US Army Corps of Engineers ®

LOUISIANA COASTAL AREA (LCA), LOUISIANA

BENEFICIAL USE OF DREDGED MATERIAL PROGRAM

JANUARY 2010

FINAL

PROGRAMMATIC STUDY REPORT

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

PROGRAMMATIC STUDY REPORT

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PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

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Cover picture is an aerial view of the beneficial use placement site (Pass a Loutre), Louisiana.

Picture provided by U.S. Army Corps of Engineers, New Orleans District (May 27, 2008).

LCA BENEFICIAL USE OF DREDGED MATERIAL PROGRAM STUDY

EXECUTIVE SUMMARY

1.0 SUMMARY INTRODUCTION

The $100 million Louisiana Coastal Area (LCA) Beneficial Use of Dredged Material (BUDMAT) Program was authorized by Title VII, Section 7006(d) of the Water Resources Development Act (WRDA) of 2007 (Public Law 110-114) on November 8, 2007 subject to approval of a decision document (i.e., this study report) by the Secretary of the Army.

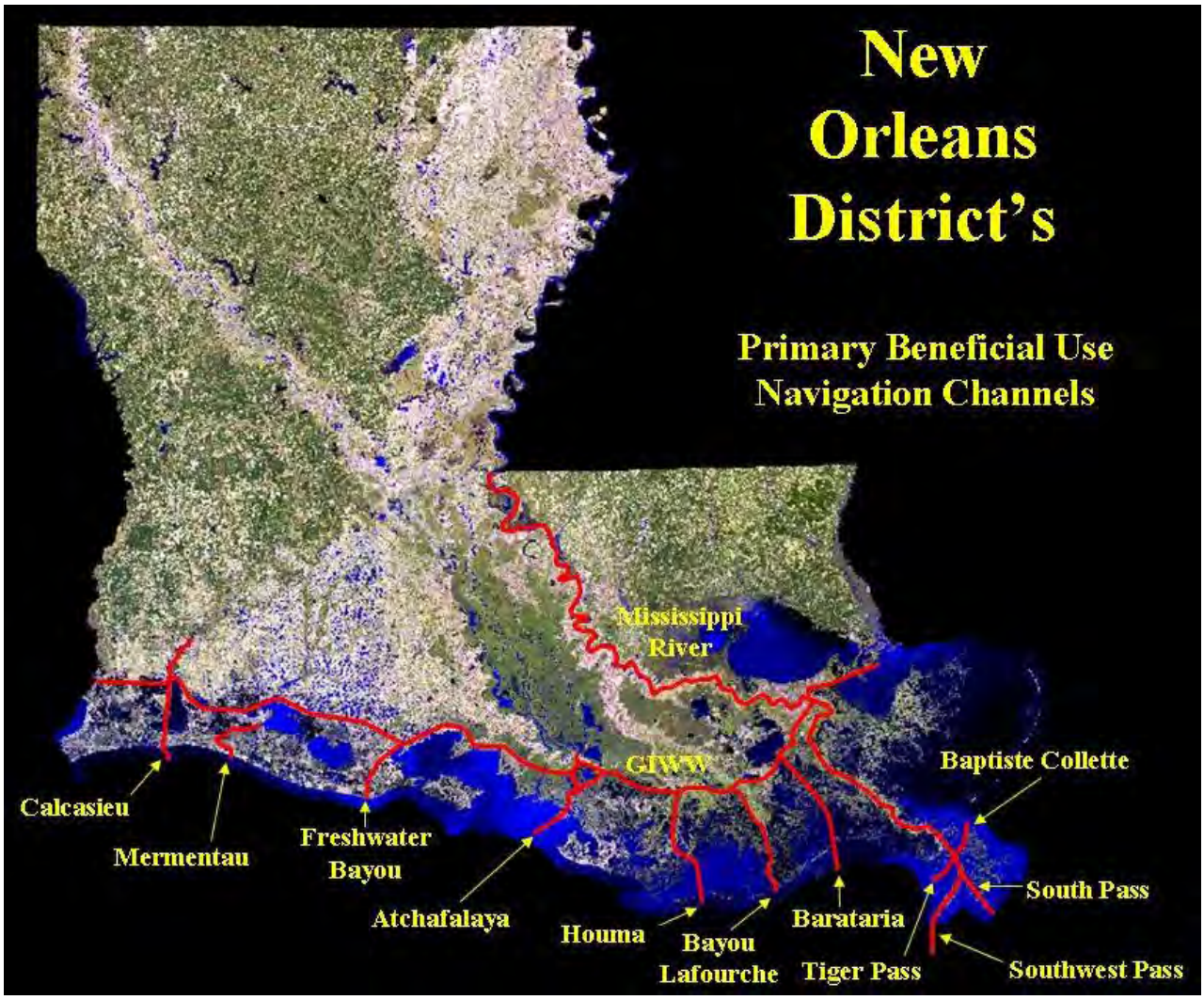
The purpose of this programmatic report is to present the findings of the study, which was conducted to establish the structure and management architecture of the BUDMAT Program to achieve restoration objectives in coastal Louisiana by taking greater advantage of existing sediment resources from maintenance of authorized Federal navigation channels.

The U.S. Army Corps of Engineers, Mississippi Valley, New Orleans District (CEMVN) has the largest annual navigation channel Operations & Maintenance (O&M) program in the USACE, with an average of 64.0 million cubic yards (mcy) of material dredged annually. Currently, approximately 24% of the material dredged under CEMVN's O&M program is used beneficially within the Federal standard. The Federal standard means the dredged material disposal alternative identified by the Corps which represents the least costly alternative consistent with sound engineering practices and meeting all of the Federal environmental standards established by Section 404 of the Clean Water Act of 1972 or Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended. Application of the Federal standard constitutes the base disposal plan (i.e., Base Plan) for a navigation project. Funds from the BUDMAT Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard. Assuming, that 15% of the $100M BUDMAT Program would be used for planning, engineering, and design activities, and real estate acquisition, the remaining $85M could be used to place dredged material beneficially.

The study area is Louisiana's coastal area from Mississippi to Texas. Louisiana parishes included in the study area include Ascension, Assumption, Calcasieu, Cameron, Iberia, Jefferson, Lafourche, Livingston, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Martin, St. Mary, St. Tammany, Tangipahoa, Terrebonne, and Vermilion.

The following nine authorized Federal navigation channels represent the most significant opportunities for additional beneficial use of dredged material in coastal Louisiana (see figure below)**:**

- Barataria Bay Waterway, LA
- Mississippi River, Outlets at Venice, LA – Tiger Pass and Baptiste Collette
- Mississippi River, Baton Rouge to the Gulf of Mexico, LA –Southwest Pass and South Pass
- Atchafalaya River and Bayous Chene, Boeuf, and Black, LA
- Calcasieu River and Pass, LA
- Houma Navigation Canal, LA
- Bayou Lafourche, LA
- Mermentau River, LA
- Freshwater Bayou, LA



Since this study evaluates a broad agency action (i.e., the establishment of the ten year, $100 million BUDMAT Program), it is a programmatic study focusing on the development of the BUDMAT Program management and execution guidelines. The State of Louisiana, acting through the Louisiana Department of Natural Resources (LDNR), as the non-Federal sponsor, and the U.S.

Army Corps of Engineers, Mississippi Valley, New Orleans District (CEMVN) initiated the BUDMAT Program study on June 1, 2006. The BUDMAT study cost is shared equally between the U.S. Army Corps of Engineers (USACE) and the State of Louisiana.

In 2005, the Coastal Protection and Restoration Authority of Louisiana (CPRA) was established by Act 8 of the 1st Extraordinary Session of the Louisiana State Legislature. This single state authority will integrate coastal restoration and hurricane protection by marshalling the expertise and resources of the Louisiana Department of Natural Resources (LDNR), the Louisiana Department of Transportation and Development (LDOTD), and other state agencies, to speak with one clear voice for the future of Louisiana's coast. Thus, CPRA will be the non-Federal sponsor for implementation of the BUDMAT Program.

2.0 MAJOR CONCLUSIONS AND FINDINGS

Need

The U.S. Congress recognizes the need to reduce Louisiana coastal wetland losses. Recent congressional acts include the Coastal Wetlands Planning, Protection and Restoration Act program (CWPPRA), which provides targeted funds through 2019 for planning and implementing projects that create, protect, restore, and enhance wetlands in coastal Louisiana. Additionally, Section 384 of the Energy Policy Act of 2005 authorized the Coastal Impact Assistance Program (CIAP) to assist coastal producing states and their political subdivisions (parishes, counties, and boroughs) in mitigating the impacts from Outer Continental Shelf oil and gas production. Louisiana is one of the six coastal states selected to receive funds under the appropriation to implement this program.

CEMVN fully recognizes the value of using dredged material for beneficial projects such as marsh creation. Given that many areas of Louisiana are sediment deprived, CEMVN and CPRA should take advantage of every opportunity to use dredged material from navigation projects to help bring new sediments into the coastal environment in the form of created marsh and other environmental features. Title VII of WRDA 2007 authorized five near term elements of the LCA Plan, including the BUDMAT Program.

Planning Objectives

The objectives of the BUDMAT Program provide the basis for evaluating program alternatives and program plan selection.

The BUDMAT Program planning objectives are:

(1) to cost effectively increase the beneficial use of material dredged from federally maintained waterways at a total cost of $100 million over a 10-year period.

(2) to address the critical needs of the LCA Program by soliciting, selecting, planning, designing, and constructing individual ecosystem restoration projects that use material dredged from the federally maintained waterways to:

- restore and create coastal landscape features such as, but not limited to, marshes, ridges, and islands that provide wildife and fisheries habitat with emphasis on ecological and hydrologic functions that support the ecosystem of coastal Louisiana.

- reduce the loss of existing coastal landscape features such as, but not limited to, marshes, ridges, and islands to help sustain the ecosystem of coastal Louisiana.

- provide protection to Louisiana's coastal infrastructure.

Based on these program objectives, beneficial use under the BUDMAT Program does not include upland disposal or disposal to solely support industrial or commercial activities such as disposal into commercial sand pits. Ecosystem restoration projects implemented under the BUDMAT Program may provide incidental or secondary benefits such as storm damage risk reduction; however, these secondary or indirect benefits will not be assessed or considered in the selection of beneficial use projects. As noted previously, funds from the Beneficial Use of Dredged Material Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal Standard. The Federal standard for dredged material disposal is the least costly alternative, consistent with sound engineering practices and meeting applicable Federal environmental statutes.

Planning Constraints

Unlike planning objectives, which represent desired positive changes, planning constraints represent restrictions that should not be violated. The constraints are as follows:

Authorized Federal navigation channels – the BUDMAT Program operates in conjunction with the maintenance dredging of Federally maintained waterways and therefore excludes dedicated dredging material for specific projects such as finding and mining a sand source for barrier island restoration.

Dredged material transport distances using current techniques – When determining the practical pumping distance cost is the primary limiting factor. Currently hydraulic pipeline cutterhead dredges have been the primary equipment used for most existing beneficial use projects and this method is cost effective for transporting dredged materials for distances up to several miles. The CEMVN Cost Engineering Section's, opinion, in discussions with the dredging industry, is that the practical pumping distance using current techniques of installing and removing pipeline on a project-by-project basis and using two booster pumps is approximately 11 miles. If another booster pump is used, a practical maximum pumping distance of 15 miles is likely achievable but would be more costly. Therefore only beneficial use sites that are less than 15 miles from the dredging location shall be considered for nomination under the BUDMAT Program in its initial year. As permanent long distance sediment pipeline projects are constructed or when cost effectiveness for long distance transport techniques improve, the practical maximum transport distance would be increased to cover larger and larger areas of coastal Louisiana for consideration under the BUDMAT Program.

Dredged material that is logistically excluded from beneficial use – Some navigation channels are dredged to cause resuspension of the material via agitation, but some dredged material is not actually removed from the channel. In addition, some reaches of the Mississippi River in the vicinity of the Port of Baton Rouge are dredged and there is little opportunity to use this material beneficially in a cost effective manner in coastal Louisiana.

Dredged material that is unsuitable for land creation and/or barrier island restoration – The sediments from both the lower Atchafalaya River and the Calcasieu River have high levels of very fine silts and clays, which do not stack very well, and are therefore poor candidates for marsh creation and barrier island restoration. These sediments may be good candidates for marsh nourishment via thin layer placement techniques that are currently being evaluated.

Funding limitations – Currently, the minimum incremental placement cost per cubic yard (cy) of material dredged is approximately $1 per cubic yard with sediments dredged from Southwest Pass using a theoretical hopper dredged pump-out scenario. Even if this low incremental cost could be applied to beneficial use projects coast wide, beneficially using an additional 20 mcy of dredged material per year would require funding of approximately $20 million per year. It is estimated that the BUDMAT Program would be funded at $10 million over a 10-year period. Thus, the estimated funding made available through the BUDMAT Program would be insufficient to beneficially use a large portion of dredged material generated in any given year.

Other limitations include the following:

- Known hazardous, toxic, and radioactive waste (HTRW) sites. The BUDMAT Program would not implement projects at sites with known HTRW concerns.
- Known cultural resource site operations restrictions. The BUDMAT Program would not implement projects at sites with known cultural concerns.
- Threatened and endangered (T&E) species operating restrictions.
- Potential conflicts with and impacts on authorized projects. Projects included in the BUDMAT Program must not result in unacceptable impacts to existing authorized projects.

Planning Assumptions

The 2004 LCA Study estimated that approximately 21,000 acres of wetlands could be created through the 10 year $100M BUDMAT Program. This estimate was based on the following assumptions: (1) an average incremental cost of $1 per cubic yard (cy) of dredged material placed beneficially, (2) an estimate of 0.00025 acres of wetlands created per cy of dredged material placed (or using the inverse, 4,000 cy of dredged material are required to create one acre of wetland based on a 2.5 feet total height of dredged material (i.e., a water depth of 1.5 feet plus 1 foot of fill above the water's surface), and (3) a 15 percent planning, engineering, design and real estate cost over the 10 year BUDMAT Program (i.e., the remaining 85 percent or $85M would be available for placing 85,000,000 cy of dredged material beneficially). This equates to approximately $4,000 per acre of wetland created. It should be noted that the estimate of the potential maximum area of wetland created by the program assumes that all of the program resources would be used for marsh creation projects. However, other restoration features such as barrier island restoration or enhancement would also be considered as candidate projects under the program and the higher cost per unit area

of restoration feature would be considered with the understanding that these types of projects provide values other than marsh features, such as unique fish and wildlife habitat, storm surge reduction, and protection of estuaries from excessive tidal flux, wave action and salinity intrusion.

Alternatives Including the Proposed Action

There are ample opportunities to use dredged material beneficially in coastal Louisiana. Due to limited program funding, guidance was developed for selecting, designing and constructing future site-specific beneficial use projects implemented under the BUDMAT Program.

Alternative Screening Process

An interagency Project Delivery Team (PDT) was assembled to develop the alternative plans and report for the BUDMAT Program. The team was composed of staff from the CEMVN, LDNR and subsequently CPRA, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (USEPA), U.S. Geological Survey (USGS), and the Natural Resource Conservation Service (NRCS).

The most suitable BUDMAT Plan is identified as the one that best meets the study objectives, is based upon identification of the most critical natural and human ecological needs, and proposes a program that would implement cost effective projects to address those needs. During program implementation, decision documents similar to the planning and design analysis described in Engineer Regulation 1105-2-100, Planning and Guidance Notebook, Appendix F: Continuing Authorities Program, would be developed to the level of detail necessary to justify site-specific beneficial use projects using National Environmental Restoration (NER) analyses and National Economic Development (NED) analyses, if applicable.

Alternatives Considered and Eliminated, or Requiring Further Study

The construction authorization language in WRDA 2007 requires that this program consider the use of sediments from the Illinois River system. These sediments could come from dredging by the State of Illinois or O&M dredging by the USACE Rock Island District, as the WRDA 2007 stipulates consideration of sediment from the Illinois River System, but not which agency is doing the dredging. The State of Illinois has used their dredge material beneficially on various projects within the state. However, the use of these materials outside of the Illinois state boundary presents several issues including the logistics of getting the material from Illinois to Louisiana, getting the material to a the proposed beneficial use project site, and laws regulating the interstate transport of soil.

Final Formulation and Evaluation of Alternative Plans

Several programmatic management and site selection alternative plans were evaluated to implement beneficial use projects in coastal Louisiana. The management and site selection methods under consideration must work within the planning objectives, constraints, and assumptions. One of the management methods included the no action plan where dredged materials would only be utilized within the Federal standard for each channel within the existing O&M budget. Dredged

materials would be disposed of in an environmentally acceptable manner, which is not necessarily beneficial use. The no action plan is carried forward as the plan all others are compared against in the future.

The customized program alternative developed through the plan formulation process conducted for this study would utilize a proactive, streamlined approach to achieve objectives of the BUDMAT Program. Using an approach that follows the basic procedures described in the 2007 EPA/USACE Beneficial Use Planning Manual, the multi-agency Project Delivery Team (PDT) identified potential selection criteria and evaluated their applicability for screening and selecting beneficial use projects. The PDT determined that an initial screening process was needed annually to identify potential projects that could be coordinated with O&M dredging, followed by two levels of evaluation criteria. First, a set of screening criteria are used to identify and select suitable candidate projects for design. The beneficial use projects for which planning and design efforts have been completed are then ranked by a second criteria set to determine which projects will be implemented by the BUDMAT Program each year in conjunction with O&M dredging of federally maintained waterways.

Plan formulation for the customized BUDMAT Program included an assessment of existing program structures to determine their ability to carry out the required functions of the BUDMAT Program. Existing program processes that fully or partially address the functional requirements for the BUDMAT Program were incorporated into the customized program alternative. A combination of existing program activities for solicitation of projects were incorporated into the customized program alternative for solicitation of projects. The customized program alternative also relies on the project planning and design processes of the Continuing Authorities Program (CAP) Section 204, which provides the appropriate level of planning and design for beneficial use projects implemented under a programmatic authorization.

Identification of the Tentatively Selected Plan

BUDMAT Program Alternative

The BUDMAT Program alternative would utilize a proactive, streamlined approach to achieve the goals of the BUDMAT Program. Under the BUDMAT Program, more dredged material would be disposed beneficially than what is currently achieved within the Federal standard. A range of 3,400 acres to 21,000 acres (5 – 33 square miles) of wetlands could be created over the 10-year, $100M BUDMAT Program. The number of acres created is tied directly to dredged material transport and placement costs. Environmental conditions would improve through the creation and/or restoration of marsh, other wetlands, natural ridges and barrier shorelines. The economic condition in the area would improve due to long-term improvement in fisheries and wildlife. The negative impacts of deterioration of marshes and wetlands would be reduced through increased land cover, increased habitat, improved water quality, greater surge protection, and reduced saltwater intrusion.

Annual Process for Implementation of the BUDMAT Program

On an annual basis the BUDMAT Program procedures would be used to solicit, screen, and select candidate beneficial use projects for planning and design, and to select construction-ready projects in conjunction with the scheduled and non-scheduled O&M dredging activities. Once

project design documents have been completed, they would be available for implementing beneficial use projects in conjunction with CEMVN's O&M dredging activities during the upcoming year. It is the intent of the BUDMAT Program to have sufficient project design documents available to utilize all available construction funding per program year.

Monitoring, Operation, and Program Success

Section 2039 of WRDA 2007 mandates that when conducting a study for a project for ecosystem restoration that the recommended project includes a plan for monitoring the success of the ecosystem restoration. Consistent with WRDA 2007, monitoring shall be a cost-shared project cost for a period of up to a maximum of ten years from completion of construction of a beneficial use project implemented under the BUDMAT Program. Additional monitoring required beyond ten years, if applicable, will be a 100% non-Federal responsibility. If required, Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) of projects implemented under the BUDMAT Program would be a 100% CPRA responsibility.

Management of Plan Implementation

Execution of the BUDMAT Program will require a concerted and collaborative effort between the USACE, the State of Louisiana, and other state and Federal agencies. For this reason, a LCA Program specific management plan was developed. This plan centers Program management at the Division level, with Program Execution at the CEMVN level. The management plan maximizes concurrent and supporting efforts between the Program Managers, the USACE Washington Headquarters, and the Assistant Secretary of the Army for Civil Works. LCA Program management and execution are conducted in full partnership with the non-Federal sponsor and in collaboration with other Federal and State resource agencies. Collaboration among other State and Federal agencies and the BUDMAT Program is ensured through participation in the Project Execution Team and the involvement of Regional Working Group and the Washington Level Federal Principals. The Regional Working Group and the Washington Level Federal Principals are, respectively, the regional and Washington level representatives of the federal stakeholder agencies with interests and expertise relevant to the LCA Program, including the Corps of Engineers, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, the U.S. Environmental Protection Agency, the Natural Resource Conservation Service and the National Marine Fisheries Service.

