Mississippi River Valley Division,
Regional Planning and Environment Division South

# Amite River and Tributaries East of the Mississippi River, Louisiana (ART)


## Appendix C-1 – Supporting Information
## November 2019

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# Section 1
# Inventory and Forecast Conditions

## 1.1 ENVIRONMENTAL SETTINGS

### 1.1.1 Land Use

Table C1-1 and Figure C1-1 below show the land use classification in acres in 2015 in the study area. This data indicate that majority of the land in the Study consists of forested wetlands (i.e. Woody Wetlands), Shrub/Scrub, and Evergreen Forest. The lower half of the Amite River Basin (ARB) is also more developed compared to the lands in the upper ARB.

*Table C1-1. Land Use Classification in the Study Area*

| Amite Land Use | | |
|---|---|---|
| Type | Acres | Percent |
| Open Water | 0 | 0% |
| Developed, Open Space | 414,851 | 6% |
| Developed, Low Intensity | 343,755 | 5% |
| Developed, Medium Intensity | 143,804 | 2% |
| Developed, High Intensity | 42,675 | 1% |
| Hay/Pasture | 624,560 | 9% |
| Cultivated Crops | 362,253 | 5% |
| Barren Land | 39,880 | 1% |
| Deciduous Forest | 171,630 | 2% |
| Evergreen Forest | 1,116,398 | 16% |
| Mixed Forest | 239,171 | 3% |
| Shrub/Scrub | 1,165,556 | 17% |
| Herbaceuous | 137,011 | 2% |
| Woody Wetlands | 2,123,732 | 30% |
| Emergent Herbaceuous Wetlands | 104,067 | 1% |
| Total | 7,029,343 | 100% |
| | | |
| Developed | 945,085 | 14% |
| Agricultural | 986,813 | 14% |
| Undeveloped | 5,097,445 | 72% |
| Total | 7,029,343 | 100% |
| Source: USGS National Land Cover Database 2015 | | |

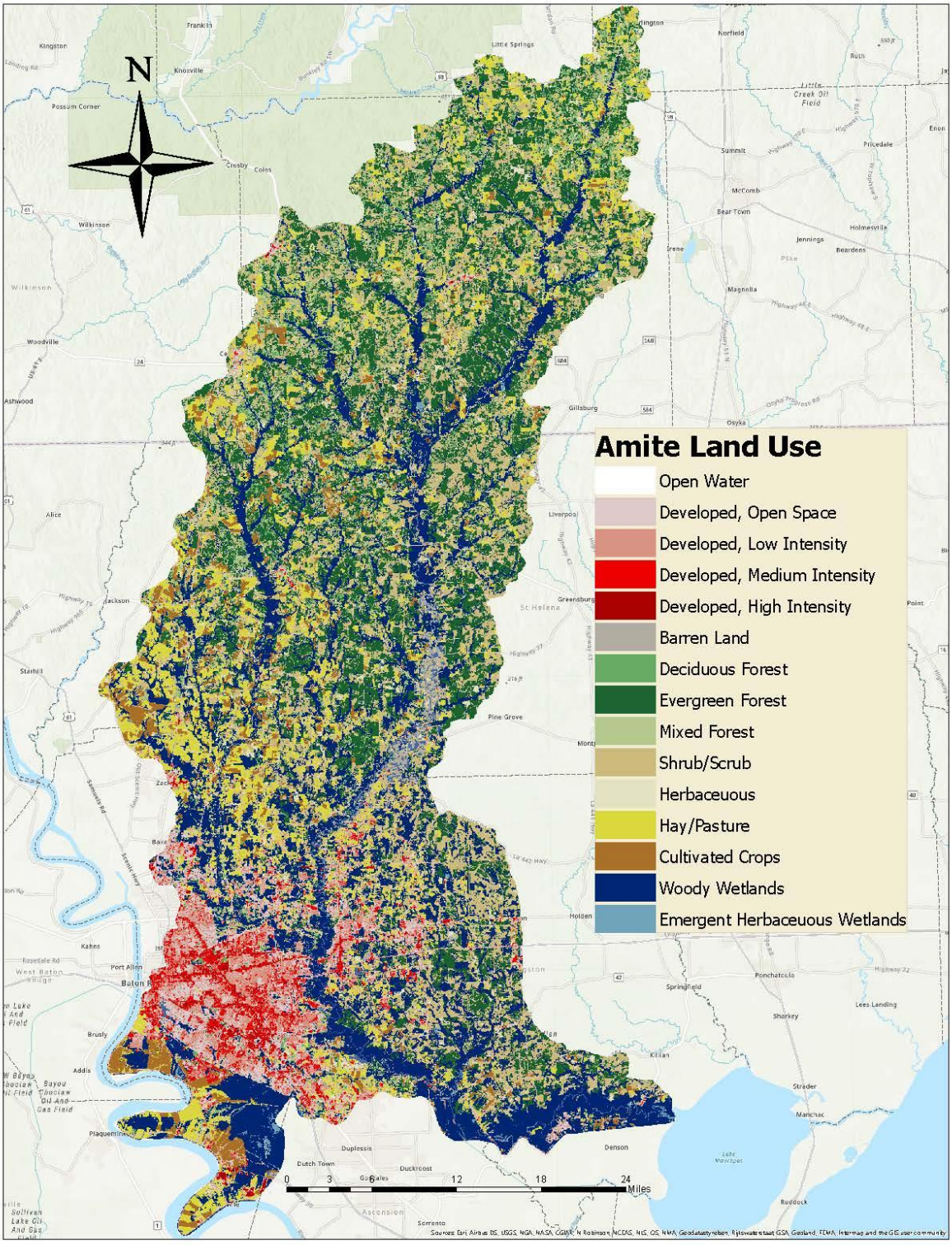


*Figure C1-1. Land Use Classification*

### 1.1.2 Climate

Table C1-2 consists of the monthly temperature normals recorded from the Baton Rouge Metro Airport, LA monitoring station by the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC). Retrieved 15 April 2019 from https://www.ncdc.noaa.gov/cdo-web/datatools/normals.

*Table C1-2. 1981-2010 Temperature Normals from Baton Rouge Metro Airport, LA US*

| MONTH | PRECIP (IN) | MIN TMP (°F) | AVG TMP (°F) | MAX TMP (°F) |
|---|---|---|---|---|
| Jan | 5.72 | 41.2 | 51.7 | 62.3 |
| Feb | 5.04 | 44.5 | 55.1 | 65.7 |
| Mar | 4.41 | 50.3 | 61.5 | 72.7 |
| Apr | 4.46 | 56.8 | 68.1 | 79.3 |
| May | 4.89 | 65.2 | 75.7 | 86.2 |
| Jun | 6.41 | 71.4 | 81.1 | 90.9 |
| Jul | 4.96 | 73.7 | 83.0 | 92.2 |
| Aug | 5.82 | 73.4 | 82.9 | 92.5 |
| Sep | 4.54 | 68.5 | 78.6 | 88.7 |
| Oct | 4.70 | 57.9 | 69.3 | 80.8 |
| Nov | 4.10 | 48.9 | 60.4 | 71.9 |
| Dec | 5.60 | 42.7 | 53.4 | 64.1 |

Normal annual precipitation for the Amite River Basin (ARB) is 60.5 inches, although for the period 1980 through 1991 rainfall averaged 64 inches a year. The ARB experienced drought conditions (-2 or less on the Palmer Drought Severity Index) during the modern era years of 1952, 1963, 1981, 1999, and 2000. Southerly, maritime winds prevail for much of the year, resulting in the potential for highly variable rainfall over the ARB. Daily variations are frequently measured in inches. Even for a 30-year averaging period annual precipitation at various weather stations throughout the ARB ranged from 56 to 67 inches. The wettest month is December with an average monthly normal rainfall of 6.14 inches. October is the driest month averaging 3.50 inches.

High cumulative rainfall events (e.g., 6 inches or more in less than 72 hours) over large areas of the ARB are caused under two typical scenarios: slow moving cold fronts encountering warm moist coastal air in late-winter or early spring; and slow moving tropical storms in summer or early fall. High short-term localized rainfall intensities (e.g., over one inch in an hour) can occur under these two scenarios, and are also experienced in a third scenario—heavy summer-time thunderstorms. Severe riverine flooding in the lower ARB has

occurred under extreme examples of all three scenarios, with minor localized flood events typically occurring at least once per year in small, poorly drained catchments. Record floods often result when significant rainfall events occur in the context of above-average seasonal rainfall patterns, which sustain high soil moisture saturation and floodplain water levels. In addition to rainfall-riverine flood events, the lower ARB is also subject to wind-driven coastal flooding associated with slow-moving tropical storms. Prolonged heavy southerly winds cause high water levels along the southeastern Louisiana coast (e.g., Breton and Mississippi Sounds), causing back-step rises in Lakes Borgne, Pontchartrain, and Maurepas. Lake Maurepas levels above 3 ft. mean sea level (MSL) typically impact the lower ARB at least once per year. Tropical storms have pushed levels above 6 ft. MSL.

### 1.1.3 Flood Events

Table C1-3 indicates the top 10 pre-2016 crests based on USGS gauges for the Amite River at Denham Springs and Comite River at Joor Rd (with peak stage data as far back as 1921 and 1943, respectively) and the peak discharge for five of the Amite River floods at Denham Springs.

*Table C1-3. Pre-August 2016 ARB Flood Crests for Amite and Comite Rivers (2017 ARB Drainage and Water Conservation District)*

| | **Amite River at Denham Springs, LA US 190** | | | **Comite River at Comite, LA Joor Road** | |
|---|---|---|---|---|---|
| | **Gauge Datum (ft)** | **Discharge (cfs)** | **Date** | **Gauge Datum (ft)** | **Date** |
| 1 | 41.5 | 112,000 | 4/8/1983 | 30.99 | 6/9/2001 |
| 2 | 41.08 | 110,000 | 4/23/1977 | 29.72 | 4/7/1983 |
| 3 | 39.88 | | 1/27/1990 | 27.58 | 1/21/1993 |
| 4 | 39.27 | | 3/15/1921 | 27.45 | 9/4/2008 |
| 5 | 38.34 | 82,700 | 6/9/2001 | 27.22 | 4/28/1997 |
| 6 | 38.15 | | 1/22/1993 | 26.54 | 1/26/1990 |
| 7 | 36.7 | 68,600 | 4/24/1979 | 26.38 | 4/12/1995 |
| 8 | 36.5 | 60,200 | 3/27/1973 | 26.16 | 3/12/2016 |
| 9 | 36.33 | | 5/20/1953 | 25.99 | 4/23/1979 |
| 10 | 36.23 | | 9/5/2008 | 25.64 | 5/19/1953 |
| Conversion from Gauge Datum to ft NAVD88 | | | | | |
| | - 1.35 | | | + 22.1 | |

See NOAA, Advanced Hydrologic Prediction Services websites for gauges.

Table C1-4 presents a summary of estimated damages from the August 2016 Louisiana flooding.

*Table C1-4: Summary of Damages by Category*

| Damages Category | Loss in Millions |
|---|---|
| Residential Housing Structures | $3,844.2 |
| Residential Housing Contents | $1,279.8 |
| Automobiles | $378.8 |
| Agriculture | $110.2 |
| Business Structures | $595.6 |
| Business Equipment | $262.8 |
| Business Inventories | $1,425.5 |
| Business Interruption Loss | $836.4 |
| Total | $8,733.3 |

Source: Terrell, D. 2016. The Economic Impact of August 2016 Floods on the State of Louisiana. http://gov.louisiana.gov/assets/docs/RestoreLA/SupportingDocs/Meeting-9-28-16/2016-August-Flood-Economic-Impact-Report_09-01-16.pdf

## 1.2 RELEVANT RESOURCES

This section contains a description of relevant resources that could be impacted by the proposed project. The important resources described are those recognized by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Relevant resources discussed in this section include both natural and human resources.

Relevant resources that could be impacted from implementation of the project are: wetlands; uplands; aquatic resources and fisheries; wildlife; threatened, endangered, and protected species; geology, soils and water bottoms, and prime and unique farmland; water quality; air quality; noise and vibration; aesthetic; cultural, historic, and Tribal trust; environmental justice; socioeconomics; and recreational resources. Navigation and essential fish habitat would not be affected by the proposed project.

# Section 2
# Natural Resources

## 2.1 WETLANDS

Figure C1-2 shows the National Wetlands Inventory data within the study area (https://www.fws.gov/wetlands/).

