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COMPREHENSIVE ENVIRONMENTAL DOCUMENT
PHASE II

GREATER NEW ORLEANS HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM

May 2021

US Army Corps of Engineers®
New Orleans District

EXECUTIVE SUMMARY

Overview

As a result of the devastation caused by Hurricane Katrina, Congress authorized and funded $14.6 billion for hurricane and storm damage risk reduction projects in the Greater New Orleans (GNO) area and southeastern Louisiana. In accordance with that authorization and funding, the United States Army Corps of Engineers (USACE) New Orleans District (CEMVN) embarked on the largest civil works project in the USACE history, the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS) to reduce the risk of hurricane and storm damage in metropolitan New Orleans. The HSDRRS was designed to provide risk reduction from a hurricane or storm event that would produce a 1 percent (%) annual chance exceedance surge elevation and associated waves, a so-called "100 year" storm. This CED Phase II addresses the cumulative impacts of the GNO HSDRRS features that form the 100-year level of risk reduction (LORR) system.[1]

This Comprehensive Environmental Document (CED) is prepared in accordance with the NEPA Emergency Alternative Arrangements approved by the Council on Environmental Quality (CEQ) (Federal Register Volume 72, Number 48, Tuesday, March 13, 2007) and the CEQ's regulations (40 Code of Federal Regulations [CFR] §1500-1508 (1978)), as reflected in the USACE Engineering Regulation (ER) 200-2-2. The NEPA Emergency Alternative Arrangements were put in place "to expeditiously complete environmental analysis of major portions of a new 100- year level of Hurricane and Storm Damage Reduction effort authorized and funded by the Administration and the Congress." In light of the emergency nature of completing the 100-year HSDRRS work, the CEQ approved the preparation of the Individual Environmental Reports (IERs) and the CED in lieu of traditional environmental assessments (EA), or environmental impact statements (EIS) as allowed by CEQ NEPA Regulations (40 CFR §1506.11) in emergency circumstances.

When the NEPA Alternative Arrangements process was outlined in 2007, it was not conceived that HSDRRS design and associated environmental compliance activities would continue well beyond 2011, the original target for construction completion. As planning and construction stretched beyond 2011, CEMVN decided to release the CED in phases. The first phase of the CED (CED Phase I) was released to the public in May 2013 and included a cumulative impact assessment of actions evaluated in IERs with a signed decision record by November 15, 2010. The CED Phase I is incorporated by reference. This document, the CED Phase II, completes the cumulative impacts evaluation and is the final step in the Alternative Arrangements process.

The scope for the CED is the 100-year HSDRRS which includes the Lake Pontchartrain and Vicinity (LPV) and Westbank and Vicinity (WBV) HSDRRS Projects, inclusive of separately authorized work that is sufficiently linked to these two projects and is needed

[1] "HSDRRS" refers to the 100-year LORR system.

to achieve the desired LORR. For LPV this includes armoring, repairing/replacing floodwalls, Permanent Canal Closures and Pumps (PCCP) and Outfall Canals, Inner Harbor Navigation Canal (IHNC) Surge Barrier and IHNC Seabrook Complex. For WBV this includes armoring and reinforcing/replacing floodwalls. This CED integrates the 100-year HSDRRS IERs into a single planning document and contains updated information for IERs that had incomplete or unavailable data at the time the respective IER Decision Record was approved. The "Proposed Action" as described in the IERs are features of the 100-year HSDRRS that are now constructed or are under construction (some mitigation construction is on-going). The 50-year period of analysis as described in the CED is the same as used for the HSDRRS planning, from 2007 through 2057. Future levee lifts that will be required to continue to meet the 100-year LORR elevations are assessed as reasonably foreseeable future work beyond 2057. Those borrow sites that were not utilized for construction of the 100-year HSDRRS are discussed as sites that could be used for future construction (USACE 2007d, USACE 2008u, and USACE 2009z) whether for HSDRRS features or other projects.

The formal termination of the Emergency Alternative Arrangements was announced in the Federal Register (Volume 80, Number 123) on Friday June 26, 2015 (Appendix B). The CEMVN transitioned back to preparing traditional NEPA documents in 2015. Once Alternative Arrangements ended, new 100-year HSDRRS construction and mitigation projects were assessed via EAs. In May of 2018, the CEMVN completed the last major project of the 100-year HSDRRS, the Permanent Canal Closures and Pump Stations on the three Orleans Parish outfall canals. Construction of the last compensatory mitigation project is expected to be complete in the spring of 2021. Some armoring of 100-year HSDRRS levees continues.

This CED Phase II is the final step to complete the cumulative impacts analysis for the HSDRRS as required by the Alternative Arrangements. This draft CED Phase II will be distributed for a 60-day public comment period. Once all comments are addressed, the Final CED Phase II will be distributed for a 30-day public viewing period. No sooner than 30 days after the publication of the Final CED Phase II, the CEMVN Commander will sign a Record of Decision (ROD). The approved ROD will be available to the public and posted on the public website at https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/HSDRRS-Projects/Comprehensive-Environmental-Document/.

Authority

Congress enacted legislation through a series of supplemental appropriation acts following Hurricanes Katrina and Rita to restore, replace, reinforce, armor, and accelerate completion of the risk reduction system damaged by the storms, and provided additional authority to the USACE to raise levee heights, to enhance and to construct new risk reduction components to achieve the 100-year LORR. Since the 2005 hurricane season, multiple supplemental appropriations were authorized for the 100-year HSDRRS work, and included:

- The U.S. Department of Defense (DoD), Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico and Pandemic Influenza Act of 2006 (3rd Supplemental - PL 109-148, Chapter 3, Construction, and Flood Control and Coastal Emergencies) authorized accelerated completion of the LPV and WBV projects and restoration of project features to design elevations at 100 percent Federal cost.

- The Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery Act of 2006 (4th Supplemental - PL 109-234, Title II, Chapter 3, Construction, and Flood Control and Coastal Emergencies) authorized construction of the level of risk reduction necessary to achieve the certification required for participation in the National Flood Insurance Program, and the replacement or reinforcement of floodwalls and armoring at critical locations.

- U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Acts of 2007 (PL 110-28, Title IV, Chapter 3, Flood Control and Coastal Emergencies Section 4302) (5th Supplemental)

- Supplemental Appropriations Act, 2008 (6th Supplemental) (PL 110-252 Title III, Chapter 3, Construction)

- Consolidated Security, Disaster Assistance, and Continuing Appropriations Act of 2009 (PL 110-329), also called the 7th Supplemental.

The Water Resources and Reform Development Act (WRRDA) of 2014 (Public Law 113-121) Section 3017 authorizes the USACE to carry out measures that address consolidation, settlement, subsidence, sea level rise, and new datum to restore certain federally authorized hurricane and storm damage reduction projects to their authorized levels of protection, if it determines the necessary work is technically feasible, environmentally acceptable, and economically justified. The authority of Section 3017 to study and construct risk reduction measures terminates 10 years after the date of enactment of WRRDA 2014 on 10 June 2024. Projects covered by WRRDA 2014, Section 3017 include LPV and WBV.

Section 2013 of the WRRDA 2014 provides that the USACE shall be responsible for the operation and maintenance (O&M), including repair of the Inner Harbor Navigation Canal Surge Barrier (barge gate and sector gates crossing the GIWW); GIWW Western Closure Complex sector gates, sluice gates, and pump station; and sector gates and pump station on the Harvey Canal. The non-Federal share of the cost of operation, maintenance, repair, rehabilitation, and replacement of any structure pursuant to Section 2013 of WRRDA 2014 is 35 percent. While Section 2013 provides that the USACE is responsible for operations and maintenance, including repair, of these HSDRRS features, no funds have been appropriated for this purpose.

Project Location

The 100-year HSDDRS is a 350-mile integrated system located within nine separate sub-basins in southeastern Louisiana within the GNO metropolitan area as shown in Figure 1. The LPV HSDRRS is bounded to the west by the Bonnet Carré Spillway; to the north by the south shore of Lake Pontchartrain; to the east by the Gulf Intracoastal Waterway (GIWW) and the Mississippi River Gulf Outlet (MRGO) and to the south by the Mississippi River. The WBV HSDRRS is bounded to the north by the Mississippi River and to the south by the Western Tie-in and the Lake Cataouatche, Westwego to Harvey and Western Closure Complex levees and the Eastern Tie-In. The LPV and WBV 100-year HSDRRS consists of upgraded levees, floodwalls, closure structures, flood gates (including sector gates), a surge barrier, storm-proofed pump stations, gates structures and pumps (operated only during storm events), and modified drainage structures.

The 100-year HSDRRS consists of two congressionally authorized risk reduction projects - the Lake Pontchartrain & Vicinity (LPV) and the Westbank & Vicinity (WBV) projects. The LPV components are those located on the east side of the Mississippi River and the WBV components are those located on the west side of the Mississippi River. To ensure 100-year LORR from storm surge traveling up the Mississippi River, a portion of the WBV project is co-located (built on top of) a reach of the Mississippi River Levee (MRL), which is part of the Mississippi River and Tributaries (MRT) Project. That 15.5-mile co-located WBV-MRL reach, from River Mile (RM) 70 to RM 85.5 was raised to the 100-year level of risk reduction (LORR) requirements. These WBV- MRL features, the existing MRL and the LPV and WBV perimeter protection features form a closed-loop system on both sides of the river, providing the residents and businesses in the GNO metropolitan area reduced risks from storm events.

