APPENDIX J

DRAFT AQUATIC RESOURCE MITIGATION PLAN

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NOTE TO REVIEWERS: This is a preliminary draft of the Aquatic Resources Mitigation Plan and is incomplete. It is being revised and will be improved in future versions of the EIS.

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LIST OF ACRONYMS

Banking Guidance	Federal Guidance on the Establishment, Use and Operation of Mitigation Banks
CGT	Columbia Gulf Transmission
CUP	Coastal Use Permit
CWA	Clean Water Act
Dth	decatherms
FAC	Facultative (wetland indicator status)
FACU	Facultative Upland (wetland indicator status)
FACW	Facultative Wetland (wetland indicator status)
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FGDC	Federal Geographic Data Committee
FGT	Florida Gas Transmission
GIS	Geographic Information System
GPS	Global Positioning System
KM	Kinder Morgan
KMLP	Kinder Morgan Louisiana Pipeline, LLC
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Deportment of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LNG	Liquefied Natural Gas
MBRT	Mitigation Banking Review Team
MP	Milepost
NGPL	Natural Gas Pipeline Company of America
NI	No Indicator (wetland indicator status)

LIST OF ACRONYMS (CONTINUED)

NL	not-listed (regarding wetland indicator status)
NMFS	National Marine Fisheries Service
OBL	Obligate Wetland (wetland indicator status)
Plan	FERC's Upland Erosion Control, Revegetation and Maintenance Plan (FERC 2003b)
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures (FERC 2003a)
Psig	pounds per square inch gauge
SE-EPPC	Southeast Exotic Pest Plant Council
UPL	Obligate Upland (wetland indicator status)
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 PROJECT DESCRIPTION

The Kinder Morgan (KM) Louisiana Pipeline will consist of three pipelines and associated pipeline support facilities, including pig launchers and receivers, and metering equipment. The three pipelines are described as follows:

- Leg 1 will consist of approximately 132 miles of 42-inch diameter pipeline commencing at a receipt point within the proposed Sabine Pass LNG Terminal and continuing to a point of interconnection with an existing Columbia Gulf Transmission (CGT) interstate pipeline in Evangeline Parish, Louisiana. The proposed route of Leg 1 is in Cameron, Calcasieu, Jefferson Davis, Acadia, and Evangeline Parishes, Louisiana.
- Leg 2 will consist of approximately 1.2 miles of 36-inch diameter pipeline, commencing at a receipt point within the Sabine Pass LNG Terminal and continuing to a point of interconnection with the existing Natural Gas Pipeline Company of America (NGPL) pipeline just south of Highway 82. The proposed route of Leg 2 is entirely in Cameron Parish, Louisiana.
- The Florida Gas Transmission (FGT) Lateral will consist of approximately 2.3 miles of 24-inch diameter lateral pipeline, extending eastward from Leg 1 at approximately Milepost (MP) 110.60, to the existing FGT Compressor Station 7. The proposed route of the FGT Lateral is entirely in Acadia Parish, Louisiana.

More details concerning the proposed routes can be found in Resource Report 1 – General Project Description.

2.0 DESCRIPTION OF AFFECTED AQUATIC RESOURCES

An aquatic resource determination was conducted on approximately 3,031 acres along the proposed KM Louisiana Pipeline and construction footprint. The proposed construction footprint includes work areas, permanent and temporary access roads, pipe yards, and interconnects. Emergent wetlands, scrub/shrub wetlands, and forested wetlands were identified during this determination. Wetland acreages have not been verified by the U.S. Army Corps of Engineers (USACE) and will likely change. The proposed project will affect approximately 4 miles of linear waterbodies, including bayous, rivers, canals, tributaries, and roadside drainages and an approximately 13.5-mile section of open water in Sabine Lake.

The underwater aquatic resource surveys did not identify any submerged aquatic vegetation or live oysters along the approximately 13.5-mile section of the route that crosses Sabine Lake. The bottom substrates found during sampling of a 3,000-foot wide corridor included soft mud with buried shell (4,552.2 acres, 87.9%), firm mud (187.6 acres, 3.6%), soft mud with exposed scattered shell (172.1 acres, 3.3%), moderately firm mud (151.8 acres, 2.9%), soft mud (105.5 acres, 2.0%), reef (5.9 acres, 1%), and exposed shell (5.4 acres, 1%). Within this 3,000 foot corridor, over 99% of the water bottom contained no evidence of live and/or recently dead oysters. The greatest density of live oysters in the study area was located within the substrates defined as exposed shell and reef. However, the pipeline route crosses mostly soft mud and firm mud; it does not cross the exposed shell and reef substrate types (see the Sabine Lake Engineering, Shallow Hazard, and Oyster Survey Reports in Appendix 2-A of Resource Report 2 – Water Use and Quality).

This document addresses the wetlands and waterbodies potentially impacted by the project. KMLP has taken measures to reduce the potential effects to wetlands by:

- Optimizing the construction ROW design to avoid and minimize filling of wetlands;
- Routing of the KM Louisiana Pipeline to avoid wetlands; and
- Selecting construction techniques that minimize wetland impacts.

The acreage of jurisdictional wetlands affected by the proposed pipeline project has not been determined by the USACE. However, once the wetland delineation report has been finalized it will be submitted to the USACE, New Orleans District for a jurisdictional determination. Table 1 shows the acreage by Cowardin Classification and wetland category (habitat description) as determined during field studies conducted during January - July 2006.