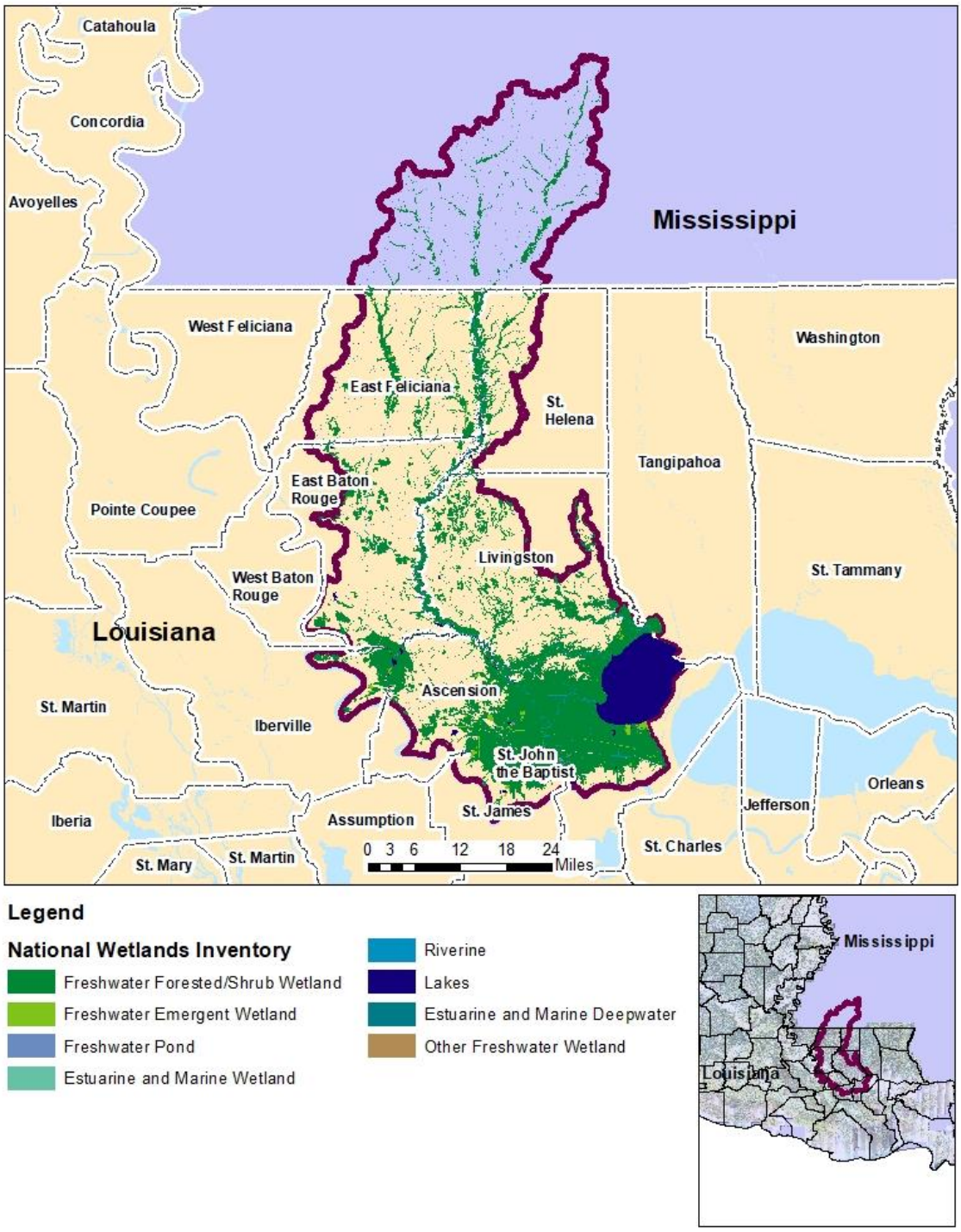


*Figure C1-2. Study Area Wetlands (National Wetlands Inventory)*

*Table C1-5. National Wetlands Inventory for the Study Area*

| Wetland classification | Acres |
|---|---|
| Estuarine and Marine Deepwater | 11.91 |
| Freshwater Emergent Wetland | 8,450.29 |
| Freshwater Forested/Shrub Wetland | 367,324.26 |
| Freshwater Pond | 7,984.49 |
| Lake | 61,879.89 |
| Riverine | 13,353.02 |

Mississippi Alluvial Plain vegetation includes:

- Swamp, found in low-lying areas typically adjacent to waterways, is dominated by cypress and tupelo-gum trees.
- Riverine habitats along stream and river bottoms and bottomland forests are comprised of water tupelo, willow, sycamore, cottonwoods, green ash, pecan, elm, cherrybark oak, and white oak trees; these are often interspersed with Chinese tallow. Depending upon the locations, riverine habitats grade into higher elevated and better drained areas comprised of oak-pine forests.
- Oak-pine forest types dominate the better drained areas especially surrounding Lake Charles and Sulfur and include longleaf pine, loblolly pine, slash pine, sweetgum, elm, southern red oak, water oak, black gum and Chinese tallow trees.
- Pasture and rangelands with mixtures of perennial grasses and legumes (e.g., bermundagrass, Pensacola bahiagrass, tall fescue, and white clover) comprise the majority of the outlying areas surrounding the cities of Abbeville, Erath, and Delcambre.

Mississippi Alluvial Plain consists of back barrier vegetated areas; freshwater, intermediate, brackish, and saline marsh; interspersed with bayous, lakes, ponds and other waters some of which may include submerged aquatic vegetation (SAVs). Vegetation typically follows the salinity gradient (O'Neil 1949; Chabreck et al. 1972; Gosselink et al. 1979; Visser et al. 2000).

- Gulf shorelines vegetation includes sea-beach orach, sea rocket, pigweed, beach tea, salt grass, seaside heliotrope, common and sea purslane, marsh-hay cordgrass, and coastal dropseed (LCA, 2004, Gosselink et al., 1979).
- Marsh types: Visser et al. (2000), expanding on previous studies by Penfound and Hathaway (1938) and Chabreck (1970), classified freshwater marsh in the Chenier Plain as a combination of maidencane and bulltongue arrowhead; intermediate marsh as sawgrass, saltmeadow cordgrass, and California bulrush;

brackish marsh as saltmeadow cordgrass, chairmaker's bulrush, and sturdy bulrush; and saline marsh as smooth cordgrass, needlegrass rush, and saltgrass.

- Submerged Aquatic Vegetation: wild celery, duckweed, pickerelweed, sago pondweed, southern naiad.

## 2.2 INVASIVE PLANTS

Invasive plants include water hyacinth, alligatorweed, hydrilla, common salvinia, giant salvinia, Chinese tallow, Chinese privet, Cogon grass, Johnsongrass, Japanese privet, Japanese honeysuckle, common ragweed, rescuegrass, sticky Chickweek, purple nutsedge, mimosa tree. These invasive species compete with native flora for resources such as nutrients and light, community structure and composition, and ecosystem processes. Water hyacinth, common salvinia, giant salvinia, and hydrilla all limit the amount of light penetrating the water column which affects plankton biomass production. Alligatorweed, Chinese tallow and Chinese privet are of minimal wildlife value and can proliferate until they become the only dominant plant species in the area, limiting food available for wildlife.

## 2.3 WETLAND LOSS

The processes of wetland loss can result from the gradual decline of marsh vegetation due to inundation and saltwater intrusion, as well as from storm surge events, both of which can eventually lead to complete loss of marsh vegetation. As marsh vegetation is lost, underlying soils are more susceptible to erosion and are typically lost as well, leading to deeper water and precluding marsh regeneration. Significant accretion of sediments is then required in order for marsh habitat to reestablish.

Perhaps the most serious and complex problem in the study area is the rate of land and habitat loss. Coastal Louisiana wetlands are one of the most critically threatened environments in the United States. These wetlands are in peril because Louisiana currently experiences greater coastal wetland loss than all other states in the contiguous United States combined (Couvillion, et al., 2017). The Louisiana coastal plain accounts for 90 percent of the total coastal marsh loss in the nation (USACE 2004). Couvillion et al. (2011) analyses shows coastal Louisiana has undergone a net change in land area of about -1,883 square miles of wetlands from 1932 to 2010. Trend analyses from 1985 to 2010 show a wetland loss rate of about 16.57 square miles per year.

Some wetland loss might also be related to livestock grazing. Moderate grazing alone is not believed to cause wetland loss, but it may be the "final straw" in marshes experiencing additional stresses such as flooding or saltwater intrusion.

The effects of recent hurricanes have accelerated forested wetland loss.

## 2.4 FUTURE CONDITIONS FOR VEGETATION RESOURCES AND INVASIVE PLANT SPECIES

The current wetland gain/loss trends as well as a change in wetland composition would continue to area vegetation zones.

Wetland losses are predicted to result in:

- Some unknown extent of existing riverine bottomland hardwood (BLH) and associated swamp habitats would be converted to more efficient water conveyance channels as human populations and development increase.
- Some unknown extent of existing pasture and rangelands would be converted to rural, suburban and urban human habitats, generally in the order presented, as human populations and development increase.
- Habitat switching would occur due to increasing sea level rise, subsidence, shoreline erosion and other land loss drivers.
- Gulf shoreline recession rates, varying between +8 ft to -52.9 ft per year, would result in Gulf shoreline rollover onto interior marshes thereby converting these existing habitats to barrier shorelines.
- Inland ponds and lakes shoreline loss rates, varying between 3.6 ft and 9.3 ft, would result in conversion of existing salt, brackish, and intermediate/fresh marsh to shallow open water habitats.

Invasive species will continue to proliferate. New species will become problematic in the future. This will add additional pressures to native animals and natural ecosystems. Invasive species management is and will continue to use money that could have been used for managing natural systems.

## 2.5 UPLANDS

**Rare, Unique, and Imperiled Vegetative Communities.** The Louisiana Natural Heritage Program (LNHP) documented the following rare, unique, and imperiled communities. These communities contribute to the diversity and stability of the coastal ecosystem. Table C1-6 displays information from the LNHP database identifying rare, unique or imperiled vegetative communities.

*Table C1-6. Louisiana Natural Heritage Program Rare, Unique, or Imperiled Vegetative Communities*

| Vegetative Communities | Basins or Parish(es) |
|---|---|
| Cypress Swamp | Iberville |
| Cypress-Tupelo Swamp | Ascension, Iberville, Livingston, St. James, St. John the Baptist, |
| Bondcypress-Swamp Blackgum Swamp | Florida Parishes on northshore of Lake Maurepas |
| Bottomland Hardwood Forest | All Parishes |
| Small Stream Forest | All Florida Parishes |
| Hardwood Slope Forest | E. Feliciana, St. Helena |
| Spruce Pine-Hardwood Flatwood | Livingston, East Baton Rouge and Ascension Parishes |

(http://www.wlf.louisiana.gov/wildlife/species-parish-list?tid=228&type_1=fact_sheet_community)
December 2, 2018

Small stream forests (also called “Riparian Forests”) are relatively narrow wetland forests occurring along small rivers and large creeks in central, western, southeastern, and northern Louisiana. They are seasonally flooded for brief periods. The percentage of sand, silt, calcareous clay, acidic clay, and organic material in the soil is highly variable (depending on local geology) and has a significant effect on species composition. Soils are typically classified as siltloams. This community includes the phase formerly designated as riparian sandy branch 29 bottom. At times, the community is quite similar in species composition to hardwood slope forests (beech-magnolia forests). For a list of tree species in this community, see Table C1-7 below.

**Rare Vegetation Communities Future Conditions.** Existing conditions and trends of land loss and development are expected to continue resulting over time in the loss of these valuable vegetative communities.