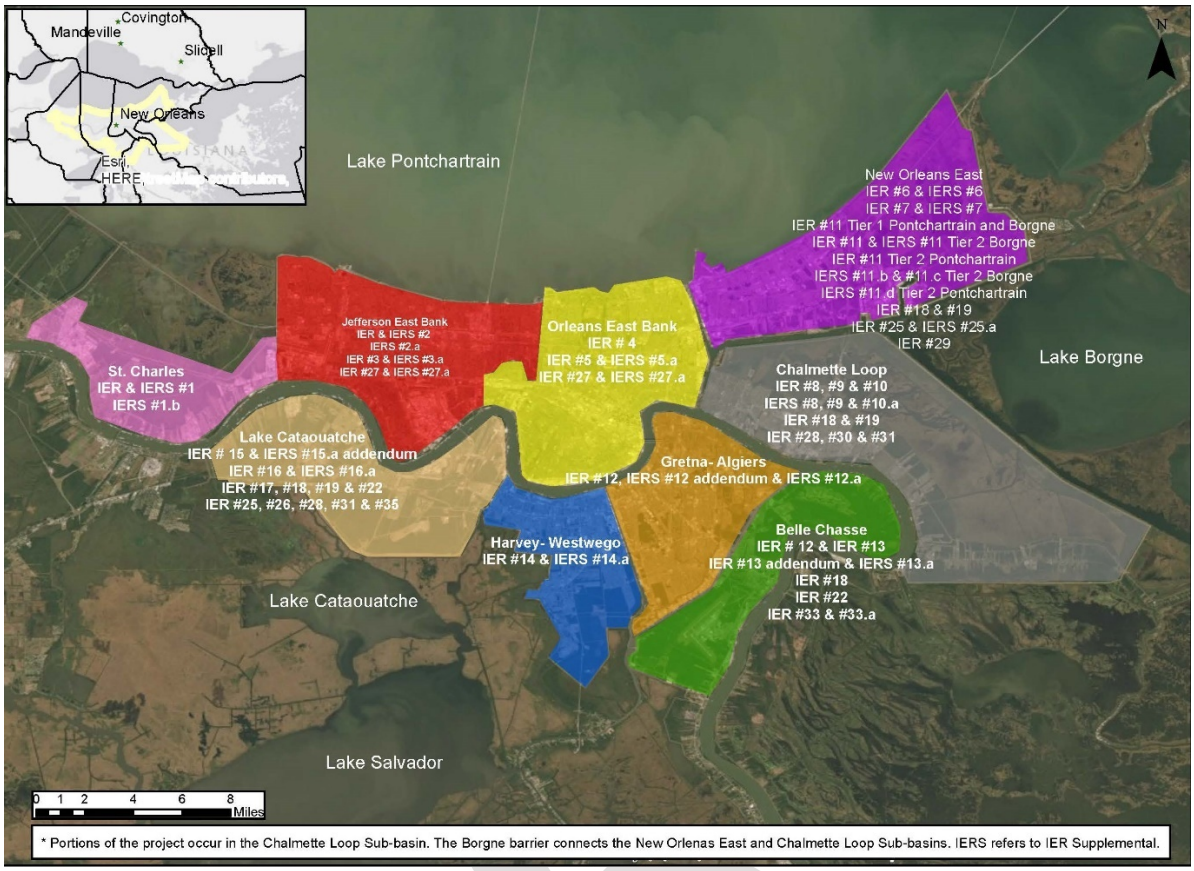

Figure ES-1: Vicinity Map and LPV and WBV IERs by Sub-basin

Hydraulic Analysis

The Interagency Performance Evaluation Team (IPET) evaluated the performance of the LPV and WBV projects as they existed at the time of Hurricane Katrina. In 2006, the IPET published the report *Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System* which determined the facts concerning the performance of the hurricane protection system during Hurricane Katrina in August 2005. The information gained through the IPET study provided a body of knowledge to assist in planning and designing more effective risk reduction features. A state-of-the-art modeling/analysis approach was developed in 2006-2010 by a multi-agency team of experts to estimate the surge hazard for the Louisiana coast and design a new risk reduction system, incorporating the risk-based framework recommended in the IPET Report. The LPV/WBV HSDRRS is authorized to reduce the risk associated with a surge and wave event with a 1% chance of occurring in any given year. In order to estimate the surge and wave hazard facing the LPV/WBV HSDRRS, statistical data to sufficiently address the 1% chance exceedance surge and wave event was established. One hundred fifty-two (152) storms were selected to expand the limited historical data record (~50 years) and statistically represent the full probabilistic space of storms expected to occur. Using state-of-the-art hydrodynamic modeling software, including Advanced CIRCulation (ADCIRC), the surge and wave responses were generated for

all 152 synthetic storms for thousands of locations along the coast of Louisiana. Using the Joint Probability Method – Optimal Sampling (JPM-OS) statistical methodology,100-year and 500-year surges (and associated waves) and uncertainty were developed for each location along the coast. Design elevations for the 100-year HSDRRS were based on these modeling efforts.

In 2012, after Hurricane Isaac, the USACE produced a report titled "*Hurricane Isaac With and Without 2012 100-YEAR HSDRRS Evaluation"* that documented the effects of the 100-year HSDRRS on the surrounding communities during Hurricane Isaac. The Hurricane Isaac model simulations showed that any changes of water level due to the construction of the 100-year HSDRRS system, as it existed in 2012, are 0.4 ft or less at communities outside the system. To further address the issue of flooding outside the 100-year HSDRRS during hurricane surge events, additional modeling was conducted as part of the evaluation of the 100-year HSDRRS effects for the CED. The analysis evaluated the projected storm surge levels in areas outside the LPV and WBV areas comparing the following scenarios: the levee system that existed in the year 1965 (pre-Betsy, pre-Federal levees), in 2005 (pre-Katrina) and in 2012 (post-100-year HSDRRS construction). The analysis describes and evaluates the past, present and potential cumulative storm surge impacts of the completed 100-year HSDRRS on the surrounding areas. The impacts to surge elevations vary by location, with the largest impacts in the immediate vicinity of the 100-year HSDRRS. At the IHNC Surge Barrier, a 2.8 ft increase in 100-yr surge levels can be attributed to the effect of the 100-year HSDRRS as compared to the 1965 pre-Betsy levee system. The analysis shows a 1.2 ft increase in the100-year water level at Venetian Isles, New Orleans, LA, which is located near the IHNC Surge Barrier. The effects of the system decrease with increased distance from the major levees and structures. At Eden Isle, Slidell, LA, a 0.2 ft increase to the 100-year water level was estimated.

The final reports, titled "An Evaluation of Storm Surge in Areas Outside the Greater New Orleans Hurricane and Storm Damage Risk Reduction System" and the "Sensitivity Analysis of Relative Sea Level Rise on Gate Closure Frequency for Lake Pontchartrain and Vicinity/West Bank and Vicinity 1% Hurricane and Storm Damage Risk Reduction System" are included in Appendix T.

National Flood Insurance Program

The completed HSDRRS achieves the LORR for storm surge and waves that are necessary for Federal Emergency Management Agency (FEMA) certification and accreditation for the National Flood Insurance Program (NFIP). FEMA notified CEMVN by letter dated February 20, 2014, that the completed 100-year HSDRRS, which provides the 1 percent annual chance exceedance flood risk reduction (also referred to as the 100-year LORR) achieved the levels of risk reduction necessary for the accreditation required to participate in the NFIP. FEMA designated areas within the 100-year HSDRRS as Zone X, or moderate risk zone (http://www.fema.gov/) on the flood insurance rate map (FIRM). Flood risk still exists even where a levee meets the NFIP requirements. Flood risk management measures, such as elevating structures,

maintaining current warning systems and evacuation plans, and wisely managing floodplain development minimize this residual risk.

An NFIP levee certification evaluation focuses only on the 1 percent annual chance exceedance flood, which is a FEMA flood insurance standard, not a public safety standard. The 100-year HSDRRS provides 100-year storm damage risk reduction through a variety of structures designed to withstand the height of the 100-year storm surge water level, wave run-up, and associated uncertainties. The 100-year HSDRRS does not improve interior forced drainage of excess rainfall within the project area; therefore, it does not provide risk reduction from a 100-year rainfall flood event, which has a 1 percent chance of occurring each year at a given location based on rainfall. A 100-year flood event is also influenced by interior drainage, pumping capacities, and river levees and floodwalls.

DESCRIPTION OF THE 100-YEAR HSDRRS

The 100-year HSDRRS is composed of components located on the east (LPV features) and west (WBV features) banks of the Mississippi River. The project area consists of nine separate sub-basins encompassing parts of St. Charles, Jefferson, Orleans, St. Bernard, and Plaquemines parishes as shown in Figure 2. The risk reduction structures addressed by the IERs consist of approximately 213 miles of levees, floodwalls, closure structures, and pump station structures.

