated emissions at each interconnect site. These sites will be permitted as minor sources as allowed under LAC 33 III:503(B).

TABLE 4.12.1.3-2

Emission from Heaters Located at Interconnect Sites

Site	NOx Emissions (tpy)	CO Emissions (tpy)	VOC Emissions (tpy)	PM_{10} Emissions (tpy)	SO_2 Emissions (tpy)
MP 1.23	36.06	34.32	17.74	2.28	0.18
MP 2.30	7.73	7.36	3.80	0.49	0.04
MP 28.24	10.30	9.81	5.07	0.65	0.05
MP 61.35	5.15	4.90	2.53	0.33	0.03
MP 87.48	7.73	7.36	3.80	0.49	0.04
MP 91.45	7.73	7.36	3.80	0.49	0.04
MP 110.04	12.88	12.26	6.34	0.82	0.06
MP111.30	7.73	7.36	3.80	0.49	0.04
MP 112.02	10.30	9.81	5.07	0.65	0.05
MP 116.95	5.15	4.90	2.53	0.33	0.03
MP 122.08	10.30	9.81	5.07	0.65	0.05
MP 132 16	10.30	9.81	5.07	0.65	0.05
Bridgeline	7.73	7.36	3.80	0.49	0.04
SW Loop JB	7.73	7.36	3.80	0.49	0.04

Operation of the above ground meter stations and block valves would not result in substantial air emissions under normal operating conditions. Typically, only minor emissions of natural gas, called fugitive emissions, occur from small connections at meter station and valve sites. Because such emissions are very small, they are not regulated by permit or source-specific requirements. Use of the access roads for maintenance would generate occasional, minor, and short term increases in dust similar to that generated on other unpaved roads in the area. Use of these roads by maintenance and operation personnel would have a negligible effect on air quality. Overall, operation of the Project would not result in significant impacts to air quality.

4.12.2 Noise

Construction, modification, and operation of the Project would affect the local noise environment. The ambient sound level of a region is defined by the total noise generated within the specific environment, and is usually comprised of sounds emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions and the effect of seasonal vegetative cover.

Two measurements used by some federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Late night and early morning (10:00 pm to 7:00 am) noise exposures are penalized +10 decibels, to account for people's greater sensitivity to sound during the nighttime hours.

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has indicated that an L_{dn} of 55 decibels on the A-weighted scale (dBA) protects the public from indoor and outdoor activity interference. We have adopted this criterion and use it to evaluate the potential noise impact from operation of the compressor facilities.

Louisiana does not regulate noise at the state level, however individual parishes have specific noise control ordinances. Calcasieu Parish and Cameron Parish prohibit operating construction equipment within 165 feet of a Noise Sensitive Area (NSA) between sunset and sunrise Monday through Saturday, and 9 pm to 8 am Sundays and holidays. Operation of vehicles including offroad vehicles without a muffler is also prohibited. (Calcasieu Parish Ordinances 18, VII, 18-100 and Cameron Parish Ordinances 15, III, 15-32). Cameron Parish also prohibits operating machinery within 300 feet of a place of worship that causes loud sounds that will interfere with worship services (Cameron Parish Ordinances, 15, III, 15-33). Acadia Parish prohibits operating internal combustion engines and air compressors without a muffler and prohibits operation of construction equipment within 500 feet of a residential area from 10 pm to 7 am (Acadia Parish Ordinances, 13, V, 13-82 and 13-87).

4.12.2.1 Affected Environment

No compressor stations would be used for the Project, therefore no existing noise level surveys were performed. Existing noise levels in areas near Project facilities are expected to be similar to other pipeline projects in rural areas of Louisiana, which typically have ambient noise levels between 40 and 60 dBA depending on proximity to area roadways.

4.12.2.2 Impacts and Mitigation

Construction Noise

Construction of the Project is expected to be typical of other pipeline projects in terms of schedule, equipment used, and types of activities. Sound levels would increase in the vicinity of construction activities, and would vary depending on the construction phase. Pipeline construction generally would proceed at rates ranging 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 six months on an intermittent basis. Construction equipment would be operated as needed during those periods and would be maintained to manufacturers' specifications to minimize noise impacts.