*Table C1-7. Rare Vegetative Species List for Forest Communities in the project area (From LDWF Natural Communities of Louisiana)*

| Small Stream Forest (Overstory Species) | |
|---|---|
| **COMMON NAME** | **SCIENTIFIC NAME** |
| southern magnolia | *Magnolia grandiflora* |
| blackgum | *Nyssa sylvatica* |
| white oak | *Quercus alba* |
| laurel oak | *Quercus laurifolia* |
| sweetgum | *Liquidambar styraciflua* |
| red maple | *Acer rubrum* |
| shagbark hickory | *Carya ovata* |
| white ash | *Fraxinus americana* |
| cherry laurel | *Prunus caroliniana* |
| yellow poplar | *Liriodendron tulipifera* |
| baldcypress | *Taxodium distichum* |
| sweet bay | *Magnolia virginiana* |
| beech | *Fagus grandifolia* |
| swamp white oak | *Quercus michauxii* |
| water oak | *Quercus nigra* |
| cherrybark oak | *Quercus pagoda* |
| sycamore | *Platanus occidentalis* |
| river birch | *Betula nigra* |
| bitternut hickory | *Carya cordiformis* |
| water ash | *Fraxinus caroliniana* |
| winged elm | *Ulmus alata* |
| spruce pine (Florida Parishes) | *Pinus glabra* |
| loblolly pine | *Pinus taeda* |
| **Small Stream Forest (Midstory and Understory Species)** | |
| **COMMON NAME** | **SCIENTIFIC NAME** |
| silverbell | *Halesia diptera* |
| arrow-wood | *Viburnum dentatum* |
| sweetleaf | *Symplocos tinctoria* |

| | |
|---|---|
| wild azalea | *Rhododendron canescens* |
| ironwood | *Carpinus caroliniana* |
| Virginia willow | *Itea virginica* |
| hazel alder | *Alnus serrulata* |
| bigleaf snowbell | *Styrax grandifolia* |
| starbush (FL Parishes) | *Illicium floridanum* |
| swamp cyrilla (FL Parishes) | *Cyrilla racemiflora* |
| leucothoe (FL Parishes) | *Leucothoe axillaris* |
| winterberry (FL Parishes) | *Ilex verticillata* |
| sebastian bush (FL Parishes) | *Sebastiana fruticosa* |
| fetterbush (FL Parishes) | *Lyonia lucida* |
| leucothoe (FL Parishes) | *Leucothoe racemosa* |

## 2.6 AQUATIC RESOURCES AND FISHERIES

*Table C1-8. Fish Species in the Amite River Watershed by Family, Scientific and Common Names (from LDWF Amite River Water Body Management Plan)*

| | |
|---|---|
| **Achiridae – American soles** | |
| *Trinectes maculates* | northern hogchoker |
| **Acipenseridae – sturgeons** | |
| *Acipenser oxyrhynchus desotoi* | Gulf sturgeon |
| **Amiidae – bowfin** | |
| *Amia calva* | bowfin |
| **Aphredoderidae – trout perches** | |
| *Aphredoderus sayanus* | pirate perch |
| **Anguillidae – freshwater eels** | |
| *Anguilla rostrata* | American eel |
| *Atherinopsidae* | New World silversides |
| *Labidesthes sicculus* | brook silverside |
| *Menidia beryllina* | inland silverside |
| **Catostomidae – suckers** | |
| *Carpiodes carpio* | river carpsucker |
| *Erimyzon sucetta* | lake chubsucker |
| *Erimyzon oblongus* | creek chubsucker |
| *Erimyzon claviformis* | western creek chubsucker |
| *Erimyzon tenuis* | sharpfin chubsucker |
| *Hypentelium nigricans* | northern hogsucker |
| *Minytrema melanops* | spotted sucker |
| *Moxostoma poecilurum* | blacktail redhorse |
| *Ictiobus bubalus* | smallmouth buffalo |
| *Ictiobus cyprinellus* | bigmouth buffalo |
| *Ictiobus niger* | black buffalo |
| **Centrarchidae - sunfishes** | |
| *Ambloplites ariommus* | shadow bass |
| *Centrarchus macropterus* | flier |
| *Elassoma zonatum* | banded pygmy sunfish |

| | |
|---|---|
| *Lepomis cyanellus* | green sunfish |
| *Lepomis humilis* | orangespotted sunfish |
| *Lepomis macrochirus* | bluegill |
| *Lepomis gulosus* | warmouth |
| *Lepomis marginatus* | dollar sunfish |
| *Lepomis megalotis* | longear sunfish |
| *Lepomis microlophus* | redear sunfish |
| *Lepomis symmetricus* | bantam sunfish |
| *Micropterus punctulatus* | spotted bass |
| *Micropterus salmoides* | largemouth bass |
| *Pomoxis annularis* | white crappie |
| *Pomoxis nigromaculatus* | black crappie |
| **Clupeidae – herrings** | |
| *Alosa chrysochloris* | skipjack herring |
| *Dorosoma cepedianum* | gizzard shad |
| *Dorosoma petenense* | threadfin shad |
| *Brevoortia patronus* | Gulf menhaden |
| **Cyprinidae - carps and minnows** | |
| *Macrhybopsis aestivalis* | speckled chub |
| *Macrhybopsis storeriana* | silver chub |
| *Hybopsis winchelli* | clear chub |
| *Notemigonus crysoleucas* | golden shiner |
| *Hybopsis amnis* | pallid shiner |
| *Luxilus chrysocephalus* | striped shiner |
| *Lythrurus fumeus* | ribbon shiner |
| *Notropis longirostris* | longnose shiner |
| *Notropis maculatus* | taillight shiner |
| *Lythrurus roseipinnis* | cherryfin shiner |
| *Notropis texanus* | weed shiner |
| *Cyprinella venusta* | blacktail shiner |
| *Notropis volucellus* | mimic shiner |
| *Opsopoeodus emiliae* | pugnose minnow |
| *Pimephales promelas* | fathead minnow |

| | |
|---|---|
| *Pimephales vigilax* | bullhead minnow |
| *Hybognathus hayi* | cypress minnow |
| *Cyprinus carpio* | common carp |
| *Notropis atherinoides* | emerald shiner |
| *Hypophthalmichthys molitrix* | silver carp |
| **Elopidae – tarpons** | |
| *Elops saurus* | ladyfish |
| **Engraulidae – anchovies** | |
| *Anchoa mitchilli* | bay anchovy |
| **Esocidae – pikes** | |
| *Esox americanus* | grass pickerel |
| *Esox niger* | chain pickerel |
| **Fundulidae – topminnows and killifishes** | |
| *Fundulus chrysotus* | golden topminnow |
| *Fundulus catenatus* | studfish |
| *Fundulus notatus* | blackstripe topminnow |
| *Fundulus olivaceus* | blackspotted topminnow |
| *Fundulus euryzonus* | broadstripe topminnow |
| **Ictaluridae - North American catfishes** | |
| *Ameiurus melas* | black bullhead |
| *Ameiurus natalis* | yellow bullhead |
| *Ameiurus nebulosus* | brown bullhead |
| *Ictalurus furcatus* | blue catfish |
| *Ictalurus punctatus* | channel catfish |
| *Pylodictis olivaris* | flathead catfish |
| *Noturus gyrinus* | tadpole madtom |
| *Noturus leptacanthus* | speckled madtom |
| *Noturus miurus* | brindled madtom |
| *Noturus nocturnes* | freckled madtom |
| **Lepisosteidae - gars** | |
| *Lepisosteus oculatus* | spotted gar |
| *Lepisosteus osseus* | longnose gar |
| *Lepisosteus platostomus* | shortnose gar |

| | |
|---|---|
| *Lepisosteus spatula* | alligator gar |
| **Moronidae – temperate basses** | |
| *Morone mississippiensis* | yellow bass |
| *Morone chrysops* | white bass |
| **Mugilidae – mullets** | |
| *Mugil cephalus* | striped mullet |
| *Petromyzontidae* | northern lampreys |
| *Ichthyomyzon gagei* | southern brook lamprey |
| **Paralichthyidae – flounders** | |
| *Paralichthys lethostigma* | southern flounder |
| **Percidae – perches** | |
| *Ammocrypta beanii* | naked sand darter |
| *Etheostoma chlorosomum* | bluntnose darter |
| *Etheostoma fusiforme* | swamp darter |
| *Etheostoma proeliare* | cypress darter |
| *Etheostoma stigmaeum* | speckled darter |
| *Etheostoma swaini* | Gulf darter |
| *Etheostoma zonale* | banded darter |
| *Percina maculata* | blackside darter |
| *Percina nigrofasciata* | blackbanded darter |
| *Percina vigil* | saddleback darter |
| *Percina sciera* | dusky darter |
| *Ammocrypta vivax* | scaly sand darter |
| *Percina caprodes* | logperch |
| **Poeciliidae – livebearers** | |
| *Gambusia affinis* | western mosquitofish |
| *Poecilia latipinna* | sailfin molly |
| *Heterandria formosa* | least killifish |
| **Polyodontidae – paddlefishes** | |
| *Polyodon spathula* | paddlefish |
| **Sciaenidae – drums** | |
| *Aplodinotus grunniens* | freshwater drum |
| *Micropogonias undulatus* | Atlantic croaker |

| **Sparidae – porgies** | |
|---|---|
| *Archosargus probatocephalus* | sheepshead |
| *Lagodon rhomboides* | pinfish |
| **Syngnathidae – pipefishes and seahorses** | |
| *Syngnathus scovelli* | Gulf pipefish |

## 2.7 WILDLIFE

*Table C1-9. Game and Non-Game Birds in Study Area*

| COMMON AND SCIENTIFIC NAME | OCCURENCE |
|---|---|
| American Kestrel (*Falco sparverius paulus*) | September to March |
| Anhinga (*Anhinga anhinga*) | July to March (FWS) |
| Bald Eagle (*Haliaeetus leucocephalus*) | August to May |
| Barn Swallow (*Hirundo rustica*) | February to November |
| Barred Owl (*Strix varia*) | Resident |
| Belted Kingfisher (*Megaceryle alcyon*) | Resident |
| Blue Jay (*Cyanocitta cristata*) | Resident |
| Carolina Chickadee (*Poecile carolinensis*) | Resident |
| Carolina Wren ( *Thryothorus ludovicianus*) | Resident |
| Cattle Egret (*Bubulcus ibis*) | September to April (FWS) |
| Cedar Waxwing (*Bombycilla cedrorum*) | November to May |
| Chimney Swift (*Chaetura pelagica*) | March to November |
| Double-crested Cormorant (*Phalacrocorax auritus*) | July to March (FWS) |
| Downy Woodpecker (*Picoides pubescens*) | Resident |
| Eastern Phoebe (*Sayornis phoebe*) | October to March |
| European Starling (*Sturnus vulgaris*) | Resident |
| Great Egret (*Ardea alba*) | August to February (FWS) |
| Reddish Egret | August to March (FWS) |
| Hooded Merganser (*Lophodytes cucullatus*) | November to May |
| Kentucky Warbler (*Oporornis formosus*) | March to September |
| Killdeer (*Charadrius vociferus*) | Resident |
| Lesser Scaup (*Aythya affinis*) | October to March |

| | |
|---|---|
| Little Blue Heron (*Egretta caerulea*) | Resident |
| Great Blue Heron | August to February (FWS) |
| Tricolored Heron | August to March (FWS) |
| Green Heron | September to March (FWS) |
| Black-crowned Night-Heron | September to March (FWS) |
| Yellow-crowned Night-Heron | September to March (FWS) |
| Mallard (*Anas platyrhynchos*) | Resident |
| Mississippi Kite (*Ictinia mississippiensis*) | April to August |
| Mourning dove (*Zenaida macroura*) | Resident |
| Northern Mockingbird (*Mimus polyglottos*) | Resident |
| Prothonotary Warbler (*Protonotaria citrea*) | March to October |
| Red-bellied Woodpecker (*Melanerpes erythrocephalus*) | Resident |
| Red-shouldered Hawk (*Buteo lineatus*) | Resident |
| Red-tailed Hawk (*Buteo jamaicensis*) | Resident |
| Ring-billed Gull (*Larus delawarensis*) | November to April |
| Ring-necked Duck (*Aythya collaris*) | October to March |
| Roseate Spoonbill (*Platalea ajaja*) | August to April (FWS) |
| Ruby-throated Hummingbird (*Archilochus colubris*) | Resident |
| Snowy Egret (*Egretta thula*) | August to March (FWS) |
| Turkey Vulture (*Cathartes aura*) | Resident |
| White Ibis (*Eudocimus albus*) | September to April (FWS) |
| White-eyed Vireo (*Vireo griseus*) | Resident |
| White-throated Sparrow (*Zonotrichia albicollis*) | October to April |
| Wood duck (*Aix sponsa*) | Resident |
| Wood Thrush (*Hylocichla mustelina*) | March to October |
| Yellow-billed Cuckoo (*Coccyzus americanus*) | March to October |

*Table C1-10. Mammals in the Study Area*

| COMMON NAME | SCIENTIFIC NAME |
|---|---|
| fox squirrel | *Sciurus niger* |
| grey squirrel | *Sciurus carolinensis* |
| mink | *Neovison vison* |
| opossum | *Didelphis virginiana* |
| raccoon | *Procyon lotor* |
| swamp rabbit | *Sylvilagus aquaticus* |
| white-tailed deer | *Odocoileus virginianus* |

*Table C1-11. Amphibians in the Study Area*

| COMMON NAME | SCIENTIFIC NAME |
|---|---|
| bullfrog | *Lithobates catesbeianus* |
| cricket frog | *Acris crepitans* |
| Gulf coast toad | *Incilius valliceps* |
| southern leopard frog | *Lithobates sphenocephalus* |

*Table C1-12. Reptiles in the Study Area*

| COMMON NAME | SCIENTIFIC NAME |
|---|---|
| American alligator | *Alligator mississippiensis* |
| snapping turtle | *Chelydra serpentina* |
| eastern spiny softshell | *Apalone spinifera* |
| red-eared slider | *Trachemys scripta elegans* |
| speckled kingsnake | *Lampropeltis holbrooki* |
| broad-banded water snake | *Nerodia fasciata confluens* |
| western cottonmouth | *Agkistrodon piscivorus leucostoma* |

## 2.8 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Factors regarding the existing conditions for threatened and endangered species in the study area principally stem from the alteration, degradation, and loss of habitats; and human disturbance. The continued high rate of commercial development throughout the study area continues to reduce available wetland habitat to threatened and endangered species. This creates increased intra- and interspecific competition for rapidly depleting resources between not only the various threatened and endangered species but also other more numerous fauna.

