



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVENUE
NEW ORLEANS, LOUISIANA 70118

Regional Planning and
Environmental Division, South
Coastal Environmental
Compliance Branch

DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI) DRAFT

**CALCASIEU RIVER AND PASS, LOUISIANA
ROCK DIKE CONSTRUCTION PROJECT**

CAMERON PARISH, LOUISIANA

ENVIRONMENTAL ASSESSMENT (EA) #560

Description of Proposed Action. The U.S. Army Corps of Engineers (USACE), Mississippi River Valley Division, Regional Planning and Environmental Division South, New Orleans District (MVN) proposes to construct dike armoring structures along the Calcasieu Lake boundaries of Calcasieu River Confined Disposal Facilities (CDF) 23, D, and E that would prevent wave erosion impacts to these disposal sites that are used for maintenance of the Federal navigational project, Calcasieu River and Pass, Louisiana. The proposed action would consist of the construction of rock dike armoring structures in Calcasieu Lake and would be located approximately between Mile 17 and Mile 11 of the Calcasieu River and Pass along the west side of Calcasieu Lake. The proposed project area is located within the historical footprint of the upland disposal area described in the 1976 Final Environmental Impact Statement (EIS), Calcasieu River and Pass (Including Salt-Water Barrier); Coon Island; Devil's Elbow; Calcasieu River Basin, Louisiana, that has historically been used during maintenance dredging of the Calcasieu Ship Channel since channel construction in the 1940s. A 2010 Calcasieu River and Pass, Louisiana Dredged Material Management Plan and Supplemental EIS, which includes features that maximize CDFs through rehabilitation and expansion while utilizing additional beneficial use disposal areas, has since re-defined the Calcasieu River and Pass, Louisiana project's dredged material disposal options.

The rock dike structure would be constructed in Calcasieu Lake along the historical disposal area right-of-way (ROW) limits and would be approximately 29,000 feet long. Earthen retention dikes would be constructed or refurbished on the channel side of dike armoring features to retain dredged material placed in these CDFs during routine maintenance dredging efforts. Borrow material for earthen dike construction or refurbishment would come from within existing upland disposal areas and/or reclaimed lake water bottom.

The proposed project area is composed of shallow open water in Calcasieu Lake, adjacent and parallel to CDFs 23, D, and E. The rock dike structure would allow approximately 544 acres of additional dredged material disposal area to become available for future use. The rock dike structures would also provide protection from wave-induced erosion of the earthen retention dikes along the CDFs.

A total of about 544 acres of lake water bottom located between existing CDF earthen retention dikes and the new dike armoring structures constructed along the historical disposal area ROW line would be reclaimed as upland disposal areas. Dike armoring structures would occupy approximately 35 acres of lake water.

Factors Considered in Determination. This office has assessed the impacts of no action and the proposed action on important resources, including wetlands, aquatic resources/ Fisheries, essential fish habitat (EFH), scrub-shrub uplands, wildlife, threatened and endangered species, cultural resources, recreation resources, air quality, water quality, and navigation. For the proposed action, no significant adverse impacts were identified for any of the important resources. Approximately 544 acres of lake water bottom located between existing CDF earthen retention dikes and the new dike armoring structures would be reclaimed as upland disposal area. The risk of encountering hazardous, toxic, and radioactive waste is low. No impacts have been identified that would require compensatory mitigation and all practicable means of avoiding adverse environmental effects have been adopted. By letter dated August 2, 2018, the U.S. Fish and Wildlife Service (USFWS) concurred that the proposed action is not likely to adversely affect any endangered or threatened species. In a letter dated August 2, 2018, the Louisiana Department of Natural Resources concurred with the determination that the proposed action is consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program. A State Water Quality Certificate, dated June 20, 2018, was received from the Louisiana Department of Environmental Quality (LDEQ). The Section 404(b)(1) evaluation was completed on *****. In a letter dated ***** , the Louisiana State Historic Preservation Officer (SHPO) concurred with the recommendation of no effect on historic properties. This office has addressed all Fish and Wildlife Coordination Act recommendations contained in an e-mail from the USFWS dated August 2, 2018. This office has concurred with or resolved all comments addressing EFH contained in a letter from the National Marine Fisheries Service dated *****. X number of public comments were received during public review.

Environmental Design Commitments. The following commitments are an integral part of the proposed action:

1. If the proposed action is changed significantly or is not implemented within one year, MVN will reinstate coordination with the USFWS to ensure that the proposed action would not adversely affect any Federally-listed threatened or endangered species or their habitat. (USFWS memo dated August 2, 2018)

2. MVN shall implement a suspended sediment control plan that includes the use of silt curtains to prevent suspended solids from negatively impacting oyster resource areas.
3. Placement of rock dike armoring material on existing submerged aquatic vegetation shall be avoided to the maximum extent practicable.
4. If any unrecorded cultural resources are determined to exist with the proposed project boundaries, no work will proceed in the area containing these cultural resources until a MVN-PDN-NCR archeologist has been notified and final coordination with the SHPO and the Tribal Historic Preservation Officer has been completed. (MVN-PDR-NCR/SHPO Standard Operating Procedure)

Public Involvement. The proposed action has been coordinated with appropriate Federal, state, and local agencies and businesses, organizations, and individuals through distribution of EA #560 for their review and comment. EA #560 is attached hereto and made a part of this FONSI.

Conclusion. This office has assessed the potential environmental impacts of the proposed action. Based on this assessment, a review of the comments made on EA #560, and the implementation of the environmental design commitments listed above, a determination has been made that the proposed action would have no significant impact on the human environment. Therefore, an Environmental Impact Statement will not be prepared.

DRAFT

Date

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Michael N. Clancy
Colonel, U.S. Army
District Commander

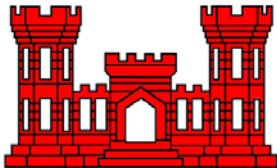
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DRAFT ENVIRONMENTAL ASSESSMENT

CALCASIEU RIVER AND PASS
ROCK DIKE CONSTRUCTION PROJECT
CALCASIEU LAKE, EAST OF HACKBERRY

EA #560

CAMERON PARISH, LOUISIANA



U.S. Army Corps of Engineers
Mississippi Valley Division
Regional Planning and Environment Division South

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DRAFT ENVIRONMENTAL ASSESSMENT

CALCASIEU RIVER and PASS ROCK DIKE CONSTRUCTION PROJECT

EA #560

CALCASIEU LAKE, EAST OF HACKBERRY, CAMERON PARISH, LOUISIANA

1 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mississippi River Valley Division, Regional Planning and Environment Division South, has prepared this draft Environmental Assessment (EA) for New Orleans District (MVN) to evaluate the potential impacts associated with the construction of dike armoring features along the west Calcasieu Lake boundaries of Calcasieu River confined disposal facilities (CDF) 23, D, and E to prevent wave erosion impacts to the disposal sites. The proposed project is located near Hackberry, Louisiana, in Cameron Parish (Figure 1). The proposed action would consist of the construction of rock/concrete dike armoring structures in Calcasieu Lake located approximately between Calcasieu River mile 17 and mile 11 (Figure 2).

This draft EA has been prepared in accordance with the National Environmental Policy Act of 1969 and the Council on Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation ER 200-2-2. This draft EA provides sufficient information on the potential adverse and beneficial environmental effects to allow the District Commander, USACE, MVN, to make an informed decision on the appropriateness of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.1 Proposed Action

MVN proposes to construct dike armoring structures along the Calcasieu Lake boundaries of Calcasieu River CDFS 23, D, and E that would prevent wave erosion impacts to these disposal sites that are used for maintenance of the Federal navigation project, Calcasieu River and Pass, Louisiana. One dike armoring alternative, rock dike construction, has been evaluated that would offer protection from wave-induced erosion effects for Calcasieu River CDFs that border the west side of Calcasieu Lake. Dike armoring would consist of rock structures constructed along the lake side of disposal area earthen dikes out to the historical disposal right-of-way footprint in Calcasieu Lake. (Figures 2 and 3). The lake bottom area between existing CDF earthen retention dikes and the new dike armoring structures will be utilized for upland disposal purposes as reclaimed portions of these disposal sites that have been lost as a result of lake side wave erosion. These areas were historically used for placement of dredged material removed

from the Calcasieu River navigation channel during maintenance dredging activities from the 1940s through the 1980s.

Rock armoring structures would be constructed in Calcasieu Lake along the historical disposal area right-of-way limits (approximately 3,000 feet east of the navigation channel centerline). A total of approximately 29,100 feet of dike armoring would be constructed: approximately 5,100 feet along the lake side of CDF 23, and approximately 24,000 feet along the lake side of CDFs D and E. Armoring structures would be constructed to a maximum elevation of approximately +7.0 feet NAVD88, with a crown width of approximately 10 feet, and a maximum side slope of about 1V/4H.

Earthen retention dikes would be constructed or refurbished on the channel side of dike armoring features to retain dredged material placed in these CDFs during routine maintenance dredging efforts. Borrow material for earthen dike construction or refurbishment would come from within existing upland disposal areas and/or reclaimed lake water bottom.

Construction equipment access to the dike armoring sites would be allowed across CDF E into the reclaimed upland disposal areas and all work would be performed within the historical disposal right-of-way limits. Overland access channels would be dredged from the Calcasieu River navigation channel at about river mile 12.3 across previously placed dredged material. Flotation access channels would be excavated within the reclaimed upland disposal areas to facilitate access to the construction site by rock barges and construction equipment. Within the reclaimed upland disposal areas for CDFs D, and E, turning basins may be excavated to enable barges to turn around in order to depart the construction site following discharge of material used to construct the dike armoring features.

Flotation access channels may also be excavated in Calcasieu Lake to facilitate access to rock armoring construction sites from outside of the historical disposal right-of-way limits (Figure 2). Flotation access channel dredging in Calcasieu Lake would be limited to the maximum extent practicable to minimize potential impacts to the lake's oyster resources. Where flotation access channels are excavated in Calcasieu Lake, dredged material would be temporarily stockpiled on one side of the channel and used to backfill these channels when dike armoring construction work has been completed. The CEMVN will work closely with the Louisiana Department of Wildlife and Fisheries to determine final access route alignments in Calcasieu Lake to minimize impacts to oyster resources. Any unavoidable impacts to oyster resources will be appropriately compensated for by using published LDWF compensation rates for impacts to water bottoms on public oyster seed grounds, public oyster seed reservations, and public oyster tonging areas.

All flotation access channels would be excavated to a maximum depth of about -8.0 feet NAVD88 and a maximum bottom width of about 80 feet.

Construction equipment carrying rock/concrete material may also access the proposed dike armoring site for CDF 23 across the land portion of this upland disposal area from the Calcasieu River.

DISPOSAL AREAS: A total of about 544 acres of lake water bottom located between existing CDF earthen retention dikes and the new dike armoring structures constructed along the historical disposal area right-of-way line would be reclaimed as upland disposal areas. Along the eastern edge of this reclaimed disposal area, dike armoring structures would occupy a total footprint of about 35 acres of lake water bottom.

Flotation access dredging and placement of flotation access channel material within the reclaimed upland disposal areas would impact approximately 97 acres of water bottom. Flotation access channel material would either be used to backfill these access channels upon completion of construction work, or left in place within the reclaimed upland disposal areas.

Material excavated during overland access channel dredging at river mile 12.3 (CDF E) would be placed on upland sites located adjacent to, and on either side of, these access channels. Approximately 4.0 acres of upland disposal area would be excavated from the mile 12.3 access channel site.

Flotation access dredging alongside the rock armoring construction site on the lake side of the historical disposal area right-of-way line would impact about 49 acres of lake water bottom. All such flotation access channel material would be placed within the reclaimed upland disposal area footprint and left in place following completion of construction activities. Flotation access dredging in Calcasieu Lake and placement of flotation access channel material on the lake water bottom outside of the historical disposal area right-of-way footprint would impact about 66 acres of lake water bottom.

METHODS OF DISCHARGE: Excavation of flotation channels would be performed by a mechanical or hydraulic dredge. Placement of rock for construction of dike armoring structures would be performed by a mechanical dredge. Silt curtains would be utilized as necessary to prevent re-suspended sediments resulting from construction activities from impacting nearby oyster resources in Calcasieu Lake.

QUANTITIES AND FREQUENCIES: Quantities of rock required for construction of armoring structures will be determined during the project final design phase.

