



Amite River and Tributaries East of the Mississippi River, Louisiana



Draft Final Integrated Feasibility Report with Environmental Assessment #600

March 2025

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Cover Page

Amite River and Tributaries, East of the Mississippi River, Louisiana
Final Integrated Feasibility Report and Environmental Assessment #600

Counties/Parishes: Amite, Lincoln, Franklin, and Wilkinson Counties, Mississippi; East Feliciana, St. Helena, East Baton Rouge, Livingston, Iberville, St. James, St. John the Baptist, and Ascension Parishes, Louisiana

Lead Agency: U.S. Army Corps of Engineers, New Orleans District

Cooperating Agencies: U.S. Fish and Wildlife Service; U.S. Environmental Protection Agency; U.S. Geological Survey; U.S. Department of Agriculture-National Resource Conservation Agency

Abstract: The Amite River and Tributaries (ART), East of the Mississippi River, Louisiana Feasibility Study (study) for flood damage reduction is authorized by the Resolution of the Committee on Public Works of the United States Senate, adopted on April 14, 1967. The study was funded by the Bipartisan Budget Act of 2018 (P.L. 115-123), Division B, Subdivision 1, Title IV. The study area includes portions of Amite, Lincoln, Franklin, and Wilkinson Counties in Mississippi, as well as East Feliciana, St. Helena, East Baton Rouge, Livingston, Iberville, St. James, St. John the Baptist, and Ascension Parishes in Louisiana. The Final Integrated Feasibility Report and Environmental Assessment #600 contains, among other things, sections on plan formulation, analysis of potential environmental impacts and consequences, alternatives analysis, mitigation, and a description of the Recommended Plan (RP). The RP includes nonstructural (NS) flood risk management solutions consisting of the elevation of 1,810 residential structures and the dry or wet floodproofing of 241 nonresidential structures in the project area, for a combined total of 2,051 structures that are preliminarily eligible for participation in the RP. The RP will produce an estimated \$17.0 million in equivalent annual net benefits, has a benefit-to-cost ratio of 1.42, and is consistent with United States Army Corps of Engineers (USACE) policies, laws, and regulations. The RP will decrease equivalent annual damages from \$201,353,000 (without project condition) to \$143,318,000 under the “with project” condition (October 2024 Price Level; FY25 Federal discount rate).

For further Information, please visit the study website at: <https://www.mvn.usace.army.mil/Amite-River-and-Tributaries/> or contact:

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Executive Summary

The United States Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (CEMVN), Regional Planning and Environment Division South (RPEDS), prepared this Final Integrated Feasibility Report and Environmental Assessment #600 (FIFR-EA). The FIFR-EA reflects the collaboration of the Non-Federal Sponsor (NFS), cooperating agencies, stakeholders, and members of the public. The Recommended Plan (RP) is supported by the NFS.

The purpose of the Amite River and Tributaries, East of the Mississippi River, Louisiana, Feasibility Study (study) is to investigate Flood Risk Management (FRM) solutions to reduce flood damages caused by rainfall in the Amite River Basin (ARB). The non-Federal sponsor (NFS) is the State of Louisiana, acting by and through, the Louisiana Department of Transportation and Development (LADOTD). A Feasibility Cost Share Agreement was executed between the Department of the Army and the NFS on October 3, 2018. The study is authorized by the Resolution of the Committee on Public Works of the United States Senate, adopted on April 14, 1967. The study is funded through the Bipartisan Budget Act of 2018 (BBA-18) (P.L. 115-123), Division B, Subdivision 1, Title IV, and is 100 percent federally funded.

Draft Integrated Feasibility Report and Environmental Assessment (DIFR/EA)

The USACE conducted concurrent review of the DIFR/EA, including public, technical, legal, and policy reviews, as well as Independent External Peer Review (IEPR) upon its public release on November 26, 2019. The Tentatively Selected Plan (TSP) of the 2019 DIFR/EA was an estimated \$2.3 billion-dollar new large-scale dry dam with a NS component to address residual risk over a 2200 mi² study area. During review, the TSP was identified to have extensive technical and policy concerns, which found the dam was constrained by site conditions that made it infeasible as designed and potentially increased life safety risk. The 2020 Battelle IEPR report is located on the USACE Amite project website. <https://www.mvn.usace.army.mil/Amite-River-and-Tributaries/>

Supplemental Second Draft Integrated Feasibility Report and Environmental Assessment (SSDIFR-EA)

Due to the size of the study area, differing stakeholder viewpoints, compliance with Engineering Regulations (ERs) and the complexities of addressing the other social effects (OSE) account, additional resources were approved by the Assistant Secretary of the Army for Civil Works ASA(CW) in November 2022 to complete the complex feasibility study. Impact assessments have been removed in accordance with Executive Order (EO) 14173, EO 14148, and EO 14151, which revoked EO 12898, EO 14008, and EO 14096. An additional \$1.91 million (M) and 20 months, to the original \$3M and 136 months, was allocated to complete critical tasks to inform the decision on the TSP and subsequent Recommended Plan (RP). The SSDIFR-EA was publicly released on December 15, 2023, with a TSP that included 3,298 nonstructural residential elevations and floodproofing of

nonresidential structures that were preliminarily eligible for participation. USACE conducted concurrent reviews of the SSDIFR-EA, including public, technical, legal, and policy reviews. After review of the comments received, additional analysis was conducted on the NS final array of alternatives. The additional analysis was conducted during feasibility level design activities that included refinement of the hydraulic and hydrology (H&H) models, structural inventory, elevation and dry floodproofing designs and project costs. As a result of this analysis, the final array of alternatives number of preliminary eligible structures was modified for the RP (Figure ES-1).

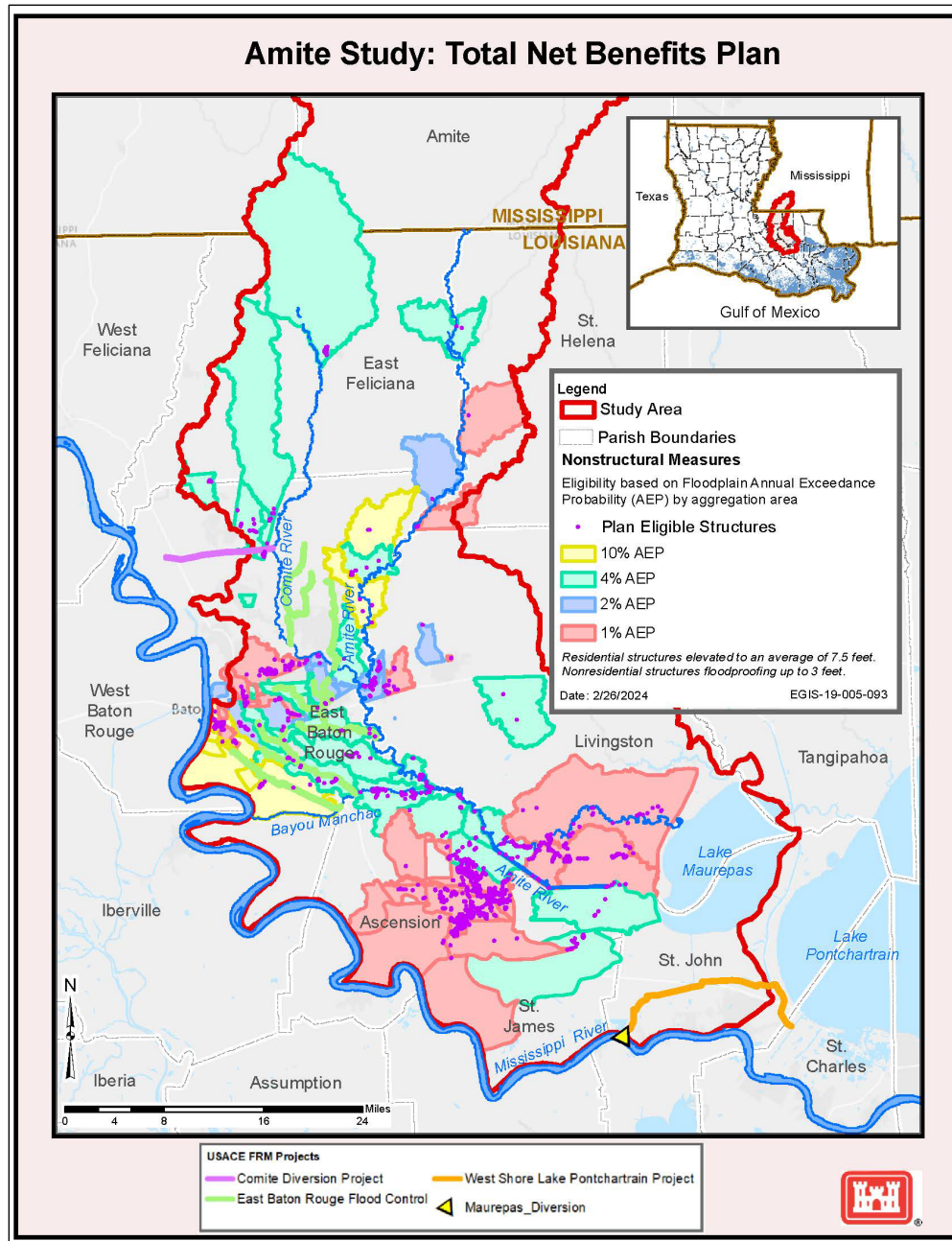


Figure ES-1. Recommended Plan (Total Net Benefits Plan)

Purpose and Need - The primary problem identified in the study area is the risk of flood damages from the Amite River and its tributaries to human life and flood damages to residential and nonresidential structures. Critical infrastructure throughout the region is also at risk of flood damages, including the I-10 and I-12 transportation corridors, government facilities, and schools. The ARB primarily has flooding from two different sources. The upper basin flooding is caused from headwater flooding from rainfall events. The lower basin flooding is caused by a combination of drainage from headwaters and backwater flooding from tides, wind setup as well as flooding from storm surge events.

Plan Formulation - The USACE's planning process was followed, which included identifying problems and opportunities, inventorying and forecasting conditions, identifying measures, creating alternatives, continually reevaluating the management measures within the alternatives, and screening measures through the selection of the Final Array of Alternatives, the TSP, and then the RP.

Most alternatives assessed had very little reduction in flood risk and thus limited benefits. Events less frequent than the 0.04 annual exceedance probability (AEP) events (0.04 AEP up) cause the majority of flooding in the ARB. The rainfall events, combined with a steep hydraulic gradient from the headlands of the basin to the flat middle and lower basins, provide for a significant backwater effect at the lower end of the system at Lake Maurepas. Once the water accumulates and backs up, it can no longer exit the basin, and the basin begins to fill. This unique hydrology was evaluated with numerous measures and alternatives that resulted in primarily shifting water from one place to another within the damage areas while not reducing the backwater effect and thus not allowing water to drain from the basin. The parishes in the study area have a combined population of about 900,000 with more than half of the population living in East Baton Rouge Parish. The study area has over 260,000 structures and of those, about 80 percent are in the central portion of the ARB north of Bayou Manchac. Many of the alternatives, such as channel improvements and diversions, were located where there were few structures, so there were limited benefits. The remaining structural alternatives that were not screened were those that provided storage of water to attenuate flooding downstream in heavily developed areas. Those structural alternatives were included in the focused array of alternatives but were later screened from further consideration and only NS plans remained.

The final array of alternatives consisted of four alternatives. The initial being the no action alternative and the first developed plan identified was the NED Plan using a new USACE method of logical aggregation. A comprehensive assessment of the four accounts was used to identify the Total Net Benefits Plan. Two additional plans were identified to increase benefits in the OSE account, which is one of the four accounts USACE uses to identify benefits of plans in accordance with the ER 1105-2-103 Section 2-4. The OSE account includes impacts to overarching social themes including social vulnerability & resiliency, health & safety, economic vitality, social connectedness, and participation.. The resulting plans, since they include some socially vulnerable aggregations, are the Federal Plans and not Locally Preferred Plans.

FINAL ARRAY OF ALTERNATIVES

Plan 1: No action would be taken under this plan. Damages would continue into the future.

Plan 2: NED Plan- Floodproofing or elevation of 1,743 structures located in the 0.1 (8 aggregates), 0.04 (25 aggregates), 0.02 (4 aggregates), or 0.01 (11 aggregates) AEP floodplains. The plan has been optimized for net benefits at the sub-reach level unless the Socially Vulnerable (SV) sub-reaches are negatively impacted, in which case parent reach optimization is carried forward. Plan 2 would include floodproofing of 189 nonresidential structures and the elevation of 1,554 residential structures to the future year (2078) 0.01 AEP Base Flood Elevation (BFE).

Plan 3: NED Plan + OSE Increment 1- Floodproofing or elevation of 1,971 structures located in the 0.1 (5 aggregates), 0.04 (23 aggregates), 0.02 (4 aggregates), or 0.01 (16 aggregates) AEP floodplains. At the sub-reach level, the largest floodplain with positive net benefits is selected for SV areas. Otherwise, the plan is equal to the NED Plan (Plan 2). Plan 3 would include the floodproofing of 216 nonresidential structures and elevation of 1,755 residential structures to the future year 0.01 AEP BFE.

Plan 4: NED Plan + OSE Increment 2- Floodproofing or elevation of 2,051 structures located in the 0.1 (5 aggregates), 0.04 (25 aggregates) 0.02 (7 aggregates), or 0.01 (20 aggregates) AEP floodplains. This plan is an alteration of Plan 3 by raising all SV sub-reaches to the next highest floodplain aggregation. Plan 4 would include floodproofing of 241 nonresidential structures and the elevation of 1,810 residential structures to the future year 0.01 AEP BFE.

PLAN EVALUATION, COMPARISON AND SELECTION

Throughout the planning process, each alternative was evaluated to determine its effects, benefits, costs, and impacts, and existing data was used to model the physical, economic, and environmental conditions, along with measuring how well each alternative performed in meeting the study objectives and avoiding the study constraints. Each alternative and measures within the alternatives were compared to the No Action Alternative.

The final array of alternatives were evaluated across multiple benefit and impact categories, which included economic (national and regional), environmental (national and regional), and social considerations, which were captured under the following accounts: National Economic Development (NED), Regional Economic Development (RED), Other Social Effects (OSE), and Environmental Quality (EQ). The decisions on the selection of the TSP and RP were informed by, among other things, H&H modeling, USACE cost estimates, engineering, environmental impacts, risk assessments, and economic modeling (Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA)).

Recommended Plan - CEMVN received a policy exception on August 23, 2024, from the ASA(CW) for the following USACE Policy: ER 1105-2-103 2-4.f(5)(d) which states: "For projects requiring Congressional authorization or that are authorized subject to a determination by the Secretary, the process continues at the division and headquarters levels through subsequent reviews and approval. The final agency decision maker for these

projects is the Secretary through the ASA(CW). If the district recommends a plan other than the NED plan, or NER for aquatic ecosystem restoration, an exception request must be prepared and submitted to the ASA(CW) for approval.”

The policy exception approved the Total Net Benefits Plan, which is Plan 4. The NS Plan has additive for OSE for positive and negative economic benefits where eligibility is expanded to include all structures within SV sub aggregates at the next highest floodplain aggregation even if the sub aggregation did not have positive net benefits. While the addition of 308 preliminarily eligible structures for elevation and floodproofing is not economically justified based on NED benefits, these measures provide other social effects benefits, and more specifically, flood risk management benefits to socially vulnerable communities that justify the Federal participation in implementation. The communities were focused on due to the feedback provided during the 2019 DIFR/EIS public, technical, legal, and policy reviews. The FRM Recommended Plan invests in and supports sustainable and resilient communities by incorporating the needs and considerations of all at risk communities that have been impacted by past flooding events. Plan 4 includes floodproofing of 241 nonresidential structures and the elevation of 1,810 residential structures located in the 0.1(5 aggregates), 0.04 (25 aggregates), 0.02 (7 aggregates) floodplain, or 0.01 (20 aggregates) AEP floodplains, for a combined total of 2,051 structures that are preliminary eligible for participation.

- Elevation of residential structures to predicted 2078, 0.01 AEP BFE to a maximum of 13 feet above ground level.
- Dry Floodproofing of nonresidential structures for flood depths not greater than 3 feet above the adjacent ground.
- Wet floodproofing of nonresidential structures for flood depths greater than 3 feet above the adjacent ground or where dry floodproofing has been determined to be impractical.

The RP would reduce, but not eliminate, future flood risk damages and residual risk would remain in the study area. The RP would accrue annualized damage reductions of \$58.0 million, approximately 30 percent of the without project damages. Eligible structures must have a permanent foundation and be permanently immobilized and affixed or anchored to the ground, as required by applicable law, and must be legally classified as immoveable real property under state law. Notwithstanding the provisions of La. R.S. 9:1149.6, a manufactured, modular, or mobile homeowner and any subsequent owner of an immobilized manufactured, modular, or mobile home, may not de-immobilize the manufactured, modular, or mobile home in the future, by detachment, removal, act of de-immobilization, or any other method. Manufactured, modular, and mobile homes that do not meet these requirements are not eligible for elevation. This criterion only applies to residential uses of manufactured, modular, and mobile homes.

USACE decision documents recognize cost risk and uncertainty surrounding implementation. All cost estimates will carry a degree of uncertainty. The estimated total project first cost for the RP at the 80 percent confidence interval is estimated at \$1,049,321,000 (Table ES-1). This project carries a degree of uncertainty such that if the

main drivers described below are realized, the first cost for the REP could increase to approximately \$1,200,819,000. The Preconstruction, Engineering, and Design (PED) and Supervision and Administration (S&A) components developed are 14 and 8 percent, respectively, of the total estimated RP construction cost. The RP is at 10 percent design maturity, corresponding to a Class 3 level of design effort and resulting in a certified Class 3 cost estimate. The total project first cost (\$1,049,321,000) consists of the base cost (745,804,000) plus contingency (\$303,517,000). Please note the overall project contingency value consist of 40.7 percent (including Real Estate & Cultural Resources); however, the construction based contingency value is 42 percent based on design maturity. The cost contingencies are intended to cover cost, and schedule increases due to the identified project risks and their probability of occurrence.

There are Operations, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) costs for the NFS and the property owners of nonresidential structures which are anticipated to begin in fiscal year 2035 which is 5 years after the first MATOC completion. On a rotating schedule, every 5 years, the NFS will conduct physical inspections, expected to cost approximately \$1,200 per structure, from the street of 10 percent of the structures that have participated in the project, approximately 205 structures, to ensure that the owners, their heirs, and assigns, are following the terms and conditions of the executed agreements. Nonresidential property owners are expected to perform regular maintenance tasks, such as cleaning weep holes, inspecting and replacing deployable system components, and reapplying sealant coatings every 5-10 years, to ensure the effectiveness and longevity of floodproofing measures. It will be essential for the property owner to follow the manufacturer's recommendations and develop a routine maintenance schedule to ensure the floodproofing system remains effective and functional over time. The estimated costs for OMRR&R for the nonresidential property owner includes \$720 for sealing coating reapplication and \$144 for sealing materials every 10 years, to maintain the functionality of the floodproofing system over time.

Table ES-1. Recommended Plan Annual Costs and Benefits Summary (2025 Price Level, FY 25 Discount Rate; \$1000s)

Recommended Plan	Plan 4 (NED+OSE 2)
Construction First Cost	\$1,049,321
Interest During Construction	\$3,884
Total Construction Cost	\$1,053,205
Average Annual Construction Cost	\$40,933
Average Annual Operation & Maintenance Costs	\$65 (sixty-five thousand)
Total Average Annual Costs	\$40,998
Equivalent Annual Benefits	\$58,035
Annual Net Benefits	\$17,037
Benefit-to-Cost Ratio (BCR)	1.42

Significant Resources/Environmental Consequences:

Compliance with all relevant environmental laws and policies has been achieved in accordance with the National Environmental Policy Act (NEPA). Our analysis determined that the RP is not expected to have a significant impact on the natural or human environment, and a Finding of No Significant Impact (FONSI) accompanies this document. Please refer to Section 8 regarding environmental laws and policies.

Table ES-2 summarizes anticipated impacts that would be incurred with implementation of the RP for relevant resources within the study area. Implementation of any of the NS plans would have negligible to no effect on any natural resources since all work is being completed at the immediate site of the property and no clearing of undisturbed habitat would be necessary. Each of the NS plans incrementally minimizes damages to properties as a result of flooding; however, the RP provides the most benefits to SV communities and includes the greatest number of properties benefited. During construction, property occupants may be temporarily displaced or disturbed by the presence of construction crews and noise generated by construction activities. After construction is complete, if a flood event occurs, property owners may not be able to access or leave the property until the flood water recedes. Table ES-2 can also be found in Section 5.3 with a more detailed analysis per resource.

Table ES-2. Relevant Resources Impacts in and near the Study Area

Relevant Resource	No Action	NED Plan	NED Plan + OSE Increment 1	NED Plan + OSE Increment 2
Wetland Resources	-	X	X	X
Upland Resources	-	X	X	X
Aquatic Resources/Fisheries	-	X	X	X
Wildlife	-	X	X	X
Threatened, Endangered, and Protected Species	X	X	X	X
Geology, Soils, and Prime and Unique Farmland	X	X	X	X
Water Quality	-	X	X	X
Air Quality	X	X	X	X
Cultural	X	Potential - and +	Potential - and +	Potential - and +
Recreation	X	Potential -	Potential -	Potential -
Aesthetics	X	Potential -	Potential -	Potential -
Socioeconomic Resources	-	Potential +	Potential +	Potential +
Other Social Effects	-	Potential +	Potential +	Potential +
Greenhouse Gas	Temporary -	Potential +	Potential +	Potential +
HTRW	X	X	X	X

(Table Legend: "+" symbolizes positive impacts, "-" symbolizes negative impacts, and "x" symbolizes no impacts)

IMPLEMENTATION OF THE RECOMMENDED PLAN – Once construction funds are appropriated for this project, the LADOTD, as the NFS, and the Department of the Army will enter into a project partnership agreement (PPA). After the signing of a PPA, the NFS will acquire the necessary land, easements, and rights of way to construct the project. The proposed method of implementation for this project is Design-Build (D-B) delivery, where design and construction are combined in a single contract with a single contractor.

It is anticipated that implementation of the Plan will occur over an approximate 8.5-year period. Following an initial 24-month PED phase, there will be 6.5 years for the elevation of residential and dry/wet floodproofing of nonresidential construction starting off with a small pilot project of 25 to 50 structures followed by soliciting 5 large Multiple Award Task Order Contract (MATOC) contracts with USACE managed contractors constructing approximately 400 structures per MATOC contract. The implementation schedule assumes that each of the 5 USACE managed contractors would floodproof or elevate 80 to 100 structures concurrently per year, thereby completing construction of up to 400 structures per year. This timeframe is highly dependent upon the amount of funding allocated in any given year, the participation rate and environmental conditions, timely approval process of structures receiving NS measures, and expediency of submittal reviews and permit processing during design-build phase.

The project delivery team (PDT) also assumed that it would take a 4-month period of time to complete the elevation or floodproofing on structures with a slab foundation, and a 3-month period of time to complete the elevation or floodproofing of structures with a crawl foundation. If there is a cost associated with the residential structure elevation that is coverable by the program, then that cost would be paid by NFS and/or USACE and not by the property owner. The property owner would not be expected to pay the coverable cost and wait for reimbursement as direct payment to the contractor from USACE is anticipated.

Implementation strategies would be a shared responsibility in coordination with the NFS. The RP implementation strategy would facilitate risk reduction increments that either could be; (1) implemented simultaneously, where the entire project is implemented in an expedited manner or, (2) implemented sequentially, where measures are implemented on a rolling incremental basis. Implementation shall include a risk informed strategy that utilizes best practices to prioritize risk reduction to the most vulnerable areas through the most cost-effective measures. Various RP implementation strategies to identify risk reduction increments were considered:

- Clustering to increase construction effectiveness and efficiency as the main factor in determining which eligible properties should be prioritized.
- Prioritizing structures identified through collaboration of stakeholders, NFS and public input, that are in critical service areas and are community lifelines. Critical service areas or community lifelines refer to indispensable services that enable continuous operation of critical business and government functions in the wake of a disaster event. Critical service areas are essential to human health and safety, economic security, and foster community resilience.

- Clustering based on socially vulnerable communities used the most recent data from the Center for Disease Control and Prevention's (CDC) Socially Vulnerable Index (SVI). Homeowners in socially vulnerable communities or those living at or below the poverty level would be given priority.
- Clustering based on willing property owners that exhibit the highest risk.
- Clustering based on first-come, first-served approach which would help ensure that resources would be used effectively by focusing on properties that have owner support.

It is anticipated the cost share for the design and construction of the project would be 65 percent Federal and 35 percent non-Federal. Final, specific cost share requirements would be identified in the PPA. Among other responsibilities, the NFS must provide all project Lands, Easements, Right of Ways, Relocations, and Disposals (LERRDs) required for the project. The NFS and property owner will be 100 percent responsible for the OMRR&R.. The NFS's obligations for the subject structure will be in perpetuity or until such time as the structure no longer exists or the project is de-authorized by Congress. The property owner shall be responsible for all costs and risks associated with maintaining, repairing, rehabilitating, and replacing the completed floodproofing measures on the property.

VIEWS OF THE NFS, AGENCIES, AND STAKEHOLDERS -The NFS (LADOTD) recognizes the importance for flood risk reduction in the ARB. The NFS supports the implementation of the RP and is in basic agreement with the applicable model PPA that will be signed if the RP is approved and funded. The views of interested parties, including federal, state, tribal, and local agencies, were considered and all comments from public reviews have been addressed and incorporated into the FIFR-EA where appropriate.

Fish and Wildlife Coordination Act: The draft Coordination Act Report (draft CAR) on the initial SSDIFR/EA was received 15 November 2023. The final CAR was provided by the U.S. Fish and Wildlife Service (USFWS) on March 22, 2024. USFWS correspondence and the final CAR are included in Environmental Appendix D-1.

LDWF: Guidance was given to USACE on Best Management Practices (BMPs) for sensitive species located in the Study Area on March 5, 2024. LDWF correspondence and the list of sensitive species can be found in Appendix D-1.

LDNR: The Coastal Zone Consistency Determination was granted for C20190202 MOD 01 for the Amite River and Tributaries Supplemental Second Draft Integrated Feasibility Report with EA #600 on March 13, 2024, with the understanding that the Office of Coastal Management Federal Consistency Section advises USACE that **additional permits may be required** when construction is located within the Coastal Zone. All contractors and voluntary participants would be made aware of this.

Public Opinion: There were five public comments received during the 45-day public review and comment period. There was one public comment opposing the RP, expressing concerns that the nonstructural plan would not alleviate flooding throughout the floodplain, and concerns about navigation on the Amite River.

Cultural, Historic, and Tribal-Trust Resources: A Programmatic Agreement between USACE, the NFS, Louisiana State Historic Preservation Officer (SHPO), and Federally-Recognized Tribes was executed on August 23, 2024, and will be adhered to during PED and implementation of the project.

REVIEWS- In accordance with USACE policy on the review of decision documents, all technical, engineering, and scientific work underwent an open, dynamic, and rigorous review process. The comprehensive review process included District Quality Control (DQC) Review, Agency Technical Review (ATR), Independent External Peer Review (IEPR), Mississippi Valley Division (MVD) Policy and Legal Compliance Review, and Headquarters Policy and Legal Compliance Review to confirm the planning analyses, alternative design and safety, and the quality of decisions. Washington-level review indicates that the plan recommended by the reporting officers complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies, as well as other administrative and legislative policies and guidelines.

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SECTION 1

Introduction

The United States Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (CEMVN), Regional Planning and Environment Division South (RPEDS), prepared this Final Integrated Feasibility Report and Environmental Assessment (FIFR-EA). It includes input from the Non-Federal Sponsor (NFS), agencies, and the public. This FIFR-EA documents the analysis conducted to identify and evaluate solutions to reduce flood damages caused by rainfall in the Amite River Basin (ARB). CEMVN undertook this study and analysis, to confirm a federal interest in the project, identify and evaluate an array of alternative plans, and make a recommendation for action or inaction. This FIFR-EA includes input from the NFS, agencies, and the public. The NFS is the State of Louisiana, acting by and through the Louisiana Department of Transportation and Development (LADOTD). The FIFR-EA also documents the plan formulation process and presents a Recommended Plan (RP) for implementation. The selection of the Recommended Plan (RP), as described herein, is based on consideration of the associated economic benefits, environmental outputs, environmental and social impacts, costs, and residual risk.

A Draft Integrated Feasibility Report and Environmental Impact Statement (DIFR-EIS) containing a draft Tentatively Selected Plan (TSP) was released for 45-day concurrent public review, Agency Technical Review (ATR), Independent External Peer Review (IEPR), and legal and policy review upon its public release on November 26, 2019. The TSP of the 2019 DIFR/EIS was an estimated \$2.3 billion-dollar new large-scale dry dam with a non-structural (NS) component to address residual risk over a 2200 mi² study area. During review, the TSP was identified to have extensive technical and policy concerns, which found the dam was constrained by site conditions that made it infeasible as designed and potentially increased life safety risk.

Due to the size of the study area, differing stakeholder viewpoints, compliance with Engineering Regulations (ERs), and the complexities of addressing social vulnerability, additional resources were approved by the Assistant Secretary of the Army for Civil Works ASA(CW) in November 2022 to complete this complex feasibility study. An additional \$1.91 million (M) and 20 months, to the original \$3M and 136 months, was allocated to complete critical tasks to inform the decision on the TSP. The Supplemental Second Draft Integrated Feasibility Report and Environmental Assessment (SSDIFR-EA) was publicly released on December 15, 2023, with a TSP that included nonstructural residential elevations and nonresidential floodproofing of 3,298 structures that were preliminarily identified as eligible for participation. USACE conducted concurrent reviews of the SSDIFR-EA, including public, technical, legal, and policy reviews. After review of the comments received, additional analysis was conducted on the NS final array of alternatives. The results of this analysis informed the final RP.

1.1 STUDY SCOPE

The Amite River and Tributaries East of the Mississippi River, Louisiana (ART) FIFR-EA is an interim response to the study authority to investigate and determine the extent of Federal interest in plans that reduce flood risk along the ARB. The effect of flooding from the Amite River and its tributaries was studied, but localized flooding, which is considered under 800 cubic foot per second (CFS), was not studied. The study investigated alternatives for flood risk management (FRM) and identified and evaluated a full range of reasonable alternatives, including the no action alternative. The results of the study are presented in this decision document, which is an Integrated Feasibility Report and National Environmental Policy Act of 1969 (NEPA) Environmental Assessment.

The FIFR-EA was prepared in accordance with the USACE Planning Guidance Notebook (Engineering Regulation (ER) 1105-2-103); ER 1105-2-101 "Risk Assessment for Flood Risk Management Studies" dated July 15, 2019; NEPA and Council on Environmental Quality (CEQ) and USACE NEPA regulations, and all other applicable laws, regulations, and policies. CEMVN uses a standard format for the Integrated Feasibility Report and EA to be consistent with the CEQ NEPA regulations. The bulleted list that follows shows the typical NEPA reporting requirements and where they are located in the FIFR-EA:

- the purpose and need for the RP or proposed action (Section 2);
- the affected environment and relevant resources in the study area where the RP or proposed action would occur (Section 3);
- alternatives and the RP or proposed action (Section 4 and Section 6);
- environmental consequences of implementing an alternative (Section 5);
- public involvement including scoping, identifying and engaging with cooperating agencies, and public review and input during preparation of the FIFR-EA (Section 9).

The study followed the specific, measurable, attainable, risk-informed, and timely (SMART) planning process. The outcome of the planning process is the identification of the National Economic Development (NED) plan and designation of the RP.

The study was conducted by a multi-disciplinary multi-agency project delivery team (PDT) comprised of professionals with the expertise required to identify the relevant water resource problems, develop alternatives to address the problems, and recommend a plan that addresses the need to reduce flooding in the study area. In addition to the NFS, cooperating agencies including the U.S. Fish and Wildlife Service; Louisiana State Historic Preservation Office (SHPO); Louisiana Department of Wildlife and Fisheries; Environmental Protection Agency (EPA), were an integral part of the PDT. Throughout the feasibility study process, the PDT also coordinated with, and integrated input from, the USACE vertical team, which includes MVD, or the Major Subordinate Command (MSC), and USACE Headquarters (HQUSACE). The PDT followed ER 1105-2-103, which describes the USACE planning process which is further detailed in Appendix F: Plan Formulation.

1.2 STUDY AUTHORITY

The study is funded using appropriations from the Bipartisan Budget Act of 2018 (Public Law 115-123) (“BBA-18”), H. R. 1892—13, Title IV, Corps of Engineers—Civil, Department of the Army, Investigations, where funds are being made available for the expenses related to the completion, or initiation and completion, of flood and storm damage risk reduction, including shore protection studies, which are currently authorized or which are authorized after the date of enactment of this the act, to reduce risk from future floods and hurricanes. The funds are at full Federal expense and funds made available for high-priority studies of projects in states and insular areas with more than one flood related major disaster declared pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S. Code [U.S.C.] 5121 et seq.) in calendar years 2014, 2015, 2016, or 2017.

The ART study area is included based on the August 2016 flooding over southeast and south-central Louisiana and is a continuing investigation under the authorization provided by the Resolution of the Committee on Public Works of the United States Senate, adopted on April 14, 1967.

“RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the report of the chief of Engineers on Amite River and Tributaries, Louisiana, published as House Document Numbered 419, Eighty-fourth Congress. And other pertinent reports, with a view to determining whether the existing project should be modified in any way at this time with particular reference to additional improvements for flood control and related purposes on Amite River, Bayou Manchac, and Comite River and their tributaries.” Committee on Public Works, 1967.”

1.3 NON-FEDERAL SPONSOR

LADOTD is the NFS pursuant to the Feasibility Cost Sharing Agreement executed on October 3, 2018. This feasibility study, funded through the BBA-18, is 100 percent federally funded. The NFS supports the implementation of the RP and is in agreement with the applicable model project partnership agreement (PPA) that will be signed if the RP is approved and funded.

1.4 STUDY AND PROJECT AREAS

1.4.1 Study Area

The study area is the ARB and its tributaries. The study area denotes the area that implementation of a project would potentially impact, which is different from the project area; the actual site the project would occupy. The ARB begins in southwest Mississippi and flows southward, crossing the state line into southeastern Louisiana. The ARB includes 2,200 square miles flowing into the Amite River and its tributaries (Figure 1-1). It includes portions of Amite, Lincoln, Franklin, and Wilkinson Counties in Mississippi, as well as East Feliciana,

St. Helena, East Baton Rouge, Livingston, Iberville, St. James, St. John the Baptist, and Ascension Parishes in Louisiana.

The study area is similar to the 1984 Amite Rivers and Tributaries Flood Control Initial Evaluation Study by USACE; however, it has been expanded to include areas that are impacted by backwater flooding to the southeast and east because they are hydraulically connected to the ARB and its tributaries. Also, structures located within St. John the Baptist and St. James Parish were removed from the study assessment after the final array of alternatives were identified. This was due to another USACE project, Westshore Lake Pontchartrain (WSLP), and study, WSLP Resiliency, that are currently active within those parishes and that is also addressing flood risk.

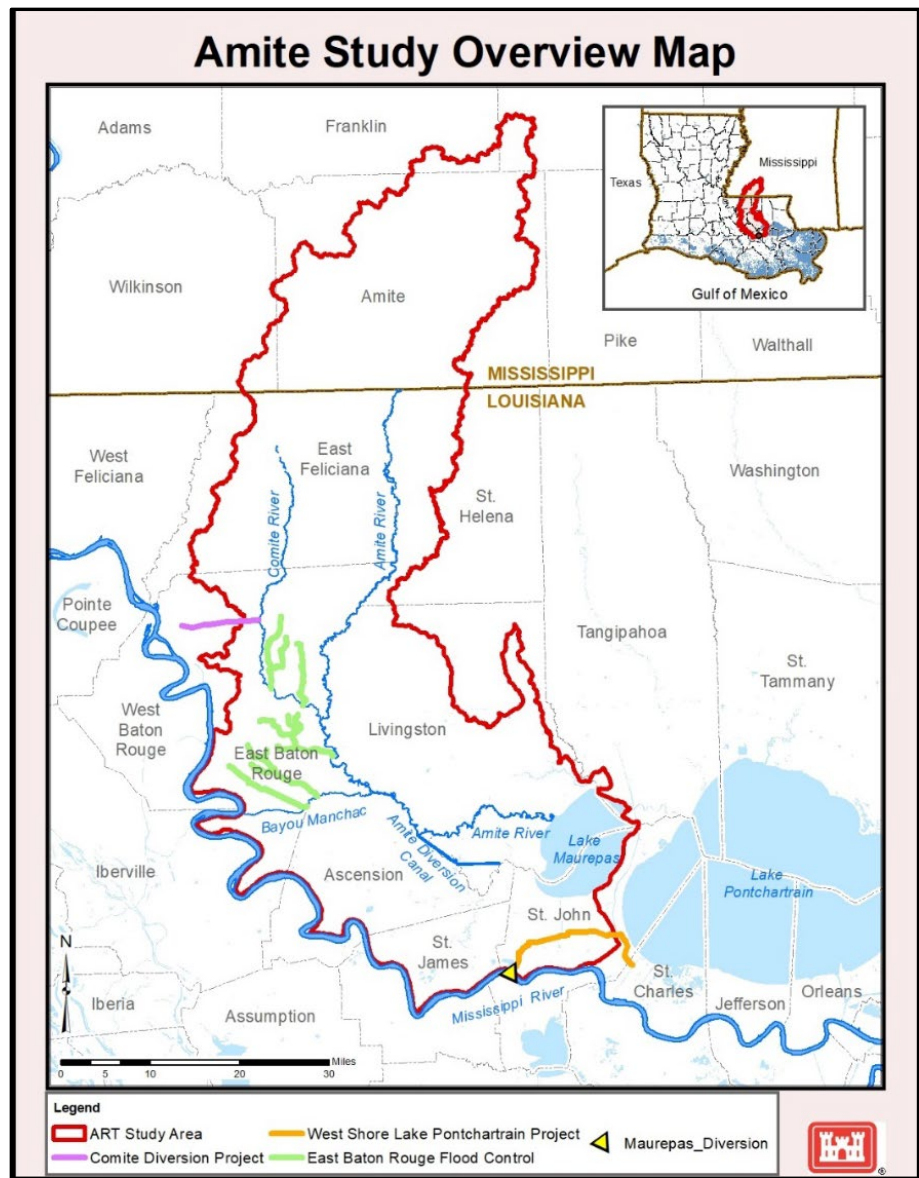


Figure 1-1. ART Study Area

1.4.2 Project Area

The project area consists of the areas identified for recommended nonstructural flood risk management solutions consisting of the elevation of residential structures and the dry or wet floodproofing of nonresidential structures developed for this study, which are situated in five of the Louisiana Parishes: Ascension, East Baton Rouge, Livingston, East Feliciana, and St. Helena Parishes. The project area for the RP relative to the ARB is shown in Figure 1-2.

No significant flood risks associated with the ARB and its tributaries were identified within Mississippi. The Mississippi Soil and Water Conservation Commission confirmed on November 19, 2018, that there are “no major flood risk problems in Mississippi from the ARB but may be some minor ones associated with bank carving/sloughing from periodic heavy rains.” Therefore, the development of alternatives was focused on Louisiana.