Although individuals in the immediate vicinity of the construction activities could experience annoyance, the impact on the noise environment at any specific location along the route would be short term. Night-time noise levels would normally be unaffected since most construction would take place only during daylight hours. The possible exceptions would be at the HDD sites. At HDD locations, drilling equipment may operate on a 24-hour per day basis over a short period of time. Predicted noise impacts on NSAs near three HDD sites indicate that sound levels would exceed 55 dBA, as discussed below.

An HDD entry pit near MP 44.5 on the west side of John Brannon Road is close to three NSAs, which are residences built in 2006. These residences are more than 50 feet away, but are less than 165 feet from the proposed workspace. Given the Calcasieu Parish noise requirements defined above, KMLP has stated that it would request an exception from the Calcasieu Parish Police Jury to allow operation of

the HDD equipment near MP 44.5 for 24 hours per day, and offer the residents temporary lodging at a nearby hotel for the duration of the HDD activities.

The other two sites of concern are an HDD exit pit at MP 49.6, which is located 400 feet from the nearest NSA, and the HDD entry pit at MP 99.8, which is located 500 feet from the nearest NSA. Predicted sound levels due to HDD operations at these two sites are 72 dBA and 70 dBA, respectively. There are no applicable noise ordinances at MP 49.6 in Calcasieu Parish because the distance from the HDD site to the NSA, which is a fishing camp, exceeds 165 feet. The HDD site at MP 99.8 is located in Acadia Parish and is within 500 feet of a residence. Acadia Parish Ordinance 13-87 prohibits operation of construction equipment within 500 feet of a residential area between 10 pm and 7 am. KMLP has not specified what mitigation measures it would take to comply with all applicable rules and regulations at these two HDD sites.

To ensure that no NSAs are exposed to excessive noise during drilling operations, **we recommend that:**

- **Prior to construction, KMLP file with the Secretary for review and written approval by the Director of OEP a noise mitigation and compliance plan for HDD operations at MP 44.5, MP 49.6, and MP 99.8. This plan should identify mitigation measures such as noise barriers, temporary housing, etc. to be implemented prior to the start of drilling operations to reduce noise from HDD activities to below 55 dBA at these NSAs.**

Operational Noise

During operation of the Project, the potential noise impacts would be limited to the vicinity of the new valve and metering stations. Principal noise sources would include gas flow through valves and metering equipment. Such gas flow noise is typically not noticeable more than a short distance from the equipment. Underground sections of the pipeline are not a substantial source of noise.

If the recommended mitigation at MP 44.5, MP 49.6, and MP 99.8 occurs, we believe that project-related noise impacts at the nearest NSAs would not be significant.

4.13 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is non-toxic but, possessing a slight inhalation hazard, is classified as a simple asphyxiate. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an ignition temperature of 1,000°F and is flammable at concentrations between 5.0 percent and 15.0 percent in air. Unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. Having a specific gravity of 0.55, it is buoyant at atmospheric temperatures and disperses rapidly in air.

In 2005, Hurricanes Rita and Katrina dramatically illustrated the susceptibility of southern Louisiana to the devastation that can be caused by major storms. Much of the aboveground utility infrastructure and offshore oil and gas facilities were seriously affected. Most of the onshore damage was caused by high winds, with some storm surge damage near the coast. The offshore damage was primarily a result of high winds, waves, and currents. Heavy rainfall also caused localized inshore flooding. The Project would be located onshore, eliminating the storm-related hazards found in the Gulf of Mexico. The pipeline would be buried at depths equal to or exceeding DOT requirements, eliminating concerns from wind or surface flooding. In areas where the soils are, or could become, saturated, including Sabine Lake, the pipeline would be concrete coated to eliminate positive buoyancy. High rainfall rates associated with hurricanes would increase the volume and velocity of stream flows, elevating the risk of erosion and scour and the resulting exposure of the pipeline. For this reason, the Project would be installed by HDD under major waterbodies, providing at least 20 feet of cover between the pipeline and the bottom of the channel; at least 5 feet of cover will be provided at minor waterbodies. Sabine Lake does not have the water depth or fetch to generate the size of waves that were observed in the Gulf of Mexico, but some increased wave action and movement of bottom sediments would occur during storms. The depth of cover over the Project would be increased to at least 4 feet in Sabine Lake as added protection against exposure. Aboveground facilities would be limited to meter stations, each of which could be isolated from the pipeline if damaged, eliminating the potential for substantial releases of natural gas. These aboveground facilities, as well as the pipeline, would be continuously monitored and could be shut down remotely in the event of an emergency. It is also likely that the Sabine Pass LNG Terminal would be shut down, or at least it would no longer receive ships, upon detection of an approaching storm, substantially reducing the amount of gas that would be delivered by the pipeline during the storm. Finally, the pipeline right-of-way would be inspected immediately following the passage of a storm to ensure the pipeline had not been exposed or otherwise damaged.