Table 1 – Summary of Wetland Acreage Impacted by the Project [1]					
Cowardin Classification	**Habitat Description**	**Area Within ROW**		**Acreage Mitigated by HDD**	**Permanent Impacts (acres)[2]**
		Construction Workspace (acres)	**Operations ROW (acres)**		
Leg 1 and Leg 2					
E2EM	Herbaceous Wetland	119.6	43.6	46.5	0.0
PEM	Herbaceous Wetland	183.7	72.9	41.3	0.0
E2SS	Scrub Shrub Wetland	18.0	6.5	7.0	0.0
PSS	Scrub Shrub Wetland	52.0	18.0	6.0	0.0
PFO	Forested Wetland	32.3	13.4	7.0	25.3
FGT Lateral					
PEM	Herbaceous Wetland	0.2	0.1	0.0	0.0
PSS	Scrub Shrub Wetland	1.6	0.8	0.0	0.0
PFO	Forested Wetland	2.8	1.4	0.0	2.8
Access Roads					
E2EM	Herbaceous Wetland	8.4	0.0	0.0	0.0
PEM	Herbaceous Wetland	0.9	0.0	0.0	0.0
PSS	Scrub Shrub Wetland	0.0	0.0	0.0	0.0
PFO	Forested Wetland	0.1	0.0	0.0	0.1
Pipe Yards					
PEM	Herbaceous	42.8	0.0	0.0	0.0

Table 1 – Summary of Wetland Acreage Impacted by the Project [1]					
Cowardin Classification	Habitat Description	Area Within ROW		Acreage Mitigated by HDD	Permanent Impacts (acres)[2]
		Construction Workspace (acres)	Operations ROW (acres)		
	Wetland				
PSS	Scrub Shrub Wetland	19.8	0.0	0.0	0.0
Aboveground Facilities					
PEM	Herbaceous Wetland	1.3	1.3	0.0	1.3
PSS	Scrub Shrub Wetland	0.6	0.6	0.0	0.6
E2EM	Herbaceous Wetland	0.8	0.8	0.0	0.8

[1] Wetland acreages have not been verified by the USACE.

2.1 Wetland Types

Existing Conditions

Wetlands are defined as "those areas inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (33 CFR Part 328). Wetlands are protected from alteration or destruction by Federal and State regulations. At the Federal level, wetlands are protected under Section 404 of the Clean Water Act. Under Section 404, the USACE has the authority to regulate the discharge of dredged or fill materials into waters and adjacent wetlands of the United States. The State of Louisiana administers a regulatory program within the jurisdiction of their Coastal Zone. Any activity affecting the Coastal Zone must obtain a Coastal Use Permit (CUP) to ensure that the activity is consistent with the Louisiana Coastal Resources Program. The KM Louisiana Pipeline falls within the coastal zone boundary for Louisiana within the parishes of Calcasieu and Cameron. KMLP will utilize the joint permit application that has been developed between the Louisiana Department of Natural Resources (LDNR) and the USACE to obtain both the CUP and USACE Section 404 permit. The Louisiana Department of Environmental

Quality (LDEQ), Office of Environmental Services exerts the authority to protect aquatic resources under Section 401 of the Clean Water Act, which requires that the LDEQ conduct a Section 401 certification review of USACE Section 404 permit applications to determine if a proposed discharge would comply with State water quality standards. This Aquatic Resource Mitigation Plan was developed in accordance with the USACE Regulatory Guidance Letter No. 02-2 dated December 24, 2002.

The KM Louisiana Pipeline lies within the Western Gulf Coastal Plain Level III ecoregion. The principal distinguishing characteristics of the Western Gulf Coastal Plain are its relatively flat topography and mainly grassland potential natural vegetation. Inland from this region, the plains are older, more irregular, and have mostly forest vegetation in the Louisiana portion or savanna-type vegetation potentials to the west in Texas. Largely because of its flat topography and fertile soils, a higher percentage of the land is in cropland than in bordering ecological regions. Rice and soybeans are the principal crops. Urban and industrial land uses have expanded greatly in recent decades in some parts of the region, and oil and gas production is common (Daigle et al. 2006).

Wetland delineation was conducted in areas with landowner/manager permission in accordance with methods defined in the USACE Wetlands Delineation Manual (USACE, 1987). Table 1 lists the delineated wetland types impacted by the KMLP Pipeline. The data reflected in Table 1 were generated from field surveys and for areas where land access was denied or the route was adjusted, aerial photography interpretation delineated wetland areas. Wetlands are defined by the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. Topography and soil characteristics along the pipeline corridor dictate the presence of those parameters, and therefore dictate the presence, type, and extent of wetlands along the construction ROW.

The Cowardin system further classifies these wetland types according to their flooding regime, which ranges from temporarily or irregularly flooded to seasonally flooded or permanently flooded (see Resource Report 2 – Water Use and Quality). The Cowardin system of wetland classification (Cowardin, et al., 1979) was used to classify the wetlands into several wetland types which are described in Table 2.

Table 2 – Habitat Description.			
Vegetation Type	**Cowardin Classification**	**Wetland Type**	**Habitat Description**
Herbaceous Wetland	Estruarine Interdial Emergent (E2EM)	Coastal Emergent Marsh	Consists of brackish, intermediate, and fresh marshes. Includes smooth cordgrass, black rush, salt meadow cordgrass, cattail, and bulrush.
	Palustrine Emergent Wetland (PEM)	Typical Palustrine Emergent Wetland	Includes natural palustrine wetlands and man-made wetlands in existing ROWs and other disturbed sites. Includes a wide variety of emergent species, such as cattail, rushes, bulrush, arrowhead, etc.
		Herbaceous Agriculture Wetland	Herbaceous wetlands that have developed on agricultural lands. Typically found in fallow rice fields or wet cattle pastures.
Scrub Shrub Wetland	Estruarine Interdial Scrub-Shrub (E2SS)	Coastal Scrub-Shrub Wetlands	Consists within brackish, intermediate, and fresh marshes. Includes wax-myrtle, *Iva fructescens*, *Sesbania*, smooth cordgrass, black rush, salt meadow cordgrass, cattail, and bulrush.
	Palustrine Scrub-Shrub Wetland (PSS)	Typical Palustrine Scrub-Shrub Wetland	Generally includes sites in various stages of regrowth from timber harvest, fallow fields/pasture, or some other disturbance. Species include water oak, red maple, Chinese tallow, bramble, etc.
		Scrub Shrub Agriculture Wetland	Scrub shrub wetlands that have developed on agricultural lands. Typically found in fallow rice fields or wet cattle pastures.
Forested Wetland	Palustrine Forested Wetland (PFO)	Bottomland Hardwood Wetland	Dominated by water oak, willow oak, green ash, and other hydrophytic hardwood species. Invasive species such as Chinese tallow are commonly found as dominants in these systems.
		Swamp	Normally associated with riparian zones and dominated by bald cypress, water tupelo, and water elm.