On March 13, 2019, U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN) obtained from the USFWS lists of threatened and endangered species that may occur in the proposed project location, and/or may be affected by the proposed project (See Appendix C-4). Table C1-13 provides a summary of these findings including the presence of critical habitat. Descriptions for species that may be affected follow below.

*Table C1-13. Threatened (T), Endangered (E), & Protected (P) Species*

| Scientific name | Common name and status (T, E, or P) | Found in Study Area | Found in Project Area | Determination of Effects: May Affect, Not Likely to Adversely Affect (NLAA), or Likely to Adversely Affect (LAA) |
|---|---|---|---|---|
| *Potamilus inflatus* | Alabama Heelsplitter Mussel (T) | Yes | Yes | May affect |
| *Acipenser oxyrhynchus desotoi* | Atlantic Sturgeon (T) | Yes | No | NLAA |
| *Trichechus manatus* | West Indian Manatee (T) | Yes | No | NLAA |
| *Haliaeetus leucocephalus* | Bald Eagle (P) | Yes | Yes | NLAA |

### 2.8.1 West Indian Manatee

Federally listed as a threatened species, *Trichechus manatus* (West Indian manatees) occasionally enter Lakes Pontchartrain and Maurepas, and associated coastal waters and streams during the summer months (i.e., June through September). Manatee occurrences appear to be increasing, and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of

Louisiana. The manatee has declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals.

Public data on manatee sightings have provided benefits for conservation efforts, according to Hieb et al. (2017). Ongoing manatee population growth, future climate change, or other large-scale environmental perturbations are likely to continue altering the timing, duration, and location of manatee visits to the northern Gulf of Mexico. Although publicly sourced data and citizen-science efforts have inherent biases, on a decadal time scale these datasets could provide comprehensive information on manatee habitat use than is possible by direct observations.

### 2.8.2 Atlantic Sturgeon

Acipenser oxyrhynchus desotoi (the Atlantic sturgeon), federally listed as a threatened species, is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf coast between the Mississippi River and the Suwannee River, Florida. In Louisiana, Gulf sturgeon have been reported at Rigolets Pass, rivers and lakes of the Lake Pontchartrain basin, and adjacent estuarine areas. Spawning occurs in coastal rivers between late winter and early spring (i.e., March to May). Adults and sub-adults may be found in those rivers and streams until November, and in estuarine or marine waters during the remainder of the year. Sturgeon less than two years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations such as those caused by water control structures that limit and prevent spawning, poor water quality, and over-fishing have negatively affected this species.

On March 19, 2003, the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) published a final rule in the Federal Register (Volume 68, No. 53) designating critical habitat for the Gulf sturgeon in Louisiana, Mississippi, Alabama, and Florida. The proposed project; however, does not occur within nor would it impact designated Gulf sturgeon critical habitat.

### 2.8.3 Inflated Heelsplitter Mussel

Federally listed as a threatened species, the Alabama heelsplitter mussel (*Potamilus inflatus*) was historically found in Louisiana in the Amite, Tangipahoa, and Pearl Rivers. Many life history aspects of the species are poorly understood but are likely similar to that of other members of the Unionidae family. Although the primary host fish for the species is not certain, investigation by K. Roe et al. (1997) indicates that the freshwater drum (Aplodinotus grunniens) is a suitable glochidial host for the species.

Based on the most recent survey data, the currently known range for the Alabama heelsplitter in Louisiana occurs only in the lower third of the Amite River along the East Baton Rouge/Livingston Parish line from Spiller's Creek, which is in the vicinity of Denham Springs downstream to the vicinity of Port Vincent. Because it has not been used widely for

past or present gravel mining operations, the lower third of the Amite River (between Louisiana Highway 37 and Louisiana Highway 42) is more typical of a coastal plain river; being characterized by a silt substratum, less channelization, and slower water flow, all of which are characteristic of heelsplitter habitat. This freshwater mussel is typically found in soft, stable substrates such as sand, mud, silt, and sandy gravel, in slow to moderate currents. Heelsplitter mussels are usually found in depositional pools below sand point bars and in shallow pools between sandbars and river banks.

Major threats to this species in Louisiana are the loss of habitat resulting from sand and gravel dredging and channel modifications for flood control, as shown by the apparent local extirpation of the species in the extensively modified upper portions of the Amite River.

## 2.9 PROTECTED SPECIES

### 2.9.1 Bald Eagle

The project-area forested wetlands provide nesting habitat for *Haliaeetus leucocephalus* (the bald eagle), which was officially removed from the List of Endangered and Threatened Species on August 8, 2007. There is one active bald eagle nest that is known to exist within the proposed project area; however, other nests may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries.

Bald eagles nest in Louisiana from October through mid-May. They typically nest in mature trees (e.g., bald cypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water in the southeastern Parishes. Areas with high numbers of nests include the north shore of Lake Pontchartrain and the Lake Salvador area. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead).

Breeding bald eagles occupy “territories” that they will typically defend against intrusion by other eagles, and that they likely return to each year. A territory may include one or more alternate nests that are built and maintained by the eagles, but which 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. Bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. 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.

Although the bald eagle has been removed from the List of Endangered and Threatened Species, it continues to be protected under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). The USFWS developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where

such impacts may constitute “disturbance,” which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:

http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf.

Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. A copy of that determination should be provided to this office.

## 2.10 GEOLOGY, SOILS AND WATER BOTTOMS, AND PRIME AND UNIQUE FARMLAND

Figure C1-3 below shows the study area divided into three regions with distinctive landforms, topographies, and associated floodplain characteristics.

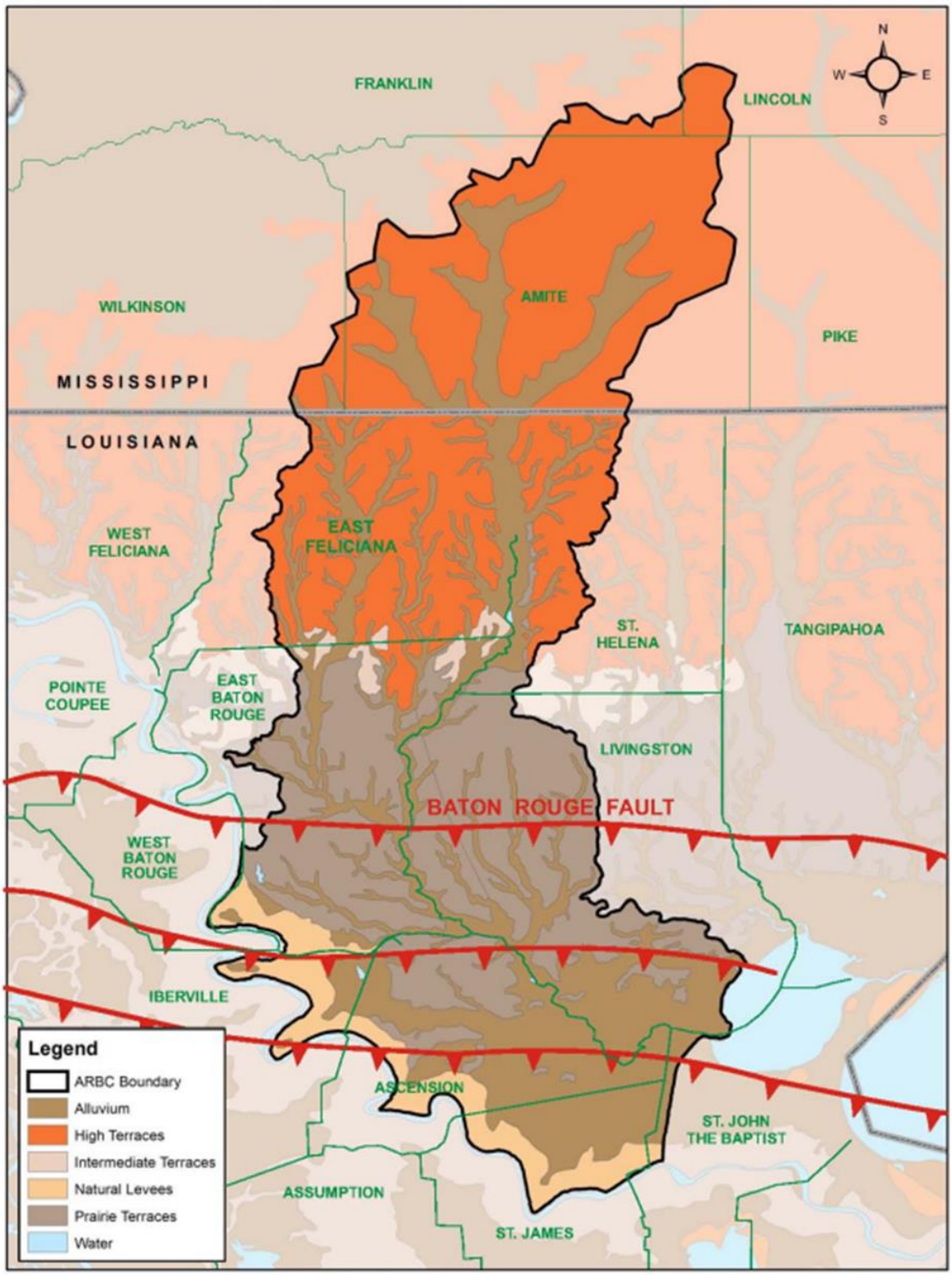


*Figure C1-3. Study area landforms*

## 2.11 SOILS, WATER BOTTOMS, AND PRIME AND UNIQUE FARMLAND

The Farmland Protection Policy Act of 1981 (FPPA) was enacted to minimize the extent that Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to assure that Federal programs are administered in a manner that, to the extent practicable, would be compatible with State, unit of local government, and private programs and policies to protect farmland.

Under this policy, soil associations are used to classify areas according to their ability to support different types of land uses, including urban development, agriculture, and silviculture. The USDA Natural Resource Conservation Service (NRCS) designates areas with particular soil characteristics as either “Farmland of Unique Importance,” “Prime Farmland,” “Prime Farmland if Irrigated,” or variations on these designations. Prime farmland, as defined by the FPPA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Farmland of unique importance is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, drought-prone, and less productive, and cannot be easily cultivated as compared to prime farmland (NRCS 2016).

For a map of the the soil textures, see Figure C1-4.

For a map and acreage of land classification of prime and unique farmlands, see Figure C1-5 and Table C1-14.