4.13.1 Safety Standards

The DOT is mandated to provide pipeline safety under Title 49, USC Chapter 601. The Pipeline and Hazardous Materials Safety Administration's (PHMSA's), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This

work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act (NGPSA) provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents. The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993 between DOT and the FERC, 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 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 the referral of complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

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

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192. These regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Part 192 also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined as follows:

- Class 1 locations include 10 or fewer buildings intended for human occupancy;
- Class 2 locations include more than 10 but less than 46 buildings intended for human occupancy;
- Class 3 locations include 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside areas occupied by 20 or more people on at least 5 days in a week for 10 weeks in any 12-month period; and
- Class 4 locations where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a

minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure (MAOP), inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas.

The Project would be designed to account for planned population development. Table 4.13.1-1 shows the area classifications for the Project.

TABLE 4.13.1-1

Area Classifications

Parish	MP Start	MP End	Area Classifications	Reasons for Class 2 or 3
Leg 1				
Cameron	0.00	1.5	3	Commercial/Industrial
Cameron	1.5	24.6	1	
Calcasieu	24.6	47.6	1	
Calcasieu	47.6	48.9	2	Houses
Calcasieu	48.9	50.5	1	
Calcasieu	50.5	51.3	3	Marina (HDD)
Calcasieu	51.3	51.8	1	
Calcasieu	51.8	52.4	3	Industrial (HDD)
Calcasieu	52.4	74.9	1	
Jefferson Davis	74.9	99.4	1	
Acadia	99.4	110.0	1	
Acadia	110.0	112.4	2	Houses/Industrial
Acadia	112.4	112.5	1	
Evangeline	112.5	121.4	1	
Evangeline	121.4	123.3	2	Houses
Evangeline	123.3	128.3	1	
Evangeline	128.3	129.9	2	Houses
Evangeline	129.9	132.1	1	
Leg 2				
Cameron	0.00	1.2	3	Commercial/Industrial
FGT Lateral				
Acadia	0.00	2.3	1	

If a subsequent increase in population density adjacent to the right-of-way indicates a change in Class location for a segment of pipeline, Sections 192.609 and 192.611 require that the pipeline operator confirm or revise the MAOP commensurate with the current Class location. If physical revisions are required, these revisions may be accomplished by reducing operating pressure, or replacing the segment with pipe of sufficient grade and wall thickness to comply with the DOT code requirements 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. Gas transmission operators must develop and follow a written integrity management program that contains all the elements described in Section 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). DOT (68 FR 69778, 69 FR 18228, and 69 FR 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in Section 192.903 of the DOT regulations.

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 would do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate in 49 USC 60109 for OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method an HCA includes:

- Current Class 3 and 4 locations;
- Any area in Class 1 or 2 where the potential impact radius[1] is greater than 660 feet 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]

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 Section 192.911. The HCAs have been determined based on the relationship of the pipeline centerline to other nearby structures and identified sites. Of the approximately 135.5 miles of pipeline route, KMLP has identified approximately 0.8 mile that would be classified as an HCA. The pipeline integrity management rule for HCAs requires inspection of the entire pipeline for HCAs every 7 years.

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

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[1] The potential impact 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. Based on an MAOP of 1,440 PSIG and a nominal diameter of 42 inches, the calculated potential impact radius for Leg 1 of the Project would be about 1,100 feet. The potential impact radius for Leg 2 and the 24-inch FGT Lateral would be 943 feet and 628 feet, respectively.

[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.

pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for:

- Receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- Establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- Emergency shutdown of system and safe restoration of service;
- Making personnel, equipment, tools, and materials available at the scene of an emergency;
- Protecting people first and then property, and making them safe from actual or potential hazards; and
- Safely restoring any service outage.