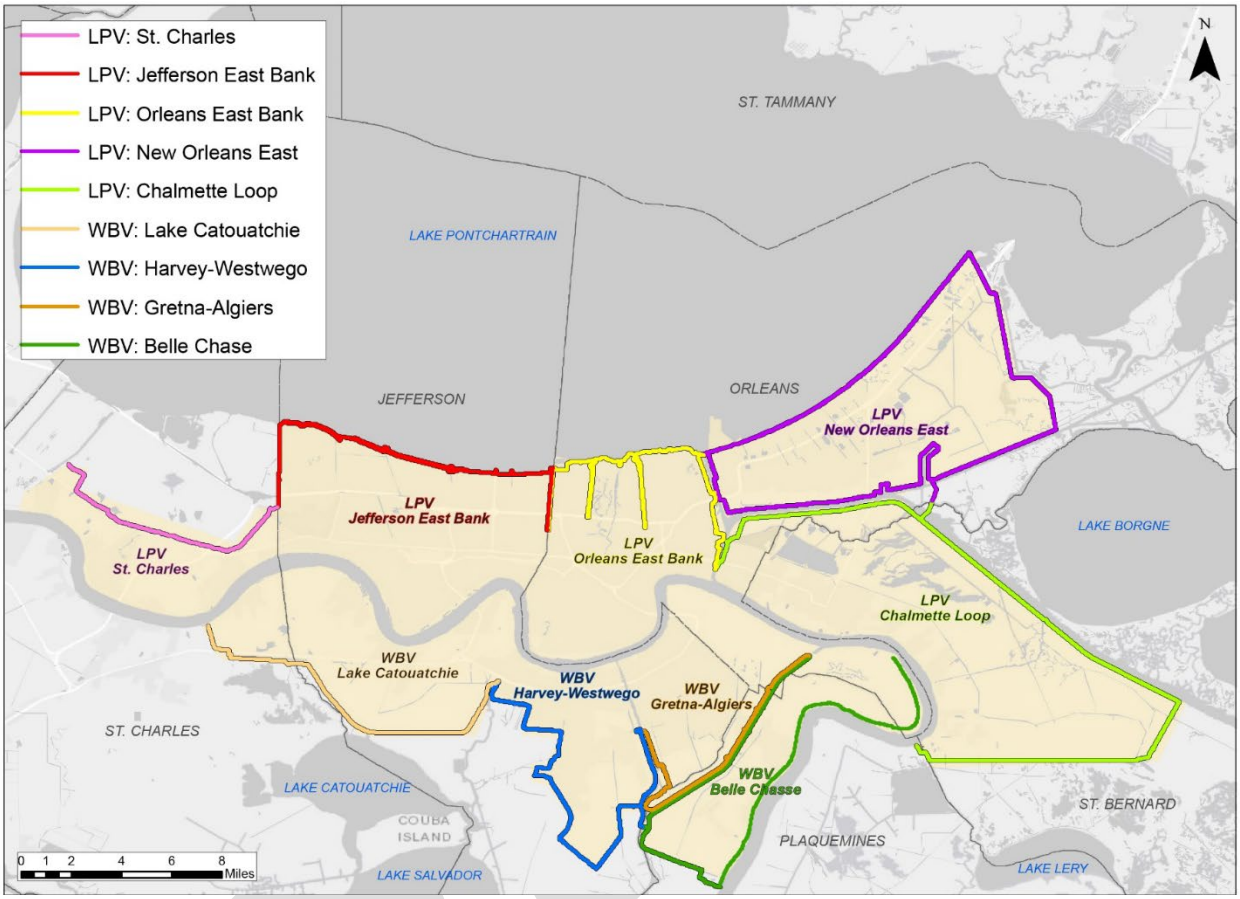

Figure ES-2: LPV and WBV Basin

Alternatives Development.

Alternatives were formulated based on a 50-year period of analysis from 2007 through 2057 (future with-project conditions) and estimated future conditions if no action was taken to address the identified problems (future without-project conditions). Alternatives included both structural and non-structural measures.

Levees were built to provide the 100-year LORR. Structural superiority is incorporated in the design elevation for those structures that would be very difficult to rebuild, if damaged, due to disruption in services. Examples where structural superiority is factored into the design are major highway and railroad flood gates that require detours, pumping station fronting protection where repairs would require reductions to pumping capacity, and sector gated structures. These structures are constructed to the 2057 levels plus 1-2' for structural superiority. Floodwalls that may be reconstructed in areas with little or no disruption of services were constructed to the 2057 level.

The USACE used the alternatives evaluation process (AEP), a systematic process for recommending a preferred alternative or "proposed action" (USACE 2008f). For a full

description of the AEP process and the development of alternatives for each component and reach, refer to the CED Phase I.

Although considered through the AEP, the No Action Alternative was not chosen as the selected plan in any of the IERs.

APPROVED ACTIONS

A total of 66 IERs, supplemental IERs and EAs were approved. The proposed actions as discussed in the IERs are now constructed, fully operational and provide the 100-year LORR. The general IER project locations are illustrated in Figure 3. Location maps of the project alignments are in Appendix C. To read the IER documents go to hyperlink https://www.mvn.usace.army.mil/HSDRRS-Projects

- IERs 1-17 assessed impacts of the risk reduction features for LPV and WBV HSDRRS.
- IERs 27 and 27a assessed impacts of the outfall canal remediation project.
- IERs 33 and 33a assessed impacts of the WBV-MRL Engineered Alternative Measures and Resilient Features co-located levee feature.
- IERs 18 – 35 (excluding nos. 20, 21, 24 and 34) assessed impacts associated with both government- and contractor- furnished borrow sites and a stockpile site. Seventy-two borrow sites located in twelve parishes in Louisiana, and one county in Mississippi were evaluated.
- Programmatic IERs (PIERs) 36 and 37 assessed the programmatic mitigation plans for the LPV and WBV, respectively. Specific mitigation sites were further assessed through tiered IERs/EAs.
- Supplemental NEPA documents assessed changes that occurred in the project engineering and design or project location.

Lake Pontchartrain & Vicinity

The LPV components were addressed in 32 IERs, supplemental IERs and mitigation IERs/EAs, which evaluated project features providing 100-year LORR for New Orleans and the surrounding east bank parishes. IERs 1-11 assessed impacts for east bank flood risk reduction projects. To make a complete and closed system, the Mississippi River and Tributaries' Mississippi River Levee (MRL) and the Upper Bonnet Carré Guide Levee provide risk reduction from riverine flood risks.

The LPV projects provide greater than 137 miles of risk reduction improvements, with approximately 43 miles of improvements directly along the southern shore of Lake Pontchartrain (Figure 3). The LPV includes four parishes and five sub-basins located in the GNO metropolitan area on the east bank of the Mississippi River. The more complex projects are discussed in further detail below.

Figure ES- 3: HSDRRS LPV and WBV Projects

Permanent Canal Closures and Pumps (IER 5, Figure 4). The PCCP are composed of permanent gated storm surge barriers and brick façade pump stations at or near the lakefront. The pumps move rainwater out of the canals, around the gates and into Lake Pontchartrain during a tropical weather event and are equipped with stand-alone emergency power supply capacity to operate independently of any publicly provided utility. The PCCP at 17th Street consists of six 1,800 cubic feet per second (cfs) pumps and two 900 cfs pumps, and has a total pumping capacity of 12,600 cfs. The PCCP at Orleans Avenue consists of three 900 cfs pumps and has a total pumping capacity of 2,700 cfs. The PCCP at London Avenue consists of four 1,800 cfs pumps and two 900 cfs pumps, and has a total pumping capacity of 9,000 cfs. The PCCP notice of construction completion was issued in May 2018 and the PCCP are fully operational.

Figure ES-4: Figure 4. 17th Street Outfall Canal PCCP

Bayou Bienvenue to Bayou Dupre, Chalmette Loop Levee and Caernarvon Floodwall (IER 8, 9, 10, Figure 5). The Chalmette Loop Levee connects to Tier 2 Borgne

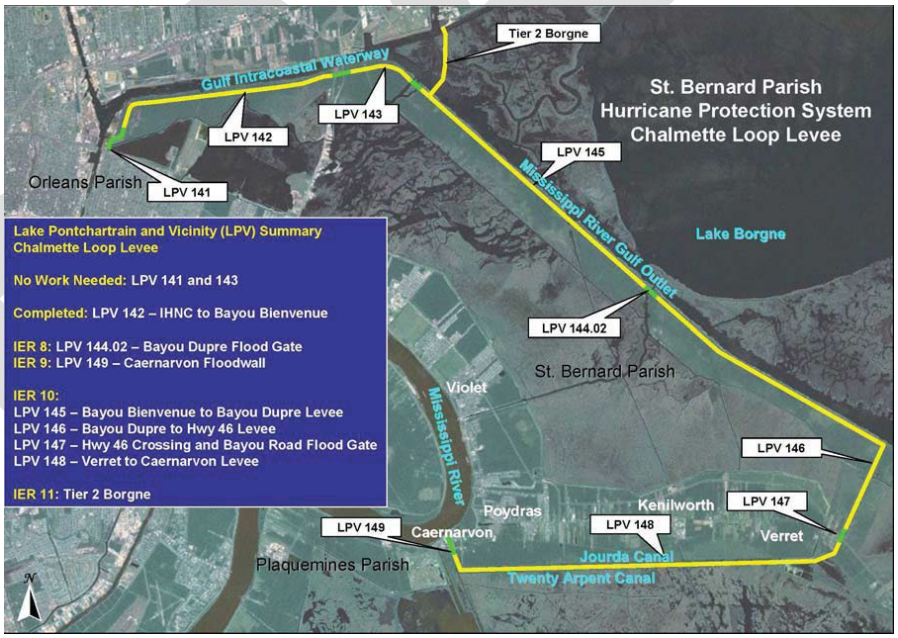

Figure ES-5: Chalmette Loop Levee

Barrier structure, the Bayou Dupre Flood Gate and the Caernarvon Floodwall. A new flood control structure was constructed at Bayou Dupre that consists of a steel sector gate and floodwall tie-ins to the existing levees. It was constructed adjacent to

the existing structure on the flood side and a pontoon bridge was constructed on the protected side. The new flood control structure was built to an elevation of +31 feet NAVD88. T-wall floodwalls were constructed to tie into the adjacent levee reaches on each side of the bayou. The old structure was left in the open position and deauthorized. In addition, an access road was permanently constructed for reaches 145, 146, 148.02 and 149, as well as raising the LPV 149 tie-in to the MRL to approximately +24-ft NAVD88.