The following sections describe the wetland categories listed above, and Table 3 lists representative species for each of the wetland category.

Coastal Emergent Marsh

The coastal emergent marsh consists of three primary marsh communities: brackish marsh (5-10 parts per thousand salinity), intermediate marsh (0.5-3.5 parts per thousand salinity), and coastal fresh marsh (<0.5 parts per thousand salinity; Stutzenbaker, 1999). Coastal emergent marsh is restricted primarily to areas along the KM Louisiana Pipeline south of the Intracoastal Waterway.

Brackish marsh communities are tidal brackish marshes typically with smooth cordgrass shoreline fringes and saltmeadow cordgrass dominating just inshore. The saltmeadow cordgrass marsh often includes some or all of the following species: common reed, hog cane, chairmaker's bulrush, saltmarsh bulrush, cattail, eastern baccharis, marshelder, and sea-ox-eye daisy. The intermediate marsh includes the above listed species, with increasing dominance by black rush and saltmarsh bulrush in the intertidal zone. Other commonly occurring species within the intermediate marsh communities include hog cane, chairmaker's bulrush, California bulrush, and cattail.

The coastal fresh marsh community occurs in tidal and non-tidal areas on the coastal plain with a salinity range of 0-0.5 parts per thousand (Stutzenbaker,1999). This habitat intergrades with the intermediate marsh along tidally influenced canals and bayous that exchange with more saline water bodies such as the GIWW. A large section of coastal fresh marsh, with exception of upland levees and open water areas, occurs north of the GIWW. Intermediate marsh species occur more commonly along canals and bayous in close proximity to the GIWW. Salt meadow cordgrass is the dominant plant species in this community with rice cutgrass, yellow bristle grass, cattail, California bulrush, fall panicum, saltmarsh bulrush, Olney bulrush, rattlebox, bigpod sesbania, seedbox, swamp smartweed, white waterlily, lotus, pennywort, and watergrass also occurring. Big Hill Bayou and most of the canals are bordered by bands of fresh marsh species such as common reed, giant cutgrass, cattail, dwarf spikerush, and California bulrush.

Typical Palustrine Emergent Wetland

This community classification includes natural, as well as man-made wetlands resulting from hydrologic modifications. Herbaceous wetlands occur within existing ROWs and cattle grazing pastures which are temporarily to seasonally flooded. These areas are common and vary in size from <0.01 acre to >1 acre. Many of the herbaceous species listed in the coastal emergent marsh section (above) are represented in this community in varying combinations and dominance. Commonly encountered plant species in this habitat include Gulf coast spikerush, dwarf spikerush, slender spikerush, soft-stem rush,

pine barren flatsedge, green flatsedge, rusty flatsedge, bushy bluestem, dallisgrass, dotted smartweed, water primrose, swamp smartweed, and maidencane.

Herbaceous Agricultural Wetlands

This habitat is typically associated with active rice or crawfish production. These communities are similar to other palustrine emergent wetlands. Jungle rice, smart weed, and various spike rushes are normally the dominant vegetation.

Coastal Scrub/Shrub Wetlands

Coastal scrub/shrub marsh communities, associated with coastal emergent marsh, are often dominated by saltmeadow cordgrass and shrubby species including wax-myrtle, *Iva fructescens*, marshelder, sea-ox-eye daisy, Carolina wolf-berry, rattlebox, and common reed.

Typical Palustrine Scrub/Shrub Wetlands

This classification represents several community variations. The most common variation includes many of the plants listed in the emergent wetland section above, but also includes shrubby species such as bramble, marshelder, saplings (usually water oak, red maple, and sweetgum) and/or Chinese tallow. Other areas with the scrub/shrub wetland classification are sites in various states of regrowth in areas of disturbance. These areas often contain mixes of scrub/shrub sapling species listed above, pine, waxmyrtle, and other plants common to the surrounding area.

Scrub Shrub Agricultural Wetlands

This habitat includes wetlands that have developed in fallow rice fields and wet cattle pastures. Vegetation types are similar in community structure to other scrub shrub wetlands, and are typically dominated by sesbania, Chinese tallow, and black willow.

Bottomland Hardwood Wetlands

Bottomland hardwood wetland communities occur along the larger streams and rivers and are characterized by overcup oak, laurel oak, willow oak, green ash, sweetgum, American hornbeam, deciduous holly, cedar elm, Texas sugarberry, red maple, and hawthorn. Shrub species commonly associated with this community include the above listed species and indigo bush, swamp cyrilla, poison ivy, Drummond sesbania, dogwood, and Sebastian bush. Common woody vines include wooly Dutchman's pipe, American buckwheat vine, common greenbrier, supplejack, cross vine, Virginia creeper, sweet grape, and Kentucky wisteria. Some of the local variations in bottomland hardwood communities within the project area might include American hornbeam, water

oak, blackgum, and sweetgum on ridges between sloughs and swamps, with Carolina ash, red maple, American snowbell, and laurel oak dominating on flats between ridges. Some flats support extensive populations of dwarf palmetto.

Species dominance in the bottomland hardwood wetland communities is highly varied, from highly vegetatively diverse communities to much less complex stands of overstory species like red maple or sweetgum.