Key to the success of the program is the infusion of the best available science and engineering for the purposes of development and implementation of restoration plans. For this reason the authorized S&T Program and S&T Office are proposed to work hand in hand with the BUDMAT Program Management and Program Execution Teams throughout plan implementation and program execution. Since the coastal ecosystem is dynamic and the state of the science is evolving, a system of advancing science and "learn while building" will be instituted. The key to success is the implementation of Adaptive Management principles into the program management.

A robust and vigorous consistency review conducted by the Program Execution Team will be done in order to protect public investment, leverage restoration opportunities of other projects and programs, and to ensure that future public and private actions do not detract from coastal restoration.

3.0 AREAS OF CONTROVERSY

The following list is a summary of the major areas of controversy identified throughout the development of the Louisiana Coastal Area Ecosystem Restoration Program and applicable to the BUDMAT Program. Specific concerns identified during the public scoping meetings for the BUDMAT Study can be found in section 5.1.2.

1. Public concern that litigation from parties negatively impacted by restoration projects will make restoration prohibitively expensive.

2. Concern about the priority of certain restoration projects.
- Request by Terrebonne and Barataria Basins residents for the immediate restoration of the Barataria-Terrebonne Estuary before other regions of the coastal ecosystem.
- Public support for the construction of restoration projects in areas that will maximize the benefits to society, culture, and the regional economy.
- Public concern for the inclusion of additional restoration features for the Chenier Plain in the implemented LCA Plan.

3. Concern about the necessity for sediment and water quality testing for dredging and disposal activities.

4. Conflicts may result when balancing economic interests with coastal restoration, especially when multiple stakeholders share common coastal resources.
- Real property rights issues including public access, mineral rights, and the perception that Federal monies would be spent to restore private properties.
- Concern with impediments to navigation and proposed re-routing of the Mississippi River and the Atchafalaya River Navigation channels.
- The effect of coastal restoration on flood control projects.

5. Concern with inaction and perceived lack of urgency with respect to restoration.
- Public support for comprehensive, long-term restoration efforts beyond near-term restoration efforts.
- Public demand for the immediate construction of restoration actions versus requirements for conducting additional study of restoration problems.

4.0 UNRESOLVED ISSUES – VIEWS OF THE NON-FEDERAL SPONSOR

These issues are further detailed in Section 4.10 Views of the non-Federal sponsor.

LCA Program Implementation Cost Share

The State of Louisiana is in full support of the LCA Beneficial Use of Dredged Material Program at current cost share ratio of 65 percent Federal, 35 percent non-Federal, with operations, maintenance, repair, replacement and rehabilitation being 100 percent non-Federal responsibility, as required in

WRDA 2007. However, the state believes that alternative cost share scenarios are appropriate and justified and intends to request from Congress that the non-Federal share of the total LCA Program implementation be set at 25 percent.

Credit for Non-Federal In-Kind Contributions

The State of Louisiana fully supports the LCA Beneficial Use of Dredged Material Program; however, it disagrees with the USACE implementation guidance related to Section 7007 of WRDA 2007. The state intends to request from Congress that in-kind contribution credit be allowed for work carried out after the date of a Design Agreement or Project Partnership Agreement and that in-kind contributions credit be allowed to carry over between LCA Program components (i.e., studies and projects), provided that provision of in-kind contributions, cash, and LERRDs fulfill the total non-Federal obligations. The state believes this view is consistent with the programmatic rules and allowances currently governing implementation of the Comprehensive Everglades Restoration Program. Furthermore, the state intends to request from Congress that in-kind contributions credit be allowed for the incremental funding it provides for beneficial use projects carried out prior to the implementation of the BUDMAT Program and that credit should be allowed commencing on the date of the Chief's Report (January 31, 2005).

Use of Federal Funds for Non-Federal Cost Share

In accordance with Section 7007(b) of WRDA 2007 and to the maximum extent allowable by law, the state will apply funds authorized by Congress under the Energy Policy Act of 2005 (Coastal Impact Assistance Program - CIAP) and the Gulf of Mexico Energy Security Act of 2006 (GOMESA) to meet its non-federal cost share for the BUDMAT Program and its resultant increase in the amount of beneficial use of dredged material performed by CEMVN.

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LCA BENEFICIAL USE OF DREDGED MATERIAL PROGRAM STUDY

1.0 STUDY INFORMATION

The $100 million Louisiana Coastal Area (LCA) Beneficial Use of Dredged Material (BUDMAT) Program was authorized by Title VII, Section 7006(d) of the Water Resources Development Act (WRDA) of 2007 (Public Law 110-114) on November 8, 2007 subject to approval of a decision document (i.e., this study report) by the Secretary of the Army.

Since this study evaluates a broad agency action (i.e., the establishment of the 10-year, $100 million BUDMAT Program); it is a programmatic effort. The study focuses on the development of the BUDMAT Program functional requirements including structure and the processes for project solicitation, selection of projects for design, and selection of projects for construction. The State of Louisiana, acting through the Louisiana Department of Natural Resources (LDNR), as the non-Federal sponsor, and the U.S. Army Corps of Engineers, Mississippi Valley, New Orleans District (CEMVN) initiated the LCA BUDMAT Program study on June 1, 2006. The BUDMAT study cost is shared equally between the U.S. Army Corps of Engineers (USACE) and the State of Louisiana.

In 2005, the Coastal Protection and Restoration Authority of Louisiana (CPRA) was established by Act 8 of the 1st Extraordinary Session of the Louisiana State Legislature. The CPRA's mandate is to develop, implement and enforce a comprehensive coastal protection and restoration master plan. This single state authority will integrate coastal restoration and hurricane protection by marshalling the expertise and resources of the Louisiana Department of Natural Resources (LDNR), the Louisiana Department of Transportation and Development (LDOTD), and other state agencies, to speak with one clear voice for the future of Louisiana's coast. Thus, CPRA will be the non-Federal sponsor for implementation of the BUDMAT Program. Working with Federal, state and local political subdivisions, including levee districts, the CPRA will work to establish a safe and sustainable coast that will protect Louisiana’s communities, the nation's critical energy infrastructure, and Louisiana’s bountiful natural resources for generations to come.

1.1 STUDY AUTHORITY

This study is a component of the LCA Ecosystem Restoration Study (LCA Study),authorized through resolutions of the U.S. House of Representatives and Senate Committees on Public Works, 19 April 1967 and 19 October 1967. While this study was being conducted, Congress passed the Water Resources Development Act of 2007 (P.L. 110-114). The resolutions of the U.S. House of Representatives and Senate Committees on Public Works contain the following language:

> “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 reports of the Chief of Engineers on the Mermentau River and Tributaries and Gulf Intracoastal

Waterway and connecting waters, Louisiana, published as Senate Document Numbered 231, Seventy-ninth Congress, on the Bayou Teche, Teche-Vermilion Waterway and Vermilion River, Louisiana, published as Senate Document Numbered 93, Seventy-seventh Congress, on the Calcasieu River salt water barrier, Louisiana, published as House Document Numbered 582, Eighty-seventh Congress, and on Bayous Terrebonne, Petit Caillou, Grand Caillou, Dularge, and connecting channels, Louisiana, and the Atchafalaya River, Morgan City to the Gulf of Mexico, published as House Document Numbered 583, Eighty-seventh Congress, and other pertinent reports including that on Bayou Lafourche and Lafourche-Jump Waterway, Louisiana, published as House Document Numbered 112, Eighty-sixth Congress, with a view to determining the advisability of improvements or modifications to existing improvements in the coastal area of Louisiana in the interest of hurricane protection, prevention of saltwater intrusion, preservation of fish and wildlife, prevention of erosion, and related water resource purposes."

Title VII of Water Resources Development Act of 2007 (P.L. 110-114) contains the following language regarding the construction authorization of the BUDMAT Program:

"SEC. 7006. CONSTRUCTION.
(d) BENEFICIAL USE OF DREDGED MATERIAL.
(1) IN GENERAL.—The Secretary, substantially in accordance with the restoration plan, shall implement in the coastal Louisiana ecosystem a program for the beneficial use of material dredged from federally maintained waterways at a total cost of $100,000,000.
(2) CONSIDERATION.—In carrying out the program under paragraph (1), the Secretary shall consider the beneficial use of sediment from the Illinois River System for wetlands restoration in wetlands-depleted watersheds of the coastal Louisiana ecosystem."

The restoration plan referenced in Title VII, Section 7006(d)(1) above was also authorized by WRDA 2007 in Title VII, Section 7003 which contains the following language:

"SEC. 7003. LOUISIANA COASTAL AREA.
(a) IN GENERAL.—The Secretary may carry out a program for ecosystem restoration, Louisiana Coastal Area, Louisiana, substantially in accordance with the report of the Chief of Engineers, dated January 31, 2005."

The report of the Chief of Engineers, dated January 31, 2005, recommended authorization of a beneficial use of dredged material program subject to the approval of a decision document by the Secretary of the Army.

1.2 STUDY PURPOSE AND SCOPE

The purpose of this programmatic report is to present the findings of the study which was conducted to establish the structure and management architecture of the BUDMAT Program to take greater advantage of existing sediment resources made available by the maintenance activities of authorized Federal navigation channels to achieve restoration objectives in coastal Louisiana. This report analyzes the problems and opportunities and expresses desired outcomes as planning

objectives. Alternatives are then developed to address these objectives. These alternatives include a plan of no action and various combinations of management measures. The environmental impacts of the alternatives are then evaluated and a feasible plan is tentatively selected. The report also presents details on the participation of the USACE and the Louisiana Coastal Protection and Restoration Authority (CPRA) needed to implement the plan. The report concludes with a recommendation for implementation of the ten-year $100M BUDMAT Program and is supported by the BUDMAT Programmatic environmental impact statement (PEIS).

The focus of this programmatic study is on the BUDMAT Program and the procedures under which future beneficial use projects will be implemented. Thus, subsequent National Environmental Policy Act (NEPA) documents will be prepared for site-specific beneficial use projects implemented under the BUDMAT Program. Additionally it is expected that these subsequent NEPA documents will tier off of the BUDMAT PEIS and its accompanying Record of Decision (ROD).

1.3 LOCATION OF THE STUDY AREA

The study area is Louisiana's coastal area from Mississippi to Texas. Louisiana parishes included in the study area include Ascension, Assumption, Calcasieu, Cameron, Iberia, Jefferson, Lafourche, Livingston, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Martin, St. Mary, St. Tammany, Tangipahoa, Terrebonne, and Vermilion.

The following nine navigation channels represent the most significant opportunities for additional beneficial use of dredged material in coastal Louisiana, see figure 1-1**:**

- Barataria Bay Waterway, LA
- Mississippi River, Outlets at Venice, LA – Tiger Pass and Baptiste Collette
- Mississippi River, Baton Rouge to the Gulf of Mexico, LA –Southwest Pass and South Pass
- Atchafalaya River and Bayous Chene, Boeuf, and Black, LA
- Calcasieu River and Pass, LA
- Houma Navigation Canal, LA
- Bayou Lafourche, LA
- Mermentau River, LA
- Freshwater Bayou, LA

1.4 HISTORY OF THE INVESTIGATION

A study entitled "Louisiana Coastal Area (LCA), Louisiana, Ecosystem Restoration Study" was initiated on March 14, 2002 and completed in November 2004. The LCA Study resulted in the recommendation of a near-term LCA Plan. The recommendation included the programmatic authorization of the $100 million, ten-year BUDMAT Program subject to the approval of a decision document by the Secretary of the Army. The LCA Study is described in detail in the following section.

1.5 PRIOR REPORTS AND EXISTING PROJECTS

Each navigational channel has corresponding environmental documents and they are listed in the annual USACE Dredging Conference reports, available on line at CEMVN's navigation web site: http://www.mvn.usace.army.mil/od/navigation.asp. Prior reports which directly pertain to the beneficial use of dredged materials include the following:

1.5.1 November 2004 Louisiana Coastal Area (LCA), Louisiana Ecosystem Restoration Study (LCA Study)

The purpose of the LCA Study was to:

- Identify the most critical human and natural ecological needs of the coastal area;
- Present and evaluate conceptual alternatives for meeting the most critical needs;

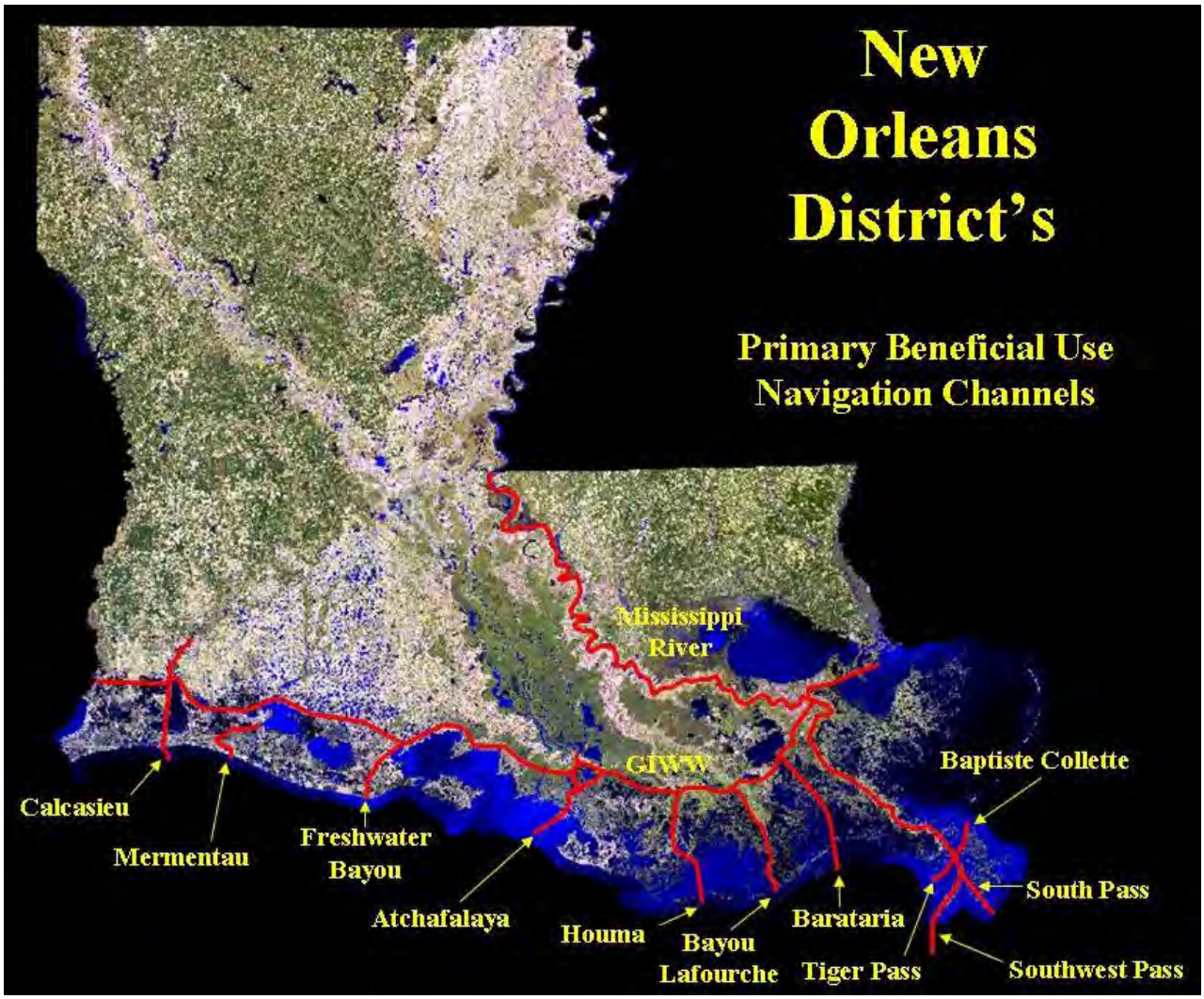


Figure 1-1. Primary Beneficial Use Navigation Channels

- Identify the kinds of restoration features that could be implemented in the near-term (within 5 to 10 years) that address the most critical needs, and propose to address these needs through features that provide the highest return in net benefits per dollar of cost;
- Establish priorities among the identified near-term restoration features;
- Describe a process by which the identified priority near-term restoration features could be developed, approved, and implemented;
- Identify the key scientific uncertainties and engineering challenges facing the effort to protect and restore the ecosystem, and propose a strategy for resolving them;
- Identify, assess and, if appropriate, recommend feasibility studies that should be undertaken within the next 5 to 10 years to fully explore other potentially promising large-scale restoration concepts; and
- Present a strategy for addressing the long-term needs of coastal Louisiana restoration beyond the near-term focus of the Louisiana Coastal Area Ecosystem Restoration Plan (LCA Plan).

The LCA Study resulted in the recommendation of the near-term LCA Plan whose goal is to reduce the current trend of degradation of the coastal ecosystem. The LCA Plan emphasizes the use of restoration strategies by subprovince (See figure 1-2) that: reintroduce historical flows of river water, nutrients, and sediment to coastal wetlands; restore coastal hydrology to minimize saltwater intrusion; and maintain the structural integrity of the coastal ecosystem. Execution of the LCA Plan would make major progress towards achieving and sustaining a coastal ecosystem that can support and protect the environment, economy, and culture of southern Louisiana and thus contribute to the economy and well-being of the Nation. Benefits to and effects on existing infrastructure, including navigation, hurricane protection, flood control, land transportation works, agricultural lands, and oil and gas production and distribution facilities were strongly considered in the formulation of coastal restoration plans.

The LCA Plan is based upon the extensive experience gained through the on-going Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) implementation effort, best available science and engineering, professional judgment, and other extensive experience in coastal restoration in Louisiana and beyond. The LCA Plan identifies, evaluates, and recommends to decision makers an appropriate, coordinated, and feasible course of action to address the identified critical water resource problems and restoration opportunities in coastal Louisiana. The LCA Study report provides a complete presentation of the study process, results, and findings; indicates compliance with applicable statutes, executive orders, and policies; documents the Federal and non-Federal interest; and provides a sound and documented basis for decision makers at all levels to evaluate the request for:

- Specific authorization for implementation of five (5) near-term critical restoration features for which construction can begin within 5 to 10 years, subject to approval of feasibility-level decision documents by the Secretary of the Army (hereinafter referred to as “conditional authorization” in the Main Report and accompanying Final Environmental Impact Statement);

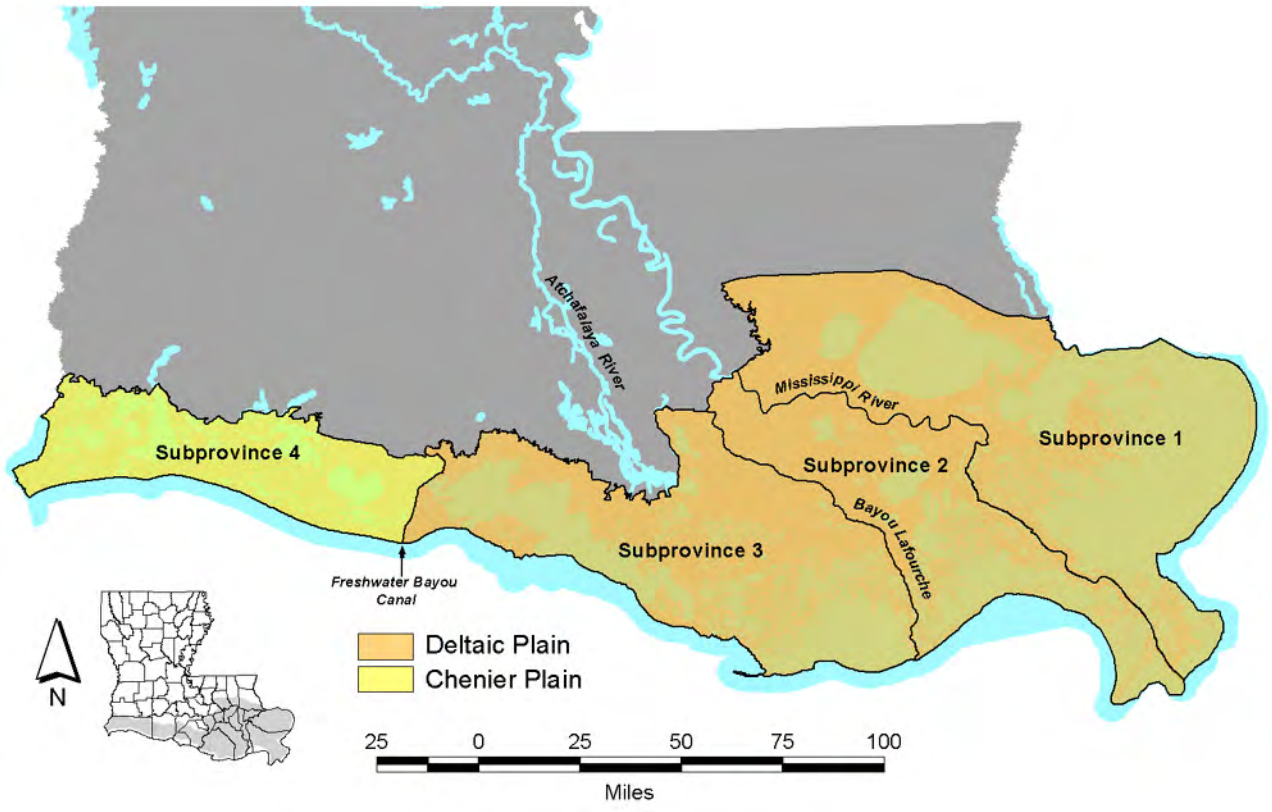


Figure 1-2. LCA Study Area and Subprovinces

- Programmatic Authorization of a Science and Technology Program;
- Programmatic Authorization of Science and Technology Program Demonstration Projects;
- **Programmatic Authorization for the Beneficial Use of Dredged Material Program**;
- Programmatic Authorization for Investigations of Modification of Existing Structures;
- Approval of ten (10) additional near-term critical restoration features and authorization for investigations to prepare necessary feasibility-level reports to be used to present recommendations for potential future Congressional authorizations (hereinafter referred to as "Congressional authorization"); and
- Approval of investigations for assessing six potentially promising large-scale and long-term restoration concepts.