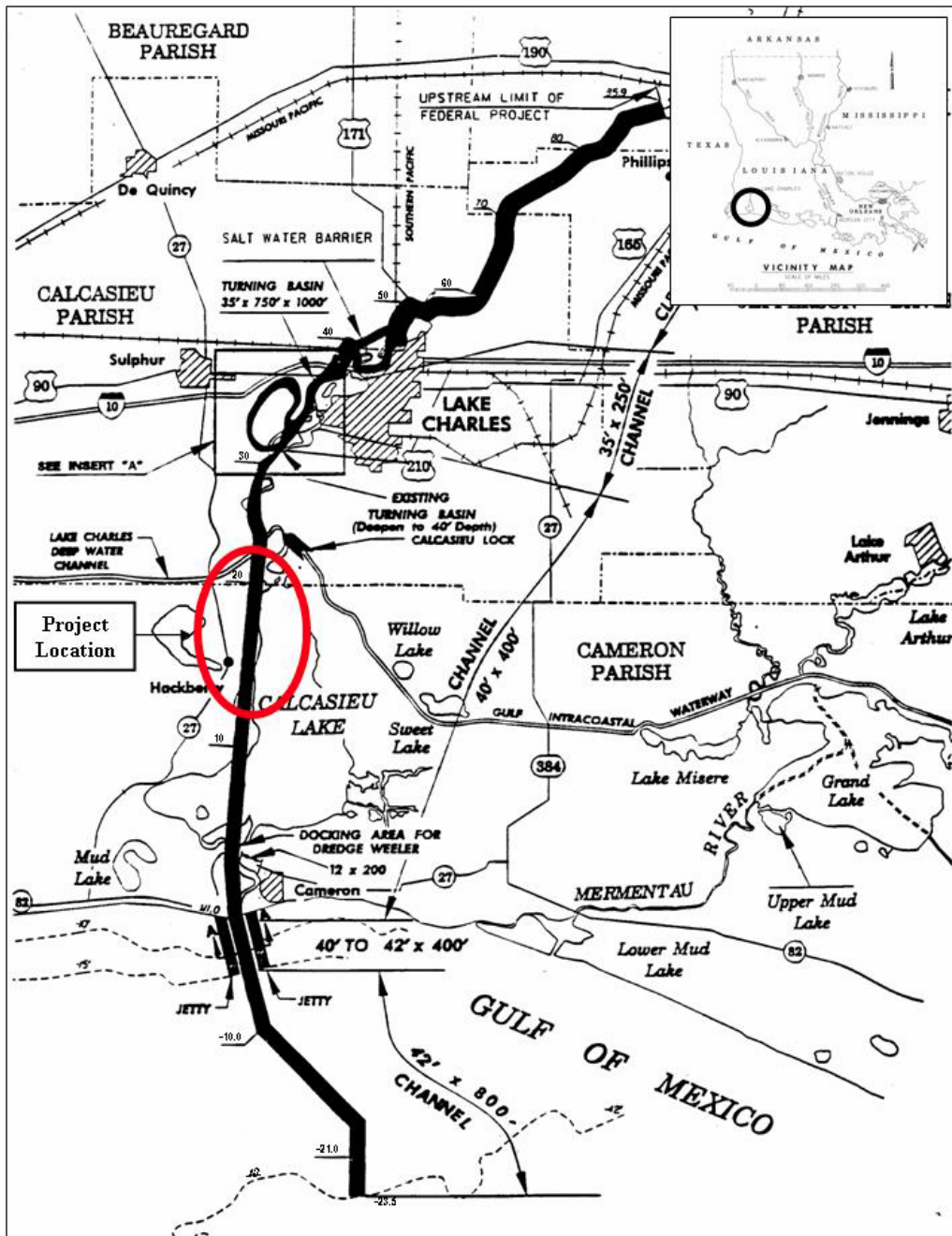


Figure 1: Project Location within the Calcasieu River and Pass, Cameron Parish

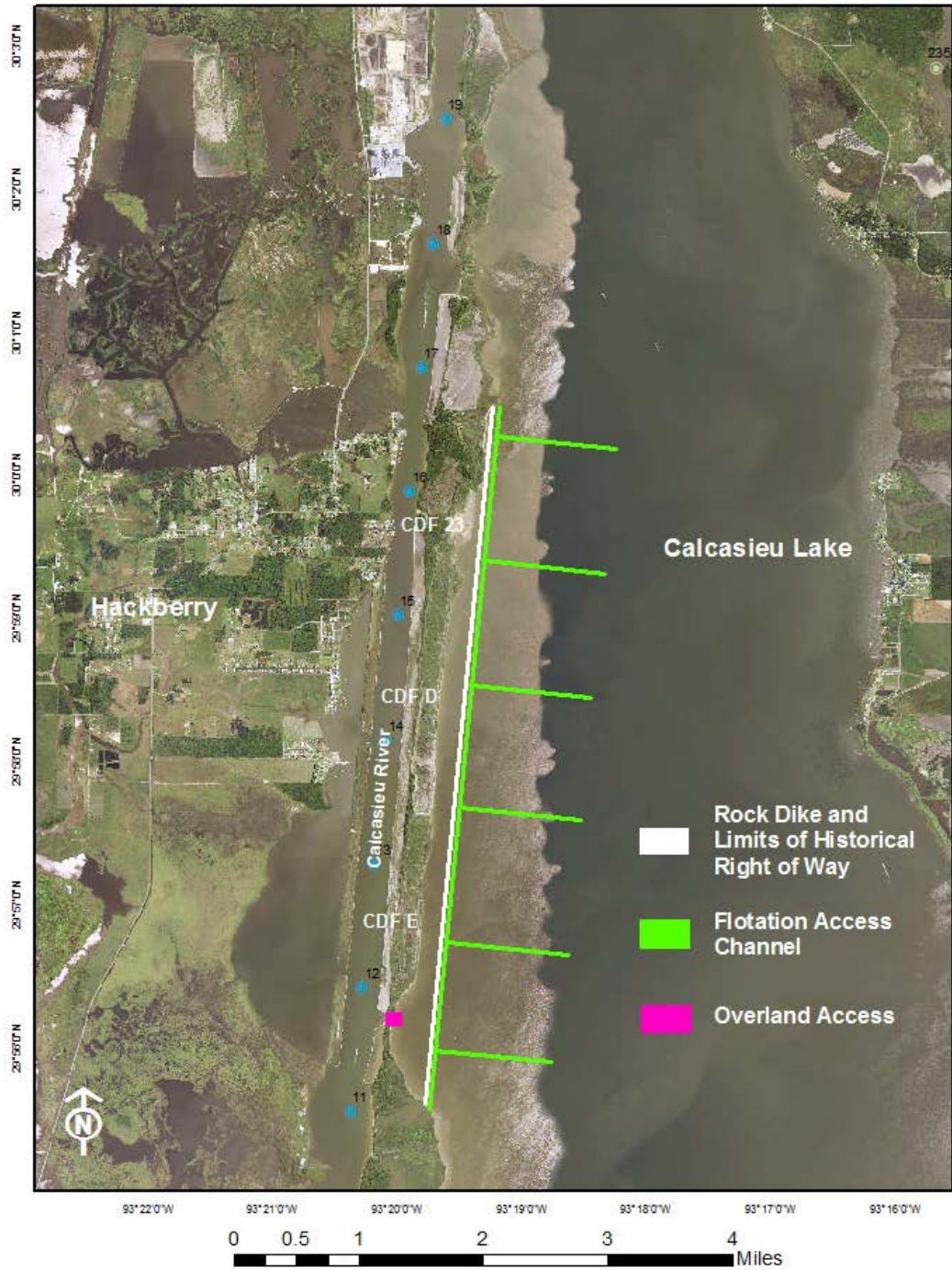


Figure 2: Map of Project Footprint

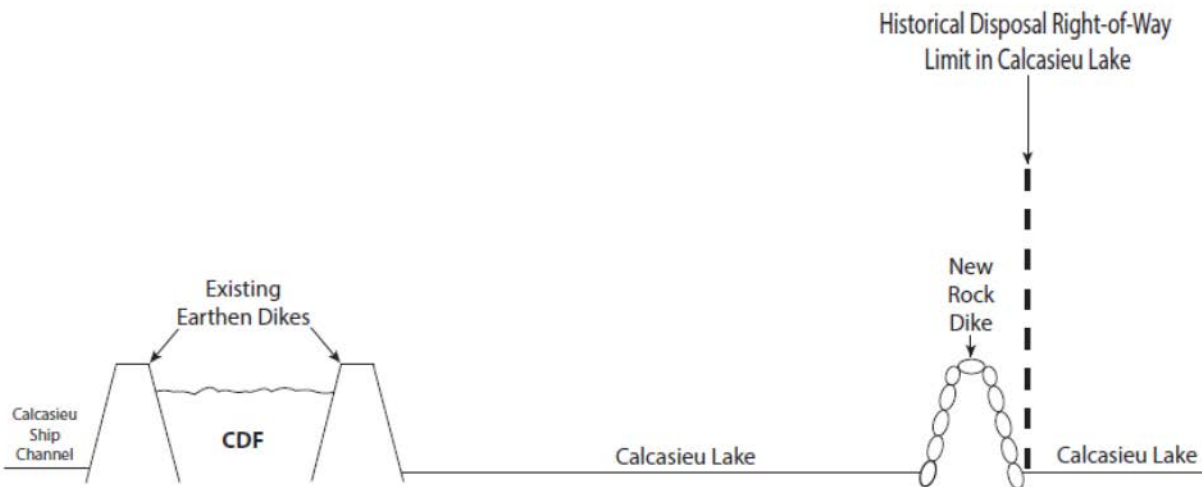


Figure 3: Rock/Concrete Dike Armoring Structure

1.2 Purpose and Need for the Proposed Action

Existing earthen retention dikes that contain Calcasieu River dredged material in upland CDFs that border Calcasieu Lake are subject to severe wave-induced erosion effects. Erosion has previously led to dike failures that have released dredged material onto adjacent Calcasieu Lake bottoms. Armoring of these retention dikes is required to prevent future unplanned releases of dredged material into Calcasieu Lake.

1.3 Authority

The proposed action was authorized by the Rivers and Harbors Act of July 24, 1946, House Document 190, 79th Congress, 2nd Session and prior Rivers and Harbors Acts, which provides for a channel 35 feet deep and 250 feet wide from the wharves of the Lake Charles Harbor and Terminal District (including the loop around Clooney Island) to the Gulf of Mexico, via Calcasieu Lake and through Calcasieu Pass, a channel 35-37 feet deep and 250 feet wide between the jetties, and an approach channel 37 feet deep by 400 feet wide seaward to the 37-foot contour of the Gulf of Mexico floor.

The Rivers and Harbors Act of July 14, 1960, House Document 436, 86th Congress, 2nd Session, provides for an approach channel having a depth of 42 feet below Mean Low Gulf (MLG) level over a bottom width of 800 feet from the Gulf of Mexico to the jettied channel; a channel 40 feet deep from the jettied end and shoreline over a bottom width of 400 feet; and a channel 40 feet deep over a bottom width of 400 feet from the shoreline at river Mile 0.0 to the wharves of the Port of Lake Charles at Mile 34.1. Additionally, this act provided for enlargement of the existing turning basin at Mile 29.6 to a depth of 40

feet; and a mooring basin at about Mile 3.0 having a width of 350 feet, a length of 2,000 feet, and a depth of 40 feet; extension of the ship channel bottom width of 250 feet below MLG over a bottom width of 250 feet from the wharves of the Port of Lake Charles, Mile 34.1 to the vicinity of the bridge on U.S. Highway 90 at Mile 36.0, and a turning basin of the same depth at the upper end having a width of 750 feet and a length 1,000 feet; and maintenance of the existing channel 12 feet deep by 200 feet wide from the ship channel to Cameron, Louisiana, via the old channel of the Calcasieu River.

1.4 Prior Reports

A Final EIS for the Continued Operation and Maintenance of Calcasieu River and Pass (Including Salt Water Barrier); Coon Island; Devil's Elbow; Calcasieu River Basin, Louisiana, was prepared by MVN in 1976, with a Statement of Findings (SOF) signed in March 1977. A final Dredged Material Management Plan (DMMP) and Supplemental EIS (SEIS), dated November 22, 2010, for the Calcasieu River and Pass, Louisiana project (Calcasieu Ship Channel) provides documentation in support of a management plan for the placement of material dredged for the maintenance and operation of the Calcasieu Ship Channel and berthing areas for a minimum 20-year period. The Record of Decision (ROD) for the SEIS was signed on December 16, 2010. The DMMP/SEIS has re-defined the Calcasieu River and Pass, Louisiana project's dredged disposal options.