A new floodwall to the west of Caernarvon canal was constructed to replace the existing floodwall (LPV 149) complex on the east side of the canal. The new alignment included a tie-in to the MRL system, new floodgates across Louisiana Highway 39 and the Norfolk Southern railroad, a t-wall floodwall along the east bank of the Caernarvon Freshwater Diversion Canal and a 56-foot-wide navigable structure to an elevation of approximately +26 feet NAVD88 across the Caernarvon Canal south of the Elevating Boats LLC sea plane hangar.

Seabrook Floodgate Complex and Inner Harbor Navigation Canal Surge Barrier (IER 11, Figure 6). The Inner Harbor Navigation Canal (IHNC) surge barrier at Lake Borgne is a key feature of the HSDRRS, providing the 100-year LORR to a large portion of Orleans and St. Bernard parishes by reducing the risk of surge entering the GIWW/IHNC corridor from Lake Borgne and the Gulf of Mexico. The 1.8-mile barrier includes three gated structures and a barrier wall with a top elevation of 26-feet.

The Seabrook Floodgate Complex is in the IHNC and reduces storm surge entering from Lake Pontchartrain. Seabrook works in tandem with the IHNC Lake Borgne Surge Barrier to provide 100-year LORR to the entire IHNC corridor. Construction consisted of a sector gate and two vertical lift gates in the IHNC 540 feet south of the Senator Ted Hickey Bridge (also known as Seabrook Bridge) and the Bascule Railroad Bridge, with floodwall tie-ins to LPV 104 to the west and LPV 105 to the east. Also constructed is a 20-foot-wide vehicle gate in the eastern floodwall to provide access to Jourdan Road.

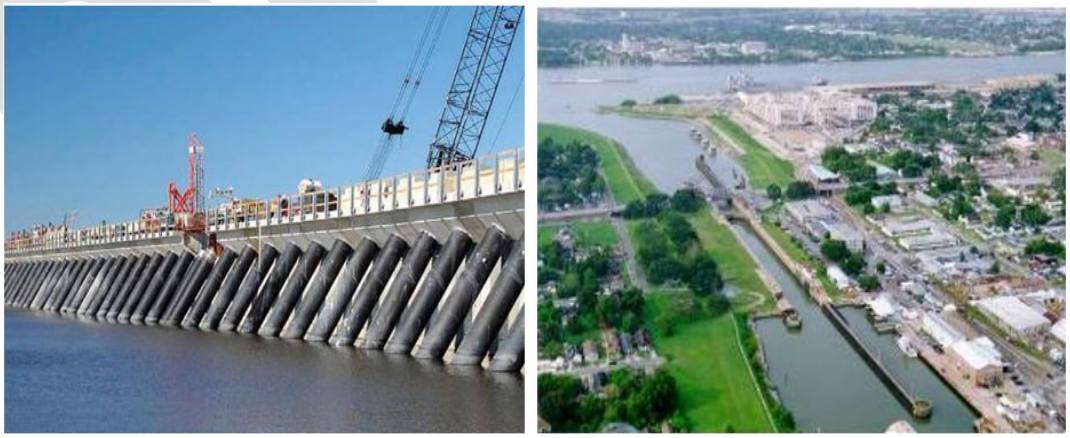

Figure ES-6: Borgne Barrier and Seabrook Floodgate Complex

Westbank & Vicinity

The WBV components were addressed in 21 IERs, supplemental IERs and mitigation IERs/EAs, which evaluated project features providing 100-year LORR. IERs 12 – 17, 33 and 33a assessed impacts for the flood risk reduction projects on the west bank. The WBV project includes improvements to or construction of 76.5 miles of levees, floodwalls, floodgates, water control structures, and other risk reduction features (Figure 3). Of these 76.5 miles, 49 miles consist of primary perimeter storm surge risk reduction features (including 15 miles co-located with the MRL) and 26 miles of detention basin features along the Harvey and Algiers canals.

Gulf Intracoastal Waterway-Western Closure Complex (GIWW, WCC, IER 12, Figure 7). The GIWW-WCC is a major feature of the 100-year HSDRRS that provides the first line of defense from storm surge entering the Harvey and Algiers Canals. The WCC consists of a sector gate, a drainage pump station, floodwalls, sluice gates, foreshore protection and an earthen levee. The WCC significantly reduces the risk to a large area of the west bank by eliminating 25 miles of levee, floodwalls, flood gates and pumping stations along the canals from the direct impacts of storm surge.

Figure ES-7: Western Closure Complex

Bayou aux Carpes Clean Water Act, Section 404(c) Site. The USACE, in cooperation with the National Park Service (NPS), finalized a Supplemental Environmental Assessment (SEA) #581 that evaluated augmentation measure(s) for the Bayou aux Carpes Clean Water Act (CWA), Section 404(c) site (BAC Site). The CEMVN made a formal request, by letter dated November 4, 2008, to the Environmental Protection Agency (EPA) to modify the Section 404(c) Final Determination for Bayou aux Carpes to include a 4,200 linear foot flood wall, including a 100-foot-wide corridor as part of the WBV Western Closure Complex. The EPA subsequently issued the Modification to the 1985 CWA Section 404(c) Final Determination for the BAC site to allow construction of the “WBV 404(c) flood wall”.

As part of the modification to the Section 404(c) determination, the CEMVN committed to fully mitigate and compensate for unavoidable impacts to the BAC site. In addition to the compensatory mitigation, the EPA requested and the CEMVN committed to

evaluate and consider for implementation additional ecological augmentation features that would add an extra measure of environmental benefits due to the unique status of the BAC Site.

The project includes modifying the shell plug at the Bayou aux Carpes to provide hydrologic exchange between the Gulf Intracoastal Water Way (GIWW) and the BAC Site, thereby partially restoring the historic hydrologic sheet flow regime. In addition, the project includes the removal of an earthen embankment, identified as a "plug", which was placed where BAC intersects the Gulf Intercostal Water Way (GIWW) in 1974. Most of the work will occur within the EPA designated BAC Site on property that is managed by the NPS as part of the Jean Lafitte National Historical Park and Preserve's (JLNHPP's) Barataria Preserve. Other Project activities would occur in state-owned water bottoms and roadways. Removal of this earthen embankment would create a sinuous connection between Bayou aux Carpes and the GIWW to partially restore hydrologic connectivity and increase wetland functions and values of the BAC Site. A Finding of No Significant Impact was signed on 1 April 2021 and construction is anticipated to be complete in August 2021.

WBV-MRL Co-Located Levee, Plaquemines and Orleans (IER 33, Figure 8).

To make a complete and closed risk reduction system, part of the WBV project is co-located with (constructed on top of) the west bank MRL between RM 70 and 85.5. The MRL serves as an integral part of the closed loop system, reducing the risk to communities from a storm surge propagating upstream from the mouth of the Mississippi River. After completing detailed storm surge modeling and overtopping analyses, it was determined that a 15.5 mile stretch of the alignment along the west bank MRL of the Mississippi River between RM 70 and 85.5 needed to be higher to meet the 1-percent LORR design elevation (USACE, 2010f). RM 85.5 was identified as the 2011 100-year design grade crossover point. This is the point where the Mississippi River and Tributaries (MR&T) authorized design grade equals the 1-percent HSDRRS design for 2011 conditions.

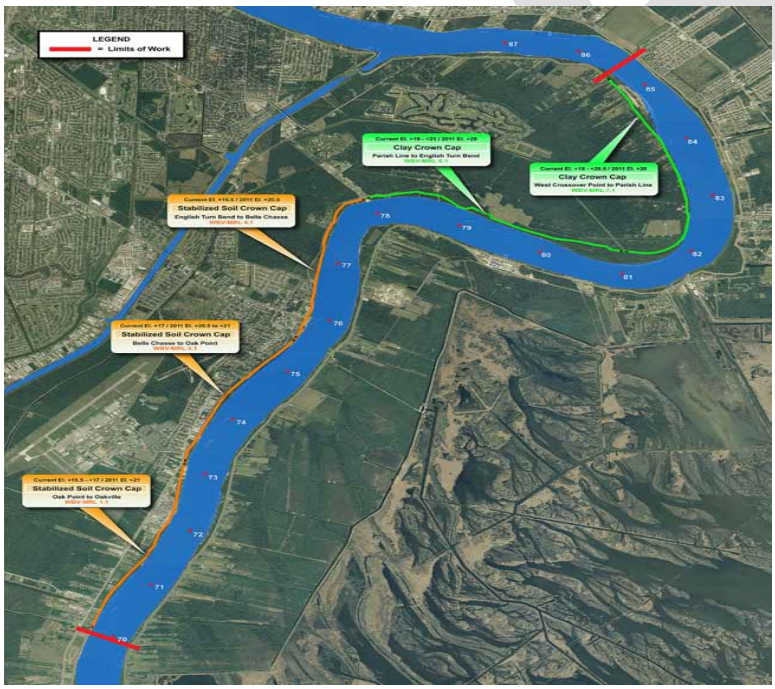

Figure ES-8: WBV-MRL Co-Located EAM Contract Reaches

IER #33 assessed impacts from construction of 15.5 miles of engineered alternative measures (EAM) on the MRL earthen levees to provide the 100-year LORR on the west bank. The Decision Record

for IER #33 was signed on December 31, 2010. The WBV-MRL EAMs met the requirements for FEMA accreditation; however, additional "resilient features" were required to improve the resiliency and longevity of the system. The WBV-MRL Resilient Features include earthen levees with gentler side slopes, floodwall and gates, and armoring of earthen levees. IER #33a assessed impacts from the construction of Resilient Features. The Decision Record for IER#33a was signed on January 11, 2012.