Authorization of the near-term LCA Plan by Title VII of WRDA 2007 has initiated the development of a series of feasibility-level decision documents that would provide detailed project justification, design, and implementation data. These future feasibility-level decision documents would support requests for project construction and would provide the basis for the implementation of the LCA Plan documented in the LCA Study report.

The authorized LCA Plan includes $100 million in programmatic authority to allow for the extra cost needed for beneficial use of dredged material over a 10-year period. Funds from the Beneficial

Use of Dredged Material (BUDMAT) Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard. The Federal standard for dredged material disposal is the least costly alternative, consistent with sound engineering and scientific practices and meeting applicable Federal environmental statutes. Of the $100 million recommended for the BUDMAT Program, approximately 15 percent (i.e., $15 million) would be used for planning, engineering, and design activities, and real estate acquisition for beneficial use projects implemented under the BUDMAT Program, and the remaining $85 million would be used for placement of dredged material within the beneficial use disposal sites. The cost breakdown was based on historical averages for similar beneficial use projects carried out by CEMVN under the CWPPRA Program. Contingencies, construction management and monitoring costs were included in the construction costs, while the Planning, Engineering, and Design costs include environmental planning and compliance costs and real estate costs (which were typically significantly less than one percent of the total costs).

A Programmatic Environmental Impact Statement (PEIS) was prepared for the LCA Study and a Record of Decision (ROD) was signed on November 18, 2005. The LCA Study and its accompanying PEIS is available at the main LCA website, http://www.lca.gov.

A Chief of Engineers report on ecosystem restoration for the Louisiana Coastal Area (LCA), Louisiana, dated January 31, 2005, recommended approval of the LCA Plan.

1.5.2 Environmental Assessment No. 51, Deposition of Dredged Material within the developing Atchafalaya River Delta

This Environmental Assessment (EA) covered the disposal of dredged material from the lower Atchafalaya River on the east side of the channel in the developing delta. By doing so, no additional fresh marsh behind the currently used disposal areas on the west side would be disturbed, and the eroding delta islands on the east side could be rehabilitated.

The Finding of No Significant Impacts (FONSI) was signed on August 28, 1985.

1.5.3 Environmental Assessment No. 62, Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana

This EA was created to address the need to study possible impact by three proposed modified features to the original Deep-Draft dredging project, those being:

- Marsh Creation,
- Interim Saltwater Intrusion Mitigation, and
- Dredged Material Disposal Areas.

The original project, filed with the U.S. Environmental Protection Agency (EPA) in July 1982, deepened the 40-foot channel between the Gulf of Mexico and Baton Rouge to 45 feet. The modifications were added as an Environmental Assessment after the EIS was filed with the EPA.

Description of Action

CEMVN proposed to modify three features of the Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana (Deep-Draft) Project. The first modification provided for an alternative use of 5 million cubic yards (28 percent of total) of material which was hydraulically dredged during construction of the 45 foot increment of the Deep-Draft project. This material was proposed to be used as bank stabilization instead of marsh creation. The FONSI attached to the EA, dated April 27, 1997, states that "this modification would result in a 350-acre reduction in the maximum acreages of marsh (18,000 acres or 35,000 acres) expected to be created with the 45-foot-deep or 55-foot-deep channels, respectively, over the 50-year project life."

The second modification provided for the construction of barge mooring facilities at Mississippi River Miles 18.6, 49.7, and 49.0 above Head of Passes adjacent to existing water treatment plants. Approximately 1300 square feet of river bottom was covered by 280 cubic yards of rock while 18 steel piles were driven into the river bottom during the construction of the mooring facilities. Barges moored at these facilities contained raw water used as an alternate water source during periods when saltwater intrusion, caused by the channel construction, made the river water unsuitable as a water source.

The third modification provided a 230-acre dredged material disposal area at Brant Island, located within the Delta National Wildlife Refuge.

The FONSI was signed on April 21, 1997.

1.5.4 Environmental Assessment No. 77, Marsh Creation, Mississippi River Outlets, Louisiana

This EA covers the proposal to create marsh within a 575-acre disposal site along Baptiste Collette Bayou and a 400-acre site along Tiger Pass. The material would be removed from these navigational channels with a hydraulic dredge during routine maintenance dredging and placed in the sites unconfined.

Description of Action

Because the existing marsh creation disposal areas in the vicinity of the entrance channel are nearing capacity, CEMVN proposes to designate two additional sites. The Baptiste Collette disposal site consists of a 575-acre area located toward the northwest from the west jetty, and about 500,000 cubic yards of material would be placed in this area annually. The Tiger Pass area would be dredged every 2.5 – 3 years, and about 400,000 cubic yards of material would be placed in a 400-acre site north of the channel during each dredging cycle. The material taken from both channels would be removed with a hydraulic dredge and placed into the unconfined disposal areas to an initial elevation of approximately 5 feet National Geodetic Vertical Datum of 1929 (NGVD). After consolidation and compaction, the final design elevation of 1.5 – 2.5 feet NGVD is anticipated.

The FONSI was signed on September 12, 1988.

1.5.5 Environmental Assessment No. 94, Bayou Lafourche Maintenance Dredging, Larose to Leeville, Louisiana

This EA covers the proposal to perform essential maintenance dredging of approximately 4.0 miles of Bayou Lafourche between Yankee Canal (Mile 19.5) and Golden Meadow (Mile 23.4). Dredged material will be utilized to create marsh adjacent to the waterway.

Description of Action

Approximately 200,000 cubic yards of fine-grained sand, silt, and clay would be removed at the first maintenance and every 15 years thereafter. The dredged material would be placed in shallow, open-water areas within previously used or unused confined disposal sites adjacent to the Bayou Lafourche Waterway. In all disposal operations, the dredged material would be placed in a manner conducive to marsh creation. The settled height of the material shall be approximately 1.5 feet mean sea level. To minimize erosion of the newly created marsh, each disposal site would be filled to the maximum extent possible to reduce erosion induced by wave action.

The FONSI was signed on November 13, 1989.

1.5.6 Environmental Assessment No. 127, Proposed Additional Dredging Material Disposal Areas for Operations and Maintenance of the Houma Navigation Canal, Terrebonne Parish, Louisiana

This EA was created to evaluate the impact of the proposed use of dredged material from the Houma Navigation Canal (HNC) for marsh creation and restoration and barrier island nourishment. The project was a modification to the original Composite Environmental Statement for Operation and Maintenance Dredging of Four Projects Located South of the Gulf Intracoastal Waterway in Terrebonne Parish, Louisiana, and filed with the EPA in April 1976.

Description of Action

The project proposed using material from routine maintenance dredging of shoaled portions of the HNC from mile 36.6 to -3.9 to replenish or create marshes and nourish Wine Island (a barrier Island in Terrebonne Bay). Approximately 450,000 cubic yards of the 2,650,000 cubic yards dredged in routine maintenance would be used to build or restore up to 245 acres of marshes and beach (on Wine Island) as opposed to continuing the practice of impounding the dredge material in upland disposal. Maintaining existing practices would result in the continued degradation of marshes and barrier islands.

The FONSI was signed on September 14, 1990.

1.5.7 Environmental Assessment No. 127A, Disposition of Dredge Material on Wine Island, Terrebonne Parish, Louisiana

This EA was an addendum to EA 127 to address issues raised by brown pelicans found to be nesting on Wine Island after the initial EA was prepared.

Description of Action

The preferred alternative would use 900,000 cubic yards of dredged material on Wine Island to enhance habitat for black skimmers and terns and to restore beaches and dunes. Areas used by pelicans for nesting would be protected with a temporary earthen dike, to prevent dredged material flowing onto the nesting area. The dredged material would be placed either directly on Wine Island to rebuild scrub/shrub habitat for the birds or 1000 ft offshore to rebuild dunes and beach. The proposed alternatives, no action and depositing all the dredged material in the offshore location were considered inferior because the former would hasten the destruction of Wine Island and the latter would not benefit tern and black skimmer habitat.

The FONSI was signed on October 11, 2002.

1.5.8 Environmental Assessment No. 155, Calcasieu River and Pass, Marsh Creation, Brown Lake and Sabine National Wildlife Refuge, Cameron and Calcasieu Parishes, Louisiana

This EA analyses potential impacts associated with the placement of dredged material removed between Mile 5 – 21 of the Calcasieu River and Pass to create marsh in shallow open water or deteriorating marsh.

Description of Action

CEMVN proposes to designate two additional disposal sites for beneficial use of dredged material. These marsh restoration sites, Brown Lake and Sabine National Wildlife Refuge (NWR) encompass approximately 5,400 acres and 1,450 acres, respectively. Dredged material removed from shoaled portions of the Calcasieu River and Pass, Louisiana, project would be used to restore the marsh in these sites. In 1992, approximately 3,870,000 cubic yards of dredged material would be placed for beneficial uses. Approximately 60 acres of marsh in the vicinity of Brown Lake and approximately 150 acres of marsh within the Sabine NWR would be created by disposal of dredged material.

The FONSI was signed on February 2, 1992.

1.5.9 Environmental Assessment No. 207, West Belle Pass Headland Restoration Project, Lafourche Parish, Louisiana

Description of Action

This EA proposed to deposit sediments dredged from Bayou Lafourche and Belle Pass into canals and shallow bays for the purpose of marsh restoration. At least 184 acres of marsh are expected to be developed. Several earthen canal closures and low-level earthen dikes will be required to semi-confine the dredge material. The west bank of Bayou Lafourche and Belle Pass will be protected with a rock or concrete rip-rap armor beginning at the west Belle Pass jetty and extending north for 17,000 ft. A rock or concrete rip-rap weir with a passageway for vessels will be built in the Evan Canal near its intersection with Bayou Lafourche. The weir will reduce tidal flows and help stabilize existing and restored marsh.

The FONSI was signed on August 4, 1995.

1.5.10 Environmental Assessment No. 207A, West Belle Pass Headland Restoration Project, Lafourche Parish, Louisiana. Supplemental

Description of Action

This EA modifies the previous EA 207 to include the deletion of dredged material disposal into the eastern Tennessee Gas Pipeline Canal; the addition of an earthen confinement dike, with closures of tidal inlets along the south bank of the Evans canal; a change in the design of the weir proposed for the Evans Canal; addition of an earthen closure along the bank of Belle Pass; and relocation of an earthen closure from one pipeline canal to another.

The FONSI was signed on July 29, 1997.

1.5.11 Environmental Assessment No. 207B, West Belle Pass Headland Restoration Project, Lafourche Parish, Louisiana

Description of Action

This EA proposes to complete the marsh restoration goals of EA 207 and 207A for the West Belle Pass Headland Restoration Project with additional disposal of maintenance material from Bayou Lafourche and Belle Pass into the West Belle Pass project area. The major features of the original CWPPRA project (EA 207) remain unchanged. Much of the original project was constructed in 1998, including the rock armament along Belle Pass and Bayou Lafourche, the rock weir on Evans Canal, and some of the wetlands creation. To complete the wetlands restoration of this area, CWPPRA has teamed up with CEMVN's operations and maintenance (O&M) program for Bayou Lafourche and Belle Pass to initiate a second dredged material placement from these navigation channels into the project area for wetlands creation.

Dredged material would be deposited in the bays and canals of the project area to an elevation between +3.5 – 4.0 ft Mean Low Gulf (MLG), so that the settled elevation would be approximately the same as nearby healthy marsh, which occurs between +2.0 – 2.5 ft MLG. CWPPRA funds would be used to reconstruct the dike between Bay Toulouse and Timbalier Bay for dredged material containment while O&M funds would be used to move the dredged material into the project area. The Bay Toulouse dike would be reconstructed of vinyl sheet pile and would be approximately 650 ft long, plus the connection of the closure to the remaining dikes, and would be 6 ft MLG in height. The material originally used for this dike was earthen material from the Bay Toulouse. This material was primarily silty sand, which was unable to withstand the environmental conditions present in the project area during the project's initial construction. Vinyl sheet pile was chosen to replace it as a less marsh-damaging alternative to rock which would require the construction of floatation canals through the project area.

This EA also discusses the plans for continued maintenance and use of this site for future disposal of dredged material from Bayou Lafourche and Belle Pass.

The FONSI was signed on June 25, 2006.

1.5.12 Environmental Assessment No. 268b, Mississippi River, Baton Rouge to the Gulf of Mexico, LA, Designation of Additional Disposal Area, Pass a Loutre, South Pass, Plaquemines Parish, Louisiana

This EA proposes to designate and additional disposal area for the beneficial use of shoal material removed during the sediment mining of the hopper dredge open water disposal area (HDDA) located at the heads of Pass a Loutre and South Pass.

Description of Action

With the proposed action, the material removed during the dredging of the HDDA would be placed in a shallow open water area to expand the existing Pass a Loutre disposal area located primarily in the Delta National Wildlife Refuge (NWR) operated by the U.S. Fish and Wildlife Service (USFWS). The proposed disposal area expansion encompasses a total of approximately 3,300 acres of shallow open water and eroding marsh located north of the Pass a Loutre. Of this total, approximately 2,200 acres is composed of shallow open water that is suitable for marsh development. Material removed from the HDDA would be placed unconfined in shallow open water areas in the proposed disposal area expansion as a series of peninsulas. The maximum initial height of the dredged material would be +7.0 feet MLG over a maximum crown width of about 300 feet. If is anticipated that the final settled elevation of the dredged material would be approximately +4.0 to +5.0 feet MLG along the peninsula crowns. These peninsulas would mimic natural peninsulas that are supportive of both nesting habitat for mottled ducks and neotropical migrants along the crowns and emergent intertidal wetland vegetation along the peninsula slopes and fringes. Gaps would be left between each individual peninsula to allow for the continued movement, flow and intertidal exchange of water.

The FONSI was signed on October 3, 2008.

1.5.13 Environmental Assessment No. 305, Mississippi River Outlets, Vicinity of Venice, LA, Baptiste Collette Maintenance Dredging, Beneficial Use of Dredged Material, Plaquemines Parish, Louisiana

This EA proposes to expand the existing disposal areas for the deposition of dredged material, removed from Baptiste Collette Bayou.

Description of Action

The proposed action would increase the capacity of the existing disposal areas located along the left and right descending banks of Baptiste Collette Bayou in Breton Sound. Approximately 1,722 acres of shallow open water along the left descending bank and 2,878 acres of shallow open water along the right descending bank would be dedicated for the beneficial use of dredged material removed from the Baptist Collette navigation channel during routine maintenance activities. The beneficial use includes wetland development and creation/refurbishment of islands for colonial nesting seabirds. Shoal material in the navigation channel would be dredged and discharged using a hydraulic cutterhead pipeline dredge. Approximately 400,000 to 1.2 million cubic yards of dredged material, consisting mainly of sandy silt, would be removed annually from the routine maintenance

dredging of the navigation channel. Dredged material would be discharged in an unconfined manner to a maximum initial height of approximately +8 ft MLG at the spit sites adjacent to the marsh development and about +3.5 ft MLG at the marsh development sites.

The FONSI was signed on January 25, 2000.

1.5.14 Environmental Assessment No. 309, Port Fourchon, Louisiana, Project, Lafourche Parish, Louisiana

This EA covers the proposal to modify the dredging material disposal plan for construction of the Port Fourchon, Louisiana navigation project. Two sites previously designated for wetland creation would not be used.

Description of Action

Material from the navigation channel would be removed with a hydraulic cutterhead dredge and deposited as slurry into designated disposal areas. The proposed plan includes deposition of material from the upstream end of the navigation channel into an abandoned oil well location canal, locally known as the Phillips Canal, to create wetland habitat. Once the canal is filled to capacity, the remaining material from the navigation channel would be deposited along the Gulf of Mexico shoreline. Both of these disposal areas were designated for dredged material disposal in the Port Fourchon Final Environmental Impact Statement (FEIS). Maintenance dredging of the channel extension and the rest of the inshore reach of the navigation would be expected about every 5 years. Material dredged during maintenance may be placed in the impoundment, depending on its condition after dredging and disposal activities for port expansion are completed. The Phillips Canal may be used for disposal again during maintenance dredging if the elevation is not sufficient for marsh development after project construction.

The FONSI was signed on November 27, 2000.

1.5.15 Environmental Assessment No. 319, Sabine Refuge Marsh Creation, Cameron Parish, Louisiana

This EA addressed the use of dredged material from the Calcasieu River and Pass (CRP) in open water areas to reestablish marshes that previously existed in those areas. EA 319 partially amends EA 155 by redesignating the location of deposit areas for dredged materials to new locations so that marsh can be restored in new locations.

Description of Action

The preferred alternative would initially use one million cubic yards of dredged material from routine maintenance of CRP. The dredged material would be placed in an 826 acre section of a designated 3,300 acre target area of the Sabine NWR, resulting in the creation of approximately 125 acres of marsh and nourishment of an additional 300 acres. Negative impacts from the placement (e.g., increased turbidity) would be temporary and outweighed by the benefit of recreating lost marshes. The no action alternative would result in continued loss of wetlands.

The FONSI was signed on December 28, 2000.

1.5.16 Environmental Assessment No. 319A, Sabine Refuge Marsh Creation, Cameron Parish, Louisiana

This EA amends EA 319 by altering the route of the pipeline that will carry the dredged material from the CRP to the target fill area.

Description of Action

Other than changing the route of the pipeline to carry dredge material to the fill site, the action is the same as described by EA 319.

The October 23, 2001 FONSI concluded that the project would have no significant impact upon the human environment.

1.5.17 Environmental Assessment No. 319B, Sabine Refuge Marsh Creation, Cameron Parish, Louisiana

This EA amends EAs 319 and 319A by changing the deposit section within the original 3,300 acre target area and also extending the pipeline route and expanding (from 100 to 150 or 200 feet) and making permanent portions of the easement for the pipeline.

Description of Action

Using dredged material from routine maintenance of the CRP, carried by pipeline into four additional target sections of approximately 230 acres each (920 acres total), this EA anticipates restoring marshes that have been lost to open water. Additionally, existing marshes and open water will be nourished by the restored marshes. The no action alternative would result in continued loss and degradation of the marshes.

The FONSI was signed on July 22, 2004.

1.5.18 Environmental Assessment No. 344, Expansion of Existing Avoca Island Disposal Area, St. Mary Parish, Louisiana

This Environmental Assessment was created to designate a 4,200-acre shallow, open-water disposal area for beneficial use placement within Avoca Island of shoal material removed during routine maintenance dredging of the Atchafalaya River and Bayous Chene, Boeuf, and Black Project.