Swamp

Cypress tupelo swamp communities are restricted primarily to wetlands associated with the banks and islands of the larger rivers and bayous in the area (e.g., in the Bayou Nezpique and the Bayou Des Cannes riparian zones). The most extensive swamp communities occur in association with bottomland hardwood wetlands. Cypress tupelo swamp communities often include some or all of the following species: bald cypress, water tupelo, swamp privet, water elm, Carolina ash, water locust, and common buttonbush. Other commonly encountered species include summersweet clethra, water willow, scarlet rosemallow, corkwood, sweetbells leucothoe, possumhaw viburnum, cupseed, and decumaria vine. Swamp community composition variations include wetlands dominated by sweetgum and/or red maple.

Table 3 – Representative Plant Species by Wetland Type

Wetland Plant Species	Stratum	Indicator Status[1]
Agrostis sp.	Herbaceous	-
Agrostis stolonifera	Herbaceous	FACW
Alternanthera philoxeroides	Herbaceous	OBL
Althaea officinalis	Herbaceous	NI
Ambrosia altissima	Herbaceous	FACU
Ambrosia trifida	Herbaceous	FAC
Andropogon glomeratus	Herbaceous	FACW+
Andropogon virginicus	Herbaceous	FAC-
Arundinaria gigantea	Herbaceous	FACW

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Aster dumosus	Herbaceous	FAC
Aster laevis	Herbaceous	UPL
Aster paludosus	Herbaceous	FACW
Axonopus affinis	Herbaceous	FACW+
Axonopus fissifolius	Herbaceous	FACW-
Bacopa monnieri	Herbaceous	OBL
Care sp.	Herbaceous	-
Centella asiatica	Herbaceous	FACW
Centella erecta	Herbaceous	FACW
Chasmanthium latifolium	Herbaceous	FAC-
Circium vulgare	Herbaceous	FAC
Cladium mariscus	Herbaceous	OBL
Cynodon dactylon	Herbaceous	FACU
Cyperus articulatus	Herbaceous	OBL
Cyperus sp.	Herbaceous	-
Cyperus virens	Herbaceous	FACW+
Dichanthelium acuminatum	Herbaceous	FAC
Dichanthelium scoparia	Herbaceous	FACW
Digitaria ciliaris	Herbaceous	NI
Distichlis spicata	Herbaceous	FACW+
Eleocharis equisetoides	Herbaceous	FAC
Eleocharis baldwnii	Herbaceous	OBL
Eleocharis ovata	Herbaceous	OBL

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Eleocharis palustris	Herbaceous	OBL
Eleocharis parvula	Herbaceous	OBL
Eleocharis vivipara	Herbaceous	OBL
Eupatorium capillifolium	Herbaceous	FACU
Eupatorium compositifolium	Herbaceous	FAC-
Fragaria virginiana	Herbaceous	FAC-
Frimbristylis sp.	Herbaceous	FAC
Gallium trifidium	Herbaceous	NI
Geranium carolinianum	Herbaceous	NL
Gnaphalium chilense	Herbaceous	FAC-
Hibiscus aculeatus	Herbaceous	FACW
Hydrocotyle bonariensis	Herbaceous	FACW
Hydrocotyle umbellata	Herbaceous	OBL
Hygrophila polysperma	Herbaceous	OBL
Iris prismatica	Herbaceous	OBL
Iris virginica	Herbaceous	OBL
Juncus effuses	Herbaceous	FACW+
Juncus interior	Herbaceous	FACU
Juncus roemerianus	Herbaceous	OBL
Ludwigia repens	Herbaceous	OBL
Lygodium japonica	Herbaceous	FAC
Nothoscordum bivalve	Herbaceous	FAC
Osmunda regalis	Herbaceous	OBL

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Panicum repens	Herbaceous	FACW-
Paspalum setaceum	Herbaceous	FAC
Paspalum sp.	Herbaceous	-
Paspalum urvillei	Herbaceous	FAC
Phalaris angusta	Herbaceous	FACW+
Phragmities australis	Herbaceous	FACW
Phyla notiflora	Herbaceous	FACW
Plantago cordata	Herbaceous	OBL
Plantago major	Herbaceous	FAC+
Poa annua	Herbaceous	FAC
Polygonum amphibium	Herbaceous	OBL
Polygonum hydropiperodies	Herbaceous	OBL
Polygonum pensylvaniaicum	Herbaceous	FACW
Polygonum punctatum	Herbaceous	FACW+
Polypogon monspeliensis	Herbaceous	FACW
Pontederia cordata	Herbaceous	OBL
Potomogeten sp.	Herbaceous	OBL
Ptilimnium capillaceum	Herbaceous	FAC
Ptilimnium sp.	Herbaceous	-
Ranunculus acris	Herbaceous	FAC
Ranunculus alterniflora	Herbaceous	OBL
Ranunculus marginata	Herbaceous	FAC
Ranunculus muricatus	Herbaceous	FACW

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Ranunculus parviflorus	Herbaceous	FAC
Rhynchospora sp.	Herbaceous	-
Rumex crispus	Herbaceous	FAC
Sabal minor	Herbaceous	FACW
Saccharum alopecuroides	Herbaceous	FAC
Saccharum giganteum	Herbaceous	FACW
Sagitaria latifoila	Herbaceous	OBL
Sagittaria graminea	Herbaceous	OBL
Sagittaria latifolia	Herbaceous	FAC-OBL
Sanguinaria canadensis	Herbaceous	NI
Schoenoplectus californicus	Herbaceous	OBL
Schoenoplectus pungens	Herbaceous	OBL
Scirpus pungens	Herbaceous	OBL
Scirpus tabernaemontani	Herbaceous	OBL
Senecio glabellus	Herbaceous	FACW+
Senecio vulgaris	Herbaceous	FACU
Setaria glauca	Herbaceous	FAC
Solidago canadensis	Herbaceous	FACU
Solidago sp.	Herbaceous	-
Sorghum halepense	Herbaceous	OBL
Spartina cynosuroidies	Herbaceous	OBL
Spartina patens	Herbaceous	FAC
Sporobolus indicus	Herbaceous	FACU+