(On the east bank of the river, the MRL also serves as an integral part of the closed loop system between RM 81.5 to RM 127 (at the Bonnet Carre Spillway), but there was no need for a co-located LPV/MRL levee because the 2011 LPV 100-year design grade crossover point is below the intersection of the MRL with the LPV tie-in at RM 81.5.)

Borrow HSDRRS Components

In 2007, the USACE began an unprecedented search for suitable earthen material to rebuild and reinforce the HSDRRS in the GNO metropolitan area. Approximately 72 borrow sites were evaluated in IERs. These borrow sites are located in twelve parishes in Louisiana and one county in Mississippi. Of those borrow sites investigated, only 21 borrow sites were excavated. All sites with wetlands were avoided. Farmland or pasture sites were primarily used as borrow areas. Refer to Appendix C for specific borrow site location maps.

Compensatory Mitigation Components

Programmatic IERs (PIERs) No. 36 and No. 37 were prepared to describe the compensatory mitigation plan to offset habitat losses incurred during construction of the LPV and WBV components. Subsequent documents tiered off the programmatic documents that provided specific details about mitigation sites and assessed the impacts of construction of the mitigation features.

Armoring

According to the Interagency Performance Evaluation Task Force (IPET) Report, four of the 50 major levee breaches caused by Hurricane Katrina resulted from foundation-induced failures (Figure 9). The remainder were caused by a combination of overtopping and scour.

Congress authorized and funded the armoring of critical elements of the 100-year HSDRRS.

Figure ES-9: Effects of Scour Near the IHNC

'Critical' elements were defined by the IPET and the American Society of Civil Engineers (ASCE) External Review Panel as those elements that suffered severe erosion and/or breaching and includes levee transitions, pipeline and utility crossings,

as well as the land side of levees and floodwalls. That the landside of levees is a ‘critical element’ is evidenced by the IPET quote, ‘No levee breaches occurred without overtopping.’ An ERDC desktop study of existing research on levee flood-side erosion potential revealed that it did not pose a significant risk of levee breaches.

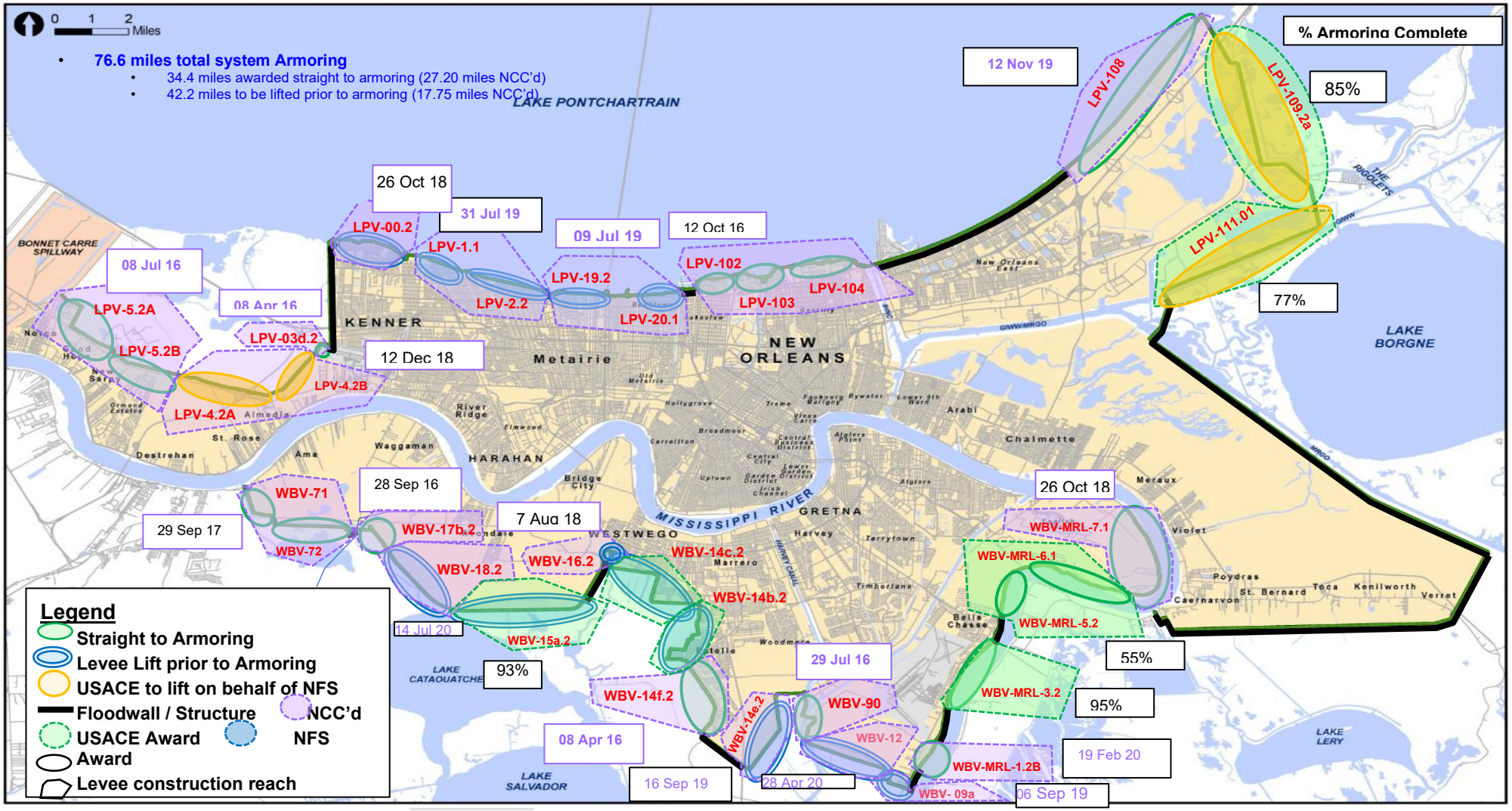

Figure ES-10: Armoring Plan per Levee Reach

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Therefore, no armoring was recommended on flood-side slopes. The armoring of 'critical elements' in the system perimeter contributes to the resiliency of the HSDRRS, when subjected to extreme storm surges greater than a 1 percent annual chance of exceedance (ACE).

Seventy-seven miles of the the 100-year HSDRRS will be armored. Thirty-four miles of levee will be armored without being first raised; 27.2 miles are complete. Forty-two miles of levee will be lifted prior to armoring; 17.75 miles are complete. A total of 26 contracts have been awarded. Eighteen are complete and eight are ongoing. Figure 10 illustrates the armoring plan and which levees went straight to armoring and which were raised prior to armoring.

Future Levee Lifts

The authorizations for the system did not authorize the future levee lifts which will be required to sustain the HSDRRS design LORR over the long term. Section 3017 of WRRDA 2014 authorized USACE to carry out measures necessary to address consolidation, settlement, and sea level rise if the necessary work is determined to be technically feasible, environmentally acceptable, and economically justified. The Bipartisan Budget Act of 2018 provided appropriations to conduct the General Re-evaluation Report necessary to inform this determination. Recently General Reevaluation Reports (GRRs) were prepared for both the LPV and WBV projects. Draft reports were released for public comment December 13, 2019. Initial rough order of magnitude estimates suggest the work would require 9 million cubic yards of additional borrow.

The Coastal Protection and Restoration Agency Board (CPRAB), as the non-Federal sponsor, can construct future lifts with its funds and may do so to sustain the design heights of several reaches until 2025 with USACE 33 USC Section 408 permissions. Absent future construction of additional levee lifts by either the USACE or CPRAB and the local levee districts, risk associated with flooding from a tropical event in the metro New Orleans area would increase over time. Section 3.3.3 describes Section 408 levee lifts under consideration by the CPRAB.

REGIONAL PROJECTS AND PROGRAMS

Since the 2005 hurricane season, significant resources and efforts focused on rebuilding southeast Louisiana. To quantify these regional efforts, a wide array of resources were canvassed to try to bring the impacts of as much of this rebuilding effort as practicable under one overarching evaluation of cumulative impacts due to regional actions. For the cumulative impact analysis, regional projects conducted by others in southeastern LA were broadly addressed through the following subheadings:

- Storm Damage Reconstruction Projects - 29;
- Orleans Parish building permits 343,220 (2005-2011)
- Redevelopment Project – 500

- Coastal and Wetlands Restoration Projects – 240
- Flood Risk Reduction Projects – 125
- Transportation Projects – 339

Past, present, and reasonably foreseeable future regional projects including regulatory permits are listed in Appendix L under the subheadings as indicated above. Major risk reduction projects in the region include those illustrated in Figure 11. Major coastal wetlands restoration and protection projects in the region are provided in Figure 12. Coastal and restoration projects considered in the analysis include the State Master Plan measures in southeastern Louisiana. The analysis includes projects under the Louisiana Coastal Impact Assistance Program (CIAP) and the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA). As of October 2020, there are a total of 226 CWPPRA projects. Of those, 149 are active, six are inactive, 17 are complete, 96 are in long-term O&M, eight have been transferred, and 46 have been deauthorized.

In addition, other regional projects include Section 408 permissions under Section 14 of the River and Harbors Act of 1899, codified at 33 USC Section 408. A total of 114 Section 408 permissions were issued between July 2016 and August 2020 by the CEMVN Operations Division. Of the issued permissions, 55 projects were in the five-parish HSDRRS project area, a majority of which were evaluated as Categorical Permissions or Categorical Exclusions.