Description of Action

CEMVN designated approximately 4,200 acres of shallow, open-water in Avoca Island as a beneficial use disposal site for shoal material removed from the Atchafalaya River and Bayous Chene, Boeuf and Black during routine maintenance of the project. Dredged material was placed within the open waters of the lake to a height conducive to wetlands development (ranging from

bottomland hardwood forest to emergent marsh). These wetlands are hydrologically connected to Bayou Chene. Retention dikes were constructed to allow consolidation of dredged material to wetland elevations, to prevent the flow of dredged material into surrounding areas and to prevent erosion.

The FONSI was signed on March 11, 2002.

1.5.19 Environmental Assessment No. 412, Houma Navigational Canal, Additional Disposal Areas, Between Miles 11.0 and 8.0, Terrebonne Parish, Louisiana

This EA was created to designate two subsided and eroded marsh areas, located approximately between Houma Navigational Canal (HNC) Mile 11.0 and Mile 8.0 on both sides of the channel. These areas would be designated as beneficial use disposal areas for the placemen of material removed during routine maintenance dredging of the HNC.

Description of Action

The CEMVN proposes to designate two subsided and eroded march areas, located approximately between HNC Mile 11.0 and Mile 8.0 on both sides of the channel. These areas would be designated as beneficial use disposal areas for the placement of material removed during routine maintenance dredging of the HNC. Dredged material slurry would be discharged into shallow open water areas of these sites to an initial height not to exceed approximately +3.0 feet (NAVD 88) for wetlands development, with an anticipated target elevation following dewatering and compaction of about +1.5 to +1.0 feet (NAVD 88). Dredged material slurry would be allowed to overflow over existing emergent marsh vegetation, but would not be allowed to exceed a height of about one foot above the existing marsh elevation. Retention dikes and/or closures would be constructed as necessary to prevent the flow of dredged material from re-entering the HNC and adjacent waterways. Such dikes and closures would also serve to protect the disposal areas from wave erosion. All attempts would be made to breach the dikes between dredging cycles (i.e., within two to three years), or on an as needed basis following the coordination with state and Federal natural resource agencies.

The FONSI was signed on February 3, 2009.

1.5.20 Environmental Assessment No. 435, Sabine Refuge Operations and Maintenance Beneficial Use Marsh Creation Disposal Area, Cameron Parish, Louisiana

This EA was created to designate a failed 4,900 acre freshwater impoundment as an unconfined beneficial use area for four million cubic yards of dredged material from the routine maintenance of the CRP to restore marshes in the unit.

Description of Action

CEMVN designated 4,900 acres of shallow open water and eroding marsh as a beneficial use disposal site for dredge material from miles 5 to 14 of the CRP. Approximately four million cubic

yards is dredged every two years and had previously been disposed of in upland impoundments. The dredged material will be carried to the fill area via pipeline. Construction of the pipeline will temporarily impact 7.8 acres of shrub/scrub, emergent marsh and shallow open water. The amount of wetlands created will depend on the funds available for the project. The no-action option would result in continued degradation of wetlands.

The FONSI was signed on August 15, 2006.

1.5.21 Environmental Assessment No. 451, Houma Navigational Canal, Additional Disposal Areas, Terrebonne Parish, Louisiana

This EA was prepared to designate four dredge disposal areas, located approximately between Houma Navigational Canal (HNC) Mile 28.0 and Mile 18.0 along the west side of the channel near Theriot, Louisiana in Terrebonne Parish. These areas would be designated as beneficial use disposal areas for the placement of material removed during routine maintenance dredging of the HNC.

Description of Action

The proposed action consists of designating four dredge disposal areas, located approximately between Houma Navigational Canal (HNC) Mile 28.0 and Mile 18.0 along the west side of the channel near Theriot, Louisiana in Terrebonne Parish. These areas would be designated as beneficial use disposal areas for the placement of material removed during routine maintenance dredging of the HNC. Dredged material slurry would be discharged into shallow open water areas of these sites to an initial height not to exceed approximately +3.0 feet for wetlands development, with an anticipated target elevation following dewatering and compaction of approximately +15 feet to +1.0 feet. Dredged material slurry would be allowed to overflow over existing emergent march vegetation, but would not be allowed to exceed a height of about one foot above the existing marsh elevation, Retention dikes and closures would be constructed as necessary to prevent the flow of dredged material from re-entering the HNC and adjacent waterway. Such dikes and closures would serve to protect the disposal areas from waver erosion. Containment dikes would be breached during the next dredging cycle if they do not naturally degrade.

The FONSI was signed on July 25, 2008.

1.5.22 Environmental Assessment No. 460, Calcasieu River and Pass, Marcantel O&M Beneficial Use Marsh Creation Disposal Area, Cameron Parish, Louisiana

This EA was prepared to evaluate the potential impacts associated with the disposal of dredged material from the routine maintenance of the Calcasieu River and Pass for marsh restoration in a new disposal site referred to as the Marcantel Site Beneficial Use Disposal Area (MS-BUDA).

Description of Action

The proposed action consists of designating an approximately 707 acre area of predominantly shallow open water and eroded marsh for beneficial use of dredged material known as the Marcantel Site beneficial use disposal area (MS-BUDA). The site is located approximately 5.5 miles west of the Calcasieu River and Pass and 1 mile south of the GIWW at river mile 248, Cameron Parish, LA. A hydraulic cutter-head pipeline dredge would remove dredged material from the Calcasieu River and Pass during routine maintenance of the waterway and place the material either confined and/or semi-confined into shallow open water areas within the MS-BUDA for marsh creation. Also included in the project is the construction of a salt-water barrier along the north-northwest rim of Black Lake, which is the south-southeast boundary of MS-BUDA.

The FONSI was signed on February 12, 2008.

2.0 PROBLEM IDENTIFICATION & OPPORTUNITIES

This chapter describes these needs in the context of problems and opportunities that can be addressed through water and related land resource management. The problems and opportunities are based upon the "without-project" conditions (no action) that are described in section 2.2.

2.1 THE PROBLEM

The Louisiana coastal plain contains the single largest expanse of coastal marshes in the contiguous United States (Penland et al. 1990). Currently Louisiana has 30 percent of the total coastal marsh and accounts for 90 percent of the coastal marsh loss in the lower 48 states (Dahl 2000, Field et al. 1991, USGS 2003). The coastal wetlands, built by the deltaic processes of the Mississippi River, contain an extraordinary diversity of coastal habitats that range from narrow natural levee and beach ridges to expanses of forested swamps and freshwater, intermediate, brackish, and saline marshes. Taken as a whole, the unique habitats, with their hydrological connections to each other, upland areas and the Gulf of Mexico, as well as migratory routes of birds, fish, and other species, combine to place the coastal wetlands of Louisiana among the Nation's most productive and important natural assets. In human terms, these coastal wetlands have been a center for culturally diverse social development.

Louisiana's coastal wetlands were built by deltaic processes involving the transport of enormous volumes of sediment and water by the Mississippi River. This sediment was eroded from the lands of the vast Mississippi River Basin in the interior of North America. For the last several thousand years, the dominance of the land building or deltaic processes resulted in a net increase of more than four million acres of coastal wetlands. In addition, there was the creation of an extensive skeleton of higher natural levee ridges along the past and present Mississippi River channels, distributaries, and bayous in the Deltaic Plain and beach ridges of the Chenier Plain. The landscape created by these deltaic processes gave rise to one of the most productive ecosystems on Earth.

Today, most of the Mississippi River's fresh water, with its nutrients and sediment, flows directly into the Gulf of Mexico, largely bypassing the coastal wetlands. Deprived of land building sediment and fresh water, the wetlands are damaged by saltwater intrusion and other causative factors associated with sea level change and land subsidence, and will eventually convert to open water. Deprived of the nutrients, the plants that define the surface of the coastal wetlands die off. Once the coastal wetlands are denuded of vegetation, the fragile substrate is left exposed to the erosive forces of waves and currents, especially during tropical storm and hurricane events.

Since the 1930s coastal Louisiana has lost more than 1.2 million acres (1,875 square miles) (Barras et al. 2003; Barras et al. 1994; and Dunbar et al. 1992). As recently as the 1970s, the loss rate for Louisiana's coastal wetlands was as high as 25,600 acres per year (40 square miles per year). The rate of loss from 1990 to 2000 was about 15,300 acres per year (24 square miles per year), mainly due to the residual effects of past human activity (Barras et al. 2003). It was estimated in 2000 that coastal Louisiana would continue to lose land at a rate of approximately 6,400 acres per year (10 square miles per year) over the next 50 years. It is estimated that an additional net loss of 328,000 acres (513 square miles) may occur by 2050, which is almost 10

percent of Louisiana's remaining coastal wetlands (Barras et al. 2003). Table 2-1 summarizes the projected net land loss by subprovince from 2000 to 2050. Figure 2-1 depicts 100 plus years of land loss in coastal Louisiana. The cumulative effects of human and natural activities in the coastal area have severely degraded the deltaic processes and shifted the coastal area from a condition of net land building to one of net land loss.

Table 2-1. Projected net land loss trends by Subprovince from 2000 to 2050

	Land in 2000 (miles^2/ acres)	Projected Land in 2050 (miles^2/ acres)	Net Land loss (miles^2/ acres)	% Land loss between 2000 and 2050	Land loss (miles^2 per year/ acres per year)	% Total loss by area
Subprovince 1	1,331 851,837	1,270 812,797	61 39,040	4.61%	1.26 806.4	12%
Subprovince 2	1,114 712,957	928 593,918	186 119,040	16.68%	3.58 2,291.2	36%
Subprovince 3	1,975 1,263,995	1,746 1,117,436	229 146,559	11.59%	4.44 2,841.6	45%
Subprovince 4	1,431 915,836	1,394 892,156	37 23,680	2.59%	0.72 460.8	7%
Total Miles^2 Total Acres	5,851 3,744,625	5,338 3,416,306	513 328,319	8.77%	10.00 6,400.0	100%

Note that total percentage of land loss is the percentage of total net land loss (513 square miles or 328,318 acres) in 2050 to the existing land (5,851 square miles or 3,744,625 acres) in 2000.

2.2 EXISTING AND FUTURE WITHOUT-PROJECT (NO ACTION) CONDITIONS

The final Programmatic Environmental Impact Statement for the November 2004 Louisiana Coastal Area (LCA), Ecosystem Restoration Study (LCA Study) thoroughly covered the coastal systems processes that have shaped ecosystems of southern Louisiana. The beneficial use of dredged materials program was one of the restoration opportunities that was authorized in WRDA 2007 based on the findings of the report of the Chief of Engineers for the LCA Study. This section provides a detailed explanation of the historic, existing, and future without project conditions (no action) for the primary resources that would be affected by the BUDMAT Program including soils, barrier systems, coastal vegetation (wetlands), wildlife, fisheries, essential fish habitat, threatened and endangered species, infrastructure, and commercial fisheries. Refer to chapters 3 and 4 of the accompanying PEIS for a comprehensive description of historic, existing, and future conditions of the resources that would be affected with and without implementation of the BUDMAT Program.

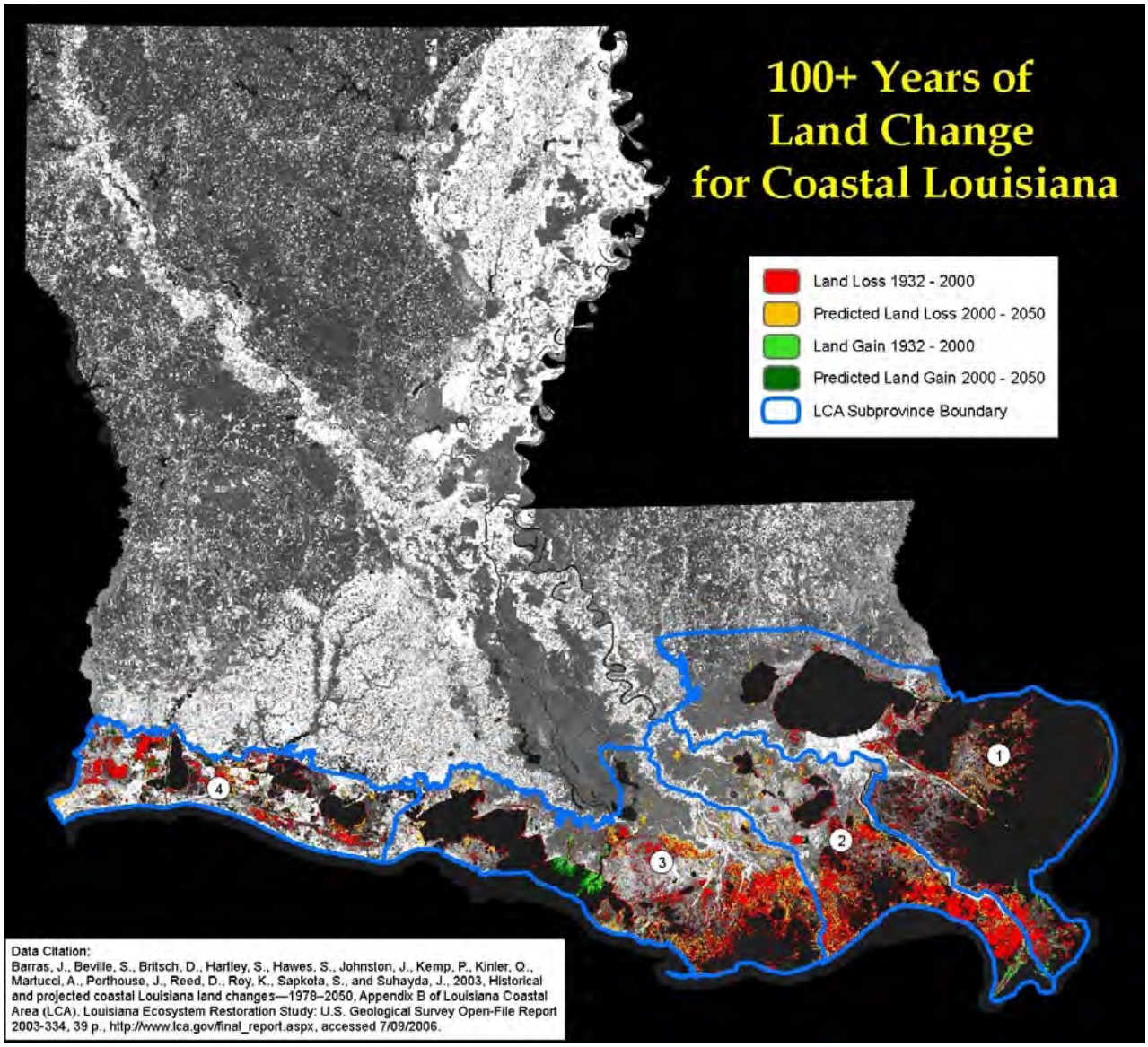


Figure 2-1. 100+ Years of Land Change for Coastal Louisiana

2.2.1 SOILS

These resources are institutionally significant because of the 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. These resources are technically significant because of the habitat provided for both open and forest-dwelling wildlife, and the provision or potential for provision of forest products and human and livestock food products. These resources are publicly significant because of the high value the public places on wildlife and fisheries supported by the soils in the area and because of their present economic value or potential for future economic value.

2.2.1.1 Historic and Existing Conditions

Coastal land loss is directly and inextricably linked to the five factors of soil formation. The five main factors that influence the process of soil formation include: climate; formation of the soil material from the parent material; the physical and chemical composition of the original parent material; the kinds of plants and other organisms living in and on the soil; the relief of the land and its effect on runoff and erosion; and the length of time the soil has to form. The effect of any one factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. Interaction of the factors results in differences among the soils and has an effect on the type of properties expressed in soils at any given site. Louisiana experienced coastal land loss of over 1.22 million acres since 1956. This resource was thoroughly covered in the LCA Study (USACE 2004), and is incorporated herein by reference.

2.2.1.2 Future Without-Project Conditions

Soil erosion and land loss would continue into the future. Natural and man-made levees would continue to subside and organic soils would not be able to maintain their elevations due to subsidence, decreased plant productivity, and wave erosion. Delta formation would continue at the mouth of the Mississippi and Atchafalaya Rivers. As erosion continued, there would be a continued loss in primary productivity due to loss of vegetated wetlands. Waterbodies would grow larger and wave erosion would accelerate causing further land loss, thus making coastal communities more vulnerable to tropical storms. In addition to land loss in coastal Louisiana, a large percentage of the Nation's wetlands would continue to disappear with accompanying impacts to wildlife, fisheries, coastal communities, and socioeconomic resources.

Net primary productivity within the study area would continue to decline and existing wetland vegetation would continue to diminish. The ongoing conversion of existing fragmented emergent wetlands to shallow open water would continue with associated indirect impacts on coastal vegetation, fish and wildlife resources, EFH, recreation, aesthetic, and socioeconomic resources. Other indirect adverse impacts that would result from the loss of important and essential vegetated habitats used by fish and wildlife are the loss of shelter, nesting, feeding, roosting, cover, nursery, and other life requirements for fish and wildlife; loss of productivity; loss of transitional habitat between estuarine and marine environments; and increased inter- and intraspecific competition between resident and migratory fish and wildlife species for decreasing wetland resources. This would also reduce the availability of important stopover habitats used by migrating neotropical birds.

The LCA Study (USACE 2004) estimated coastal Louisiana would continue to lose land at a rate of approximately 6,400 acres per year (10 square miles per year) over the next 50 years. It is estimated that an additional net loss of approximately 328,000 acres (513 square miles) may occur by 2050, which is almost 10 percent of Louisiana's remaining coastal wetlands. However, these wetland soil losses would be offset to some extent by other Federal, state, local, and private restoration efforts across coastal Louisiana including approximately 2,650 net acres of wetland soils that would be restored through the beneficial use of dredged material within CEMVN's O&M Program or with additional funding sources such as CWPPRA, Section 204, or CIAP.

2.2.2 BARRIER SYSTEMS: BARRIER SHORELINES, HEADLANDS, AND ISLANDS

These resources are institutionally recognized by the Coastal Barrier Resources Act of 1990 (16 U.S.C. §§3501-3510). Section 3501 of the act describes the Congressional statement of findings that:

- Coastal barriers provide habitats for migratory birds, wildlife, finfish, shellfish and other aquatic organisms;
- Coastal barriers contain resources of extraordinary scientific, recreational, natural, historic, and ecologic importance;
- Coastal barriers serve as natural storm protective buffers and are generally unsuitable for development because they are vulnerable to hurricane and other storm damage and because natural shoreline recession and the movement of unstable sediments undermine human structures;
- Certain actions and programs of the Federal Government have subsidized and permitted human development on coastal barriers and the result has been the loss of barrier resources, threats to human life, health, and property, and the expenditure of millions of tax dollars each year; and
- A program of coordinated Federal, state, and local governments is critical to the more appropriate use and conservation of coastal barriers.

These resources are technically significant because they serve as natural storm protective buffers and provide critical habit for migratory birds, wildlife, finfish, shellfish and other aquatic organisms. These resources are publicly significant because of the high value the public places on the maintenance and restoration of barrier islands for storm protection.

2.2.2.1 Historic and Existing Conditions

Louisiana's barrier systems (figure 2-2) are the first line of defense against the storms and hurricanes that impact coastal Louisiana; they dampen the impacts of waves and surges before they move landward toward more fragile inland estuarine and wetland areas. They also protect the inshore oil and gas extraction infrastructure that is not built to withstand the gulf waves. The barrier systems regulate the exchange of higher salinity gulf waters with the lower salinity waters of the interior coastal areas. This is seen in the estuarine gradient of progressively fresher vegetation zones as one travels inland from the saline marshes near the gulf, landward to less saline brackish marshes, intermediate marshes, freshwater marshes, and swamps.

The diversity and abundance of natural resources in Louisiana's barrier systems plays a major role in making this unique area "A Working Coast." This "working coast" is also a rich fishery, recreational or "sportsman's paradise", and coastal and offshore petroleum production area. In addition to providing critical habitat for threatened and endangered species, such as the piping plover, brown pelican, and sea turtles, Louisiana's barrier systems protect what many consider to be critically imperiled human habitat. Barrier Islands are constantly building, eroding, and shifting

under the normal actions of wind and waves. Restoration of barrier islands is recommended in the Louisiana State Master Plan (Coastal Protection and Restoration Authority of Louisiana 2007) in the Terrebonne and Barataria Basins because these ecologically important habitats are close enough to marsh and human settlements to diffuse wave energy and storm surge. These areas also provide

habitat for migratory birds and threatened and endangered species. The State Master Plan lists the Chandeleur Islands as a separate case due to their lack of proximity to the mainland for significant storm protection; however, they do represent valuable habitat.