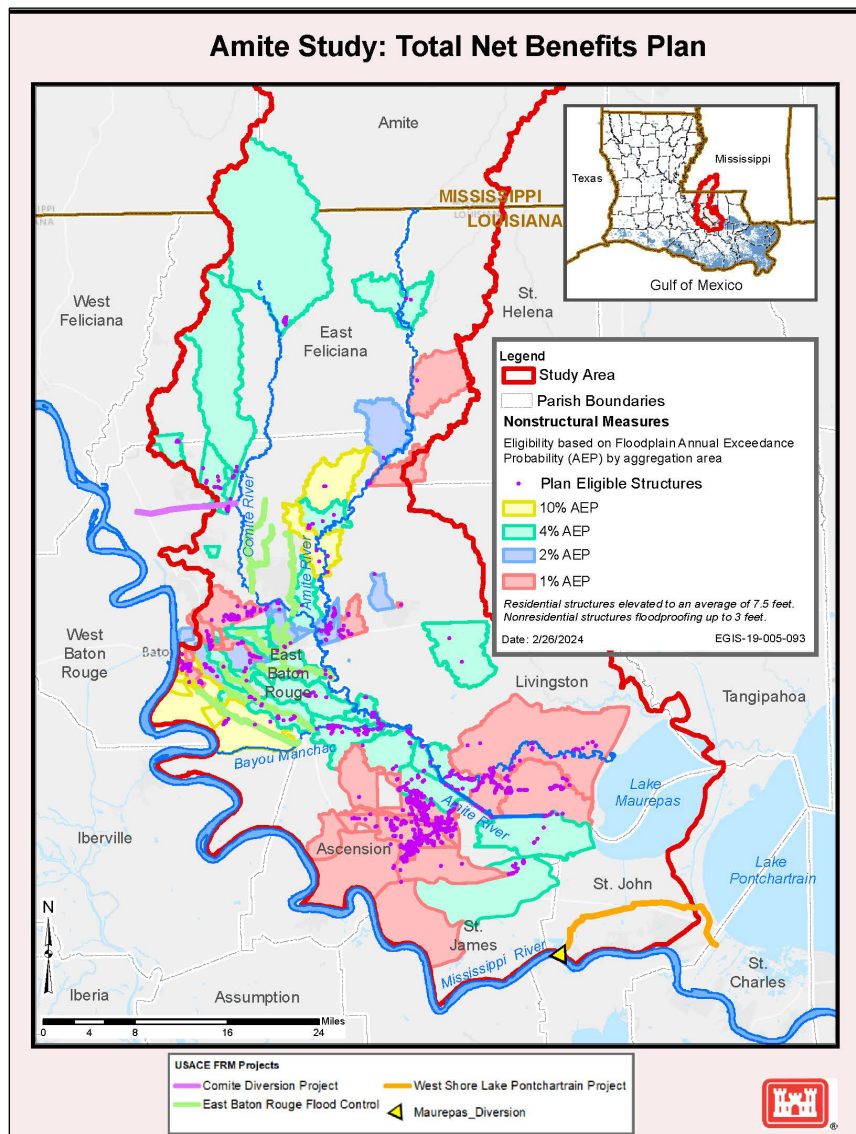


Figure 1-2. Project Area of the Recommended Plan

1.5 PRIOR REPORTS, EXISTING WATER PROJECTS, AND ONGOING PROGRAMS

Prior reports and studies by USACE, as well as other agencies, were reviewed and considered during writing of the FIFR-EA. Information from the documents presented in Table 1-1 were deemed the most relevant to problem identification and plan formulation.

Table 1-1. Relevant Prior Reports and Studies

Year	Study/Report/Environmental Document Title	Data Source	Consistency	Structural Measures	Non-Structural Measures	FWOP Conditions
Comprehensive Planning Studies						
1980	LA Coastal Resources Program	X	X	X	X	X
1999	Coast 2050: Toward a Sustainable Coastal LA	X	X	X	X	X
2004	LA Coastal Area (LCA), LA Ecosystem Restoration Study	X	X	X	X	X
2017	Louisiana State Master Plan by Coastal Protection and Restoration Authority	X	X	X	X	X
2017	Louisiana Watershed Resiliency Study: Developed Following the March and August 2016 Floods by Federal Emergency Management Agency, Mitigation Branch, Hazard Performance Analysis Group	X	X	X	X	X
2017	Characterization of Peak Streamflows and Flood Inundation of Selected Areas in Louisiana from the August 2016 Flood by United States Geological Survey (USGS) for FEMA	X	X			X
Flood Damage Risk Reduction Projects and Reports						
1888	Preliminary Examination of Bayou Manchac, Louisiana by USACE	X				
1907	Pass Manchac, Louisiana House Doc 882, 60th Congress, 1st Session	X				
1912	Completed Pass Manchac Project by USACE via the River and Harbor Act of 6/24/1910	X				X
1927	Amite River and Bayou Manchac, Louisiana Navigation Project was authorized. (7'X60' navigation canal)	X				X
1928	USACE completes navigation channel improvements in the ARB from Denham Springs to Lake Maurepas.	X				X
1930	Amite River and Bayou Manchac, Louisiana Feasibility Report by USACE	X	X			X
1953-1967	LA DPW and East Baton Rouge improvements to Wards Creek, Clay Cut Bayou, Jacks Bayou, Bayou Duplantier and White Bayou.	X				
1955	ARB and Tributaries Flood Control Study by USACE	X	X	X	X	X
1956	USACE Chief of Engineers Report: Amite River and Tributaries	X	X	X	X	X
1964	USACE completes channel improvements to upstream portions of Amite River, and to lower portions of Comite River, Blind River, and Bayou Manchac, including construction of the Amite River Diversion Canal and weir	X	X	X	X	X

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Year	Study/Report/Environmental Document Title	Data Source	Consistency	Structural Measures	Non-Structural Measures	FWOP Conditions
1971	Bayou Fountain: Floodplain Information Report for East Baton Rouge Parish by USACE	X	X			X
1972	Amite Rivers and Tributaries: Preliminary Evaluation Report by USACE	X	X			X
1972	Ward Creek and Tributaries: Floodplain Information Report for East Baton Rouge Parish by USACE	X	X			X
1974	Clay Cut Bayou, Jones Creek and Tributaries: Flood plain Information Report for East Baton Rouge Parish by USACE	X	X			X
1976	Hurricane Creek, Monte Sano Bayou and Tributaries: Floodplain Information Report for East Baton Rouge Parish by USACE	X	X			X
1976	Cypress Bayou and Tributaries: Floodplain Information Report for East Baton Rouge Parish by USACE	X	X	X	X	X
1979	Bayou Manchac and Amite River Louisiana Feasibility Report by USACE	X	X	X	X	X
1984	Amite Rivers and Tributaries: Flood Control Initial Evaluation Study by USACE	X	X	X	X	X
1989	Amite River Flood Control Study Report for LADOTD	X	X	X		X
1990	Amite River and Tributaries, Louisiana, Comite River Basin Feasibility Study by USACE	X	X	X	X	X
1990	Land Use and Development Plan (Horizon Plan) for the City of Baton Rouge	X	X			X
1991	Comite River Final EIS by USACE	X	X			X
1991	Amite River And Tributaries Study - Feasibility Report on Comite River Basin by USACE	X	X	X	X	X
1992	Amite River and Tributaries Darlington Reservoir Feasibility Study by USACE	X	X	X	X	X
1995	Comite River Design Memorandum No. 1 by USACE	X	X	X	X	X
1995	Final Environmental Assessment (EA #222) Amite River and Tributaries Louisiana, Comite River Basin, Revision of Diversion Channel Alignment and Other Changes by USACE	X	X			X
1995	Amite Rivers and Tributaries East Baton Rouge Flood Control Projects by USACE	X	X	X	X	X
1995	Study to Lower Stages along the Amite River (3 Low Impact Dry Dams) by C.E. Matrailler P.E. & Cecil E. Soileau P.E.	X	X	X		
1995	ARB Flood Control Program for LADOTD	X	X	X		
1996	Post Authorization Change Report for the Comite River Diversion Plan by USACE	X	X	X	X	X
1997	Livingston Parish Feasibility Study for channel improvement for Flood Control by USACE	X	X	X	X	X
1997	Darlington Reservoir Re-evaluation Study by USACE	X		X		

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Year	Study/Report/Environmental Document Title	Data Source	Consistency	Structural Measures	Non-Structural Measures	FWOP Conditions
1998	ARBC in conjunction with USGS, LADOTD and LOEP and USACE establish a Flood Warning System for the ARB	X	X		X	X
1999	Comite River Diversion Construction Authority WRDA August 17, 1999	X				X
1999	Amite River Sand & Gravel Mine Reclamation Demonstration Project for LADOTD	X	X			
2000	Amite River and Tributaries Ecosystem Restoration Reconnaissance Study by USACE	X	X			
2002	Environmental Assessment, Lilly Bayou Control Structure, Phase 1 EA# 222-A by USACE	X	X	X	X	X
2005	City of Baton Rouge and East Baton Rouge Parish Bridge Location Index Map by City of Baton Rouge & East Baton Rouge Parish	X	X			X
2005	Frog Bayou and Alligator Bayou Comprehensive Flood Risk Reduction Plan for the Pontchartrain Levee District	X	X			X
2007	Fluvial Instability and Channel Degradation of Amite River and its Tributaries, Southwest Mississippi and Southeast Louisiana by ERDC Geotechnical and Structures Lab	X	X	X	X	X
2007	East Baton Rouge Flood Control Project Authority WRDA 2007	X				X
2011	Amite River Field Investigation and Geomorphic Assessment by ERDC Coastal & Hydraulics Laboratory	X	X		X	X
2014	West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study by USACE	X	X	X	X	X
2015	ARB Floodplain Management Plan by Gulf Engineers and Consultants for ARB Drainage and Water Conservation District	X	X	X	X	X
2016	August 2016 Flood Preliminary Report ARB	X	X	X	X	X
2017	Hydrologic and Hydraulic Numerical Model of the ARB-Detailed Work Plan, Detailed Cost Estimate and Schedule Proposal	X	X			X
2018	West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study by USACE	X	X	X	X	X
2018	St. James/Ascension Storm Surge Flood Protection Project by The Pontchartrain Levee District	X	X	X	X	X
2018	Bayou Conway & Panama Canal Drainage Improvement Project by The Pontchartrain Levee District	X	X	X		X
2018	Laurel Ridge Levee Extension Project Ascension Parish by The Pontchartrain Levee District	X	X	X	X	X
2019	Investigation into the Potential Hydraulic Impacts of Dredging the Lower Amite River for LADOTD	X	X	X		
2019	ARB Numerical Model Project Report for LADOTD	X	X			X
2019	Investigation into the Impacts of the Darlington Reservoir Concept for LADOTD	X	X	X		X

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Year	Study/Report/Environmental Document Title	Data Source	Consistency	Structural Measures	Non-Structural Measures	FWOP Conditions
2019	Draft Integrated Feasibility Report and Environmental for Impact Statement Amite River and Tributaries, East of the Mississippi River, Louisiana	X	X	X	X	X
2019	Amite River and Tributaries-Comprehensive Study East of the Mississippi River, Louisiana. Environmental Impact Statement Final Scoping Report	X	X	X	X	X
2020	Final Independent External Peer Review Report (IEPR) Amite River and Tributaries – East of the Mississippi River, Louisiana, Feasibility Study	X	X	X	X	X
2020	Comment Response Record for the IEPR of the Amite River and Tributaries – East of the Mississippi River, Louisiana, Feasibility Study USACE Final Evaluator Responses and Panel Final Back Checks	X	X	X	X	X

1.5.1 USACE FRM Constructed Projects

There is one existing FRM USACE constructed project in the study area that was authorized on August 9, 1955 (construction was completed in 1964). Pursuant to the 1955 authorization, the NFS(s) for that project are responsible for its operation and maintenance (O&M). The 1955 authorization states:

“Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That improvements in the interest of flood control and drainage be undertaken in the Amite River, Bayou Manchac and the Comite River, such work to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of Engineers, substantially in accordance with a survey report entitled “Survey Report of Amite River and Tributaries La.,” of the district engineer, Corps of Engineers, New Orleans District, dated June 8, 1955, approved by the division engineer, Corps of Engineers, Lower Mississippi Valley Division, and submitted to the Board of Engineers for Rivers and Harbors on July 5, 1955 at an estimated first cost to the United States of \$3,008,000: Provided, That local interest comply with the provisions in the district engineer’s recommendations, including the contribution of 24.7 per centum of actual cost in cash or equivalent work as approved by the Chief of Engineers, for Comite River, presently estimated at \$67,000.” House of Representatives, 1956.

The 1955 authorized constructed features include the following:

- Bayou Manchac-Clearing and snagging on bayou from the mouth to below Ward Creek at mile 7.81.
- Comite River-Channel enlargement and realignment on Comite River from its mouth to Cypress Bayou at mile 10
- Blind River-Intermittent Clearing/snagging on Blind River below Lake Maurepas

- Amite River-Enlargement/realignment between Bayou Manchac (mile 35.75) to control weir at (mile 25.3); intermittent clearing/snagging from mouth Comite (mile 54) to Bayou Manchac (mile 35.75)
- Amite Diversion Channel-Construct weir and diversion 19 miles long from mile 25.3 on the Amite to mile 4.8 on the Blind River. Weir original design 1,500' at sea level divided into 1,000 & 500' sections and then modified to include 5x20' boat way.

1.5.2 USACE FRM Studies and In Construction Projects

There are several authorized USACE studies and construction projects, which may impact the hydrology of the ARB when construction is completed. They include the following:

- Comite River Diversion Project-The Amite H&H model has the authorized project in place (Appendix H). The project is located in East Baton Rouge Parish, LA in the southern portion of the Comite River Basin and currently in construction. The features will provide urban flood damage reduction to reduce risks from rainfall events/headwater flooding for residents in the area. The primary project features include a control structure at the Comite River, a control structure at Lilly Bayou, three control drop structures at the intersections of the diversion channel with White, Cypress and Baton Rouge Bayous, a drop control structure in the vicinity of McHugh Road, two railroad bridges, four highway bridges and one parish road bridge (USACE, 2023a).
- Comite Resiliency Study- The study recommendations will be completed after this study effort. If a project is authorized and appropriated from the Comite Resiliency Study during the implementation of a project associated with the ART study effort, it will be assessed at that time.
- East Baton Rouge (EBR) Flood Risk Reduction Project- The authorized project is intended to reduce flooding along 5 sub-basins throughout the EBR Parish, including Jones Creek, Ward Creek, Bayou Fountain, Blackwater Bayou, and Beaver Bayou. The project is in construction consisting of improvements to 50 miles of channels, including clearing and snagging, channel enlargement, and placement of riprap to reduce the risk of flood damages during heavy rainfall events (USACE,2023b). Sensitivity tests were run to see how adjusting these 5 inflow hydrographs would impact water surface elevations (WSE) throughout the ARB. These tests showed that even right next to the inflow locations, WSE increases were less than 0.02 feet for the 25-year event. Therefore, the EBR project was not incorporated into H&H model (Appendix H).
- Westshore Lake Pontchartrain (WSLP) Project - The project is located in southeast Louisiana on the east-bank of the Mississippi River in St. Charles, St. John the Baptist, and St. James parishes in southeast Louisiana. The project is currently in construction and includes a 100-year level risk reduction system extending from the Bonnet Carre spillway to Garyville (USACE,2023c). The project was not included in the ART H&H model geometry (Appendix H). The impact of the levee project on water levels in the study area was determined

based on ADCIRC modeling that WSE increase due to the WSLP project will be less than 0.1 feet in the ART project area.

- WSLP Resiliency Study- The study assessment and recommendations, which includes locally focused flood risk assessment of this subarea that includes St John the Baptist and St. James Parishes will be completed after this study effort. It is not anticipated any recommendations from the WSLP resiliency study will impact this one since the structural inventory for St. John the Baptist and St. James Parish were removed from the NS plan assessment.
- Maurepas Diversion-This is a mitigation feature of the WSLP project and is not included in the ART H&H model since it was determined to not have an effect on USACE plan selection for this study due to the location and minimal hydraulic influence. The Maurepas Diversion is a 2,000 cfs freshwater diversion to be constructed by Louisiana Coastal Protection and Restoration Authority (CPRA) that will reconnect the Mississippi River to the Maurepas Swamp, strategically delivering nutrient-laden river water to restore a degraded Cypress-Tupelo swamp (CPRA, 2023).

The State of Louisiana is in the process of developing a comprehensive State Watershed Plan. Per the 2018 Phase 1 Investigation Report for the Louisiana Statewide Comprehensive Water Based Floodplain Management Program (LWFMP) that informed the creation of the Louisiana Watershed Initiative (LWI):

“Currently, Louisiana’s various different jurisdictions, including city/parish planning, perform floodplain management activities in a largely uncoordinated fashion. Additionally, various jurisdictions, including city/parish planning and zoning departments or public works, regulate or undertake activities that affect floodplains independently, even when they affect the same watersheds. Floodplain issues are managed within political jurisdictions, often without mechanism to consider the effects on other jurisdictions or the watershed on a whole.” LWFMP, 2018

The LWI has continued to develop guidance and planning documents to develop a more holistic approach to watershed management across the state. The Operational Guidance for State Agencies was developed to increase policy and programmatic alignment among state agencies in advance of the State Watershed Plan. Currently, the Initial State Watershed Plan provides the framework for the development of regional watershed management plans. Detailed watershed information and planning will reside within the regional plans, which will be incorporated into the state plan.

Several programs provide funding to the study area for floodplain-related activities, as provided in Table 1-2. Louisiana Governor’s Office of Homeland Security and Emergency Preparedness (GOSHEP) coordinates funds from grants for Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), Pre-Disaster Mitigation Program (PDM). Office of Community of Development (OCD) coordinates funds from the Community Development Block Grant (CDBG). Statewide support (CAPP-SSSE) funds are coordinated by the Analysis Team of LA Watershed Initiative, GOSHEP and LADOTD.

Based on communication with the GOSHEP, LADOTD, and OCD, the current programs and projects with funding that may have an impact on the hydrology of the ART study area are presented in Table 1-3. Additionally, the Louisiana Watershed Resiliency Study is currently ongoing by the Federal Emergency Management Agency (FEMA) and the state has applied to FEMA for a Housing and Urban Development grant.

Table 1-2. Funding Sources for Floodplain Related Activities within the Study Area

Funding Source	Type	Grantor	Funding Range (\$ Millions)
Federal Emergency Management Agency (FEMA) Public Assistance (PA)	Post disaster (Non-recurring)	Federal	Varies based on eligible recovery and mitigation scopes of work following a major presidential disaster declaration.
HMGP	Post disaster (Non-recurring)	Federal	Varies based on amount of total federal assistance
FMA	Non-disaster (recurring)	Federal	Varies based on amount appropriated annually by congress, from the NFIP
PDM	Non-disaster (recurring)	Federal	Varies based on amount appropriated annually by congress
CDBG	Post-disaster (Non-recurring)	Federal	\$65 to \$13,400
Gulf of Mexico Energy Security Act (GOMESA)	Recurring	Federal	\$0.1 to \$8 (previous) \$70 predicted
Statewide Flood Control Program	Recurring	State	\$10 to \$20

Source: LWFMP, 2018.

Table 1-3. Current Funded Programs/Projects within the Study Area

Program	Project Title	Parish
FMA	FMA-PJ-06-LA-2017-024	East Baton Rouge
FMA	EBR Acquisition/Demolition & Elevation	East Baton Rouge
FMA	Livingston FMA 2016 Acquisition & Elevation	Livingston Parish Council
FMA	FY 17 Flood Mitigation Assistance	Livingston Parish Council
HMGP	Livingston Parish 4263 Elevation Project	Livingston Parish Council
HMGP	St. Helena Parish Home Acquisition	St. Helena Parish
FMA	St. John the Baptist Parish Elevation Project	St. John The Baptist
HMGP	Drainage Improvements	St. John The Baptist

SECTION 2

Problems and Opportunities (Purpose and Need)

2.1 SPECIFIC PROBLEMS AND OPPORTUNITIES

The study area has previously experienced riverine flooding from excessive rainfall events, in addition to residual flood damages associated with hurricanes and tropical storms. Since 1851, the paths of 52 tropical events have crossed the study area. The paths and intensities of these storms are shown in Figure 2-1. The FEMA flood claims for the most recent events to impact the area are shown in Table 2-1. Table 2-2 shows the flood claims paid between 1978 and September 2018 for all counties and parishes in the study area. The table includes the number of claims, number of paid losses, and the total amount paid in the dollar value at the time of the payment. The table excludes losses that were not covered by flood insurance.

The most recent event to affect the study area was the 2016 Louisiana flood resulting from rainfall. This event brought catastrophic flooding damage to Baton Rouge and the surrounding areas with both localized flooding and riverine flooding from the Amite and Comite Rivers and their tributaries. In August 2016, the President issued disaster declarations for parishes in the ART study area due to impacts from “The Great Flood of 2016.” The flood was responsible directly and indirectly for 13 deaths across all parishes (Louisiana Department of Health, 2023) and the rescue of at least 19,000 people (Louisiana National Guard Public Affairs Office, 2016). The study area experienced historic flooding to thousands of homes and businesses and impacts to the Nation's critical infrastructure because both the I-10 and I-12 transportation systems were shut down for days. Major urban centers in the ART study area saw significant flooding, well outside of normal flood stages.

The study will provide FRM alternatives to reduce the risks to public, commercial, and residential property, real estate, infrastructure, and human life; increase the reliability of the Nation's transportation corridor (I-10-I-12); and enhance public education and awareness of flood risks.

2.1.1 Problems

The primary problem identified in the study area is the risk of flood damages from the Amite River and its tributaries to human life and flood damages to residential and nonresidential structures. Critical infrastructure throughout the regions includes the I-10 and I-12 transportation corridors, government facilities, and schools. This critical infrastructure is expected to have increased risk of damage from rainfall events. Problems are based on the need of evaluating flood risk management in the ART study area and depend on addressing the planning goal and objectives (See Section 2.2).

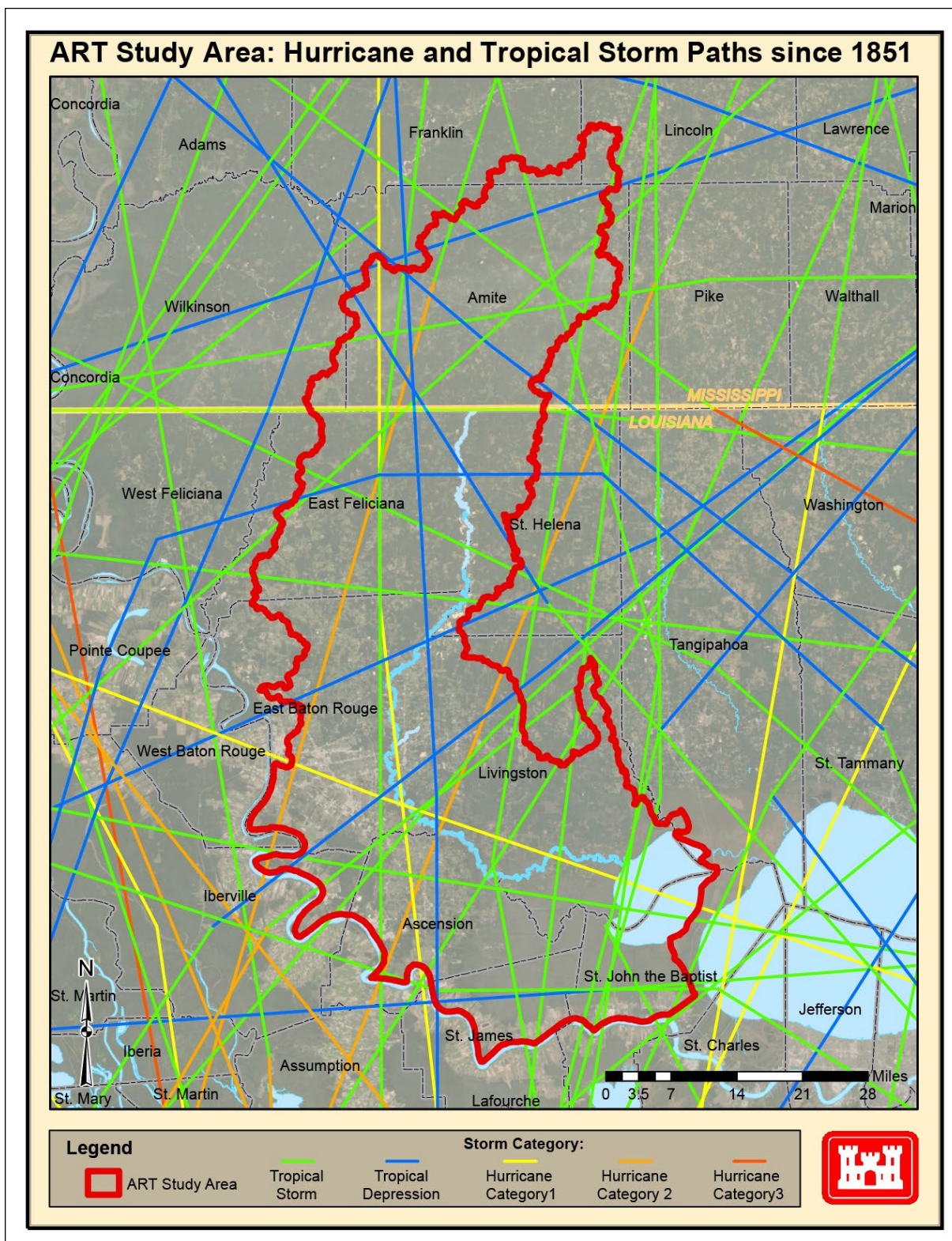


Figure 2-1. Hurricane and Tropical Storm Paths Since 1851

Table 2-1. Top Tropical Storms by Amount Paid by FEMA in the Study Area

Event	Month & Year	Number of Paid Claims	Total Amount Paid (millions)
2016 Louisiana Floods	August 2016	20,641	\$1,689.2
Tropical Storm Lee	September 2011	9,725	\$377.6
Hurricane Ike	September 2008	45,374	\$2,074.1
Hurricane Gustav	September 2008	4,396	\$88.9
Hurricane Rita	September 2005	8,921	\$348.7
Hurricane Andrew	August 1992	5,242	\$128.9
Hurricane Ida	September 2021	21,637	\$1,112.0
Hurricane Zeta	October 2020	1,041	\$17.3
Tropical Storm Nicholas	September 2021	254	\$5.6

Source: Federal Emergency Management Agency (FEMA)

Note 1: Total amount paid is at price level at time of the event.

Note 2: Claims and amount paid are for entire event, which may include areas outside of the study area.

Table 2-2. FEMA Flood Claims in the Study Area by Parish/County from January 1978 through September 2023

Parish/County	Total Number of Claims	Number of Paid Claims	Total Payments (millions)
Ascension	6,005	5,141	\$285.7
East Baton Rouge	18,958	15,792	\$948.5
East Feliciana	14	12	\$0.6
Iberville	544	439	\$7.3
Livingston	10,270	8,829	\$477.2
St. Helena	51	36	\$1.7
St. James	206	144	\$3.4
St. John the Baptist	8,725	7,209	\$483.4
Total	44,773	37,602	\$2,207.8

Source: Federal Emergency Management Agency (FEMA)

2.1.2 Opportunities

Opportunities to address the identified problems include:

- Risk Reduction to life, land, property, and infrastructure from flooding.
- Work with local communities to manage flood risk by leveraging the following efforts:
 - enhance public education and awareness of floodplain management;
 - improve flood warnings for preparation and evacuation;
 - recommend future modifications to the roadway systems to maintain emergency response vehicles access during hurricane and tropical storm events.
- Increase the resiliency of the vitally important I-10/I-12 transportation corridor.
- Prevent degradation to fish and wildlife habitat by:
 - improving water quality;
 - increasing habitat or slowing down the trend of habitat quality reduction;
 - encouraging best management practices for land use management.
- Afford access to recreation (boating, bike trails, camping, swimming, and sightseeing facilities)

2.2 PLANNING GOAL AND OBJECTIVES

The primary goal is to reduce the severity of flood risk, damages, and risk to human life along the ARB to residents, businesses, and critical infrastructure. The Federal objective of water and related land resources project planning is to contribute to NED consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements. Planning objectives represent desired positive changes to future conditions. All the objectives focus on alternatives within the study area and within the 50-year period of analysis from 2028 to 2078. All references to 2028, 2078, and 2128 hydraulic outputs were calculated using assumptions for 2026, 2076, and 2126 respectively for the purposes of this final report. The planning objectives are:

- reduce risk to human life from flooding;
- reduce flood damages from rainfall in the ART study area to industrial, commercial, and agricultural facilities and residential and nonresidential structures;
- reduce interruption to the nation's transportation corridors, particularly the I-10/I-12 infrastructure;
- reduce risks to critical infrastructure (e.g. medical centers, schools, transportation etc.).

2.3 PLANNING CONSTRAINTS AND CONSIDERATIONS

A planning constraint is a restriction that limits plan formulation or that formulation must work around. It is a statement of things the alternative plans avoid. One planning constraint was identified in this study:

- Avoid promoting development within the floodplain (in accordance with E.O. 11988) to the maximum extent practicable, which contributes to increased life safety risk.

Additionally, several planning considerations were identified for plan formulation that would not require the removal of an alternative plan, but needed to be assessed as part of the plan formulation process:

- Avoid or minimize negative impacts to:
 - threatened and endangered (T&E) species and protected species;
 - critical habitat, e.g., T&E;
 - water quality;
 - cultural, historic, and Tribal-trust resources;
 - recreation use in the ART study area.
- Recognition/awareness that reaches of the Amite and Comite Rivers are Scenic Rivers, which may require legislative changes to implement alternatives.
- Consistency with local floodplain management plans by not inducing flooding in other areas.

2.4 PUBLIC AND AGENCY COORDINATION

Early NEPA coordination with the NFS, stakeholders, Federal and State agencies, and Federally-Recognized Tribes: the Alabama-Coushatta Tribe of Texas (ACTT), Chickasaw Nation, Chitimacha Tribe of Louisiana (CTL), Choctaw Nation of Oklahoma (CNO), Coushatta Tribe of Louisiana (CT), Jena Band of Choctaw Indians (JBCI), Mississippi Band of Choctaw Indians (MBCI), Muscogee (Creek) Nation (MCN), Seminole Nation of Oklahoma (SNO), Seminole Tribe of Florida (STF), and Tunica-Biloxi Tribe of Louisiana (TBTL) was performed prior to the notice of intent (NOI) and afterward through public meetings, social media, and the CEMVN website. USACE hosted general scoping meetings within 90 days of the start of the study, per Water Resources Reform and Development Act (WRRDA) 2014. As part of the early coordination, general scoping was initiated prior to the NEPA NOI, in conformity with 40 CFR 1500-1508. A public website page with the study information and request for feedback was established in mid-December 2018.

The cooperating and participating agencies include LADOTD, ARB Commission (ARBC), CPRA, and the following parishes: Livingston, Ascension, St. Helena, East Feliciana, East Baton Rouge, Iberville, St. John the Baptist, and St. James. Resource agencies that USACE has coordinated with include the U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), U.S. Geological Survey (USGS), and LDWF. Federally-Recognized Tribes (the ACTT, CTL, CNO, CT, MBCI, JBCI, STF, SNO, and TBTL) were invited by letter to become Cooperating or Participating agencies for this Action. On December 20, 2019, the CNO responded "The [CNO] thanks the USACE, New Orleans District, for the correspondence regarding the above referenced project. The Choctaw Nation Historic Preservation Department requests to consult on this project under the Section 106 review process." No other responses from Federally-Recognized Tribes.

A NEPA stakeholder meeting was conducted by USACE on December 3, 2018, at the USGS Baton Rouge, Louisiana, office that included an option to participate by video conference. A subsequent reconnaissance meeting was conducted on December 10, 2018, with the NFS, and resource agencies at the CPRA's Baton Rouge, Louisiana office that also included an option to participate by video conference. Federally-Recognized Tribes were invited but were unable to attend. However, a follow up meeting was held on January 7, 2019, during which the MBCI participated. Additionally, a public scoping meeting was conducted on January 10, 2019, at CEMVN with Facebook live streaming, where feedback was requested as well. Feedback from the public scoping meeting resulted in the identification of three additional measures.

In accordance with NEPA, a NOI to prepare an EIS was published in the Federal Register (Volume 84, No. 63) on April 2, 2019. The scoping period ended on July 8, 2019. Three public scoping meetings were conducted within the study area on April 24 and 25, 2019, with Facebook live streaming. Comments were accepted via written correspondence and emails. Approximately 80 non-USACE people attended the meetings in person and the Facebook live streaming had over 6,000 views. Scoping identified four areas of concern: flooding, dredging opportunities, levee opportunities, and nature-based engineering. People are concerned about inducement of flooding into other areas and proposed further investigation in alternative formulation and specific areas of concern. Feedback from the public scoping meeting resulted in the identification of one additional measure, which was proposed by the Healthy Gulf Collaborative, regarding conversion of sand and gravel mines to bottomland hardwoods habitat for flood control.

A meeting was conducted on June 18, 2019, with collaborative stakeholders, the NFS, resource agencies, and Federally-Recognized Tribes to present the preliminary final array of alternatives and the screening rationale of the alternatives that were screened. As a result, three agencies, (USFWS, LDEQ, and LDWF) requested an evaluation of river restoration, which resulted in the addition of another alternative, restoration of river meanders.

The scoping report can be found on the project website: <https://www.mvn.usace.army.mil/Amite-River-and-Tributaries/>. It is titled "Appendix C-2 EIS Final Scoping Report" and is found under the 2019 Draft Report and Appendices header. The scoping report has copies of all written feedback received prior to the additional resources approval in 2022.

Additional resources were approved in 2022 to reassess the dry dam and further evaluate NS alternatives. An internal project specific Strategic Communication plan was developed which identified the purpose of the Communications Plan, its goals and objectives, and the stakeholders including the public, elected officials, Tribal governments, special interests groups, government agencies, environmental organizations, and non-governmental organizations. Key messaging, communication methods, and an outreach schedule were also included in the plan. Community outreach meetings were conducted on February 28, 2023, and March 1, 2023, to inform and engage residents about the flood risk reduction measures.

Consistent with 33 U.S.C. 2356(c), outreach efforts focused on civic and faith-based organizations that serve residents of socially vulnerable communities affected by flooding, including local churches, libraries, non-profits, and community centers. Initial and follow-up calls were made to 29 churches, 4 community centers, 3 non-profits, and 3 academic institutions. Of those contacted, six churches, two community centers, two non-profits, and two academic institutions agreed to disseminate our one-page summary of the outreach effort to the residents they serve. Table 2-3 shows the typical NEPA reporting requirements and where they are located in the FIFR-EA.

Table 2-3. NEPA Information in the FIFR-EA

NEPA Sections	Location in this Document
Cover Sheet	Cover Page
Abstract	Cover Page
Table of Contents	Table of Contents
Purpose of and Need for Action	Section 2
Alternatives Including Proposed Action	Section 4
Affected Environment	Section 3
Environmental Consequences	Section 5
List of Preparers	List of Preparers Section
Public Involvement	Section 9
Environmental Laws and Regulations	Section 8
List of Report Recipients	Section 9
Appendices	Table of Contents

SECTION 3

Inventory and Forecast Conditions

The President's CEQ regulations (40 CFR Part 1500 *et seq.*), promulgated to implement NEPA provides guidance for the preparation of NEPA documents. Section 1502.15 of the CEQ regulations states that the Affected Environment section shall contain data and analysis "commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced." This Section of the report describes the existing conditions of the affected environment within the study area as well as the project area. Included in this Section are descriptions of the relevant resources, among others, that may be affected by the RP such as wetlands, fisheries, essential fish habitat, threatened and endangered species, and socioeconomic environment.

3.1 ENVIRONMENTAL SETTINGS

3.1.1 Land Use

The Pre-Contact settlement of the ARB extends as far back as the Paleoindian period (11,500-8,000 B.C.), although few sites of this age have been identified within the study area. However, archaeological evidence supports that during the period from 8,000 B.C. to 800 B.C., the region was well inhabited by Native American peoples who often settled along ridges overlooking streams with gravel outcroppings. It is noteworthy to mention that during the subsequent Pre-Contact period, from approximately 800 B.C. and leading up until the time of Native American-European contact, settlement strategies shift away from the uplands of the ARB towards alluvial valleys, giving rise to some of the earliest agricultural-based settlements in the region. Upon the arrival of Europeans to the ARB, there were multiple groups of Native Americans occupying the ARB. The effects of contact between these cultures are understudied at the present time and can be refined as additional investigations are conducted in the future. European Settlements from the 1800s in the ARB primarily consisted of farming, fishing, hunting, and trapping communities near the Prairie Terraces and natural levees, often at or near floodplains. More densely populated communities began to form in response to the need for government administration and trade centers, resulting in the slow degradation of nearly 100 percent of the natural forested landscape. Road and rail networks further contributed to urbanization near high-ground water routes, and the establishment of multiple universities, a large petrochemical industry, and the Second World War prompted continuous population growth into the 1900s (GEC, Inc., 2015).

As of 2015, the study area predominantly consisted of undeveloped acreage. About 28 percent of the land was developed for commercial, residential, agricultural, recreation, and industrial purposes. The remaining 72 percent of the land was comprised of wetlands, new-growth forest, barren land, and other undeveloped land. Refer to Appendix D-2 for the land use classification table and map of the study area.

3.1.2 Climate, Weather Patterns, and Changing Conditions

The ART Study evaluates the feasibility of NS flood risk measures from 2028 to 2078. The most significant impact on coastal wetlands resulting from changing conditions is sea level change (SLC). A changing conditions analysis of precipitation, flood frequency and sea level change is included in Appendix H of this report, which provides more detailed information.

Climate in the region is humid subtropical, being heavily influenced by the movements of warm moist air off of the Gulf of America (formerly “Gulf of Mexico”). Average monthly temperatures vary from approximately 51.2°F in January to 82.0°F in July. Winter nighttime lows below freezing are common, as are summer daytime highs in the mid-90s. See Appendix D-2, Table D:1-2 for the monthly temperature normals recorded from the Baton Rouge Metro Airport, LA monitoring station by the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center.

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

High cumulative rainfall events (e.g., 6 inches or more in less than 72 hours) over large areas of the ARB are caused under two typical scenarios: slow moving cold fronts encountering warm moist coastal air in late winter or early spring; and slow-moving tropical storms in summer or early fall. High short-term localized rainfall intensities (e.g., over one inch in an hour) can occur under these two scenarios and are also experienced in a third scenario—heavy summer-time thunderstorms. Severe riverine flooding in the lower ARB has occurred under extreme examples of all three scenarios, with minor localized flood events typically occurring at least once per year in small, poorly drained catchments. Record floods often result when significant rainfall events occur in the context of above-average seasonal rainfall patterns, which sustain high soil moisture saturation and floodplain water levels. In addition to rainfall-riverine flood events, the lower ARB is also subject to wind-driven coastal flooding associated with slow-moving tropical storms. Prolonged, heavy, southerly winds cause high water levels along the southeastern Louisiana coast (e.g., Breton and Mississippi Sounds), causing back-step rises in Lakes Borgne, Pontchartrain, and Maurepas. Lake Maurepas levels above 3 feet mean sea level (MSL) typically impact the lower ARB at least once per year. Tropical storms have pushed levels above 6 feet MSL. Increasing levels of relative sea level change (RSLC) are also associated with changing conditions (See Section 3.1.4).

Current projections of storm frequencies from the CPRA Coastal Master Plan Report (2017) anticipates increased frequencies for hurricanes and decreased frequencies for tropical

storms. See Table 3-1 for the average annual number of North Atlantic Basin tropical storms and major hurricanes (CPRA 2017). <https://coastal.la.gov/our-plan/2023-coastal-master-plan/>

Table 3-1. North Atlantic Basin Tropical Storms and Major Hurricanes based on the Plausible Range of Future Tropical Storm Frequency

	1981-2010 Average	Projected Average for 2015-2065	Range of Frequency change (2015-2065)
All tropical storms	12.1	8.8 to 12.6	-28%
Major Hurricanes	2.7	3.1 to 8.6	+13% and +83%

See Appendix D-1, Table D1-2 for the temperature normals from Baton Rouge Metro Airport.

3.1.3 Flood Events

The August 2016 Flood Preliminary Report for ARB (Jacobsen, B.J. 2017) provides findings on prior flooding, as well as the 2016 Flood Event. See Appendix D-2, Section 1.1.3 for Table D:1-3, which presents the top 10 pre-2016 crests based on USGS gauges for the Amite River at Denham Springs and Comite River at Joor Road (with peak stage data as far back as 1921 and 1943, respectively) and the peak discharge for five of the Amite River floods at Denham Springs. Three significant pre-2016 flood events are:

- The April 1983 Flood. A slow-moving system produced 6 to 13 inches of rain over a broad portion of the ARB, with high totals in the Upland Hills. This flood established the pre-2016 record flood for the lower Amite River and backwater in associated tributaries in the Middle and Lower Prairie zones. It was the second highest flood recorded on the Comite River at Joor Road. About 5,300 homes and 200 businesses were flooded and an estimated \$172 million of damages incurred (1983 dollars). Flood damages in the Comite River Sub-basin were estimated to be \$48 million.
- Hurricane Juan in October 1985. Hurricane Juan became stalled along the Louisiana coast for several days, producing extremely high wind-driven water levels in Lake Maurepas, reportedly above 6 feet NAVD 88, and 6-day rainfall totals of 5 to 11 inches throughout the ARB. Record flooding occurred in the Coastal Wetlands and Margins. Upstream portions of the ARB were largely unaffected.
- Tropical Storm Allison in June 2001. Tropical Storm Allison stalled over the region, with 7-day measured rainfall totals of 19.66 inches in Baton Rouge; 14.07 inches in Denham Springs; and 23.29 inches in Ascension Parish. The 7-day rainfall totals in parts of the lower ARB were considered a 0.01 AEP precipitation event. Due to a significant drought and very low soil moisture conditions present prior to the event, flood conditions in the upper and middle ARB were not as extreme.

The top tropical storms by amount paid by FEMA in the study area are presented in Table 2-1.

The August 2016 flood over southeast and south-central Louisiana was caused by a slow-moving low-pressure system that had its origins as an Atlantic tropical wave. Beginning on Monday, August 8, 2016, the low traversed east-to-west across northern Florida and lower Alabama/Mississippi and approached the ARB late on Thursday, 11 August 2016. The low was not considered an area of interest for development by the National Hurricane Center. The U.S. National Weather Service (NWS) issued a flash flood watch for the region on Tuesday, August 9. Flash flood and river flood warnings were issued beginning Wednesday, August 10 and continued through the event. The majority of the ARB received in excess of 10 inches, with a large portion of the northern half of the ARB experiencing over 15 inches. Parts of the Middle Prairie zone in northern East Baton Rouge and northwestern Livingston Parishes had over 20 inches of rainfall.