Additional related environmental reports for Federal actions near the proposed project area include the following EAs: "Lake Charles Ship Channel, Cameron and Calcasieu Parishes, Louisiana, Marsh Creation," with the FONSI signed on January 29, 1992; "Calcasieu Ship Channel Bayou Black Remediation," with the FONSI signed on January 24, 1996; "East Fork, Calcasieu Pass – Assumption of Maintenance," with the FONSI signed on October 12, 1999; "Sabine Refuge Marsh Creation, Cameron Parish," with the FONSI signed on December 28, 2000; "Calcasieu River and Pass, Louisiana, Turner Bay Disposal Area," with the FONSI signed on March 6, 2001; "Calcasieu River and Pass, Louisiana, Bank Stabilization and Dike Protection of Confined Disposal Facilities, Cameron Parish, Louisiana," with the FONSI signed on December 14, 2001; "Sabine Refuge O&M Beneficial Use Marsh Creation Disposal Area," with the FONSI signed on August 15, 2006; "Calcasieu River and Pass, Foreshore Rock Dikes and Bank Armoring, Cameron Parish, Louisiana," with the FONSI signed on August 19, 2009; and "Calcasieu River and Pass, Louisiana, Placement of Dredged Material in Calcasieu Lake", with the FONSI signed on June 20, 2013.

1.5 Public Concerns

The citizens of Cameron Parish, and Louisiana in general, are concerned about the loss of wetlands in the Calcasieu River Basin (USACE 2010). Coastal wetlands in Louisiana are being lost to subsidence and erosion at a rate of approximately 25,200 acres per year since the 1970s (Barras et al. 2003). Wetlands loss affects wildlife and fisheries as well as the ability of populated areas such as Lake Charles and Cameron to withstand hurricane and tropical storm surges. The Calcasieu River and Pass, Louisiana project is

an important economic link for the Port of Lake Charles and regional industries to the Gulf of Mexico. Port facilities are located along the Calcasieu River and Pass, Louisiana navigation channel while city docks are located approximately 32 miles inland from the Gulf of Mexico. Commercial navigation in the navigational channel, especially deep draft navigation, relies on the consistent depth authorized for the project. The lack of approved disposal sites and other factors contribute to stretches of the navigation channel being less than project depth and width. A depth-deficient navigation channel forces river pilots to place safety restrictions on large vessels, such as one-way traffic, causing delays and increasing costs at the Port of Lake Charles.

2 ALTERNATIVES TO THE PROPOSED ACTION

One alternative to the proposed action was considered. This alternative was No-action.

2.1 No Action – Future without Project Condition

In the future without project condition (a.k.a no action), the proposed action would not be constructed. Future MVN dredging operations in the inland reach of the Calcasieu River and Pass, Louisiana project would continue to utilize CDFs 23, D and E; however, without armoring the CDF retention dikes they would be subject to severe wave-induced erosion effects from Calcasieu Lake. Future unplanned releases of the dredged material from the CDFs would occur and the water quality of Calcasieu Lake and other lake resources would potentially be impacted by increased turbidity due to releases of the dredged material. In the absence of the shoreline protection afforded by the rock dike/concrete structures or the marsh platforms, lake-side erosion of adjacent CDFs and associated earthen containment dikes and the subsequent spilling of dredged material into Calcasieu Lake would continue, potentially impacting water quality and other lake resources.

3 AFFECTED ENVIRONMENT

3.1 General Description

3.1.1 Environmental Setting

The proposed project area is located in southwestern Louisiana in the lower Calcasieu River Basin in Cameron Parish, Louisiana. The lower Calcasieu River Basin is dominated by the Calcasieu River and Pass, Louisiana project navigation channel and Calcasieu Lake—both of which occupy portions of Calcasieu and Cameron parishes. The Calcasieu River and Pass, Louisiana project provides deep draft navigation for ships to enter the Port of Lake Charles. The proposed dike armoring project area is located along the western shoreline of Calcasieu Lake, immediately east of approximate River Mile 17 and River Mile 11 of the navigation channel. The project area is located in the 7th Congressional District.

3.1.2 Description of the Watershed

The Calcasieu River Basin is a shallow wetland/aquatic system with the Calcasieu River providing freshwater input at the north end and a generally north to south circulation pattern through Calcasieu Lake. Calcasieu Lake is considered a partially-mixed estuary in which tidal inundation creates a salt wedge in the upper estuary, forcing a mixing zone with the upper freshwater discharge into the system. Calcasieu Pass permits tidal exchange with the Gulf of Mexico. Water level fluctuations are the result of Calcasieu River discharge, tides and winds. Tides are a major factor affecting the water movement in the basin with mean ranges of 1.7 feet at Calcasieu Pass and 0.7 feet at Lake Charles.

The Calcasieu River drains approximately 3,775 square miles and has an overall mainstream length of 191 miles. The character of the river changes from a small, fast stream at its headwaters near Slagle, Louisiana to a broad sluggish estuary extending from the Lake Charles area to the Gulf of Mexico. Historically, the natural channel of the Calcasieu River ran through the central part of Calcasieu Lake and exited through the naturally twisting lower Calcasieu River, depositing material into the adjacent wetlands, creating a bar at the mouth of Calcasieu Pass which controlled intrusion of saltwater into the basin. This natural process provided a naturally degrading, yet sustainable marsh habitat that thrived despite natural subsidence and sea level rise common in Louisiana coastal marshes.

Beginning in the late 1800's and continuing into the mid-1900's, navigational improvements in the ship channel resulted in significant modifications to natural hydrologic patterns in the basin. These alterations have resulted in the disruption of the natural hydrologic and sedimentation processes which contributed to wetland building and maintenance, while subsidence and sea level rise result in an average water level rise of 0.25 inches per year (USGS 2007). The present river circulation largely bypasses Calcasieu Lake causing the river to drop much of its sediment load in the ship channel rather than in the lake and adjacent wetlands. Sedimentation of the ship channel is primarily the result of bank erosion and sloughing of bank sediments into the channel.

The deeper and wider channel permits saltwater to travel farther north in the ship channel affecting greater acreages of wetlands. As a result, a saltwater barrier was constructed north of the Calcasieu River above Lake Charles to prevent further movement of the saltwater wedge upstream. The barrier divides the river into an upstream fresh water system and a downstream estuarine system. The natural river channel below the barrier and above the Gulf Intracoastal Waterway (GIWW) has been widened, deepened and, in places, replaced by a new channel (the Calcasieu River and Pass, Louisiana project navigation channel). The new channel was dredged for navigational purposes. The extensive modifications have resulted in a complex system of interlaced natural and artificial channels, loops and lakes.

An estimated total of 116,791 acres of wetlands in the Calcasieu-Sabine River Basin have converted to open water since 1932 (USGS 2007). Marshes adjacent to the Calcasieu

River and Pass, Louisiana project and Calcasieu Lake are experiencing severe erosion caused by the combination of several factors including recent hurricanes, geological subsidence, sea level rise, wave action, and a combination of man made changes. Hydrological modifications caused by navigation improvements—most notably the Calcasieu Ship Channel and the GIWW—coupled with an average rate of subsidence of 0.69 inches per year (1-2 feet per century), have had significant impacts on wetland and aquatic habitats in the basin. There has been an inland migration of marsh zones in the basin with increasing acreages of salt and brackish marshes accompanied by the loss of intermediate and fresh marshes. Areas in coastal southwest Louisiana have experienced changes in vegetation and an overall shift to species adapted to saline conditions due to increased salinity caused by the creation and maintenance of navigation channels, canals, and associated spoil banks which impeded the north-south flow of freshwater over the marsh (USFWS 2007).

Habitats present in the vicinity of the proposed project include: 1) emergent marsh, 2) shallow open water, and 3) scrub-shrub vegetation (associated with upland CDFs) (Figures 4 & 5).



Figure 4: Partial Scrub-Shrub Present in the Project Area



Figure 5: Partial Scrub-Shrub Present in the Project Area

3.1.3 Climate

The area climate is humid, subtropical with a strong maritime character. Warm, moist southeasterly winds from the Gulf of Mexico prevail throughout most of the year, with occasional cool, dry fronts dominated by northeast high pressure systems. The influx of cold air occurs less frequently in autumn and only rarely in summer. Tropical storms and hurricanes are likely to affect the area 3 out of every 10 years, with severe storm damage approximately once every 2 or 3 decades. The majority of these occur between early June and November. The largest recent hurricanes were Katrina and Rita in 2005 which caused significant damage in the project area. Hurricanes Gustav and Ike in 2008, Isaac in 2012, and Harvey in 2016 caused additional damage in the area. Summer thunderstorms are common, and tornadoes strike occasionally. Average annual temperature in the area is 67 °F, with mean monthly temperatures ranging from 82 °F in August to 52 °F in January. Average annual precipitation is 57.0 inches, varying from a monthly average of 7.5 inches in July to 3.5 inches in October.

3.1.4 Geology

Surface sediments within the project site and the surrounding area are largely comprised of river alluvium deposited by the Calcasieu River and Lake. Artificial levees composed of dredged material and riprap are the main significant topographic features within the project area. The surface, riverine, and lacustrine deposits are underlain by approximately 34,000 feet of sediment and sedimentary rock that consist almost entirely of sandstone,

siltstone, and claystone. These sediments record the outward progression of the Gulf Coastal Plain over time as a result of natural erosion and sedimentation processes.

The project area is a deltaic-marine environment. The current morphology of the basin is primarily the result of deterioration of abandoned delta complexes through wave erosion and subsidence. Abandoned deltaic environments have received little attention in the past, but recent concern for coastal land loss in Louisiana has generated considerable interest in these environments and has resulted in the formulation of a model (the Penland and Boyd model) that provides an interpretation for some of the more distinctive features observed in these areas.

In the Penland and Boyd model, deltaic-marine environments form repeatedly over time in cyclic patterns. The model begins with the formation of delta lobes by sediment deposition from a river and its distributaries. Over time the course of the river changes, resulting in abandonment of the delta lobe. The abandoned lobe is rapidly destroyed by erosion and/or subsidence; winnowed sediments from the lobe accumulate offshore to form barrier islands. Wave erosion gradually destroys the barrier islands, leaving shallow shoals in their place. Eventually the river resumes its previous course, resulting in the rebuilding of the delta lobe and the beginning of a new cycle.

Deltaic-marine environments are transitional environments, combining the morphologic features of fluvial and deltaic environments with those of coastal settings. A wide variety of features may be found in deltaic-marine environments, depending in part upon the local climate and geologic setting. These include distributaries; interdistributary marshes; cheniers; bays, lakes, and sounds; beaches and barrier islands; and reefs.

3.2 Relevant Resources

This section contains a description of relevant resources that could be impacted by the project. The important resources described in this section 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. Table 1 provides summary information of the institutional, technical, and public importance of these resources.

A wide selection of resources were initially considered and determined not to be affected by the project. Socioeconomic resources, including land use, aesthetics, population, transportation, oil and gas, environmental justice, environmental health and safety, community cohesion, desirable community growth, tax revenues, property values, public facilities and services, business activity and employment, and displacement of people, would not be affected by the proposed project. Furthermore, no prime or unique farmlands, as defined and protected by the Farmland Protection Policy Act, would be affected by the proposed project.

Table 1: Relevant Resources

Resource	Institutionally Important	Technically Important	Publicly Important
Wetlands	Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., EO 11988, and Fish and Wildlife Coordination Act.	They provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they provide storage areas for storm and flood waters; they serve as natural water filtration areas; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non-consumptive recreational opportunities.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of marshes.
Aquatic Resources/ Fisheries	Fish and Wildlife Coordination Act of 1958, as amended; Clean Water Act of 1977, as amended; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968.	They are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of the various freshwater and marine habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.
Essential Fish Habitat (EFH)	Magnuson-Stevens Fishery Conservation and Management Act of 1996, Public Law 104-297	Federal and state agencies recognize the value of EFH. The Act states, EFH is "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."	Public places a high value on seafood and the recreational and commercial opportunities EFH provides.
Scrub-shrub Uplands	Food Security Act of 1985, as amended; the Farmland Protection Policy Act of 1981; the Fish and Wildlife Coordination act of 1958, as amended.	The habitat provided for both open and forest-dwelling wildlife, and the provision or potential provision of forest products and human and livestock food products.	The high value the public places on their present value or potential for future economic value.
Wildlife	Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918	They are a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.
Threatened and Endangered Species	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940.	USACE, USFWS, NMFS, NRCS, USEPA, LDWF, and LADNR cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem.	The public supports the preservation of rare or declining species and their habitats.