Figure 2-2. Louisiana's Barrier Systems

2.2.2.1.1 BARRIER ISLANDS

Chandeleur Barrier System: At over 46 miles (75 km) long, the Chandeleur barrier system is the oldest barrier island arc on the Deltaic Plain. These islands enclose Breton Sound and Chandeleur Sound in St. Bernard and Plaquemines Parishes. The Chandeleur Islands are part of the Breton National Wildlife Refuge (NWR), a large portion of which is a designated wilderness area. The Chandeleur Barrier System includes the following islands: Chandeleur, New Harbor Islands, North Islands, Freemason Islands, Curlew, Errol, Grand Goosier, and Breton Islands.

The Chandeleurs were on the east side of Hurricane Katrina, and in the counterclockwise spin of the storm, received a significant hit, with the eye of the storm passing approximately 50 miles to the east. The storm surge and large waves from Hurricane Katrina submerged the islands, stripped sand from the beaches, and eroded large sections of the marsh. According to preliminary studies by the USGS and National Aeronautics and Space Administration (NASA), a significant portion of these islands were breached (Barras 2006; Stone 2007). Initial observation by survey crews shows tremendous storm impact to the islands, with large scours offshore and numerous breaches to the shoreface (Flocks 2006). It is too soon to tell the long term effects and recovery.

Plaquemines Barrier System: This approximately 30-mile long barrier system forms the seaward geologic framework for the eastern Barataria Basin and lies about 31 miles northwest of the active Mississippi River Delta. Historic Fort Livingston is situated upon West Grand Terre, the largest island in this system. The Plaquemines barrier system consists of remnant barrier spits and islands defined either by a tidal pass, or the entrance to a bayou. These islands include: Cheniere Ronquille, Bay La Mer Gulf Shore, Bay Joe Wise Gulf Shore, Shell Island, Pelican Island, and Dry Cypress Bayou Gulf Area. The 2005 hurricanes did not seem to have a significant impact on the Plaquemines Barrier System as the islands were west of Hurricane Katrina, and far to the east of Hurricane Rita.

Bayou Lafourche Barrier System: The Bayou Lafourche barrier system stretches over 37 miles from Barataria Pass near Grand Isle to Cat Island Pass. This barrier system forms the seaward geologic framework of western Barataria Basin and the eastern Terrebonne Basin. This barrier system consists of the only commercially developed barrier island in Louisiana, Grand Isle. The 12-mile Caminada-Moreau headland, with some of the highest rates of shoreline loss in coastal Louisiana, is the landfall site of many oil and gas pipelines, including the Louisiana Offshore Oil Port (LOOP) facilities, which handles 12 percent of the U.S. crude oil imports and connects to over 50 percent of the U.S. refinery capacity (www.loopllc.com). The westernmost islands in this barrier system include Timbalier Island and East Timbalier Island. These islands have experienced more lateral morphological change than any others in Louisiana (Williams et al. 1992). As the Plaquemines Barrier System, the 2005 hurricanes did not seem to have a significant impact on the Bayou Lafourche Barrier Systems. The storm surges overtopped islands and coastal headlands, but did not wash them away.

Isles Dernieres Barrier System: At over 16 miles long, the Isles Dernieres barrier system forms the seaward geologic framework for the western Terrebonne Basin. In 1853, this barrier system was a continuous shoreline system, except for Wine Island (Williams et al. 1992). Today, this

barrier system consists of five main islands: Wine Island, East Island, Trinity Island, Whiskey Island, and Raccoon Island.

East Island suffered severe erosion from the 2005 hurricanes, loosing approximately one third of its land mass chiefly on the eastern end of the island (Boudreaux-Bodin, ed. 2006). Currently a CWPPRA project is under construction to repair previous (prior to 2005) storm damage and reunite the western portion of East Island to Trinity Island by pumping Gulf of Mexico sand into the "New Cut" breach.

2.2.2.1.2 CHENIER PLAIN

The Chenier Plain of southwestern Louisiana, with elevations of approximately 6 ft to 20 ft, extends from Sabine Pass, Texas to Southwest Point, Louisiana. A chenier plain consists of multiple shore-parallel, sand-rich ridges that are perched on and physically separated from one another by relatively finer-grained, clay-rich sediments. Oak trees ("cheniers" in French) grew on these ridges and gave the region its name.

Historically, the general mechanism of deposition along the chenier plain was closely related to variations in the amounts of alluvial sediments transported westward by the littoral flow when the Mississippi River oscillated between subdeltas. Chronic erosion in this area is caused by a deficit of sand and sediment in the littoral flow, caused by stabilization of the Mississippi River and regulation of the Atchafalaya River to the east. In addition the Calcasieu and Mermentau Rivers are not supplying coarse grained sediment to the area, and the Calcasieu Ship Channel jetties deflect the little material that exists further offshore. Chenier ridge habitat has also been lost due to clearing for development and agriculture.

Coastal communities of southwestern Louisiana were severely impacted by Hurricane Rita, with some communities being totally destroyed. Coastal beaches were overwashed by the storm surge, with the sands being redeposited further inland. The Holly Beach Sand Management project (CWPPRA CS-31) was completed in 2003 and included breakwater modifications, sand fences and plantings. The fences created high stable dunes which to a certain extent withstood the storm surge. Land analysis by USGS of the project benefit area indicates a gain of 85 acres of land or 0.8 percent of the land acreage, in the project benefit area after the storm. The additional acreage could have come from off-shore sand or from the Holly Beach project's sand nourishment.

2.2.2.2 Future Without-Project Conditions

While all the barrier island systems in the study area would continue to experience varying rates of land loss, the greatest occurrence of land loss is within the Barataria/Terrebonne shoreline; which is expected to continue in to the future.

The natural and human-induced land loss processes on these barrier systems would likely continue at the present rates. Marine influences and tropical storm events would be the primary factors affecting land loss of the barrier island systems. As this land loss trend continues, hydrologic connections between the gulf and interior areas would increase and exacerbate land loss and conversion of habitat type within the interior wetland communities.

O&M funded beneficial use sites such as West Belle Pass at Port Fourchon and Freshwater Bayou Canal would continue to be used, allowing some accretion of land. Aerial photographs indicate that the gulf shoreline west of the Freshwater Bayou Canal has prograded as much as 1,300 feet seaward within a mile down drift from the beach nourishment disposal area.

One of the most valuable services that barrier islands provide is protection of inland areas during storms and hurricanes. Barrier islands and coastal wetlands reduce the magnitude of hurricane storm surges and related flooding. As islands shrink and disappear, they provide mainland areas less protection from storm surge; however, if barrier islands were raised and widened, storm surges experienced inland would decrease (Suhayda 1997). With no action the following resources would continue to diminish: critical habitats for threatened and endangered species such as the piping plover, sea turtles, and brown pelican; essential and diverse habitats for migratory birds and other wildlife; and essential spawning, nursery, nesting, and feeding habitats for commercially and recreationally important species of finfish and shellfish, as well as other aquatic organisms. The continued loss of Louisiana's barrier systems would adversely impact the extraordinary scenic, scientific, recreational, natural, historic, archeological, cultural, and economic importance of these barrier islands.

The continued loss of these coastal barrier systems would result in the reduction and eventual loss of the natural protective storm buffering of these barrier systems. Without the protective buffer provided structures on this "working coast."

The long term degradation of the barrier islands would lead to the coastal wetlands being directly impacted by wave energy from tropical storms, increasing the land loss rate, leaving coastal cities and towns increasingly vulnerable.

2.2.3 COASTAL VEGETATION RESOURCES – WETLANDS

This resource is institutionally important because of: the Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968. Wetlands are technically important because: 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 nonconsumptive recreational opportunities. Wetlands are publicly important because of the high value the public places on the functions and values that wetlands provide. Bottomland hardwood forests are technically significant because: they provide necessary habitat for a variety of species of plants, fish, and wildlife; they often provide a variety of wetland functions and values; they are an important source of lumber and other commercial forest products; and they provide various consumptive and nonconsumptive recreational opportunities. Bottomland hardwood forests are publicly significant because of the high priority that the public places on their aesthetic, recreational, and commercial values.

2.2.3.1 Historic and Existing Conditions

Louisiana's coastal wetlands comprise a variety of environments formed by spatially and temporally varying conditions that continually influence and change the vegetative landscape. The environmental factors and their innumerable combinations that regulate the occurrence and distribution of plant species and associations include, but are not limited to, soil and water salinity, soil type, elevation, hydrology and flooding regime, tidal influence, and climate. Competition, especially from invasive species, herbivory pressure, and man-made disturbance, such as burning or hydrologic modification, are other forces that can impact vegetative species. Each plant species adapts to a definite range of environmental conditions, and those species that are adapted to similar conditions form communities or associations that are best able to grow and successfully compete for a particular site. Wherever the prevailing environmental conditions are similar, analogous communities with comparable species composition and dominance tend to occur. When environmental conditions change, succession can occur where plant species or whole communities are replaced by others more suited to the new conditions (O'Neil 1949; Chabreck 1972a).

Wetlands of national significance include the Barataria – Terrebonne National Estuary which was nominated for participation in the EPA administered National Estuary Program on October 16, 1989. In his nomination letter, the Governor of Louisiana stated, "Louisiana faces a pivotal battle in the Barataria-Terrebonne Estuarine Complex if we are to do our part in winning the national war to stem the net loss of wetlands..." On September 13, 1990, the EPA and the State of Louisiana committed to a cooperative agreement under the National Estuary Program to form the Barataria-Terrebonne National Estuary Program The program's charter was to develop a coalition of government, private, and commercial interests for the preservation of the Barataria and Terrebonne.

Other wetlands of national interest include those found in 10 National Wildlife Refuges encompassing more than 301,700 acres in coastal Louisiana. They include Sabine, Cameron Prairie, Lacassine, Shell Keys, Bayou Teche, Delta, Breton, Bayou Savage, Big Branch Marsh, and Mandalay NWR. One National Park, the Barataria Preserve unit of Jean Lafitte Nation Park, protects overt 20,000 acres of swamps, marshes, and ridges just south of the City of New Orleans. The Louisiana Department of Wildlife and Fisheries also operates 17 refuges, preserves and wildlife management areas in coastal Louisiana, comprising more than 572,000 acres. Some of these refuges and wildlife management areas have been increased in size over the years as mitigation for wetland damages from other projects, such as the construction of levees.

In habitats with restricted variation in conditions, such as those with extreme salinity, species diversity is reduced. Since the source of salinity in coastal Louisiana is the Gulf of Mexico, salinity levels exist along a gradient, which declines as the saltwater moves inland. A zonation of plant species that differ in salinity tolerance exists along that gradient, with the species diversity of those zones increasing from salt to fresh environments (table 2-2).

Louisiana's coastal vegetative landscape is characterized by a diversity of plant communities that have been previously classified and mapped according to major association or type (Penfound and Hathaway 1938; O'Neil 1949; Chabreck et al. 1968; Chabreck 1970, 1972b; Cowardin et al. 1979; Chabreck and Linscombe 1978, 1988; Visser et al. 1998, 1999, 2000; and Chabreck et al. 2001).

Table 2-2. Salinity ranges for the four coastal wetland types

Wetland Type	Range (ppt)	Mean (ppt)	Typical Range (ppt)
Fresh	0.1 – 6.7	<3.0	0 – 3
Intermediate	0.4 – 9.9	3.3	2 – 5
Brackish	0.4 – 28.1	8.0	4 – 15
Saline	0.6 – 51.9	16.0	12 +
(Source: Chabreck, 1972; Louisiana Coastal Wetlands Conservation and Restoration Task Force; and the Wetlands Conservation and Restoration Authority 1998) ppt – parts per thousand			

The types and productivity of vegetative communities are greatly influenced by the same factors responsible for coastal land loss. Furthermore, the persistence of a vegetative community is dependent upon its ability to adapt to changing conditions. The loss of wetlands has and continues to impact all vegetative community types from the barrier islands, headlands, and salt marshes at the coastal shore to the interior fresh marshes, swamps and bottomland forests.

With the exception of Saline Marsh, all habitat types lost land between 2001 and 2005, as seen in table 2-3. Some of the saline marsh gain can be attributed to the conversion of fresher marshes to saline due to the inflow of gulf water. Whether these changes are permanent remains to be seen, and is a subject of study for Federal and state institutions. Approximately 650 square miles of coastal land was lost between 2001 and 2005, however, some marshes have started to recover from the devastation of the 2005 hurricanes, only to be hit hard again by Hurricanes Gustav and Ike in September 2008.

Table 2-3. Wetland habitat (square miles) by sub-province.

Habitat Classes		Sub-Province 1	Sub-Province 2	Sub-Province 3	Sub-Province 4	Total LCA Area
Fresh Marsh	2001	111	283	534	542	1470
	2005	88	284	545	500	1417
Intermediate Marsh	2001	251	133	302	445	1131
	2005	19	124	267	416	826
Brackish Marsh	2001	282	102	314	215	913
	2005	237	100	298	210	845
Saline Marsh	2001	177	184	177	47	585
	2005	191	197	220	54	662
Swamp/Wetland Forest And other land	2001	553	460	608	6	1627
	2005	467	351	511	0	1329
Total	**2001**	1374	1162	1935	1255	5726
	2005	1002	1056	1841	1180	5079

Source: LCA EIS (2001 data) and USGS (Fall 2005 data).

Imagery and data collected after the 2008 hurricanes was used to calculate the land changes in the 15-mile Initial Areas of Opportunity, described in section 3.1.1.b, adjacent to the federally maintained navigation channels (table 2-4). Some of these channels are dredged annually, and some are dredged only every 7-10 years, as discussed in section 2.3.3. The highest land loss, 19 percent, is reflected by the Breton Sound portion of the Lower Mississippi River, which was in the direct path of Hurricane Katrina in 2005. Other high land loss areas are adjacent to the Houma Navigation Canal, Port Fourchon, and the Barataria Waterway in the Terrebonne and Barataria Basins.

Table 2-4. Change in Land Area for BUDMAT Initial Areas of Opportunity

Approximately 15 miles from Federally maintained navigation channels					
Navigation Channel	**Basin**	**Total Area (acres)**	**Acres change 1985 – 2008**	**Change, acres per year 1985-2008**	**% Change**
Calcasieu Ship Channel	Calcasieu	376,826	-13,553	-594	-4%
Mermentau	Mermentau	289,324	-11,596	-508	-4%
Freshwater Bayou	Mermentau Teche / Vermilion	217,075	-14,144	-597	-7%
Berwick Harbor	Atchafalaya	217,244	12,274	518	6%
Atchafalaya	Atchafalaya	547,128	26,319	1110	5%
Houma Navigation Canal	Terrebonne	663,718	-52,528	-2,216	-8%
Port Fourchon	Terrebonne & Barataria	272,353	-27,288	-1151	-10%
Barataria Waterway	Barataria	778,726	-69,020	-2,912	-9%
Lower Mississippi River	Mississippi River Delta and part of Breton Sound	696,625	-130,573	-5,684	-19%
(USGS data: Barras et al 2008 and Barras 2009)					
Barras, J.A., 2009, Land area change and overview of major hurricane impacts in coastal Louisiana, 2004-08: U.S. Geological Survey Scientific Investigations Map 3080, scale 1:250,000, 6 p. pamphlet.					

2.2.3.1.1 WETLANDS – SWAMPS AND MARSHES

Wetlands were covered extensively in the LCA Study (USACE 2004), and are incorporated herein by reference.

During the 1900s, Louisiana lost approximately 1.2 million acres of its coastal wetlands. Coastwide loss rates peaked at approximately 42 square miles per year during the 1950s and 1960s. Between 1983 and 1990, Louisiana's coastal wetlands were being lost at approximately 24 square miles each year (USACE 2004). The estimated 217 square mile conversion of land to water due to the hurricanes of 2005 will result in a substantially increased loss rate for the time increment

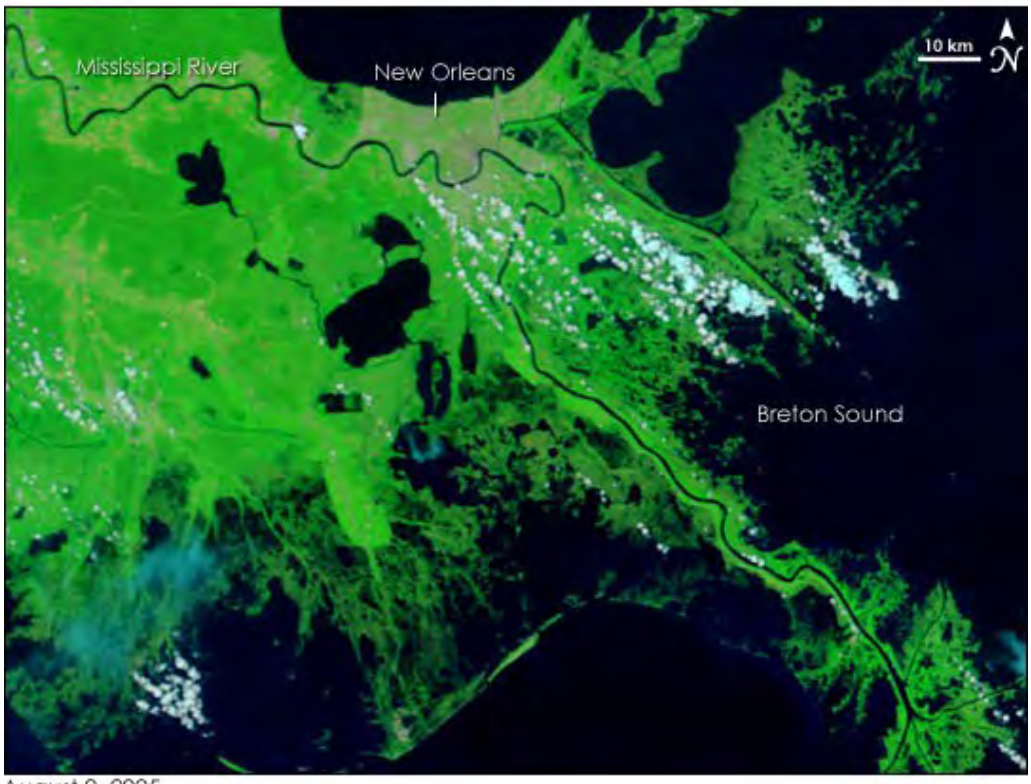
encompassing that year (USGS 2006). Additionally, large areas of fresh marsh and low-salinity wetlands have converted to deteriorated brackish and saline marshes, or open water.

The initial estimated loss of wetlands after the 2005 hurricanes by USGS includes the caveat that it does not take into account some marsh recovery, but indications are such that much of the loss may be permanent. Some areas of open water will likely become permanent. Substantial marsh loss, primarily from Hurricane Katrina, occurred east of the Mississippi River in St. Bernard and Plaquemines Parishes. Approximately 39 square miles of marsh around the upper and central portions of Breton Sound were converted to open water by ripping of the marsh or marsh submergence (figures 2-3 and 2-4.)

Other impacts to wetlands after hurricanes include:

- Compressed or folded marsh, where a net decrease in surface area results from marsh being pushed together, somewhat like an accordion closing.
- Marsh balls, which are created by the marsh being piled, rolled, or otherwise deformed to create large mounds (resulting in a decreased surface area)
- Sheer, a rip between marsh surfaces that tears marsh and moves it apart, allowing expanses of water to form.
- Scoured, marsh with vegetation ripped off at the roots, exposing a muddy bottom.
- Inverted or flipped, unbroken marsh mat lifted from its clay base and overturned with roots pointing skywards
- Salt burn, where salt water from the Gulf of Mexico pushed into freshwater areas, killing and damaging salt-sensitive plants.
- Floatant marsh being uprooted and transported further inland by the storm surge, leaving behind open water.
- Deposition of additional sediments from the storm surge.

The storm surges from Hurricanes Katrina and Rita pushed as far inland as 29 miles, damaging freshwater marsh vegetation and overtopping chenier ridges. Monitoring stations located in the upper Barataria Basin showed that salinity increased from 0.2 to over 10 parts per thousand (ppt) following the passage of Hurricane Katrina (Smith 2006). Areas outside the direct paths of the hurricanes were also affected. A continuous recording station in a freshwater marsh of Terrebonne Parish recorded a peak salinity of 17 ppt following Hurricane Rita and the salinity levels remained above 6 ppt into December 2005 (Steyer et al. 2007). The Terrebonne, Barataria, and Lower Mississippi Basins had the highest land loss rates in the 23 year study period, ranging from 9 to 19 percent. This reflects subsidence, relative sea level rise, hurricane damage, and damages from oil and gas exploration (Johnston et al 2009). Prolonged flooding of marshes by saltwater was a major problem in southwestern Louisiana, including the Calcasieu and Mermentau Basins. Saltwater became trapped by cheniers, flooding the fresh marshes behind them. Louisiana was in an extended drought before the 2005 hurricanes, and the drought continued well into 2006. Therefore, saltwater was not immediately flushed from freshwater systems inundated by Gulf waters during the hurricanes (NMFS 2007).