A report commissioned by Louisiana Economic Development (2016) estimates damages under lost economic activity, property damages to residences, autos and businesses, and damage to government infrastructure. Operations at approximately 19,900 Louisiana businesses were disrupted by the flooding event, impacting approximately 278,500 workers (14 percent of the Louisiana workforce). Table 3-2 provides a summary of damages by category (Terrell 2016).

Table 3-2. Summary of Damages by Category

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

3.1.4 Sea Level Change

ER 1100-2-8162 (USACE 2019) provides guidance for incorporating direct and indirect physical effects of projected future SLC across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and

systems of projects. Potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence.

Research by experts predict continued or accelerated changing conditions for the 21st century and possibly beyond, which would cause a continued or accelerated rise in global MSL. The resulting local RSLC will likely impact USACE coastal project and system performance. As a result, managing, planning, engineering, designing, operating, and maintaining for SLC must consider how sensitive and adaptable natural and managed ecosystems and human and engineered systems are to changing conditions and other related global changes. Planning studies and engineering designs over the project life cycle, for both existing and proposed projects, will consider alternatives that are formulated and evaluated for the entire range of possible future rates of SLC, represented here by three scenarios of “low,” “intermediate,” and “high” SLC. These alternatives will include NS alternatives. In compliance with USACE policy (ER 1100-2-8162), the performance under all three SLC scenarios was analyzed for the final array of alternatives.

Using USACE-predicted future water levels under the SLC scenarios, those water levels were converted into RSLC rates, incorporating SLC effects measured at the gauges and land loss experienced in the study area. No operations and maintenance activities were planned for any of the projects in relation to future elevation changes. Long-term sustainability (percent land left at the end of the period of analysis) was used to analyze the impact that different SLC scenarios had on the project areas as discussed in the Changing Conditions Risks from Precipitation, Flood Frequency and Sea Level Change Section 7.2.4 of this report.

3.2 RELEVANT RESOURCES

This section contains a description of relevant resources in the study area that could be impacted by the proposed project. The significant resources described are those recognized by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Significance based on institutional recognition means that the importance of an environmental resource is acknowledged in the laws, adopted plans, and other policy statements of public agencies, Federally-Recognized Tribes, or private groups. Significance based on public recognition means that some segment of the general public recognizes the importance of an environmental resource. Significance based on technical recognition means that the importance of an environmental resource is based on scientific or technical knowledge or judgment of critical resource characteristics. Table 3-3 provides summary information of the institutional, technical, and public importance of these resources.

Resources not impacted in this study include Navigation, Noise and Vibration, and Essential Fish Habitat.

Table 3-3. Relevant Resources in the Study Area

Resource	Institutionally Important	Technically Important	Publicly Important
Cultural and Historic Resources	National Historic Preservation Act (NHPA), as amended, and Section 106 and 110 of the NHPA; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979).	Federal, State, and Tribal stakeholders document and protect cultural resources including archaeological sites, districts, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and/or sites of religious and cultural significance based on their association or linkage to past events, to historically important persons, 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.
Executive Order 13175: Consultation and Coordination with Indian Tribal Governments	It is the policy of the Federal government to consult with Federally recognized Tribal Governments on a Government-to-Government basis as required in E.O. 13175 ("Consultation and Coordination with Indian Tribal Governments;" U.S. President 2000). The requirement to conduct coordination and consultation with Federally-Recognized Tribes on and off Tribal lands for "any activity that has the potential to significantly affect protected tribal resources, tribal rights (including treaty rights), and Indian lands" finds its basis in the constitution, Supreme Court cases, and is clarified in later planning laws. The USACE Tribal Consultation Policy, December 05, 2023, updated the implementation of this E.O. and later Presidential guidance. The 2023 USACE Tribal Consultation Policy and Related Documents provide definitions for key terms, such as tribal resources, tribal rights, Indian lands, consultation, as well as guidance on the specific trigger for consultation.	Following USACE's Tribal Consultation Policy (2012, and E.O. 13175), USACE engaged in consultation through the Section 106 NHPA process (described above). Through this process, it was determined that the proposed alternatives would not impact reservation or tribal trust lands. Subsequently to initiating this Government-to-Government consultation, the new USACE Tribal Consultation Policy was released in December 2023, the same month the SSDIFR-EA went out for public review, and after the study had already reached important milestones while following the earlier policy.	The United States recognizes the right of Tribal governments to self-govern and supports Tribal sovereignty and self-determination. E.O. 13175, and USACE's 2012/2023 Tribal Consultation Policy, applies only to Federally-Recognized Tribes.

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Resource	Institutionally Important	Technically Important	Publicly Important
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 of the 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.
Aesthetics	USACE ER 1105-2-100, and National Environmental Policy Act of 1969, the Coastal Barrier Resources Act of 1990, Louisiana's National and Scenic Rivers Act of 1988, and the National and Local Scenic Byway Program.	Visual accessibility to unique combinations of geological, botanical, and cultural features that may be an asset to a study area. State and Federal agencies recognize the value of beaches and shore dunes.	Environmental organizations and the public support the preservation of natural pleasing vistas.
Wetlands	Clean Water Act of 1972, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; the Estuary Protection Act of 1968., E.O. 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.
Uplands	Food Security Act of 1985, as amended; the Farmland Protection Policy Act of 1981; and the Fish and Wildlife Coordination Act of 1958, as amended.	They provide habitat for both open and forest-dwelling wildlife, and the provision or potential for 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.
Aquatic Resources/ Fisheries	Fish and Wildlife Coordination Act of 1958, as amended; Clean Water Act of 1972, 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.
Soils and Water Bottoms	Fish and Wildlife Coordination Act, Marine Protection, Research, and Sanctuaries Act of 1990	State and Federal agencies recognize the value of water bottoms for the production of benthic organisms.	Environmental organizations and the public support the preservation of water quality and fishery resources.

Resource	Institutionally Important	Technically Important	Publicly Important
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, Endangered, and Protected 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, EPA, LDWF, and Louisiana Department of Natural Resources 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.
Geology, Soils, and Prime and Unique Farmland	Farmland Protection Policy Act	State and Federal agencies recognize the value of farmland for the production of food, feed and forage.	Public places a high value on food and feed production.
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.
Water Quality	Clean Water Act of 1972, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, and Louisiana State & Local Coastal Resources Act of 1978.	USACE, USFWS, NMFS, NRCS, EPA, and State DNR and wildlife/fishery offices recognize value of fisheries and good water quality and 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.
Other Social Effects	ER 1105-2-103 and 33 U.S. Code § 2281	State and Federal agencies recognize social and economic welfare of all populations.	Public concerns about the fair and equitable treatment (fair treatment and meaningful involvement) of all people with respect to environmental and human health consequences of Federal laws, regulations, policies, and actions.
Socioeconomics	USACE ER 1105-2-100, and National Environmental Policy Act of 1969	When an environmental document is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental document will discuss all of these effects on the human environment.	Government programs, policies and projects can cause potentially significant changes in many features of the socioeconomic environment.

3.2.1 Natural Environment

3.2.1.1 Wetland Resources

Bottomland hardwood forests (BLH) in the study area are dominated by water oak, nuttall oak, green ash, red maple, and pignut. Swamps in the lower ARB are dominated by bald cypress and water tupelo, which have regenerated following extensive logging of virgin forest more than 70 years ago. The Louisiana swamps generally lack a mature canopy, as was present in the forests before logging occurred, and have lower productivity where isolated from riverine influences (Shaffer et al., 2003). Economically important natural resources associated with these swamps include fisheries of crawfish, blue catfish, and channel catfish, as well as logging. The classification of wetlands habitat from the U.S. Fish and Wildlife National Wetlands Inventory (<https://www.fws.gov/wetlands/>) is located in Appendix D-1.

3.2.1.2 Upland Resources

(From LDWF Natural Communities of Louisiana)

Hardwood Slope Forest

These forests mostly occur on slopes, or sometimes on stream and river terraces that are only rarely subject to flooding. This natural community occurs along slopes rising out of the floodplains in the upper ARB and is dominated by hardwood trees with a sparse herbaceous layer. The hardwood slope forest community historically occupied approximately 100,000 to 500,000 acres and an estimated 25 to 50 percent of this acreage remains. Habitat conversion to pine plantations or residential uses, invasive and exotic species (including Chinese tallow (*Triadica sebifera*), Chinese privet (*Ligustrum sinense*), and cogon grass (*Imperata cylindrica*)) construction of roads, utilities and pipelines, and use of off-road vehicles currently threatens the long-term viability of these forests.

Small Stream Forest

Small stream forests are relatively narrow forests occurring along small rivers and large creeks in central, western, southeastern, and northern Louisiana. They are seasonally flooded for brief periods. The percentage of sand, silt, calcareous clay, acidic clay, and organic material in the soil is highly variable (depending on local geology) and has a significant effect on species composition. Soils are typically classified as silt-loams. At times, the community is quite similar in species composition to hardwood slope forests (beech-magnolia forests). These forested wetlands are critical components of the landscape filtering surface and subsurface flows, improving water quality, and storing sediment and nutrients (Rummer 2004). See Appendix D-1, Table D:2-3 for a vegetative species list for this natural community.

Spruce Pine-Hardwood Mesic Flatwoods

This flatwoods type is a natural mixed forest community endemic to the western Florida Parishes and is distinguished by the prevalence of Spruce Pine (*Pinus glabra*) over Loblolly Pine (*Pinus taeda*), although Loblolly Pine is usually present at some level. Hardwoods usually dominate the forest, but Spruce Pine can dominate areas within a stand. Soils are hydric, acidic silt loams including the Encrow, Gilbert and Springfield series. These soils are

significantly higher in nutrient levels than those historically supporting the Longleaf Pine (*Pinus palustris*) communities occupying similar hydrologic settings in the eastern Florida Parishes (Smith 1996). This edaphic factor may have precluded Longleaf Pine from this community type. Historically, fire was likely not a major component in this community as the constituent plant species are not fire adapted, and fuel conditions are not conducive to fire. Spruce Pine-Hardwood Flatwoods typically have a dense canopy resulting in heavy shading and, usually, a sparse understory. Palmetto is often an understory dominant.

Nuisance Species (from LDWF Waterbody Management Plan 2017)

Common salvinia and water hyacinth have been the main source of access and habitat issues and complaints over the past several years. Common salvinia is scattered throughout the ARB and is constantly being restocked by draining swamps and bayous. Within the river system, the desire to own/sell waterfront property has led to the construction of numerous man-made canals over the past four decades. These canals are typically 50 to 200 feet wide, dead-end offshoots of the main river channel. The canals are lined with houses, camps, boat slips, docks, and an occasional boat ramp. The canal systems are rarely designed so that river water can flow through unimpeded (i.e. horseshoe in shape, etc.). Consequently, these dead-end canals have no inherent “flushing” mechanism to remove floating vegetation. Invariably, some form of aquatic vegetation makes its way into these canals each year and remains stranded due to the stagnant water conditions and thrives. When the suspect vegetation in these canals reaches unacceptable levels, shoreline property owners call LDWF to complain.

Estimates of vegetation coverage are:

Problematic Species:

- Common Salvinia (*Salvinia minima*) – 25 acres
- Water Hyacinth (*Eichhornia crassipes*) – 15 acres
- Duckweed (*Lemna spp.*) – 15 acres
- Duck Lettuce (*Ottelia alismoides*) – 50 acres
- Crested Floating Heart (*Nymphoides cristata*) – 6 acres

Beneficial Species:

- Yellow Water Lily (*Nymphaea mexicana*) – 100 acres
- Coontail (*Ceratophyllum demersum*) – 100 acres

3.2.1.3 Aquatic Resources and Fisheries

For a list of fish species in the study area, see Appendix D-2, Table D:2-4 (LDWF Amite River Waterbody Management Plan).

The Alabama Hickorynut (*Obovaria unicolor*) is an at-risk species, a 1.2 - 2 inch-long freshwater mussel, with round or elliptical shape. The outer shell (periostracum) is smooth and brown to yellow-brown, with rays. This species is a long-term brooder that is gravid from June through August of the following year. Like other freshwater mussels, the Alabama

Hickorynut releases its larvae (glochidia) into the water column, where they parasitize a fish (glochial host) in order to transform into a juvenile mussel. Once the glochidia are ready, they release from the host to find a suitable substrate. Suitable glochidial host fishes for this species include the naked sand darter (*Ammocrypta beanii*), southern sand darter (*Ammocrypta meridiana*), Johnny darter (*Etheostoma nigrum*), Gulf darter (*Etheostoma swaini*), blackbanded darter (*Percina nigrofasciata*), dusky darter (*Percina sciera*), and redspot darter (*Etheostoma artesiae*).

The Alabama Hickorynut inhabits sand and gravel substrates in moderate currents in large streams. However, the presence of moderate gradient pool and riffle habitats in a variety of stream and river sizes may contain this species. In Louisiana, the Alabama Hickorynut is known to occur in the Pearl and Amite River systems. Habitat modification and destruction due to siltation (i.e. from flooding events) and impoundment threaten this species. It is also negatively affected by the pollution of streams and rivers.

The rare Broadstripe topminnow (*Fundulus euryzonus*) is endemic to the Amite and Tangipahoa River Basins. The Broadstripe topminnow is listed as Vulnerable at the global and national level and Imperiled at the state level. This fish prefers smaller channel widths, with riparian vegetation canopy; features of upstream reaches of rivers. Current and historical mining operations in the ARB have led to channelization, which changes the upstream reaches of the river to behave more like downstream reaches by widening the channel and increasing water flow; thus, diminishing suitable habitat for the topminnow.

3.2.1.4 Wildlife

The study-area wetland and non-wetland forests provide valuable habitat for a variety of migratory game and non-game birds, mammals, amphibians, and reptiles. For a listing of associated species, see Appendix D-2, Table D:2-5 through Table D:2-8.

The coastal marshes and forested wetlands of the Lake Pontchartrain Basin have been identified by the North American Waterfowl Management Plan (NAWMP), Gulf Coast Joint Venture (GCJV): Mississippi River Coastal Wetlands Initiative as a key waterfowl wintering area. The Gulf Coast is the terminus of the Central and Mississippi Flyways and is therefore one of the most important waterfowl areas in North America, providing both wintering and migration habitat for significant numbers of the continental duck and goose populations that use both flyways.

The Mississippi River Coastal Wetlands Initiative area is dominated by coastal marsh, forested swamps, and seasonally flooded bottomland hardwoods that provide habitat for several species of wintering waterfowl. Wood ducks are the primary waterfowl species in forested wetlands, while other ducks, and use those forested habitats to a lesser degree. Other game birds are present in or adjacent to the study area including rails (Family: *Rallidae*). Non-game bird species also utilize the study area marshes, including various species of gulls and terns. Birds of prey in the study area include resident and transient hawks. Some neo-tropical migrants, currently experiencing population decline, are dependent on large, forested areas to successfully reproduce. Also present are cuckoos,

swifts, hummingbirds, woodpeckers, and the belted kingfisher (*Megaceryle alcyon*). See Appendix D-2, Table D:2-5 for a list of bird species in the study area.

3.2.1.5 Threatened, Endangered, and Protected Species

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

On November 15, 2023, CEMVN obtained a draft Coordination Act Report (CAR) from the USFWS that provides a list of threatened and endangered species that may occur in the proposed project location, and/or may be affected by the proposed project. Table D:2-9 in Appendix D-2 includes a summary of findings from the draft CAR. The final CAR was provided by USFWS on March 22, 2024, with no changes from the draft CAR. USFWS correspondence, and the final CAR are included in Environmental Appendix D-1.

West Indian Manatee

Federally listed as a threatened species, *Trichechus manatus* (West Indian manatees) occasionally enter Lakes Pontchartrain and Maurepas and associated coastal waters and streams during the summer months (i.e., June through September). Manatee occurrences appear to be increasing, and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. The manatee has declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals. All contract personnel associated with the project should be informed of the potential presence of manatees and the need to avoid collisions with manatees, which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. All construction personnel are responsible for observing water-related activities for the presence of manatee(s). Temporary signs should be posted prior to and during all construction/dredging activities to remind personnel to be observant for manatees during active construction/dredging operations or within vessel movement zones (i.e., work area), and at least one sign should be placed where it is visible to the vessel operator. Siltation barriers, if used, should be made of material in which manatees could not become entangled, and should be properly secured and monitored. If a manatee is sighted within 100 yards of the active work zone, special operating conditions should be implemented, including: no operation of moving equipment within 50 feet of a manatee; all vessels should operate at no wake/idle speeds within 100 yards of the work area; and siltation barriers, if used, should be re-secured and monitored. Once the manatee has left the 100-yard buffer zone around the work area on its own accord, special operating conditions are no longer necessary, but careful observations would be resumed. Any manatee sighting should be immediately reported to the Service's

Lafayette, Louisiana Field Office (337/291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (225/765-2821).

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

Gulf Sturgeon

Acipenser oxyrinchus desotoi (the Gulf sturgeon), federally listed as a threatened species, is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf Coast between the Mississippi River and the Suwannee River, Florida. In Louisiana, Gulf sturgeon have been reported at Rigolets Pass, rivers and lakes of the Lake Pontchartrain Basin, and adjacent estuarine areas. Spawning occurs in coastal rivers between late winter and early spring (i.e., March to May). Adults and sub-adults may be found in those rivers and streams until November, and in estuarine or marine waters during the remainder of the year. Sturgeon less than 2 years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations, such as those caused by water control structures that limit and prevent spawning, poor water quality, and over-fishing have negatively affected this species.

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

Inflated Heelsplitter Mussel

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

Based on the most recent survey data, the currently known range for the Alabama heelsplitter in Louisiana occurs only in the lower third of the Amite River, along the East Baton Rouge/Livingston Parish line from Spiller's Creek, which is in the vicinity of Denham Springs, downstream to the vicinity of Port Vincent. Because it has not been used widely for past or present gravel mining operations, the lower third of the Amite River (between Louisiana Highway 37 and Louisiana Highway 42) is more typical of a coastal plain river, being characterized by a silt substratum, less channelization, and slower water flow, all of

which are characteristic of Heelsplitter habitat. This freshwater mussel is typically found in soft, stable substrates such as sand, mud, silt, and sandy gravel, in slow to moderate currents. Heelsplitter mussels are usually found in depositional pools below sand point bars and in shallow pools between sandbars and riverbanks.

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

Northern Long-Eared Bat

The northern long-eared bat (*Myotis septentrionalis*), federally listed as an endangered species, is a medium sized bat about 3 to 3.7 inches in length but with a wingspan of 9 to 10 inches and is distinguished by its long ears. Its fur color can range from medium to dark brown on the back and tawny to pale brown on the underside. The northern long-eared bat can be found in much of the eastern and north central United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In Louisiana, there have been confirmed reports of sightings in West Feliciana, Winn, and Grant parishes, although they can possibly be found in other parishes in the state. Some individuals were documented during mist net and bridge surveys on the Winn District of the Kisatchie National Forest and observed under bridges on the Winn District in Grant Parish.

Northern long-eared bats can be found in mixed pine/hardwood forest with intermittent streams. Northern long-eared bats roost alone or in small colonies underneath bark or in cavities or crevices of both live trees and snags (dead trees). During the winter, northern long-eared bats can be found hibernating in caves and abandoned mines, although none have been documented using caves in Louisiana. Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges to feed on moths, flies, leafhoppers, caddis flies and beetles, which they catch using echolocation. This bat can also feed by gleaning motionless insects from vegetation and water surfaces.

The most prominent threat to this species is white-nose syndrome, a disease known to cause high mortality in bats that hibernate in caves. Other sources of mortality for northern long-eared bats are wind energy development, habitat destruction or disturbance, changing conditions and contaminants.

Protected Species

Bald Eagle

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

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

Breeding bald eagles occupy "territories" that they will typically defend against intrusion by other eagles and that they likely return to each year. A territory may include one or more alternate nests that are built and maintained by the eagles, but which may not be used for nesting in a given year. Potential nest trees within a nesting territory may, therefore, provide important alternative bald eagle nest sites. Bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. Disturbance during this critical period may lead to nest abandonment, cracked and chilled eggs, and exposure of small young to the elements. Human activity near a nest late in the nesting cycle may also cause flightless birds to jump from the nest tree, thus reducing their chance of survival.

Colonial Nesting Birds

According to the final CAR from USFWS (dated March 22, 2024, see Appendix D-1 Agency Coordination), the study area includes habitats that are commonly inhabited by colonial nesting waterbirds, which include herons, egrets, night-herons, ibis, and roseate spoonbills. Recommendations to address compliance with the Migratory Bird Treaty Act are included in Section 8.5.

3.2.1.6 Geology, Soils and Water Bottoms, and Prime Farmland

The study area can be roughly divided into three regions with distinctive landforms, topographies, and associated floodplain characteristics. For a map of the geographic and physiographic setting, see Appendix D-2, Figure D:2-2.

1. The High Terraces region includes the Mississippi counties, East Feliciana Parish, St. Helena Parish, and northern East Baton Rouge Parish. This area, with sediment dated to the Pleistocene era, consists of narrow floodplains with rolling hills at elevations typically ranging from approximately 80 to 500 feet above MSL.
2. The Intermediate and Prairie Terraces region includes most of East Baton Rouge and Livingston Parishes and upland portions of Iberville and Ascension Parishes. This landscape transitions from rural hilly older Plio-Pleistocene Terraces to flatter, mid-elevation (approximately 20 to 80 feet MSL) recent Intermediate and Prairie Pleistocene Terraces.
3. The Recent Alluvial Floodplain region includes lower Livingston Parish, the remainder of Iberville and Ascension Parishes, as well as St. James Parish. This area is dominated by expansive, low-lying (approximately 1 to 5 feet MSL), alluvial floodplains filled during the recent Holocene.

Soils and Water Bottoms

Soil textures present in the study area are found in Appendix D-2, Section 2.11.

Prime and Unique Farmland

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

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

No unique farmlands are located within the study area, but approximately 503,703 acres of prime farmlands are located within the study area. For land classification and acreage of prime and unique farmlands in the study area, see Appendix D-2, Section 2.11.

3.2.1.7 Water Quality

The dominant bodies of water in the ARB are the Amite River, Blind River, and Comite River. Numerous rivers and streams cross through the ARB and its hydrology is greatly affected in the lower basin because the elevation is around sea level, plus or minus a foot.

Water quality in the main channels of the ARB is influenced by non-point source agricultural runoff and by residential and commercial point sources. Water quality in the upper ARB; however, is often quite different because of hydrological modifications from the sand and gravel mines and berms. Louisiana Department of Environmental Quality has a general permit for the Louisiana Pollutant Discharge Elimination System, which requires that "impoundments of process or mine dewatering wastewater must be surrounded by a levee of sufficient size and construction to prevent a discharge of pollutants into waters of the state." The berms must have a height of 2 feet freeboard.

Nineteen water bodies in the Amite watershed are listed as impaired for one or more designated uses in the 2016 Integrated Report of Water Quality in Louisiana. (See Appendix D-2, Table D:2-11 for the Final 2016 Integrated Report of Water Quality in Louisiana).

Most of the segments are impaired for fish and wildlife propagation and swimming. In the Amite watershed, the top five suspected causes of impairment are 1) dissolved oxygen, 2) nitrate/nitrite (nitrite plus nitrate as N), 3) fecal coliform, 4) phosphorus (Total), and 5) turbidity.

3.2.1.8 Air Quality

The EPA, Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards for six principal pollutants, called “criteria” pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. Ozone is the only parameter not directly emitted into the air, but forms in the atmosphere when three atoms of oxygen (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.

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

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

Federal activities proposed in the ozone-maintenance area may be subject to the state’s general conformity regulations as stated under LAC 33:III.14.A, Determining Conformity of

General Federal Actions to State or Federal Implementation Plans. A general conformity applicability determination is made by estimating the total of direct and indirect volatile organic compound (VOC) and nitrogen oxide (NOX) emissions caused by the construction of the project. Prescribed de minimis levels of 100 tons per year per pollutant are applicable in maintenance areas. Projects that would result in discharges below the de minimis level are exempt from further consultation and development of mitigation plans for reducing emissions.

3.2.2 HUMAN ENVIRONMENT

3.2.2.1 Cultural and Historical Resources

Federal regulations require USACE, as an agency responsible for funds appropriated by Congress, to identify if properties are historic (listed or eligible for listing in the National Register of Historic Places (NRHP)); to assess the effects the work will have on historic properties; to seek ways to avoid, minimize, or mitigate any adverse effects to historic properties; and to evaluate the proposed action's potential for significant impacts to the human and natural environment. The consideration of impacts to historic and cultural resources is mandated under Section 101(b)(4) of NEPA as implemented by 40 CFR, Parts 1501-1508. Additionally, Section 106 of the National Historic Preservation Act (NHPA), as amended (54 U.S.C. § 300101 et seq.), requires Federal agencies to consider their effects on historic properties (i.e., historic and cultural resources) and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. Section 106 lays out four (4) basic steps that must be carried out sequentially (i.e., "Standard" Section 106): 1) establish the undertaking; 2) identify and evaluate historic properties; 3) assess effects to historic properties; and 4) resolve any adverse effects (avoid, minimize, or mitigate). An agency cannot assess the effects of the undertaking on historic properties until it has identified and evaluated historic properties within the Area of Potential Effects (APE). The Federal agency must consult with the appropriate State Historic Preservation Officer(s) (SHPO), Tribal Historic Preservation Officer/s (THPO) and/or tribal officials, state and local governments, NFS/applicants, and other Consulting Parties in identifying historic properties, assessing effects, and resolving adverse effects, and provide for public involvement. Additionally, it is the policy of the Federal government to consult with Indian Tribal Governments on a Government-to-Government basis as required in E.O. 13175 (U.S. President 2000).

Existing Conditions

The cultural prehistory and history of southeast Louisiana and southwest Mississippi is shared with much of the southeast. The generalized Pre-Contact cultural chronology for the region according to Rees (2010:12) is divided into five primary archaeological components, or "periods," as follows: Paleoindian (11,500-8000 B.C.), Archaic (8000-800 B.C.), Woodland (800 B.C.-1200 A.D.), Mississippian (1200-1700 A.D.), and Historic (1700 A.D.-present). Regionally, these periods have been further divided into sub-periods based on material culture, settlement patterns, subsistence practices, and sociopolitical organization. Specific sub-periods identified within the study area include Poverty Point, Tchefuncte, Marksville, Baytown, Troyville, Coles Creek, Plaquemine, and Mississippian. Post-Contact Period (ca.

1650 A.D.-present) cultural affiliations within the study area follow the thematic approach set forth in the Louisiana Division of Archaeology's (LDOA) State of Louisiana Site Record Form (August 29, 2018) and are divided into the following temporal groups: *Historic Exploration* (1541-1803 A.D.), *Antebellum Louisiana* (1803-1860 A.D.), *War and Aftermath* (1860-1890 A.D.), *Industrial and Modern* (1890-1945 A.D.), and *Post-WWII* (1945 A.D.-present).

Archaeological Sites

Based on a review of the LDOA, *Louisiana Cultural Resources Map* (web-resource), the Mississippi Department of Archives and History Historic Resources Inventory Map (web-resource), and pertinent site and survey reports regarding previous investigations, CEMVN determined that approximately 468 archaeological sites (Table 3-4) are recorded within the current study area that collectively span the entire spectrum of Pre-Contact and Post-Contact archaeological components referenced above; encompassing some 10,000 years or more. It is also important to stress that many of the known sites in the study area have occupation spans encompassing more than one of the aforementioned cultural/temporal periods, attesting to the long-ranging cultural importance of the region. Presently, no comprehensive systematic archaeological survey has been conducted throughout the entire study area and the distribution of recorded archaeological sites is largely indicative of project-specific federal and state compliance activities (e.g., linear surveys of roads, pipelines, and power line rights-of-way). Therefore, in addition to considering the known sites within the region, project alternatives must also be assessed for archaeological site potential.

Table 3-4. Historic Properties within the Study Area.

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

Archaeological Site Potential

Louisiana's Comprehensive Archaeological Plan (Girard, et al. 2018) and research conducted by Earth Search, Inc. (Lee et al. 2009) for the *Proposed Amite River and Tributaries, Bayou Manchac Water Shed Feasibility Study, Ascension, East Baton Rouge & Iberville Parishes, Louisiana*, can be used for baseline planning purposes. The unique geomorphology and ecology of the study area has largely influenced site type and location. To examine how the physical landscape impacts the archaeological record, the LDOA divides the study area into a series of regions that follow the ecoregions classification of the Western Ecology Division of the U.S. Environmental Protection Agency (Daigle et al. 2006). There are six Regions at Level III, three of which fall within the present study area (Southern Coastal Plain, Mississippi Valley Loess Plain and Mississippi Alluvial Plain). All three Level III Regions are then further divided into sub-regions (Level IV: Southern Rolling Plains, Baton Rouge Terrace, Gulf Coast Flatwoods, Inland Swamps, and Southern Holocene Meander Belts). Girard, et al. (2018: 24-31) define how the unique environmental, biological, and physiological characteristics of each region influenced cultural development to provide context to the distribution of where sites are likely or unlikely to occur. Complimentary to Girard, et al.'s (2018) ecosystem-based model (above), Lee et al. recommend:

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

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

U.S. Civil War

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

Program (ABPP; 54 U.S.C. 380101-380103), Civil War Sites Advisory Commission (Public Law 101-628) has assigned Preservation Priorities (<http://npshistory.com/publications/battlefield/cwsac/report.pdf>) to five individual battlefields located within the Study Area: Magnolia Cemetery (East Baton Rouge: Priority IV.1), Donaldsonville 1862 (Ascension Parish; Priority IV.2), Donaldsonville 1863 (Ascension Parish; Priority IV.2), Cox's Plantation (Ascension Parish; Priority IV.1), and Port Hudson (East Baton Rouge Parish and East Feliciana Parish: Priority I.1).

Louisiana Scenic Rivers Act

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

Next Steps

No determination of effect under the NHPA pursuant to 36 CFR 800.4(d) is being made at this time. As an alternate to the "Standard Section 106" process described above, and in partial fulfillment of its Section 106 responsibilities, on August 23, 2024 CEMVN executed the "*Programmatic Agreement Among The U.S. Army Corps Of Engineers, New Orleans District; Louisiana Department Of Transportation And Development; Louisiana State Historic Preservation Officer Of The Department Of Culture, Recreation & Tourism; Choctaw Nation Of Oklahoma; And Mississippi Band Of Choctaw Indians; Regarding The Amite River And Tributaries-East Of The Mississippi River, Louisiana, Flood Risk Management Feasibility Study.*" The Draft Programmatic Agreement (PA) was distributed to all consulting parties and the Advisory Council on Historic Preservation (ACHP) for review and comment. The final executed PA is provided as Appendix D-3 (Attachment 1)

A PA is appropriate when the undertaking is complex; the undertaking will adversely affect a significant historic property; the extent of effects is unknown; there is public controversy; and/or the parties involved overwhelmingly prefer it. The goal of this Section 106 consultation was to provide a framework for addressing this undertaking and establish protocols for continuing consultation with SHPO(s), Federally-Recognized Tribal governments, and other stakeholders. The PA identifies Consulting Parties, defines applicability, establishes review timeframes, stipulates roles and responsibilities of stakeholders, includes procedures for consultation with Federally-Recognized Tribes, considers the views of the SHPO/THPO(s) and other Consulting Parties, affords for public participation, provides programmatic allowances that exempt certain actions from Section 106 review, outlines a standard review process, determines an appropriate level of field investigation to identify, evaluate, and determine the potential to affect historic properties

and/or sites of religious and cultural significance, streamlines the assessment and resolution of adverse effects to historic properties through avoidance, minimization, and programmatic treatment approaches for mitigation, establishes reporting frequency and schedule, provides provisions for post-review unexpected discoveries and unmarked burials, and incorporates the procedures for amendments, duration, termination, dispute resolution, and implementation.

The PA governs USACE's subsequent National Historic Preservation Act (NHPA) compliance efforts and will be adhered to during PED and implementation of the project and sets out the measures CEMVN will implement to resolve adverse effects through avoidance, minimization, and/or mitigation (36 CFR § 800.14(b)). Following the execution of the PA, the Chief of Engineers may proceed with making a final decision on the project and issuing a Finding of No Significant Impact (FONSI) in compliance with NHPA and NEPA.

3.2.2.2 Aesthetics

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

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

Numerous efforts have been made to protect and promote visual resources within the ARB that are known for their unique culture and natural identity. One of these efforts, made by the Louisiana Department of Culture, Recreation & Tourism, is for marketing scenic byways thru rural landscape and culturally significant communities. There is a Scenic Byway bordering the study area on the south and east, which includes the Great River Road. This is but one

segment to an overall scenic byway that stretches on multiple thoroughfares from Canada to the Gulf of America. It is state and federally designated and has an “All American Road” status, making it significant in culture, history, recreation, archeology, aesthetics, and tourism.

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

“The general purpose of the Louisiana Scenic Rivers Act as it applies to the Amite River is to protect this section of river from channel modifications, protect water quality and habitats, and preserve recreational and scenic aspects of this river. Many of the Amite River reaches upstream and downstream of Grangeville have experienced significant mining activity and are neither natural nor scenic.” (ERDC/GSL TR-07-26, 2007, Page 12) Since 2007, LDWF has made efforts to halt in-stream mining and relocate mining sites further off the channel. While not pristine, the river remains natural and scenic in many of those reaches.

3.2.2.3 Recreation

Opportunities for both consumptive and non-consumptive recreational activities in the study area are centered on natural resources. Consumptive recreational activities in the area include hunting and fishing. Non-consumptive recreational activities include hiking, canoeing, boating, biking, ATV riding, camping, outdoor photography, wildlife observation, and environmental education/interpretation.

The following public recreation areas, both within and near the study area, provide high quality recreational opportunities: Homochitto National Forest, Caston Creek Wildlife Management Area (WMA), Maurepas Swamp WMA, Waddill Outdoor Education Center, and multiple county-wide park and recreation systems. Table 3-5 highlights the extensive network of recreation resources within the study area currently established at the public level.

Table 3.5. Recreational Resources within the Study Area

Public Area	Size (acres)	Parish / County	Managing Agency	Recreation		Boat Launch	Recreational Highlights
				Consumptive	Non-consumptive		
National Forest							
Homochito National Forest	191,846	Amite, Franklin, Lincoln, Wilkinso n	United States Departme nt of Agriculture Forest Service	fishing, hunting	Horseback riding, hiking, picnicking, mountain biking, birding, photography, camping, shooting range	Yes	This National Forest is just outside the project area border to the northwest and includes 5.5 mile Bushy Creek Horse Trail Clear Springs Recreation Area, Okhissa Lake Recreation Area with boat ramps, Woodman Springs Shooting Range
State Wildlife Refuge							
Caston Creek WMA	28,286	Amite, Franklin	Mississippi Departme nt of Wildlife, Fisheries& Parks	Fishing, hunting	Horseback riding, hiking, picnicking, mountain biking, birding, photography, camping	No	This WMA is just outside the project area border to the northwest and within Homochito National Forest. It offers scenic horseback trails as well as various hiking and biking trails for the avid outdoorsmen or the novice adventurer.
Maurepas Swamp WMA	124,567	Ascensio n, Livingsto n, St. James, St. John the Baptist	Louisiana Departme nt of Wildlife and Fisheries	fishing, hunting, trapping	Boating, camping, birding, wildlife viewing	No	Bald eagles and osprey nest in and around the WMA. Numerous species of neotropical migrant birds use this coastal forest habitat during fall and spring migrations. Resident birds, including wood ducks, black-bellied whistling ducks, egrets, and herons can be found on the WMA year-round.
Waddill Outdoor Education Center	237	East Baton Rouge	Louisiana Departme nt of Wildlife and Fisheries	fishing,	Nature trails, birding, shooting range, archery range, picnic facilities	No	Accessible via North Flannery Road or by boat from the Comite River. LDWF initiated a Summer Day Camp for children ages 12 to 16 in the summer of 2011. The camp is free and open for 5 days allowing participants to receive official boater and hunter education certifications. The camp also offers a fish identification class, fishing and canoeing, skeet shooting, and other outdoor related activities.
Parish/County Park System							
Ascension Parish Parks	N/A	Ascensio n	Ascension	N/A	Ballfields, courts, playgrounds, leisure paths, swimming pools, picnic areas	Yes	The parish has 13 parks within the study area in communities including St. Amant, Gonzales, Prairieville, and Geismar

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

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

Table 3-6. L&WCF Grant Funding within the Project Area

Grants	Parish/County	Amount
2	Amite	\$73,181.00
1	Wilkinson	\$20,000.00
20	Ascension	\$1,542,343.00
51	East Baton Rouge	\$2,694,127.00
2	Iberville	\$349,295.00
19	Livingston	\$2,208,956.00
4	St. James	\$367,093.00
1	St. John the Baptist	\$128,027.00
100	Total	\$7,383,022.00

Source: <https://lwcf.tplgis.org/mappast/>

3.2.2.4 Socioeconomics

Tables 3-7, 3-8, and 3-9 display the population, number of households, and the employment (number of jobs) for each of the parishes and counties for the years 2000, 2010, and 2017 as well as projections for the years 2025 and 2045. The 2000 and 2010 population, number of households, and employment is based on estimates from the 2010 U.S. Census and the projections were developed by Moody's Analytics (ECCA) Forecast, which has projections to the year 2045.

Table 3-7 Historical and Projected Population by Parish/County

Parish/County	2000	2010	2017	2025	2045
Ascension	76,627	107,215	122,948	136,988	161,973
East Baton Rouge	412,852	440,171	446,268	441,495	415,720
East Feliciana	21,360	20,267	19,412	18,140	15,910
Iberville	33,320	33,387	33,027	31,166	27,428
Livingston	91,814	128,026	138,228	150,306	166,260
St. Helena	10,525	11,203	10,363	9,681	8,592
St. James	21,201	22,006	21,790	22,599	23,727
St. John the Baptist	43,248	45,621	44,078	45,713	47,995
Amite	13,599	13,131	12,447	11,992	11,680
Franklin	8,448	8,118	7,765	7,517	7,476
Lincoln	33,166	34,869	34,347	35,400	36,479
Wilkinson	10,312	9,878	8,804	8,335	7,823
Total	776,472	873,893	899,477	919,332	931,063

Sources: 2000, 2010, 2017 from U.S. Census Bureau; 2025, 2045 from Moody's Analytics (ECCA) Forecast

Table 3-8. Projected Households by Parish/County

Parish/County	2000	2010	2017	2025	2045
Ascension	26,995	38,050	44,890	51,815	66,244
East Baton Rouge	156,740	172,440	179,910	184,008	186,082
East Feliciana	6,694	6,996	6,922	6,752	6,411
Iberville	10,697	11,075	11,229	11,137	10,643
Livingston	32,997	46,297	52,184	57,891	69,149
St. Helena	3,890	4,323	4,116	3,995	3,810
St. James	7,002	7,691	7,945	8,561	9,727
St. John the Baptist	14,381	15,875	16,005	17,249	19,602
Amite	5,261	5,349	5,213	5,149	5,252
Franklin	3,205	3,214	3,118	3,138	3,272
Lincoln	12,563	13,313	13,682	14,272	15,446
Wilkinson	3,584	3,452	3,236	3,097	3,065
Total	284,008	328,074	348,450	367,063	398,703

Sources: 2000, 2010 from U.S. Census Bureau; 2017, 2025, 2045 from Moody's Analytics (ECCA) Forecast

Table 3-9. Projected Employment by Parish/County

Parish/County	2000	2010	2017	2025	2045
Ascension	36,431	49,414	59,670	65,803	82,614
East Baton Rouge	197,789	205,112	227,301	222,833	222,810
East Feliciana	7,811	7,427	7,866	7,321	6,820
Iberville	11,745	12,622	13,661	12,892	12,054
Livingston	42,326	56,675	66,010	70,000	82,219
St. Helena	3,830	4,097	4,171	3,868	3,649
St. James	8,102	8,949	8,940	9,257	10,448
St. John the Baptist	18,702	19,252	18,794	19,479	21,968
Amite	5,274	4,385	4,206	4,023	4,082
Franklin	3,234	2,866	2,721	2,650	2,747
Lincoln	13,981	12,940	13,614	13,749	14,784
Wilkinson	3,239	2,968	2,610	2,404	2,343
Total	352,463	386,704	429,564	434,280	466,538

Sources: 2000, 2010 from U.S. Bureau of Labor Statistics; 2017, 2025, 2045 from Moody's Analytics (ECCA) Forecast

Table 3-10 shows the per capita personal income levels for the 12 parishes and counties for the years 2000, 2010, 2017, and 2025, with projections provided by Moody's Analytics Forecast.