Resource	Institutionally Important	Technically Important	Publicly Important
Cultural Resources	National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979	State and Federal agencies document and protect sites. Their association or linkage to past events, to historically important persons, and to design and construction values; and for their ability to yield important information about prehistory and history.	Preservation groups and private individuals support protection and enhancement of historical resources.
Recreation Resources	Federal Water Project Recreation Act of 1965 as amended and Land and Water Conservation Fund Act of 1965 as amended	Provide high economic value to local, state, and national economies.	Public makes high demands on recreational areas. There is a high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana; and the large per-capita number of recreational boat registrations in Louisiana.
Air Quality	Clean Air Act of 1963, Louisiana Environmental Quality Act of 1983.	State and Federal agencies recognize the status of ambient air quality in relation to the NAAQS.	Virtually all citizens express a desire for clean air.
Hydrology and Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, and La State & Local Coastal Resources Act of 1978.	USACE, USFWS, NMFS, NRCS, USEPA, and State DNR and wildlife/fishery offices recognize value of fisheries and good water quality. the national and state standards established to assess water quality	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.
Navigation	Rivers and Harbors Act of 1899 and River and Harbor Flood Control Act of 1970 (PL 91-611).	N/A	Navigation concerns affect area economy and are of significant interest to community.

3.2.1 Wetlands

Existing Conditions

The Calcasieu-Sabine River Basin contains approximately 312,500 acres of wetlands, consisting of 32,800 acres of fresh marsh, 112,000 acres of intermediate marsh, 158,200 acres of brackish marsh, and 9,500 acres of saline marsh. An estimated total of 116,791 acres of wetlands in the Calcasieu-Sabine River Basin have converted to open water since 1932 (USGS 2007). The basin is projected to lose an additional 50,000 acres by 2050 without restoration (LDNR 1998). Subsidence and sea level rise are natural processes that contribute to wetland deterioration and loss. Under pristine conditions, natural marsh building and maintenance processes are effective in maintaining coastal marshes, despite subsidence and sea level rise; however, human alterations have disrupted the hydrologic processes which contributed to wetland building and maintenance, while subsidence and sea level rise may result in a water level rise of 1.4 feet to 2.7 feet over the next 50 years (Coastal Protection and Restoration Authority 2017).

Emergent estuarine marsh, composed primarily of vegetation that is rooted in seasonally or permanently flooded soils with most of the vegetative portion of the plant above water, is the primary form of wetland within the project vicinity. Minimal amounts of wetland exist within the project area and mainly occur as brackish fringe marsh along the lake-side shoreline of upland CDFs (Figures 4 and 6). Descriptively, the marshes within tidally-influenced portions of Calcasieu Lake are dominated by smooth cordgrass (*Spartina alterniflora*), due to frequent flooding and high salinity. Within the interior marshes, saltmeadow cordgrass (*Spartina patens*) and saltgrass (*Distichlis spicata*) are the dominant species. Additional plant species include hogcane (*Spartina cynosuroides*), Roseau cane (*Phragmites australis*), black rush (*Juncus roemarianus*), and leafy three-square (*Scirpus robustus*). The marshes provide nursery habitat for estuarine larval and juvenile fish, crab, and shrimp species. Additionally, numerous estuarine-dependent fish and shellfish, migratory waterfowl, wildlife, and several species of wading, diving, and shore birds are commonly found in the project setting.

A report by the USACE Engineering Research and Development Center Water Station (Phase 2 Study) compiled historical survey data from 1972-1998 to determine erosion rates along the banks of the Calcasieu Ship Channel (USACE 2005). The study found that erosion occurred on the west bank (mainly fringe marsh erosion) between Miles 8.0 and 11.0 and Miles 18.0 and 23.0, and on the east bank (fringe marsh and active shoreline erosion) between Miles 11.0 and 19.0, encompassing a total of 8 miles of the ship channel. Near the proposed project vicinity, erosion occurred (along the east bank and CDF 23) at a rate of approximately 6 feet/year for a distance of 150 feet.

3.2.2 Aquatic Resources / Fisheries

Existing Conditions

The project area contains shallow open water bottoms with water depths less than 2 feet (Figure 6). The water bottoms in this area are composed of firm silty, sandy clay. Common commercial/recreational fish species found in or near the project area include red drum (*Sciaenops ocellatus*), spotted sea trout (*Cynoscion nebulosus*), sand seatrout (*Cynoscion arenarius*), striped mullet (*Mugil cephalus*), Gulf menhaden (*Brevoortia patronus*), Atlantic croaker (*Micropogonias undulatus*), southern flounder (*Paralichthys lethostigma*), and spot (*Leiostomus xanthurus*).

Commercially important shellfish found in the area are also mainly estuarine and marine, and include blue crab (*Callinectes sapidus*), brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*Farfantepenaeus duorarum*), white shrimp (*Litopenaeus setiferus*), Gulf stone crab (*Menippe adina*), and oysters (*Crassostrea virginica*). Other commercially less important species include grass shrimp (*Palaemonetes pugio*), mysid shrimp (*Mysidopsis bahia*), roughneck shrimp (*Trachypenaeus constrictis*), and mud crab (*Eurypanopeus depressus*).



Figure 6: Habitat Present in the Project Area

Calcasieu Lake contains approximately 58,260 acres of Public Oyster Seed Grounds within Coastal Study Area 7, as designated by the Louisiana Division of Wildlife and Fisheries (LDWF) (LDNR 2011a). Historical reef acreage for all of Calcasieu Lake is 1,691 acres—healthy oyster reefs are mainly located in the southern end of the lake (i.e., the Lower Lake) and do not occur within the proposed project area (LDWF 2010). The Louisiana Department of Health and Hospitals (LDHH) has limited the amount of acreage available to oyster harvest in Calcasieu Lake east of the Calcasieu River and Pass, Louisiana navigation channel due to non-attainment of State water quality standards. In general, oysters can only be harvested in the southern portion of the lake where water quality meets minimum standards. The total area has been changed several times over the years with the current acreage being approximately 14,743 water bottom acres (LDWF 2010). There are no oyster leases within the proposed project area or elsewhere in Calcasieu Lake.

The LDWF has established water bottom types to characterize public oyster areas based on substrate conditions (Table 2). These water bottom types are used to determine compensation for impacts to public oyster areas. The assessment found that the shallow open waters containing Public Oyster Tonging Areas adjacent to CDFs 23, D, and E generally did not contain potentially productive (Type III – exposed shell and reef) oyster habitat, based on diver observations and oyster samples. Rather, the assessment concluded that water bottoms in the area contained mainly soft mud (Type I), moderately firm mud (Type II), and firm mud or sands (Type II), that were devoid of oysters (standing crop = 0 sacks/acre) and shell; and buried shells (Type II) of Atlantic rangia clam (*Rangia cuneata*) with little or no exposed oyster or clam shell or live oysters.

Table 2: Water bottom types in LDWF-designated Public Oyster Seed Grounds.

Water-Bottom Type	Category	Description
Type I	Soft Mud	Soft, slushy mud – would not support small pieces of cultch material
Type II	Moderately Firm Mud	Bottom that would support small pieces of cultch material
	Firm Mud or Sands	Compact muddy or sandy substrate
	Buried Shells	Shells buried under sediment
Type III	Exposed Shell	Single or scattered shells, or hard substrates such as clam shells, limestone, concrete aggregate, etc.
	Reef	Thick Shell

Source: LDWF

Submerged aquatic vegetation (SAV) occurs along the coastal areas of Louisiana; however, SAVs were not observed in the project area during water bottom surveys associated with the oyster resources assessment conducted for the 2010 DMMP/SEIS. The National Marine Fisheries Service (1999) reported that SAV coverage in Calcasieu Lake was low and decreasing, primarily due to alterations in the watershed and to point-sources of pollution. According to Jerald Horst (2006), a long-time fisheries biologist with the Louisiana State University Extension Service, SAVs have completely disappeared from Calcasieu Lake.

The proposed project area also supports populations of phytoplankton and zooplankton (e.g., copepods, rotifers, fish larvae, and molluscan and crustacean larvae). Benthic invertebrate populations are comprised of both epifaunal and infaunal species (e.g., polychaete and oligochaete worms, crustaceans, bivalves and gastropod mollusks). These organisms constitute vital components of the aquatic food chain and may comprise the diets of numerous finfish and shellfish species in the area.

3.2.3 Essential Fish Habitat

Existing Conditions

Specific categories of essential fish habitat (EFH) include all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), including subtidal vegetation (sea grasses and algae) and adjacent intertidal wetland vegetation (marshes and mangroves). In addition, estuarine aquatic habitats provide nursery and foraging areas that support economically important marine fishery species such as spotted seatrout, southern flounder, Atlantic croaker, Gulf menhaden, striped mullet, spot, and blue crab. These species may serve as prey for Federally-managed fish species such as mackerels, snappers, groupers, billfishes and sharks.

The estuarine waters in the proposed project area include EFH for several Federally-managed species (Table 3). These species use the proposed project area for foraging and nursery habitat, as well as a migration route to other areas considered to be EFH. Specific categories of EFH in the project area include estuarine emergent wetlands, mud/sand substrates, and estuarine water column. A brief description of the EFH species found in the proposed project area follows:

Table 3: EFH species in the project area.

Common Name	Life Stage	EFH
red drum	adult	Gulf of Mexico & estuarine mud bottoms, oyster reef
red drum	juvenile	SAV, estuarine mud bottoms, marsh/water interface
red drum	larvae/post larvae	all estuaries planktonic, SAV, sand/shell/soft bottom, emergent marsh
brown shrimp	adult	Gulf of Mexico <110 m, silt sand, muddy sand
brown shrimp	juvenile	marsh edge, SAV, tidal creeks, inner marsh
brown shrimp	larvae/post larvae	planktonic, sand/shell/soft bottom, SAV, emergent marsh
white shrimp	adult	Gulf of Mexico <33 m, silt, soft mud
white shrimp	juvenile	marsh edge, SAV, marsh ponds, inner marsh, oyster reef
white shrimp	larvae/post larvae	planktonic, soft bottom, emergent marsh

Red drum (*Sciaenops ocellatus*) is an important recreational gamefish found in coastal waters throughout the Gulf of Mexico. Adults inhabit nearshore waters, particularly areas within the surf zone or in the vicinity of inlets. Spawning occurs in nearshore areas, and eggs and larvae are transported by tides and wind currents into estuaries. Larvae and juveniles occupy estuarine environments until maturation. Red drum are predatory in all stages of life; however, the type of prey consumed varies with life stage. Subadult red drum primarily consume small marine invertebrates including mysids and copepods, while adults feed on large marine invertebrates, including shrimp and crabs, and small fishes.

Shrimp species include the brown shrimp (*Farfantepenaeus aztecus*) and the white shrimp (*Litopenaeus setiferus*). Adult penaeids generally occupy offshore areas of higher salinity, where spawning occurs. After hatching, larvae enter estuaries and remain there throughout the juvenile stage. Estuarine habitat serves as a nursery area offering a suitable substrate, an abundant food supply, and protection from predators. Subadult shrimp consume organic matter, including marsh grasses and microorganisms found in estuarine sediments.

3.2.4 Scrub-Shrub Uplands

Existing Conditions

Scrub-shrub habitat in the proposed project vicinity occurs along the upland elevations of CDFs 23, D, and E. Scrub-shrub vegetation exists in portions CDFs 23 and D (Figures 4 & 5) while other portions of CDF D and most of CDF E are denuded of vegetation (Figure 7) due to recent disposal activities related to the Calcasieu River and Pass, Louisiana project.



Figure 7: CDF E, Mostly Denuded of Scrub Shrub Vegetation

Early successional species, such as Chinese tallow (*Triadica sebifera*) and black willow (*Salix nigra*), as well as marsh elder (*Iva frutescens*), eastern baccharis (*Baccharis halimifolia*), and Roseau cane are dominant plants comprising these scrub-shrub areas. In addition, a sparse ground cover of mainly grasses, sedges, and herbaceous vegetation occurs among the scrub-shrub understory in the area. The soils in this habitat are composed of compacted silt, clay, sand, and organic materials. This area remains dry most of the year except during conditions of extremely high water from periodic high tides and high river stages.