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Trasescantia hirsutiflora	Herbaceous	NL
Trifolium repens	Herbaceous	FACU
Typha latifolia	Herbaceous	OBL
Typha sp.	Herbaceous	OBL
Verbena brasilinsis	Herbaceous	FAC-
Verbena hastata	Herbaceous	FAC
Vicia ludovicidana	Herbaceous	FACU
Vicia sativa	Herbaceous	FACU
Viola peditifida	Herbaceous	FACU
Zizanium aquatica	Herbaceous	OBL
Acer rubrum	Sapling	FAC
Celtis laevigata	Sapling	FACW
Fraxinus pennsylvanica	Sapling	FACW
Ligustrum sinense	Sapling	FAC
Liquidambar styracifola	Sapling	FAC+
Pinus taeda	Sapling	FAC
Quercus nigra	Sapling	FAC
Quercus phellos	Sapling	FACW-
Salix nigra	Sapling	OBL
Sambucus canadensis	Sapling	FACW-
Sapium sebiferum	Sapling	FAC
Ulmus americana	Sapling	FACW
Baccharis angustifolia	Shrub	FACW+

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Baccharis halimifolia	Shrub	FAC
Cephalanthus occidentalis	Shrub	OBL
Halesia diptera	Shrub	FAC
Ilex vomitoria	Shrub	FAC
Iva frutescens	Shrub	FACW
Ligustrum sinense	Shrub	FAC
Ligustrum vulgare	Shrub	UPL
Myrica cerifera	Shrub	FAC+
Rosa laevaigata	Shrub	NL
Rubus strigosis	Shrub	FAC
Rubus trivialis	Shrub	FAC
Sabal minor	Shrub	FACW
Sambucus canadensis	Shrub	FACW-
Sasbania drummondii	Shrub	FACW
Viburnum dentatum	Shrub	FAC
Acer rubrum	Tree	FAC
Carpinus caroliniana	Tree	FAC
Celtis laevigata	Tree	FACW
Crataegus mollis	Tree	FAC
Crataegus viridis	Tree	FACW
Fraxinus pennsylvanica	Tree	FACW
Gleditsia triacanthus	Tree	FAC-
Ilex decidua	Tree	FACW-

Table 3 – Representative Plant Species by Wetland Type		
Wetland Plant Species	**Stratum**	**Indicator Status[1]**
Liquidambar styraciflua	Tree	FAC+
Nyssa sylvatica	Tree	FACW
Pinus taeda	Tree	FAC
Planaera aquatica	Tree	OBL
Quercus lyrata	Tree	OBL
Quercus nigra	Tree	FAC
Quercus phellos	Tree	FACW-
Quercus virginiana	Tree	FACU+
Salix nigra	Tree	FAC
Sapium sebiferum	Tree	FAC
Taxicodium disticium	Tree	OBL
Ulmus Americana	Tree	FACW
Vitis rotundifolia	Vine	FAC
Aeschynomene indica	Vine	FACW
Ampelopsis arborea	Vine	FAC
Berchemia scandens	Vine	FACW
Lonicera japonica	Vine	FAC
Mikania scandens	Vine	FACW+
Smilax rotundafolia	Vine	FAC
Smilax sp.	Vine	-
Toxicodendron radicans	Vine	FAC

[1] Indicator Statuses (Resource Management Group, Inc. 1994): FAC = Facultative (equally likely to occur in wetlands and non-wetlands, 34%-66% probability); FACU = Facultative Upland (67% - 99% probability to occur in non-wetlands, 1%-33% probability in wetlands); FACW = Facultative Wetland (estimated 67% - 99% probability to occur in wetlands); NI = No Indicator (insufficient information available to determine an indicator status); NL = not-listed (may be because, OBL = Obligate Wetland (occurs with an estimated 99%

probability in wetlands); and UPL = Obligate Upland (>99% probability of occurring in nonwetlands in this region; may occur in wetlands in other regions). If a species doesn't occur in wetlands in any region, it is not included in Resource Management Group, Inc. (1994).

3.0 MITIGATION APPROACH

Table 1 outlines the approximate delineated acreage of each wetland community expected to be: ·

- Temporarily affected during construction and restored which would not result in a permanent loss of habitat; and
- Permanently (i.e., for at least the life of the project) affected by construction and operation of the pipeline.

Temporary impacts include pipeline construction through waterbodies, coastal emergent marsh, herbaceous wetland (palustrine emergent), and scrub/shrub wetlands and temporarily disturbed construction areas (e.g., laydown areas, staging areas). These areas will be graded and restored to pre-construction conditions, as applicable. Wetlands in temporarily affected sites will be allowed to revegetate, restoring wetland function. Permanent impacts include pipeline interconnect sites, permanent access roads, and the removal of forested wetlands. Where possible, construction techniques like horizontal directional drilling (HDD) will be implemented to avoid and/or minimize impacts. In addition, extensive use of HDD technology to avoid impacts to watercourses or sensitive areas and alternative pipeline routes involving additional mileage (discussed in Resource Report 10) were evaluated to minimize impacts.