Table 3-10. Per Capita Income (\$) by Parish/County

Parish/County	2000	2010	2017	2025
Ascension	24,052	39,416	47,628	60,180
East Baton Rouge	27,228	39,651	48,120	60,048
East Feliciana	20,049	33,122	39,908	53,331
Iberville	18,681	32,342	38,960	50,288
Livingston	21,521	32,621	39,883	51,341
St. Helena	16,821	34,136	41,273	55,046
St. James	18,722	38,421	45,219	60,576
St. John the Baptist	20,002	33,894	41,505	57,423
Amite	17,923	25,620	32,225	41,711
Franklin	15,844	27,175	33,133	42,441
Lincoln	20,257	30,468	36,895	44,607
Wilkinson	14,667	24,322	28,745	37,916

Sources: 2000, 2010 from U.S. Census Bureau; 2017, 2025 from Moody's Analytics (ECCA) Forecast

3.2.2.5 Other Social Effects

In accordance with the USACE Institute for Water Resources (IWR) handbook in Applying OSE in Alternatives Analysis (USACE, 2013), the CEMVN identified six themes to describe the social impact in the study area. The six social factors include:

- Social Vulnerability & Resiliency
- Health & Safety
- Economic Vitality
- Social Connectedness
- Participation
- Disadvantaged Communities

3.3 FUTURE WITHOUT PROJECT CONDITIONS

NEPA requires that, in analyzing alternatives to a proposed action, a federal agency must consider an alternative of "no action." The future-without-project (FWOP) conditions apply when the proposed action would not be implemented and the predicted additional

environmental gains (e.g. flood risk reduction) would not be achieved. The FWOP conditions would include lower tax revenues as property values decline due to higher risk of damage from flooding events over time. Higher risk of damage from flooding could manifest itself in higher premiums for flood insurance under FEMA's National Flood Insurance Program. Higher premiums are expected to increase the cost of property ownership and result in correspondingly lower market values.

Without implementation of the proposed action, other federal, state, local, and private restoration efforts may still occur within or near the proposed project area (please see Section 1.4 for project area definition). Section 1.5 of the FIFR-EA discusses ongoing programs and potential projects in the study area for floodplain related activities. None of the proposed projects described in Section 1.5 are currently in construction and if they were implemented, would have only localized flood risk reduction within the study area. The projects/programs would have the potential to reduce the number of eligible structures.

Section 1.5.1 details current projects in and around the study area. The Comite River Diversion, which is currently under construction, will be located approximately 20 river miles upstream of the confluence of the Comite and Amite Rivers (Figure 1-1). The project will divert water from the Comite River west to the Mississippi River, between the cities of Zachary and Baker, providing urban flood damage risk reduction.

SECTION 4

Formulation of Alternatives

Plan formulation supports the USACE water resources development mission. A systematic and repeatable planning approach is used to ensure that sound decisions are made. The Principles and Guidelines describe the process for Federal water resource studies. It requires formulating alternative plans that contribute to Federal objectives. Alternative plans are a set of one or more management measures functioning together to address one or more planning objectives. A management measure is a feature or activity that can be implemented at a specific geographic site to address one or more planning objectives.

The initial plan formulation strategy was to focus on regional solutions (e.g., dams, detention basin, and diversion) followed by formulation based on economics damage centers (e.g., where the greatest consequences are) minimizing life loss and/or more local protection. These measures/alternatives were developed based on previous reports and studies, NFS information, stakeholder/public input, new H&H, geotechnical assessments, and professional judgment. This section also describes the plan formulation process to identify the Recommended Plan, which includes development of cost estimates and economic analysis.

4.1 MANAGEMENT MEASURES AND SCREENING

The ARB primarily has flooding from two different sources. The upper basin flooding is caused from headwater flooding from rainfall events. The lower basin flooding is caused by a combination of drainage from headwaters and backwater flooding from tides, wind setup as well as flooding from tropical coastal storm events. Thirty-four NS and structural management measures of a variety of scales were identified for evaluation to reduce the risk of flood damages within the ART study area (Table 4-1). The measures were evaluated by the screening process based on the planning objectives, constraints, as well as the opportunities and problems of the study/project area.

The management measures comprised of the FRM concepts are:

- Remove Water (RW) = removing water more quickly out of the ARB
- Hold Water (HW) = during heavy rainfall events, water would be held back from flowing down the ARB until water levels drop to reduce the flood risk
- Nonstructural (NS) = does not modify or restrict the natural flood
- Upper and Lower Basin (UL) = alternative that likely results in reduced flood risk for the entire ARB.
- Focused Structural (FS) = measures to protect critical facilities.

Nineteen measures were carried forward to develop the alternative plans. Section 2 of Appendix F provides a description of the evaluation.

Table 4-1. Management Measures

Measure ID	Description
RW-1	Dredging of Outfall @ Amite River
RW-2	Dredging of Lower Amite River
RW-3	Dredging of Upper Amite River
RW-4	Dredging of Bayou Manchac
RW-5	Bridge Restrictions/ Improvements for I-12
RW-6	Amite River Channel Bank Gapping
RW-7	Storage Area at Spanish Lake, Ascension/Iberville Parish
RW-8	Hwy 22 and Port Vincent Bridge Drainage Improvements
RW-9	Upper Amite Bridge Restrictions/ Improvements
RW-10	Bayou Conway Pump to Mississippi River
RW-11	Diversion Gravity Fed (Manchac)
RW-12	Diversion Pump Station (Manchac)
RW-13	Diversion Gravity Fed (Union)
RW-14	Diversion Pump Station (Union) with conveyance channel
RW-15	Diversion Gravity Fed (Romeville)
RW-16	Diversion Pump Station (Romeville) with conveyance channel
RW-17	Modifications to Comite Diversion
RW-18	Dredging of Outfall @ Blind River
RW-19	Dredging of Lower Blind River
RW-20	Dredging of Colyell Creek
RW-21	Amite River Diversion Channel Bank Gapping
RW-22	Dredging of Lake Maurepas
HW-1	0.01 AEP Dry Dams-Upper Amite Tributaries
HW-2	Small Dry Dams on Amite River -Upper Amite
HW-3	Reservoirs along Bayou Manchac
HW-4	Flood Gate at Blind River Hwy 61
HW-5	Dry Retention Ponds- Lower Amite
HW-6	Closures at Tidal Passes
HW-7	University Lakes as Reservoir
UL-1	Large Scale Dam -Upper Amite (i.e. Darlington 0.04 AEP)
NS-1	Flood warning/Monitoring systems
UL-2	Dredging of Amite River Tributaries
NS-2	NS Improvements for high frequency events
FS-1	Ring Levees around Critical Facilities

Note: Shaded cells are measures that were not carried forward during the screening process.

4.2 DEVELOPMENT OF INITIAL ARRAY OF ALTERNATIVE AND SCREENING

Fifteen alternatives were assembled through the plan formulation process from the measures identified in Table 4-1, which include alternatives for no action and NS (Table 4-2). The alternative plans were initially identified using one or more of the 19 management measures that were carried forward after the screening evaluation. Two additional alternatives were identified through public scoping, as discussed in Section 2.4.

Events less frequent than the 0.04 AEP events cause the majority of flooding in the ARB. The rainfall events, combined with a steep hydraulic gradient from the headlands of the basin to the flat middle and lower basins (Figure 4-1), provide for a significant backwater effect at the lower end of the system at Lake Maurepas. Once the water accumulates and backs up, it can no longer exit the basin and the basin begins to fill. This unique hydrology was evaluated with numerous measures and alternatives that resulted in primarily shifting water from one place to another within the damage areas while not reducing the backwater effect and thus not allowing water to drain from the basin. In essence, other alternatives could not get to the core of the issues because they were not removing water from the hydraulic budget. Because water backs up into the watershed, water surface elevations did not lower in specific areas or overall. This, in turn, did not allow for significant lowering of water surface elevation in damage areas. The parishes in the study area have a combined population of about 900,000 with more than half of the population living in East Baton Rouge Parish. The study area has over 260,000 structures and of those, about 80 percent are in the central portion of the ARB, north of Bayou Manchac. Many of the alternatives, such as channel improvements and diversions, were located where there were few structures, so there were limited benefits. Additionally, no significant flood risks associated with the ARB and its tributaries were identified within the state of Mississippi. The remaining alternatives that were not screened were those that provided storage of water to attenuate flooding downstream in heavily developed areas. Those alternatives are the focused array of alternatives.

In compliance with the Water Resources Development Act of 2016 (WRDA, 2016) Section 1184, engineering with nature was considered. Alternatives 14 and 15 are nature-based features; however, they were screened due to limited flood risk reduction benefits as discussed in Appendix G.

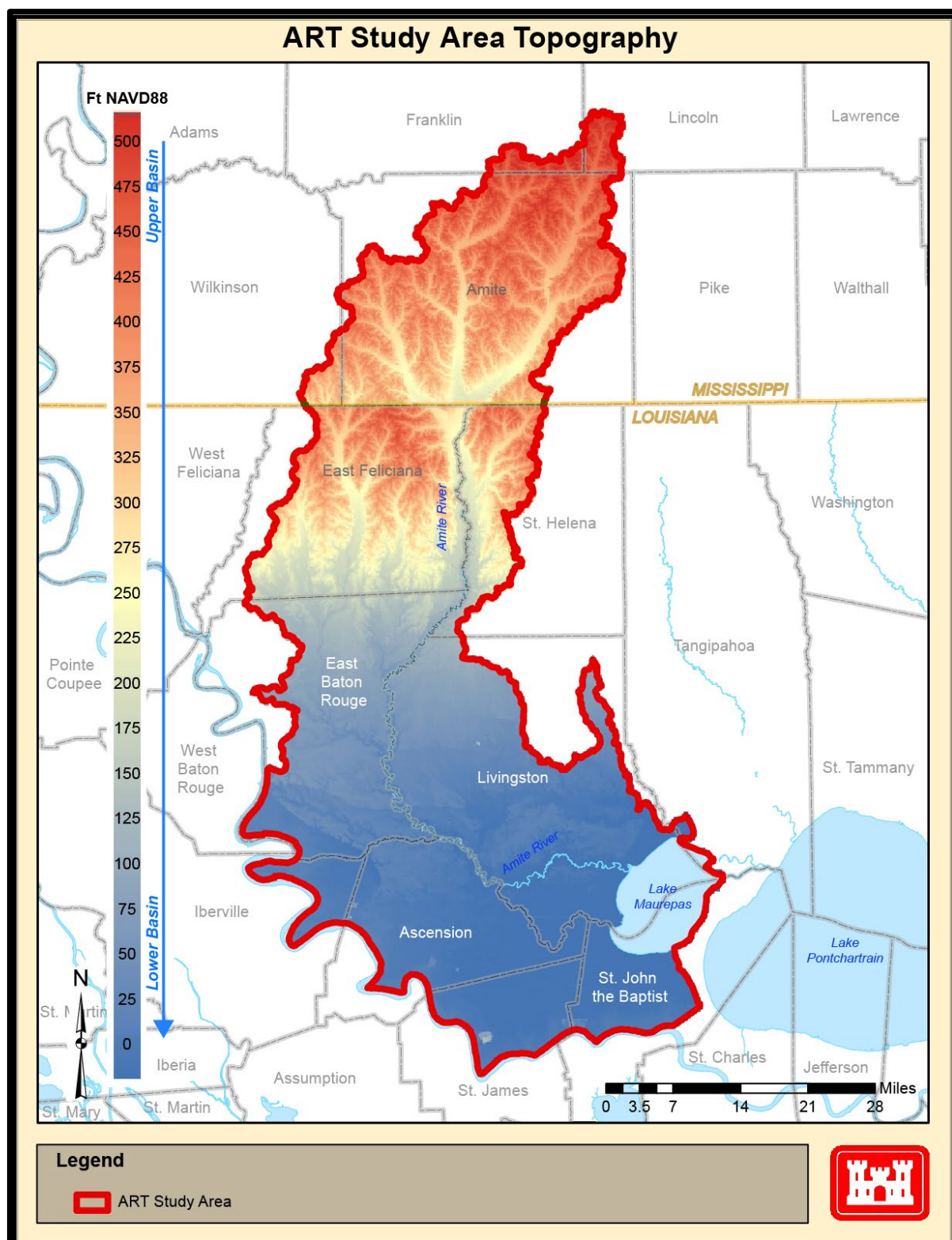


Figure 4-1. ARB Topographic Digital Elevation Model (Source: Louisiana Oil Spill Coordinators Office 2001)

Table 4-2. Alternatives

Alt ID	Measures Included	Alternative Description
Alt 1	No Action	No action would be taken under this plan. Damages would continue into the future.
Alt 2	RW-1+RW-2	Dredging of the Amite River outfall (RW-1) and in the lower reaches of the Amite River (RW-2)
Alt 3	RW-6	Lower Amite River Channel Bank Gapping (RW-6)
Alt 4	RW-8	Hwy 22 and Port Vincent Bridge drainage improvements (RW-8)
Alt 5	HW-3+ RW-4	Dredging (RW-4) and storage along Bayou Manchac in multiple small reservoirs (HW-3)
Alt 6	RW-7+NS-2+FS-1	Flood gate at Airline Hwy, Pump to MS River, open flood gates at Turtle and Alligator Bayous (RW-7) with the addition of NS measures (NS-2) and ring levees for residential communities and critical infrastructure (FS-1)
Alt 7	RW-5+RW-9	Reduction of flow restrictions from bridges at I-12 (RW-5) and above I-12 (RW-9)
Alt 8	RW-3	Dredging of the Upper and Central Amite Basin, above I-12 (RW-3)
Alt 9	HW-7	University Lakes as reservoirs (HW-7)
Alt 10	HW-1	0.01 AEP Dry Dams along tributaries (HW-1)
Alt 11	HW-2	Small dry dams on the Amite River (HW-2)
Alt 12	UL-1	Large scale 0.04 AEP dam (UL-1) (wet or dry)
Alt 13	NS-1+ NS-2	NS (NS-1 and NS-2) (0.04 and 0.02 AEP floodplains)
Alt 14	None	Conversion of sand and gravel mines in the Amite Riverine to bottomland hardwood forest and swamp forest. This is considered a natural and nature-based measure.
Alt 15	None	Restoration of River Meanders. This is considered a natural and nature-based measure.
Alt 16*	None	Acquisition and Buyouts

Note: Shaded cells are alternatives that were not carried forward during the screening process.

* Alternative 16 was identified by USACE during internal reviews, after the release of the SSDIFR-EA on December 15, 2023. As detailed in Section 4.4.3 of this report, this alternative underwent evaluation and screening.

4.3 FOCUSED ARRAY OF ALTERNATIVES

The focused array of alternatives, which are the same alternatives as previously identified in the final array in the publicly released 2019 DIFR/EIS, are presented in Table 4-3.

Descriptions of the alternatives are presented in the Plan Formulation Appendix F and designs are presented in Engineering Appendix B.

Table 4-3. Focused Array of Alternatives

Alt ID	Management Measures	Alternative Description
Alt 1	No Action	No action would be taken under this plan. Damages would continue into the future.
Alt 10	HW-1	0.01 AEP Dry Dams along tributaries (HW-1)
Alt 12	UL-1	Large scale 0.04 AEP dam (UL-1) (wet and dry)
Alt 13	NS-1+ NS-2	NS (NS-1 and NS-2) (0.04 and .02 AEP floodplains)

Three alternatives were screened due to negative net benefits: the NS plan for a 0.02 AEP floodplain, large scale 0.04 AEP wet Darlington Dam and the three 0.01 AEP dry dams on the Darlington, Lilley, and Bluff Creeks (Appendix F). The remaining alternatives were, Alternative 10 for an 0.01 AEP dry dam on Sandy Creek, Alternative 12 0.04 AEP dry Darlington Dam and Alternative 13 NS plan for 0.04 AEP. The alternative carried forward and chosen to be the TSP based on the 2019 economic evaluation was Alternative 12, an 0.04 AEP dry Darlington Dam since it had the highest net economic benefits.

4.3.1 2019 TSP Public, Policy and Technical Reviews and Additional Detailed Evaluation

The TSP in the publicly released 2019 DIFR/EIS was identified as a \$2.3 billion dry dam and with NS measures to address residual risk. This plan was preliminarily determined to be feasible; however, technical and policy concerns were raised during its public, policy, and technical reviews and in additional detailed evaluation.

Per ER 1105-2-103, acceptability is the workability and viability of the alternative plan with respect to acceptance by state and local entities and the public and compatibility with existing laws, regulations, and public policies. Two primary dimensions to acceptability are implementability and satisfaction. Implementability means that the alternative is feasible from technical, financial, and legal perspective. If it is not feasible due to any of these factors, then it cannot be implemented, and therefore is not acceptable. An infeasible plan should not be carried forward for further consideration. However, just because a plan is not the preferred plan of a NFS does not make it infeasible or unacceptable. The non-Federal partner's willingness or unwillingness to sign a Project Cooperation Agreement should not be the test of whether a plan is acceptable or not. The second dimension to acceptability is the satisfaction that a particular is welcome from a political or preferential perspective. Obviously, the extent to which a plan is welcome or satisfactory is a qualitative judgement. Nevertheless, discussions as to the degree of support (or lack thereof) enjoyed by particular alternatives from a community, state Department of Natural Resources, Ducks Unlimited, or other national or regional organizations, for example, are additional pieces of information that can help planners evaluate whether to carry forward or screen out alternative plans.

4.3.2 Implementability

Implementability means that the alternative is feasible from technical, environmental, economic, financial, political, legal, institutional, and social perspectives. If it is not feasible due to any of these factors, then it cannot be implemented, and therefore is not acceptable. The level of the dam design, due in part to a lack of soil data, was insufficient to ensure constructability. Constructing the dam would introduce significant incremental risk to the communities downstream. A semi quantitative risk analysis was not conducted to identify how severe the incremental risk would be.

For a dam to be effective to reduce flood risk, it needs to be located in the upper Amite River watershed, an area where sand and gravel mining is extensive. There is a high likelihood that there would be presence of these high porosity soils throughout the upper Amite River area which would result in weaker soil strengths that require a much larger dam base and section. Without the increased level of design evaluation, the available information regarding the embankment (settlement, seepage, abutments) and structures (spillway and controlled outlet) were insufficient to inform the dam safety process and constructability. In consideration of the technical and policy concerns raised during public, policy, and technical review and in accordance with USACE policies ER 1110-2-1302 Civil Works Cost estimating, the overall contingency for dam increased from 30 percent used for the 2019 DIFR-EIS to be around 110-130 percent. This level of increase in cost contingency would also be applied to the other dam alternative (Alternative 10) of the 0.01 AEP dry dam on Sandy Creek.

As a result, a USACE policy compliant, technically implementable, and constructable dam design and cost, including addressing incremental life risk, would likely exceed the benefits resulting in no federal interest. Because of the previously outlined social impacts and acceptability, the cost was not reevaluated. The best available Geotech data was used to screen the dam from a technical standpoint and economic standpoint.

4.3.3 Social Impacts and Acceptability

Again, the two components of acceptability are implementability and satisfaction. In light of the acceptability policy criteria outlined previously, there are substantial social impacts that would have resulted from the dam and more specifically the unsupportable adverse impacts to socially vulnerable communities that would occur. In February 2021, the Governor of Louisiana expressed concerns regarding the potential impacts to disadvantaged communities within the footprint of the Darlington Dry Dam. The area where Darlington Dam would be located has a large portion of low income and historically underserved residents according to the U.S. Census Bureau. There is the potential for high, adverse, disproportionate, direct impacts to communities with limited resources and representation from construction of the Darlington Dam. A disproportionately high and adverse effect means the adverse impact is appreciably more severe or greater in magnitude on vulnerable populations than that suffered by communities with robust representation and resources after considering offsetting benefits. The high adverse impact is the relocation of households that are currently within the footprint of the proposed dam. The benefits of the dam would be

flood risk reduction. A vast majority of structures benefiting (damages prevented) are located well south of the dam. The area of the dam footprint is feeling the high burden of the project (relocations) while only receiving a small share of the flood risk reduction benefits. The community would likely relocate to housing in an area outside of a floodplain. All structures within the footprint of the proposed dam would have been acquired. This concern was critical to the Governor and his concerns were expressed to the CEMVN Commander in a letter.

Additionally, there was significant public dispute as to the nature or effects of the dam project. East Feliciana and St. Helena Parishes, Louisiana, and Amite County, Mississippi have passed public resolutions against USACE construction of the dam due to concerns about community impacts to the parishes. Finally, there is significant public dispute as to the economic and environmental costs or benefits of the dam project. St. Helena and East Feliciana Parishes also have concerns regarding the loss of tax base due to large land acquisitions.

The misalignment between the Darlington Dam and USACE policies and initiatives along with the lack of support and satisfaction from both state and local governments and a sector of the public gives rise to the dam alternative not being acceptable. Based on acceptability criteria, the Darlington Dam alternative is screened as an alternative.

4.3.4 Conclusion

Based on the concerns and available information the Dry Dam alternative did not meet USACE tolerable risk guidelines due to economic risk/cost effectiveness, potential societal life risk, and environmental acceptability. For these reasons the Dry Dam alternative (including Alternative 10: Sandy Creek Dry Dam) was removed from further consideration consistent with USACE policy of acceptability and implementability in accordance with ER 1105-2-100 (the applicable Engineering Regulation in effect at the time the decision was made).

4.4 FINAL ARRAY OF ALTERNATIVES PLAN DEVELOPMENT

With removal of the Dry Dam alternative from further consideration, the next highest NED alternative and likely the only economically justified one was the 0.04 AEP NS plan. To further assess the 0.04 AEP NS only plan, three plans were developed as well as revisions to existing conditions to account for projects that alter the hydrology as described in Section 1.5 of the FIFR-EA and H&H models for inclusion of residual risk from storm surge downstream boundary conditions (See Appendix H). The first developed plan identified was the NED Plan using a new USACE method of aggregation and an additional two alternatives that increased OSE benefits for SV areas. Plan 1 is the no action alternative.

For purposes of alternative development of the final array, assessment of the NS Plans included elevation and floodproofing measures as follows:

- Elevation of residential structures to predicted 2078, 0.01 AEP BFE to a maximum of 13 feet above ground level.

- Dry Floodproofing of nonresidential structures for flood depths not greater than 3 feet above the adjacent ground.

Elevation of structures greater than 13 feet above ground level introduces damage risk from winds during tropical events as a new condition. This height generally serves as a differentiator for insurance rates for wind/hail coverage as well and is therefore used as the upper limit for elevating structures. If the BFE elevation is greater than 13 feet above ground level, the structure would still be eligible for elevation up to that height with the residual risk present. Wet floodproofing of nonresidential structures for flood depths greater than 3 feet above the adjacent ground or where dry floodproofing has been determined to be impractical was carried forward as an option for implementation. For evaluation purposes, the cost and benefits of elevation and dry flood proofing was used to determine the NS plans.

4.4.1 USACE Logical Aggregation Method

All NS plans employed the USACE “logical aggregation method” which according to USACE Planning Bulletin 2019-03, NS analyses are to be conducted using the method. Rather than the individual structure, selected groups of structures known as “aggregates” are the unit of analysis and each such aggregate is a separable element that must be incrementally justified. Aggregates were arranged based on several factors (See Appendix G: Economic and Social Consideration). Since the study area is subject to riverine, rainfall, and residual flood damages associated with hurricanes and coastal storm flood events, aggregates were primarily grouped according to the source (type of flood event) of the flooding. Using this method, 106 floodplain aggregates (groups of structures) were identified.

4.4.2 Flood Risk Source Evaluation

For the purposes of this study, alternatives were strictly developed to address rainfall flood risk. Once the final array of alternatives was developed, an increment of residual risk for storm surge was added. The HEC-FDA economic model uses aggregations based on the rainfall WSE only and calculates the flood damages based on the predominate condition since as the relative WSE at a given probability changes, the expected annual damage changes. The predominant condition WSE takes the higher of the WSEs generated by two hydrologic boundary condition scenarios: one condition accounts for basin-wide rainfall events with normal highwater downstream boundary condition and a secondary condition that has negligible basin rainfall with storm surge downstream boundary conditions. The details of these models are available in the H&H Appendix H. Eight flooding events were used (0.5, 0.2, 0.1, 0.04, and 0.02, 0.01, 0.005, and 0.002) for the HEC-FDA analysis resulting in assignment of stages relative to the probabilities change.

4.4.3 Acquisition and Buyouts Assessment

Acquisition and buyouts were not carried forward to the final array for assessment of NS plans using the USACE logical aggregation method. The USACE team completed an economic analysis to assess the cost of acquisition and relocation of structures based on the eligible structures in Plan 4. The cost estimate of acquiring structures was computed upon completion of model execution. Acquisition costs are based on parcel of land acquisition,

structure(s) built on the land, an architectural survey, and other associated miscellaneous acquisition process costs. The depreciated structure replacement value (excluding any contents) was used to represent structure cost, previously described as sourced from RS Means square foot cost data. Cultural resources concerns are addressed by obtaining an architectural survey. Finally, demolition, deed changes, legal fees, and re-grading the surface were estimated and included as miscellaneous costs. These miscellaneous costs were sourced from the 2010 USACE Cedar Rapids, Iowa Feasibility Report. The prices derived from the 2010 report were price indexed to 2023 price levels. Acquisition costs by structure were summed to yield an estimate of total structure acquisition cost.

Relocation costs were based on tenant relocation (i.e. renter not owner) temporarily displaced from an acquired parcel, as required per Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (URA). Relocation costs include purchasing a suitably located piece of property commensurate with the acquired parcel, and all other URA associated costs. Other URA costs include assisting tenants with searching/moving expenses and incidentals, as well as re-establishing costs for nonresidential structures. The URA costs amount to \$53,800 per residential and \$269,000 per nonresidential structure. Relocation costs by structure were summed to yield an estimate of total structure relocation cost. The total acquisition and relocation costs were summed and applied on a per structure basis to estimate acquisition and relocation cost. The acquisition and relocation first costs, prior to feasibility level design activities, was \$2,216,403,800 versus the elevation and floodproofing measures of \$1,657,970,000. The alternative was screened due to high first costs relating to damage reduction realized resulting in negative net benefits.

Additionally, interior study area damages result from widespread and low-level flooding. Therefore, individual reaches were not identified by this logical aggregation method application relating to relocations and buyouts.

4.4.4 Feasibility Level Design Activities

The SSDIFR-EA was publicly released on December 15, 2023. The December 2023 TSP included residential elevations and commercial floodproofing for a combined total of 3,298 preliminary classified eligible structures. USACE then conducted concurrent reviews of the December 2023 SSDIFR-EA, consisting of public, technical, legal, and policy reviews. Comment review led to additional analysis conducted on the NS final alternatives array.

Prior to feasibility level design activities, analysis completed during the SSDIFR-EA Plans 2-4 study area were evaluated using the 0.1, 0.04, and 0.02 AEP floodplains as the aggregation method. Hydraulic and Economic modeling refinements consisted of reassessing Plans 2-4 using the 0.1, 0.04, 0.02, and 0.01 AEP floodplains. Modeling refinements resulted in fewer economically justified structures.

Additional analysis, conducted during feasibility level design activities, consisted of refinements to Hydraulics and Hydrology modeling, structural inventory, and designs for elevating residences and dry floodproofing commercial buildings.

The following four-step approach was used to develop designs for elevating residential homes and dry floodproofing commercial buildings:

1. Structural inventory evaluation of data provided by Economics and adjusted, where necessary, to increase the accuracy of cost estimation.
2. Assess geologic conditions regionally to determine a conservative depth to Pleistocene to be applied across the study area for segmented friction piling.
3. Develop quantities used to develop cost estimates for residential structures.
 - a) First, inventory data was sorted into categories of 1-story buildings, 2-story buildings, slab foundations, pier foundations, and mobile homes (which are also pier foundations).
 - b) Second, average representative home size for each residential category (SF) were developed.
 - c) Third, a generalized lift concept for each of the five categories was developed based on average SF.
 - d) Fourth, structure weight was estimated in tons/SF to create jacking and cribbing design concepts to complete a lift.
 - e) Fifth, items necessary to restore utilities and flood proof mechanical accessories were identified and incorporated into the cost estimate, including basic requirements to access elevated structures (i.e. stairs/decking).
4. Finally, typical sections were developed for dry floodproofing nonresidential structures identified as masonry construction (commercial) and metal building construction (industrial). These sections are applied to the lower 3-foot structure perimeter as a dry floodproofing measure. Designs include deployment of barriers at doors and windows (or other openings in perimeter walls), which required owner/tenant agreement to deploy in advance of a storm. Quantity estimates were then developed for cost estimation based on the dry floodproofing designs and structural inventory data for each commercial building category (masonry or metal).

Please refer to Engineering Appendix B for further details regarding the engineering approach to develop representative designs and corresponding costs for the nonstructural RP.

4.4.5 Plan 2: NED Plan Identification

The NED Plan was identified by determining the net benefits of each floodplain aggregate (groups of structures), which employed the USACE logical aggregation method, based on the damages incurred. Of the 106 floodplain aggregates, 48 were identified as economically justified. The event that has the highest return of net benefits, per aggregation, was chosen. The plan is optimized for net benefits at the sub-reach level as well unless the SV sub-reaches are negatively impacted, in which case parent reach optimization is carried forward.

Plan 2 includes floodproofing of 189 nonresidential structures and the elevation of 1,554 residential structures to the future year (2078) 0.01 AEP BFE (Figure 4-2). The plan includes

floodproofing or elevation a total of 1,743 structures located in the 0.1 (8 aggregates), 0.04 (25 aggregates), 0.02 (4 aggregates), or 0.01 (11 aggregates) AEP floodplains.

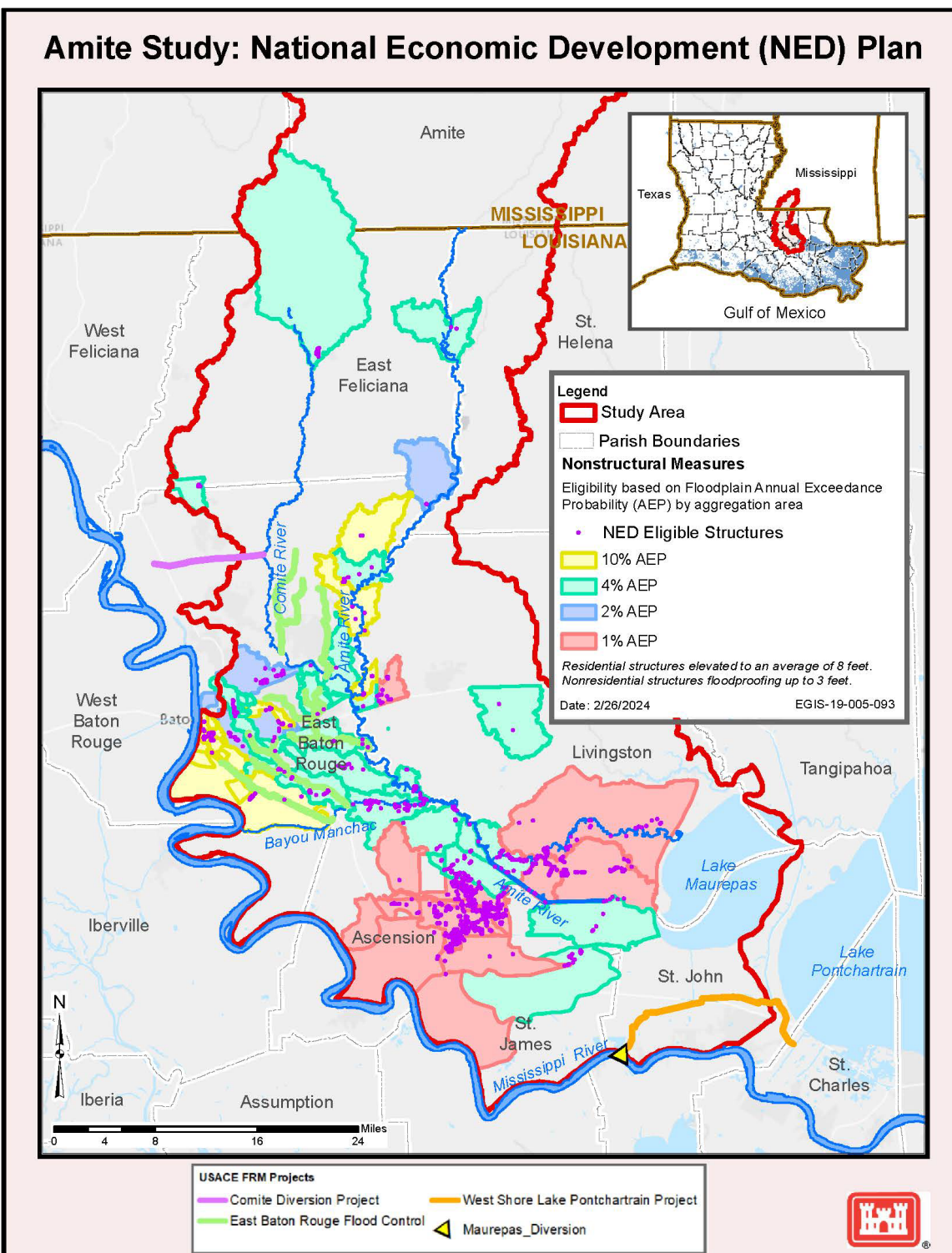


Figure 4-2. NED Plan

4.4.6 Total Net Benefits Plan Development

A comprehensive assessment of the four accounts was used to identify the Total Net Benefits Plan (See Section 6.4 for comparison). Two additional plans were identified to increase benefits in the Other Social Effects (OSE) account, which is one of the four accounts USACE uses to identify benefits of plans in accordance with the ER 1105-2-103 Section 2-4. The OSE account includes impacts to overarching social themes including social vulnerability & resiliency, health & safety, economic vitality, social connectedness, and participation. OSE, and more specifically flood risk management benefits to a socially vulnerable community, were focused on in part due to the feedback provided during the 2019 DIFR/EIS public, technical, legal, and policy reviews and as well as included aggregations. The resulting plans—since they include some socially vulnerable community aggregations—are the Federal plans and not Locally Preferred Plans.

The primary database used to represent social vulnerability data was the CDC's Social Vulnerability Index (CDC-SVI) (see Figure 4-3). CDC-SVI data included representation for socioeconomic status, age, disabilities, language, minority status, housing, and transportation (Figure 4-3). Areas in the 90th percentile or higher were flagged as having high social vulnerability. The aggregates used to identify the NED Plan were further subdivided into 19 SV sub aggregates allowing the team to evaluate impacts and formulate alternatives specific to areas experiencing high social vulnerability. Eligibility for incremental total net benefits plans relied on a comparison of the benefits at the 0.1, 0.04, 0.02, and 0.01 AEP floodplain aggregations and parametric construction costs at the sub aggregate level. Plan 3 and Plan 4 include all structures eligible within Plan 2 and they expand eligibility to include additional structures in areas experiencing social vulnerability. See Appendix G: Economic and Social Consideration for additional information regarding the process used.

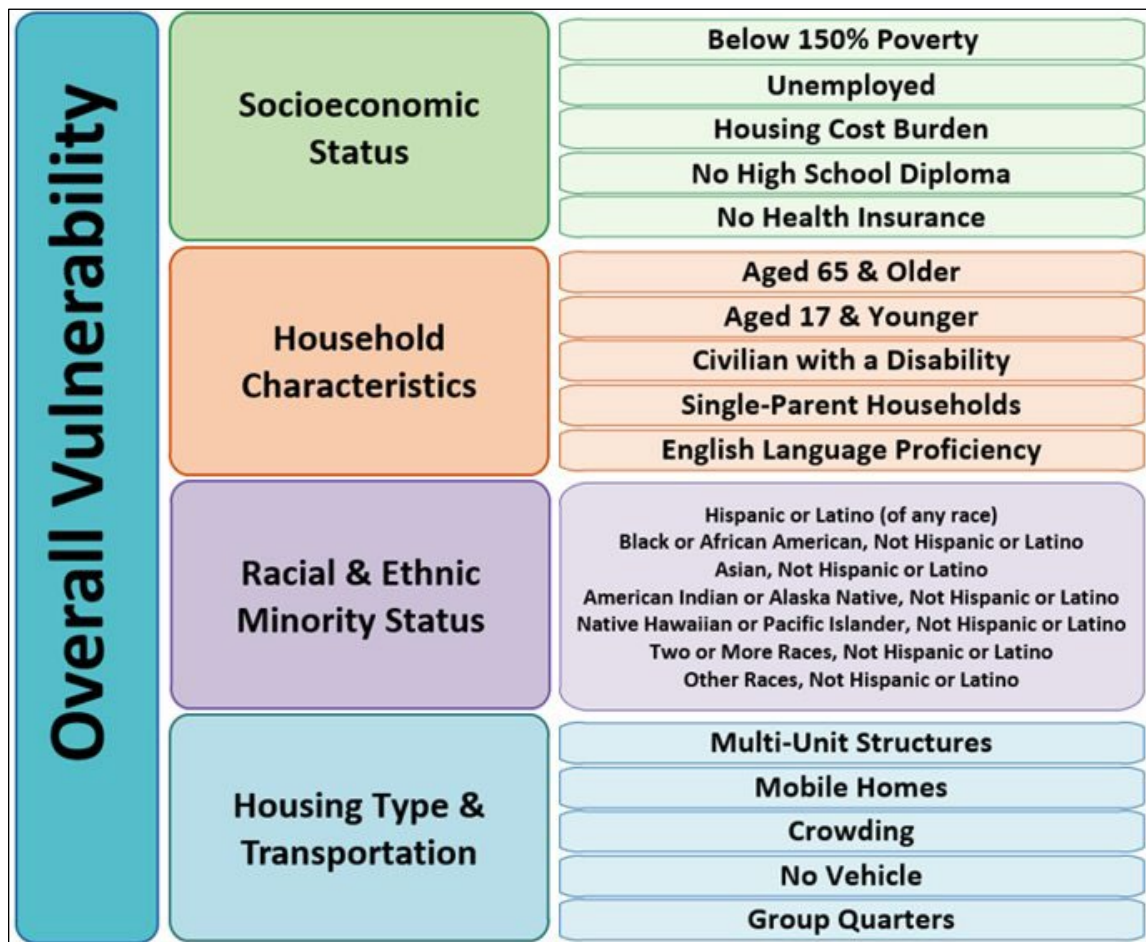


Figure 4-3. CDC's Social Vulnerability Index

4.4.7 Plan 3: NED Plan + OSE Increment 1

Plan 3 builds upon the NED Plan by including one increment of increasing OSE benefits by including at the sub-reach level the largest floodplain with positive net benefits for SV areas. Otherwise, the plan is equal to the NED Plan (Plan 2). NS Plan 3 includes floodproofing or elevation of 1,971 structures located in the 0.1 (5 aggregates), 0.04 (23 aggregates), 0.02 (4 aggregates), or 0.01 (16 aggregates) AEP floodplains. Plan 3 includes floodproofing of 216 nonresidential structures and elevation of 1,755 residential structures to the future year 0.01 AEP BFE (Figure 4-4).

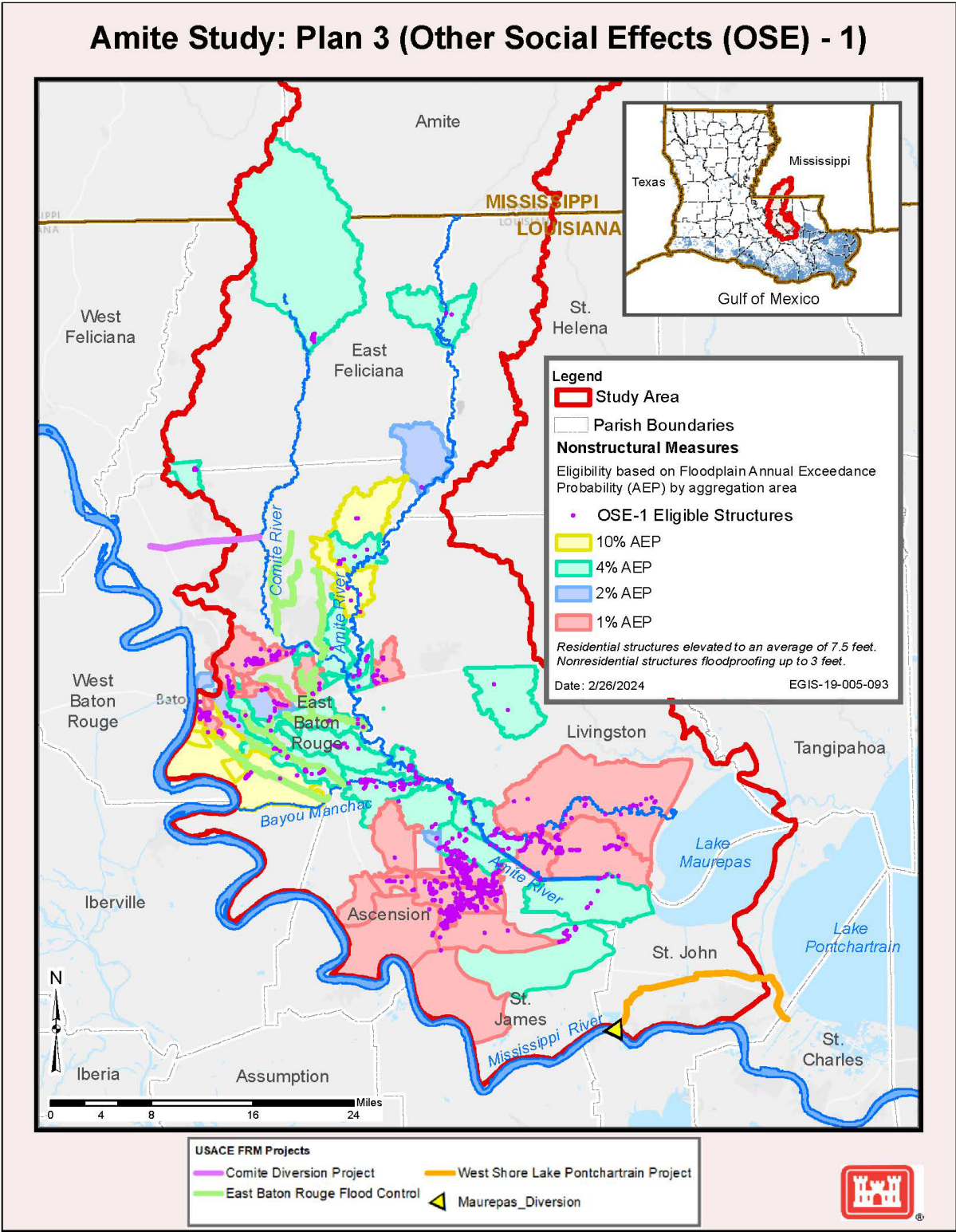


Figure 4-4. Plan 3: NED Plan + OSE Increment 1

4.4.8 Plan 4: NED Plan + OSE Increment 2

Plan 4 incrementally increases OSE benefits from Plan 3 by raising all SV sub-reaches to the next highest floodplain aggregation (Figure 4-5). NS Plan 4 includes floodproofing or elevation of 2,051 structures located in the 0.1 (5 aggregates), 0.04 (25 aggregates) 0.02 (7 aggregates) floodplain or 0.01 (20 aggregates) AEP floodplains. Plan 4 would include floodproofing of 241 nonresidential structures and the elevation of 1,810 residential structures to the future year 0.01 AEP BFE.