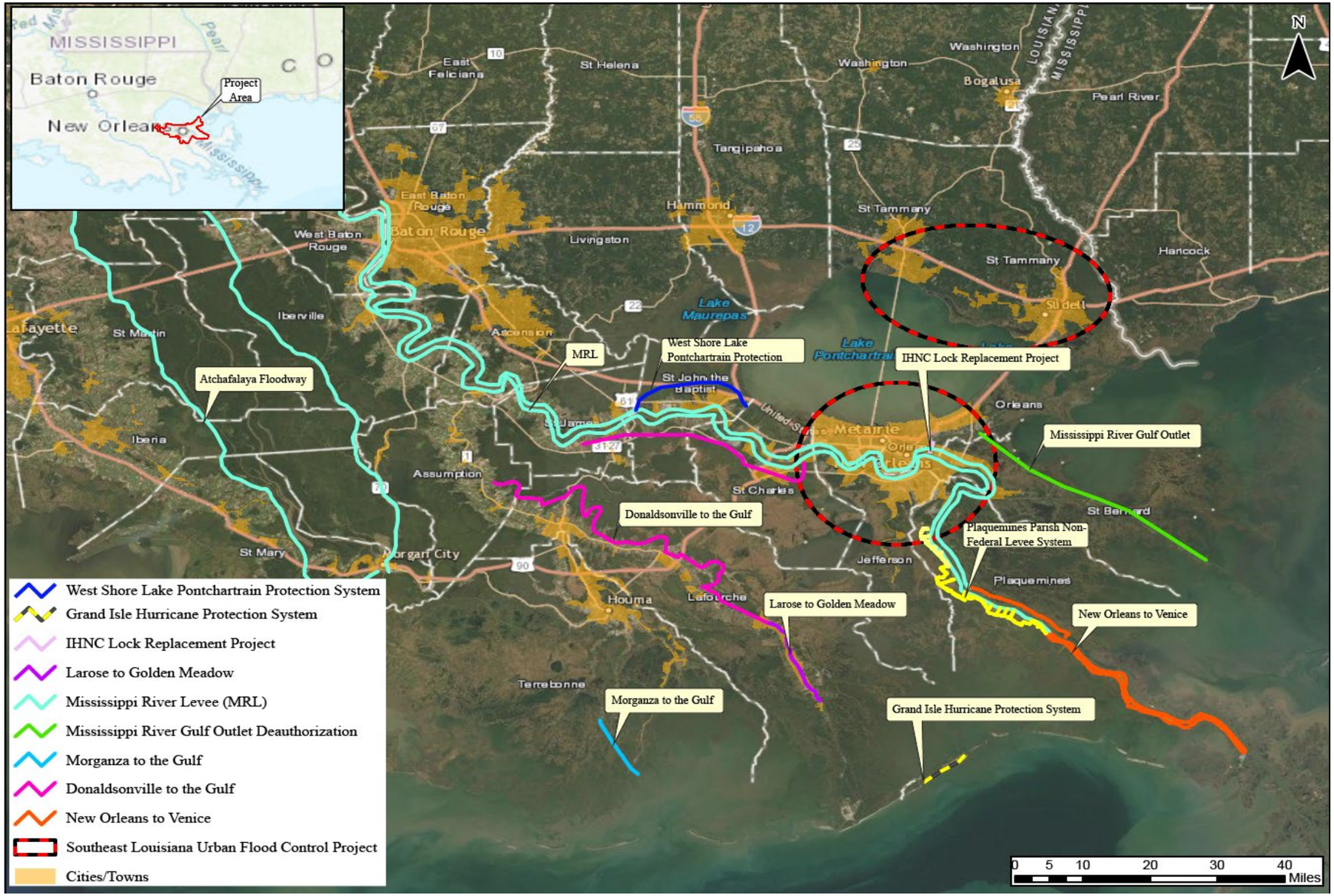

Figure ES-11: Major Flood Risk Reduction Projects in Louisiana

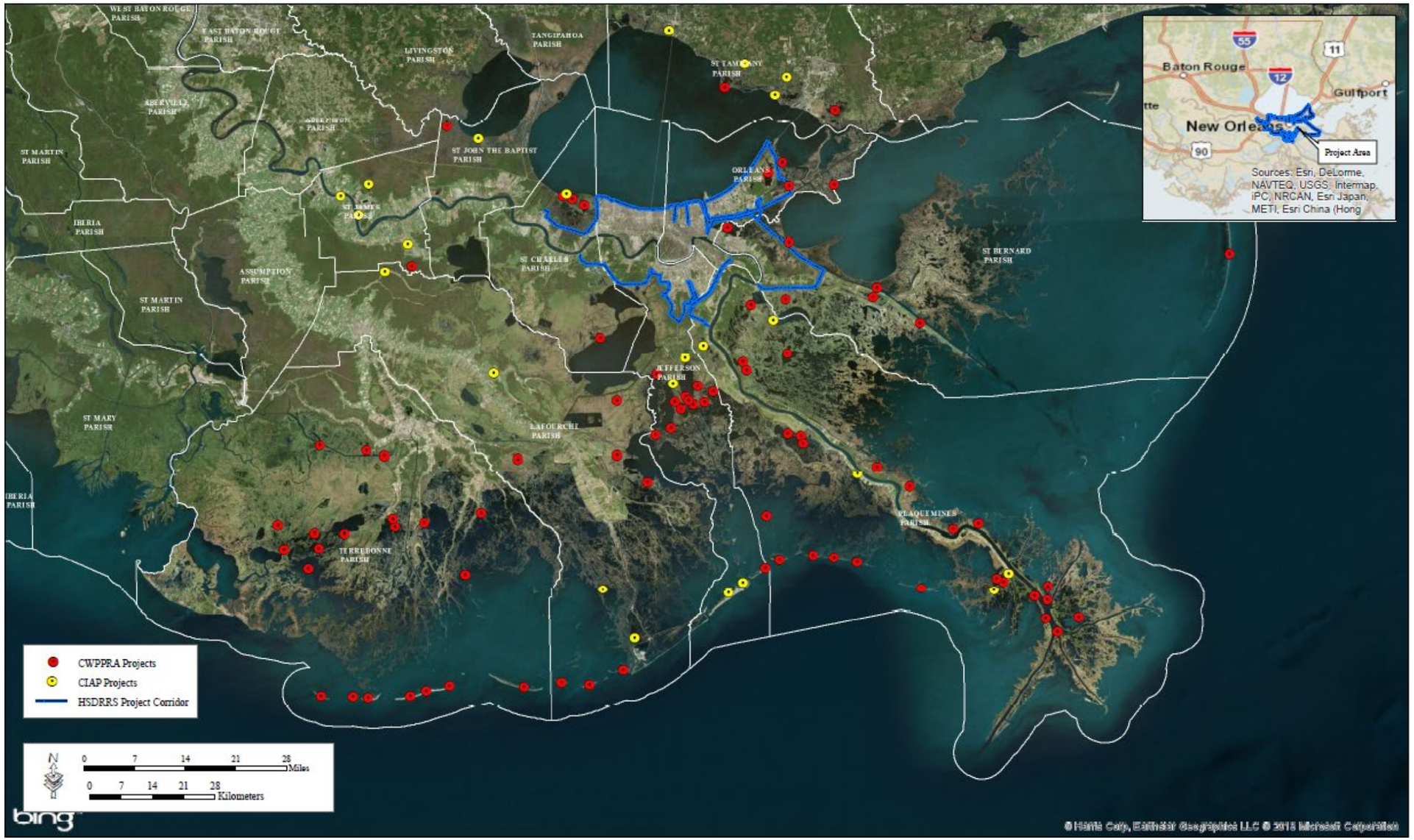

Figure ES-12: Major Coastal Restoration and Protection Projects in Louisiana

PROJECT COMPENSATORY MITIGATION

The goal of HSDRRS compensatory mitigation is to compensate for unavoidable losses of wetlands and bottomland hardwood forests (BLH) incurred during construction of the LPV and WBV HSDRRS in accordance with relevant laws and policies. The compensatory mitigation plan replaces the lost functions and services of the impacted habitats through restoration or enhancement activities designed to create/increase/improve the habitat functions and services at specific mitigation sites. Impacts to a National Wildlife Refuge (NWR) are mitigated in kind on the refuge impacted as per the Department of Interior (DOI) Policy (FR Vol. 64, No. 175, 10 Sep 1999). Impacts to JLNHPP are mitigated in kind on the JLNHPP as per the National Park Service (NPS) Director's Order 77-1 requiring impacts occurring on a National Park to be mitigated "on lands managed by the NPS, with the following recommended priority order: 1) within the same wetland system as the impacted wetland; 2) within the same watershed; or 3) in another watershed within the same NPS unit." Additionally, all unavoidable adverse impacts to the Bayou aux Carpes CWA Section 404(c) area were mitigated within that area and/or on the JLNHPP.

Although the compensatory mitigation effort may not be at the site of the actual impact, consistent with Section 2036 of WRDA 2007, mitigation occurred within the same watershed, to the maximum extent practicable. Under the Compensatory Mitigation Program, impacts to wetlands and BLH from the LPV HSDRRS features are mitigated within the Lake Pontchartrain Basin and the impacts from the WBV HSDRRS features are mitigated in the Barataria Basin, between Bayou Lafourche and the Mississippi River.