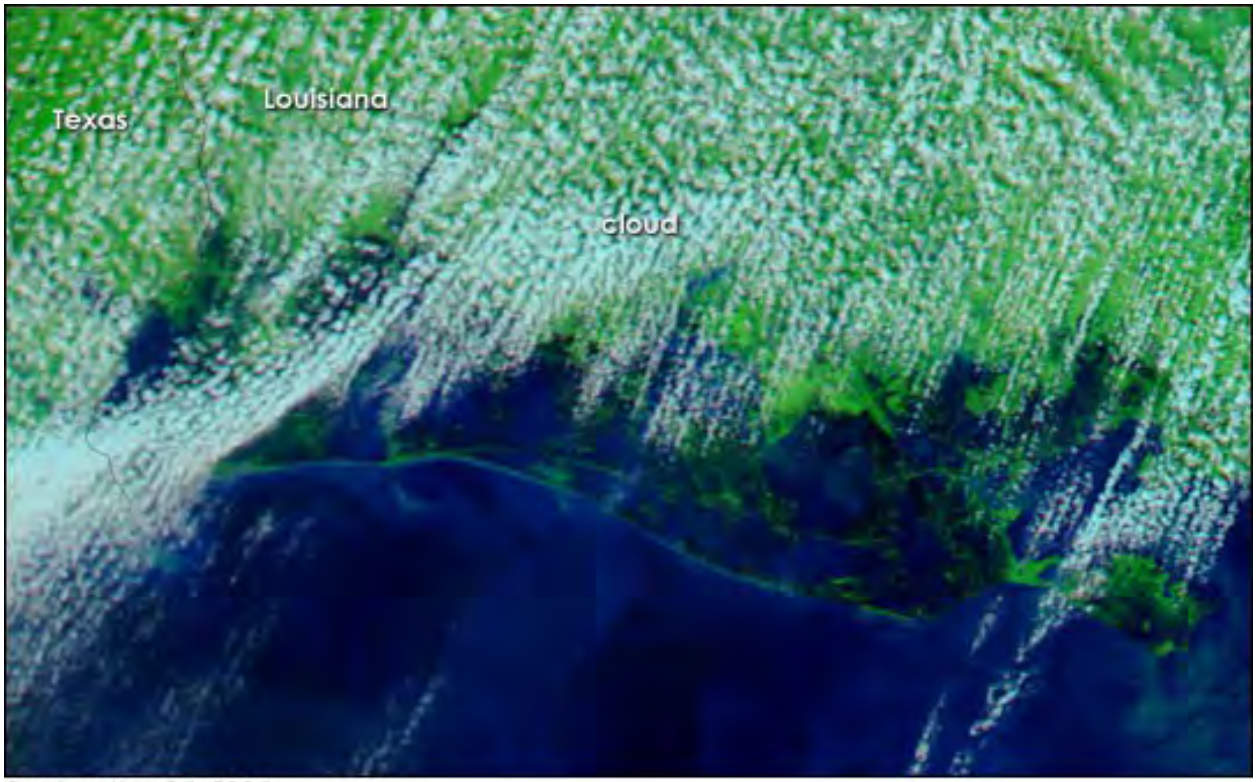


August 9, 2005

September 4, 2005

Figure 2-3. Flooding impacts after Hurricane Katrina (NASA imagery).

September 21, 2005



September 25, 2005

Figure 2-4. Flooding impacts after Hurricane Rita (NASA imagery)

2.2.3.1.2 CHENIERS

As stated previously, the Chenier Plain of southwestern Louisiana, with elevations of approximately 6 ft to 20 ft, extends from Sabine Pass, Texas to Southwest Point, Louisiana. A chenier plain consists of multiple shore-parallel, sand-rich ridges that are perched on and physically separated from one another by relatively finer-grained, clay-rich sediments. Oak trees ("cheniers" in French) grew on these ridges and gave the region its name. The Chenier Plain evolved during the Holocene as numerous cycles of deposition and erosion created alternating ridges separated by marshlands. These processes concentrated the coarse-grained sediments and formed shore-parallel ridges called "cheniers" (Gould and McFarlan 1959; Byrne et al. 1959). Introduction of new sediment by westward shifts of the Mississippi River Delta resulted in the isolation of these ridges by accretion of new material on the existing shoreline. Thus, repeated seaward growth and retreat along the Chenier Plain is a consequence of deltaic deposition farther east as well as the periodic cessation of sediment supply to the Chenier Plain as rivers and streams changed course, abandoning channels and old deltas. Currently, the Atchafalaya River is supplying the Chenier Plain with fine-grained sediments by westward-directed longshore transport.

In much of study area, chenier ridge habitat has been lost or dramatically altered due to subsidence or the cutting of canals through ridges. As a result the dredged material embankment ridges along canals have become a surrogate for cheniers. In some areas, dredged material embankments provide nearly the only surface available for emergent vegetation. They can support a wide variety of plant species depending on their elevation, age, and proximity to seed sources. The lower edges of the dredged material embankments usually have a band of smooth cordgrass along the water's edge on the side opposite the canal. The canal side has a higher energy regime and is usually bare along the lower edges. Some of the early colonizers of newer dredged material embankments in the area are seaside goldenrod, marsh-hay cordgrass, salt grass, and seaside heliotrope. The shrubs, marsh elder and groundsel bush, occur on almost all dredged material embankments in the project area and are occasionally intertwined with dodder vine. Older, higher dredged material embankments support well-developed communities with shrub species such as elderberry, yaupon, and wax myrtle. Vines such as marine-vine and blackberry are also found. These older ridges also support the tree species live oak, hackberry, honey locust, and toothache tree.

Figure 2-5. "Burned" marsh on Cameron Prairie NWR, two years after Hurricane Rita.

The Chenier Plain received a direct hit from Hurricane Rita which destroyed much of what had been rebuilt after Hurricane Audrey of 1957. Audrey, a Category 4 hurricane, destroyed the coastal town of Cameron and sent 8-foot to 12-foot storm surges penetrating as far inland as 25 miles. Almost 50 years later, Cameron was hard hit again by the 10-foot to 15-foot storm surges of Hurricane Rita. These hurricane storm surges pushed saline water far inland, which were trapped behind the Chenier ridges, causing severe stress or killing fresh marshes (figure 2-5). The effect

is often referred to as “burning.” Recovery for these effected areas is partially dependant on sufficient rainfall to dilute and wash away the salts. During the recovery phase, these burned marshes are more susceptible to erosion due to the lack of plants to hold the fragile soils in place. Three years later, the Chenier Plain and eastwards into the Terrebonne Basin was inundated by the high tides and storm surges from Hurricanes Gustav and Ike, which came on shore as category 2 storms. Gustav made landfall near Cocodrie, LA in the center of the Terrebonne Basin in early September 2008, and Ike made landfall two weeks later at the north end of Galveston Island, TX , devastating the island, but a storm surge of over 8-10 feet extended across the Calcasieu and Mermentau Basins.

2.2.3.2 Future Without-Project Conditions

2.2.3.2.1 WETLANDS – SWAMPS AND MARSHES

Direct loss of vegetated habitat would continue to occur as plants are physically removed by erosion from marine processes, increased water velocities, and increased herbivory pressures. Changes in environmental conditions that occur quickly or beyond the tolerance limits of plant species to adapt or allow succession, would cause conversion directly to open water. Continued subsidence and other factors that would facilitate increased flooding and saltwater intrusion would cause complete die-off of the more vulnerable plant communities. In particular, large-scale loss of protective land forms, such as elevated ridges and islands, land bridges, and contiguous fringing marshes, that buffer the rare or unique vegetative communities or vulnerable vegetative habitats formed in highly organic conditions, would result in habitat conversion or loss. Increased erosion and water exchange could cause changes in water temperatures and deepening of shallow water areas, and drive turbidity increases that would cause decreases in the presence and productivity of submerged aquatic vegetation.

Current beneficial use of dredge projects counter to a small extent the severe land loss experienced by coastal Louisiana. Existing marsh restoration projects have restored approximately 265 acres per year of wetlands using O&M funds, and this rate is expected to continue through various funding sources.

The multiple benefits derived from the attributes and functions of wetland vegetation become indirectly impacted by the decline and loss of vegetative habitats. Louisiana plant species and communities vary widely in their abilities to adapt to a variety of environmental conditions. In habitats where variation in conditions becomes restricted, such as those with extreme salinity, water depths, or sediment and nutrient deprivation, species diversity would be severely reduced. Ultimately, species distribution and successional patterns of plant communities would be negatively influenced and only those communities of species that can adapt to severely limited conditions would endure. Sustained environmental stressors causing declines in plant production would also result in biomass deficits. As a result, accumulation of the decomposing organic material that contributes to the structure and vertical accretion of soils would be reduced, carbon sequestration would diminish, and the contribution that serves as the basis of the trophic chain would be curtailed. Deterioration and loss of emergent and submerged plant communities would cause a decline in protection against substrate erosion, water quality improvement, and the contribution of food and physical structure for cover, nesting, and nursery habitat for wildlife and fisheries. Placement of

dredged material in degraded wetlands could cause a change in fisheries habitat adjacent to and/or within beneficial use sites from open water to smaller channels and ponds within a marsh. Loss of stabilizing vegetative cover increases the exposure of wetland soils to increased particle detachment, export out of the system, and further loss of elevation.

Continued degradation and loss of existing wetland vegetative habitats, in concert with truncation of replenishing processes would accelerate declines in the interdependent processes of plant production and vertical maintenance necessary for persistence of a stable ecosystem. Without action, future wetlands loss would continue. Under the currently available long-term forecast, geographers have predicted a net decrease of 462,760 acres of total wetland vegetative habitat would occur through 2050. This estimate was prepared for the future-without conditions of the LCA Study. The U.S. Geological Survey and the U.S. Fish and Wildlife service are developing an updated forecast of habitat loss for coastal Louisiana that considers the land losses observed due to hurricanes Katrina and Rita and other storm events; however, a new forecast for the typical 50-year period of analysis (ER-1105-2-100, 2-4.j.) will not be available until after the completion of this study. The predicted net changes in each habitat type identified for the LCA Study is as follows: a decrease of 141,960 acres fresh marsh, an increase of 231,950 acres of intermediate marsh, a decrease of 147,050 acres of brackish marsh, a decrease of 314,620 acres of saline marsh, and a decrease of 91,080 acres of swamp/wetland forest (LCA Study). Intermediate marshes are expected in increase as fresh marshes and swamps covert to intermediate marsh (more saline) as salt water pushes further inland. Additionally, if investment in the maintenance of existing restoration efforts is discontinued, accelerated loss may also occur in vegetative habitats currently under protection. Since the Louisiana coastal ecosystem contains 40 percent of the Nation's wetlands, and is experiencing 80 percent of the loss (Penland et al. 1990), the potential impacts to other significant resources dependent upon Louisiana's vegetative habitat and the associated functions and values would be cumulatively severe on a state, Gulf of Mexico regional, and national level.

2.2.3.2.2 CHENIERS

Land subsidence and sea level rise would continue erode the cheniers, gradually subsiding to marsh level, with most of the woody vegetation dying. Some shrubs such as marsh elder and groundsel bush would survive the increased salinity and submergence for a time. However, as the open water area increases, submergence, erosion, and salt spray would cause additional plant mortality. Almost 6 percent loss of emergent wetland habitat is expected in 50 years throughout the Chenier Plain. Increasing saltwater intrusion, particularly in the western half of Subprovince 4 and at the extreme eastern subprovince boundary, would drive transition of existing vegetated habitats to saltier regimes. Direct land loss through subsidence and increased hydrologic connection would also continue.

As the chenier ridges are lost, the marshes between the ridges would be fragmented at a faster rate, and more susceptible to salt water intrusion and storm surges. Resting or nesting habitat for avian species would also be detrimentally impacted by the loss of trees that grow on the ridges.

Chenier ridges provide storm surge protection for marshes between the ridges and for the people that inhabit them. Losing the ridges would allow Gulf waters to intrude farther inland.

CWPPRA and CIAP funds have been proposed to restore or rebuild ridges in some areas and this effort is expected to continue.

2.2.4 WILDLIFE: BIRDS, MAMMALS, AMPHIBIANS, AND REPTILES

This resource is institutionally significant because of the National Environmental Policy Act of 1969; the Coastal Zone Management Act; Estuary Protection Act; the Fish and Wildlife Coordination Act of 1958, as amended; the Migratory Bird Conservation Act of 1929, as amended; the Migratory Bird Treaty Act of 1918; the Endangered Species Act of 1973 (ESA), as amended; the Fish and Wildlife Conservation Act of 1980; the North American Wetlands Conservation Act; Executive Order 13186 Migratory Bird Habitat Protection; Migratory Bird Conservation Act; and the Marine Mammal Protection Act. Wildlife resources are technically significant because they are a critical element of various coastal habitats, they are an important indicator of the health of coastal habitats, and many wildlife species are important recreational and commercial resources. Wildlife resources are publicly significant because of the high priority that the public places on their aesthetic, recreational, and commercial value.

The biodiversity characterizing coastal Louisiana is nationally significant. Coastal Louisiana contains an estimated 40 percent of the vegetated estuarine wetlands in the contiguous United States. Louisiana's coastal wetlands provide important habitats for various life cycle phases for over 50 rare, threatened, or endangered species including: piping plover (*Charadrius melodus*), bald eagle (*Haliaeetus leucocephalus*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*), diamondbacked terrapin (*Malaclemys terrapin*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), and Louisiana black bear (*Ursus americanus luteolus*). In the Barataria-Terrebonne estuary alone, one of the most degraded but most productive and diverse estuary complexes of coastal Louisiana, it is estimated that 353 species of birds are known to occur, of which 185 species are annual returning migrants, many of which are protected under the Migratory Bird Treaty Act, including the brown pelican (*Pelicanus occidentalis*). In total, approximately 735 species of birds, finfish, shellfish, reptiles, amphibians, and mammals spend all or part of their life cycle in the estuary (http://www.btnep.org). The past and continuing loss of coastal wetlands and their associated habitat values are the principle threat to the nationally significant fish and wildlife resources that depend on them.

2.2.4.1 Historic and Existing Conditions

The two sub-provinces hit hardest by the hurricanes of 2005 and 2008, Pontchartrain-Breton-East Mississippi River Delta and the Calcasieu-Mermentau (Sub-provinces 1 and 4 respectively) are still recovering from the storms. Long-term effects to wildlife are still unknown. In the short-term, wildlife were displaced by the storm surge, and may remain displaced as marshes were destroyed or burned by salt-water intrusion. Migratory birds may not find as many trees or shrubs for rest in their north or southbound routes across the Gulf of Mexico.

Louisiana's coastal marshes provide winter habitat for more than 50 percent of the duck population of the Mississippi Flyway. Fresh and intermediate marshes support the greatest

concentrations of wintering waterfowl in coastal Louisiana. Those wetlands are vitally important to the mission of Gulf Coast Joint Venture, which was established to help achieve the goals of the North American Waterfowl Management Plan. Louisiana's coastal marshes, swamps, and associated habitats also support many other migratory birds such as rails, gallinules, shorebirds, seabirds, wading birds, and numerous songbirds. One hundred ninety-seven colonies of wading birds and seabirds (representing 215,249 pairs of nesting birds were observed in coastal Louisiana during a 2001 survey (Michot 2003). The cheniers and natural levees forests of coastal Louisiana provide essential stopover habitat to numerous neotropical migratory passerine birds.

Coastal Louisiana has long been a leading fur-producing area in North America. Common furbearers include nutria, mink, muskrat, raccoon, and river otter. Those coastal marshes and swamps also support game animals such as the white-tailed deer and swamp rabbit. The area also supports 1.5 million alligators for which sport and commercial hunting is closely regulated.

2.2.4.2 Future Without-Project Conditions

The projection of wildlife abundance is based almost exclusively on the predicted conversion of marsh to open water and the gradual sinking and resultant deterioration of forested habitat throughout the study area. Numerous other factors, including water quality, harvesting level, and habitat changes elsewhere in a species' range cannot be predicted and were not considered in these projections. Therefore, the projections presented are to be viewed and used with caution.

Louisiana's coastal wetlands are predicted to continue to experience land loss and habitat change into the future. The effect of such losses and changes would likely result in a decrease in the abundance of wildlife as marshes, forested wetlands, and their associated habitats continue to deteriorate and convert to open water. Populations of resident and migratory birds and other animals directly dependent on the marshes and swamps would decrease, an impact that would be felt in much of North America, where some of these species spend part of their life cycle.

Louisiana coastal wetlands provide essential stopover habitat for neotropical migratory birds on their annual migration route. Without places along the way that provide an adequate food supply for the quick replenishment of fat reserves, shelter from predators, and water for rehydration, migratory birds may be negatively affected. Some of the first habitats available after crossing the Gulf include Louisiana's chenier ridges. Of the few remaining ridges, only small patches support forested habitat. As the ridges continue to subside below elevations that can support forests, great number of neotropical migrants would be negatively affected. As Louisiana continues to lose more coastal wetlands, survival of individual migrating birds may be effected, which may effect population size, and over the long term, survival potential for the species as a whole.

When combined with CWPPRA and other restoration authorities, beneficial use of dredged material within the Federal Standard would have an impact on wildlife resources, as those programs would work synergistically to improve habitat conditions for wildlife populations across the coast. Continental populations of migratory avian species, such as neotropical songbirds and waterfowl, could improve as critical migratory habitat is restored, protected, and enhanced. Although unlikely to impact populations on a continental scale, game animals, furbearers, reptiles, amphibians, and

invasive species (especially the nutria) would also benefit from the cumulative effects of existing restoration programs.

2.2.5 FISHERIES

Fishery resources are institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended; the Endangered Species Act of 1973; the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended (Magnuson-Stevens Act); the Magnuson-Stevens Act Reauthorization of 2006; the Coastal Zone Management Act; and the Estuary protection Act. Fishery resources are technically significant because: they are a critical element of many valuable freshwater and marine habitats; they are indicators of the health of various freshwater and marine habitats; and many species are commercially important. Fishery resources are publicly significant because of the high priority placed on their aesthetic, recreational, and commercial value.

2.2.5.1 Historic and Existing Conditions

Louisiana's vast and biologically diverse coastal area serves as an important gulf coast estuarine system, which functions as a nursery, feeding, spawning, and growout area for many aquatic organisms. Louisiana ports produce a catch comparable to that of the entire Atlantic seaboard, and more than triple that of the remaining Gulf States (NMFS 2001). Four Louisiana ports have ranked among the top 10 in value of commercial fisheries landings throughout the U.S. since 1981 (NMFS 2003). Louisiana's commercial landings have been over one billion lbs/yr for over 20 years, with a value exceeding $400 million in 2000. White shrimp (*Litopenaeus setiferus)*, brown shrimp (*Farfantepenaeus aztecus*), and gulf menhaden (*Brevoortia patronus*) account for the majority of commercial harvest by value.

The term fish, as used in this document, includes a variety of finfish and shellfish. There are several ways to profile this diverse collection of organisms. For the purpose of this study, the general salinity preference of an organism for the freshwater, estuarine, or marine environment is used.

Freshwater species inhabit lakes, rivers, and backwaters where salinities remain low. Lagoons, bayous, and ponds throughout Louisiana provide excellent freshwater habitat for species such as largemouth bass (*Micropterus salmoides*), crappie (*Pomoxis* spp.), various other sunfish species, and catfish (*Ictalurus* sp.).

The majority of the LCA Study area is considered estuarine habitat; therefore, estuarine aquatic organisms are a significant resource within the project area. Estuarine fishery species may be resident (species residing in the estuary throughout their life cycle), such as killifishes (*Cyprinodontidae*), or transient (species that use estuaries during their life cycle), such as gulf menhaden, blue crab (*Callinectes sapidus*), and shrimp.

Marine species are found in offshore waters throughout the gulf coast and generally do not depend on coastal estuaries to complete any part of their life cycle. These species are in some ways

dependant on the health and productivity of coastal estuaries, in that their prey often are made up of estuarine dependant species. In addition, some marine species frequently inhabit the lower reaches of estuaries, where productivity is high.