The composition of the final array plans is shown in Tables 4-5, 4-6, and 4-7. Table 4-5 displays the number of structures eligible for nonstructural flood risk management measures in each plan. Table 4-6 shows the with-project foundation heights of the structures elevated by plan. Table 4-7 displays the number of reaches or sub-reaches that optimized at each floodplain per plan.

Table 4-5. Structures Eligible for Nonstructural Flood Risk Management Measures by Plan

Plans in Final Array	Elevate	Floodproof	Total Structures
Plan 2 (NED)	1,554	189	1,743
Plan 3 (NED+OSE1)	1,755	216	1,971
Plan 4 (NED+OSE2)	1,810	241	2,051

Table 4-6. Residential Foundation Heights After Elevation

Plans in Final Array	<5'	5' to 8'	8' to 10'	10' to 12'	>12'	Total Structures	Average Foundation Height
Plan 2 (NED)	270	706	507	67	4	1,554	7.77
Plan 3 (NED+OSE1)	452	724	508	67	4	1,755	7.42
Plan 4 (NED+OSE2)	478	752	509	67	4	1,810	7.36

Table 4-7. Number of Reaches or Sub-reaches by AEP Floodplain by Plan

Plans in Final Array	Number of Reaches or Sub-reaches				
	0.1 AEP (10-year)	0.04 AEP (25-year)	0.02 AEP (50-year)	0.01 AEP (100-year)	Total
Plan 2 (NED)	8	25	4	11	48
Plan 3 (NED+OSE1)	5	23	4	16	48
Plan 4 (NED+OSE2)	5	25	7	20	57

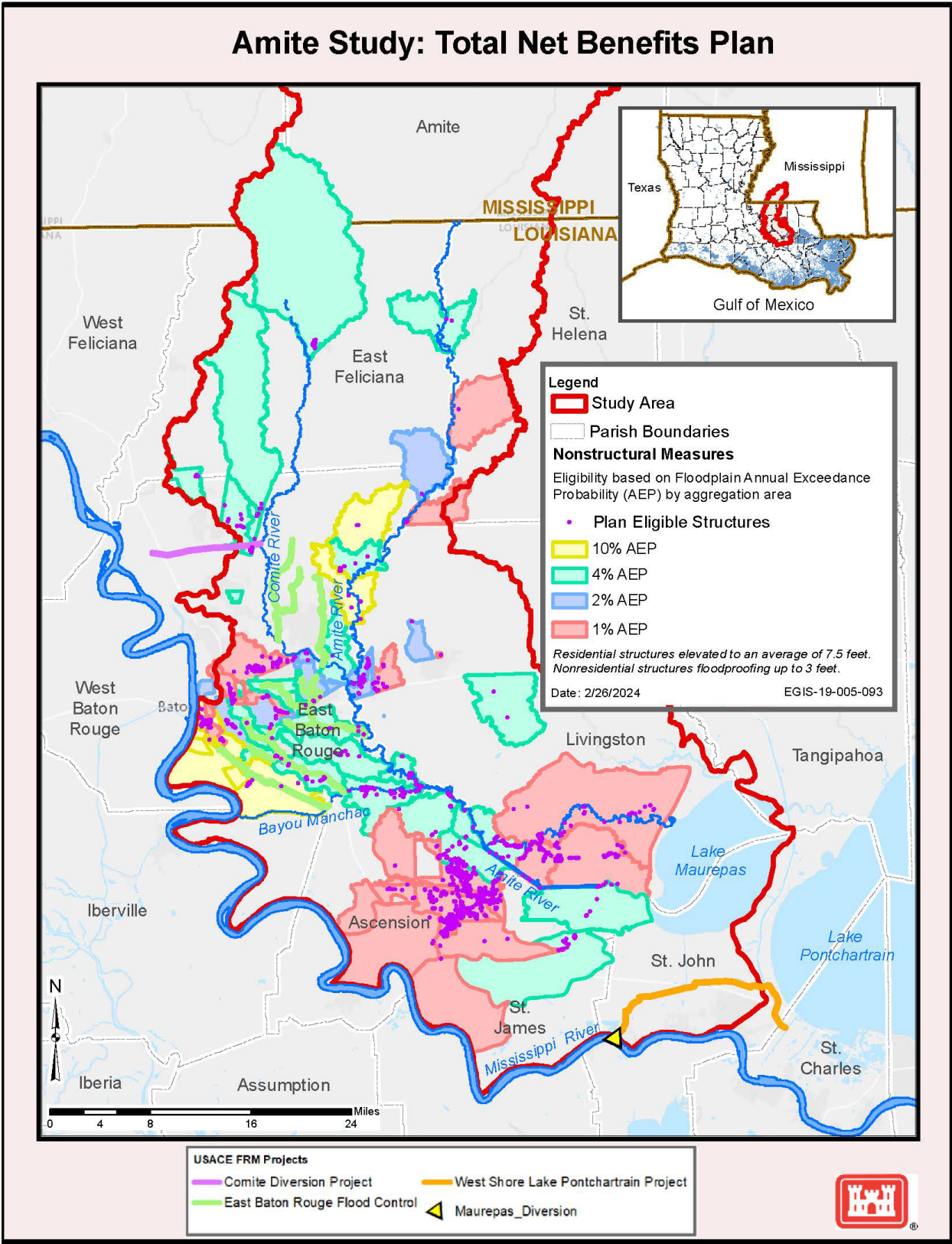


Figure 4-5. Plan 4: NED Plan + OSE Increment 2

SECTION 5

Evaluate Alternative Plans

5.1 ENVIRONMENTAL CONSEQUENCES

In accordance with NEPA, this chapter includes the scientific and analytic basis for comparison of the considered alternatives identified in Section 4 – Formulation of Alternatives. The discussion includes the alternatives' impacts on those resources identified in Section 3, Inventory and Forecast Conditions, including direct, indirect, and cumulative effects; the relationship between short-term uses and long-term productivity; and any irreversible or irretrievable commitments of resources involved should one of the alternatives be implemented.

Risk and uncertainties surrounding the Recommended Plan's impacts to wetland resources (Section 5.3.1), Cultural and Historic Resources (Section 5.3.1.5), Other Social Effects (Section 5.3.1.09), and Socioeconomics (Section 5.3.1.10) are addressed in the FIFR-EA.

5.2 CUMULATIVE EFFECTS ANALYSIS

The CEQ Regulations define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR §1508.7).

Cumulative effects are not caused by a single project but include the effects of a particular project in conjunction with other projects (past, present and future) on the particular resource. Cumulative effects are studied to enable the public, decision-makers and project proponents to consider the “big picture” effects of a given project on the community and the environment. The role of the analyst is to narrow the focus of the cumulative effects analysis to important issues of national, regional and local significance (CEQ, 1997).

The CEQ issued a manual entitled “Cumulative Effects under the National Environmental Policy Act” (CEQ, 1997). This manual presents an 11-step procedure for addressing cumulative impact analysis. The cumulative effects analysis concentrates on whether the actions proposed for this study, combined with the impacts of other projects, would result in a significant cumulative impact, and if so, whether this study's contribution to this impact would be cumulatively considerable.

Projects in the ART study area that were considered for Cumulative effects include the Comite River Diversion Project, Comite Resiliency Study, EBR Flood Risk Reduction Project, West Shore Lake Pontchartrain Project, West Shore Lake Pontchartrain Resiliency Study, and the Maurepas Diversion mitigation project, all described in further detail in

Section 1.5. The current, and potential reasonably foreseeable future, status of the aforementioned projects was taken into consideration when evaluating the effects on relevant resources identified.

5.3 SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY EACH ALTERNATIVE

This chapter describes the environmental consequences associated with implementing the final array of alternatives described in Section 4.

This chapter compares the effects of the proposed final array of alternative plans:

- Plan 1: No Action Alternative
- Plan 2: NED Plan
- Plan 3: NED Plan + OSE Increment 1
- Plan 4: NED Plan + OSE Increment 2 (Recommended Plan)

5.3.1 Relevant Resources Affected

This section describes the direct, indirect, and cumulative effects of the No Action Alternative, the NED Plan, and the OSE Plans, as described in Section 4, on relevant resources identified.

Initially, a wide selection of resources were considered (Section 3) and several were determined not to be affected by the project. This was due to the resources not being present in the vicinity of residential or commercial structures. Wetlands, uplands, aquatic resources/fisheries, prime and unique farmland, air quality, and essential fish habitat are considered relevant resources in the study area but are not expected to be affected by the proposed project. Table 5-1 provides a list of the relevant resources in the project area and summarizes anticipated impact(s) from implementation of the proposed action.

Table 5-1. Relevant Resources Impacts in and near the Project Area

Relevant Resource	Negative Impact	Positive Impact	No Impact
Wetland Resources	Wetland resources would continue to decline due to RSLR and habitat loss with all alternatives.		The NS alternatives including the NS RP would not affect projected habitat loss rates nor RSLR and are not expected to impact wetland resources
Upland Resources	Upland resources would continue to decline due to RSLR and habitat loss with all alternatives		The NS alternatives including the NS RP would not affect projected habitat loss rates nor RSLR and are not expected to impact upland resources
Aquatic Resources/Fisheries	Aquatic resources/ Fisheries would continue to decline due to RSLR and habitat loss with all alternatives		The NS alternatives including the NS RP would not affect projected habitat loss rates nor RSLR and are not expected to impact aquatic resources/fisheries
Wildlife	Wildlife resources would continue to decline due to RSLR and habitat loss with all alternatives	The NS alternatives and NS RP could provide habitat for some wildlife	The NS alternatives including the NS RP would not affect projected habitat loss rates nor RSLR and are not expected to impact wildlife
Threatened, Endangered, and Protected Species			No impacts are expected with the No Action Alternative and NS alternatives including the NS RP
Geology, Soils, and Prime and Unique Farmland			No impacts are expected with the No Action Alternative and any potential impacts associated with the NS alternatives, including the NS RP would be temporary and corrected following construction.
Water Quality	Water quality could continue to be impacted by flood events, erosion, and potential human development with No Action.		The NS alternatives including the NS RP are not expected to impact water quality
Air Quality			No impacts are expected with the No Action Alternative, and the impacts associated with the NS alternatives, including the NS RP will be <i>de minimus</i>
Cultural Resources	Potential adverse impacts for NS alternatives, and NS RP	The NS alternatives and NS RP could have potential positive indirect impacts towards preserving at-risk unique architectural and design characteristics that the communities and historic districts in the 0.01 AEP floodplain strive to maintain and enhance.	No impacts associated with the No Action Alternative

Relevant Resource	Negative Impact	Positive Impact	No Impact
Recreation	Potential adverse impacts associated with the No Action Alternative, NS alternatives and NS RP		
Aesthetics	Potential adverse impacts for NS alternatives, and NS RP		No impacts are expected with the No Action Alternative
Socioeconomic Resources	Potential adverse impacts for No Action	Potential positive impacts for NS alternatives including the NS RP	
Other Social Effects	Potential adverse impacts for No Action	Permanent positive impacts associated with reduced flood risk for socially vulnerable communities are possible for the NS alternatives including the NS RP	
HTRW			No impacts are expected with the No Action Alternative and NS alternatives including the NS RP

While there may be marginal effects to land-use from each of the alternatives, no major changes to land-use are expected from any of the alternatives being considered. Wetland and Upland resources would potentially have negative impacts due to SLR, continued habitat degradation, and anthropogenic development. Geology, Soils, and Prime and Unique Farmland and Threatened, Endangered, and Protected Species would not incur impacts from implementation of the NS RP.

5.3.1.1 Wildlife

Impacts of Considered Alternatives

Plan 1: No Action Alternative

Direct and Indirect Impacts: With the No Action alternative, habitat loss would likely continue at the present rate, resulting in a direct and indirect reduction of habitat diversity and availability for resident terrestrial wildlife (See Appendix D-2).

Cumulative Impacts: Without implementation of the proposed action, the cumulative effects from past, present, and foreseeable future actions would be that habitat loss would likely continue at the present rate due to SLR, continued habitat degradation, and anthropogenic development, resulting in a cumulative reduction of habitat diversity and availability for resident terrestrial wildlife (see Appendix D-2).

Plan 2: NED Plan

Direct Indirect and Impacts: Elevating up to 1,554 residential structures over 7 years in the ARB floodplain could potentially provide shelter to wildlife species from predators temporarily or long term; however, given the limited number of structures that would be elevated, this

impact would likely be minor in scale for wildlife in the study area due to access to other available habitat options, such as forests.

Habitat loss would likely continue at the present rate, resulting in a direct and indirect reduction of habitat diversity and availability for resident terrestrial wildlife as stated in the No Action Alternative (See Appendix D-2).

Cumulative Impacts: With implementation of the NED Plan (Plan 2), the cumulative effects from past, present, and reasonably foreseeable future actions would be that wildlife habitat loss would likely continue at the present rate due to SLR, continued habitat degradation, and anthropogenic development, resulting in a cumulative reduction of habitat diversity and availability for resident terrestrial wildlife and only have limited to no impacts on wildlife other than potentially increasing available shelter.

Plan 3: NED Plan + OSE Increment 1

Direct and Indirect Impacts: Elevating up to 1,755 residential structures over 7 years in the ARB floodplain could potentially provide shelter to wildlife species from predators temporarily or long term; however, given the limited number of structures that would be elevated, this impact would likely be minor in scale for wildlife in the study area due to access to other available habitat options, such as forests.

Habitat loss would likely continue at the present rate, resulting in a direct and indirect reduction of habitat diversity and availability for resident terrestrial wildlife as stated in the No Action Alternative (See Appendix D-2).

Cumulative Impacts: With implementation of the NED Plan + OSE Increment 1 (Plan 3), the cumulative effects from past, present, and reasonably foreseeable future actions would be that wildlife habitat loss would likely continue at the present rate due to SLR, continued habitat degradation, and anthropogenic development, resulting in a cumulative reduction of habitat diversity and availability for resident terrestrial wildlife and only have limited to no impacts on wildlife other than potentially increasing available shelter.

Plan 4: NED Plan + OSE Increment 2

Direct and Indirect Impacts: Elevating up to 1,810 residential structures over 7 years in the ARB floodplain could potentially provide shelter to wildlife species from predators temporarily or long term; however, given the limited number of structures that would be elevated, this impact would be low to negligible in extent for wildlife in the study area due to other available habitat options, such as forests.

Habitat loss would likely continue at the present rate, resulting in a direct and indirect reduction of habitat diversity and availability for resident terrestrial wildlife as stated in the No Action Alternative (See Appendix D-2).

Cumulative Impacts: With implementation of the NED Plan + OSE Increment 2 (Plan 4), the cumulative effects from past, present, and reasonably foreseeable future actions would be that wildlife habitat loss would likely continue at the present rate due to SLR, continued

habitat degradation, and anthropogenic development, resulting in a cumulative reduction of habitat diversity and availability for resident terrestrial wildlife and only have limited to no impacts on wildlife other than potentially increasing available shelter.

5.3.1.2 Threatened, Endangered, and Protected Species

Impacts of Considered Alternatives

Plan 1: No Action Alternative

Direct and Indirect Impacts: With the No Action alternative, no direct impacts to endangered species or their critical habitat would occur (Table 5-2). Existing conditions would persist and listed threatened, endangered, or protected species would likely continue to be subject to institutional recognition and further regulations and federal management. Listed species could also be adversely impacted by the continued habitat loss and degradation in the study area, including the inflated heelsplitter mussel.

Table 5-2. Threatened (T), Endangered (E), & Protected (P) Species in Study Area

Scientific name	Common name and status (T, E, or P)	Listing	Found in Study Area	Determination of Effects
<i>Potamilus inflatus</i>	Alabama Heelsplitter Mussel (T)	Federal	Yes	No effect
<i>Acipenser oxyrhynchus desotoi</i>	Gulf Sturgeon (T)	Federal	Yes	No effect
<i>Trichechus manatus</i>	West Indian Manatee (T)	Federal	Yes	No effect
<i>Myotis septentrionalis</i>	Northern long-eared bat (E)	Federal	Yes	No effect
<i>Haliaeetus leucocephalus</i>	Bald Eagle (P)	State	Yes	No effect

Cumulative Impacts: Existing conditions would persist and listed threatened, endangered, or protected species would likely continue to be subject to institutional recognition and further regulations and federal management. Listed species could also be adversely impacted by the continued habitat loss (due to SLR, continued habitat degradation, and anthropogenic development) and degradation in the study area, including the inflated heelsplitter mussel.

Plan 2: NED Plan

Direct, Indirect, and Cumulative Impacts: This alternative would not result in direct, indirect, or cumulative impacts to threatened, endangered, or protected species as the NED Plan would not involve activity in habitat occupied by T&E species. All work would occur at

residential and nonresidential properties that already have a structure occupying the space where the elevation or floodproofing would take place.

Plan 3: NED Plan + OSE Increment 1

Direct, Indirect, and Cumulative Impacts: This alternative would not result in direct, indirect, or cumulative impacts to threatened, endangered, or protected species as the NED Plan + OSE Increment 1 would not involve activity in habitat occupied by T&E species. All work would occur at residential and nonresidential properties that already have a structure occupying the space where the elevation or floodproofing would take place.

Plan 4: NED Plan + OSE Increment 2

Direct, Indirect, and Cumulative Impacts: This alternative would not result in direct, indirect, or cumulative impacts to threatened, endangered, or protected species as the NED Plan + OSE Increment 2 would not involve activity in habitat occupied by T&E species. All work would occur at residential and nonresidential properties that already have a structure occupying the space where elevation or floodproofing would take place.

5.3.1.3 Geology, Soils and Water Bottoms, and Prime Farmland

Impacts of Considered Alternatives

Plan 1: No Action Alternative

Direct and Indirect Impacts: This alternative would not have an effect on prime farmland. Soil and water bottoms could continue to experience both anthropogenic and natural impacts within the ART study area, including the sand and gravel operations and erosional forces that alter the river channel.

Cumulative Impacts: Cumulatively, the soils and water bottoms would continue to experience periodic shifts during rainfall events.

Plan 2: NED Plan

Direct, Indirect, and Cumulative Impacts: Elevating or floodproofing up to 1,743 structures in the floodplain could have temporary effects on prime farmland or soils. Access, staging, foundation work, and hardening, demolition, site cleanup, and other associated site work that occurs on these soils could cause temporary impacts and the sites would be restored to preconstruction conditions (Appendix I).

Plan 3: NED Plan + OSE Increment 1

Direct, Indirect, and Cumulative Impacts: Elevating or floodproofing up to 1,971 structures in the floodplain could have temporary effects on prime farmland, soils, or water bottoms. Access, staging, foundation work, and hardening, demolition, site cleanup, and other associated site work that occurs on these soils could cause temporary impacts and the sites would be restored to preconstruction conditions (Appendix I).

Plan 4: NED Plan + OSE Increment 2

Direct, Indirect, and Cumulative Impacts: Elevating or floodproofing up to 2,051 structures in the floodplain could have temporary effects on prime farmland, soils, or water bottoms. Access, staging, foundation work, and hardening, demolition, site cleanup, and other associated site work that occurs on these soils could cause temporary impacts and the sites would be restored to preconstruction conditions (Appendix I).

5.3.1.4 Water Quality

Impacts of Considered Alternatives

Plan 1: No Action Alternative

Direct, Indirect, and Cumulative Impacts: With the No Action alternative, no direct impacts to water quality would occur. Indirect and cumulative impacts would be the continued degradation of water quality as the area continues to erode as a result of flood events and human development in the ART study area.

Plane 2: NED Plan

Direct and Indirect Impacts: Elevating or floodproofing up to 1,743 structures for this alternative would not directly or indirectly impact water quality as the elevating or floodproofing of homes would not occur in any form of water body. Implementation measures would be in place during construction to avoid impacts to water quality.

Cumulative Impacts: When combined with other past, present, and reasonably foreseeable future projects in the ART study area this alternative would not impact water quality as the elevating or floodproofing of structures would not occur in any form of water body.

Plan 3: NED Plan + OSE Increment 1

Direct and Indirect Impacts: Elevating or floodproofing up to 1,971 structures for this alternative would not directly or indirectly impact water quality as the elevating or floodproofing of homes would not occur in any form of water body. Implementation measures would be in place during construction to avoid impacts to water quality.

Cumulative Impacts: When combined with other past, present, and reasonably foreseeable future projects in the ART study area this alternative would not impact water quality as the elevating or floodproofing of structures would not occur in any form of water body.

Plan 4: NED Plan + OSE Increment 2

Direct and Indirect Impacts: Elevating or floodproofing up to 2,051 structures for this alternative would not directly or indirectly impact water quality as the elevating or floodproofing of homes would not occur in any form of water body. Implementation measures would be in place during construction to avoid impacts to water quality.

Cumulative Impacts: When combined with other past, present, and reasonably foreseeable future projects in the ART study area, this alternative would not impact water quality as the elevating or floodproofing of structures would not occur in any form of water body.

5.3.1.5 Cultural and Historic Resources

Plan 1: No Action Alternative

Direct, Indirect, and Cumulative Impacts: Impacts to cultural and historic resources within the study area have resulted from both natural processes, (e.g., flooding and erosion) and human activities (e.g., development, commercial gravel mining, recreational use, and vandalism). Riverine environments are dynamic and impacts to cultural and historic resources would continue at the current trend because of natural processes and anthropogenic modifications to the landscape. The No Action Alternative would have no immediate impact on archaeological resources. Artificial and natural processes would likely continue to erode and deteriorate known archaeological resources, while exposing previously undocumented sites and/or artifacts. The No Action Alternative would also have no immediate impact on historic buildings, structures, and other infrastructure. However, the built-environment would not remain static over time and would continue to evolve. Adverse impacts that are expected to occur to some built-environment resources include non-compatible modifications, deterioration due to neglect and abandonment, and damage from flooding or other natural disasters. Other historic buildings, structures, and infrastructure will likely be maintained and/or restored in manners consistent with the Secretary of the Interior's (SOI) Standards for the Treatment of Historic Properties (48 FR 44716-42; September 29, 1983). Further, the number of potentially NRHP-eligible built-environment properties will increase over time as resources continue to age and gather historical significance. No change would occur in the management condition of cultural and historic resources; Federal actions or undertakings would continue to be reviewed in accordance with Section 106 of the NHPA.

Plan 2: NED Plan

Direct:

A review of Plan 2 indicates that the considered action includes ground disturbing activities (e.g., access, staging, foundation work and hardening, demolition, site cleanup, and other associated site work) within the project footprint that may directly affect archeological resources in a manner that may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Plan 2 also has potential for significant direct impacts to historic built-environment resources (e.g., residential, commercial, and public structures). These structures may possess unique architectural and design characteristics that many property-owners strive to maintain and enhance. The considered action includes direct modifications (i.e., elevation, flood proofing, retrofit) to potential built-environment historic properties that may diminish the integrity of the property's design, materials, and/or workmanship, but also have potential to cause other types of direct effects to the integrity of the property's location, setting, feeling, or association.

USACE anticipates that many potential direct adverse effects to archaeological resources can be avoided or minimized by confining NS work to substantially stay within the existing building/structure footprint through work restrictions designed to avoid impacts to archaeological resources developed in consultation with SHPO, Federally-Recognized Tribes, and other Consulting Parties that are incorporated into the PA. USACE will seek ways to revise the scope of the project to substantially conform to the SOI Standards, and/or avoid or minimize adverse effects for NRHP-listed or eligible historic properties and/or properties of religious or cultural significance to Federally-Recognized Tribes, or TCP(s). USACE also anticipates that many potential direct adverse effects to built-environment resources may be further avoided or minimized through the “design review” process to be conducted in consultation with SHPO, Federally-Recognized Tribes, and other Consulting Parties, that is included within the PA. The NS treatment selected should, whenever possible, utilize design principles and practices that retain or minimize changes to the building’s historic features, integrity, and character. Should the proposal have a direct adverse effect on a NRHP-eligible cultural resource that cannot be avoided or minimized, USACE would work toward a resolution of adverse effects with SHPO, Federally-Recognized Tribes, and other Consulting Parties following the procedures negotiated in the PA, executed on August 23, 2024 (Appendix D3; Attachment 1). Any additional conditions or requirements would be documented at that time.

Indirect:

In addition to individual historic properties where NS measures are implemented, Plan 2 also has the potential for indirect impacts to known and undocumented built-environment resources in the larger context of the surrounding viewshed that the building(s) occupy, or are adjacent to, through the successive introduction of new visual elements and/or modifications to the viewshed and overall visual landscape of known and previously undocumented (e.g., individual/contributing NRHP-eligible structures, local and NRHP-listed or eligible NRHDs), that may diminish the integrity of these property’s location, setting, and feeling. The arrangement of structures within their community represents a distinct pattern of cultural development that should be valued and preserved. The type, scale, location, and pattern of historic properties define the overall character of a neighborhood. A NS design proposal for a single property, regardless of if the individual structure is historic or not, must also consider its relationship to historic properties within the neighborhood and/or historic district in which it is located. The treatment of an individual property’s site features, design, materials, and/or workmanship, can play a critical role in avoiding or minimizing the potentially disruptive indirect visual impacts that NS measures can have on a surrounding neighborhood, historic district, or other types of built-environment resources.

Although Plan 2 has the potential to indirectly impact multiple historic properties, one of the most significant outcomes of this effort would be to reduce risk to historic structures from future flood events so they maintain their character in relation to other historic buildings within each neighborhood or historic district, thus protecting the architectural qualities of each neighborhood or historic district. Therefore, Plan 2 may have positive indirect impacts towards preserving at-risk unique architectural and design characteristics that the communities and historic districts in the 0.04 AEP floodplain strive to maintain and enhance.

USACE anticipates that many of the potential indirect adverse effects to built-environment resources will be localized and could be avoided or minimized through the design review process included within the PA (see above). The NS measures represent a framework in which a range of potential flood risk reduction actions are required to be considered, each with a unique range of planning considerations and constraints, including neighborhood context. Where possible, by integrating both traditional and innovative NS design approaches it is still possible to reinforce a historic building's physical relationship to its site, neighboring buildings, the street on which it is located, as well as the neighborhood or historic district it may be located within or adjacent to, in a sensitive manner to produce the best individualized approach for a given historic building, neighborhood, and/or historic district. These approaches can reduce the damaging visual effects of altering historic properties in a manner that maintains or complements their individual character and setting. Appropriate techniques to avoid or minimize potential indirect negative visual effects could include considering ways to revise the scope of the project to substantially conform to the SOI *Standards*; limiting elevation heights; shifting specific project elements away from the historic property to lessen the adverse effect (e.g., buffering); aesthetic camouflaging treatments; and/or use of sympathetic infill panels and landscaping features to visually shield project elements from historic properties within the surrounding viewshed. Potential adverse impacts to NRHP-eligible historic buildings, structures, NRHD(s), or other built-environment resources that cannot be avoided or minimized would be mitigated as appropriate following the procedures negotiated in the PA (Appendix D3; Attachment 1) in consultation with SHPO, Federally-Recognized Tribes, and other Consulting Parties, as appropriate. Any additional conditions or requirements would be documented at that time.

Cumulative:

Cumulative impacts to cultural resources would be the additive combination of the direct and indirect impacts of Plan 2 and other Federal, state, local, and private, flood risk projects existing and/or authorized for construction along the Amite River Basin (see: Table 1-1 in the Relevant Prior Reports and Studies Section). Activities associated with this alternate action have the potential to directly and/or indirectly effect existing and previously undocumented cultural resources within the project footprints, surrounding viewsheds, and communities they occur in.

Potential negative impacts of Plan 2 may include direct, indirect, and cumulative effects to properties included in or eligible for inclusion in the NRHP and cultural resources significant at the state, local, and national level and/or of significance to Federally-Recognized Tribes that may be listed or eligible for the NRHP; including archaeological sites, historic structures, local and NRHDs, and other built-environment resources. Conversely, Plan 2 may have long-term positive net impacts to cultural resources within communities in the 0.1, 0.04, 0.02 and 0.01 AEP floodplains. USACE acknowledges that the implementation of Plan 2 may result in modifications to historic buildings or other built-environment resources potentially not meeting the SOI *Standards*. However, the overarching goal of this effort is to reduce risk from future flood events within the Amite River Basin, thus; potentially protecting the architectural qualities of communities within the 0.1, 0.04, 0.02 and 0.01 AEP floodplains. Therefore, Plan 2 may also result in net positive cumulative impacts towards preserving

nonrenewable at-risk unique architectural and design characteristics that the communities and historic districts strive to maintain and enhance. Otherwise, damage to, or widespread loss of, cultural resources could lead to the loss of connection to place; causing a net loss of cultural diversity within the 0.1, 0.04, 0.02, and 0.01 AEP floodplains and its surrounding communities. This is important because the cultural resources within many portions of the 0.1, 0.04, 0.02, and 0.01 AEP floodplains are understudied and/or not duplicated or replaced at other locations. Because most cultural resources are nonrenewable this would constitute a detrimental cumulative impact.

The assessment of direct, indirect, and cumulative impacts for Plan 2 may require a comprehensive inventory and NRHP evaluation of built-environment resources inclusive of each site where NS measures are proposed in addition to the larger surrounding viewshed that would need to be completed in PED; it is recommended that inventory work for each site should be conducted no more than 5 years in advance of construction. Potential adverse impacts to archaeological sites, historic buildings, structures, NRHD(s), or other built-environment resources listed or eligible for the NRHP that cannot be avoided or minimized would be mitigated following the procedures negotiated in the PA (Appendix D3; Attachment 1) in consultation with SHPO, Federally-Recognized Tribes, and other Consulting Parties, as appropriate. Any additional conditions or requirements would be documented at that time.

Plan 3: NED Plan + OSE Increment 1

Direct, Indirect, and Cumulative Impacts: The direct, indirect, and cumulative impacts to cultural resources for the considered action would be proportionally similar to the impacts specified for Plan 2 described previously.

Plan 4: NED Plan + OSE Increment 2

Direct, Indirect, and Cumulative Impacts: The direct, indirect, and cumulative impacts to cultural resources for the considered action would be proportionally similar to the impacts specified for Plan 2 described previously.

5.3.1.6 Aesthetics

Plan 1: No Action Alternative

Direct and Indirect Impacts: The harmonious natural landscape combination of rivers and creeks slowly meandering southward is contrasted by unnaturally straight roadways and spoil banks, cutting through the mosaic of forest, pine plantations, pasture, and cropland. Visual resources would continue to evolve from existing conditions as a result of both land use trends and natural processes over the course of time. Waterways would continue to swell to capacity and overflow into nearby areas seasonally. Communities near these waterways would continue to experience high water events seasonally due to rainfall inputs from development adding to, and at times exceeding, the pre-development capacity.

Cumulative Impacts: Cumulative impacts to visual resources would be the additive combination of impacts by this and other Federal, state, local, and private flood risk

reduction efforts, including but not limited to the CRD and the EBR Flood Control Project. User activity in the area would continue to be influenced by high water events thereby potentially affecting visual quality.

Plan 2: NED Plan

Direct and Indirect Impacts: The aesthetic resources assessment focuses on NS measures as conceptualized at feasibility level to generalize aesthetic impacts across the area of influence. Because this assessment would be continued during PED, the discussion is part of an ongoing effort and should not be considered final. Some effective aesthetic mitigation tools that could be considered during PED include strategic screening, relocating construction components, implementing materials for camouflage or disguise, utilization of low-profile construction components, downsizing construction components, substitution of alternate technologies, planning for maintenance concerns prior to implementation, and use of non-specular materials. Elevating and floodproofing structures would not affect visual quality when assessing landscape components consisting of water, landform, vegetation, and land use. However, the action would have the potential to affect visual quality when assessing the landscape component of user activity. For example, elevating and flood proofing structures has the potential to alter compatibility, scale contrast, and/or spatial dominance depending on that structure's unique and distinctive visual quality. The effects of this would be more acute with individual/contributing NHRP-eligible structures and NHRP-listed or eligible NRHDs. For more discussion regarding historical viewshed analysis, please refer to cultural and historic resources Section 5.3.1.6 in this document.

Cumulative Impacts: Cumulative impacts to visual resources would be the additive combination of impacts by this and other Federal, State, local, and private flood risk reduction efforts, including but not limited to the CRD and the EBR Flood Control Project. User activity in the area would not be influenced to the same magnitude by high water events thereby preserving visual quality.

Plan 3: NED Plan + OSE Increment 1

Direct and Indirect Impacts: The direct and indirect impacts to aesthetics for the considered action would be proportionally similar to the impacts specified for Plan 2 described previously.

Cumulative Impacts: The cumulative impacts to aesthetics for the considered action would be similar to the impacts specified for Plan 2.

Plan 4: NED Plan + OSE Increment 2

Direct and Indirect Impacts: The direct and indirect impacts to aesthetics for the considered action would be proportionally similar to the impacts specified for Plan 2 described previously.

Cumulative Impacts: The cumulative impacts to aesthetics for the considered action would be similar to the impacts specified for Plan 2.

5.3.1.7 Air Quality

Alternative 1: No Action Alternative

Direct and Indirect Impacts: The study area would continue to be subject to air pollutants from mobile sources including vehicles traveling on city roads. Any permitted air pollution sources within the study area should remain in compliance and not significantly impact sensitive resources.

Cumulative Impacts: Cumulative impacts to air quality would be the additive combination of impacts by other Federal, State, local, and private flood risk reduction efforts, including but not limited to the CRD and the EBR Flood Control Project, that are in the nearby vicinity.

Plan 2: NED Plan

Direct and Indirect Impacts: No aspect of the plan, neither short-term nor long-term, has been identified that would potentially result in violations to air quality standards. The environment would not be exposed to contaminants/pollutants in such quantities and duration that would be injurious to human, plant, or animal life, or property, or which unreasonably interferes with the comfortable enjoyment of life, or property, or the conduct of business. Fugitive dust levels may increase at construction sites but would be short term and *de minimis* in nature.

Cumulative Impacts: The plan is not expected to add to cumulative effects in the study area due to any potential impacts being short term and *de minimis*.

Plan 3: NED Plan + OSE Increment 1

Direct and Indirect Impacts: No aspect of the plan, neither short-term nor long-term, has been identified that would potentially result in violations to air quality standards. The environment would not be exposed to contaminants/pollutants in such quantities and duration that would be injurious to human, plant, or animal life, or property, or which unreasonably interferes with the comfortable enjoyment of life, or property, or the conduct of business. Fugitive dust levels may increase at construction sites but would be short term and *de minimis* in nature.

Cumulative Impacts: The plan is not expected to add to cumulative effects in the study area due to any potential impacts being short term and *de minimis*.

Plan 4: NED Plan + OSE Increment 2

Direct and Indirect Impacts: No aspect of the plan, neither short-term nor long-term, has been identified that would potentially result in violations to air quality standards. The environment would not be exposed to contaminants/pollutants in such quantities and duration that would be injurious to human, plant, or animal life, or property, or which unreasonably interferes with the comfortable enjoyment of life, or property, or the conduct of business. Fugitive dust levels may increase at construction sites but would be short term and *de minimis* in nature.

Cumulative Impacts: The plan is not expected to add to cumulative effects in the study area due to any potential impacts being short term and *de minimis*.

5.3.1.8 Recreation

Alternative 1: No Action Alternative

Direct and Indirect Impacts: Without intervention, communities within the study area would continue to be at risk from high water events induced by rainfall inputs. Recreational resources would continue to be influenced by existing conditions as a result of both land use trends and natural processes over the course of time. Access to recreation activities would continue to be interrupted during flood events depending on their location and the severity of the flooding. Recreation structures would remain susceptible to damages resulting from flood events.

Cumulative Impacts: Cumulative impacts to recreational resources would be the additive combination of impacts by this and other Federal, State, local, and private flood risk reduction efforts, including but not limited to the CRD and the EBR Flood Control Project. Recreation structures could continue to be at risk during flood events impacting access.

Plan 2: NED Plan

Direct and Indirect Impacts: The NS features could potentially have impacts to recreational resources, depending on the methods used. A direct impact from flood proofing park buildings is that the recreational use would be temporarily unavailable during flood proofing work. An indirect impact of elevating structures would be an increase in building costs for future recreational projects which could result in fewer recreational projects being constructed.

Cumulative Impacts: Cumulative impacts to recreational resources would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including but not limited to the CRD and the EBR Flood Control Project. For example, availability and access to recreation areas could be interrupted during these construction projects and potential increase in building costs for future recreation projects could result in future projects being constructed in the area.

Plan 3: NED Plan + OSE Increment 1

Direct and Indirect Impacts: The NS features would have proportionally similar impacts to recreational resources as Plan 2, depending on the methods used.

Cumulative Impacts: The cumulative impacts to recreation for the considered action would be similar to the impacts specified for Plan 2.

Plan 4: NED Plan + OSE Increment 2

Direct and Indirect, Impacts: The NS features would have proportionally similar impacts to recreational resources as Plan 2, depending on the methods used.

Cumulative Impacts: The cumulative impacts to recreation for the considered action would be similar to the impacts specified for Plan 2.

5.3.1.9 Other Social Effects

Alternative 1: No Action Alternative

Direct, Indirect, and Cumulative Impacts: The no action alternative would not provide flood risk reduction to the residents living within the study area. There would be no direct impact on low income and/or underserved population groups identified using U.S. Census Bureau data under this alternative. However, because this alternative fails to provide flood risk reduction, the actual and perceived risks to low-income and/or underserved population groups under this alternative would be higher than under the action alternatives.

Figure 5-1 shows the structures in the ART study area at risk for flooding from a 100-year event, under the no action plan, and which are in areas of concern. Of the 14,183 structures identified in the future without-project condition that are at risk for flooding, 5,250 are in areas of concern, or about 37 percent of structures. In this case, at risk for flooding from a cumulative 100-year flood event, means there is a risk for flooding at the first-floor elevation of the structure or inside the home or business.

Indirect impacts under the no action alternative include a higher potential for permanent displacement of low income and/or underserved groups as compared to the with-project alternatives as residents relocate to areas with higher levels of flood protection.

Cumulative impacts under the no action alternative include the potential for a steady decline in low income and/or underserved population groups and other groups as residents move to areas with lower flood risks, as well as continued financial and emotional strain placed on these groups as they prepare for and recover from flood events. Other Federal, State, local, and private flood risk reduction efforts, including but not limited to, the CRD and the EBR Flood Control Project, would also beneficially influence these populations by providing additional flood risk reduction. Changing conditions could negatively affect residents in communities with socioeconomic concerns by increasing the intensity and frequency of flood events.