The CEMVN described and evaluated its proposed mitigation plan to address the mitigation requirements and compensate for unavoidable habitat losses caused by the construction of the LPV and WBV HSDRRS in Programmatic Individual Environmental Reports (PIERs #36 and #37). The LPV Programmatic Mitigation IER (PIER #36) was finalized with a signed Decision Record November 22, 2013 and the WBV Programmatic Mitigation IER (PIER #37) was finalized with a signed Decision Record June 13, 2014. These documents assessed mitigation plans that include both programmatic and constructible features. The constructible features, which consisted of the purchase of mitigation bank credits, were implemented as soon as the mitigation plans were approved. The programmatic features consisted of Corps-constructed projects that required further evaluation and agency coordination. NEPA documents tiering off these programmatic documents evaluated the proposed Corps-constructed mitigation features and documented agency coordination. In total there were 8 NEPA documents for both the LPV and WBV that assessed the mitigation projects.

Early in the 100-year HSDRRS planning process, CEMVN estimated that up to 4,000 acres of unavoidable impacts could occur to wetland and bottomland hardwood habitat for which compensatory mitigation would be required. As the engineering and design progressed and measures to avoid and minimize impacts were incorporated, the acres

impacted significantly decreased to approximately 1,800.44 total acres (938.63 average annual habitat units (AAHUs)) for all habitat types.

Impacts generated from construction of the LPV HSDRRS are being mitigated within the Lake Pontchartrain Basin and within the Louisiana coastal zone (excluding the barrier islands). Impacts generated from construction of the WBV HSDRRS are being mitigated in the Barataria Basin limited by the intermediate/brackish marsh interface.

LPV MITIGATION PLAN

As stated in the PIER 36 document, mitigation measures that could be implemented immediately were the purchase of mitigation bank credits to fully mitigate for swamp and BLH-wet impacts. Table 1 shows the impacts by habitat type and indicates whether the impacts occurred on the flood side or protected side of the levee. LPV programmatic features assessed in the PIER and further refined and assessed in subsequent NEPA supplements include:

Table ES-1: LPV Mitigation Plan

Habitat Type	AAHU Impacted	Mitigation Project	Status
Non-Refuge BM	118.06	Bayou Sauvage FS BM & New Zydeco Ridge – marsh component	Constructed 6/20. Draft monitoring plan 2/21
Refuge BM	8.79		Constructed 4/20
Refuge IM	41.29	Turtle Bayou PS IM	Constructed 8/19. Draft monitoring plan 2/21
Refuge PS BLH-wet	83.29	New Zydeco Ridge BLH-wet	Constructed 4/20. Draft monitoring plan 8/21
Refuge FS BLH-wet	8.91		

BM = Brackish Marsh; IM = intermediate marsh; BLH = bottomland hardwoods; PS = protected side; FS = flood side

WBV MITIGATION PLAN

Under the WBV mitigation plan, 11.6 mitigation bank credits to satisfy the mitigation obligation of 7.3 AAHUs of protected side BLH-wet/dry impacts were purchased in the WBV basin. Table 2 shows the impacts by habitat type and whether the impacts occurred on the flood side or protected side of the levee. (Note that the initial Lake Boeuf Restoration projects proposed in the PIER #37 and SPIER 37a were determined to not be constructible and were therefore replaced by a project at Highway 307 assessed in SEA #572.) Programmatic features assessed in the PIER and further refined and assessed in subsequent NEPA supplements include:

Table ES-2: WBV HSDRRS Mitigation Plan

Habitat Type	AAHU	Mitigation Project	Project Acres	Status
General PS BLH-Dry enhancement	193	Avondale Gardens	920	Constructed 11/2019. Final monitoring plan 11/19
General FS BLH-wet	72.04	Highway 307	133	Construction underway 3/21
General FS Swamp	134.52		287	Construction underway 3/21
General FS Fresh Marsh	65.92	JELA General FM JL1B5 & JL15 Park BLH-wet JL14A Park swamp JL7 Park FM JL1B4	138	Constructed 11/19. Draft monitoring plan 5/20
Park/404(c) FS BLH-wet (Hwy 45)	3.12		12.16	Constructed. Draft monitoring plan 10/19
Park/404(c) FS Swamp (Milaudon)	71.9		20.44	Construction 2016. Draft monitoring plan 9/20
Park/404(c) FS Fresh Marsh	3.03		20.40	Constructed. Draft monitoring plan 5/20

COORDINATON AND CONSULTATION

With the very large five-parish 100-year HSDRRS project area came the necessity to have substantial public awareness, agency and public coordination and cooperation. Coordination and consultation with local, State and Federal agencies was conducted in accordance with applicable laws and regulations and the commitments made as part of the NEPA Alternative Arrangements and announced in the Federal Register.

Public Involvement

The public involvement process began on March 13, 2007, when the USACE published the NEPA Alternative Arrangements in the Federal Register. Public involvement continued and was actively sought during the preparation of the IERs and the CED Phase I using newspaper advertisements, websites, mailing lists, and news releases. Scoping for the HSDRRS and the NEPA Alternative Arrangements process was initiated through the placement of advertisements and public notices in the *USA Today* and the New Orleans *Times-Picayune* newspapers. Nine public scoping meetings were held throughout the project area between March and April 2007. A public scoping meeting for the CED was held on September 2, 2009. A summary of the scoping meetings, comments received, and responses is in Appendix E. The public was engaged throughout the HSDRRS planning process, including 200 public meetings, scoping meetings, and workshops.

HSDRRS and Alternative Arrangement information was made readily available to the public through the creation of a website, www.nolaenvironmental.gov, dedicated to providing the public a “one-stop-shop” location to find information regarding HSDRRS public notices, meetings, calendar of events and NEPA documents. The website was used as a repository for environmental reports, coordination/compliance documents, and design information, as well as information regarding other flood risk reduction

projects in southeast Louisiana. The website has since been closed; however, the information regarding the HSDRRS efforts remains available to the public at https://www.mvn.usace.army.mil/Missions/HSDRRS/ . Environmental reports are available at https://www.mvn.usace.army.mil/HSDRRS-Projects/.

Since March 2007, the CEMVN hosted approximately 200 monthly public meetings at locations throughout the GNO metropolitan area. The CEMVN released public notices in local and national newspapers, news releases, emails, and mail notifications to stakeholders prior to each public meeting. The public was able to provide oral comments during the meetings or provide written comments in person, by mail and via the public website. A 30-day public comment period followed each meeting in which the public was provided the opportunity to provide input. In addition, comments were accepted anytime during the IER process. Each draft IER was posted to the www.nolaenvironmental.gov website (now discontinued) for a 30-day public review period. The documents may now be found on the https://www.mvn.usace.army.mil/Environmental/NEPA/ website.

Agency Coordination

Each IER and supplemental IER was coordinated with appropriate congressional, Federal, state, and local agencies, as well as non-governmental agencies and other interested parties. An interagency team was established for each IER in which Federal and State agency staff played an integral role in the project planning and alternative analysis phases of the projects.

Monthly meetings with resource agencies were held to discuss specific project details as well as determine the potential for direct and indirect impacts of the proposed actions. Table 3 lists the coordinating agencies. These agencies, as well as other interested parties, are receiving copies of this draft CED.

Table ES-3: Agency Coordination and Consultation

Federal	State	Local
Federal Emergency Management Agency	Coastal Protection and Restoration Authority of Louisiana	Jefferson Parish
Natural Resources Conservation Service	Department of Cultural, Recreation, and Tourism	Orleans Parish
National Park Service	Department of Environmental Quality	Orleans Levee District
National Oceanic and Atmospheric Administration (NOAA)	Department of Health	Plaquemines Parish
NOAA National Marine Fisheries Service	Department of Natural Resources (DNR)	Port of New Orleans
U.S. Coast Guard	Department of Transportation and Development	St. Bernard Parish

U.S. Environmental Protection Agency	Department of Wildlife and Fisheries	St. Charles Parish
U.S. Fish and Wildlife Service (USFWS)	Governor's Executive Assistant for Coastal Activities	Office of the Mayor of New Orleans
Federal Highways Administration	State Historic Preservation Officer	New Orleans Sewerage and Water Board
U.S. Geological Survey	Offices of members of the La. Congressional Delegation	

In addition, Native American Tribal Nations were brought into the coordination and public involvement effort.

Formal coordination began with the USFWS early in 2007. The Service provided a programmatic Coordination Act Report (CAR) in early 2008 (Appendix Q). The programmatic CAR contains specific recommendations for minimizing adverse impacts on the natural environment from the 100-year HSDRRS construction. The CEMVN utilized these recommendations when designing and/or constructing the HSDRRS features, to the greatest extent practicable. In addition to the programmatic CAR for the system-wide HSDRRS effort, the Service provided a CAR with project-specific recommendations for each IER and IER supplemental document.

Relevant Laws and Regulations

The USACE complied with all applicable Federal, State and Local laws in its planning and construction of the HSDRRS including the Clean Water Act, Clean Air Act, Coastal Zone Management Act, Fish and Wildlife Coordination Act, Endangered Species Act, and National Historic Preservation Act to name just a few.

SUMMARY OF HSDRRS IMPACTS AND CONCLUSION

The summary of impacts is for all 100-year HSDRRS work covered by the IERs and by any EAs completed after the end of Alternative Arrangements. The impacts assessed for borrow is limited to borrow sites excavated up to October 2015.