In general, the scrub-shrub uplands and limited grasslands in the project area provide only marginal habitat—in part due to the dominance of the highly invasive Chinese tallow and other non-native and/or noxious species, as well as vegetative disturbances associated with previous dredged material disposal events in these CDFs. Scrub-shrub habitat is utilized by several species of marsh and terrestrial mammals including nutria (*Myocaster coypus*), raccoon (*Procyon lotor*), muskrat (*Ondatra zibethicus*), swamp rabbit (*Sylvilagus aquaticus*), and white-tailed deer (*Odocoileus virginianus*). Birds such as egrets (*Ardea alba*; *Egretta thula*), herons (*Ardea herodias*; *Egretta spp.*; *Nycticorax spp.*), rails, and gallinules, as well as mottled ducks (*Anas fulvigula*), use scrub-shrub vegetation for nesting because nests would not be affected by occasional high water. Scrub-shrub habitat provides essential refuge for marsh animals during high water events. During hurricanes and tropical storms animals seek the highest land masses in the area and are often forced to climb into branches of scrub-shrub vegetation to escape rising waters. Scrub-shrub vegetation may provide a limited source of hard and soft mast for wildlife

species utilizing the area. Grassland among the scrub-shrub upland habitat of the CDFs is used for cattle grazing.

In the proposed project vicinity, continued wave-induced shoreline erosion along the lake side of existing CDFs and associated upland habitat has resulted in the loss of sediments such that the current lake-side boundaries of these CDFs have migrated west of their historical eastern boundaries in Calcasieu Lake.

3.2.5 Wildlife

Existing Conditions

Several species of wading birds and seabirds, including black skimmers (*Rynchops niger*), gull-billed terns (*Sterna nilotica*), royal terns (*Sterna maxima*), sandwich terns (*Sterna sandvicensis*), Caspian terns (*Sterna caspia*), black-necked stilts (*Himantopus mexicanus*), laughing gulls (*Larus atricilla*), ring-billed gulls (*Larus delawarensis*), herring gulls (*Larus argentatus*), ibis (*Plegadis spp.*; *Eudocimus albus*), egrets, cormorants (*Phalacrocorax spp.*), and mottled ducks are ordinarily found in the area.

Terrestrial fauna occurring near the project area include nutria, muskrat, swamp rabbit, mink (*Mustela vison*), white-tailed deer, river otter (*Lontra canadensis*), raccoons, and coyote (*Canis latrans*).

Numerous terrestrial invertebrates are found throughout the project area. The most notable are insects, which often serve as vectors, transmitting disease organisms to higher animals, including man. Mosquitoes are the most important of the vectors in the area, although other groups, such as deer flies, horseflies, and biting midges are also considered vectors. The area provides suitable breeding habitat for such species as the salt-marsh mosquitoes (*Aedes sollicitans* and *Culex salinarius*), and other species of mosquitoes. Mosquitoes carry the West Nile virus, which has recently caused illness and death of both animals and humans in Louisiana.

3.2.6 Threatened and Endangered Species

Existing Conditions

Federally-listed threatened or endangered species under the purview of the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) potentially occurring in the proposed project area include the piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), West Indian manatee (*Trichechus manatus*), and sea turtles (Table 4). Brown pelicans and other colonial nesting wading birds and seabirds protected under the Migratory Bird Treaty Act (MBTA) may be encountered in the project area as well. No critical habitat for any threatened or endangered species has been designated within the proposed project area, and none of these species are known to breed within the project vicinity.

The piping plover, as well as its designated critical habitat, occurs along the Louisiana coast (<http://critical.habitat.fws.gov/crithab>). Piping plovers winter in Louisiana and may be present eight to ten months of the year (LDWF 2011). They depart for the wintering grounds from mid-July through late October and remain until late March or April. Piping plovers forage on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no or very sparse vegetation. They roost in unvegetated or sparsely vegetated areas, which may have debris, detritus, or micro-topographic relief offering refuge from high winds and cold weather. They also forage and roost in wrack deposited on beaches. Piping plovers could occur along the shoreline and in the intertidal and shallow waters of the project area during winter migration, but are not permanent residents of the area.

The red knot occurs seasonally along the Louisiana coast. The red knot breeds in the central Canadian arctic but is found in Louisiana during spring and fall migrations and the winter months, generally September through March (USFWS 2017). During migration and on their wintering grounds, red knots forage along sandy beaches, tidal mudflats, salt marshes, and peat banks. Observations along the Texas coast indicate that red knots forage on beaches, oyster reefs, and exposed bay bottoms, and they roost on high sand flats, reefs, and other sites protected from high tides. In wintering and migration habitats, red knots commonly forage on bivalves, gastropods, and crustaceans. Coquina clams (*Donax variabilis*), a frequent and often important food resource for red knots, are common along many gulf beaches. Construction activities associated with the proposed work may cause red knots occurring near the project area to be temporarily displaced to nearby areas containing foraging and loafing habitat.

West Indian manatees, also known as sea cows, are large aquatic mammals found in shallow, slow-moving rivers, estuaries, salt water bays, canals, and coastal areas. Range is generally restricted to the southeastern United States, although individuals may occasionally venture as far north as Massachusetts and as far west as Texas (USFWS 2011). They are rare visitors to coastal Louisiana, occasionally entering Lakes Pontchartrain and Maurepas, and associated coastal waters and streams during the summer months. They have also been reported in the Amite, Blind, Tchefuncte, and Tickfaw rivers, and in canals within the adjacent coastal marshes of Louisiana. It is extremely unlikely that manatees would be found in the project area or elsewhere in the Calcasieu River and Pass, Louisiana project area and surrounding shallow open waters.

Loggerhead sea turtles (*Caretta caretta*) nest within the coastal United States from Louisiana to Virginia, with major nesting concentrations occurring on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (NMFS/USFWS 2009). In Louisiana, loggerhead sea turtles are known to nest on the Chandeleur Island (LDWF 2011). Nesting and hatching for loggerheads in the Gulf of Mexico occur from May through November.

Green sea turtles (*Chelonia mydas*) are more tropical in their distribution, and are rarely seen in Louisiana coastal waters (LDWF 2011). Nesting in the Southeastern U.S. occurs

roughly from June through September (NMFS/USFWS 1991). Nesting within the project area is highly unlikely, as green sea turtles prefer to nest on high-energy beaches with deep sand and little organic content. Furthermore, the Minerals Management Service (1997) indicated that reports of green sea turtle nesting in the northern Gulf are “isolated and infrequent.”

The most seriously endangered of the sea turtles, Kemp’s Ridley turtles (*Lepidochelys kempi*) occur mainly in bays and coastal waters of the Atlantic Ocean and Gulf of Mexico (NMFS/USFWS 1992a). Nesting occurs on the northeastern coast of Mexico and occasionally on Texas Gulf Coast beaches from April to July. No Kemp’s Ridley sea turtle nesting habitat occurs near the project site, and nesting has not been known to occur in the area. Along the Louisiana coast, turtles are generally found in shallow nearshore and inshore areas, and especially in salt marsh habitats, from May through October.

The hawksbill (*Eretmochelys imbricate*) is a small sea turtle, generally spending most of its life in tropical waters such as the warmer portions of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (NMFS/USFWS 1993). Hawksbills frequent rocky areas, coral reefs, shallow coastal areas, lagoons, narrow creeks, and passes. Nesting may occur on almost any undisturbed deep-sand beach in the tropics—in North America, the Caribbean coast of Mexico is a major nesting area. In the continental United States, nesting sites are restricted to Florida where nesting is sporadic at best (NMFS/USFWS, 1993). Due to the lack of suitable foraging and nesting habitats, there is a low probability of this species occurring within the project area.

The leatherback sea turtle (*Dermochelys coriacea*) is the largest, deepest diving, and most migratory and wide ranging of all the sea turtles (NMFS/USFWS 1992). Leatherbacks are mainly pelagic, inhabiting the open ocean and seldom entering coastal waters except for nesting purposes. Nesting in the United States is mainly confined to the Florida coast, and no nesting has been reported from Louisiana (Gunter 1981).

The NMFS, Protected Resources Division is responsible for aquatic marine endangered and threatened sea turtles. High levels of sediment in the water column and low prey availability probably preclude any high use by sea turtles in the area.

The brown pelican (*Pelecanus occidentalis*), a year-round resident of coastal Louisiana that may occur in the project area, was removed from the Federal List of Endangered and Threatened Wildlife (i.e., “delisted”) by USFWS on November 17, 2009. Despite its recent delisting, brown pelicans—and other colonial nesting wading birds and seabirds—remain protected under the MBTA. Portions of the proposed project area may contain habitats commonly inhabited by colonial nesting wading birds and seabirds.

Table 4: Threatened (T) or Endangered (E) Species Potentially in Project Area

Common Name	Scientific Name	Federal Status	State Status
piping plover	<i>Charadrius melodus</i>	T	T
red knot	<i>Calidris canutus rufa</i>	T	T
West Indian manatee	<i>Trichechus manatus</i>	E	E
loggerhead sea turtle	<i>Caretta</i>	T	T
green sea turtle	<i>Chelonia mydas</i>	T	T
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	E	E
leatherback sea turtle	<i>Dermochelys coriacea</i>	E	E
hawksbill sea turtle	<i>Eretmochelys imbricate</i>	E	E

3.2.7 Cultural Resources

Existing Conditions

As part of the DMMP/SEIS study, research for historic and archaeological resources was conducted in 2007 by Coastal Environments, Inc. under contract with the CEMVN. A total of forty-nine archaeological sites are known to exist within the DMMP/SEIS study area (Ryan and Pearson 2007). Seven of these sites are historic, thirty-three prehistoric, and nine with both historic and prehistoric components. The seven historic sites consist of three artifact scatters, two historic houses and their associated archaeological deposits, a World War II gun emplacement and the site of a Civil War era house and battlefield.

Of the thirty-three prehistoric period sites, five are artifact scatters, one consists of fragments of an aboriginal pirogue, two are earth and shell middens and the remaining twenty-five are shell middens. Archaeological sites within the study area date from the Tchula to Mississippian periods (500 B.C.-A.D. 1700). Of the twenty-five prehistoric shell middens sites, seven date to the Coles Creek period (A.D. 700-1200), two to the Marksville (A.D. 1- 400) and Coles Creek periods and eight to the Mississippian (A.D. 1200-1700) period. The pirogue fragments date to between A.D.1425 to 1650. The remaining sites could not be dated.

The nine multi-component sites date from the prehistoric Coles Creek and Mississippian periods and the historic period components are either unknown or date to the nineteenth and/or early twentieth centuries. One historic period site dates to the Civil War (1861-1865).

None of the forty-nine identified sites are located near or within the proposed project area. The project area was also not identified as an area of high probability for shipwrecks or other cultural resources based on the results of the study.

3.2.8 Recreational Resources

Existing Conditions

The project area is located east of the Sabine National Wildlife Refuge (SNWR). According to the Fish and Wildlife Service, the SNWR occupies the marshes between Calcasieu and Sabine lakes in southwest Louisiana, and encompasses 125,790 acres, consisting of 40,403 acres of open water and 85,387 acres of marsh grassland. This area contains a diversity of habitat including freshwater impoundments, wooded ridges and levees, canals, ponds, lakes, and bayous. Some of the largest wetland management efforts in Louisiana occur at Sabine. The refuge is managed to provide habitat for migratory waterfowl and other birds and to preserve and enhance coastal marshes for wildlife and fish.

Recreational activities that historically and currently are popular in the vicinity of Calcasieu Lake and Sabine marshes, include motor boating for pleasure, ingress and egress to numerous private camps accessible only by water, fishing, crabbing, shrimping, hunting, and passive recreational activities, such as observation of wildlife and nature study. Hunting and fishing are the primary recreational activities of the region due to the varied and unique fish and wildlife and natural resources. Along the Calcasieu River and Pass, numerous intersecting channels exist, providing sportspeople water access into the adjacent marshes and lakes.

3.2.9 Air Quality

Existing Conditions

The U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) 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 (O₃) 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.

For Cameron Parish, all six parameters are currently in attainment of all NAAQS in accordance with 40 CFR 81.320 (1999 edition). No conformity review (under the Clean Air Act General Conformity Rule) is required for the proposed action because the project area is designated as an attainment area.