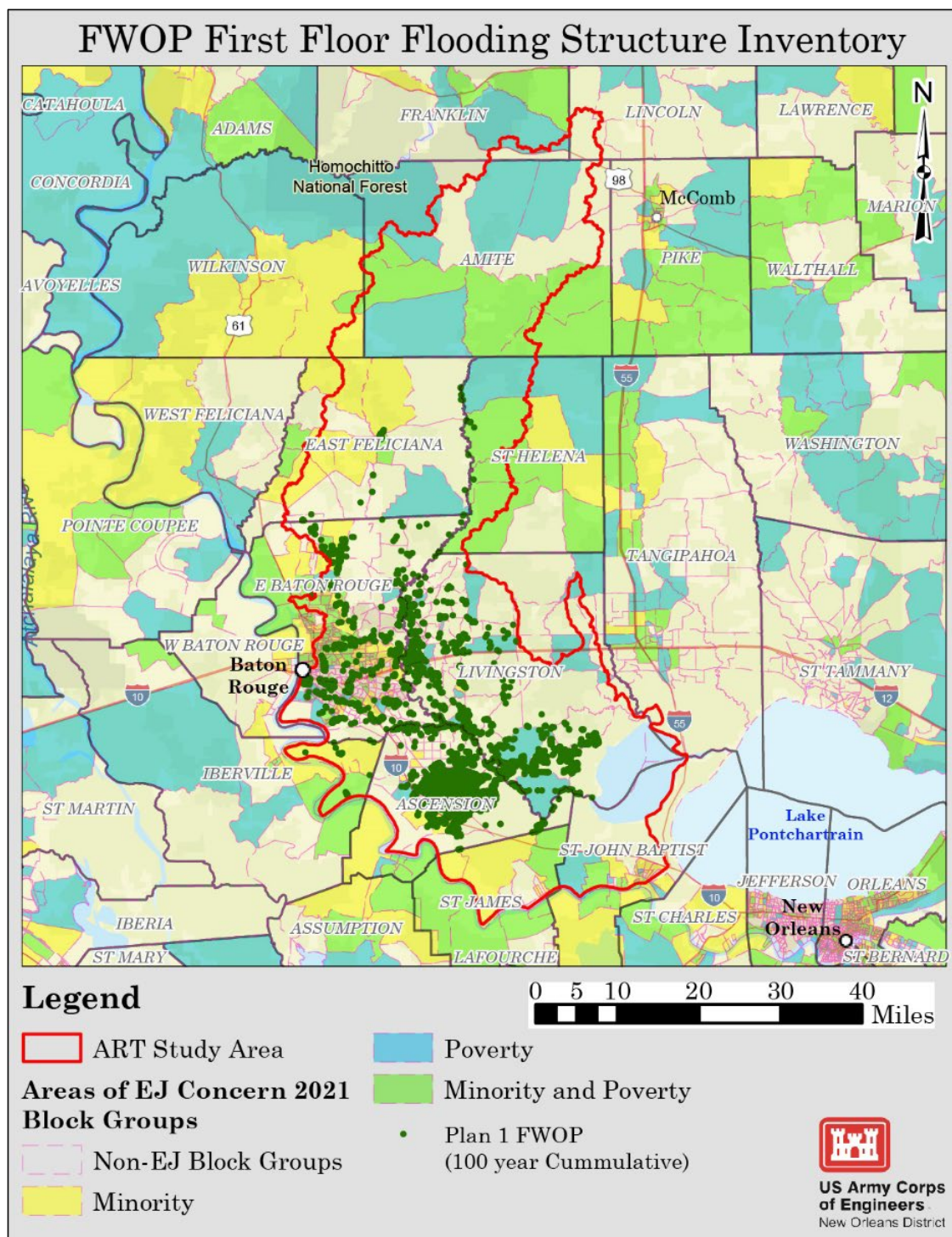


Figure 5-1. Plan 1, Future Without-Project Condition, 100- year Floodplain, Structures at Risk for First Floor Flooding

Polygon shapefiles shown on the maps are from Steven Manson, Jonathan Schroeder, David Van Riper, Tracy Kugler, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 16.0 [dataset]. Minneapolis, MN: IPUMS. 2021. <http://doi.org/10.18128/D050.V16.0>

Plan 2: NED Plan

Direct Impacts: The voluntary NS plan involving residential elevations and nonresidential floodproofing of structures may directly impact socially vulnerable communities but these impacts are not expected to be significant. All residents, regardless of race and/or income, who own eligible structures, would have the option of participating in the proposed plan. Direct impacts include temporary disruption of use of homes during elevation. At this time, there are 1,743 structures (the vast majority are residential structures) located in the 0.1, 0.04, 0.02 and 0.01 AEP floodplains and it is uncertain who may participate in the non-structural plan since participation is voluntary. All structures within these floodplains are in economically justified reaches and could be flood-proofed or elevated; therefore, all residents within these reaches who own eligible structures, irrespective of race, ethnicity, or income, would be able to choose to participate in the plan.

Figure 5-2 shows the location of 1,743 structures preliminarily eligible for elevation or floodproofing (blue dots). Of the 1,743 structures preliminarily eligible for home elevation or nonresidential floodproofing in the 100-year floodplain, based on EPA EJ Screen Tool data, 509 are in areas of concern or about 29 percent of total preliminarily eligible structures. Homeowners living in areas of concern may opt-in to participate in the elevation plan if PED eligibility criteria are met, which would result in a direct positive benefit to those choosing to participate. The 509 eligible structures in areas of concern under Plan 2 represent about 10 percent of the structures in areas of concern that are at risk for flooding (at first floor elevation) under the future without-project condition (509/5,250).

The NS measures may provide those choosing home elevation in this low-density area of low income and/or underserved populations with flood risk reduction. Despite existing base floor elevations differing among individual structures, elevations would provide the same level of risk reduction benefits per structure at year 2078 (end of the period of analysis). Homeowners would be responsible for costs associated with repairs to ensure a structurally-sound home and any HTRW remediation prior to elevation. Homeowners would also be responsible for temporary relocation costs during elevation. However, renters and/or displaced persons, as defined by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (URA), would be eligible for financial assistance for temporary living quarters during home elevation. The actual cost to elevate the structure, would not be borne by any single individual or the community; rather, these costs would be part of the proposed project costs.

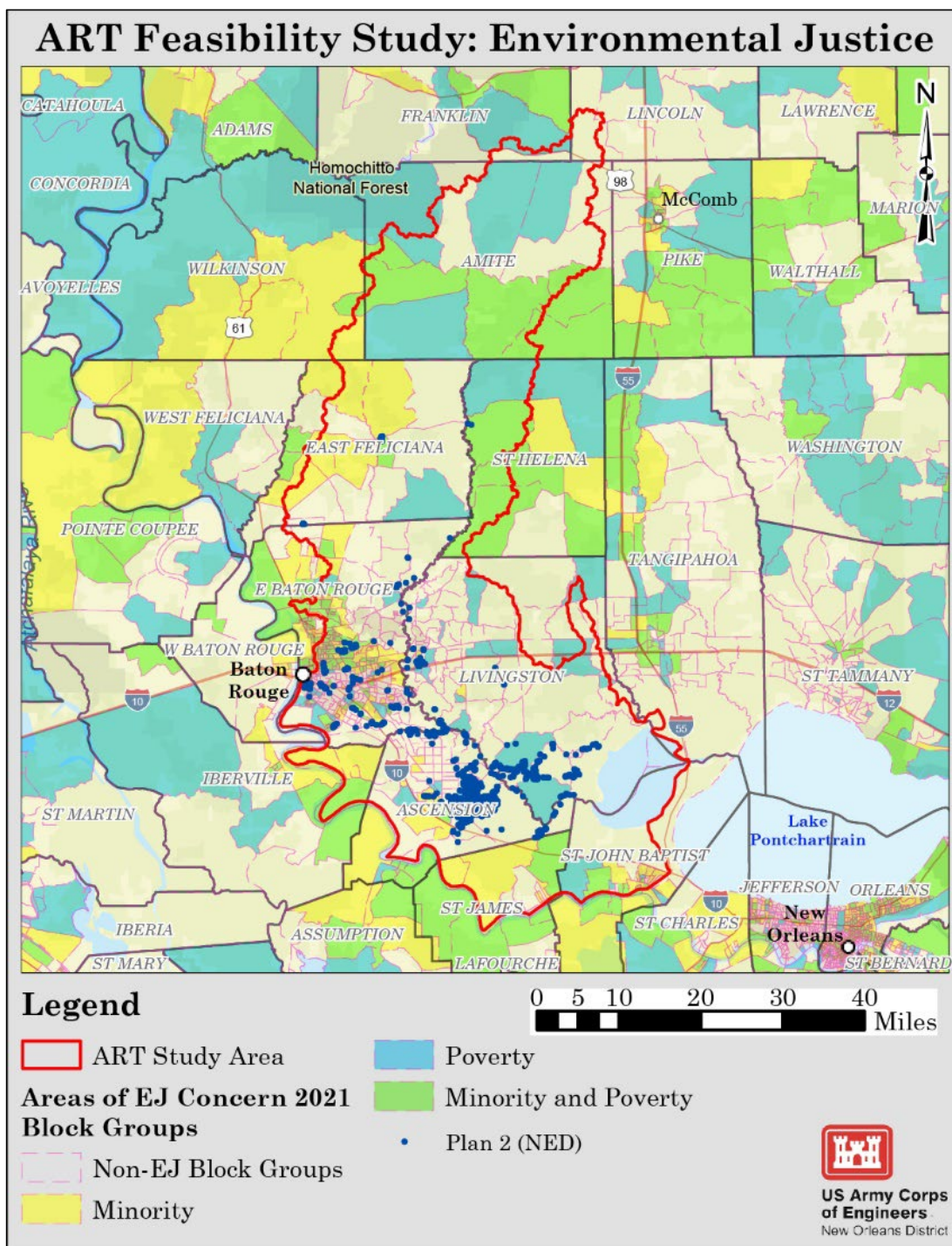


Figure 5-2. Plan 2, NED, 100-Year Floodplain, Eligible Structures and Areas of Concern

Polygon shapefiles are from Steven Manson, Jonathan Schroeder, David Van Riper, Tracy Kugler, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 16.0 [dataset]. Minneapolis, MN: IPUMS. 2021. <http://doi.org/10.18128/D050.V16.0>

Indirect Impacts: The ineligible project costs to elevate a structure are the responsibility of the eligible homeowner. These costs could be an adverse impact if the homeowner is living at or below the poverty level. Mitigation strategies to increase participation and to bridge the financial gap to participation are discussed at the end of this section, below, with the heading “Mitigation of Potential Indirect Impacts.”

Beneficial indirect impacts include reducing flood risk of the residents and businesses that participate in the program and improving the ability to recover much more quickly after a storm event. Other positive social effects and comprehensive benefits are discussed in more detail in Section 1.1.4 of Appendix G – Economics and Social Considerations.

Cumulative Impacts: Positive cumulative impacts to low income and/or underserved populations associated with providing risk reduction are expected to occur as a result of the lower flood risk in the area under this alternative. Additionally, other Federal, State and local flood risk reduction projects will provide positive cumulative impacts by reducing flood risk to low income and/or underserved communities. Elevated housing within floodplains will have a lower flood risk from storm events. For those living in structures in floodplains that choose not to elevate, flood risk from future storm events will continue.

Plan 3: NED Plan + OSE 1 Increment

Direct, Indirect, and Cumulative Impacts:

The beneficial impacts of Plan 3 are similar to Plan 2 and include flood risk reduction but for up to 1,971 preliminarily eligible structures, or 228 more structures than are in the NED Plan 2. A vast majority of the additional 228 structures included in Plan 3 are residential and are located in SV areas as defined by the CDC.

Based on previously available EPA EJ Screen Tool data, about 718 of the 1,971 structures are in areas of concern or about 36 percent of the preliminarily eligible structures that comprise Plan 3. Figure 5-3 shows the location of the preliminarily eligible structures under Plan 3 with the dark blue dots representing NED Plan 2 carried forward into Plan 3 and light blue dots as the additional SV structures or about 228. Direct impacts for homeowners who participate in the elevation program include a lower flood risk since their structure would be elevated to the 100-year storm elevation or to a maximum of 13 feet. The ground surface would still be at risk for flooding which includes street flooding and any potential flooding of property remaining at grade, such as automobiles. Businesses and other nonresidential structures in areas of concern that are found eligible for participation and opt-in, would be floodproofed which would result in a lower flood risk. After a flood event, these participating businesses would likely be able to reopen and offer their services to residents in areas of concern much more quickly than if they choose not to participate in the floodproofing program.

Indirect impacts for eligible participants in Plan 3 include OSE and comprehensive benefits such as the over-arching social themes including social vulnerability & resiliency, health & safety, economic vitality and social connectedness. Impacts to these social themes are prevalent in flood risk management projects and Plan 3 improves these social themes by

offering a housing elevation program or business floodproofing option. Both eligible homes and businesses, could be elevated or floodproofed, which adds to the study area's resiliency to recover after a disaster. Out of 191 Louisiana Census Tracts within the ART study area, there were 46 Tracts that were identified as experiencing social vulnerability and that include 228 additional structures that are not in Plan 2. These are shown in Figure 5-3 as light blue dots. Specific details about the demographics of the communities these 228 structures are located in, are provided in Appendix G. The 228 structures are added to the NED plan based upon being identified as SV using the CDC's tool called SoVi.

Potential adverse indirect impacts from Plan 3 are similar to those discussed for the NED Plan 2 and include the possibility that low-income homeowners may not be able to afford ineligible project costs associated with relocation and ensuring structures meet eligibility criteria for elevation.

Areas of concern may benefit from regional economic development spurred by the implementation of the NS Plan. An increase in jobs, labor income, value-added and sales are economic impacts that disadvantaged areas could experience to varying degrees. These project-related economic impacts are considered regional impacts. For more information on regional economic development, see Section 6 in Appendix G.

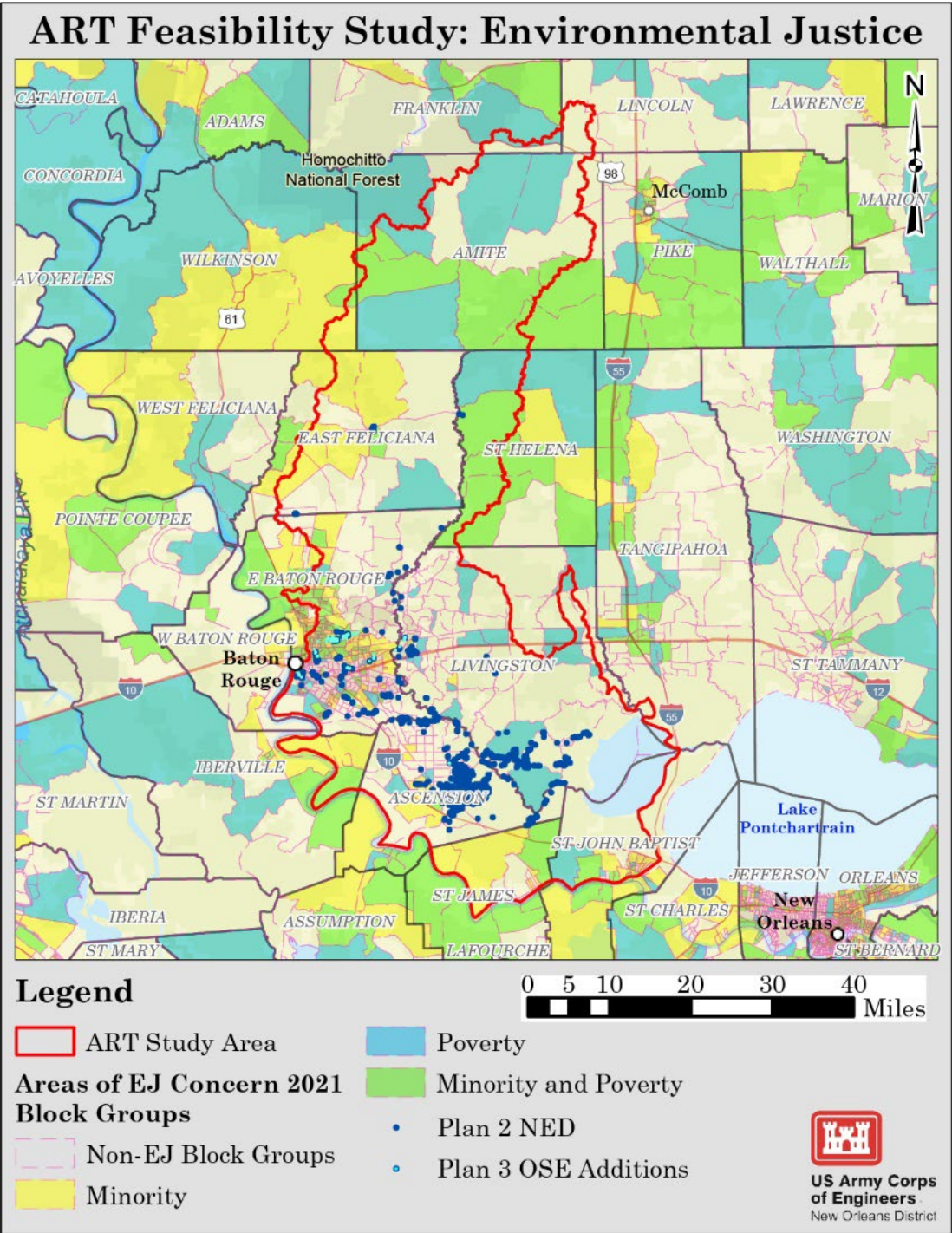


Figure 5-3. Plan 3, NED/OSE1, 100-Year Floodplain, Eligible Structures and Areas of Concern

Polygon shapefiles are from Steven Manson, Jonathan Schroeder, David Van Riper, Tracy Kugler, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 16.0 [dataset]. Minneapolis, MN: IPUMS. 2021. <http://doi.org/10.18128/D050.V16.0>

Plan 4: NED Plan + OSE 2 Increment

Direct, Indirect, and Cumulative Impacts:

Plan 4 is similar to Plan 3 except Plan 4 includes 80 more preliminarily eligible residential structures that are in SV areas that are not in Plan 3. A total of 2,051 structures are preliminarily eligible under Plan 4 and based on EPA EJ Screen Tool data, about 37 percent (750) are in areas of concern. Figure 5-4 shows the location of Plan 4 preliminarily eligible structures and structures in areas of concern with the dark blue dots representing the OSE Plan 3 preliminarily eligible structures and the light blue dots representing the additional 80 structures. Positive direct benefits, such as lower flood risk, will accrue to residents and businesses in areas of concern who participate in the plan.

Adverse indirect impacts to homeowners who participate could potentially include the need for temporary housing during construction and costs associated with preparing their home for elevation. Some homeowners, particularly those who are low-income, may be unable to afford the ineligible project costs associated with participating in the elevation plan. Mitigation of these potential financial hurdles associated with elevation are discussed in the section below, Mitigation of Potential Indirect Impacts.

Positive indirect impacts also accrue to areas of concern by reducing social vulnerability and adverse OSE, as is described for Plan 3. These affects are similar to Plan 3 but could impact a slightly larger area since more structures are preliminarily eligible for elevation and floodproofing, based in part on Social Vulnerability.

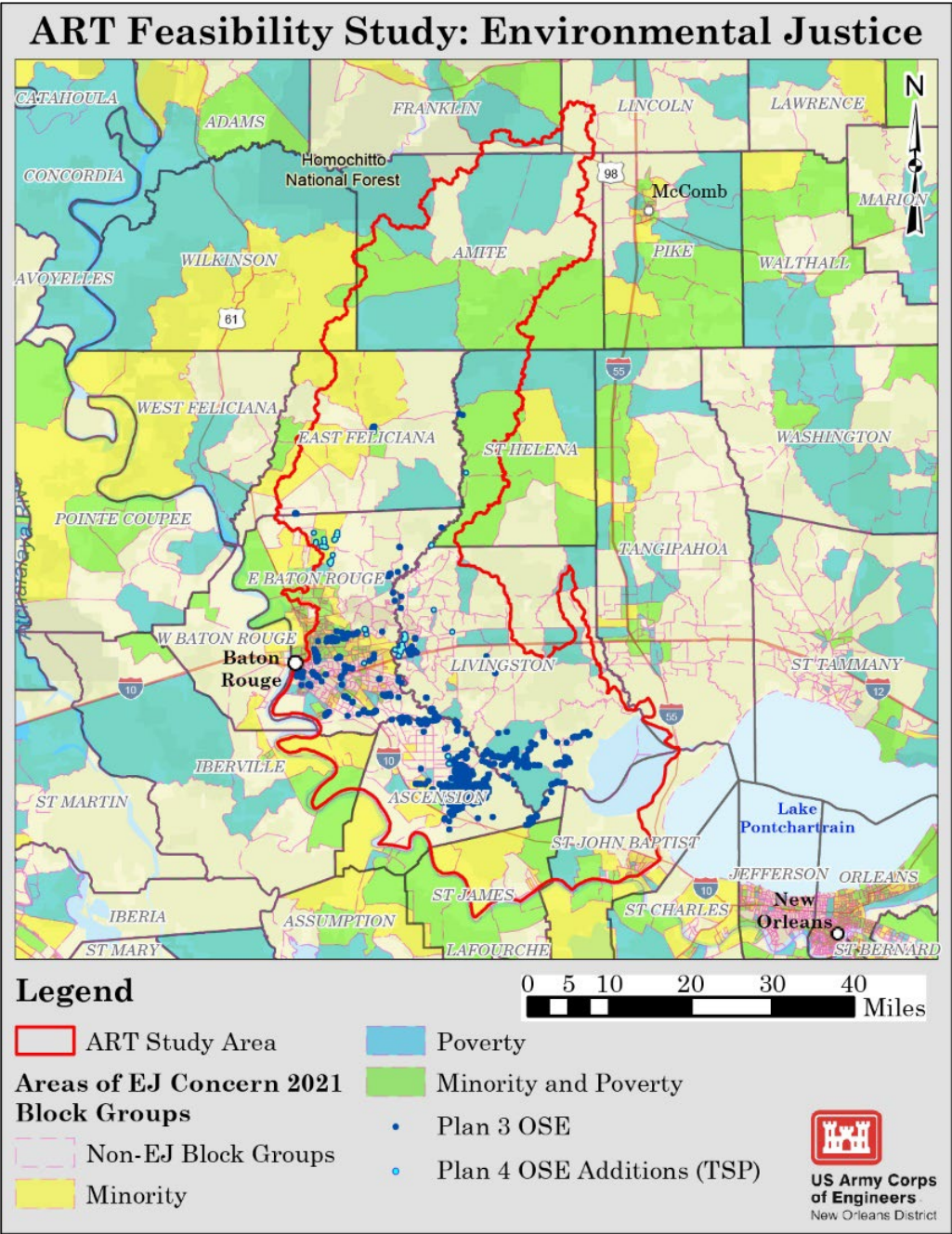


Figure 5-4. Plan 4, NED/OSE2, 100-Year Floodplain, Eligible Structures and Areas of Concern

Polygon shapefiles are from Steven Manson, Jonathan Schroeder, David Van Riper, Tracy Kugler, and Steven Ruggles. IPUMS National Historical Geographic Information System: Version 16.0 [dataset]. Minneapolis, MN: IPUMS. 2021. <http://doi.org/10.18128/D050.V16.0>

Impacts to Disadvantaged Communities:

There are nine census tracts in the study area that have been identified as disadvantaged communities. Each of these communities qualify due to their low-income designation and the economic loss to building value resulting from natural hazards each year. Additionally, categories shared by some but not all these communities include barriers to transportation, unemployment, percent of adults with less than a high school diploma, high rates of heart disease, and projected flood risk. The factors considered included Social Vulnerability & Resiliency, Health & Safety, Economic Vitality, and Social Connectedness.

Approximately 38 percent, 43 percent, and 41 percent of preliminarily eligible structures in each of the three non-structural plans (Plans 2, 3 and 4 respectively) are in disadvantaged communities. More information is in Section 6.4.4.

Mitigation of Potential Indirect Impacts to Disadvantaged Communities:

For those residents in areas of concern who may not be able to participate in the elevation program because of financial reasons and who are low-income, there may be opportunities provided by other Federal, state and local authorities to assist and bridge the financial gap to increase participation.

To increase participation rates for the Recommended Plan, for homeowners who cannot afford costs associated with the NS plan, the following items may be considered, but would likely require additional Congressional authority:

- Allowances, such as those referenced in the WRDA 2022, Section 8154, to provide temporary relocation assistance to voluntary homeowner participants in NS projects.
- Future agreements developed with a NFS may include that no cost share be requested directly of the property owner for eligible costs associated with participation in this project.
- Develop an assistance program to help connect preliminarily eligible homeowners to other programs to meet some of the USACE secondary eligibility criteria such as repair condition of the structure. An example would be the State of Louisiana Partial Action Plan No.1 for the Utilization of Community Development Block Grant Funds in Response to Hurricane Isaac administered through the Louisiana Office of Community Development/ Disaster Recovery Unit.

Other Benefits to Areas of Concern - Clustering Based on Socially Vulnerable Communities:

During implementation of the NS Plan, a clustering methodology would identify populations in areas of social vulnerability using the most recent data from the Center for Disease Control and Prevention (CDC) Socially Vulnerable Index (SVI). For this effort, US percentile ranking may be chosen over Louisiana percentile ranking to ensure that all census tracts with potential SVI are captured.

According to CDC's SVI documentation, census tracts at the 90th percentile or higher indicate high vulnerability. SVI includes four themes: Socioeconomic Status; Household Characteristics; Racial & Ethnic Minority Status; and Housing Type/Transportation (Figure 5-2). To capture all SV, census tracts with 90th percentile or higher in any of the four themes may be classified as highly vulnerable which are areas where the population is exposed to high levels of environmental stressors and are low-income who reside in disadvantage communities as identified by the previously available CEQ's Climate and Economic Justice Screening Tool using the most recent demographic statistics from the U.S. Census Bureau. This approach would rank environmental and demographic data as the main factor for determining which eligible properties should be prioritized. Homeowners in disadvantaged communities or those living at or below the poverty level would be given priority.

5.3.1.10 Socioeconomics

Plan 1: No Action Alternative

Direct and Indirect Impacts: The no action alternative would maintain the current without-project condition of the study area.

Cumulative Impacts: Cumulative impacts to socioeconomic resources would be the additive combination of impacts by this study and other studies, including, but not limited to the two aforementioned projects. There are no expected cumulative impacts due to the CRD and EBR Flood Control projects or other Federal, state, local, or private flood risk reduction efforts.

Plan 2: Nonstructural NED Plan

Direct and Indirect Impacts:

The non-structural alternative would rely upon the voluntary participation of residents of the 1,743 structures within the 0.01 AEP floodplain who opt-in to have their structures flood-proofed, or elevated and meet all eligibility criteria. The voluntary nature of this alternative makes it impossible to determine which residents would participate without surveys. With the construction of this project, there is the potential for small, direct impacts to employment in the construction industry during duration of construction.

Cumulative Impacts: There are no expected cumulative socioeconomic impacts due to this alternative. Socioeconomic impacts due to this alternative are independent of the socioeconomic impacts of the CRD and EBR Flood Control projects or other Federal, state, local, or private flood risk reduction efforts.

Plan 3: Nonstructural NED Plan + OSE Increment 1

Direct and Indirect Impacts: The non-structural alternative would rely upon the voluntary participation of residents of the 1,971 structures within the 0.01 AEP floodplain who opt-in to have their structures flood-proofed, or elevated and meet all eligibility criteria. The voluntary nature of this alternative makes it impossible to determine which residents would participate

without surveys. With the construction of this project, there is the potential for small, direct impacts to employment in the construction industry during duration of construction.

Cumulative Impacts: There are no expected cumulative socioeconomic impacts due to this alternative. Socioeconomic impacts due to this alternative are independent of the socioeconomic impacts of the CRD and EBR Flood Control projects or other Federal, state, local, or private flood risk reduction efforts.

Plan 4: Nonstructural NED Plan + OSE Increment 2

Direct and Indirect Impacts: The non-structural alternative would rely upon the voluntary participation of residents of the 2,051 structures within the 0.01 AEP floodplain who opt-in to have their structures flood-proofed, or elevated and meet all eligibility criteria. The voluntary nature of this alternative makes it impossible to determine which residents would participate without surveys. With the construction of this project, there is the potential for small, direct impacts to employment in the construction industry during duration of construction.

Cumulative Impacts: There are no expected cumulative socioeconomic impacts due to this alternative. Socioeconomic impacts due to this alternative are independent of the socioeconomic impacts of the CRD and EBR Flood Control projects or other Federal, state, local, or private flood risk reduction efforts.

SECTION 6

Evaluation and Comparison of Final Array of Alternative Plans

The USACE evaluated measures described in Section 4 and screened them based on their ability to meet the project objectives, avoid constraints, and to maximize benefits provided over the 50-year period of analysis from 2028 - 2078. Plans were developed with incrementally justified measures in accordance with ER 1105-2-103 and WRDA 1986. Four plans, including the No Action alternative, were progressed for further evaluation in selecting the TSP and subsequently the Recommended Plan (RP), which included:

Plan 1: No action would be taken under this plan. Damages would continue into the future.

Plan 2: NED Plan- Floodproofing or elevation of 1,743 structures located in the 0.1 (8 aggregates), 0.04 (25 aggregates), 0.02 (4 aggregates) or 0.01 (11 aggregates) AEP floodplains. The plan has been optimized for net benefits at the sub-reach level unless the SV sub -reaches are negatively impacted, in which case parent reach optimization is carried forward. Plan 2 would include floodproofing of 189 nonresidential structures and the elevation of 1,554 residential structures to the future year (2078) 0.01 AEP BFE.

Plan 3: NED Plan + OSE Increment 1- Floodproofing or elevation of 1,971 structures located in the 0.1 (5 aggregates), 0.04 (23 aggregates), 0.02 (4 aggregates) or 0.01 (16 aggregates) AEP floodplains. At the sub-reach level, the largest floodplain with positive net benefits is selected for SV areas. Otherwise, the plan is equal to the NED Plan (Plan 2). Plan 3 would include the floodproofing of 216 nonresidential structures and elevation of 1,755 residential structures to the future year 0.01 AEP BFE.

Plan 4: NED Plan + OSE Increment 2- Floodproofing or elevation of 2,051 structures located in the 0.1 (5 aggregates), 0.04 (25 aggregates) 0.02 (7 aggregates) floodplain or 0.01 (20 aggregates) AEP floodplains. This plan is an alteration of Plan 3 by raising all SV sub-reaches to the next highest floodplain aggregation. Plan 4 would include floodproofing of 241 nonresidential structures and the elevation of 1,810 residential structures to the future year 0.01 AEP BFE.

Risk Reduction- The term 0.01 AEP level of risk reduction, refers to a level of reduced risk of rainfall, riverine or storm surge driven flooding that the project has a 1 percent chance of experiencing each year. Different combinations of size, intensity and track of rainfall and coastal storm could result in a 0.01 probability of a surge and/or rainfall event.

The measures in the Final Array of Alternative Plans were evaluated for economics (Section 6.1) and then to the planning objectives (Section 6.2) and the formulation criteria (Section 6.3) as given and defined in the Principles and Guidelines (P&G) Section VI.1.6.2(c). They were subsequently compared to the four Federal accounts (Section 6.4) that are used to

assess the effects of the final array of alternatives. This evaluation and screening informs the decision in selecting the TSP and subsequently the RP.

6.1 ECONOMIC EVALUATION OF FINAL ARRAY OF ALTERNATIVE PLANS

The following assumptions were applied when evaluating floodproofing and elevations of structures within the 0.1, 0.04, 0.02 and 0.01 AEP floodplains (Table 6-1):

- Elevation of residential structures to predicted 2078, 0.01 AEP BFE to a maximum of 13 feet above ground level*.
- Dry Floodproofing of nonresidential structures for flood depths not greater than 3 feet above the adjacent ground.

*Elevating structures greater than 13 feet above ground level introduces damage risk from winds during tropical events as a new condition. This height generally serves as a differentiator for insurance rates for wind/hail coverage as well and is therefore used as the upper limit for elevating structures. If the BFE elevation is greater than 13 feet above ground level, the structure would still be eligible for elevation up to that height with the residual risk present.

The equivalent annual benefits were compared to the annual costs to develop a benefit-to-cost ratio for each of the plans in the final array. The net benefits for the plans were calculated by subtracting the annual costs from the base year equivalent annual benefits. Table 6-2 shows the average annual costs, benefits, net benefits, and benefit-to-cost ratios for the plans in the final array. Table 6-2 presents information in 2024 price levels and discount rate (2.75 percent) to be consistent across all three plans. The National Economic Development (NED) plan is the plan that reasonably maximizes net benefits. While this analysis found Plan 2 to be the NED plan, the team has identified Plan 4 as the recommended total net benefits plan. The total net benefits plan and a formal exception to the NED plan was approved by the Assistant Secretary of the Army for Civil Works on 23-AUG-2024. Each plan's costs were developed and assume the same S&A, P&D, and contingency.

Table 6-1. Nonstructural Flood Risk Management Plans Floodplain Aggregation by Reach

Floodplain AEP	Plan 2: NED Plan	Plan 3: NED + OSE Increment 1	Plan 4: NED + OSE Increment 2
0.1	8	5	5
0.04	25	23	25
0.02	4	4	7
0.01	11	16	20

Table 6-2. Economic Analysis of Final Array of Alternatives (2024 Price Level; FY24 Discount Rate)

Costs	Plan 2: NED Plan	Plan 3: NED + OSE Increment 1	Plan 4: NED + OSE Increment 2*
Total Project Costs			
First Cost	\$897.5 M	\$1.07 B	\$1.10 B
Interest During Construction	\$3.0 M	\$3.6 M	\$3.7 M
Total Investment Cost	\$900.5 M	\$1.07 B	\$1.10 B
Estimated Annual Costs			
Annualized Annual Project Costs	\$33.4 M	\$39.7 M	\$40. M
Average Annual Benefits			
Equivalent Annual Benefits	\$53.4 M	\$57.7 M	\$58.1 M
Annual Net Benefits	\$20.0 M	\$20.0 M	\$17.3 M
Benefit-to-Cost Ratio (BCR)	1.59	1.45	1.42

6.2 EVALUATION OF STUDY PLANNING OBJECTIVES

Plans 1 through 4 were compared to the study objectives, presented and discussed in Section 2.2 of the FIFR-EA, to validate the selection of the RP based on net benefit calculations (Table 6-3).

Objective 1 (reduce the risk to human life from flooding) and Objective 2 (reduce flood damages from rainfall in the ART study area to industrial, commercial, and agricultural facilities and residential and nonresidential structures) were evaluated through the performance analysis described in Section 6.1 of the FIFR-EA. The analysis quantitatively measured the reductions in WSEs which informed the subsequent economic analysis to determine the change in the number and frequency of flooded structures compared to the No Action Alternative. Public infrastructure such as hospitals are included in the nonstructural analysis. All of the Final Array of Alternatives decreased the risk to public health and safety by reducing the number of structures impacted by flooding and reducing the annual flood damages when compared with the No Action Alternative. The No Action Alternative does not decrease the risk to public safety. Specifically, regarding life safety risk reduction for all nonstructural flood risk management plans it is a minor positive impact

because of structure elevation. Life safety risk reduction is specific to residents who shelter in place and during events not requiring evacuation.

Objective 3 is to reduce interruption to the nation's transportation corridors, particularly the I-10/I-12 infrastructure. Transportation corridors include one or more routes that connect centers of economic activity. Transportation corridors provide transportation and other logistics services that promote trade among the cities and countries along the corridor. Interstate 10 and Interstate 12 are the major transportation corridor within the study area. The potential for flow restrictions from bridges up to the 0.002 AEP event was assessed for the I-10/I-12 corridor, as outlined in Appendix F: Plan Formulation for Alternative 7. Since the bridges were found capable of passing water flows, Alternative 7 was not carried forward. As a result, Objective 3 did not emerge as a distinguishing factor in the Final Array of Alternatives.

Objective 4 is to reduce risks to critical infrastructure (e.g. medical centers, schools, transportation etc.). Objective 4 did not end up being a distinguishing factor in the Final Array of Alternatives between nonstructural flood risk management plans; however, some critical infrastructure are preliminary eligible as part of the nonstructural flood risk management plans vs. the no action.

Table 6-3. Final Array Evaluation to Study Objectives

Alternative	Reduce flood damages from rainfall events	Reduce risk to human life from flooding	Reduce interruption to the nation's transportation corridors	Reduce risks to critical infrastructure (e.g. medical centers, schools, transportation etc.);
Plan 1: No Action	Low	Low	Low	Low
Plan2: Nonstructural NED Plan	Medium	Medium	Low	Low
Plan 3: NED + OSE Increment 1	Medium	Medium	Low	Low
Plan 4: NED + OSE Increment 2	Medium	Medium	Low	Low

High-Signifies the metric was met considerably.

Medium-Signifies the metric was met moderately.

Low-Signifies the metric was minimally met if all.

6.3 PRINCIPLE AND GUIDANCE CRITERIA EVALUATION

The four formulation criteria suggested by the P&G (completeness, effectiveness, efficiency, and acceptability) were also used to aide in the selection of the RP. Descriptions of the P&G criteria are below. Table 6-4 presents the P&G criteria evaluation.

- *Acceptability* is the workability and viability of the alternative plan with respect to acceptance by state and local entities and the public and compatibility with existing laws, regulations, and public policies (P&G Section VI.1.6.2(c)(4)). Acceptability means a measure or plan is technically, environmentally, economically, and socially feasible. Measures or plans that are clearly not feasible should be dropped from consideration.
- *Completeness* is a determination of whether or not the plan includes all elements necessary to achieve the objectives of the plan. It is an indication of the degree that the outputs of the plan are dependent upon the actions of others.
- *Effectiveness* is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities (P&G Section VI.1.6.2(c)(2)). Alternative plans that clearly make little or no contribution to the planning objectives should be dropped from consideration.
- *Efficiency* is the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment (P&G Section VI.1.6.2(c)(3)). Benefits can be both monetary and non-monetary. Alternative plans that provided little benefit relative to cost should be dropped from consideration.

Table 6-4. Final Array Evaluation to P&G Criteria

Alternative	Acceptability	Completeness	Effectiveness	Efficiency
Plan 1: No Action	Partially. Viable and in accordance with state and local entities and with existing laws. Provides no solution to the identified problems.	No. Does not meet objectives to reduce flood risk.	No. The alternative does not alleviate the problems identified and does not meet the objectives of the project.	Yes. No money is expended, no benefits are gained, problems are not alleviated, and objectives are not met. No flooding risk would be reduced.
Plan 2: NED Plan	Yes. Viable and in accordance with state and local existing laws.	Yes. The alternative includes all features needed to produce the stated effects.	Partially. The alternative alleviates some of the flood risk. It does not reduce interruption to the nation's transportation corridors within the study area.	Yes. Is the most cost-effective means of providing a reduction of damages to eligible structures.
Plan 3: NED + OSE Increment 1	Yes. Viable and in accordance with state and local existing laws.	Yes. The alternative includes all features needed to produce the stated effects.	Partially. The alternative alleviates some of the flood risk. It does not reduce interruption to the nation's transportation corridors within the study area.	Partially. It is cost effective but does have a slightly lower net benefits and increased cost but provides some potential to reduce flooding for SV areas.
Plan 4: Plan 4: NED + OSE Increment 2	Yes. Viable and in accordance with state and local existing laws.	Yes. The alternative includes all features needed to produce the stated effects.	Partially. The alternative alleviates some of the flood risk. It does not reduce interruption to the nation's transportation corridors within the study area.	Partially. It is cost effective but does have a lower net benefits and increased cost but provides the highest potential to reduce flooding for SV areas.

6.4 COMPARISON OF ALTERNATIVES TO SYSTEM OF ACCOUNTS-FLOOD RISK MANAGEMENT SYSTEM

Plan formulation has been conducted with a focus on achieving the federal objective of water and related land resources project planning, which is to contribute to NED consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable EOs, and other Federal planning requirements. Plan formulation considers all effects, beneficial or adverse, to each of the four evaluation accounts identified in the USACE 2014 PRG which are NED, Environmental Quality (EQ), Regional Economic Development (RED), and OSE. Table 6-5 compares the four Federal accounts against the three NS alternatives in the final array presented in 2024 price levels and discount rate (2.75

percent) to be consistent across all three plans. This is a summary of the highest-ranking alternatives by account.

Table 6-5. P&G Four Federal Accounts Assessment

Four Accounts	Plan 2: NED Plan	Plan 3: NED + OSE Increment 1	Plan 4: NED + OSE Increment 2
National Economic Development (NED)	Avg. Annual Benefits \$ 53.4 M Avg. Annual Costs \$ 33.4 M Net Annual Benefits \$ 20.0 M BCR 1.59	Avg. Annual Benefits \$57.7 M Avg. Annual Costs \$ 39.7 M Net Annual Benefits \$20.0 M BCR 1.45	Avg. Annual Benefits \$58.1 M Avg. Annual Costs \$ 40.8 M Net Annual Benefits \$17.3 M BCR 1.42
Environmental Quality (EQ)	No significant impacts to the environment.	No significant impacts to the environment.	No significant impacts to the environment.
Regional Economic Development (RED)	Value Added: \$1,179,983,000 FTE Jobs: 12,715	Value Added: \$1,240,191,000 FTE Jobs: 13,364	Value Added: \$1,218,000,000 FTE Jobs: 13,117
OSE	Overall minor positive benefits associated with the NED NS plan. These benefits are realized via the Social Vulnerability & Resiliency, Health & Life Safety, Economic Vitality, Social Connectedness and Participation. For a detailed explanation of OSE criteria, reference Table 6-7.	Both Minor & Moderate positive benefits are associated with Plan 2. These benefits are realized via the Social Vulnerability & Resiliency, Health & Life Safety, Economic Vitality, Social Connectedness, and Participation. For a detailed explanation of OSE criteria, reference Table 6-7.	Both Minor & Moderate positive benefits are associated with Plan 2. These benefits are realized via the Social Vulnerability & Resiliency, Health & Life Safety, Economic Vitality, Social Connectedness, and Participation. For a detailed explanation of OSE criteria, reference Table 6-7.