3.1 Mitigation for Temporary Impacts

KMLP proposes to mitigate areas of temporary impact through restoration of the affected areas at a 1:1 ratio according to the FERC (2003a) Wetland and Waterbody Construction and Mitigation Procedures (Procedures). These procedures, and the proposed mitigation implementation plans, include:

- Trench breakers will be installed to prevent the pipeline from draining wetlands;
- A permanent slope breaker will be installed at the base of slopes for gradients steeper than five percent;
- No fertilizer, lime, or mulch will be applied to wetlands, unless instructed in writing by the appropriate state agency;

- KMLP will consult with the appropriate state agency to develop a project specific wetland restoration plan;
- Until a project-specific management plan is implemented, KMLP will revegetate construction ROW utilizing seed mixes, application rates, and planting dates obtained from the local soil conservation authority [in upland areas];
- KMLP will ensure that disturbed wetland areas are successfully revegetate with wetland herbaceous or woody species; and
- KMLP will remove temporary sediment barriers between wetlands and uplands once uplands have been stabilized.

In addition, although the proposed KM Louisiana Pipeline does not expect to impact any oyster habitat, KMLP will compensate the state of Louisiana according to the Louisiana Department of Wildlife and Fisheries (LDWF) established compensation rates for impacts to water bottoms on public oyster seed grounds, public oyster seed reservations, and public oyster tonging areas (LDWF 2003).

3.2 Mitigation for Permanent Impacts

Construction of the KM Louisiana Pipeline will permanently affect approximately 30.9 acres of wetlands based on environmental surveys (Table 1). However, this acreage estimate is not based on USACE jurisdictional determinations and is not considered final. Once the survey information is verified by the USACE, KMLP will implement a mitigation plan that outlines mitigation components in detail. Mitigation options being considered include wetland creation and restoration projects, wetland preservation, in-lieu-fee mitigation, and mitigation banking. KMLP does not expect to permanently impact any oyster habitat.

3.3 Goals and Objectives

The goal of wetland mitigation is to ensure no net loss of wetland functional value for the wetlands affected by the proposed Project. For the proposed project, this goal will be accomplished through:

- Wetland creation and restoration project(s);
- Wetland preservation;
- Mitigation banking;

- In-lieu-fee mitigation; or
- A combination of some or all of these options.

4.0 WETLAND ACREAGE REQUIRING MITIGATION

Table 1 provides an approximation of acreage requiring mitigation. USACE jurisdictional determination for the pipeline and terminal has not been completed, and the values listed in Table 1 do not necessarily reflect the actual jurisdictional wetlands, as verified by the USACE, that will require mitigation.

5.0 MITIGATION OPTIONS

The KMLP Draft Aquatic Resource Mitigation Plan explores four mitigation options to mitigate for permanent wetland impacts:

- Wetland restoration;
- Wetland preservation;
- Mitigation banking; and
- In-lieu-fee mitigation.

KMLP is currently exploring these options and will not finalize the mitigation components until the wetland types and acreages identified during the wetland delineation have been verified and approved by the USACE.

5.1 Wetland Creation and Restoration

KMLP is currently exploring several possibilities for wetland creation and restoration. A representative of the U.S. Fish and Wildlife Service (USFWS), Sabine National Wildlife Refuge has been contacted to determine whether there are potential wetland creation or restoration sites within or near the refuge (Voros 2006). The Sabine National Wildlife Refuge is directly adjacent to Leg 1 of the KM Louisiana Pipeline and would be an ideal location for mitigating wetland impacts associated with this project. In addition to the USFWS, private lands along the route are currently being identified that may serve as potential wetland creation or restoration sites. It is the goal of KMLP to identify wetland creation and restoration sites that are in-kind and as close as possible to the actual wetlands being mitigated.

Several Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) projects were identified in the vicinity of the proposed project (see Resource Report 8 –

Land Use, Recreation, and Aesthetics). KMLP investigated whether it could work with any of these projects to achieve its mitigation goals. It was discovered that the organization of these projects precludes the use of additional funds once the projects have been initiated (Clark 2006).

5.2 Mitigation Banking

In 1995, the Federal Guidance on the Establishment, Use and Operation of Mitigation Banks (Banking Guidance) was issued. Consistent with that guidance, KMLP may purchase mitigation credits from an approved bank. Mitigation banking instruments are reviewed and approved by an interagency Mitigation Banking Review Team (MBRT). The MBRT ensures that the banking instrument appropriately addresses the physical and legal characteristics of the bank and how the bank will be established and operated (e.g., classes of wetlands and/or other aquatic resources proposed for inclusion in the bank, geographic service area where credits may be sold, wetland classes or other aquatic resource impacts suitable for compensation, methods for determining credits and debits). The bank sponsor is responsible for the operation and maintenance of the bank during its operational life, as well as the long-term management and ecological success of the wetlands and/or other aquatic resources, and must provide financial assurances (USEPA 2000).

KMLP has initiated contact with the USACE, New Orleans District to determine if any of the mitigation banks listed on their website would be in the vicinity of the project and have available mitigation credits (Barlow 2006; Breaux 2006). KMLP also has contacted USFWS in Lafayette, Louisiana to investigate mitigation banking opportunities (Holland 2006).

5.3 Wetland Preservation

The USACE and U.S. Environmental Protection Agency (USEPA) agree that if on-site compensatory mitigation is not practicable, off-site compensatory mitigation should be undertaken in the same geographic area if practicable (i.e., in close proximity and, to the extent possible, the same watershed). They have also agreed that generally, in-kind compensatory mitigation is preferable to out-of-kind and that mitigation banking may be an acceptable form of compensatory mitigation. The agencies recognize the general preference for restoration over other forms of mitigation, given the increased chance for ecological success (USEPA 2000). However, if wetland creation,

restoration, or mitigation banking options are not available within an acceptable distance from the project, wetland preservation may be a desirable alternative. In many areas, certain wetland types are becoming fragmented to the point that they eventually cannot perform as functional wetlands or serve as a viable habitat for wetland species. In these cases, where the destruction of a particular wetland type is imminent based on current trends, preservation may be as ecologically beneficial as the other compensatory mitigation options discussed.