3.2.10 Water Quality

Existing Conditions

In the Calcasieu River, water quality parameters of concern include pathogens, copper, and mercury. The potential sources of impairment include municipal point sources, inflow and infiltration urban runoff/storm sewers, package plants (small flows) collection system failure, and atmospheric deposition (EPA 2011). Calcasieu River and Calcasieu Lake are a part of the Lower Calcasieu Watershed, along with other water bodies including Bayou Bois Connine, Bayou Chopique, Black Bayou, Black Lake, Grand Bayou, Gulf of Mexico, Mud Lake, and Old East Bayou. According to U.S. Environmental Protection Agency (EPA) characterization, the Lower Calcasieu Watershed has serious water quality problems with a score of 5 out of 6 (EPA 2011). This score is given to watersheds with aquatic conditions well below state or tribal water quality goals that have serious problems exposed by other indicators.

As part of its surface water quality monitoring program, the Louisiana Department of Environmental Quality (LDEQ) routinely monitors 25 parameters on a monthly or bimonthly basis using a fixed station, long-term network (Monitored Assessments) (LDEQ 1996). Based upon those data and the use of less-continuous information (Evaluated Assessments), such as fish tissue contaminants data, complaint investigations, and spill reports, the LDEQ has assessed water quality fitness for the following uses: primary contact recreation (swimming), secondary contact recreation (boating, fishing), fish and wildlife propagation, drinking water supply, and shellfish propagation (LDEQ 1996). Based upon existing data and more subjective information, water quality is determined to either fully, partially, or not support those uses. A designation of “threatened” is used for waters that fully support their designated uses but that may not fully support certain uses in the future because of anticipated sources or adverse trends in pollution. According to the LDEQ 2012 Louisiana Water Quality Inventory: Integrated Report, the 2014 Louisiana Water Quality Inventory: Integrated Report, and the 2016 Louisiana Water Quality Inventory: Integrated Report, Calcasieu Lake (segment LA030402_00) and the Calcasieu River from below Moss Lake to the Gulf of Mexico (segment LA030401_00) fully support the designated use for oyster propagation (LDEQ 2007 and 2011).

Since 1999 the EPA has been conducting the Calcasieu Estuary Project in cooperation with the LDEQ, National Oceanic and Atmospheric Administration (NOAA), and the U.S. Department of the Interior (DOI). The project is focused on the evaluation of sediments in

the estuary. This is the most extensive sediment research in the project vicinity and includes Bayou d'inde, Bayou Verdine, Upper Calcasieu River, and the lower Calcasieu River ending at Moss Lake. The principal pollutants in the estuary are listed as PCBs, hexachlorobenzene, hexachlorobutadine, mercury, zinc, ethylene dichloride, lead and copper. The EPA also maintains a database containing data from sediment research projects that have been completed in the Calcasieu estuary since 1983. The following research projects have reported locations in the vicinity of the proposed project: 1983-1985 LDWF CALECO study conducted by McNeese State University, Louisiana; 1988-1989 EPA Toxics Lower Calcasieu River study conducted by Research Triangle Institute, North Carolina; and 1997 EPA Toxics Calcasieu Estuary study conducted by Toxicon Environmental Sciences, Florida. The sediment data originating from those studies did not show any pollutant exceedance when compared to EPA Freshwater Sediment Quality Criteria.

As part of the Calcasieu River and Pass, Louisiana DMMP/SEIS study, water and sediment samples were collected from multiple stations within designated Dredged Material Management Units (DMMUs) in the Calcasieu Ship Channel and from two reference areas, including the Calcasieu Lake Wetland Creation Reference Area located adjacent to CDFs D and E. Samples were analyzed in accordance with the protocols described in Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual (ITM) (USEPA/USACE 1998) and Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities - Testing Manual (UTM) (USACE 2003) as specified in MVN's Sampling and Analysis Plan, Figure 3-5, for the DMMP/SEIS study. Physical and chemical analyses were performed on sediments from each in-channel station and the two reference areas. Reference areas were selected to represent potential wetland development disposal areas in shallow open water within broken marsh or in shallow open water in Calcasieu Lake. Chemical analyses also were conducted on ambient water from six in-channel stations, from a reference area, from the Calcasieu Lake Wetland Creation Disposal Area, and on an elutriate from each in-channel station. Water at the Calcasieu Lake disposal area and in the Calcasieu River represent receiving waters for wetland development areas within Calcasieu Lake and for effluent discharged from CDFs, respectively. Water column toxicity tests/suspended particulate phase bioassays used an elutriate dilution series from six DMMUs. Benthic toxicity tests/solid phase bioassays and bioaccumulation tests (metals and polycyclic aromatic hydrocarbons [PAHs]) used composited sediment from each DMMU and both reference areas. The MVN sampling and analysis plan, the scope of work, and the results of the physical and chemical analyses of water and sediment samples can be found in the report "Final Calcasieu River and Pass, Louisiana, Dredged Material Management Plan, Phase 2, Sampling and Analysis". The water and sediment quality data are presented, and the analyses discussed, in the 2010 DMMP/SEIS as well. Evaluation of the results from the benthic toxicity tests/solid phase bioassays and bioaccumulation tests indicated that the discharge of dredged material from the Calcasieu River navigation channel into shallow open water disposal areas was not likely to have an unacceptable adverse effect on survival, growth, or reproduction of aquatic organisms or pose a human health risk due to toxicity of bioaccumulation of contaminants.

3.2.11 Navigation

Existing Conditions

The Calcasieu River and Pass, Louisiana project is an important economic link for the Port of Lake Charles and regional industries to the Gulf of Mexico and global shipping. Port facilities are located along the Calcasieu River and Pass, Louisiana navigation channel, with the City Docks and other terminals located approximately 32 miles inland from the Gulf of Mexico. The Industrial Canal Terminal is located approximately 20 miles inland from the Gulf of Mexico at the confluence of the GIWW and the Calcasieu Ship Channel. The Calcasieu River and Pass, Louisiana project provides port facilities with a channel approximately 400 feet wide and 40 feet deep. Berth depths range from 36 to 40 feet.

The Calcasieu Ship Channel serves the public facilities at the Port of Lake Charles and several private industries in the Lake Charles-Sulphur area. Major commodities handled by port public facilities through the navigation channel include barite, crude oil, rice, petroleum coke, rutile, caustic soda, flour, wood chips, and forest products. Major commodities handled by private industries through the navigation channel include crude oil, petroleum products and petrochemicals, and petroleum industry equipment and supplies, among others.

4 ENVIRONMENTAL CONSEQUENCES

4.1 Wetlands

Future Conditions with No Action

Without implementation of the proposed action, the existing earthen retention dikes that contain Calcasieu River dredged material in the CDFs would continue to be subjected to severe wave-induced erosion effects from the lake. Dike failures would continue to occur and dredged material would continue to be released onto adjacent Calcasieu Lake bottoms.

Future Conditions with the Proposed Action

With implementation of the proposed action, the existing CDF earthen retention dikes will be armored with rock out into Calcasieu Lake to a maximum distance represented by the historical disposal area ROW limits. The existing earthen dikes of the CDFs would be protected from wave action and future unplanned releases of dredged material into Calcasieu Lake would not occur. In conjunction with the armoring, approximately 544 acres of the CDFs would be reclaimed out to the historical disposal area ROW limits.

Although no wetlands would be affected by the proposed project, it is anticipated that with placement of the rock dike and any future filling of the reclaimed CDF acreage, there

exists the potential to protect any existing fringe wetlands and establish marsh habitat behind newly constructed dikes. The protection of fringe wetlands and creation of any potential marsh habitat would be considered temporary benefits to the overall project area. These benefits would be temporary due to the fact that the CDFs are approved to receive dredge material from the Calcasieu River and Pass dredging cycles, and therefore, the wetlands would eventually be converted to uplands.

4.2 Aquatic Resources /Fisheries

Future Conditions with No Action

Without implementation of the proposed action, aquatic resources/fisheries may be directly or indirectly impacted by continued lake-side erosion of adjacent CDFs and associated earthen containment dikes, and the subsequent spilling of dredged material into Calcasieu Lake. These effects could incidentally diminish the amount of foraging habitat available to finfish and shellfish. Mobile fishery species would most likely relocate to other areas, while some existing benthic invertebrates would be eliminated or replaced by more tolerant forms.

Future Conditions with the Proposed Action

With implementation of the proposed action, there would be some minimal direct and indirect effects to aquatic resources/fisheries in the form of altered open water bottom habitat. Approximately 544 acres of shallow open water bottoms would be temporarily or permanently impacted by the placement of rock material into the proposed disposal area.

It is anticipated that mobile fishery species would avoid proposed project area during construction, thereby minimizing direct and indirect impacts to those species. Sessile or slow moving benthic organisms may be smothered in the reclaimed CDFs where dredged material would be deposited.

Healthy oyster reefs are located mainly in the southern end of Calcasieu Lake; however, as a precaution, silt curtains would be utilized to prevent re-suspended sediments resulting from construction activities from impacting any nearby oyster resources. Turbidity monitoring may be performed in potentially affected areas of Calcasieu Lake near the proposed rock dike placement before, during, and after construction activities to determine if such an action produces an increase in turbidity levels that are unacceptable to state water quality criteria and oyster resources.

Some positive indirect impacts to fisheries in the project area are expected with implementation of this alternative. The placement of rock to construct the dike would provide hard surfaces on which new oyster reefs may begin to form, as well as providing valuable foraging, breeding, and nursery habitat for finfish and other shellfish. Benefits to both commercial and recreational finfish and shellfish fisheries are expected.

4.3 Essential Fish Habitat

Future Conditions with No Action

Without implementation of the proposed action, no direct impacts to EFH within the project area would occur. However, indirect impacts to EFH would likely occur as existing estuarine emergent marsh in the vicinity continues to be converted to open water due to natural and anthropogenic factors. In addition, the continued lake-side erosion of CDFs and associated earthen containment dikes, and the subsequent spilling of material into Calcasieu Lake, would continue at the present rate. The resulting sedimentation would potentially impact EFH for brown shrimp, white shrimp, red drum, and Gulf stone crab through the deposition and degradation of shallow open water bottom and mud/sand habitat in this portion of Calcasieu Lake.

Future Conditions with the Proposed Action

With implementation of the proposed action, approximately 544 acres of shallow open water bottoms would be permanently impacted by the placement of rock material into the proposed disposal area and the subsequent filling of this open water area with dredged material. EFH for brown shrimp, white shrimp, red drum, and Gulf stone crab would be impacted in the project area during the construction of the rock dike. The rock dike would essentially form a barrier preventing the movement of fish, shrimp, and crabs from accessing the lake waters that would be located behind the rock dike.

Additional, short term EFH impacts would include a temporary and localized increase in estuarine water column turbidity during the placement of rock material in shallow open water areas; however, the project area is a naturally turbid environment and increased turbidity is not expected to significantly affect EFH needs within the project area.

4.4 Scrub-Shrub Uplands

Future Conditions with No Action

Without implementation of the proposed action, wave-induced lake-side erosion of the CDFs would likely continue at the current rate, resulting in further degradation and/or loss of scrub-shrub habitat in the area. The resulting loss of habitat and habitat diversity would have an indirect impact on wildlife species dependent on scrub-shrub habitat along upland elevations in the area.

Future Conditions with the Proposed Action

With implementation of the proposed action, there would be minimal beneficial direct and indirect effects to scrub-shrub uplands. The rock dikes would protect the earthen dikes along the CDFs from wave induced erosion, thereby, allowing the scrub-shrub to remain in place. The scrub-shrub would continue to provide habitat for wildlife species in the area.

4.5 Wildlife

Future Conditions with No Action

Without implementation of the proposed action, wildlife in the project area may be indirectly impacted. Wave-induced erosion of the existing CDF bankline and earthen containment dikes, and associated habitat, would continue to occur resulting in a reduction of habitat diversity and availability for resident terrestrial wildlife, migratory waterfowl, and other avian species.

In addition, the continued erosion of the CDF and earthen containment dikes along the lake shoreline would likely result in adverse impacts such as sediment deposition due to dike/bankline failure and the spilling of dredged material into the lake. These effects could directly and indirectly impact wildlife by incidentally diminishing, at least temporarily, the availability of foraging habitat in the lake.

Future Conditions with the Proposed Action

With implementation of the proposed action, minimal adverse direct and indirect impacts to wildlife are anticipated. Terrestrial wildlife may be temporarily affected by noise from the construction of the flotation access channels that would allow the rock-carrying barges into the project area.

4.6 Threatened or Endangered Species

Future Conditions with No Action

Without implementation of the proposed action, no direct or indirect impacts to threatened or endangered species or their critical habitat would occur.

Future Conditions with the Proposed Action

With implementation of the proposed action, there would be minimal effects to threatened or endangered species.