FY24 Interest 2.75% and 2024 Price Level
Cost Share 35% NFS and 65% Federal

6.4.1 NED Account Comparison

The intent of comparing alternative flood risk reduction plans in terms of NED account was to identify the beneficial and adverse effects that the plans may have on the national economy. Beneficial effects are increases in the economic value of the national output of goods and services attributable to a plan. Increases in NED were expressed as the plans' economic benefits, and the adverse NED effects were the investment opportunities lost by committing funds to the implementation of a plan. The factors considered included structure and content damage and emergency costs.

6.4.2 EQ Account Comparison

The EQ account is an assessment of favorable or unfavorable ecological, aesthetic, and cultural or natural resources changes. Environmental Impacts of the RP are described in detail in Section 5. The analysis was conducted with the participation of agencies, local governments, and stakeholders through an on-going and engaging series of scoping meetings, public input meetings, agency and stakeholder meetings, and on-site meetings, and will continue through the PED phase and coordination of the project through State and Agency reviews. The EQ account was another means of evaluating the plans to assist in making recommendations. The factors considered included habitat change and threatened & endangered species risk.

6.4.3 RED Account Comparison

The RED account addresses the impacts that the USACE expenditures associated with the implementation of the NS plans will have on the levels of income, output, and employment throughout the region. This RED analysis employs input-output economic analysis, which measures the interdependence among industries and workers in an economy. This analysis uses a matrix representation of a regional economy to predict the effect that changes in one industry will have on other industries. The greater the interdependence among industry sectors, the larger the multiplier effect on the economy. Changes to government spending drive the input-output model to project new levels of sales (output), value added Gross Regional Product, employment, and income for each industry.

Regional Economic System (RECONS) Version 2 was the specific input-output model used to estimate the regional economic development impacts of the RP Plan. The USACE Institute for Water Resources, Louis Berger, and Michigan State University developed the regional economic impact modeling tool, RECONS, that provides estimates of jobs and other economic measures such as labor income, value added, and sales that are supported by USACE programs, projects, and activities. This modeling tool automates calculations and generates estimates of jobs, labor income, value added, and sales using IMPLAN®'s multipliers and ratios, customized impact areas for USACE project locations, and customized spending profiles for USACE projects, business lines, and work activities. RECONS allows the USACE to evaluate the regional economic impact and contribution associated with USACE expenditures, activities, and infrastructure. Table 6-6 summarizes RED impacts from RECONS. Additional information can also be found in Appendix G: Economic and Social Consideration. The factors include the total expenditure, value added (gross regional product), and full-time equivalent jobs.

Table 6-6. RED Impacts from RECONS

Plan	Expenditures	Gross Regional Product	Full-time Equivalent Jobs
1: No Action	\$0	\$0	0
2: NED Plan	\$775,646,000	\$1,179,983,000	13,700
3: NED + OSE Increment 1	\$815,223,000	\$1,240,191,000	13,400
4: NED + OSE Increment 2	\$800,840,000	\$1,218,001,000	13,100

6.5 OTHER SOCIAL EFFECTS

The OSE account includes impacts to over-arching social themes including social vulnerability & resiliency, health & safety, economic vitality, social connectedness, and participation. Impacts to these social themes are prevalent in flood risk management projects and are evaluated and discussed in the OSE account (Table 6-7).

Evaluation of the outcomes of the various alternatives on SV populations using the Center for Disease Control, Agency for Toxic Substances and Disease Registry's Social Vulnerability and US. Census Bureau statistics, United States Geological Survey Food Atlas, and the previously available Council on Environmental Quality's Climate and Economic Justice Screening Tool. Additionally, the life safety risk to the study area utilizing submergence criteria from the LifeSim technical manual was evaluated.

Table 6-7. Summary of OSE Benefit Themes

OSE Theme	Indicator	Plan 2: NED Plan	Plan 3: NED + OSE Increment 1	Plan 4: NED + OSE Increment 2
Social Vulnerability & Resiliency	Structures included in SV Areas	+	++	++
Health & Safety	Life Safety	+	+	+
	Critical Infrastructure	+	+	+
	Food Insecurity	+	++	++
Economic Vitality	Employment Activity	+	+	+
Social Connectedness	Civic Infrastructure	+	+	+
Participation	Public Involvement	<i>Evaluated Post-Draft Report Outreach</i>		
Impacts to Low Income and/or Underserved Communities	Structures included in Areas of concern	+	++	++

Legend:

+: Minor Positive Benefits

++: Moderate Positive Benefits

+++: Significant Positive Benefits

Social Vulnerability & Resiliency:

Plan 2 provides minor benefits to individuals experiencing social vulnerability in the study area. Under this plan, \$6.4 Million, 11.1 percent of total net benefits are provided to these identified areas. Plan 3, NED + OSE Increment 1 provides moderate benefits to individuals experiencing social vulnerability within the ART study area. This plan was formulated with specific considerations of Social Vulnerability. Under this plan, incremental benefits in communities experiencing social vulnerability were increased to \$7.2 Million, or 12.8 percent of overall benefits. Plan 4, NED + OSE Increment 2 provides moderate benefits to communities experiencing social vulnerability, increasing the total benefits to these identified areas to \$7.9 Million, for an overall 14 percent of total benefits of the plan. Additional information on the incorporation of social vulnerability into the final array and their impacts can be found in the Economic & Social Consideration Appendix, Appendix G, in sections 1.2.2, 7.2.1, and 7.3.1.

Health & Safety

Life Safety:

Life safety concerns were addressed for the ART study via a simplified method utilizing the submergence criteria established by the Risk Management Center's (RMC) LifeSim technical manual. This approach does not include warning and evacuation and assumes that all residents within the structures are trapped in the structure at the time the max depth arrives.

All proposed NS plans do not palliate life safety risk on roadways; however, palliation of proposed elevations and floodproofing does reduce the number of structures experiencing high hazard conditions according to the submergence criteria thresholds in the LifeSim technical manual. The decreased life safety concern is consistent among all of the plans in the final array. Reference Appendix G, section 7.3.3 for additional information relating to life safety.

Critical Infrastructure:

Critical infrastructure was assessed by surveying the physical critical infrastructure that is palliated under the final array. Under Plan 2, there are seven critical infrastructure facilities included for floodproofing measures. Under Plans 3 and 4, there are eight facilities included. This improvement will allow these services and their assistance to return to operation sooner than under the existing flood conditions. See Appendix G, section 7.3.3 for additional information relating to critical infrastructure.

Food Insecurity:

Food Insecurity impacts were determined through the USGS Food Access Atlas, where tracts are identified as experiencing food insecurity if they are both low income and have low access to fresh grocers. Plan 2 palliates 10 total grocery stores, 2 of which are included in areas experiencing food insecurity. Plan 3 includes palliation of 11 grocery stores in total, with the additional grocer not being in an area that experiences food insecurity, but in an

area that experiences social vulnerability. Plan 4 includes a total of 12 grocery stores, with the additional grocer being in an area that experiences social vulnerability Reference Appendix G, section 7.3.3 for additional information related to food insecurity.

Economic Vitality

Economic vitality was assessed via employment by industry and the number of commercial structures palliated under each of the plans. Plan 2 floodproofs 189 commercial structures, Plan 3 floodproofs 216 commercial structures, and Plan 4 floodproofs 241 commercial structures. The palliation of these structures will decrease the duration of employment and consumption pauses.

Social Connectedness

Impacts to social connectedness were measured via inclusion of civic infrastructure in each of the plans. Civic infrastructure includes community centers and places of worship. Each of the plans in the final array palliates one place of worship.

Communities of Concern

The number of structures included in the plans within areas of concern were determined by the Council on Environmental Quality's previously available Climate and Economic Justice Screening Tool. Plan 2 included 655, or 38 percent of total structures in areas of higher risk and concern. Plan 3 included an additional 191 structures in areas of higher risk and concern for a total of 846, or 43 percent of the total eligible structures in the plan. Of the increase in total structures from Plan 2, 84 percent of the increased structures are in areas of higher risk and concern. Plan 4 included an additional 4 structures in areas of concern for a total of 850, or 41 percent of the total eligible structures in the plan. Of the increase in total structures from Plan 2, 63 percent of the increased structures are in areas of higher risk and concern (Table 6-8).

Table 6-8. Communities of Concern based on previous CEJST Data

	<i>Plan 2: NED Plan</i>	<i>Plan 3: NED + OSE Increment 1</i>	<i>Plan 4: NED + OSE Increment 2</i>
All Structures Included	1,743	1,971	2,051
Structures in Communities of Concern	655	846	850
% of Structures in Communities of Concern	38%	43%	41%

6.6 IDENTIFYING THE RECOMMENDED PLAN

CEMVN does not recommend the NED Plan; therefore, a policy exception from ASA(CW) is required for the following USACE Policy: ER 1105-2-103 2-4.f(5)(d) stating: "For projects requiring Congressional authorization or that are authorized subject to a determination by the Secretary, the process continues at the division and headquarters levels through

subsequent reviews and approval. The final agency decision maker for these projects is the Secretary through the ASA(CW). If the district recommends a plan other than the NED plan, or NER for aquatic ecosystem restoration, an exception request must be prepared and submitted to the ASA(CW) for approval.”

The policy exception was approved on August 23, 2024, by ASA(CW) for the Total Net Benefits Plan, which is Plan 4. The NS Plan has additive for OSE for positive and negative economic benefits where eligibility is expanded to include all structures within SV sub aggregates at the next highest floodplain aggregation even if the sub aggregation did not have positive net benefits. This provides FRM in terms of national economic development along with the added benefit of flood risk reduction to vulnerable and disadvantaged communities, maximizing the OSE account (Table 6-9). While this plan is not the NED Plan, it provides the best level of comprehensively assessed benefits for flood risk reduction to the ART study area and is the Total Net Benefits Plan for this study. Plan 4 includes floodproofing of 241 nonresidential structures and the elevation of 1,810 residential structures located in the 0.1 (5 aggregates), 0.04 (25 aggregates) 0.02 (7 aggregates) floodplain or 0.01 (20 aggregates) AEP floodplains, for a combined total of 2,051 structures that are preliminary eligible for participation.

Table 6-9 displays the final annual costs and benefits summary for the Recommended Plan (RP) using the Cost Mandatory Center of Expertise Certified Estimate, which was done at 2025 price levels and with FY2025’s discount rate (3.00%).

Table 6-9. Recommended Plan Annual Costs and Benefits Summary (2025 Price Level, FY 25 Discount Rate; \$1000s)

Recommended Plan	Plan 4 (NED+OSE 2)
Construction First Cost	\$1,049,321
Interest During Construction	\$3,884
Total Construction Cost	\$1,053,205
Average Annual Construction Cost	\$40,933
Average Annual Operation & Maintenance Costs	\$65 (sixty-five thousand)
Total Average Annual Costs	\$40,998
Equivalent Annual Benefits	\$58,035
Annual Net Benefits	\$17,037
Benefit-to-Cost Ratio (BCR)	1.42

SECTION 7

Recommended Plan

The RP is Plan 4, the Total Net Benefits Plan, which includes NS flood risk management solutions of the elevation of residential structures and the dry or wet floodproofing of non-residential structures on a total of 2,051 structures, located in the 0.1 (5 aggregates), 0.04 (25 aggregates), 0.02 (7 aggregates), or 0.01 (20 aggregates) AEP floodplains in the ART study area (Figure 7-1). Eligible structures were determined based on the 2076 rainfall/riverine floodplain and were optimized using damages from the predominate condition for:

- 1,810 residential structures,
- 241 nonresidential structures.

The reduction in damages would be achieved by elevating residential structures to the 2078 0.01 AEP BFE that has been individually determined for each structure, up to 13 feet above ground surface, and floodproofing up to 3 feet above ground surface. During implementation, each structure would be individually surveyed. Participation in the RP is 100 percent voluntary.

This plan, using the USACE Cost Mandatory Center of Expertise Certified Estimate has an average annual construction cost of \$41 million (total project cost of \$1.05 billion including interest during construction), along with average annual OMRR&R costs of \$65 thousand, giving a BCR of 1.42, and net benefits of \$17.0 million at the current Federal discount rate (FDR) of 3.00 percent and FY 2025 Price Level.

While the addition of 308 preliminarily eligible structures for elevation and floodproofing is not economically justified based on NED benefits, these measures provide other social effects benefits and more specifically flood risk management benefits to socially vulnerable communities that justify the Federal participation in implementation. Communities of concern were focused on due to the feedback provided during the 2019 DIFR/EIS public, technical, legal, and policy reviews. The FRM Recommended Plan invests in and supports sustainable and resilient communities by incorporating the needs and considerations of all at risk communities that have been impacted by past flooding events. No significant flood risks associated with the ARB and its tributaries were identified within Mississippi; therefore, no structures in Mississippi have been identified as eligible as part of this plan.

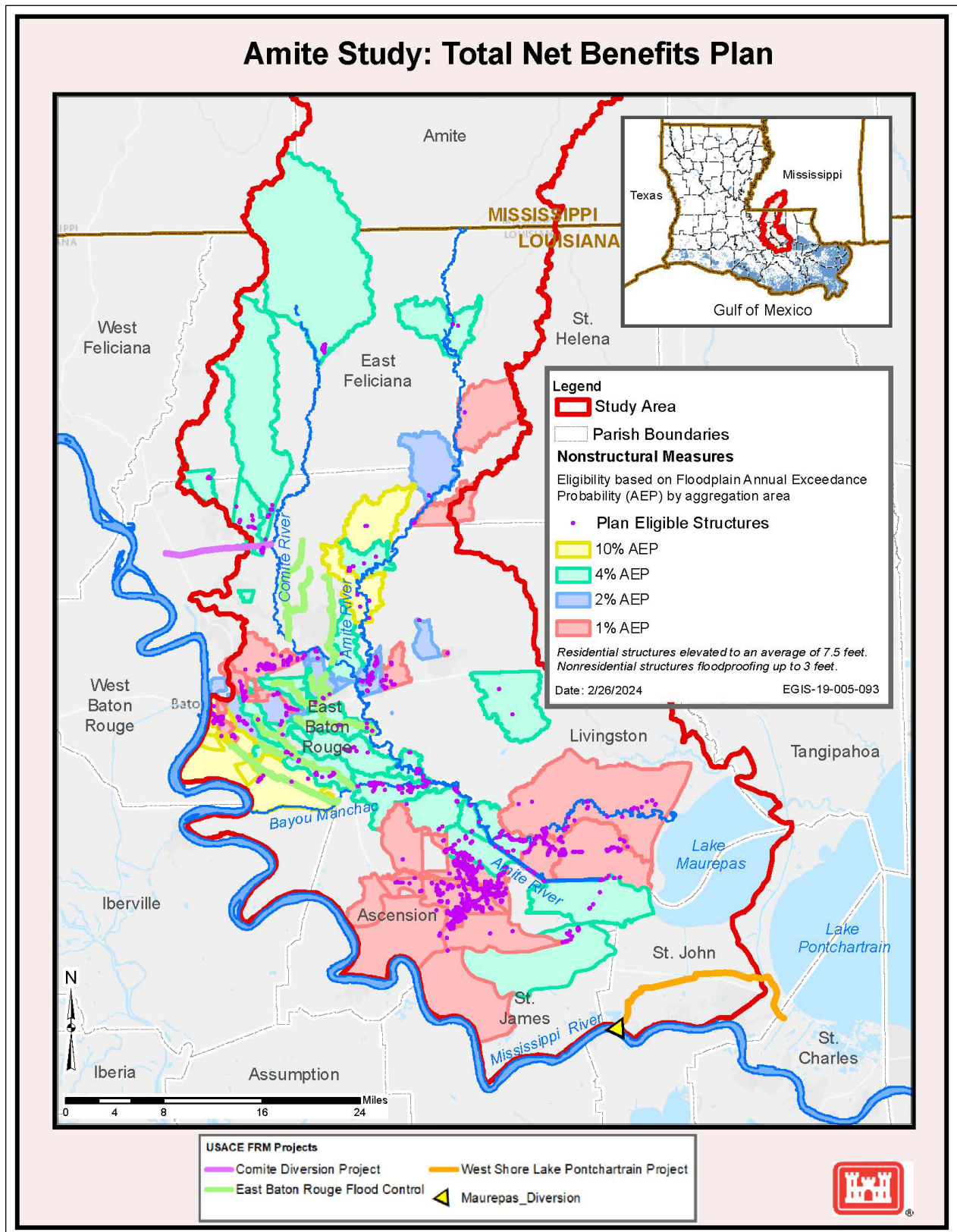


Figure 7-1. Recommended Plan

7.1 IMPLEMENTING THE PLAN

Subject to project authorization, appropriation and availability of funding, full environmental compliance, and execution of a binding agreement with the NFS, construction is currently scheduled to begin in 2028 (Appendix I: Implementation Plan). The proposed method of implementation for this project is Design-Build (D-B) delivery, where design and construction are combined in a single contract with a single contractor.

It is anticipated that implementation of the Plan will occur over an approximate 8.5-year period. Following an initial 24-month PED phase, there will be 6.5 years for the elevation of residential and dry/wet floodproofing of nonresidential construction starting off with a small pilot project of 25 to 50 structures followed by soliciting 5 large MATOC contracts with USACE managed contractors constructing approximately 400 structures per MATOC contract. The implementation schedule assumes that each of the 5 USACE managed contractors would floodproof or elevate 80 to 100 structures concurrently per year, thereby completing construction of up to 400 structures per year. This timeframe is highly dependent upon the amount of funding allocated in any given year, the participation rate and environmental conditions, timely approval process of structures receiving NS measures, and expediency of submittal reviews and permit processing during design-build phase. The implementation of other USACE projects in Louisiana containing a NS plan were also considered in making the 400 structures a year assumption based on contractor capability. The contractor capability assumption risk is discussed in Appendix C, Cost & Schedule Risk Analysis Details. The PDT also assumed that it would take a 4-month period of time to complete the elevation or floodproofing on structures with a slab foundation, and a 3-month period of time to complete the elevation or floodproofing of structures with a crawl foundation. If there is a cost associated with the residential structure elevation that is coverable by the program, then that cost would be paid by NFS and/or USACE and not by the property owner. The property owner would not be expected to pay the coverable cost and wait for reimbursement as direct payment to the contractor from USACE is anticipated.

In order to be preliminarily eligible for inclusion in the RP, the following criteria must be met:

1. The structure must have a FFE at or below the applicable floodplain (which may be a 0.1, 0.04, 0.02 and 0.01 AEP year floodplain depending on the location of the structure) based on hydrologic conditions predicted to occur in 2028 (the beginning of the 50-year period of analysis) at a specific location.
2. The elevation or floodproofing measures proposed for the structure must be economically justified based on an aggregation or sub aggregation level that are anticipated to be avoided over the 50-year period of analysis (years 2028-2078) unless they have been identified eligible based on SV criteria and included in the next highest aggregation regardless of economic justification.
3. The structure must have a permanent foundation and be permanently immobilized and affixed or anchored to the ground, as required by applicable law, and must be legally classified as immovable real property under state law of La. R.S. 51:912, ART XIV-B. Notwithstanding the provisions of La. R.S. 9:1149.6, a manufactured, modular, or mobile homeowner and any subsequent owner may not de-immobilize

the manufactured, modular, or mobile home in the future, by detachment, removal, act of de-immobilization, or any other method. Manufactured, modular, and mobile homes that do not meet these requirements are not eligible for elevation. This criterion only applies to residential uses of manufactured, modular, and mobile homes.

Once construction funds are appropriated for this project, the LADOTD, as the NFS, and the Department of the Army will enter into a PPA. After the signing of the PPA, the NFS must provide all project LERRDs required for the project.

The following work tasks were assumed for cost estimation purposes. No Federal funds will be used to restore, replace, or repair a structure or bring a structure into compliance with applicable building and other codes. Elements of structure elevation work that are potentially eligible project costs include but are not limited to: design costs; costs of title searches (in review of title information submitted by the property owner), surveys; and costs of obtaining all required permits (i.e., zoning or land use approvals, environmental permits or required certifications, historic preservation approvals, and building permits).

Elevation of Residential Structures

No additions to the habitable spaces of a structure (including but not limited to, outbuildings, detached garages, sheds, etc.) will be permitted in the performance of the elevation work. In no event shall the structure be elevated if USACE determines that the structure is not physically sound and/or capable of being raised safely.

Elements of structure elevation work that are potentially eligible project costs include the following tasks:

- Raising the roof and extending the walls of a side structure attached to the main structure (i.e., garage).
- Raising mechanical equipment (e.g., air conditioner, furnace, water heater, electrical panel, fuel storage, valves, or meters).
- Connecting, disconnecting, and extending utility connections for electrical power, fuel, incoming potable water, wastewater discharge.
- Meeting access requirements of applicable building and other codes (e.g., stairs with landings, guardrails) and/or the Americans with Disabilities Act.
- Creating large vent openings in the foundation and walls to meet requirements for floodwater entry and exit.
- Special access improvements.
- Removal of any trees and other vegetation which restrict the elevation work.
- Debris removal (all demolition debris (hazardous and non-hazardous) shall be removed and taken to an approved landfill.
- Site grading and site restoration including grading landscaping to it preconstruction condition, but it cannot adversely affect drainage of adjacent properties.
- Temporary site protection measures during the elevation work such as temporary construction silt and security fencing.

- Allowable relocation assistance funds for displaced tenants who are unable to occupy the structure during the elevation process in accordance with the Uniform Relocation Assistance (URA) and Real Property Acquisition Policies for Federal and Federally Assisted Programs of 1970, Public Law 91-646, 84 Stat. 1984 (42 U.S.C. 4601), as amended by the Surface Transportation and Uniform Relocation Assistance Act of 1987, Title IV of Public Law 100-17, 101 Stat. 246-256. Relocation assistance for tenants who cannot live in the structure during the elevation process, may include, advisory services, eligible reasonable out-of-pocket expenses incurred during temporary displacement (e.g., moving and storage of household goods required to be removed during construction, temporary quarters, meals, etc.).

Dry Floodproofing of Nonresidential Structures

Elements of structure work that are deemed to be potentially eligible dry floodproofing costs include, the following tasks:

- Construction of an impermeable barrier, which is attached to the existing foundation, three feet above grade around the entire building perimeter.
- Development/design of deployable and/or permanent barriers at door, window, or other foundation openings which are within three feet of grade.
- Installation of backflow preventors and/or valves on utility lines as necessary.
- Relocate, rearrange, and/or elevate all utility lines as necessary and perform disconnections and subsequent reconnections post flood proofing activities.
- Installation of sump pumps and sub-drains (as necessary).
- Water resistant material; water resistant window coverings, waterproof adhesives sealants and compounds, and floor drains.
- Removal of any trees that restrict the dry floodproofing of a structure.
- Temporary site protection measures during site work.
- Site grading and site restoration including grading landscaping to the preconstruction condition (but it cannot adversely affect drainage of adjacent properties).

Wet Floodproofing of Nonresidential Structures

Elements of structure work that are deemed to be potentially eligible wet floodproofing costs include the following tasks:

- Wet floodproofing of the structure.
- Engineered flood vents.
- Flood-resistant construction materials such as rigid foam board wall insulation or cement board and molding within the interior of the building.
- Elevation and wet floodproofing of electric outlets.
- Concrete floor treatment and interior wall and floor sealer/stains.
- Exterior paint coatings.

- Sand/water blasting or other manual removal of rusted coatings and application of epoxy coatings.
- Elevation and wet floodproofing of mechanical and electrical equipment.
- Connecting, disconnecting, and extending utility connections for electrical power, fuel, incoming potable water, wastewater discharge.
- Removal of any trees which restrict access to floodproofing the structure.
- Temporary site protection measures during site work.
- Site grading and site restoration including grading landscaping to the preconstruction condition (but it cannot adversely affect drainage of adjacent properties).

7.1.1 Real Estate

The estimated total cost for Real Estate for Plan 4 is \$69,494,000. These costs include administrative costs associated with implementation of the plan and temporary residential relocations of tenants during structure elevation. Real estate tasks associated with elevating (approximately 1,810 structures) and floodproofing (approximately 241 structures) could include such items as obtaining rights-of-entry, title work, preparation, execution, and recordation of the estates and any needed curative documents, residential relocation costs for tenants, and subsequent inspections to ensure the work was performed in accordance with the PPA.

Floodproofing nonresidential structures and elevating residential structures will be offered to property owners on a voluntary basis and implemented only with the property owner's consent. Property owners who have preliminarily eligible structures that wish to participate in the floodproofing measures will be required to apply for the program and provide a right-of-entry to their property.

The proposed legal mechanism to undertake the residential elevation or nonresidential floodproofing measures would be through the use of a non-standard permanent Restrictive Easement that would outline the elevation or floodproofing treatment, identify restrictions owners must take or abstain from to ensure the long-term performance of elevation and floodproofing measures, and contain restrictions and covenants that would run with the land. Additionally, a non-standard Perpetual Access Easement would be required prior to initiation of construction to allow for ingress and egress over the property to inspect and monitor the residential and non-residential structure(s) and project measures to ensure compliance with the restrictive easement. The language of the non-standard estates will need to be approved through CEMVD and HQUSACE in accordance with USACE regulations. The easements will be recorded in local land records to run with the land.

The proposed nonstandard estates will be executed between the property owner and the NFS. If a property owner elects not to have the NS treatment performed on their structure and an agreement is not obtained, eminent domain will not be pursued.

7.1.2 Operations, Maintenance, Repair, Rehabilitation, and Replacement

The NFS and property owner will be 100 percent responsible for the OMRR&R (Appendix I, Section 11) which are anticipated to begin in fiscal year 2035 which is 5 years after the first MATOC completion. On a rotating schedule, every 5 years, the NFS will conduct physical inspections, expected to cost approximately \$1,200 per structure, from the street of 10 percent of the structures that have participated in the project, approximately 205 structures, to ensure that the owners, their heirs, and assigns, are following the terms and conditions of the executed agreements. The NFS's obligations for the subject structure will be in perpetuity or until such time as the structure no longer exists or the project is de-authorized by Congress. The property owner shall be responsible for all costs and risk associated with maintaining, repairing, rehabilitating, and replacing the completed floodproofing measures on the property.

Nonresidential property owners are expected to perform regular maintenance tasks, such as cleaning weep holes, inspecting and replacing deployable system components, and reapplying sealant coatings every 5-10 years, to ensure the effectiveness and longevity of floodproofing measures. It will be essential for the property owner to follow the manufacturer's recommendations and develop a routine maintenance schedule to ensure the floodproofing system remains effective and functional over time. The estimated costs for OMRR&R for the nonresidential property owner includes \$720 for sealing coating reapplication and \$144 for sealing materials every 10 years, to maintain the functionality of the floodproofing system over time.

Cost Sharing Requirements

A NFS must support all phases of the project. Feasibility study costs are typically shared 50 percent Federal and 50 percent non-Federal, but this study is 100 percent federally funded. For NS features, design and implementation phases are cost-shared, with the NFS providing 35 percent of the total project costs. Once a project has been implemented, OMRR&R of the project is a 100 percent non-Federal responsibility.

Total project first costs of the RP at FY 25 price levels are approximately \$1.05 B. The total fully funded cost of the project, with escalation through the mid-point of construction, is approximately \$1.25 B (Table 7-1). As part of feasibility level design activities, the costs will continue to be refined and will be updated within the final report.

Table 7-1. Project First Costs and Total Apportionments

Project First Costs	
Construction	\$564.0 M
PED	\$90.2 M
Construction Management	\$45.3 M
Real Estate	\$46.4 M
Contingency	\$303.5 M
Total Project First Cost (constant dollar basis) Apportionment	\$1.05 B
Federal Share (65%)	\$682 M
Non-Federal Share (35%)	\$367 M
Total Project Cost (Fully Funded)	\$1.25 B
Federal Share (65%)	\$811 M
Non-Federal Share (35%)	\$437 M

FY 2025 Price Level

7.1.3 Federal Responsibilities for the Selected Plan

The Federal Government will be responsible for PED and construction of the project in accordance with the applicable provisions of Public Law 99-662 (WRDA of 1986), as amended. The Government, subject to congressional authorization, the availability of funds, and the execution of a binding agreement with the NFS in accordance with Section 221 of the Flood Control Act of 1970, as amended, and using those funds provided by the NFS, shall expeditiously construct the project, applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

7.1.4 Non-Federal Responsibilities for the Selected Plan

Federal implementation of the project for NS flood risk management includes, but is not limited to, the following required items of local cooperation to be undertaken by the non-Federal sponsor in accordance with applicable Federal laws, regulations, and policies:

- a. Provide 35 percent of construction costs, as further specified below:
 1. Provide, during design, 35 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;
 2. Provide all lands, easements, rights-of-way, and placement areas and perform all relocations determined by the Federal government to be required for the project;
 3. Provide, during construction, any additional contribution necessary to make its total contribution equal to at least 35 percent of construction costs;

- b. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the level of flood risk reduction the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;
- c. Inform affected interests, at least yearly, of the extent of risk reduction afforded by the flood risk management features; participate in and comply with applicable Federal floodplain management and flood insurance programs; prepare a floodplain management plan for the project to be implemented not later than one year after completion of construction of the project; and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with the project;
- d. Operate, maintain, repair, rehabilitate, and replace the project or functional portion thereof at no cost to the Federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal laws and regulations and any specific directions prescribed by the Federal government;
- e. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project to inspect the project, and, if necessary, to undertake work necessary to the proper functioning of the project for its authorized purpose;
- f. Hold and save the Federal government free from all damages arising from design, construction, operation, maintenance, repair, rehabilitation, and replacement of the project, except for damages due to the fault or negligence of the Federal government or its contractors;
- g. Perform, or ensure performance of, any investigations for hazardous, toxic, and radioactive wastes (HTRW) that are determined necessary to identify the existence and extent of any HTRW regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, and any other applicable law, that may exist in, on, or under real property interests that the Federal government determines to be necessary for construction, operation, and maintenance of the project;
- h. Agree, as between the Federal government and the non-Federal sponsor, to be solely responsible for the performance and costs of cleanup and response of any HTRW regulated under applicable law that are located in, on, or under real property interests required for construction, operation, and maintenance of the project, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination, without reimbursement or credit by the Federal government;
- i. Agree, as between the Federal government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the owner and operator of the project for the purpose of CERCLA liability or other applicable law, and to the maximum extent

practicable shall carry out its responsibilities in a manner that will not cause HTRW liability to arise under applicable law; and

- j. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. 4630 and 4655) and the Uniform Regulations contained in 49 C.F.R Part 24, in acquiring real property interests necessary for construction, operation, and maintenance of the project including those necessary for relocations, and placement area improvements; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

7.2 RISK AND UNCERTAINTY

Risk and uncertainty are intrinsic in water resources planning and design. Risk is a measure of the probability and consequence of uncertain future events. It is the chance of an undesirable outcome. Uncertainty refers to the likelihood an outcome results from a lack of knowledge about critical elements or processes contributing to risk or natural variability in the same elements or processes.

For nonstructural, the level of risk reduction is variable, as every structure in the aggregation has a unique ground surface elevation and structural attributes such as foundation height, value, and condition. Each of these factors led to each individual structure, in the project area, having a different level of risk reduction relative to its neighbors and other structures in the inventory. The result is that the RP does not have a single level of risk reduction, but rather 2,051 different levels. The level of risk reduction can be summarized by how many structures see risk reduction for each of the eight flood frequencies ran through HEC-FDA, see Appendix G Economics and Social Vulnerability for additional discussion on the risk reduction.

7.2.1 Project Cost and Level of Design

USACE decision documents recognize cost risk and uncertainty surrounding implementation. All cost estimates will carry a degree of uncertainty. The estimated total project first cost for the RP is \$1.05B. The fully funded total project cost for the RP is approximately \$1.25B at the 80 percent confidence level. The costs are based on a USACE Class 3 level of technical information and design reflecting a 10 percent level of project definition as presented in the Design Maturity Memorandum. The project first cost and fully funded project cost include the contingency developed utilizing the Cost and Schedule Risk Analysis (CSRA). The 2024 CSRA Baseline Cost Estimate Report is located in (Appendix C), and computed contingency for the overall project is 42 percent. The cost contingency reflects an 80 percent confidence level in estimated fully funded total project cost and is intended to cover potential cost and schedule increases associated with identified project risks and their probability of occurrence. An 80 percent confidence level still carries some degree of risk or uncertainty.

The currently known major risk drivers for cost as noted in the CSRA are the following:

- Construction Contract Modifications;
- Escalation Rate;
- Technical/Design Changes for Dry Floodproofing;
- Availability of Floodproof Contractors;
- Scope Maturity;
- PED and S&A costs;
- Acquisition Strategy.

The currently known major risk drivers to schedule as noted in the CSRA are the following:

- PED and S&A Cost;
- Acquisition Strategy;
- Intermittent Funding;
- Technical/Design Changes for Dry Floodproofing;
- Subordinating Mortgages

Engineering design factors that carry uncertainty include:

- Final construction design;
- Modeling analysis and assumptions;
- Existing or future projects cause unexpected effects on the RP.

These major Cost and Schedule drivers can be used to support development of a risk management plan that will facilitate control of risk factors and their potential impacts throughout the project lifecycle. However, there still exists the potential for other unanticipated and uncontrollable changes in environmental or economic conditions that could further increase the total project first cost beyond the current estimate and/or necessitate changes in the project's design.

Computation of Structure Elevation and Dry Floodproofing Costs - Reference Section 4.4.4 for a summary of feasibility level design activities and quantity development. Further details can be found in Engineering Appendix B. Appendix C: Cost Engineering provides details on the RP cost estimation approach based on the engineering assumptions, designs, and quantity calculations. The cost estimate and benefits for the RP assumes 100 percent participation by the owners of eligible residential structures, but historically actual participation percentages fall well below 100 percent. The estimate utilizes the best available information and judgment by the cost estimating community across the enterprise with respect to PED percentage and Supervision and Administration (S&A) percentage. Please note, there is not a strong history of execution of such a program by USACE. Another uncertainty that could impact the ultimate cost for the residential structure elevations is the frequency and magnitude of Congressional appropriations to execute the RP. Incremental funding may prolong overall execution timeline potentially increasing RP total cost.

Dry floodproofing costs were developed using a recently approved USACE cost estimate template specifically for the nonstructural measure of dry floodproofing. This template

incorporates MII software to estimate the cost. See “Appendix C: Cost Engineering” for details on the cost estimation for the RP. As the structural inventory was based on sample data only, and not accurate at the individual structure level, no design flood elevation data was provided for the nonresidential structures. For costing purposes, it was assumed all nonresidential structures in the inventory had slab on grade foundations and would be dry floodproofed 3 feet above grade. Due to the large variability of the nonresidential structure types, a small sampling by occupancy type was taken and estimates were made for the number of openings in the building envelope that needed to be protected. Until a site investigation can be performed for each individual structure during PED to determine best floodproofing method, it was assumed all nonresidential structures would be dry floodproofed by using one of two design sections developed during feasibility level design activities. Reference Section 4.4.4 and Engineering Appendix B for further details on the two proposed sections. The level of design maturity for feasibility dry floodproofing is considered to be 10 percent with expected cost growth during PED when site specific designs are developed. The design maturity and corresponding CSRA-derived contingency of 42 percent align with a Class 3 level.

7.2.2 Structural Inventory

The foundation heights of the economic structures above the ground were determined using statistical random sampling procedures. Sampling was necessary due to varying types of structure foundations (slab on grade and pier/pile) and the large variation in the heights of these foundations above the ground elevation. Statistical formulas were used to account for the estimated variation, acceptable error, and level of confidence and to determine a statistically significant number of structures to be surveyed. A focused Agency Technical Review (ATR) was conducted on this process in August of 2024 to confirm the adequacy of the sampling techniques used to develop the results.

Foundation heights were re-sampled and reevaluated throughout the study as the project condition became refined. However, refinement does not eliminate uncertainty in foundation height estimates given that site by site field survey work was not conducted, and elevation certificates were not available. Fieldwork includes sampling foundation heights with professional tools for each structure. This activity is cost and time prohibitive within current planning doctrine and therefore the study incorporated best practices as it relates to risk and uncertainty to represent foundation heights. For example, a single-story residential slab foundation average foundation height is 1.68 feet, with a standard deviation of 0.25 feet. Therefore, on average, foundation heights for these structures will vary between 1.43 and 1.93 feet. Outliers are known to exist and slab foundation heights outside of these bounds are expected during PED. Ultimately an accurate on average approach was taken for this study with respect to the structural inventory. Reference discussion in Engineering Appendix B for a Geospatial Engineering Analysis of the Economics Structure inventory and refinements made to categorization of structures for cost estimating purposes.

7.2.3 Participation Rate

Since nonstructural flood risk management measures are voluntary, participation can have a significant impact on the residual risk associated with fully nonstructural plans. A participation rate sensitivity analysis was conducted using the HEC-FDA Structure Detail Output following the Scenario Approach recommended in the National Nonstructural Committee's Best Practice Guide (BPG) 2020-03. This approach is meant to provide an expected "best case" and "worst case" scenario from the aspect of net benefits and potential project justification. This analysis does not include risk or uncertainty and uses the parametric costs utilized in the formulation of the plans in the final array. Since there are nonstructural flood risk management projects ongoing that could help inform future participation in this study's plans, data associated with 25 percent, 50 percent, and 75 percent participation rate are provided in Table 7-2 as well as 100 percent as a basis of comparison. Additional information is provided in Appendix G, Section 5.5.

Table 7-2 Net Benefits and BCRs by Participation Rate and Plan

Plan	Net Benefits (Thousands)						
	25% Participation Rate		50% Participation Rate		75% Participation Rate		100%
	Worst Case	Best Case	Worst Case	Best Case	Worst Case	Best Case	
Plan 2	-\$1,325	\$19,003	\$3,060	\$29,020	\$13,076	\$33,404	\$32,080
Plan 4	-\$5,279	\$21,040	-\$3,066	\$31,465	\$7,360	\$33,679	\$28,399
Plan	Benefit-to-Cost Ratios						
	25% Participation Rate		50% Participation Rate		75% Participation Rate		100%
	Worst Case	Best Case	Worst Case	Best Case	Worst Case	Best Case	
Plan 2	0.73	3.42	1.31	3.16	1.85	2.81	2.38
Plan 4	0.36	3.42	0.77	3.06	1.37	2.66	1.99

7.2.4 Changing Conditions Risks from Precipitation, Flood Frequency and Sea Level Change

7.2.5 Changing Conditions – Relative Sea Level Change

To evaluate potential future changes in project performance due to relative sea level change, ER 1100-2-8162 requires planning studies and engineering designs to be formulated and evaluated considering all possible rates of SLC: low, intermediate, and high. The ER directs to the USACE Sea Level Change Curve Calculator online tool to develop the three rates. For the high-subsidence area of coastal Louisiana, the Sea-Level Calculator for

Non-NOAA Long-Term Tide Gauges was used specifically. After comparing and evaluating the rates determined by the calculator, the PDT determined that the 'intermediate' rate of SLC should be used in this study for future conditions model runs in the analysis of alternatives. This topic is discussed further in Section 6.3 of Appendix H: Hydrologic & Hydraulics. All references to 2028, 2078, and 2128 hydraulic outputs were calculated using assumptions for 2026, 2076, and 2126 respectively for the purposes of this final report.

In recognition of the uncertainty presented by SLC, the RP design is based on the 2078, 0.01 AEP BFE predominate condition WSE, which uses the higher of the WSEs created by riverine flooding due to precipitation or storm surge flooding. This results in an increase in structure elevation heights and likely floodproofing for many of the structures, that will help ensure adaptation capacity. NFS will continue to monitor local conditions and determine if the intermediate scenario of sea level change is reasonably representative of observed conditions. If observed conditions significantly exceeding the intermediate projection are identified during design or construction, reevaluation of the RP will be required. Discussion of a potential changing conditions adaptation plan is included in Appendix I Implementation Plan. This framework will be developed during PED. The 2128 100-year floodplain was also modeled to estimate the magnitude of residual risk due to future SLC. EP 1100-2-1 (Procedures to Evaluate Sea Level Change) states that PDTs must estimate a "future affected area" by estimating the floodplain for 100 years from the baseline year using the high sea level change curve. The guidance states that with this information, "if the level of risk is shown to be high, later stages of the study may improve on the quality or quantity of data in order to better capture the risks associated with project area vulnerability." Annex H-4 in appendix H shows the floodplain for the 2128 0.01 AEP predominant event Figure 7-1 shows the study area floodplain estimate increase comparison for 0.01 AEP floodplain based on 2078 vs 2128 predominant WSE using the high SLC curve. The 6-10 feet of WSE increase is in the lower basin area where the flooding is caused by a combination of slow riverine drainage as well as flooding from storm surge.