KMLP has discussed wetland preservation opportunities with LDWF (Myers 2006) and is in the process of exploring possibilities with conservation organizations including The Nature Conservancy and Sierra Club. KMLP also has discussed the role that The Trust for Public Land may play in facilitating this process (Schmidt 2006). The Trust for Public Land is a non-profit organization that acts as an intermediary between willing sellers and typically a public entity to purchase land for public use.

5.4 In-lieu-fee Mitigation

In-lieu-fee, fee mitigation, or other similar arrangements, wherein funds are paid to a natural resource management entity for implementation of either specific or general wetland or other aquatic resource development project, are not considered to meet the definition of mitigation banking because they do not typically provide compensatory mitigation in advance of project impacts. Moreover, such arrangements do not typically provide a clear timetable for the initiation of mitigation efforts. The USACE, in consultation with the other agencies, may find circumstances where such arrangements are appropriate so long as they meet the requirements that would otherwise apply to an offsite, prospective mitigation effort and provide adequate assurances of success and timely implementation. In such cases, a formal agreement between the sponsor and the agencies, similar to a mitigation bank, is necessary to define the conditions under which its use is considered appropriate. In-lieu-fee agreements may be used to compensate for impacts authorized by a USACE individual permit if the in-lieu-fee arrangement is developed, reviewed, and approved using the process established for mitigation banks in the Banking Guidance. MBRTs should review applications from such in-lieu-fee sponsors to ensure that such agreements are consistent with the Banking Guidance (USEPA 2000).

KMLP will only consider in-lieu-fee mitigation if compensatory mitigation, mitigation banking, or wetland preservation are not practicable for mitigating wetland impacts associated with this project.

5.5 Location(s) for Mitigation Efforts

Mitigation options selected will be located in the Sabine Lake, Lower Sabine, Lower Calcasieu, Upper Calcasieu, Mermentau, and Mermentau Headwaters watersheds. This rationale complements the goal of Section 404(b)(1) guidelines of no net loss of function and value.

5.6 Mitigation Acreage Considerations

Wetland acreages requiring mitigation will be quantified and presented by habitat type following USACE determination of the wetland locations identified during the field studies.

6.0 PIPELINE MONITORING PLAN

6.1 Temporary Impacts

Monitoring the success of the wetland restoration for temporarily affected wetlands will be conducted for three years or until the revegetation is considered to be successful as described in FERC's Procedures (FERC 2003a). Revegetation shall be considered successful if the herbaceous and/or woody species is at least 80 percent areal coverage of native wetland vegetation. KMLP, and/or its agents, will conduct monitoring in these areas.

6.2 Additional Monitoring Plans

Areas within the pipeline construction corridor and associated work areas will be restored to pre-project contours. Pre- and post-construction elevation surveys will be conducted. Elevation survey results will be submitted to the USACE within 90 days after completion of pipeline installation. Additional soil from off site may be brought into areas containing highly organic soils susceptible to high erosion rates.

Aerial photography with Geographic Information System (GIS) analysis will be used to monitor the entire pipeline construction corridor and an additional 200- meter buffer zone (100 meters paralleling each side of the construction corridor). The following GIS/Remote Sensing method and standard will be used: The pipeline corridor will be monitored by pre- and post-construction aerial photography (taken 12 months after construction completion to allow for vegetative regrowth) at a scale of 1:4800 or 1 inch to 400 feet. GIS and Remote Sensing techniques will be used to conduct an analysis of

change to determine the amount of vegetated marsh impacted by pipeline construction activities.

Monitoring reports will be submitted that include at a minimum: (1) a pre-project GIS analysis assessing the existing emergent marsh to open water ratio, in acres, within the permitted corridor (which includes the construction corridor and the 200 meter buffer zone); (2) a post-project GIS analysis assessing the emergent marsh to open water ratio, in acres, within the permitted corridor (which includes the construction corridor and the 200-meter buffer zone); (3) Ortho corrected imagery covering the construction corridor and buffer zone, maximum of 6-inch pixel size and Color Infra-red imagery, about 2 meter spatial accuracy; and (4) all vector deliverables to be in Arcview Shapefile format with Federal Geographic Data Committee (FGDC) compliant metadata and all raster imagery in GeoTIFF format with FGDC compliant metadata. A binary classification system will be used consisting of open water and vegetated areas. The classified data will meet or exceed 90 percent attribute accuracy as determined by industry standard and verified by statistically valid ground truth sampling techniques; this may include Global Positioning System based ground surveys. Monitoring reports will be submitted to the USACE, detailing the results from the pre- and post-GIS analysis and the above referenced data sets, within 90 days after completion of the 12-month interval between the pre- and post-construction analysis.

In addition, pursuant to NMFS (2006) recommendations, monitoring of wetlands considered to be Essential Fish Habitat (EFH) will document project impacts as follows:

- The monitoring primarily would be photographic in nature, with photos being taken from on the ground at work sites;
- It would occur pre-construction, immediately post-construction, and one growing season post-construction with photos of all work sites; and
- Photos would be taken every 500 feet (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 being recorded in a tabular form and referenced to an aerial photo documenting photo numbers.

Wetlands considered EFH are listed in Table 3-1 in Resource Report 3 - Fish, Wildlife and Vegetation.

7.0 MAINTENANCE AND CONTINGENCY PLAN

7.1 Maintenance

Maintenance to address temporary impacts as well as long-term vegetation management of the pipeline ROW will be conducted by KMLP according to the FERC regulations summarized below.

- Vegetative maintenance will not be conducted over the entire width of the ROW in wetlands. Rather a corridor centered on the pipeline and up to 10 feet wide will be maintained in an herbaceous state. Trees within 15 feet of the pipeline greater than 15 feet in height may be cut and removed from the permanent ROW in accordance with the FERC guidelines in order to protect the integrity of the pipeline operations over time (FERC 2003a).
- Herbicides will not be used within 100 feet of a wetland unless directed to do so by the appropriate state agency (FERC 2003a).