Piping plover and red knot could occur along the shoreline and in the intertidal and shallow waters of the project area during winter migration, but are not permanent residents of the area. Piping plover and red knot may be temporarily affected by noise from the construction of the flotation access channels that would allow the rock-carrying barges into the project area and from the equipment used during the construction of the rock dike.

It is extremely unlikely that manatees would be found in the project area or elsewhere in the Calcasieu River and Pass, Louisiana project area and surrounding shallow open waters; however, if manatees are observed within 100 yards of the “active work zone”

during proposed construction activities, MVN would implement the appropriate special operating conditions (e.g., no operation of moving equipment within 50 feet of a manatee; all vessels should operate at no wake/idle speeds within 100 yards of work area; siltation barriers, if used, would be made of material in which manatees could not become entangled, would be secured and monitored; report manatee sightings or collisions), as provided by the USFWS, Lafayette, Louisiana Field Office. Special operating conditions for manatees would be included in any MVN plans and specifications developed prior to dredging and disposal activities.

To minimize disturbance to pelicans and other colonial nesting birds and seabirds potentially occurring in the project area, MVN would observe restrictions on activity provided by the USFWS, Lafayette, Louisiana Field Office. Special operating conditions addressing pelicans and other colonial nesting wading birds and seabirds (reporting presence of birds and/or nests; no-work distance restrictions—2,000 feet for brown pelicans; bird nesting prevention and avoidance measures; marking discovered nests) would be included in any MVN plans and specifications developed prior to dredging and disposal activities. In addition, dredging and disposal activities would be restricted to non-nesting periods for colonial nesting wading birds and seabirds when practicable.

Although threatened or endangered species may occur within the general project vicinity, their presence within the project area is highly unlikely. Furthermore, the proposed project area does not contain critical habitat for Federally-listed species, and the open water areas surrounding the project area would allow them to easily avoid the project activities. Therefore, either alternative is not likely to adversely affect Federally-listed threatened or endangered species, or their critical habitat, under the jurisdiction of USFWS. The USFWS concurred with this determination in a letter dated August 2, 2018. Additionally, MVN has concluded that no critical habitat for any threatened, endangered, or candidate species under the purview of NMFS has been designated within the project area, and that there would be no effect to any of the NMFS Federally-listed species.

4.7 Cultural Resources

Future Conditions with No Action

Without implementation of the proposed action, there would be no direct or indirect impacts to cultural resources. The conditions within the existing environment would continue as they have in the past and would be dictated by the natural land use patterns and processes that have dominated the area in the past.

Future Conditions with the Proposed Action

With implementation of the proposed action, there would be no direct or indirect impacts to known cultural resources, as the proposed project would take place in an area identified as a low probability area for cultural resources (Ryan and Pearson 2007). A review of reports and records, archaeological site distribution maps, and U.S. Geological Survey

quadrangle maps show that the proposed construction activities will not impact any known historic or cultural resources. The CEMVN began consultation for the project with the Louisiana State Historic Preservation Officer (SHPO) and the Federally-recognized tribes in a letter dated July 19, 2018, which concluded that no historic properties would be affected (36 CFR Part 800.4(d)(1)). In the event that significant historic and cultural resources are encountered, work in the location of the site would be halted, and a MVN archaeologist and the SHPO and tribes would be notified for further consultation.

4.8 Recreation Resources

Future Conditions with No Action

Without implementation of the proposed action, the conditions within the recreational environment would continue as they have in the past and would be dictated by the natural land use patterns and material placement processes that have dominated in the area. The no-action condition is likely to continue a path of general habitat and resource degradation.

The no-action alternative would have no direct impacts to recreational resources in the project area, except in areas where dredge material placement occurs from routine maintenance of the Calcasieu River. Much of the recreational activities occurring in SNWR and, generally, in southern Louisiana would continue to consist of hunting, fishing, and wildlife viewing. Each of these activities are directly related to the conditions of natural resources of the area. Indirect impacts include the loss of recreational opportunities which are affected by land loss and changes in habitat diversity and wildlife and fisheries populations. Loss of recreational opportunities are expected to occur without implementation of the proposed action except in those areas where dredged material from the Calcasieu Ship Channel maintenance events is placed in a manner conducive to coastal habitat creation and restoration. Dredged material would continue to be disposed within the Federal Standard.

Future Conditions with the Proposed Action

With implementation of the proposed action, there will be short-term, direct impacts to recreational resources in the area. The recreational environment in and around the construction of rock dikes and the access channels within the Calcasieu Lake would experience limited short-term disruption imposed by the physical size and working activities imposed by the floating dredge facility and equipment. Creation of material impoundment with the rock dike and new access channels in Calcasieu Lake would directly impact areas of existing marsh vegetation and shallow open water habitat which would impact opportunities for fishing in the area. Construction of the rock dikes could indirectly impact fishing in the area of work for a period of 12-24 months. The indirect impacts are expected to be temporary and result from increases in turbidity occurring during the excavation of the flotation access channels and rock dike construction. With

implementation of the proposed action, no long-term, significant adverse direct or indirect impacts to recreation and recreation navigation would occur.

With implementation of the proposed action, positive, indirect impacts to recreational fishing in the project area are expected. Rock dikes will provide valuable foraging, breeding, and nursery habitat for finfish and shellfish. Over the long-term, reducing or stopping erosion and subsequent conversion to open water should have positive indirect impacts on fishing and hunting resources by reducing interior marsh loss and stabilizing habitats of estuarine dependent fish and wildlife.

4.9 Air Quality

Future Conditions with No Action

Without implementation of the proposed action, no direct or indirect impacts to ambient air quality would occur.

Future Conditions with the Proposed Action

With implementation of the proposed action, direct and indirect impacts to ambient air quality within the project area—and possibly farther afield—are expected to be temporary and primarily due to the emissions of construction equipment. Due to the limited duration of the proposed project, any increases or impacts to ambient air quality are expected to be short-term and minor and are not expected to cause or contribute to a violation of Federal or State ambient air quality standards. Once all construction activities associated with the selected alternative cease, air quality within the vicinity is expected to return to pre-construction conditions.

4.10 Water Quality

Future Conditions with No Action

Without implementation of the proposed action, it is unlikely that adverse direct impacts to water quality or sediment quality would occur in the short term. Indirect impacts to water quality could occur over time, as lake-side CDFs and containment dikes continue to erode, spilling and re-depositing material previously dredged from the Calcasieu Ship Channel into the lake and causing sedimentation and creating localized areas with elevated levels of suspended solids (Examination of the substrate of Calcasieu Lake in the vicinity of eroded CDFs has shown that eroded material has generally remained localized [2010 DMMP/SEIS, Appendix I, Oyster Resources]).

Water quality and habitat quality degradation (e.g., increased turbidity and total suspended solids, sedimentation) could eventually contribute to the segment's failure to meet designated uses (e.g., fish and wildlife propagation, shellfish propagation) described in the LDEQ's Surface Water Quality Standards (LAC 33:IX.1111.C).

Future Conditions with the Proposed Action

With implementation of the proposed action, there would be some disturbances to ambient water quality in the project area; however, direct and indirect impacts would be temporary. The construction activities would include flotation channel construction and the deposition of rock dike material. These activities could possibly cause temporary increases in turbidity and suspended solids concentrations, and a reduction in light penetration in the immediate area of the rock dike placement. Localized temporary pH changes as well as dissolved oxygen deficits may also occur during the construction phase. Minimal impacts to the area water quality would occur during construction and these impacts would be eliminated after construction is completed.

The proposed open water placement of rock for erosion protection, which is not expected to have any adverse effect on sediment and water quality of the receiving site, was evaluated under Section 404(b)(1) of the Clean Water Act on January 12, 2018 and June 28, 2018. To comply with Section 401 of the Clean Water Act, a Louisiana Water Quality Certificate was received from LDEQ on June 20, 2018.

4.11 Navigation

Future Conditions with No Action

Without implementation of the proposed action, lake-side erosion of the adjacent CDFs and their earthen containment dikes and the subsequent spilling of dredged material into Calcasieu Lake would continue. Spillage of CDF material into Calcasieu Lake could result in shoaling of the lake bottom, potentially affecting small-vessel navigation near the lake shoreline.

Future Conditions with the Proposed Action

With implementation of the proposed action, no significant adverse direct or indirect impacts to navigation in the project area would occur. The placement of rock would make the project area inaccessible; however, the shallow nature of the area currently limits vessel access.

4.12 Hazardous, Toxic, and Radioactive Waste

The USACE is obligated under Engineer Regulation 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of the proposed action. ER 1165-2132 identifies our HTRW policy to avoid the use of project funds for HTRW removal and remediation activities. Costs for necessary special handling or remediation of wastes (e.g., Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq. (RCRA) regulated), pollutants and other contaminants, which are not regulated under the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C.

9601 et seq. (CERCLA), will be treated as project costs if the requirement is the result of a validly promulgated Federal, state or local regulation.

An ASTM E 1527-05 Phase I Hazardous, Toxic, or Radioactive Waste Environmental Site Assessment (ESA), entitled "Calcasieu River and Pass, Louisiana Dredged Material Management Plan", was completed in January 2009. An update to the Phase I ESA was completed in July 2018. A copy of the updated Phase I ESA will be maintained on file at CEMVN. The Phase I ESA identified potential Recognized Environmental Conditions (RECs) sites. Potential REC sites near this proposed project include oil and gas wells and pipelines recorded from the Louisiana Department of Natural Resources database. The proposed construction as planned, however, will not affect the well locations, there is a low probability that HTRW would affect the proposed project, personnel working on the project, members of the public, or the environment in the project area.

4.13 Cumulative Impacts

The Council on Environmental Quality's (CEQ) regulations (40 CFR 1500-1508) implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.) define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7)". Cumulative Effects can result from individually minor but collectively significant actions taking place over a period of time."

With the implementation of the proposed action, approximately 544 acres of shallow open water bottom will be directly impacted. The completed project would result in a reduction in the likelihood of future unplanned releases of dredged material into Calcasieu Lake. Fishing and recreational boating would be eliminated within the rock dike containment; however, the rock material on the open water side of Calcasieu Lake would provide foraging areas for fish and shellfish that may create more opportunities for recreational fishing.

Currently there are approximately 58,260 acres of Public Oyster Area in Calcasieu Lake. Construction of the rock dike would reduce that amount by approximately 544 acres but the rock would enhance the oyster growing potential and public oyster harvesting potential. Though 544 acres of potential oyster area would be lost, the acreage inside of the rock dike would become available for future Calcasieu River and Pass dredge material disposal as the need arises.

Cumulative impacts associated with past actions in the Calcasieu River estuary have produced a natural environment that is markedly different than 140 years ago. A total of 116,791 acres of wetlands in the Calcasieu-Sabine River Basin have converted to open water since 1932 (USGS 2007). Scientists attribute these habitat changes to a combination of human-induced hydrologic changes, accompanied by the occasional

severe storm event. The hydrological alterations that have had the most significant impact in the basin area are navigation corridors. Construction of the Calcasieu Ship Channel caused increased saltwater and tidal intrusion into the estuary leading to marsh loss and a shift to more saline habitats in the Calcasieu River Basin (USDA 1994). These changes have affected hydrology by channeling saltwater into the historical low-salinity estuary. Future activities in the Calcasieu River Basin are expected to further contribute to cumulative degradation of wetlands and other important resources in the vicinity of the project area. MVN anticipates continued maintenance dredging of the Calcasieu River and Pass, Louisiana project indefinitely. The cumulative impacts of proposed action would have only minor impacts on the overall Calcasieu River Basin, including temporary changes in water quality and water bottoms. The significant cumulative impacts from the proposed action would be the reduction of severe wave-induced erosion of the CDF earthen dikes thereby preventing unplanned releases of dredged material into Calcasieu Lake and providing potential locations for oysters to attach and grow.

The EIS prepared by MVN for the Continued Operation and Maintenance of Calcasieu River and Pass (Including Salt Water Barrier); Coon Island; Devil's Elbow; Calcasieu River, Louisiana, was signed in March 1977. Maintenance dredging of the project still occurs, and MVN anticipates continuing maintenance dredging indefinitely.

A supplemental EIS was prepared for the Dredged Material Management Plan for the Calcasieu River and Pass (River Miles 36.0 to 5.0), Louisiana project. The DMMP/SEIS study investigated alternatives for managing dredged material for the next 20 years, including confined aquatic (open water or ocean), within banks, beach nourishment, and other beneficial use-placement areas.