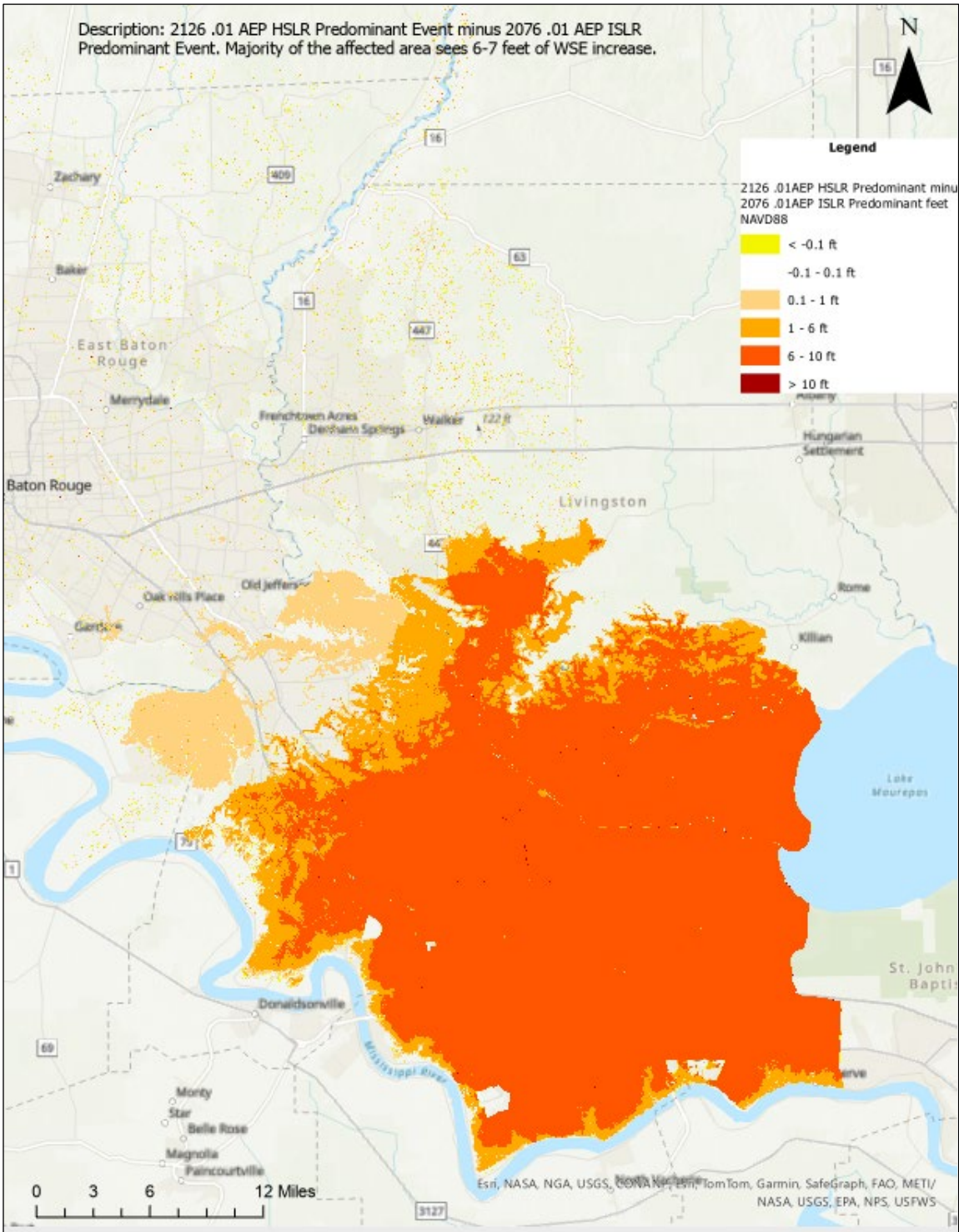


Figure 7-1. Study Area Floodplain Estimate Increase Comparison for 0.01 AEP Floodplain Based on 2028 vs 2128 Predominant WSE Using the High Sea Level Change Curve

Another way to assess the sensitivity of the RP to RSLC rates is to compare the total intermediate RSLR over the project lifespan to the high RSLC rate and identify when the high RSLR will surpass the total intermediate RSLC. Figure 7-2 shows this occurring in the year 2050 at the New Canal Station gauge. This indicates that the residual risk to project performance due to RSLR increases significantly beyond 2050.

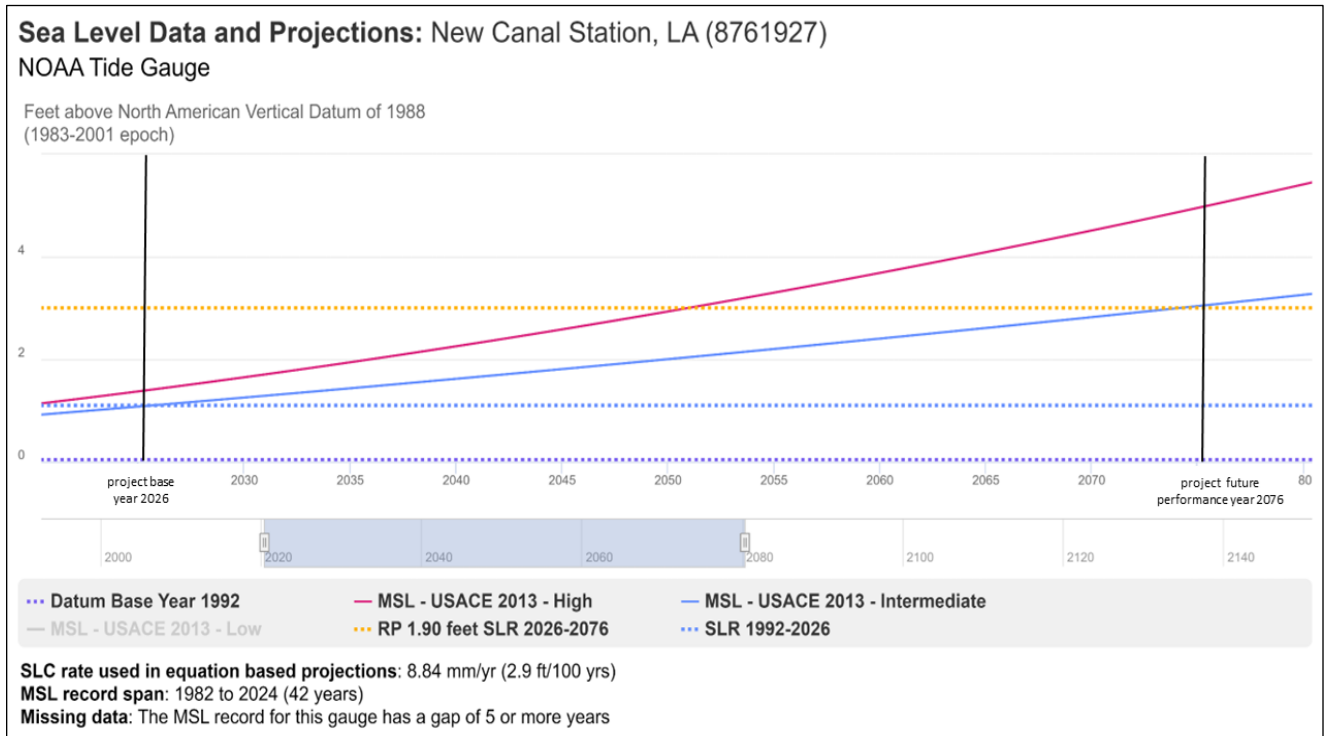


Figure 7-2. Comparison of Total Intermediate RSLR to High RSLR Curve

Table 4-6 in Section 4 of this report shows the average foundation height for the RP is 7.4 feet for the intermediate SLC. The majority of the structures can accommodate an additional approximately 5 feet of elevation rise to maximum 13 feet above ground surface.

7.2.6 Residual Risks

Changing conditions pose risks to the project performance through shifts in meteorologic and hydrologic variables. These risks are distinct from the risk of RSLC and are too uncertain to include in the hydraulic models and cost benefit calculation. One risk identified in the changing conditions analysis was risk of up to 4 percent increase in 1-day maximum precipitation. Appendix H Section 6 describes the tool that identified this potential increase and also includes a literature review of projected hydrology in the area, which confirms that there is low certainty around future hydrology such as this. Residual risks are summarized in Table 7-3, which is reproduced from Section 6.6 of Appendix H. Section 6 of appendix H includes more detail on the changing conditions from precipitation, flood frequency and sea level change and includes literature for more detailed statistical analysis.

Table 7-3 Residual Risks from Changing Conditions of Precipitation, Flood Frequency and Sea Level Change

Feature	Trigger	Hazard	Harm	Qualitative Likelihood
Individual Home Floodproofing/Elevations	Increased precipitation intensity and frequency	Future flood volumes may be larger than present. Larger flood volumes may occur more frequently	The larger and more frequent flood volumes could put more strain on floodproofing measures and overwhelm them if large enough	Somewhat likely [1]
Individual Home Floodproofing/Elevations	Increased streamflows	Future flood volumes may be larger than present. Larger flood volumes may occur more frequently	The larger and more frequent flood volumes could put more strain on floodproofing measures and overwhelm them if large enough	Somewhat likely [1]
Individual Home Floodproofing/Elevations	Increased frequency of storm surge	Future flood volumes may be larger than present. Larger flood volumes may occur more frequently	More frequent storm surges could strain or overwhelm flood proofing measures. Saltier flood waters could be corrosive to homes/elevation structures.	Somewhat likely [1]
Individual Home Floodproofing/Elevations	Higher storm surge levels due to SLR	Future flood volumes may be larger than present. Larger flood volumes may occur more frequently	More frequent storm surges could strain or overwhelm flood proofing measures. Saltier flood waters could be corrosive to homes/elevation structures.	Somewhat likely [1]

As the project RP is a non-structural only plan, risks from changing conditions of precipitation, flood frequency and sea level change are limited to impacts relating to increased flooding frequency and volumes on individual home floodproofing measures. The qualitative likelihood of each trigger is based on the non-stationarity/trend analysis conducted by Dewberry [reference 1], which suggested increases in all listed triggers. In addition to larger flood frequency and volumes on the individual homes, corrosive impacts from storm surge waters should be considered for future risks.

7.2.7 Change Conditions Due to Implementation of Flood Risk Reduction Projects by Others

Section 1.5 of this report discusses ongoing programs and potential projects in the study area for floodplain related activities. None of the proposed projects are currently funded for construction and if they were implemented, would have flood risk reduction within the study area. The projects/programs would have the potential to reduce the number of eligible structures for the RP and could also impact the study area hydrology. CEMVN will continue to monitor local flood risk programs in the area which should include coordination with Parish FEMA floodplain managers, GOSHEP, Pontchartrain Levee District and the Amite River Basin Commission. If significantly changed conditions are identified during PED or construction, reevaluation of the RP will be required.

7.2.8 Residual Risk and Damages

The ART study area is impacted by riverine flooding and coastal storm surge. The ART study is authorized as a flood risk reduction study, therefore nonstructural flood risk management plans were developed using riverine water surface elevation. This excludes structures impacted solely by coastal storm surge from inclusion in the final array. Table 7-4 shows the number of structures with first-floor flooding by flood source and frequency. The final array of plans, developed using riverine water surface elevations, reduces approximately 30 percent of the existing condition damages.

Due to the nature of the NS measures included in this analysis, there is no reduction in residual risk to roads, railways, or vehicles. There is no reduction in damages associated with debris cleanup or other emergency costs. This also applies to individuals who decide not to participate since the measures proposed are voluntary. There is no expected transformed risk with the construction of the proposed RP.

The residual risk, along with the potential consequences, will be communicated to the NFS and will become a requirement of any communication and evacuation plan when this plan is implemented. This will enhance the existing USACE Interagency Nonstructural Project for the City of Denham Springs in Livingston Parish, which already features GIS applications including a 3D Flood Impact Viewer, a Flood Impact Analysis Dashboard, and a Flood Depth Viewer. The applications improve the community's ability to avoid hazards, protect vulnerable structures, evacuate at-risk areas, and direct emergency and post-response assistance. Furthermore, the State of Louisiana Governor's Office of Homeland Security and Emergency Preparedness maintains comprehensive evacuation plans for each parish within the study area, updating them every two years in accordance with La. R.S. 29:729 (8). Each parish is also required to have multi-year training and exercise plans, with annual training and exercise workshops. For additional requirements and details, please refer to the following link: <https://gohsep.la.gov/media/pkrpmkxm/parish-ohsep-requirements-timeline-as-of-12-18-2023.pdf>

Table 7-4 Number of Structures with First-floor Flooding Based on Source of Flooding

Year	Floodplain	Rainfall		Predominate	Difference
2028	0.1 AEP (10 year)	294	1,443	1,149	
	0.04 AEP (25 year)	793	3,349	2,556	
	0.02 AEP (50 year)	1,445	5,864	4,419	
	0.01 AEP (100 year)	3,024	9,612	6,588	
	0.005 AEP (200 year)	5,927	14,667	8,740	
	0.002 AEP (500 year)	12,792	23,298	10,506	
2078	0.1 AEP (10 year)	857	3,368	2,511	
	0.04 AEP (25 year)	1,447	6,284	4,837	
	0.02 AEP (50 year)	2,150	9,544	7,394	
	0.01 AEP (100 year)	3,911	13,428	9,517	
	0.005 AEP (200 year)	6,930	18,341	11,411	
	0.002 AEP (500 year)	14,046	27,388	13,342	

7.2.9 Potential Induced Flooding

No potential induced flooding is anticipated with RP.

7.2.10 Environmental Operating Principles

The RP supports the USACE Environmental Operating Principles through consideration of environmental consequences of federal actions, fostering sustainability as a way of life and mutually supporting economic/environmentally sustainable solutions by developing a plan that is responsible, legally compliant and leverages scientific, economic, and social considerations. The planning process and development of a plan to meet the problems and needs of the area was transparent with consideration of the views and comments from stakeholders, NGOs, and the public.

7.3 VIEWS OF THE NON-FEDERAL SPONSOR

The LaDOTD supports the implementation of the RP and is in basic agreement with the applicable model PPA that will be signed if the RP is approved and funded. Recognizing that the nonstructural design in the RP will provide much-needed flood risk reduction measures to Louisiana residents living in the Amite River Basin, particularly after the devastating flood in 2016, LaDOTD formally indicated its support of the effort in April 2024.

SECTION 8

Environmental Laws and Regulations

8.1 EXECUTIVE ORDER 11988 FLOODPLAIN MANAGEMENT

Executive Order (E.O.) 11988 directs Federal agencies to reduce flood loss risk; minimize flood impacts on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by flood plains. Agencies must consider alternatives to avoid adverse and incompatible development in the flood plain. If the only practical alternative requires action in the flood plain, agencies must design or modify their action to minimize adverse impacts. The proposed action is in compliance with E.O. 11988 because it would only include non-structural measures and not result in development of the floodplain.

8.2 EXECUTIVE ORDER 11990 PROTECTION OF WETLANDS

The purpose of E.O. 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, the order requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. If impacts to wetlands are determined, a wetlands assessment must be prepared that describes the alternatives considered. The procedures include a requirement for public review of assessments. The proposed action would not result in impacts to wetlands and therefore is in compliance with E.O. 11990.

8.3 COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act (CZMA) requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." Coordination with the Louisiana Department of Natural Resources regarding consistency with the CZMA was finalized in C20190202 MOD 01 on March 13, 2024, with the understanding that the Office of Coastal Management Federal Consistency advises USACE that ***additional permits may be required*** when construction is located within the Coastal Zone. All contractors and voluntary participants would be made aware of this.

8.4 ENDANGERED SPECIES ACT OF 1973

The Endangered Species Act (ESA) is designed to protect and recover threatened and endangered (T&E) species of fish, wildlife, and plants. Coordination with USFWS identified five threatened, endangered, or protected species that may be found in the study area: West Indian manatee, gulf sturgeon, inflated heelsplitter mussel, Northern long-eared bat, and bald eagle. No plants were identified as being threatened or endangered in the project area. If a manatee(s) is sighted within 100 yards of any construction, moving equipment must be

kept at least 50 feet away from the manatee or shut down. Based on review of existing data and in coordination with the USFWS guidelines, the CEMVN finds that there would be no effect on threatened and endangered species with implementation of this project.

8.5 MIGRATORY BIRD TREATY ACT

The project area is known to support colonial nesting wading/water birds (e.g., herons, egrets, ibis, night-herons and roseate spoonbills) and shorebirds (terns and gulls). Based on review of existing data, and with the use of USFWS guidelines, the CEMVN finds that implementation of the recommended plan would have no effect on colonial nesting water/wading birds or shorebirds. USFWS and/or USACE biologists would survey the proposed project area before project implementation to confirm no nesting activity as suitable habitat and the potential for nesting exist within the project area. If active nesting exists within 1,000 feet (water birds) or 1,300 feet (shorebirds) of construction activities then USACE, in coordination with USFWS, would develop specific measures to avoid potential adverse impacts to those species. A detailed nesting prevention plan may be necessary in order to deter birds from nesting within the aforementioned buffer zones in order to avoid potential adverse impacts. If a nesting prevention plan is necessary, it would be prepared in coordination with USFWS.

The bald eagle was removed from the List of Endangered and Threatened Species in August 2007, but continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act of 1918, as amended (MBTA). During nesting season, construction must take place outside of USFWS/LDWF buffer zones. A USACE Biologist and/or a USFWS Biologist would survey for nesting birds. This would be done prior to the start of project implementation.

8.6 FISH AND WILDLIFE COORDINATION ACT OF 1934

The Fish and Wildlife Coordination Act (FWCA) provides authority for USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It requires Federal agencies that construct, license or permit water resource development projects to first consult with the USFWS, NMFS and State resource agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. Section 2(b) requires the USFWS to produce a Coordination Act Report (CAR) that details existing fish and wildlife resources in a project area, potential impacts due to a proposed project and recommendations for a project. The USFWS reviewed the proposed action project described in this FIFR-EA. The final CAR was provided by USFWS on March 22, 2024. USFWS correspondence, and the final CAR are included in Environmental Appendix D-1.

1. If ring levees are proposed as part of the “non-structural” component of the RP, the levee alignments should be located to avoid and minimize impacts to both herbaceous wetlands and forested communities (wet and non-wet) as much as possible. The acreage of wetlands and forested habitat enclosed within ring levees also should be minimized to the maximum extent practicable.

USACE RESPONSE: Partially adopt. Ring levees are not a part of the proposed NS RP. Should this change in the future, USACE would re-coordinate with the USFWS and avoid and minimize impacts to habitat to the maximum extent practicable.

2. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. During project construction, a qualified biologist should inspect the proposed construction site for the presence of documented and undocumented wading bird nesting colonies and bald eagles.
 - a. All construction activity during the wading bird nesting season (February through October 31 for wading bird nesting colonies, exact dates may vary) should be restricted within 1,000 feet of a wading bird colony. If restricting construction activity within 1,000 feet of a wading bird colony is not feasible, the CPRA should coordinate with the Service to identify and implement alternative best management practices to protect wading bird nesting colonies.
 - b. During construction activities, if a bald eagle nest is within or adjacent to the proposed project area, the applicant should follow the bald and golden eagle guidelines found on-line [here](#) to determine whether disturbance will occur and/or an incidental take permit is needed.

USACE RESPONSE: Adopt. During project implementation a qualified biologist would be on site to ensure activities would not affect colonial wading birds during the nesting season. USACE would also be in compliance with the Bald and Golden Eagle Protection Act if activities are within 660 feet of a bald eagle nest.

3. If implementation of the proposed action has the potential to directly or indirectly affect Inflated heelsplitter mussel, Gulf sturgeon, West Indian Manatee, or the Northern long-eared bat, then consultation with this office should be initiated.

USACE RESPONSE: Adopt. The NS RP would not affect Inflated heelsplitter mussel, Gulf sturgeon, West Indian manatee, or the Northern long- bat. Should this change in the future, USACE would re-coordinate with the USFWS and avoid and minimize impacts to habitat to the maximum extent practicable.

4. West Indian manatees occasionally enter Louisiana coastal waters and streams during the warmer months (i.e., June through September). During in-water work in areas that potentially support manatees all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and state law. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with manatees, although passively taking pictures or video would be acceptable. For more detail on

avoiding contact with manatees refer to the Endangered and Threatened Species section of this document, contact this office.

USACE RESPONSE: Adopt. There is no in-water work anticipated with the proposed NS RP. Should this change in the future, USACE would re-coordinate with the USFWS and avoid and minimize impacts to the maximum extent practicable.

5. The Service recommends that the USACE contact the Service for additional ESA section 7 consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat, 3) the action is modified in a manner that causes effects to listed species or designated critical habitat, or 4) a new species is listed or critical habitat designated.

USACE RESPONSE: Adopt.

The comments in the final CAR were the same as the draft CAR, therefore, USACE-MVN responses remain the same as well.

8.7 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

A phase I environmental site assessment is required for all USACE civil works projects to facilitate early identification and appropriate consideration of potential hazardous, toxic, and radioactive waste (HTRW) problems. HTRW includes any material listed as a “Hazardous Substance” under CERCLA. Other regulated contaminants include those substances that are not included under CERCLA but pose a potential health or safety hazard. Examples include, but are not limited to, many industrial wastes, naturally occurring radioactive materials, many products and wastes associated with the oil and gas industry, herbicides, and pesticides. ER 1165-2-132 and Division Regulation 1165-2-9 established policies for conducting HTRW review for USACE civil works projects.

A preliminary HTRW phase 1 environmental site assessment was conducted for the current FIFR-EA and no HTRW concerns were identified. The ART study area was surveyed via aerial photography and environmental database searches in the study area’s respective zip codes, and no HTRW concerns were identified. The proposed action would include an individual HTRW assessment per structure, should that structure go through the process of being elevated. If during the individual HTRW assessment, a recognized environmental condition (REC) is identified, it would be incumbent upon the property owner to address the REC in order to be considered a part of the program.

8.8 CLEAN AIR ACT OF 1970

The Clean Air Act (CAA) sets goals and standards for the quality and purity of air. It requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. 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. Four parishes in the study area are located in the Baton Rouge metropolitan area, which has been designated by the EPA as a maintenance area for ozone under the 8-hour standard effective December 27, 2016. Because the NS Plans are expected to result in discharges below the de minimis level, they are exempt from further consultation under the CAA.

8.9 NATIONAL HISTORIC PRESERVATION ACT OF 1966

USACE is continuing to follow its NHPA Section 106 procedures described in Section 3 and 5 and has engaged with Consulting Parties to develop a project-specific PA in furtherance of USACE's Section 106 NHPA responsibilities for this Undertaking in accordance 36 CFR 800.14(b). The Final PA was executed on August 23, 2024, and is included as Appendix D-3 (Attachment 1). The PA governs USACE's subsequent NHPA compliance efforts. Following the execution of the PA, USACE may proceed with issuing a FONSI in compliance with Section 106 of the NHPA.

8.10 TRIBAL CONSULTATION

It is the policy of the Federal Government to consult with Federally-Recognized Tribal Governments on a Government-to-Government basis as required in E.O. 13175 ("Consultation and Coordination with Indian Tribal Governments;" U.S. President 2000). The requirement to conduct coordination and consultation with Federally-Recognized Tribes on and off Tribal land finds its basis in the constitution, Supreme Court cases, and is clarified in later planning laws, such as the National Environmental Policy Act. When conducting a civil works planning activity (<http://www.usace.army.mil/Missions/Civil-Works/Tribal-Nations/>), USACE is directed to follow six principles when engaging with Tribal Governments. These principles emphasize Tribal sovereignty, the Federal Government's trust responsibility, Government-to-Government consultation, early and pre-decisional consultation, recognition of Tribal self-reliance, focusing USACE on efforts at Tribal capacity building, and requiring USACE to protect natural and cultural resources during project development and implementation. Moreover, the USACE Planning and Guidance Notebook (ER 1105-2-100), including Smart Planning, gives guidance in EP 1105-2-57 (March 01, 2019) reinforcing the same authorities and processes. The most explicit and accessible guidance regarding USACE and Tribal interaction can be found in USACE's Tribal Consultation Policy (November 01, 2012).

In addition to consulting with Federally-Recognized Tribes under the NHPA as described above (NHPA 1966 Section), USACE is consulting in accordance with E.O. 13175, NEPA, and its 2012 Tribal Policy. The 2012 Tribal Consultation Policy directs that consultation should begin at the earliest planning stages before decisions are made and actions are taken (paragraph 3b); provides guidance that USACE should contact "[T]ribes whose aboriginal territories extend to the lands where an activity would occur...sufficiently early to allow a timely review of the proposed action" (paragraph 5.d.(1); and goes on to state that the USACE official interacting with Federally-Recognized Tribes should maintain open lines of communication through consultation with Tribes during the decision making process for matters that have the potential to significantly affect protected Tribal resources, Tribal rights

(including treat rights), and Indian lands (paragraph 6. d.). In sum, all this guidance directs the agency to start early and to coordinate often.

USACE initiated the Tribal consultation process by inviting Tribes to participate in the early scoping process via letter on December 4, 2018 (also see Public Scoping Section 2.4). The letters were directed to the leadership of each of the Tribal governments whose aboriginal and historic territories or historic removal routes extended to the lands where the proposed activities would occur (i.e., the ACTT, CTL, CNO, CT, MBCI, JBCI, STF, SNO, and TBTL). Two responses were received that did not address the substance of the request. The MBCI participated in a scoping meeting and raised the issue of effects to pre-contact archaeological sites from any of the then-proposed alternatives. Next, on April 10, 2019, USACE provided an email distribution of the April 2, 2019, Notice of Intent to produce an EIS as well as the advertisement of public meetings for this project. No responses were received regarding this distribution. USACE also invited each of the Tribes to participate as a cooperating agency in the development of the EIS at a meeting on June 18, 2019. Only the MCN responded to this correspondence, indicating that the Tribe was choosing to consult under the NHPA, rather than participate as a cooperating agency. USACE intends to keep the lines of communication open throughout the study, relying on the Section 106 NHPA process to capture significant Tribal concerns regarding historic properties, but remains committed to undertaking additional Government-to-Government consultations, as necessary.

SECTION 9

Public Involvement

The PDT met every other Thursday with team members and the NFS during the study to discuss progress and pitfalls of the study.

Early NEPA coordination with the NFS, stakeholders, Federal and State agencies, and Federally-Recognized Tribes was performed prior to the 2019 notice of intent (NOI) and afterward through public meetings, social media, and the CEMVN website. USACE hosted general scoping meetings within 90 days of the start of the study, per Water Resources Reform and Development Act (WRRDA) 2014. As part of the early coordination, general scoping was initiated prior to the NEPA NOI, in conformity with 40 CFR 1500-1508. A public website page with the study information and request for feedback was established in mid-December 2018.

The collaborative stakeholders associated with this study are USACE, LADOTD, ARB Commission (ARBC), CPRA, and the following parishes: Livingston, Ascension, St. Helena, East Feliciana, East Baton Rouge, Iberville, St. John the Baptist, and St. James. Resource agencies associated with this study include the U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), U.S. Geological Survey (USGS), and the Louisiana Department of Wildlife and Fisheries (LDWF). Additionally, in partial fulfillment of USACE's responsibilities under E.O. 13175, early NEPA coordination was initiated with the following Federally-Recognized Tribes: the ACTT, CTL, CNO, CT, MBCI, JBCI, STF, SNO, and TBTL, on December 4, 2018.

A NEPA stakeholder meeting was conducted by USACE on December 3, 2018, at the USGS Baton Rouge, Louisiana office that included an option to participate by video conference. A subsequent reconnaissance meeting was conducted on December 10, 2018, with the NFS, and resource agencies at the CPRA's Baton Rouge, Louisiana office, which also included an option to participate by video conference. Federally-Recognized Tribes were invited but were unable to attend. However, a follow up meeting was held on January 7, 2019, during which the MBCI participated. Additionally, a public scoping meeting was conducted on January 10, 2019, at CEMVN with Facebook live streaming, where feedback was requested as well. Feedback from the public scoping meeting resulted in the identification of three additional measures.

In accordance with NEPA, a NOI to prepare an EIS was published in the Federal Register (Volume 84, No. 63) on April 2, 2019. The scoping period ended on July 8, 2019. Three public scoping meetings were conducted within the study area on April 24 and 25, with Facebook live streaming. Comments were accepted via written correspondence and emails. Approximately 80 non-USACE people attended the meetings in person and the Facebook live streaming had over 6,000 views. Scoping identified four areas of concern: flooding, dredging opportunities, levee opportunities, and nature-based engineering. People are concerned about inducement of flooding into other area and proposed further investigation in

alternative formulation and specific areas of concern. Feedback from the public scoping meeting resulted in the identification of one additional measure, which was proposed by the Healthy Gulf Collaborative, regarding conversion of sand and gravel mines to bottomland hardwoods habitat for flood control.

A meeting was conducted on June 18, 2019, with collaborative stakeholders, the NFS, resource agencies, and Federally-Recognized Tribes to present the preliminary final array of alternatives and the screening rationale of the alternatives that were screened. As a result, three agencies, (USFWS, Louisiana Department of Environmental Quality (LDEQ), and LDWF) requested an evaluation of river restoration, which resulted in the addition of another alternative, restoration of river meanders.

The scoping report was included in the 2019 DIFR/EIS, Environmental Appendix C-2, which has copies of all written feedback received prior to the additional resources approval in 2022. It can be found at <https://www.mvn.usace.army.mil/Amite-River-and-Tributaries/>.

After the additional resources were approved to reassess the dry dam and further evaluate NS alternatives, community outreach meetings were conducted on February 28, 2023, and March 1, 2023, to inform and engage residents about the flood risk reduction measures. Consistent with 33 U.S.C. 2356(c), outreach efforts focused on civic and faith-based organizations that serve residents in areas of concern, including local churches, libraries, non-profits, and community centers. Initial and follow-up calls were made to 29 churches, 4 community centers, 3 non-profits, and 3 academic institutions. Of those contacted, six churches, two community centers, two non-profits, and two academic institutions agreed to disseminate our one-page summary of the outreach effort to the residents they serve.

A Public Notice of the draft IFR-EA was available for a 45-day comment period beginning December 15, 2023, and end on January 29, 2024. The 2019 NOI to prepare an EIS was retracted, by publication in the Federal Register, on August 08, 2024.

Additionally, community outreach was conducted for general public meetings on January 16 and 17, 2024 that focused on the second draft report release. This was a concerted effort that identified representatives of residents in areas of concern and invited them to the public meetings (for example, non-profit organizations). On Thursday, January 18, 2024, at 10:00am and 6:00pm, virtual public meetings were held for the Amite River and Tributaries Study. To encourage attendance from residents living in typically underrepresented communities within the study area, 500 pre-postage paid comment cards that additionally contained the meeting purpose and logistics were disseminated to local libraries, community centers, and civic organizations.

Comment cards were mailed to 13 library branches within the East Baton Rouge Parish Library system, as well as hand delivered to the East Baton Rouge Library Main Branch. Additionally, comment cards were hand delivered to four City of Baton Rouge Community Centers that offer a variety of social services and programming, as well as three civic organizations-- Louisiana Environmental Action Network, Together Baton Rouge, and the Sierra Club Delta Chapter. Due to prior engagement, comments cards were also mailed to the Darlington Church of God in Christ located in Greensburg, LA.

A Public Notice of the draft IFR-EA was available for a 45-day comment period beginning December 15, 2023, and ended on January 29, 2024. During the 45-day comment period USACE received a total of 6 comments received from the public. One comment received was of opposition to the recommended plan. Another comment included concerns over navigability of the Amite River, which is outside of the scope and authority of this feasibility study. The remaining comments received included concerns about the recommended plan being fully non-structural, meaning there would be no reduction in flooding or frequency of flooding in the Amite River Basin. Federal Agency comments received during the Public Review period were of concurrence and/or no-objection. All comments have been recorded by USACE-MVN in Appendix D-4 and applicable comments were taken into consideration during revision of the final report.

Preparation of this FIFR-EA was 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, have received copies of the report:

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
Coastal Protection and Restoration Authority Board of Louisiana
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
Louisiana Departments of Transportation and Development

District Engineer's Recommendation

I, Cullen A. Jones, District Engineer for the CEMVN, have given consideration to all significant aspects of the RP in the overall public interest, which include but are not limited to, environmental, social, and economic effects; engineering feasibility; public safety and other considerations set forth and addressed in this report. The following is description of the Plan that I am recommending for authorization as a federal project and implementation. The RP is being recommended with such modifications thereto as in the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers, may be advisable.

The non-federal sponsor is in support of the RP and is in basic agreement with the terms of the model PPA that will be used for the project. The items of local cooperation that shall be the responsibility of the non-federal sponsor are contained in Section 7.1.5 of this report and are incorporated herein by reference in this, my recommendation. Prior to the implementation of the RP, the non-federal sponsor, shall agree in writing to perform the required items of cooperation.

My recommendations reflect the information available at this time and current USACE policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to Congress as proposals for authorization and implementation funding. However, prior to transmittal to Congress, the non-federal sponsor, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

This report has been prepared in accordance with all applicable laws, policies, and regulations. In addition, the requirements of the NEPA and all applicable environmental laws and regulations have been complied with throughout the course of this study and in the preparation of the RP and this FIFR-EA.

The RP (also the Total Net Benefits Plan) for this study includes a NS plan for eligible properties within the study area to reduce the risk of flood damages. The RP would greatly reduce, but not eliminate future damages and residual risk would remain. The RP reduces annual damages by approximately 30 percent relative to the without project condition. The residual risk, along with the potential consequences, has been communicated to the non-federal sponsor and will become a requirement of any communication and evacuation plan. The NS plan (using 10 percent, 4 percent, 2 percent, and 1 percent AEP) was efficient and incrementally justified because it provided the most net benefits to reduce flood damages. The NS plan also had positive National Economic Development (NED), Regional Economic Development and Other Social Effects benefits and the least Environmental Quality impacts of any alternative in the Final Array of Alternatives.

Additional Considerations

Public testimony and comment from across the Amite River Basin and within the study area reveal a multitude of concerns that cannot be addressed under current authorities and may be addressed through future Congressional authorities. No one authority can solve all the problems immediately; therefore, a systematic approach involving multiple projects from several different programs and under several different authorities will be required to effectively deal with the array of issues in the Amite River Basin.

1. *Participation in the RP.* To increase participation rates for the RP for property owners who cannot afford the cost associated with the NS plan (where SV and/or income criteria may be developed), the following items may be considered for future Congressional action.
 - Allowances, such as those referenced in the WRDA 2022, Section 8154, to provide temporary relocation assistance to voluntary homeowner participants in NS projects.
 - Future agreements developed with a NFS may include that no cost share be requested directly of the property owner for eligible cost of this project.
 - Develop an assistance program to help connect preliminary eligible homeowners to other programs in order to meet some of the USACE secondary eligibility criteria such as repair condition of the structure. An example would be State of Louisiana Partial Action Plan No.1 for the Utilization of Community Development Block Grant Funds in Response to Hurricane Isaac administered through the Louisiana Office of Community Development/ Disaster Recovery Unit.
2. *Recommended Action by Others.* Additional recommendations that may be implemented by others that will further reduce the residual risks associated with flood damages were identified during the study.
 - Content Protection Measures of Wet Floodproofed Buildings. While wet floodproofing reduces structural damages, it does not reduce the risk and associated benefits to contents. The NFS, or individual owners, are encouraged to consider implementing content protection measures.
 - Adoption of More Stringent Local Floodplain Regulations. Although communities within the study area cannot change the minimum National Flood Insurance Program (NFIP) standards. The NFS should work with the local governments to adopt local standards that achieve higher levels of flood risk reduction. Examples of potential actions may include replacing elevation requirements based on the 0.01 AEP to the 0.002 AEP level of risk reduction; implementing a zero-rise floodway; and adopting cumulative damages as the trigger for substantial damage determination.
 - Adoption of More Restrictive Parish and Municipal Building Codes, Land Use and Zoning Regulations, and Other Developmental Controls. Local governments within the floodplain should be encouraged to adopt, implement, and enforce stricter

building and housing code requirements, land use and zoning regulations, and other developmental controls aimed at reducing flood risk and flood damage.

CULLEN A. JONES, P.E., PMP
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District Commander

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List of Acronyms and Abbreviations

AAHU	Average Annual Habitat Units
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ACTT	Alabama-Coushatta Tribe of Texas
AEP	Annual Exceedance Probability
APE	Area of Potential Effects
ARB	Amite River Basin
ARBC	Amite River Basin Commission
ART	Amite River and Tributaries East of the Mississippi River, Louisiana
BCR	Benefit to Cost Ratio
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
BREC	Recreation and Park Commission for the Parish of East Baton Rouge
CAR	Coordination Act Report
CDBG	Community Development Block Grant
CEMVN	USACE New Orleans District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CNO	Choctaw Nation of Oklahoma
CPRA	Coastal Protection and Restoration Authority
CRD	Comite River Diversion
CT	Coushatta Tribe of Louisiana
CTL	Chitimacha Tribe of Louisiana
CWA	Clean Water Act

DEA	Draft Environmental Assessment
DEIS	Draft Integrated Feasibility Report and Environmental Impact Statement
EA	Environmental Assessment
EBR	East Baton Rouge
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EQ	Environmental Quality
ER	Engineer Regulation
ESA	Endangered Species Act
FDR	Federal Discount Rate
FEIS	Integrated Feasibility Report and Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIFR-EA	Final Integrated Feasibility Report and Environmental Impact Statement
FMA	Flood Mitigation Assistance
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act of 1981
FRM	Flood Risk Management
FS	Focused Structural
FWCA	Fish and Wildlife Coordination Act
FWS	Fish and Wildlife Services
FY	Fiscal Year
FWOP	Future With Out Project
GCJV	Gulf Coast Joint Venture
GOMESA	Gulf of Mexico Energy Security Act

GOSHEP	Louisiana Governor's Office of Homeland Security and Emergency Preparedness
H&H	Hydraulics and Hydrology
HMGP	Hazard Mitigation Grant Program
HTRW	Hazardous, Toxic, and Radioactive Waste
HW	Hold Water
IFR	Integrated Feasibility Report
JBCI	Jena Band of Choctaw Indians
LCA	LA Coastal Area
LDEQ	Louisiana Department of Environmental Quality
LDOA	Louisiana Division of Archaeology
LADOTD	Louisiana Department of Transportation and Development
LDWF	Louisiana Department of Wildlife and Fisheries
LPR	Livingston Parks and Recreation
LWCF	Land and Water Conservation Fund
LWFMP	Louisiana Statewide Comprehensive Water Based Floodplain Management Program
LWI	Louisiana Watershed Initiative
MBCI	Mississippi Band of Choctaw Indians
MBTA	Migratory Bird Treaty Act
MCACES MII	Micro-Computer Aided Cost Estimating System, 2nd Generation
MCN	Muscogee (Creek) Nation
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAWMP	North American Waterfowl Management Plan
NBEM	National Bald Eagle Management
NED	National Economic Development

NEPA	National Environmental Policy Act
NFS	Non-Federal Sponsor
NGVD	National Geographic Vertical Datum
NRHD	National Register Historic District
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NLAA	Not Likely to Adversely Affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOX	Nitrogen Oxide
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NS	Nonstructural
NSI	National Structure Inventory
NWI	National Wetlands Inventory
NWS	US National Weather Service
O&M	Operation and Maintenance
OCD	Office of Community of Development
OMRR&R	Operations, Maintenance, Repair, Rehabilitation, and Replacement
OSE	Other Social Effects
PA	Programmatic Agreement
PARDS	Parks and Recreation of Denham Springs
PDM	Pre-Disaster Mitigation Program

PDT	Professional Development Team
PED	Preconstruction Engineering and Design
PPA	Project Partnership Agreement
REC	Recognized Environmental Condition
RECONS	Regional Economic System
RED	Regional Economic Development
ROD	Record of Decision
ROE	Right of Entry
RP	Recommended Plan
RPDES	Regional Planning and Environment Division South
RSLC	Relative Sea Level Change
RW	Remove Water
SHPO	State Historic Preservation Officer
SLC	Sea Level Change
SNO	Seminole Nation of Oklahoma
SSDIFR	Supplemental Second Draft Integrated Feasibility Report
STF	Seminole Tribe of Florida
SWPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TBTL	Tunica-Biloxi Tribe of Louisiana
THPO	Tribal Historic Preservation Officers
TSP	Tentatively Selected Plan
UL	Upper and Lower Basin
URA	Uniform Relocation Assistance Act
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture

USGS	United States Geological Survey
USFWS	United State Fish and Wildlife Service
VOC	Volatile Organic Compound
WMA	Wildlife Management Area
WQC	Water Quality Certification
WRRDA	Water Resources Reform and Development Act
WVA	Wetland Value Assessment