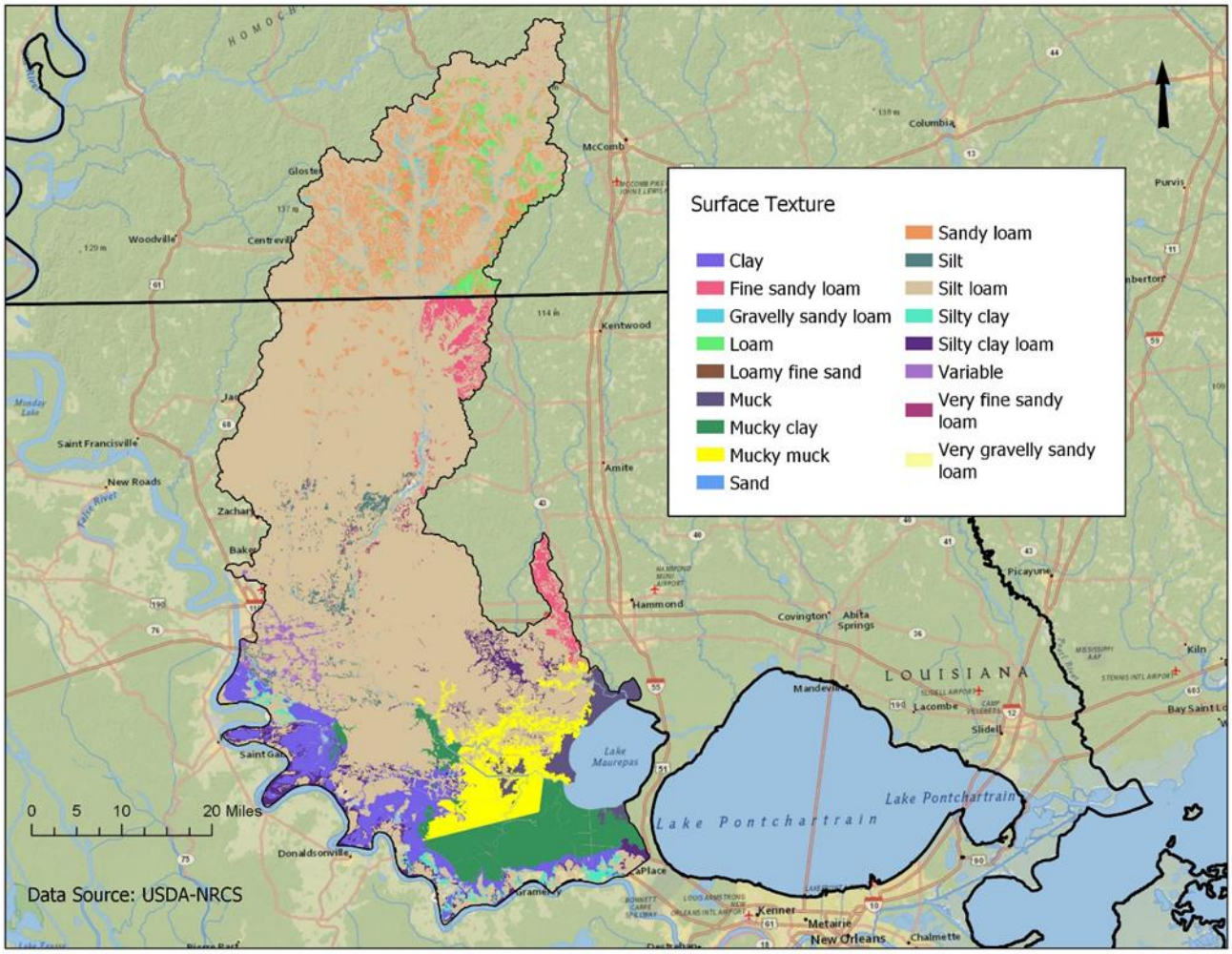


*Figure C1-4. Soil textures in the study area*

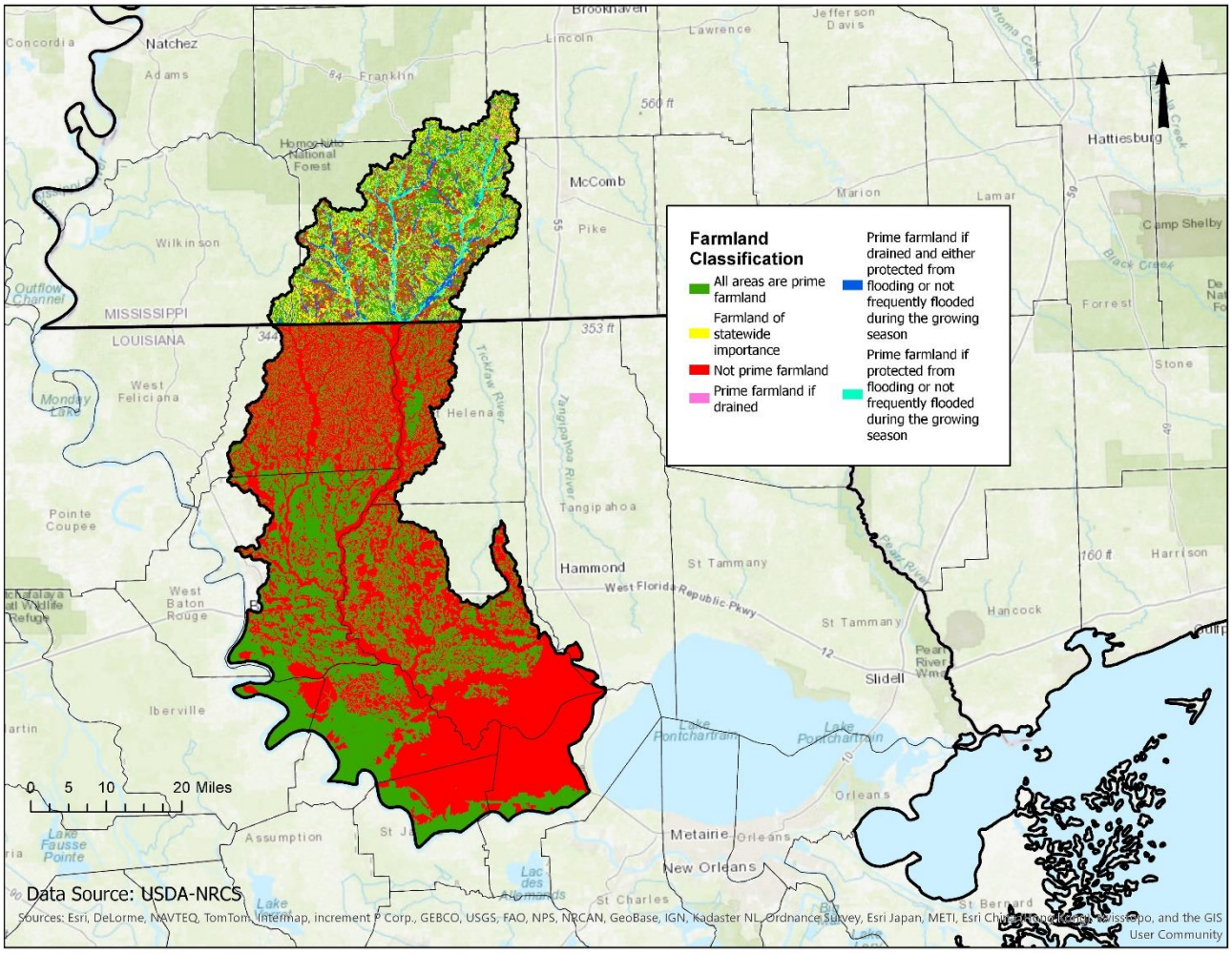


*Figure C1-5. Prime and unique farmland classification map of study area*

*Table C1-14. Prime and unique farmland acres in the study area*

**Mississippi Counties**

| Acres | Farmland Type |
|---|---|
| 148,443.12 | All areas are prime farmland |
| 94,551.75 | Farmland of statewide importance |
| 58,333.22 | Not prime farmland |
| 1,624.24 | Prime farmland if drained |
| 35,413.52 | Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season |
| 31,044.76 | Prime farmland if protected from flooding or not frequently flooded during the growing season |
| **369,410.63** | **Total** |

**Louisiana Parishes**

| Acres | Farmland Type |
|---|---|
| 503,703.59 | All areas are prime farmland |
| 755,798.58 | Not prime farmland |
| **1,259,502.16** | **Total** |

## 2.12 WATER QUALITY

Nineteen water bodies in the Amite Watershed are listed as impaired for one or more designated uses in the *2016 Integrated Report of Water Quality in Louisiana.* Designated uses include swimming, boating, fishing, drinking water, and outstanding natural resource (i.e. Louisiana Scenic Rivers).

Most of the segments are impaired for fish and wildlife propagation and swimming. In the Amite Watershed, the top five suspected causes of impairment are 1) dissolved oxygen, 2) nitrate/nitrite (nitrite plus nitrate as N), 3) fecal coliform, 4) Phosphorus (Total), and 5) Turbidity (See Table C1-15 below).

*Table C1-15. Water Quality 305(b) impaired waterbodies in the study area*

| Sub-segment Number | Subsegment Description | Size (mi) | Designated Water Body Uses* | | | | | Impaired Use for Suspected Cause | Suspected Causes of Impairment | Suspected Sources of Impairment |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | PCR | SCR | FWP | DWS | ONR | | | |
| LA040301_00 | Amite River-From Mississippi state line to La. Highway 37 (Scenic) | 30 | F | N | N | | N | Fish and Wildlife Propogation (FWP) | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040301_00 | Amite River-From Mississippi state line to La. Highway 37 (Scenic) | 30 | F | N | N | | N | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040301_00 | Amite River-From Mississippi state line to La. Highway 37 (Scenic) | 30 | F | N | N | | N | FWP | Turbidity | Sand/gravel/rock Mining or Quarries |
| LA040301_00 | Amite River-From Mississippi state line to La. Highway 37 (Scenic) | 30 | F | N | N | | N | FWP | Turbidity | Sand/gravel/rock Mining or Quarries |
| LA040301_00 | Amite River-From Mississippi state line to La. Highway 37 (Scenic) | 30 | F | N | N | | N | FWP | Fecal Coliform | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040302_00 | Amite River-From LA 37 to Amite River Diversion Canal | 69 | N | F | N | | | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040302_00 | Amite River-From LA 37 to Amite River Diversion Canal | 69 | N | F | N | | | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040302_00 | Amite River-From LA 37 to Amite River Diversion Canal | 69 | N | F | N | | | FWP | Oxygen, Dissolved | Natural Sources |
| LA040302_00 | Amite River-From LA 37 to Amite River Diversion Canal | 69 | N | F | N | | | FWP | Fecal Coliform | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040302_00 | Amite River-From LA 37 to Amite River Diversion Canal | 69 | N | F | N | | | FWP | Fecal Coliform | Sanitary Sewer Overflows (Collection System Failures) |
| LA040303_00 | Amite River-From Amite River Diversion Canal to Lake Maurepas | 21 | F | F | N | | | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LA040303_00 | Amite River-From Amite River Diversion Canal to Lake Maurepas | 21 | F | F | N | | | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040303_00 | Amite River-From Amite River Diversion Canal to Lake Maurepas | 21 | F | F | N | | | FWP | Nitrate/Nitrite (Nitrite + Nitrate as N) | Upstream Source |
| LA040303_00 | Amite River-From Amite River Diversion Canal to Lake Maurepas | 21 | F | F | N | | | FWP | Oxygen, Dissolved | Upstream Source |
| LA040303_00 | Amite River-From Amite River Diversion Canal to Lake Maurepas | 21 | F | F | N | | | FWP | Phosphorus (Total) | Upstream Source |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Chloride | Natural Sources |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Nitrate/Nitrite (Nitrite + Nitrate as N) | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Nitrate/Nitrite (Nitrite + Nitrate as N) | Package Plant or Other Permitted Small Flows Discharges |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Oxygen, Dissolved | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Oxygen, Dissolved | Package Plant or Other Permitted Small Flows Discharges |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Phosphorus (Total) | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Phosphorus (Total) | Package Plant or Other Permitted Small Flows Discharges |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Sulfates | Natural Sources |
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Total Dissolved Solids | Natural Sources |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LA040304_00 | Grays Creek-From headwaters to Amite River | 20 | N | F | N | | | FWP | Fecal Coliform | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040305_00 | Colyell Creek; includes tributaries and Colyell Bay | 76 | F | F | N | | | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040305_00 | Colyell Creek; includes tributaries and Colyell Bay | 76 | F | F | N | | | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040305_00 | Colyell Creek; includes tributaries and Colyell Bay | 76 | F | F | N | | | FWP | Nitrate/Nitrite (Nitrite + Nitrate as N) | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040305_00 | Colyell Creek; includes tributaries and Colyell Bay | 76 | F | F | N | | | FWP | Oxygen, Dissolved | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040305_00 | Colyell Creek; includes tributaries and Colyell Bay | 76 | F | F | N | | | FWP | Phosphorus (Total) | On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) |
| LA040305_00 | Colyell Creek; includes tributaries and Colyell Bay | 76 | F | F | N | | | FWP | Total Dissolved Solids | Source Unknown |
| LA040401_00 | Blind River-From Amite River Diversion Canal to mouth at Lake Maurepas (Scenic) | 5 | F | F | N | | N | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040401_00 | Blind River-From Amite River Diversion Canal to mouth at Lake Maurepas (Scenic) | 5 | F | F | N | | N | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040401_00 | Blind River-From Amite River Diversion Canal to mouth at Lake Maurepas (Scenic) | 5 | F | F | N | | N | FWP | Non-Native Aquatic Plants | Introduction of Non-native Organisms (Accidental or Intentional) |
| LA040401_00 | Blind River-From Amite River Diversion Canal to mouth at Lake Maurepas (Scenic) | 5 | F | F | N | | N | FWP | Oxygen, Dissolved | Natural Sources |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LA040401_00 | Blind River-From Amite River Diversion Canal to mouth at Lake Maurepas (Scenic) | 5 | F | F | N | | N | FWP | Turbidity | Natural Sources |
| LA040402_00 | Amite River Diversion Canal-From Amite River to Blind River | 10 | F | F | N | | | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040402_00 | Amite River Diversion Canal-From Amite River to Blind River | 10 | F | F | N | | | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040402_00 | Amite River Diversion Canal-From Amite River to Blind River | 10 | F | F | N | | | FWP | Oxygen, Dissolved | Natural Sources |
| LA040403_00 | Blind River-From headwaters to Amite River Diversion Canal (Scenic) | 20 | F | F | N | | F | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040403_00 | Blind River-From headwaters to Amite River Diversion Canal (Scenic) | 20 | F | F | N | | F | FWP | Mercury in Fish Tissue | Source Unknown |
| LA040403_00 | Blind River-From headwaters to Amite River Diversion Canal (Scenic) | 20 | F | F | N | | F | FWP | Non-Native Aquatic Plants | Introduction of Non-native Organisms (Accidental or Intentional) |
| LA040403_00 | Blind River-From headwaters to Amite River Diversion Canal (Scenic) | 20 | F | F | N | | F | FWP | Oxygen, Dissolved | Natural Sources |
| LA040403_00555632 | Petite Amite River - Located within subsegment LA040403_00. This unit is added for advisory tracking purposes only and is not a subsegment as defined by LAC 33:IX.1123.A. et seq. No other assessment is made for this waterbody. | 11 | | | N | | | FWP | Mercury in Fish Tissue | Atmospheric Deposition - Toxics |
| LA040403_00555632 | Petite Amite River - Located within subsegment LA040403_00. This unit is added for advisory tracking purposes only and is not a subsegment as defined by LAC 33:IX.1123.A. et seq. No other assessment is made for this waterbody. | 11 | | | N | | | FWP | Mercury in Fish Tissue | Source Unknown |