EA #343 discussed the construction of 27,650 linear feet of rock dikes between Miles 16.0 and 11.0 of the Calcasieu River and Pass, Louisiana project. Approximately 56 acres of shallow open water bottom was impacted by the dike placement.

EA #485 addressed the potential impacts associated with the construction of foreshore rock dikes and bank armoring along the channel side boundaries of existing upland CDFs located on the left-descending bank, and bank armoring along a portion of the right-descending bank of the Calcasieu River and Pass, Louisiana project.

Numerous land stewardship projects have been implemented in the Calcasieu-Sabine River Basin to help restore its estuaries and protect its shoreline. Table 6 lists completed and ongoing restoration and management projects in the basin funded by the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). These projects have or are expected to have beneficial impacts on natural resources in the study area. CWPPRA was the first Federal statutory mandate for restoration of Louisiana's coastal wetlands. As of July, 2008, 145 active CWPPRA projects have been approved, 74 have been constructed, 17 are under construction, and 26 have been de-authorized or transferred to other programs. Many of these projects have occurred in the Calcasieu River and Pass, Louisiana project vicinity.

Through the Coastal Impact Assistance Program (CIAP), an EA (#460) was completed by MVN for the beneficial use of dredged material at the Black Lake (Marcantel) property. The FONSI was signed November 7, 2008. This disposal site would restore approximately 350 acres of eroded marsh approximately one mile south of the GIWW, along the former northern/northwestern rim of Black Lake. The general purpose of the project would be to create a diversity of habitat from beneficially used dredged material from maintenance of the Calcasieu River and Pass, Louisiana project.

Table 5: CWPPRA restoration projects for the Calcasieu-Sabine River Basin

Agency	Project Name	Type	Net Benefit After 20 Years (acres)
NRCS	Black Bayou Culverts Hydrologic Restoration	Hydrologic Restoration	540
NMFS	Black Bayou Hydrologic Restoration	Hydrologic Restoration	3,594
NRCS	Brown Lake Hydrologic Restoration	Hydrologic Restoration	282
USFWS	Cameron Creole Plugs	Hydrologic Restoration	865
NRCS	Cameron-Creole Maintenance	Hydrologic Restoration	2,602
USACE	Clear Marais Bank Protection	Shoreline Protection	1,067
NRCS	East Mud Lake Marsh Management	Marsh Management	1,520
USFWS	East Sabine Lake Hydrologic Restoration	Hydrologic Restoration	225
NRCS	GIWW - Perry Ridge West Bank Stabilization	Shoreline Protection	83
NRCS	Holly Beach Sand Management	Shoreline Protection	330
NRCS	Highway 384 Hydrologic Restoration	Hydrologic Restoration	150
NRCS	Perry Ridge Shore Protection	Shoreline Protection	1,203
NRCS	Plowed Terraces Demonstration	Sediment and Nutrient Trapping, Demonstration	N/A
USFWS	Replace Sabine Refuge Water Control Structures at Headquarters Canal, West Cove Canal, and Hog Island Gully	Marsh Management	953
USFWS	Sabine National Wildlife Refuge Erosion Protection	Shoreline Protection	5,542
USACE	Sabine Refuge Marsh Creation, Cycle 1	Marsh Creation	214

USACE	Sabine Refuge Marsh Creation, Cycle 2	Marsh Creation	261
USACE	Sabine Refuge Marsh Creation, Cycle 3	Marsh Creation	187
USACE	Sabine Refuge Marsh Creation, Cycle 4	Marsh Creation	163
USACE	Sabine Refuge Marsh Creation, Cycle 5	Marsh Creation	168
NRCS	Sweet Lake/Willow Lake Hydrologic Restoration	Shoreline Protection	5,796
NRCS	West Hackberry Vegetative Planting Demonstration	Vegetative Planting Demo.	N/A

Source: USGS, 2007

Other reasonably foreseeable future actions, which may contribute to cumulative impacts, include:

- CIAP. CIAP was originally authorized by Congress in 2001 in the Outer Continental Shelf (OCS) Lands Act, as amended (31 U.S.C. 6301-6305). Section 384 of the Energy Policy Act of 2005 (Public Law 109-58) authorized CIAP funds to be distributed to OCS oil and gas producing states to mitigate the impacts of OCS oil and gas activities for fiscal years 2007 through 2010. The state liaisons for this program are LDNR in Louisiana. The CIAP allocations have been used to fund various state and local coastal activities and projects including: monitoring, assessment, research, and planning; habitat, water quality, and wetland restoration; coastline erosion control; and control of invasive non-native plant and animal species.
- Construction of a general anchorage in the Calcasieu Ship Channel. Deep-draft vessel traffic on the Calcasieu Ship Channel suffers costly delays due to the width of the inland reach of the ship channel, which prohibits most deep-draft vessels from passing head-on in the channel. These delays are exacerbated by liquefied natural gas (LNG) vessel traffic, which cannot meet and pass in the ship channel, including the 32-mile long Gulf reach. MVN is currently undertaking a feasibility study to construct anchorage areas along the channel where deep-draft vessels can layover closer to their destinations and to provide passing lanes where non-LNG vessels can meet and pass closer to their destinations.
- Construction of new LNG terminals. Onshore regasification facilities that use imported LNG have been in existence in the U.S. since 1969. However, only four were constructed, the largest of which is the Trunkline facility. Two new LNG facilities have been approved by FERC to be constructed in the project area: the Cameron LNG, owned by Sempra Energy, and the Creole Trail LNG, owned by Cheniere LNG. Future installation of LNG terminals should be evaluated for environmental impacts and required mitigation.
- The Trans-Texas Water Program. The 1968 Texas Water Plan was prepared by the Texas Water Development Board as a comprehensive 50-year plan for securing the

future water supply needs of the State of Texas. Recommendations for the program include the transfer of surplus “state” waters from basins having surplus supplies to basins that experience water shortages. The Sabine River was identified as one source of freshwater for southeast Texas. Potential adverse effects of altering river inflows to the Sabine Basin should be mitigated or avoided.

- Rycade Canal Hydrologic Restoration Project. The Rycade Canal project (C/S-02) is a semi-impounded marsh management project located in Cameron Parish, Louisiana. The project area consists of approximately 6,575 acres of brackish marsh in and adjacent to the Sabine NWR in Cameron Parish. Rycade Canal, built in the 1940's as an oil well location canal, is an avenue for salt water from the GIWW via Black Lake, and from the Calcasieu Ship Channel via Hog Island Gully. The project objectives are to protect low salinity marsh by reducing rapid water fluctuations and water circulation patterns that encourage salt water intrusion and tidal scouring, and reestablish historic hydrologic boundaries and flow patterns by structural repairs, levee repair/reconstruction, and embankment repair on the GIWW.
- Southwest Coastal Louisiana Feasibility Study. The Water Resources Development Act (WRDA) of 2007 authorized funding for a number of coastal restoration and hurricane protection projects in the Louisiana Coastal Area. Section 7010 included the Southwest Coastal Louisiana Hurricane and Storm Damage Reduction Study. A reconnaissance study completed in 2007, which recommended levee alternatives, was broadened in focus by the State of Louisiana and MVN to include both levee and restoration alternatives. MVN and the State of Louisiana completed a feasibility report and environmental impact statement on April 21, 2016. The report has a dual purpose of hurricane and storm damage risk reduction, through the National Economic Development plan, and coastal ecosystem restoration, through the Nation Ecosystem Restoration plan, for the southwest coastal portion of the State of Louisiana. This represents the first time an integrated coastal protection and hurricane protection study has been undertaken for Southwest Louisiana.
- Section 204 Study, Calcasieu River and Pass, Mile 5-14 Project. WRDA 2007 provided for the funding of a Continuing Authorities Program (CAP) study under Section 204 of WRDA 1992 to use the material from maintenance dredging to restore/rehabilitate estuarine marsh habitat along the eastern shore of Calcasieu Lake. The CAP 204 program would be used to pay the incremental costs between the Federal standard and the beneficial use of the same material. Several potential sites have been identified for the receipt of material dredged from the Calcasieu River and Pass, Louisiana project between channel Miles 5.0 and 14.0. Sites covered by the 2010 DMMP/SEIS would be eliminated from consideration for the CAP 204 project, as those would become part of the definition of the Federal standard. A feasibility study conducted by MVN is currently ongoing.

5 COORDINATION

Preparation of this draft EA and associated FONSI have been coordinated with appropriate Congressional, Federal, Tribal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, are receiving copies of this draft EA and draft FONSI:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Natural Resources Conservation Service, State Conservationist
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer
Cameron Parish Government
Alabama-Coushatta Tribe of Texas
Caddo Nation of Oklahoma
Chickasaw Nation
Chitimacha Tribe of Louisiana
Choctaw Nation of Oklahoma
Mississippi Band of Choctaw Indians
Coushatta Tribe of Louisiana
Jena Band of Choctaw Indians
Quapaw Tribe of Oklahoma
Seminole Tribe of Florida
Seminole Nation of Oklahoma
Tunica-Biloxi Tribe of Louisiana

6 MITIGATION

An assessment of the potential environmental impacts to important resources found that the proposed project would have only minimal and insignificant impacts to resources in the project area. These impacts would be mainly related to the loss of shallow open water bottom habitat and associated fisheries resources due to construction activities as part of proposed action. The presence of comparable habitat within the project vicinity minimizes the loss of shallow open water bottom habitat due to the proposed action. Any losses of fisheries resources related to the removal of shallow open water bottom by construction of the rock dike would be out-weighed by the fisheries benefits anticipated from the placement of rock material.

MVN will coordinate with LDWF with respect to any requirements for mitigation (e.g., compensation for impacts through planting of cultch material or direct payment to the Public Oyster Seed Ground Development Account), if any, for the loss of oyster habitat in designated Public Oyster Seed Grounds. No existing wetlands would be adversely impacted by the construction activities of the proposed project; therefore, no wetlands mitigation is required.

7 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Environmental compliance for either alternative would be achieved upon: coordination of this draft EA and associated FONSI with appropriate agencies, organizations, and individuals for their review and comments; USFWS confirmation that either alternative would not be likely to adversely affect any endangered or threatened species; LDNR concurrence with the determination that either alternative is consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program; receipt of a Water Quality Certificate from the State of Louisiana; public review of the Section 404(b)(1) Public Notice; signature of the Section 404(b)(1) Evaluation; receipt of the Louisiana SHPO Determination of No Effect on cultural resources; receipt and acceptance or resolution of all USFWS Fish and Wildlife Coordination Act recommendations; and receipt and acceptance or resolution of all NMFS EFH recommendations. The draft FONSI will not be signed until the alternatives achieve environmental compliance with applicable laws and regulations, as described above.

- In an e-mail dated August 2, 2018, USFWS stated that, in accordance with Section 7 of the Endangered Species Act, the proposed action is not likely to adversely affect any federally-listed threatened or endangered species or their critical habitat within the proposed project area.
- In accordance with the USFWS Fish and Wildlife Coordination Act, USFWS recommends that the Corps during the preparation for or during disposal operations place material into the open water areas between the existing shoreline and the proposed rock dikes to create marsh habitat.
 - ✓ The placement of the rock dike and any future filling of the reclaimed CDF acreage has the potential to establish marsh habitat behind newly constructed dikes. The creation of any marsh habitat would be considered temporary due to the fact that the CDFs are approved to receive dredge material from the Calcasieu River and Pass dredging cycles, and therefore, the marsh would eventually be converted to uplands.

8 CONCLUSION

The proposed action consists of constructing rock dike armoring structures along the Calcasieu Lake boundaries of Calcasieu River CDFs 23, D, and E. The structures would prevent wave-induced erosion of the dikes and would, thereby, prevent future unplanned releases of dredged material into Calcasieu Lake.

The proposed project has been found to have an overall beneficial effect on the water quality of Calcasieu Lake by preventing releases of dredged material from the CDFs into the lake. The rock dike would also provide potential areas of oyster habitat where oysters may attach and grow

This office has assessed the environmental impacts of the proposed action and has determined that it would have no significant adverse impact upon navigation, wetlands, fisheries, wildlife, EFH, threatened and endangered species, water quality, air quality, cultural resources, and recreational resources.

9 PREPARED BY

Draft EA #560 and the associated FONSI were prepared by Joseph Musso, environmental resource specialist, with relevant sections prepared by: Noah Fulmer - Cultural Resources; and Andrew Perez - Recreational Resources. The address of the preparers is: U.S. Army Corps of Engineers, New Orleans District, Regional Planning and Environmental Division South, 7400 Leake Avenue, New Orleans, Louisiana 70118.

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