Variances from FERC's Upland Erosion Control, Revegetation and Maintenance Plan (Plan) (FERC 2003b) and Procedures (FERC 2003a) that KMLP has requested be considered are described in Resource Report 2 – Water Use and Quality.

7.2 Contingency Plan

If revegetation success is not achieved after three years, the area along the pipeline ROW that has not revegetated will have the topography checked by a land survey to determine if long-term surface grading impacts remain from construction. Proper grade will be restored if necessary, and the area will be revegetated and monitored for another year, as before. If revegetation is not successful after an additional year of monitoring, a supplemental planting will be conducted.

7.3 Invasive Species Control Plan

7.3.1 Introduction

Chinese Tallow, a noxious invasive species of tree commonly found throughout the Project area (USGS 2000; USDA 2006), is likely to become established in the disturbed area of the ROW following restoration, if not controlled. As part of its Implementation Plan, KMLP will prepare a plan for the control of Chinese Tallow and other invasive species, if identified. Control of invasive species would allow native species to become

re-established. The plan would be initiated after right-of-way restoration and in consultation with landowners. Key elements of the plan would include:

- Training field personnel in the identification and control of the Chinese Tallow Tree;
- Providing field personnel with the applicable registration for the purchase of regulated herbicides and training in their proper handling and application;
- Controlling the spread of older Chinese Tallow Trees by mechanical cutting and chemical treatment;
- Removing young Chinese Tallow Tree saplings by hand or machine; and
- Documenting and reporting control activities and the volumes of herbicide used.

7.3.2 Logistics

Field personnel qualifications

Invasive plant control field personnel will be trained to identify Chinese tallow and other invasive species, and perform the prescribed mechanical and chemical treatment procedures. Additionally, these individuals will have the applicable training and registration to purchase, handle, and apply regulated herbicides used for control. An accompanying safety and health plan will be developed and implemented in conjunction with this control plan.

Site access

After initial restoration is completed along the pipeline ROW, pipe yards and extra workspaces, KMLP will contact the affected landowners and/or managers to gain permission to initiate the Chinese tallow and other invasive species control on their property.

7.3.3 Chinese Tallow Control

The Chinese tallow control plan requires mechanical (cutting and hand pulling) and potentially chemical treatment to effectively manage while providing the opportunity for native and other preferred species to establish after pipeline construction is completed.

Chinese tallow mechanical cutting

Field personnel will cut any remaining Chinese tallow trees found within the former construction areas at ground level with power equipment or manual saws (SE-EPPC 2005). Debris will be gathered and transported to an approved offsite disposal facility.

Chinese tallow chemical treatment

As cutting older trees leads to stump and root suckering, cutting will not provide satisfactory control unless stumps are treated with chemicals (LSU 2005). It is common practice to use diesel or another oil as an application medium for several herbicides; however, KMLP will not use diesel or another oil since the pipeline route has a significant acreage of wetlands and open-water habitats. For cut stumps, one of the following chemical applications will be used:

- *Glyphosate (common trade names include Ranger,® Rodeo,® and Roundup Ultra,®)*: Horizontally cut stems at or near ground level. Immediately apply a 50 percent solution of glyphosate and water to the cut stump, covering the outer 20 percent of the stump (SE-EPPC 2005). Since glyphosate is nonselective, it is very important to protect the surrounding desirable plants. Thus, a sponge or similar discrete application method will be used to apply the glyphosate solution. Also, the water mixed with glyphosate must be free of dirt as this herbicide binds tightly to soil clay and organic matter; otherwise the effectiveness of the application is reduced.
- *Triclopyr (common trade names include Remedy® and Grandstand®)*: Horizontally cut stems at or near ground level. Immediately apply a 50 percent solution of triclopyr and water to the cut stump, covering the outer 20 percent of the stump (SE-EPPC 2005). In areas where desirable grasses are growing under and around Chinese tallow, SE-EPPC (2005) reports that triclopyr can be used without non-target damage.

Chinese tallow sapling control

Chinese tallow is effectively controlled by removal of young seedlings; hand or machine pulling of seedlings and saplings provides excellent control (LSU 2005). Plants should be pulled as soon as they are large enough to grasp, but before they produce seeds. Seedlings are best pulled after a rain when the soil is loose. The entire root must be removed since broken fragments may resprout (SE-EPPC 2005).

Chinese tallow control frequency

As Chinese tallow is a successful invasive species, there is always a potential for the plant to establish. However, the goal of this control program is to allow native and other desirable plants sufficient opportunity to establish along the construction ROW and other extra workspaces. Therefore, KMLP will control Chinese tallow growth in areas of

the construction ROW for 3 years after completion of the pipeline system. The following describes the control procedures to be used for a given year.

Year 0 (during construction demobilization): Cutting including off-site debris disposal followed with chemical treatment as described above will be conducted during construction demobilization. KMLP will record the herbicide(s) volume used during this effort.

Year 1 (late-summer): Reports indicate that spring herbicide application may not be successful, and that to translocate (i.e., transporting the herbicide into the root system by natural circulation within the plant) the herbicide into the plant most effectively, late summer to early fall applications should be employed (TNC 2005). KMLP will apply chemical (herbicide) treatment to stumps and roots exhibiting sprouts. Also, saplings will be removed by pulling as described above. KMLP will record the herbicide(s) volume used during this effort.

Year 2 (late-summer): KMLP will apply chemical (herbicide) treatment to stumps and roots exhibiting sprouts. Also, saplings will be removed by pulling as described above. KMLP will record the herbicide(s) volume used during this effort.

Year 3 (late-summer): KMLP will apply chemical (herbicide) treatment to stumps and roots exhibiting sprouts. Also, saplings will be removed by pulling as described above. KMLP will record the herbicide(s) volume used during this effort. KMLP will present a report to the USACE and FERC documenting the control activities conducted since construction demobilization, including the volume by year of herbicide(s) used.

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