*Designated Use Descriptions
PCR = Primary Contact Recreation (swimming)
SCR = Secondary Contact Recreation (boating)
FWP = Fish and Wildlife Propagation (fishing)
DWS = Drinking Water Supply
ONR = Outstanding Natural Resource
F = Fully supporting designated use; N = Not supporting designated use

## 2.13 AIR QUALITY

The U.S. Environmental Protection Agency (EPA), Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards for six principal pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. Ozone is the only parameter not directly emitted into the air but forms in the atmosphere when three atoms of oxygen (03) are combined by a chemical reaction between oxides of nitrogen and volatile organic compounds in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of nitrogen and volatile organic compounds, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air. The Clean Air Act General Conformity Rule (58 FR 63214, November 30, 1993, Final Rule, Determining Conformity of General Federal Actions to State or Federal Implementation Plans) dictates that a conformity review be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more National Ambient Air Quality Standards. A conformity assessment would require quantifying the direct and indirect emissions of criteria pollutants caused by the Federal action to determine whether the proposed action conforms to Clean Air Act requirements and any State Implementation Plan.

The general conformity rule was designed to ensure that Federal actions do not impede local efforts to control air pollution. It is called a conformity rule because Federal agencies are required to demonstrate that their actions "conform with" (i.e., do not undermine) the approved State Implementation Plan for their geographic area. The purpose of conformity is to (1) ensure Federal activities do not interfere with the air quality budgets in the State Implementation Plans; (2) ensure actions do not cause or contribute to new violations, and (3) ensure attainment and maintenance of the National Ambient Air Quality Standards.

The Amite River and Tributaries Study Area includes several parishes in Louisiana and several counties in southwest Mississippi. Four of the Louisiana parishes are located in the Baton Rouge metropolitan area which has been designated by the EPA as a maintenance area for ozone under the 8-hour standard effective December 27, 2016. This classification is the result of area-wide air quality modeling studies, and the information is readily available from the LDEQ, Office of Environmental Assessment and Environmental Services.

Federal activities that are proposed in the ozone-maintenance area may be subject to the State's general conformity regulations as promulgated under LAC 33:III.14.A, Determining Conformity of General Federal Actions to State or Federal Implementation Plans. A general conformity applicability determination is made by estimating the total of direct and indirect volatile organic compound (VOC) and nitrogen oxide ($NO^X$) emissions caused by the construction of the project. Prescribed de minimis levels of 100 tons per year per pollutant are applicable in Ascension Parish. Projects that would result in discharges below the de minimis level are exempt from further consultation and development of mitigation plans for reducing emissions.

## 2.14 NOISE AND VIBRATION

No supporting information is available for this resource.

# Section 3
# Human Resources

## 3.1 CULTURAL, HISTORIC, AND TRIBAL TRUST RESOURCES

The cultural prehistory and history of Southeast Louisiana and Southwest Mississippi is a rich one that is shared with much of the southeast. The generalized Pre-Contact cultural chronology for the region according to Rees (2010:12) is divided into five primary archaeological components, or "periods," as follows: Paleoindian (11,500-8000 B.C.), Archaic (8000-800 B.C.), Woodland (800 B.C.-1200 A.D.), Mississippian (1200-1700 A.D.), and Historic (1700 A.D.-present). Regionally, these periods have been further divided into sub-periods based on material culture, settlement patterns, subsistence practices, and sociopolitical organization. Specific sub-periods identified within the study area include: Poverty Point, Tchefuncte, Marksville, Baytown, Troyville, Coles Creek, Plaquemine, and Mississippian. Post-Contact Period (ca. 1650 A.D.-present) cultural affiliations within the study area, follow the thematic approach set forth in the Louisiana Division of Archaeology's (LDOA) *State of Louisiana Site Record Form* (amended August 29, 2018) and are divided into the following temporal groups: *Historic Exploration* (1541-1803 A.D.), *Antebellum Louisiana* (1803-1860 A.D.), *War and Aftermath* (1860-1890 A.D.), *Industrial and Modern* (1890-1945 A.D.), and *Post-WWII* (1945 A.D.-present).

## 3.2 HISTORIC PROPERTIES

Preserving historic properties as important reflections of our American heritage became a national policy through passage of the Antiquities Act of 1906, the Historic Sites Act of 1935, and Section 106 of the National Historic Preservation Act (NHPA), as amended (54 U.S.C. § 306108), and it's implementing regulations, 36 Code of Federal Regulations [CFR] Part 800. The passage of the NHPA established the National Register of Historic Places (NRHP) and the process for adding properties to it. Historic properties in the study area were identified based on a review of the National Register (NR) database and project files. NR-listed properties typically fall into one of five categories: building, structure, object, site, and district. The National Park Service (NPS) uses the following definitions to differentiate NR historic resource types (NPS 1995):

1. **Building:** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also refer to a historically and functionally related unit, such as a courthouse and jail or a house and barn.
2. **Structure:** The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.

3. **Object:** The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or a relatively small in scale and simply constructed. CEMVN's background research indicates that there are no NRHP-listed Objects within the study area.
4. **Site:** A site is the location of a significant event, a prehistoric/historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.
5. **District:** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

In addition to the five (5) common types of NR properties mentioned above, CEMVN also reviewed the study area for the presence of National Historic Landmarks (NHLs) and archaeological sites not presently listed on the NR (Table C1-16):

**National Historic Landmark:** The NPS has developed criteria for the recognition of nationally significant properties, which are designated NHLs and prehistoric and historic units of the NPS. NHLs are those districts, sites, buildings, structures, and objects designated by the Secretary of the Interior (SOI) as possessing national significance in American history, architecture, archeology, engineering, and culture. NHLs are afforded a special level of protection and Section 110(f) of the NHPA requires that before approval of any federal Undertaking which may directly and adversely affect any NHL, the head of the responsible federal agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the Undertaking.

**Archaeological Sites Not Presently Listed on the National Register:** Not every archaeological site is eligible for the NR because not all archaeological sites possess both significance and sufficient integrity to be considered eligible for listing. Most eligibility determinations made pursuant to the Section 106 process are called "consensus determinations" because agreement between the federal agency and the State Historic Preservation Officer (SHPO)/Tribal Historic Preservation Officer (THPO) is all that is normally required for federal Undertakings; no formal nomination to or listing on the NR is necessary. The LA and MS SHPOs maintain databases of all previously recorded sites within their respective states. Individual alternate actions will be screened against the databases to determine if sites that have been identified as eligible for NR-listing, but not yet enrolled, exist within proposed work areas.

*Table C1-16. Historic Properties within the Study Area*

| County/Parish: | Building | Site | Structure | District | NHL | Archaeological Sites |
|---|---|---|---|---|---|---|
| Mississippi: | | | | | | |
| Amite | 18 | 1 | — | — | — | 29 |
| Franklin | 3 | — | 2 | — | — | — |
| Lincoln | 14 | — | — | 1 | — | — |
| Wilkinson | 11 | 3 | — | 2 | — | 1 |
| Louisiana: | | | | | | |
| Ascension | 17 | 1 | — | 1 | — | 78 |
| East Baton Rouge | 67 | 7 | 2 | 13 | 2 | 20 |
| East Feliciana | 28 | 1 | — | 2 | 1 | 104 |
| Iberville | 21 | — | 1 | 1 | — | 22 |
| Livingston | 13 | — | — | 1 | — | 87 |
| St. Helena | 3 | — | — | — | — | 72 |
| St. James | 19 | — | 1 | 2 | 1 | 41 |
| St. John the Baptist | 14 | 1 | — | 2 | 1 | 14 |

### 3.2.1 Archaeological Sites

Based on a review of the LDOA, *Louisiana Cultural Resources Map* (web-resource), the Mississippi Department of Archives and History (MDAH) *Historic Resources Inventory Map* (web-resource), and pertinent site and survey reports regarding previous investigations, CEMVN determined that approximately 468 archaeological sites (Table C1-16) are recorded within the current study area that collectively span the entire spectrum of Pre-Contact and Post-Contact archaeological components referenced above; encompassing some 10,000 years or more. It is also important to stress that many of the known sites in the study area have occupation spans encompassing more than one of these cultural/temporal periods attesting to the long-ranging cultural importance of the region. Presently, no comprehensive systematic archaeological survey has been conducted throughout the entire study area and the distribution of recorded archaeological sites is largely indicative of project-specific federal and state compliance activities (e.g., linear surveys of roads, pipelines, and power line right-of-ways). Therefore, in addition to considering the known sites within the region, project areas must also be further assessed for archaeological site potential.

### 3.2.2 Archaeological Site Potential

In lieu of additional survey data, *Louisiana's Comprehensive Archaeological Plan* (Girard, et al. 2018) and research conducted by Earth Search, Inc. (Lee et al. 2009) for the *Proposed Amite River and Tributaries, Bayou Manchac Water Shed Feasibility Study, Ascension, East Baton Rouge & Iberville Parishes, Louisiana*, can be used for baseline planning purposes. To a great extent, the unique geomorphology and ecology of the study area has influenced site type and location. To examine how the physical landscape impacts the archaeological record, the LDOA divides the study area into a series of regions that follow the ecoregions classification of the Western Ecology Division of the U.S. Environmental Protection Agency (https://www.epa.gov/eco-research/ecoregion-download-files-state-region-6#pane-16). There are six (6) Regions at Level III, three of which fall within the present study area (*Southern Coastal Plain*, *Mississippi Valley Loess Plain* and *Mississippi Alluvial Plain*). All three Level III Regions are then further divided into sub-regions (Level IV: *Southern Rolling Plains*, *Baton Rouge Terrace*, *Gulf Coast Flatwoods*, *Inland Swamps*, *and Southern Holocene Meander Belts*). Girard, et al. (2018: 24-31) define how the unique environmental, biological, and physiological characteristics of each region influenced cultural development in order to provide context to the distribution of where sites are likely or unlikely to occur as is summarized below:

The *Mississippi Alluvial Plain* Level III ecoregion falls within the southern portion of the present study area and includes the *Southern Holocene Meander Belt* and *Inland Swamp* Level IV ecoregions:

*In the southern portion of the [study area] this region includes the Holocene-age deltaic lobes of the Mississippi River...Sites are found predominantly on higher, better-drained landforms. These are typically natural levees along channels, but may include point bars and other surfaces. In many areas, the distribution and age of sites on the modern surface reflects the geological history of that area, rather than its entire occupational history…The Inland Swamp sub-region represents the transition between freshwater backswamps to fresh, brackish, and saline waters of the deltaic marshes…Much of the land is low-lying and subject to seasonal flooding. Numerous bayous drain the region with their natural levees providing the only elevated ground… Sites are concentrated along natural levees. Channel migration has eroded many landforms, and sediment deposition has buried many others.*

The *Mississippi Valley Loess Plains* Level III ecoregion encompasses the central-southern half of the present study area and includes the *Southern Rolling Plains and Baton Rouge Terrace* Level IV ecoregions:

*This region consists of rolling hills and bluffs immediately east of the Mississippi Alluvial Plain [and] is underlain by Miocene and Pliocene sand, silt, and gravel deposits in the northern half, and by Pleistocene age silts, sands, and clays in the south…The region is dominated by the thick layer of Late Pleistocene loess derived from the Mississippi River valley that is draped over the gently rolling topography…Sites are typically situated on higher*

*ridge crests and along stream margins. Sites will occur in surface contents in higher elevations while occasional buried sites may be found in alluvial settings.*

The *Southern Coastal Plain* Level III ecoregion comprises the northern central-half of the present study area, spanning the Louisiana/Mississippi border, and includes the *Gulf Coast Flatwoods* Level IV ecoregion:

*The uplands consist of gently rolling topography dissected by north-south trending streams and rivers…Holocene alluvial deposits are in floodplains and on low terraces along major streams…Sites in the upland areas are concentrated on higher ridge crests and overlooking streams. Most of these deposits are shallow with overlapping occupations and no opportunity for stratified sites. Buried and stratified sites may occur in the floodplains of the larger streams.*

Complimentary to Girard, et al.'s (2018) ecosystem-based model (above), Lee et al. (2009:132) recommend:

*It is essential that investigations be conducted in the fullest consideration and effective integration of available knowledge of landscape dynamics. In doing so, surveys can be designed to provide adequate assessment of all areas, but with greater attention and effort focused on areas that would have been relatively more favorable for prehistoric occupation. Of greater importance, it avoids the expenditure of resources in areas where existing knowledge of geomorphic processes and landscape evolution indicates with confidence that prehistoric activities were precluded or where subsequent natural processes have destroyed the evidence…Geomorphologic data, previous archaeological investigations, and previously recorded sites will constitute the primary data sets utilized in the predictive model. Landform type, elevation, and soils will also be utilized to construct the predictive model. These data will be integrated to determine high probability areas within the riverine and upland portions of the project area.*

Geospatial modeling of cultural landscapes for predictive scientific research is an important emerging approach in contemporary archaeology. Depending on the scale of the final array of project alternatives, it may be advantageous to develop a geospatial predictive model based upon the work of Girard, et al. (2018) and Lee et al. (2009) that incorporates the accumulated environmental and archaeological information specified above as a means to forecast the probability of significant archaeological sites occurring in any particular location that can be used to guide efficient identification and evaluation strategies.