The American oyster (*Crassostrea virginica*) is indigenous to coastal Louisiana, and provides a rich ecological and commercial resource. This organism is unique in that it does not migrate like other estuarine species. Salinity plays a key role in oyster sustainability. Typically, they proliferate in salinities ranging from 5 parts per thousand to 15 parts per thousand. Fresher waters fail to support biological function, and waters that are more saline promote disease and predation.

2.2.5.2 Future Without-Project Conditions

Current O&M beneficial use projects have helped reestablish wetlands, providing valuable foraging habitat and cover for fisheries species that inhabit lakes, bayous, and open water areas. Resurgence of volunteer marsh grasses has created new habitats for the fisheries species currently inhabiting these waterways. Direct impacts to fisheries may result from events such as hypoxia, but would be expected to be smaller in comparison to indirect impacts.

Indirect impacts to fisheries may result from the expected continuation of land loss and further loss of habitat supportive of estuarine and marine fishery species. In the short-term, land loss and predicted sea level changes would be likely to increase open water habitats available to marine species, except in the active deltas of the Atchafalaya and Mississippi Rivers; and areas otherwise influenced by river flow. In the long-term, as open water replaces wetland habitat and the extent of marsh to water interface begins to decrease; fishery productivity would be likely to decline (Minello et al. 1994; Rozas and Reed 1993). This may already be happening in the Barataria and Terrebonne estuaries.

Other considerations on the impact to fisheries are predator/prey relationships; water quality, salinity, and temperature; harvest rates; wetland development activities (dredge/fill); habitat conversion (e.g., wetland to upland); and access blockages. Habitat suitability, diversity, population size, and harvest rates influence the future condition of fisheries. Habitat suitability for fisheries varies by species, and depends on different water quality and substrate types.

2.2.6 ESSENTIAL FISH HABITAT (EFH)

This resource is institutionally significant because of the Magnuson-Stevens Fishery Conservation and Management Act. Essential Fish Habitat (EFH) is technically significant because, as the Act states, EFH is “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." EFH is publicly significant because of the high value that the public places on the seafood and the recreational and commercial opportunities EFH provides. A summary of EFH requirements for species managed by the Gulf of Mexico Fishery Management Council (GMFMC), and for which EFH has been designated in Louisiana, can be found in the accompanying BUDMAT PEIS.

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2.2.6.1 Historic and Existing Conditions

BUDMAT study area includes, but is not limited to, estuarine wetlands (e.g., marsh edge, inner marsh, marsh ponds, and tidal creeks); submerged aquatic vegetation; seagrasses; mud, sand, shell, and rock substrates (e.g., oyster reefs and barrier island flats); mangrove wetlands; and estuarine water column. Any activities that may adversely affect EFH should be avoided, minimized, or mitigated to conserve EFH.

Fish and most macro-crustaceans are highly mobile, and they rely on a variety of habitats for different functions (Miller and Dunn 1980). The characteristics of coastal Louisiana waters essential to fish are not static. There are a number of fish species that are Federally managed, with a variety of life stage requirements. The Magnuson-Stevens Act requires a conservative approach to designating EFH. For these reasons, EFH is not confined to isolated locations. All of the estuarine and marine portions of the BUDMAT Program area are considered EFH and are an important consideration in the development of any restoration plan.

As conditions along Louisiana's coast have changed, effects to different categories of EFH have varied. For example, as the marsh has been lost, it has generally been replaced with other categories of EFH, such as submerged aquatic vegetation or mud bottoms. In contrast, in areas where active delta growth is occurring, the opposite may have happened (e.g., mud bottoms have been replaced with marsh). It is important to have a balance between different categories of EFH for the various life stages of Federally managed fishery species in the BUDMAT area. The general trend in the recent past has been one of conversion of highly productive categories of EFH, such as inner marsh and marsh edge, to less productive estuarine water column; and mud, sand, or shell substrates. If this trend continues, it is likely to result in less complex, biologically diverse habitats and unsustainable fishery productivity.

All tidally influenced waters and substrates in coastal Louisiana, including the sub-tidal and tidal vegetation (seagrasses, algae, marshes, and mangroves) are designated as EFH. There are over 8 million acres of marsh and water habitat, of which over 4.4 million acres are surface water. Over half of the waters are between 0–5.9 ft in depth (Perret et al. 1971). Sediments are mud, sand, and silt across the coast (Barrett et al. 1971). Submerged vegetation occurs along the coast, but no acreage figure is available, except for Lake Pontchartrain, where an estimated 20,000 acres existed in the 1990s (Gulf of Mexico Fishery Management Council 1998).

EFH alterations of particular concern are the marsh loss experienced along the Louisiana coast. Land/water interface has been shown to be more important to fishery production than total wetland acreage (Faller 1979; Gosselink 1984; Zimmerman et al. 1984).

2.2.6.2 Future Without-Project Conditions

Although previous restoration efforts in the BUDMAT Program study area have helped maintain some categories of EFH, the cumulative impacts of land loss, conversion of habitats, sea level change, increased storm intensity, etc., would be expected to lead to a net decrease in the habitat most supportive of estuarine and marine species. The direct losses of highly productive

forms of EFH would lead to losses of shallow habitat, due to the exposed nature of the shallow open water bottoms that are being formed. Shallow waters would be likely to become deep waters, and salinity gradients would be less estuarine, with a sharper distinction between saline and freshwater habitat, as coastal residents continue their efforts to protect self and property with levees, flood gates, and other water control structures.

The relationship of wetland loss to fisheries productivity is complex (Boesch and Turner, 1984). Some loss of marsh wetlands may have increased the total amount of open water-marsh interface that provides shelter from predation for juveniles of a number of species. However, this study also pointed out continued loss of coastal wetlands may eventually decrease the available habitat for juvenile fin and shellfish that provides shelter from predation, and that the reduced influx of detrital plant debris into the estuarine environment may eventually have negative impacts on adjacent shallow-water fish habitat. It is believed that marsh loss that has been experienced to date has increased this land/water interface and increased fishery production. As land loss continues, it is believed that this interface would approach a maximum and begin to decline. This would, in turn, result in a decline in fishery production. In some areas, continued marsh loss is already resulting in the reduction of this interface.

The no action alternative would indirectly impact species that are linked in the food chain to directly affected species. Population reductions in directly affected species, such as brown shrimp and white shrimp, affect species dependent on shrimp for food. As marsh, barrier islands, and other EFH are directly lost, less protection would be available to remaining EFH. These areas would be more susceptible to storm, wind, and wave erosion. A decrease in species population levels would result as populations are stressed by habitat displacement and reduction. With no action, categories of EFH, such as inner marsh and marsh edge, would be converted to less productive forms of EFH (e.g., estuarine water column; and mud, sand, or shell substrates) as wetlands degrade.

The effect of human activity, coupled with natural forces, has been substantial to EFH. Water quality degradation, invasive species introductions, storms, and a general reduction in marsh, barrier island, and other habitats contribute to negative impacts on some categories of EFH (e.g., estuarine water column and marsh edge). Water quality degradation, invasive species introductions, storms, and fishing activities contribute to the negative impacts on EFH. Water quality regulations and coastal restoration efforts are believed to minimize some of these negative impacts to EFH. A reduction in suspended sediment load of the Mississippi River and mining of river sediments reduces the net supply available to coastal marshes, and contributes to their loss. Artificial levees confining the river restrict river flow and reduce nourishment to barrier islands and delta building. Coupled with coastal degradation, subsidence, sea level change, shoreline erosion, and saltwater intrusion the no action alternative would substantially decrease the quality of EFH and the ability of the BUDMAT Program area to support Federally managed species.

2.2.7 THREATENED AND ENDANGERED SPECIES

This resource is institutionally significant because of: the Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald and Golden Eagle Protection Act of 1940. Endangered (E) or threatened (T) species are technically significant because the status

of such species provides an indication of the overall health of an ecosystem. These species are publicly significant because of the desire of the public to protect them and their habitats.

Within the State of Louisiana, there are 25 animal and 4 plant species (some with critical habitats) under the jurisdiction of the USFWS and/or NMFS (see BUDMAT PEIS), which are presently classified as threatened or endangered. The USFWS and NMFS share jurisdictional responsibility for sea turtles and the gulf sturgeon. Of the animals and plants under USFWS and/or NMFS jurisdiction, only 12 animal species are within the study area and include the West Indian manatee, the Louisiana black bear, the piping plover, the gulf sturgeon, the pallid sturgeon, the green sea turtle, the Kemp's Ridley sea turtle, the hawksbill sea turtle, the leatherback sea turtle, and the loggerhead sea turtle.

2.2.7.1 Historic and Existing Conditions

From a programmatic standpoint, historic and existing conditions for threatened and endangered species relevant to the BUDMAT Study area principally stem from the alteration, degradation, and loss of habitats; human disturbance and exploitation; and pollution. Louisiana's unabated coastal land loss continues to reduce available coastland resources. This creates increased competition among and between the various threatened and endangered species for scarce coastal resources.

Informal coordination with the USFWS and NMFS was initiated to determine potential impacts of conceptual, programmatic restoration alternatives to threatened and endangered species and their critical habitats. Generally, formal coordination and preparation of any necessary documentation such as Biological Assessments, if necessary, would be initiated with either or both of these agencies on a specific project-by-project basis as required.

2.2.7.2 Future Without-Project Conditions

Generally, continued coastal land loss and deterioration of critical coastal habitats, especially barrier shorelines/islands, is anticipated to impact all threatened and endangered species, which utilize coastal Louisiana. In particular, the brown pelican, piping plover, and all sea turtles would most likely be impacted to the greatest extent, as these species utilize the rapidly deteriorating barrier islands.

Continued loss of coastal wetlands would cause habitat loss and a decrease in food supply for several listed species including brown pelicans, piping plovers, loggerhead sea turtles, and Kemp's Ridley sea turtles. The other threatened and endangered species occurring in Louisiana's coastal wetlands and coastal waters are either transient or do not rely as heavily on coastal wetlands for habitat or food sources.

Indirect impacts to threatened and endangered species under the no action alternative would result from the long-term and far field effects of less habitat being restored. Reduced habitat for feeding, resting or wintering grounds could force T&E species to move elsewhere or could increase the stress on the population to such an extent that they could decline.

With no action, less habitat could be restored, resulting in less area for resting, feeding, and wintering grounds. In the short term, populations of coastal dependant species would be forced to marginal habitats, move elsewhere, or increase density on the resources available. In the long-term, populations could decline to the extent that they become increasingly rare in coastal Louisiana.

2.2.8 INFRASTRUCTURE

This resource is institutionally significant because of the National Environmental Policy Act of 1969; the Estuary Protection Act; the Clean Water Act; the River and Harbors Acts; the Watershed Protection and Flood Protection Act; and the Water Resources Development Acts. Of particular relevance is the degree to which the proposed action affects public health, safety, and economic well-being; and the quality of the human environment. This resource is technically significant because the social and economic welfare of the nation may be positively or adversely impacted by the proposed action. This resource is publicly significant because of the public's concern for health, welfare, and economic and social well-being from water resources projects.

2.2.8.1 Historic and Existing Conditions

Table 2-5 is a summary of the infrastructure in the portions of the study area that are considered at risk. All assets are valued in 2003 dollars.

Table 2-5. Summary of the Valuation of Assets in the BUDMAT Study Area

Asset Category	**Value**
Oil and Gas Production Facilities	$ 3,207,180,000
Pipeline	$ 12,435,043,000
Highways	$ 5,981,038,000
Railroads	$ 385,770,000
Navigable Waterways	$ 2,576,6411,000
Ports	$ 869,376,000
Industrial and Manufacturing Facilities	$ 30,418,984,000
Transmission Lines	$ 416,844,000
Municipal and Parish Utility Infrastructure	$ 4,333,403,000
Municipal and Parish Private Buildings	$ 42,238,389,000
Agricultural Interests –Lands	$ 159,690,000
Agricultural Interests –Products	$ 163,424,000
Total Asset Value	**$103,185,792,000**
Source: Waldemar S. Nelson & Co., 2003	

The estimation methods used include replacement costs (for pipelines, highways, and railroads) and fair market value (for agriculture and private buildings). Also, the value of the navigable waterways in the study area was calculated by using operation and maintenance costs. It was assumed that the costs paid for the navigable waterways in the system are justified (i.e., that the value of the waterways system is equal to what is being paid to maintain them). The estimated total asset value that would be at greater risk if coastal erosion continues is between $95 billion and $100 billion.

2.2.8.2 Future Without-Project Conditions

As previously mentioned, Louisiana's coastal wetlands are the richest estuaries in the country for fisheries production. They are also some of the richest in oil and gas activities. Infrastructure related to these activities as well as navigation, pipelines, agriculture, etc. have a total asset value of approximately $102 billion in 2006 dollars. If no further restoration activities are implemented in coastal Louisiana, these assets, to varying degrees, are at risk. On a local community level, land loss can result in the loss of boat launches, marinas, access roads, supply shops, and local flood protection. Such losses can lead to a community's inability to sustain itself economically as they have to invest more money in infrastructure repairs and relocations.

On a national and international level, the impacts of coastal erosion would be felt in the oil, gas, and pipeline industry. For example, as barrier islands and coastal wetlands continue to erode, open water has scoured away land protecting pipelines. Exposed pipelines are at increased risk of damage and failure. Disruption of flows could affect the Nation's energy supplies and energy security. There is also potential for ecological damage from damage and failure of these facilities.

Navigation infrastructure is already being impacted by coastal erosion. Three areas of the GIWW are experiencing problems. Increased shoaling causes traffic moving on the waterway to slow down which increases the time and cost of moving commodities. It also increases the annual dredging maintenance cost to keep the channel at authorized depths.

2.2.9 COMMERCIAL FISHERIES

This resource is institutionally significant because of the National Environmental Policy Act of 1969; the Estuary Protection Act; the Clean Water Act; the River and Harbors Acts; the Watershed Protection and Flood Protection Act; and the Water Resources Development Acts. Of particular relevance is the degree to which the proposed action affects public health, safety, and economic well-being; and the quality of the human environment. This resource is technically significant because the social and economic welfare of the nation may be positively or adversely impacted by the proposed action. This resource is publicly significant because of the public's concern for health, welfare, and economic and social well-being from water resources projects.

2.2.9.1 Historic and Existing Conditions

Louisiana's coastal wetlands are the richest estuaries in the country for fisheries production. Commercially and recreationally important species such as brown and white shrimp, blue crabs, eastern oysters, and menhaden are abundant, but these species populations are threatened if land loss continues. Louisiana has historically been an important contributor to the Nation's domestic fish and shellfish production, and is one of the primary contributors to the Nation's food supply for protein. While Louisiana has long been the Nation's largest shrimp and menhaden producer, it has also recently become the leading producer of blue crabs and oysters. As reported by the National Marine Fisheries Service in July of 2007, total landings in Louisiana were 844 million pounds in

2006. The percentage contribution of total landings for the gulf region was 65 percent and for the Nation was 8.9 percent. Dockside revenues for commercial fisheries in coastal Louisiana were over $202 million in 2006. These revenues were the third largest for any state in the contiguous United States, fourth behind Alaska, Massachusetts, and Maine.

The most important species, in terms of Louisiana dockside revenue in 2006, was shrimp. Louisiana landed approximately 144 million pounds of shrimp in 2006, or about 40 percent of United States' total landings. In 2006, the gulf region landed over 80 percent of the total United States' shrimp catch and Louisiana landed about 50 percent of shrimp caught in the gulf. Almost all of the shrimp caught in Louisiana and along the gulf coast have spent an important part of their life living and growing in the Louisiana coastal marshes. Another important species harvested in the area is menhaden. Menhaden is processed to produce both fishmeal and fish oil. Fishmeal is used as a high protein animal feed. The broiler (chicken) industry is currently the largest user of menhaden meal, followed by the turkey, swine, pet food, and ruminant (cattle/livestock) industries. The Louisiana menhaden fisheries landings were the largest in the Nation, landing twice as much as the next closest state. The percent of dockside value from Louisiana to that of the rest of the Nation was over 50 percent.

In 2006 alone, Louisiana landed more than 50 percent of the Gulf of Mexico and well over 33 percent of the Nation's oyster catch by pounds with 29 percent of the value. Louisiana also has led the United States in eastern oyster production, contributing just under half of the U.S. production. Louisiana also produced about 32 percent of the Nation's blue crabs in 2005. As with eastern oyster production, the trend has been for Louisiana to become the largest producer of blue crabs in the Nation, surpassing other states that were the dominant producers in the 1990s. The dockside value for blue crabs landed in Louisiana in 2006 was more than $32 million of landings of 53.4 million pounds based on preliminary estimates reported by NMFS.

After Hurricanes Katrina and Rita, significant reductions were seen in landings of several marine fisheries during the initial 12 months. During the following 3 months, these fisheries showed significant recovery. However, most of these fisheries had not recovered to levels seen in pre-storm years.

2.2.9.2 Future Without-Project Conditions

Concurrent with projected land loss would be an increase in saltwater intrusion into some of the upper estuaries as barrier islands and marshes degrade. This would result in a shift in the populations of fishes and invertebrates, with more saline-dominated species replacing freshwater species in some areas. The band of intermediate salinity necessary for oyster production would likely narrow significantly, and essential fish habitat for many commercial fishery species would likewise decline, leading to a net loss in fisheries population size and diversity.

Wetland habitat losses would decrease the productivity of Louisiana's coastal fisheries. The seafood industry would likely suffer significant losses in employment as estuaries that are necessary to produce shrimp, oysters, and other valuable species, erode. Job losses would occur in the areas reliant on fishing, harvesting, processing, and shipping of the seafood catch. Thus, changes in existing fisheries habitat caused by wetland loss, saltwater intrusion, and reduced salinity gradients

would likely increase the risk of a decline in the supply of nationally distributed seafood products from Louisiana's coast.

The connections between coastal estuaries and offshore populations vary geographically. Approximately 32 percent of the commercial fish landings off the northeastern states depend upon estuaries during some life stage. The dependence figure jumps to 98 percent along the Gulf of Mexico, where marshes support menhaden and shrimp populations. It is estimated that over 75 percent of Louisiana's commercially harvested fish and shellfish populations are dependent on these wetlands during at least some portion of their life cycle. Wetland habitat losses would decrease the productivity of these fisheries. Marsh loss and associated habitat changes may have already affected blue crab populations. Moreover, menhaden depend upon the estuary for a critical stage in their life cycle.

The years 2006 and 2007 have proven to be times of rapid recovery for commercial fisheries from the damages of Hurricanes Katrina and Rita. However, future without project, the seafood industry would likely suffer significant losses in employment as resources, which are necessary to produce shrimp, oysters, and other valuable species (mainly estuaries), begin to erode. Job losses would occur in the areas of fishing, harvesting, processing, and shipping of seafood catch.

2.2.10 EXISTING AND FUTURE WITHOUT PROJECT CONDITIONS FOR OTHER RESOURCES

Historic and existing conditions and future without conditions for other resource elements must also be considered in determining baseline conditions and potential benefits and impacts of the various plan alternatives for BUDMAT. The information on historical, existing and projected future conditions for these other resources are documented in more detail in the accompanying PEIS document.

2.3 CRITICAL NEEDS AND OPPORTUNITIES

2.3.1 Critical Needs

The LCA Study identified the following critical needs in coastal Louisiana:

Prevent future land loss where predicted to occur

Addressing this need would create and sustain diverse coastal habitats, sustain wildlife and plant diversity, and sustain socio-economic resources. Effective measures to reverse coastal land loss should affect plant communities, in their root zone, in such a way as to promote healthy growth and reproduction, plant succession, or revegetation of denuded surfaces. Increasing nutrients and sediment in the estuarine area would increase the growth of marsh vegetation and slow the rate of land loss. Increased plant growth would result in greater production of organic detritus that is essential for a high rate of fisheries and wildlife production. Production of phytoplankton and zooplankton would increase in areas where turbidity is not limiting, and, as a result, the harvest of sport and commercial finfish and shellfish that depend on these microorganisms would increase.

Restore or preserve endangered critical geomorphic features

Addressing this need would restore geomorphic features, such as natural levee ridges, lake rims, land bridges, gulf shoreline barrier islands, barrier headlands, and chenier ridges. These features are essential to maintaining the integrity of coastal ecosystems because they are an integral part of the overall system and in many instances represent the first line of defense against marine influences and tropical storm events.

Protect vital local, regional, and national socio-economic resources

Addressing this need would reduce the increased risk of damage to cultures, communities, infrastructure, business and industry, and flood protection. Accelerated land loss and ecosystem degradation places over $100 billion of infrastructure at increased risk to damage as a result of storm events. This need could be met by increasing the coastal wetland's capacity to buffer hurricane-induced flooding through wetland creation, wetland sustenance, and retention of barrier island systems.