HSDRRS Construction Impacts[2]

The majority of the impacts resulting from construction of the 100-year HSDRRS are considered negligible for most resources; approximately 25% are considered minor and 25% are considered moderate. Moderate impacts to water quality, wetlands, and transportation occurred in most sub-basins. Table 4 summarizes the intensity of the

[2] In USACE's NEPA evaluations of HSDRRS features, the intensity of impacts is classified as negligible, minor, moderate, or major.

permanent adverse impacts of the 100-year HSDRRS actions by sub-basin. Table 5 summarizes the intensity of permanent impacts resulting from HSDRRS borrow excavation, processing, transportation and staging prior to October 2015, by parish/county, for those borrow sites located outside the 100-year HSDRRS project area. The majority of the impacts related to borrow were negligible for most resources and most parishes. There were some minor impacts to soils, BLH and wildlife. There were moderate impacts to transportation for most of the parishes.

The construction of the 100-year HSDRRS had short-term impacts on both the human and natural environment in the project area. On a local scale or for individuals near construction sites, many of the temporary short-term and localized impacts, such as noise emissions, impacts on recreation resources and aesthetics, and air emissions (e.g., fugitive dust), were major. However, on a sub-basin, parish and regional basis, these impacts were temporary and short term, only occurring during the length of the construction period, and negligible or minor in intensity.

For some resources, where the construction activities altered the physical condition of relatively undisturbed areas, the impacts were of greater intensity and were permanent. To reduce these impacts, mitigation measures were implemented to the greatest extent possible. Since the HSDRRS was predominantly constructed within a highly urbanized environment, it did not directly impact significant resources beyond the physical boundaries of the constructed features and the excavated borrow sites.

Most resources analyzed in the IERs and the CED were impacted during active construction, and most impacts were either temporary or short term, and limited to the length of the period of construction. In general, most of the impacted resources have returned or will return to pre-construction conditions or nearly so now that a majority of the work is complete. Some armoring is still occurring and impacts are ongoing until work is concluded.

Table ES-4: Intensity of the HSDRRS Permanent Adverse Impacts by Sub-Basin

Resource	Negligible Impacts									Minor Impacts									Moderate Impacts									Major Impacts								
	St. Charles	Jefferson East	Orleans East	New Orleans East	Chalmette Loop	Belle Chasse	Gretna-Algiers	Harvey Westwego	Lake Catoouatche	St. Charles	Jefferson East	Orleans East	New Orleans East	Chalmette Loop	Belle Chasse	Gretna-Algiers	Harvey Westwego	Lake Catoouatche	St. Charles	Jefferson East	Orleans East	New Orleans East	Chalmette Loop	Belle Chasse	Gretna-Algiers	Harvey Westwego	Lake Catoouatche	St. Charles	Jefferson East	Orleans East	New Orleans East	Chalmette Loop	Belle Chasse	Gretna-Algiers	Harvey Westwego	Lake Catoouatche
Soils		X	X				X	X		X			X	X	X			X																	
Water Quality			X								X								X			X	X	X	X	X	X								
Wetlands			X																X	X		X	X	X	X	X	X								
Uplands; BLH-dry	X	X	X					X					X	X	X	X		X																	
Fisheries		X					X	X		X		X		X	X	X	X	X		X		X													
Wildlife		X		X						X		X			X	X	X	X					X											
EFH	X	X				X	X	X	X			X		X								X													
T&E Species	X	X	X	X	X	X	X	X	X																										
Cultural	X	X	X	X	X	X	X	X	X																										
Recreational	X				X	X	X				X	X	X				X	X																	
Aesthetics										X	X		X	X	X		X				X				X		X								
Air Quality	X	X	X	X	X	X	X	X	X																										
Noise	X	X	X	X	X	X	X	X	X																										
Transportation																			X	X	X	X	X	X	X	X	X								
Socioeconomic	X	X	X	X	X	X	X	X	X																										
HTRW	X	X	X	X	X	X	X	X	X																										

Table ES-5: Intensity of the HSDRRS Construction Permanent Adverse Impacts outside the HSDRRS Project Area (Borrow Sites)1

Resource	Negligible Impacts											Minor Impacts										Moderate Impacts										Major Impacts									
	Ascension	East Baton Rouge	Iberville	Lafourche	Plaquemines	St. Bernard	St. Charles	St. James	St. John the Baptist	St. Tammany	Hancock	Ascension	East Baton Rouge	Iberville	Lafourche	Plaquemines	St. Bernard	St. Charles	St. James	St. John the Baptist	St. Tammany	Hancock	Ascension	East Baton Rouge	Iberville	Lafourche	Plaquemines	St. Bernard	St. Charles	St. James	St. John the Baptist	St. Tammany	Hancock	Ascension	East Baton Rouge	Iberville	Lafourche	Plaquemines	St. Bernard	St. Charles	St. James	St. John the Baptist	St. Tammany	Hancock
Soils	X	X		X			X							X		X	X		X	X	X	X																			
Water Quality	X	X	X	X	X	X	X	X	X		X										X																				
Wetlands	X	X	X	X	X	X	X	X	X	X	X																														
Uplands/BLH-dry	X	X	X	X												X	X	X	X	X	X	X																			
Fisheries	X	X	X	X	X	X	X	X	X	X	X																														
Wildlife	X	X	X	X		X	X		X	X						X			X			X																			
EFH	X	X	X	X	X	X	X	X	X	X	X																														
T&E Species	X	X	X	X	X	X	X	X	X	X	X																														
Cultural	X	X	X	X	X	X	X	X	X	X	X																														
Recreational	X	X	X	X	X	X	X	X	X	X	X																														
Aesthetics	X	X	X	X	X	X	X	X	X	X	X																														
Air Quality	X	X	X	X	X	X	X	X	X	X	X																														
Noise	X	X	X	X	X	X	X	X	X	X	X																														
Transportation	X	X	X	X																							X	X	X	X	X	X	X									
Socioeconomic	X	X	X	X	X	X	X	X	X	X	X																														
HTRW	X	X	X	X	X	X	X	X	X	X	X																														

Table 6 summarizes the intensity of the impacts from construction of all HSDRRS features.

Table ES-6: Intensity of the Cumulative Adverse Impacts of HSDRRS Construction

Resource	Negligible Impacts	Minor Impacts	Moderate Impacts	Major Impacts
Soils		X		
Water Quality			X	
Wetlands			X	
Uplands			X	
Fisheries		X		
EFH		X		
Wildlife Resources		X		
Threatened and Endangered Species	X			
Cultural Resources	X			
Recreational Resources	X			
Aesthetics		X		
Air Quality	X			
Noise	X			
Transportation			X	
Socioeconomics and Environmental Justice	X			
HTRW	X			

Cumulative Impacts of Regional Actions

Cumulative impacts were described in detail in Section 4, and as anticipated, the 100-year HSDRRS has contributed and will continue to contribute to cumulative impacts in the GNO metropolitan area and in southeastern Louisiana. Table 7 provides a summary of the intensity of cumulative impacts of 100-year HSDRRS and other regional actions. There are major impacts to soils and wetlands; moderate impacts to water quality, uplands, wildlife, essential fish habitat and transportation. There are minor and negligible impacts to the other relevant resources.

Table ES-7: Intensity of the Cumulative Adverse Impacts of HSDRRS and Other Regional Actions on Relevant Resources

Resource	Negligible Impacts	Minor Impacts	Moderate Impacts	Major Impacts
Soils				X
Water Quality			X	
Wetlands				X
Uplands			X	
Fisheries		X		
Wildlife Resources			X	
EFH			X	
Threatened and Endangered Species	X			
Cultural Resources		X		
Recreational Resources	X			
Aesthetics	X			
Air Quality	X			
Noise	X			
Transportation			X	
Socioeconomics and Environmental Justice	X			
HTRW	X			

Other ongoing and proposed projects in southeast Louisiana may provide cumulative benefits. For example, projects such as Coastal Wetlands Planning Protection and Restoration Act projects, and other coastal and wetland restoration projects, including 100-year HSDRRS wetlands mitigation activities, would provide long-term benefits to wildlife, fisheries, and sustainability of wetlands regionally.

CONCLUSION

The devastation to the GNO metropolitan area and the Gulf coast from Hurricanes Katrina and Rita counts as one of the most expensive natural disasters in U.S. history. The 100-year HSDRRS provides the level of risk reduction necessary for public confidence to live and work in the GNO metropolitan area and has encouraged rebuilding and reconstruction in storm and flood damaged areas.

Adverse impacts on southeast Louisiana from the 2005 hurricane season were great, and discussion of economic losses and social disruption does not fully capture the changes to the local communities as a result. Southeast Louisiana suffered terrible losses but has mostly recovered from the devastation experienced in 2005. Since the

start of the 100-year HSDRRS construction, the CEMVN engaged the public through hundreds of meetings regarding the design of the 100-year level of risk reduction project components. To the extent practicable, CEMVN minimized impacts on residents, businesses, transportation, and sensitive biological resources during design and implementation. CEMVN regularly provided the public with updates on construction progress. The CEMVN described the project actions in various IERs and in the CED and evaluated impacts on the natural and human environment. Through the planning, design, and construction phases, the CEMVN developed mitigation processes to avoid, minimize and compensate for short-term and permanent impacts on the human and natural environment, such as systematic avoidance of wetlands at borrow sites, requiring mitigation bank credit purchase for non-jurisdictional BLH impacts at contractor-furnished borrow sites, and implementing a Mitigation Program to address wetland and BLH compensatory mitigation needs. Further, because more borrow sites were evaluated in the IERs than were used for the excavation of borrow material, impacts on soils (including prime farmland soils), BLH-dry, and transportation were less than originally described. For other resources, such as air quality and noise, the longer construction period beyond the anticipated 2011 date increased the duration of these impacts; however, given their temporary nature, those impacts were determined to be negligible or minor. Throughout this process, the CEMVN has sought to provide the level of risk reduction desired by the community and minimized permanent losses of relevant resources that are valued in the region and throughout the U.S.