It is estimated that several hundred archaeological sites exist within the proposed study area that cover the range of human occupation from the Paleo-Indian through to historic occupation. It is anticipated that project measures and/or alternative measures will impact these sites. Additional studies and research will need to be conducted subsequent to the execution of the PA.

### 3.2.3 Tribal Areas of Interest

CEMVN utilizes the USACE Tribal Consultation Policy, 1 November 2012, as guidance when implementing its Federal trust responsibility to Tribal Nations. Further, it is the policy of the Federal Government to consult with Tribal Governments on a Government-to-Government basis as required in Executive Order 13175. CEMVN recognizes that Tribes may have sites of religious and cultural significance on or off Tribal Lands, as defined in 36 CFR § 800.16(x), including sites that may contain human remains and/or associated cultural items, that may be affected by this Undertaking. Each Tribe has a THPO who consults with federal agencies regarding activities that may impact archaeological sites of ancestral interest. Ten federally recognized Tribal Nations have identified study parishes within Louisiana as Areas of Interest (AOI; Table C1-17): ACTT, CTL, CNO, CT, JBCI, MBCI, MCN, SNO, STF, and the TBTL. Five (5) federally recognized Tribes have identified study counties within Mississippi as AOIs (Table C1-17): CTL, CNO, JBCI, MBCI, and SNO. Of these Tribes, none currently hold lands within the study area.

*Table C1-17. Federally recognized Tribal Nation Areas of Interest*

| County/Parish: | ACTT | CTL | CNO | CT | JBCI | MBCI | MCN | SNO | STF | TBTL |
|---|---|---|---|---|---|---|---|---|---|---|
| Mississippi: | | | | | | | | | | |
| Amite | No | No | Yes | No | Yes | Yes | No | Yes | No | No |
| Franklin | No | No | Yes | No | Yes | Yes | No | Yes | No | No |
| Lincoln | No | No | Yes | No | Yes | Yes | No | Yes | No | No |
| Wilkinson | No | Yes | Yes | No | Yes | Yes | No | Yes | No | No |
| Louisiana: | | | | | | | | | | |
| Ascension | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| East Baton Rouge | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| East Feliciana | No | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Iberville | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Livingston | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | Yes |
| St. Helena | No | No | Yes | Yes | Yes | Yes | No | No | No | Yes |
| St. James | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | Yes |
| St. John the Baptist | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

## 3.3 U.S. CIVIL WAR

The study area is also the setting of at least 11 terrestrial and naval Civil War battles ranging from small skirmishes to major decisive battles. The NPS's American Battlefield Protection

Program (ABPP; 54 U.S.C. 380101-380103), Civil War Sites Advisory Commission (Public Law 101-628), has assigned Preservation Priorities (https://www.nps.gov/abpp/battles/bystate.htm) to five (5) individual battlefields located within the study area: Magnolia Cemetery (East Baton Rouge: Priority IV.1), Donaldsonville 1862 (Ascension Parish; Priority IV.2), Donaldsonville 1863 (Ascension Parish; Priority IV.2), Cox's Plantation (Ascension Parish; Priority IV.1), and Port Hudson (East Baton Rouge Parish and East Feliciana Parish: Priority I.1).

## 3.4 LOUISIANA SCENIC RIVERS ACT

The Louisiana Department of Wildlife and Fisheries is the lead state agency in the State Scenic River Program. Archaeological resources within scenic river corridors are protected by law under the Louisiana Scenic Rivers Act of 1988 (LSRA). The current study area includes the following Louisiana Natural and Scenic Rivers: the Amite River, Comite River, Blind River, and Bayou Manchac. In addition to the extra protections afforded to cultural resources under the LSRA, Bayou Manchac from the Amite River to the Mississippi River is designated as a "Historic and Scenic River," which requires that "full consideration shall be given to the detrimental effect of any proposed action upon the historic and scenic character thereof, as well as the benefits of the prosed use."

## 3.5 NHPA AND TRIBAL COORDINATION

Section 106 of the NHPA lays out four (4) basic steps that must be carried out sequentially: 1) establish the undertaking; 2) identify and evaluate historic properties; 3) assess effects to historic properties; and 4) resolve any adverse effects (avoid, minimize, or mitigate). An agency cannot assess the effects of the undertaking on historic properties until it has identified and evaluated historic properties within the APE. The federal agency must consult with the appropriate SHPOs, THPOs and/or tribal officials, state and local officials, non-federal sponsors/applicants, and any other consulting parties in identifying historic properties, assessing effects, and resolving adverse effects, and provide for public involvement.

CEMVN will develop an Area of Potential Effects (APE) for each alternative in consultation with external stakeholders (consulting parties), the scope of which will include related project activities, after which CEMVN will require the obligation of funding to initiate the appropriate level of field investigations to complete Archaeological and Standing Structures Evaluation adhering to the LDOA Field Standards for Archaeological Investigation and Testing and Report Standards, and the SOI Standards for History, Archaeology, Architectural History, Architecture, or Historic Architecture (48 FR 44716). Following the completion of the aforementioned identification and evaluation, CEMVN will use the resulting technical reports to assess cultural and historic resources within the project area according to the NRHP Criteria for Evaluation (36 CFR 60.4 [a-d]). Should CEMVN determine that its programs may result in Undertakings with the potential to affect historic properties and/or sites of religious and cultural significance, CEMVN will prepare consultation letters to SHPO, Tribes, and

other consulting parties describing the undertaking, the APE, the historic properties that may be affected, and CEMVN's determination of Effect. Should there be an Adverse Effect, CEMVN may elect to negotiate a traditional Memorandum of Agreement (MOA) that sets out the measures the CEMVN will implement to resolve those adverse effects through avoidance, minimization, or mitigation (36 CFR § 800.14(b)). If multiple resources will be affected, the development of individual MOAs for each adverse effect will be required.

As an alternative to the "Standard" Section 106 process described above, the agency may also defer final identification and evaluation of historic properties if specifically provided for in a Programmatic Agreement (PA) executed pursuant to § 800.14(b). A PA is likely to be more appropriate when the undertaking is complex, the undertaking will adversely affect a significant historic property, the extent of effects is unknown, there is public controversy, the parties involved overwhelmingly prefer it, or at the feasibility level there is insufficient funding and time to fully conduct all required NHPA cultural resources identification and evaluation and to determine any necessary avoidance, minimization, or mitigation measures in consultation with stakeholders and the agency is mandated by law to make a final decision on this undertaking within a timeframe that simply cannot accommodate the standard Section 106 process. The process should establish the likely presence of historic properties within the APE for each alternative, taking into account the number of alternatives under consideration, the magnitude of the undertaking and its likely effects, and the views of the SHPO/THPO and any other consulting parties. Furthermore, CEMVN's Section 106 compliance requirements may be more effectively and efficiently implemented if a programmatic approach is used to stipulate roles and responsibilities, exempt certain actions from Section 106 review, establish protocols for continuing consultation, facilitate identification and evaluation of historic properties, and streamline the assessment and resolution of adverse effects. Following the successful execution of the PA, CEMVN may proceed with issuing a ROD in compliance with Section 106 of the NHPA and in coordination with NEPA.

## 3.6 AESTHETICS

The majority of the study area is within the ARB, which constitutes a mosaic of forest, pine plantations, pasture, and cropland. The primary land-use in the area is agriculture. The Amite River flows South from the Mississippi Valley Loess Plains Ecoregion and into the Mississippi Alluvial Ecoregion. The dominant natural vegetation in the northeast consists of upland forests dominated by oak, hickory, and both loblolly and shortleaf pine. The dominant natural vegetation in the northwest consists of forests characterized by beech, southern magnolia, and American holly. The dominant natural vegetation in the south consists of inland swamps and ridges (according to the State of Louisiana Eco-Region Map, ref. "Louisiana Speaks" and "USGS Eco-Region Map", Daigle, J.J., Griffith, G.E. Omernik, J.M., Faulker, P.L., McCulloh, R.P., Handley, L.R., Smith, L.M., and Chapman, S.S., 2006, Ecoregions of Louisiana color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,00)."

From an aesthetic perspective, the inland swamps in the south have a fairly dense canopy constituted by bald cypress and water tupelo trees. The majority of the bald cypress are rarely the mature and majestic specimens as they once were due to logging operations in the early 1900s. The heavily shaded swamp understory is composed primarily of red maple and green ash. The ground is hard bottom. The tranquil swamps are perennially wet and the water is clear. These swamp areas are often difficult to access and are generally viewed into from roadway edges, waterways, and natural ridges. The ridges are small rises in the inland swamp and are typically occupied by Water Oak, Diamond Oak, Sweetgum, Ash, Wax Myrtle, Black Willow, Chinese Tallow, and Privet. The ridges provide a dryer and slightly more accessible setting in contrast to the surrounding darkness and wetness of the inland swamps for hunters, nature observers, bird watchers, and ecologists.

Numerous efforts have been made to protect and promote visual resources within the ARB that are known for their unique culture and natural identity. One of these efforts, made by the Louisiana Department of Culture, Recreation & Tourism, is for marketing scenic byways thru rural landscape and culturally significant communities. There is a Scenic Byway bordering the study area on the south and east which includes the Great River Road. This is but one segment to an overall scenic byway that stretches on multiple thoroughfares from Canada to the Gulf of Mexico. It is state and federally designated and has an “All American Road” status, making it significant in culture, history, recreation, archeology, aesthetics and tourism.

In 1970, the Louisiana Legislature created the Louisiana Natural and Scenic Rivers System. The System was developed for the purpose of preserving, protecting, developing, reclaiming, and enhancing the wilderness qualities, scenic beauties, and ecological regimes of certain free-flowing Louisiana streams. These rivers, streams and bayous, and segments thereof, are located throughout the state and offer a unique opportunity for individuals and communities to become involved in the protection, conservation and preservation of two of Louisiana's greatest natural resources; its wilderness and its water. Within the study area, there are four designated Louisiana Natural and Scenic Rivers (RS 56:1857). The Amite River from the Louisiana-Mississippi state line to La. Hwy. 37 in East Feliciana Parish; the Blind River from its origin in St. James Parish to its entrance into Lake Maurepas; the Comite River from the Wilson-Clinton Hwy in East Feliciana Parish to the entrance of White Bayou in East Baton Rouge Parish; and Bayou Manchac from the Amite River to the Mississippi River is designated as a Louisiana Historic and Scenic River (RS 56:1856).

## 3.7 RECREATION

Both consumptive and non-consumptive recreation activities in the study area are centered on natural resources. Consumptive recreation includes hunting, fishing for freshwater and saltwater species, and trapping alligators and nutria. Non-consumptive recreation includes wildlife viewing, sightseeing, boating, camping, and environmental education/interpretation. Opportunities for the activities listed are widespread via the waterways within and comprising the boundaries of the study area.

The following public areas, both within and in close proximity to the study area, have been set aside and provide high quality recreation opportunities: Homochito National Forest, Caston Creek Wildlife Management Area (WMA), Maurepas Swamp WMA, Waddill Outdoor Education Center, and multiple county-wide park and recreation systems (Table C1-18).