Each operator must establish and maintain liaison with appropriate fire, police, and public officials to identify the resources and responsibilities of each organization that may respond to a gas pipeline emergency, and coordinate mutual assistance in responding to emergencies. 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. KMLP 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. KMLP would develop an Emergency Plan for the Project that incorporates these procedures as required by Part 192.

4.13.2 Pipeline Accident Data

Since February 9, 1970, 49 CFR Part 191 has required all operators of transmission and gathering systems to notify DOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- Caused a death or personal injury requiring hospitalization;
- Required taking any segment of transmission line out of service;
- Resulted in gas ignition;
- Caused estimated damage to the property of the operator, or others, or both, of a total of $5,000 or more;
- Required immediate repair on a transmission line;
- Occurred while testing with gas or another medium; or
- In the judgment of the operator was significant, even though it did not meet the above criteria.

Since 1984, DOT has required operators to report within 20 days incidents that involve property damage of more than $50,000, injury requiring in-patient hospitalization, death, release of gas, or those considered significant by the operator. Table 4.13.2-1 presents a summary of incident data for the period

TABLE 4.13.2-1

Natural Gas Service Incidents by Cause

Cause	Incidents per 1,000 miles of Pipeline (percentage) 1970-1984		1986-2005	
Outside force	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	(100)	0.26	(100)

1970 to 1984, 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).

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 4.13.2-1 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 winds, storms, and thermal strains; and willful damage. Table 4.13.2-2 shows that human error in equipment usage was responsible for approximately 75 percent of outside forces incidents. Since April 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "One Call" program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. The 1986 through 2005 data show that the portion of incidents caused by outside forces has decreased to 38.5 percent.

The pipelines included in the data set in table 4.13.2-1 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

TABLE 4.13.2-2

Outside Forces Incidents by Cause (1970-1984)

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

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 4.13.2-3 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 4.13.2-3

External Corrosion by Level of Control (1970-1984)

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

4.13.3 Impact on Public Safety

The service incident data summarized in table 4.13.2-1 include pipeline failures of all magnitudes with widely varying consequences. Approximately two-thirds of the incidents were classified as leaks, and the remaining third classified as ruptures, implying a more serious failure.

Table 4.13.3-1 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 nonemployees, to better identify a fatality rate experienced by the general public. Of the total 5.0 nationwide average, fatalities among the public averaged 2.6 per year over this period. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and nonemployees. However, the data show that the total annual average for the period 1984 through 2005

TABLE 4.13.3-1

Annual Average Fatalities - Natural Gas Transmission and Gathering Systems[a,b]

Year	Employees	Nonemployees	Total
1970-June 1984	2.4	2.6	5.0
1984-2005[c]	-	-	3.6
1984-2005[c]	-	-	2.8[d]

[a] 1970 through June 1984 – Jones et al,1986.
[b] Pipeline and Hazardous Materials Administration, 2005.
[c] Employee/nonemployee breakdown not available after June 1984.
[d] Without 18 offshore fatalities occurring in 1989 - 11 fatalities resulted from a fishing vessel striking an offshore pipeline and 7 fatalities resulted from explosion on an offshore production platform.

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.

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in table 4.13.3-2 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average 2.6 public fatalities per year is relatively small considering the more than 300,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is approximately two orders of magnitude (100 times) lower than the fatalities from natural hazards such as lightning, tornados, floods, earthquakes, etc.

TABLE 4.13.3-2

Nationwide Accidental Deaths[a]

Type of Accident	Fatalities
All accidents	90,523
Motor vehicles	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. (1984-93 average)	181
All liquid and gas pipelines (1978-87 average)[b]	27
Gas transmission and gathering lines, nonemployees only (1970-84 average)[c]	2.6

[a] All data, unless otherwise noted, reflects 1996 statistics from the U.S. Department of Commerce, Bureau of the Census, "Statistical Abstract of the United States 118th Edition."
[b] U.S. Department of Transportation, "Annual Report on Pipeline Safety - Calendar Year 1987."
[c] Jones et al 1986.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on approximately 301,000 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 KMLP Project might result in a public fatality every 738-plus years. This would represent a slight increase in risk to the nearby public.