Table C1-18. Public areas within the study area

| Public Area | Size (acres) | Parish / County | Managing Agency | Recreation | | Boat Launch | Recreational Highlights |
|---|---|---|---|---|---|---|---|
| | | | | Consumptive | Non-consumptive | | |
| National Forest | | | | | | | |
| Homochito National Forest | 191,839 | Amite, Franklin, Lincoln, Wilkinson | United States Department of Agriculture Forest Service | fishing, hunting | Horseback riding, hiking, picnicking, mountain biking, birding, photography, camping, shooting range | Yes | This National Forest is just outside the project area border to the northwest and includes 5.5 mile Bushy Creek Horse Trail, Clear Springs Recreation Area, Okhissa Lake Recreation Area with boat ramps, Woodman Springs Shooting Range |
| State Wildlife Refuge | | | | | | | |
| Caston Creek WMA | 28,286 | Amite, Franklin | Mississippi Department of Wildlife, Fisheries& Parks | Fishing, hunting | Horseback riding, hiking, picnicking, mountain biking, birding, photography, camping | No | This WMA is just outside the project area border to the northwest and within Homochito National Forest. It offers scenic horseback trails as well as various hiking and biking trails for the avid outdoorsmen or the novice adventurer. |
| Maurepas Swamp WMA | 124,567 | Ascension, Livingston, St. James, St. John the Baptist | Louisiana Department of Wildlife and Fisheries | fishing, hunting, trapping | Boating, camping, birding, wildlife viewing | No | Bald eagles and osprey nest in and around the WMA. Numerous species of neotropical migrant birds use this coastal forest habitat during fall and spring migrations. Resident birds, including wood ducks, black-bellied whistling ducks, egrets, and herons can be found on the WMA year-round. |
| Waddill Outdoor Education Center | 237 | East Baton Rouge | Louisiana Department of Wildlife and Fisheries | fishing, | Nature trails, birding, shooting range, archery range, picnic facilities | No | Accessible via North Flannery Road or by boat from the Comite River. LDWF initiated a Summer Day Camp for children ages 12 to 16 in the summer of 2011. The camp is free and open for 5 days allowing participants to receive official boater and hunter education certifications. The camp also offers a fish identification class, fishing and canoeing, skeet shooting, and other outdoor-related activities. |
| Parish / County Park System | | | | | | | |
| Ascension Parish Parks | N/A | Ascension | Ascension | N/A | Ballfields, courts, playgrounds, leisure paths, swimming pools, picnic | Yes | The Parish has 13 parks within the study area in communities including St. Amant, Gonzales, Prairieville, and Geismer |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | areas | | |
| Recreation and Park Commission for the Parish of East Baton Rouge (BREC) | N/A | East Baton Rouge | BREC | N/A | Horseback riding, hiking, picnicking, mountain biking, birding, photography, camping, shooting range | Yes | BREC has more than 180 parks including a unique mix of facilities, which mirror the history and rich natural resources in the region; including a state-of-the-art observatory, a swamp nature center and conservation areas, a performing arts theatre, an equestrian park, an art gallery, an arboretum, an accredited zoo, seven golf courses and an extreme sports park with a 30,000-foot concrete skate park, rock-climbing wall, BMX track and velodrome. |
| Livingston Parish Parks | N/A | Livingston | Livingston | N/A | Ball field, courts, pools, leisure paths, picnic areas | No | The Parish has parks within the study area in communities including Greenwell Springs, Walker, Parks and Recreation of Denham Springs (PARDS), and Livingston Parks and Recreation (LPR). |
| St. James Parish Parks | N/A | St. James | St. James Parish Parks and Recreation | N/A | Ball fields, courts, playgrounds, leisure paths, swimming pools | No | The Parish has 4 parks within the study area including Gramercy Park, Lutcher Park, Paulina Park, and Romeville Park |
| St. John Parish Parks | N/A | St. John the Baptist | St. John the Baptist | N/A | Ball fields, courts, playgrounds, leisure paths, swimming pools, picnic areas | No | The Parish has 8 parks within the study area: Ezekiel Jackson, Regala, Belle Pointe, Emily C. Watkins, Greenwood, Cambridge, Stephanie Wilking, and Hwy. 51 Park |

According to the United States Department of the Interior National Park Service Land & Water Conservation Fund (LWCF), nearly 100 recreation projects within the study area have been supported between 1965 and 2011. Section 6(f)(3) of the LWCF Act assures that once an area has been funded with LWCF assistance, it is continually maintained in public recreation use unless National Park Service (NPS) approves substitution property of reasonably equivalent usefulness and location and of at least equal fair market value. Table C1-19 below illustrates funding from the LWCF within the study area.

*Table C1-19 LWCF funding within study area*

| Parish | Grants | Amount |
|---|---|---|
| Ascension | 19 | $1,249,286.86 |
| East Baton Rouge | 58 | $3,729,989.60 |
| Livingston | 16 | $1,538,956.14 |
| St. James | 5 | $539,740.17 |
| St. John the Baptist | 1 | $128,026.56 |
| **Total:** | **99** | **$7,185,999.33** |

## 3.8 ENVIRONMENTAL JUSTICE

Five of the twelve parishes or counties in the study area including East Baton Rouge, Iberville, St. James and St. John the Baptist Parishes as well as Wilkinson County, MS, have a majority of their population identifying as minority (Table C1-20).

*Table C1-20. Total Population and Racial/Ethnic Composition*

| Geography | Total Population Estimate | White | Black or African American | American Indian and Alaska Native | Asian | Native Hawaiian and Other Pacific Islander | Some other race | Two or more races | Percent Minority | Hispanic or Latino (of any race) | Percent Hispanic or Latino (of any race) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ascension Parish, LA | 119,129 | 87,674 | 26,036 | 47 | 1,072 | - | 965 | 3,335 | 26.4% | 6,261 | 5.3% |
| East Baton Rouge Parish, LA | 446,167 | 212,859 | 204,078 | 944 | 15,146 | 123 | 5,832 | 7,185 | 52.3% | 17,825 | 4.0% |
| East Feliciana Parish, LA | 19,553 | 10,508 | 8,734 | 57 | 31 | - | 59 | 164 | 46.3% | 296 | 1.5% |
| Iberville Parish, LA | 33,122 | 16,392 | 16,195 | 83 | 20 | - | 165 | 267 | 50.5% | 837 | 2.5% |
| Livingston Parish, LA | 137,096 | 124,798 | 8,191 | 330 | 655 | 17 | 957 | 2,148 | 9.0% | 4,741 | 3.5% |
| St. Helena Parish, LA | 10,509 | 4,632 | 5,671 | 79 | 23 | - | 25 | 79 | 55.9% | 24 | 0.2% |
| St. James Parish, LA | 21,485 | 10,420 | 10,692 | 21 | 51 | - | 132 | 169 | 51.5% | 336 | 1.6% |
| St. John the Baptist Parish, LA | 43,565 | 17,716 | 24,175 | - | 391 | - | 438 | 845 | 59.3% | 2,524 | 5.8% |
| Amite County, MS | 12,574 | 7,237 | 5,277 | 3 | 34 | - | - | 23 | 42.4% | 29 | 0.2% |
| Franklin County, MS | 7,772 | 4,949 | 2,795 | - | 2 | - | - | 26 | 36.3% | 65 | 0.8% |
| Lincoln County, MS | 34,542 | 23,567 | 10,641 | 4 | 254 | - | - | 76 | 31.8% | 369 | 1.1% |
| Wilkinson County, MS | 9,084 | 2,537 | 6,477 | - | 6 | - | 39 | 25 | 72.1% | 26 | 0.3% |

Source: U.S. Census Bureau 2017 ACS.

Four of the twelve Parishes/Counties in the study area, including St. Helena Parish in Louisiana and Amite, Lincoln and Wilkinson Counties in Mississippi have 20 percent or more of individuals living below poverty, which in 2017 is $25,094 for a family of four (Table C1-21).

*Table C1-21: Persons Living Below Poverty Level*

| Geography | Population Estimate* | Below Poverty Level | Percent Below Poverty Level |
|---|---|---|---|
| Ascension Parish, LA | 118,199 | 13,824 | 11.7 |
| East Baton Rouge Parish, LA | 436,841 | 83,483 | 19.1 |
| East Feliciana Parish, LA | 16,329 | 2,928 | 17.9 |
| Iberville Parish, LA | 29,598 | 5,708 | 19.3 |
| Livingston Parish, LA | 135,933 | 17,959 | 13.2 |
| St. Helena Parish, LA | 10,280 | 2,719 | 26.4 |
| St. James Parish, LA | 21,275 | 3,316 | 15.6 |
| St. John the Baptist Parish, LA | 42,804 | 7,643 | 17.9 |
| Amite County, MS | 12,464 | 2,846 | 22.8 |
| Franklin County, MS | 7,666 | 1,369 | 17.9 |
| Lincoln County, MS | 33,986 | 8,007 | 23.6 |
| Wilkinson County, MS | 8,023 | 3,107 | 38.7 |
| * For Whom Poverty Status is Determined | | | |

Source: U.S. Census Bureau 2017 ACS.

The Environmental Indicators for the Darlington Dam, presented in Table C1-22, are all below the 80th percentile in the State or USA, which is according to EPA, the percentile where one would not expect EJ concerns. The Environmental Indicators do not highlight EJ concerns. However, the demographic indicator, Minority Population (Table C1-20), shows the area well over 50 percent minority, both for communities within the Darlington Dam footprint and communities in the 25-year floodplain. The community within the dam footprint is considered an EJ community based upon minority criteria with over 50 percent of population identifying as minority.

*Table C1-22. Darlington Dam Selected Environmental and Demographic Indicators*

| Selected Variables | Study Area Value | State Avg | Percentile in State | EPA Region Avg | Percen-tile in EPA Region | USA Avg | Percen-tile in USA |
|---|---|---|---|---|---|---|---|
| Environmental Indicators | | | | | | | |
| Particulate Matter (PM 2.5 in µg/m³) | 8.68 | 9.03 | 30 | 9.55 | 18 | 9.53 | 31 |
| Ozone (ppb) | 36.4 | 37.4 | 33 | 40.4 | 24 | 42.5 | 14 |
| NATA* Diesel PM (µg/m³) | 0.232 | 0.891 | 11 | 0.721 | <50th | 0.938 | <50th |
| NATA* Air Toxics Cancer Risk (risk per MM) | 44 | 49 | 37 | 42 | 60-70th | 40 | 60-70th |
| NATA* Respiratory Hazard Index | 1.3 | 1.9 | 6 | 1.8 | <50th | 1.8 | <50th |
| Traffic Proximity and Volume (daily traffic count/distance to road) | 2.4 | 250 | 13 | 320 | 7 | 600 | 7 |
| Lead Paint Indicator (% pre-1960s housing) | 0.038 | 0.21 | 21 | 0.18 | 39 | 0.29 | 23 |
| Superfund Proximity (site count/km distance) | 0.012 | 0.067 | 21 | 0.07 | 20 | 0.12 | 12 |
| RMP Proximity (facility count/km distance) | 0.066 | 0.88 | 18 | 0.8 | 14 | 0.72 | 15 |
| Hazardous Waste Proximity (facility count/km distance) | 0.029 | 0.74 | 4 | 0.86 | 8 | 4.3 | 6 |
| Wastewater Discharge Indicator (toxicity-weighted concentration/m distance) | 0 | 0.49 | N/A | 0.38 | 36 | 30 | 40 |
| Demographic Indicators | | | | | | | |
| Demographic Index | 59% | 40% | 76 | 44% | 71 | 36% | 81 |
| Minority Population | 73% | 41% | 80 | 51% | 70 | 38% | 80 |
| Linguistically Isolated Population | 1% | 2% | 66 | 6% | 39 | 4% | 48 |
| Population with Less Than High School Education | 20% | 16% | 66 | 17% | 66 | 13% | 77 |
| Population under Age 5 | 9% | 7% | 73 | 7% | 69 | 6% | 77 |
| Population over Age 64 | 16% | 14% | 66 | 13% | 71 | 14% | 63 |

*The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

Note: This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is

at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. For additional information, see: www.epa.gov/environmentaljustice

Additonally, 20% or more of households in three of four block groups comprising the dam have incomes below the poverty level (Table C-23). The community within the footprint of the dam is considered an EJ community based upon the low-income criteria with over 20 percent of households living below poverty level.

*Table C1-23. Darlington Dam Households Below Poverty*

| Census Tract/BG | Total Population in Census Block Group | Households | Number of Households below Poverty Level | % HHLDS below Poverty |
|---|---|---|---|---|
| 220919511/002 | 765 | 291 | 70 | 24% |
| 220379513/001 | 850 | 323 | 59 | 18% |
| 220919511/003 | 1,047 | 398 | 100 | 25% |
| 220379516/001 | 1,613 | 613 | 141 | 23% |
| Total | 4,275 | 1,625 | 370 | 23% |

Source: EPA EJSCREEN and the U.S. Census Bureau.
Note: The data shown represents large census block groups and the percent of households below poverty. The structures within the Darlington Dam footprint are part of large census block groups.

# References and Resources

**Project References**

Couvillion, B.R. 2011. Land Area Change in Coastal Louisiana from 1932 to 2010. https://pubs.usgs.gov/sim/3164/downloads/SIM3164_Pamphlet.pdf

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