2.3.2 The Federal Standard

Funds from the BUDMAT Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard. Disposal plans for each of the primary navigation channels in Louisiana are discussed in section 2.3.3 Opportunities. Figures 2-6 through 2-14 also depict the current disposal areas that are environmentally cleared for each of the primary navigation channels within CEMVN.

The Code of Federal Regulations (CFR), Title 33, Volume 3, parts 335 through 338 is applicable to the USACE when undertaking operation and maintenance activities at Army Civil Works projects. The regulation prescribes the practices and procedures to be followed by the USACE to ensure compliance with the specific statutes governing Army Civil Works operations and maintenance projects involving the discharge of dredged or fill material into waters of the U.S. or the transportation of dredged material for the purpose of disposal into ocean waters.

Section 335.4, Policy, of the CFR Title 33 states:

"The Corps of Engineers undertakes operations and maintenance activities where appropriate and environmentally acceptable. All practicable and reasonable alternatives are fully considered on an equal basis. This includes the discharge of dredged or fill material into waters of the U.S. or ocean waters in the least costly manner, at the least costly and most practicable location, and consistent with engineering and environmental requirements."

Section 335.7, Definitions, of the CFR Title 33 states:

"Federal standard means the dredged material disposal alternative or alternatives identified by the Corps which represent the least costly alternatives consistent with sound engineering practices and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria. Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

All Federally maintained navigation projects must demonstrate that there is sufficient dredged material disposal capacity for a minimum of 20 years. Therefore, a preliminary assessment is required for all Federal navigation projects to document the continued viability of the project and the availability of dredged material disposal capacity sufficient to accommodate 20 years of maintenance dredging. If the preliminary assessment determines that there is not sufficient capacity to accommodate maintenance dredging for the next 20 years, then a dredged material management plan (DMMP) study must be performed. Previously, DMMPs were referred to as Long Term Management Plans (LTMPs). Management plans are updated on an as needed basis to develop strategies to maximize the capacity of the recommended disposal alternative while attempting to reduce dredging frequencies and quantities. Priority is given to projects for which existing dredging material disposal sites, including existing non-beneficial use upland confined disposal facilities, are expected to reach capacity or to no longer be available sometime in the next 10 years. For some navigation projects a preliminary assessment may be sufficient to establish the Base Plan and confirm that continued maintenance appears to be warranted. The documentation establishing the Base Plan for each of the primary navigation channels in CEMVN is available upon request. The documentation is also available at the main LCA website, http;//www.lca.gov. Currently the CEMVN is conducting DMMP studies for both the Calcasieu River and Pass and the Atchafalaya River and Bayous Chene, Boeuf, and Black navigation projects. The Calcasieu River and Pass DMMP is scheduled to be completed in 2009 and the Atchafalaya River and Bayous Chene, Boeuf, and Black draft DMMP is scheduled to be completed in 2010. Once approved the DMMPs will update and redefine the Base Plan for these two navigation channels. Therefore, beneficial use projects that could be currently implemented under BUDMAT may not be appropriate once the revised DMMPs are approved.

2.3.3 Opportunities

Several opportunities for ecosystem restoration were identified in the LCA Study and are reiterated below.

Restoration of barrier islands

Placement of sand to restore or nourish barrier islands could sustain these geomorphic features. Doing so would provide additional protection from hurricane storm surges and protect the ecology of estuarine bays and marshes by reducing gulf influences, as well as protect nationally important water bird nesting areas.

Restoration of other geomorphic features

Reestablishing ridges or natural banks can help restore salinity and marsh inundation patterns and provide fishery access in previously unavailable habitats.

Restoration of Wetlands

The LCA Study also identified the use of sediment from dedicated dredging or maintenance dredging (e.g., beneficial use) to create a marsh platform which can create large amounts of coastal habitat quickly.

CEMVN has the largest annual navigation channel Operations & Maintenance (O&M) program in the USACE, with an average of 64.0 million cubic yards (mcy) of material dredged annually. Currently, approximately 24 percent of the material dredged under CEMVN's O&M program is used beneficially within the Federal standard, which represents the least-cost environmentally acceptable disposal alternative. Therefore, on an average annual basis, approximately 15.4 mcy of dredged material is used beneficially under CEMVN's O&M program. Additional dredged material is used beneficially in the surrounding environment with funding from the CWPPRA Program, the CIAP Program, or the Continuing Authorities Program (CAP) defined by the Water Resources Development Act (WRDA) of 1992, Section 204 for Beneficial Use of Dredged Material. CEMVN, along with the State of Louisiana as the non-Federal sponsor, has beneficially placed dredged material to create over 19,500 acres (30 square miles) of land between 1976 and 2006. Assuming, that 15 percent of the $100M BUDMAT Program would be used for planning, engineering, and design activities, and real estate acquisition, the remaining $85M could be used to place dredged material beneficially. Table 2-6 is a summary of the dredging activities for the primary authorized navigation channels in CEMVN.

There is a reasonable potential to use an additional 20 mcy of material beneficially annually if sufficient funding were made available. As discussed later in section 3.1.1.c, a portion (approximately 14.6 mcy) of the average annual dredged material is not available because it is from the maintenance of the upstream Mississippi River crossings and the dredged material is either redeposited back into the Mississippi River or simply resuspended for transport downstream via the river currents. Thus, if the material is taken out of the system upstream, it is not available for downstream beneficial use. Also discussed in section 3.1.1.d is the approximately 14 mcy of fluff material dredged from the Atchafalaya and Calcasieu River bar channels that is considered unsuitable for wetland creation or barrier island restoration due to the fluff material's tendency to stay in suspension rather than settling out of the water column. Therefore, excluding the 14.6 and the 14 mcy discussed above and excluding the 15.4 mcy already used beneficially with the Federal standard, from the average annual dredging quantity of 64.0 mcy, about 20 mcy of additional dredged material could be used beneficially each year if funding were made available.

The 2004 LCA Study estimated that approximately 21,000 acres of wetlands could be created through the ten year $100M BUDMAT Program. This estimate was based on the following assumptions: (1) an average incremental cost of $1 per cubic yard (cy) of dredged material placed beneficially, (2) an estimate of 0.00025 acres of wetlands created per cy of dredged material placed (or using the inverse, 4,000 cy of dredged material are required to create one acre of wetland based on a 2.5 feet total height of dredged material (i.e., a water depth of 1.5 feet plus 1 foot of fill above the water's surface), and (3) a 15 percent planning, engineering, design and real estate cost over the ten year BUDMAT Program (i.e., the remaining 85 percent or $85M would be available for placing 85,000,000 cy of dredged material beneficially). This equates to approximately $4,000 per acre of wetland created. It should be noted that the estimate of the potential maximum area of wetland created by the program assumes that all of the program resources would be used for marsh creation projects. However, other restoration features such as barrier island restoration or enhancement will also be considered as candidate projects under the program and the higher cost per unit area of restoration feature will be considered with the understanding that these types of projects provide values other than marsh features, such as unique fish and wildlife habitat, storm surge reduction, and protection of estuaries from excessive tidal flux, wave action and salinity intrusion.

As discussed in the following paragraphs describing each of the primary navigation channels, recent 2007 cost estimates of potential beneficial use projects investigated by CEMVN reveal a significantly higher range for incremental cost associated with the beneficial use of dredged material. Incremental costs developed in 2007 range anywhere from just over $1.40 per cy to more than $9 per cy with an average incremental cost of approximately $4 per cy of dredged material placed beneficially. Likewise, cost per acre of wetland created ranged anywhere from $12,000/acre to over $77,000/acre. Incremental costs are highly dependent upon the quantity of material to be placed, the requirement of retention measures such as dikes (earthen or hard structures such as rock), or geotubes, the length of discharge pipeline required to reach the beneficial use site from the dredge plant, the actual depth of water at each beneficial use site, the location of the dredging and disposal work (i.e., within protected areas versus offshore high energy areas), and the efficiency of the dredging operations. Retention measures are utilized to either retain finer sediments or minimize the loss of sediments from the erosional effects of wave action. Earthen retention dikes typically account for only 5 percent of the costs for placement of dredged materials. Rock dikes are much more expensive and costs vary widely depending on the site specific conditions of the beneficial use area. Incremental costs are also highly dependent on the prices of major items such as fuel and steel (required for the discharge pipeline). Per CEMVN's Cost Engineering Section, fuel costs account for approximately 50 percent of the total dredging costs. Likewise, the estimated acres per cy of dredged material (or inversely, the cy of dredged material required to create one acre of wetland) is also highly dependent on target marsh elevation(s), the physical characteristics of the dredged material which affect both the initial stacking and bulking, as well as the subsequent compaction of the sediments in the beneficial use site, and the geological properties of the beneficial use site affecting the anticipated settlement of the dredged material.

Using the conservative average incremental cost of $4 per cy, the number of acres of wetlands that could be created under the BUDMAT Program would likely be about 3,400 acres over the ten year program life. This conservative estimate assumes the following: (1) an average <u>incremental</u> cost of $4 per cy of dredged material placed beneficially, (2) an estimate of 0.00016 acres of wetlands created per cy of dredged material placed (or using the inverse, 6,250 cy of dredged material are required to create one acre of wetland based on a 4.0 feet total height of dredged material (i.e., a water depth of 2.5 feet plus 1.5 feet of fill above the water's surface, and (3) a 15 percent planning, engineering, design and real estate cost over the ten year BUDMAT Program (i.e., the remaining 85 percent or $85M would be available for placing 21,250,000 cy of dredged material beneficially based upon an average incremental cost of $4 per cy). This conservative estimate equates to approximately $25,000 per acre of wetlands created.

As described above the range of potential acres of wetland created under the ten year BUDMAT Program could vary significantly from the conservative average estimate of 3,400 acres up to potentially 21,000 acres as stated in the 20004 LCA Study if beneficial use sites were limited to only the nearby shallow open water areas. The costs per acre of wetlands created could vary from $4,000/acre to over $77,000/acre. For comparison, the CWPPRA Program which has been constructing restoration projects in coastal Louisiana since 1991 utilizes a middle 20th percentile cost effectiveness criterion of between $42,000 and $85,000 per net acre created, protected, or restored. Interestingly, this criterion was revised upward from between $40,000 and $60,000 per net acre in 2007 to account for increased cost of coastal restoration projects since the criterion was

first developed in 2004. The upper and lower limits of the CWPPRA cost effectiveness criterion is more than $140,000 per net acre and less than $11,500 per net acre, respectively. While net acres denote what is anticipated at the end of the CWPRRA 20 year project life and the acres created under the BUDMAT Program denote what is estimated to be created after initial settlement and compaction of the dredged sediment occurs, the comparison does help to put into perspective the fact that the costs for coastal restoration projects vary widely.

As stated in section 2.2.3, wetlands are institutionally important because of: the Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968. Wetlands are technically important because: 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 nonconsumptive recreational opportunities. Wetlands are publicly important because of the high value the public places on the functions and values that wetlands provide. The $100 million BUDMAT Program is only one component of the near-term LCA Plan and accounts for approximately 5% of the total estimated cost of the near-term LCA Plan. While the BUDMAT Program alone will not halt or reverse the loss of wetlands in coastal Louisiana, the potential to create up to 21,000 acres of wetlands would account for about 6% of the estimated 328,000 acres of land loss currently expected to occur in coastal Louisiana between the years 2000 and 2050.

Table 2-6 also identifies those reaches where CEMVN's current O&M program budget allows for the beneficial use of the dredged material. Following is a discussion of the maintenance dredging operations for each of CEMVN's primary navigation channels. Additional potential beneficial use projects investigated by CEMVN in those navigation channels where the material is not currently used 100 percent beneficially are also discussed. Maps are also provided for each navigation channel. These maps depict the current disposal areas that are environmentally cleared for each of the primary navigation channels within CEMVN. Table 2-7 is a graphical representation of the frequency of dredging typically scheduled on each of the navigation channel reaches displayed in table 2-6. Thus, table 2-7 depicts the beneficial use opportunities that would be available throughout the ten-year BUDMAT Program. The Mississippi, Atchafalaya, and Calcasieu Rivers all have reaches that are dredged every year whereas other navigation channels are dredged on a less than annual basis.

As discussed in section 2.3.2, the Federal standard means the dredged material disposal alternative identified by the Corps which represents the least costly alternative consistent with sound engineering practices and meeting all of the Federal environmental standards established by Section 404 of the Clean Water Act of 1972 or Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended. Application of the Federal standard constitutes the base disposal plan (i.e., Base Plan) for a navigation project. Funds for the BUDMAT Program would be

Table 2-6. New Orleans District (CEMVN) Primary Navigation Channels

Based on New Orleans District data from years 1996 through 2007.		AVERAGE QUANTITY PER EVENT (cubic yards)	AVERAGE ANNUAL QUANTITY (cubic yards)		FEDERAL STANDARD[1] (% USED BENEFICIALLY
CHANNEL / REACH	FREQUENCY OF DREDGING			Grain Size Analysis	
Barataria Bay WW - bar	every 3 to 4 years	640,000	182,857	64%Sand/26%Silt/10%Clay	100
Barataria Bay WW - bay	every 6 years	641,000	106,833	10%Sand/90%Silt-Clay	--
Barataria Bay WW - inland	every 9 years	379,800	42,200	15%Sand/85%Silt-Clay	--
Miss River - crossings	annually	14,620,000	14,620,000	100% Sand	0
Miss River - Baptiste Collette	every 1 to 3 years	1,354,800	677,400	30%Sand/70%Silt-Clay	100
Miss River - Southwest Pass*	annually	15,615,000	15,615,000	25%Sand/50%Silt/25%Clay	6
Miss River - Tiger Pass	every 1 to 3 years	1,941,900	970,950	30%Sand/70%Silt-Clay	100
Miss River - South Pass	every 7 to 8 years	5,993,000	799,067	45%Sand/45%Silt/10%Clay	100
Miss River - New Orleans Harbor	annually	1,131,500	1,131,500	100% Sand	0
Bayou Lafourche - jetty/bar	every 1 to 2 years	637,900	425,267	20%Sand/56%Silt/24%Clay	100
Bayou Lafourche - inland	every 5 years	850,000	170,000	35%Sand/45%Silt/20%Clay	100
Atchafalaya - bar	annually	9,000,000	9,000,000	7%Sand/72%Silt/21%Clay	20
Atchafalaya (Lower) - bay	annually	2,130,000	2,130,000	80%Sand/18%Silt/2%Clay	100
Atchafalaya - Horseshoe Bend	annually	1,200,000	1,200,000	80%Sand/18%Silt/2%Clay	100
Bayous Chene, Boeuf & Black	every 5 to 6 years	5,773,000	1,049,636	3%Sand/77%Silt/20%Clay	22
Berwick Bay Harbor	annually	1,686,000	1,686,000	92%Sand/8%Silt-Clay	**varies****
Houma Nav Canal - inland	every 8 years	725,300	90,663	28%Sand/51%Silt/21%Clay	40
Houma Nav Canal - bay	every 1 to 2 years	1,815,000	1,210,000	5%Sand/74%Silt/21%Clay	44
Houma Nav Canal - bar	every 1 to 2 years	663,000	442,000	29%Sand/64%Silt/7%Clay	0
Freshwater Bayou - Lock to Gulf	every 2 to 4 years	1,057,000	352,333	29%Sand/64%Silt/7%Clay	100
Freshwater Bayou - inland	every 15 years	2,000,000	133,333	unknown	--
Mermentau River - bar & inland	every 1 to 3 years	1,264,000	632,000	15%Sand/85%Silt-Clay	100
Calcasieu - Mile 5 to 14	every 2 to 3 years	3,615,000	1,446,000	12%Sand/35%Silt/53%Clay	0
Calcasieu - Mile 14 to 24.5	every 2 to 3 years	5,250,000	2,100,000	12%Sand/35%Silt/53%Clay	0
Calcasieu - Mile 28 to 36	every 3 to 8 years	1,334,000	242,545	35%Sand/50%Silt/15%Clay	0
Calcasieu - bar	annually	7,547,000	7,547,000	9%Sand/45%Silt/46%Clay	10
		88,864,200	64,002,585		

* Includes the periodic mining of the Pass A Loutre hopper dredge disposal area in years 1997, 2004, and 2007.

** Placement into commericial sand pits for beneficial use varies depending on capacity of pits and commercial needs.

Table 2-7. CEMVN Primary Navigation Channels – Dredging Frequency

Based on New Orleans District data from years 1996 through 2007.

CHANNEL / REACH	FREQUENCY OF DREDGING	Year 1 FY10	Year 2 FY11	Year 3 FY12	Year 4 FY13	Year 5 FY14	Year 6 FY15	Year 7 FY16	Year 8 FY17	Year 9 FY18	Year 10 FY19
Barataria Bay WW - bar	every 3 to 4 years			■			■			■	
Barataria Bay WW - bay	every 6 years						■				
Barataria Bay WW - inland	every 9 years									■	
Miss River - crossings	annually	■	■	■	■	■	■	■	■	■	■
Miss River - Baptiste Collette	every 1 to 3 years		■		■		■		■		■
Miss River - Southwest Pass*	annually	■	■	■	■	■	■	■	■	■	■
Miss River - Tiger Pass	every 1 to 3 years		■		■		■		■		■
Miss River - South Pass	every 7 to 8 years			■							■
Miss River - New Orleans Harbor	annually	■	■	■	■	■	■	■	■	■	■
Bayou Lafourche - jetty/bar	every 1 to 2 years		■		■		■		■		■
Bayou Lafourche - inland	every 5 years			■					■		
Atchafalaya - bar	annually	■	■	■	■	■	■	■	■	■	■
Atchafalaya (Lower) - bay	annually	■	■	■	■	■	■	■	■	■	■
Atchafalaya - Horseshoe Bend	annually	■	■	■	■	■	■	■	■	■	■
Bayous Chene, Boeuf & Black	every 5 to 6 years					■					■
Berwick Bay Harbor	annually	■	■	■	■	■	■	■	■	■	■
Houma Nav Canal - inland	every 8 years					■					
Houma Nav Canal - bay	every 1 to 2 years		■		■		■		■		■
Houma Nav Canal - bar	every 1 to 2 years		■		■		■		■		■
Freshwater Bayou - Lock to Gulf	every 2 to 4 years			■			■			■	
Freshwater Bayou - inland	every 15 years										
Mermentau River - bar & inland	every 1 to 3 years		■		■		■		■		■
Calcasieu - Mile 5 to 14	every 2 to 3 years		■		■		■		■		■
Calcasieu - Mile 14 to 24.5	every 2 to 3 years		■		■		■		■		■
Calcasieu - Mile 28 to 36	every 3 to 8 years			■					■		
Calcasieu - bar	annually	■	■	■	■	■	■	■	■	■	■

used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard.

2.3.3.1 Barataria Bay Waterway, LA – Figure 2-6

The Barataria Bay Waterway is divided into three reaches as follows: the Dupre Cut Inland reach (Mile 36.7 to Mile 16); the Barataria Bay reach (Mile 16 to Mile 0); and the Bar Channel reach (Mile 0 to Mile -3.8). Dredging records dating back to 1960 indicate that dredged material from construction and maintenance of the Dupre Cut Inland reach was placed into confined disposal facilities along the east and west banks of the waterway. In 1999, dredged material from Mile 31.0 to Mile 25.5 of this reach was placed in degraded wetlands adjacent to the west bank of the channel after retention dikes were constructed as part of a Section 204 of the Water Resources Development Act of 1992 project to restore marsh. The construction of the retention dikes allowed CEMVN to place the dredged material at the beneficial use site within the Federal standard. Dredged material has been placed at Queen Bess Island for restoration of habitat for Louisiana brown pelicans, and at wetlands development placement areas in the vicinity of Mile 14 and 6.5. Prior to 1996, all dredged material from routine maintenance of the Barataria Bay Waterway bar channel was placed into the ocean dredged material disposal site located adjacent to the channel on the northeast side. Beginning in 1996 and continuing for each maintenance event thereafter, 100 percent of the dredged material from this bar reach has been placed on or adjacent to Grand Terre Island for island restoration within the Federal standard.

Assuming 4,000 cy of dredged material is required to create one acre of wetland and using the average quantity per event from table 2-6 and the frequency of dredging from table 2-7, there is the potential to create an additional 255 acres of wetlands over the ten-year BUDMAT Program using maintenance dredged material from the bay and inland reaches of the Barataria Bay Waterway. This is in addition to the beneficial use that is currently being conducted within the Federal standard in the bar reach of the channel.

In the Barataria Bay reach, the presence of numerous oyster leases both within and adjacent to the navigation channel limits beneficial use of dredged material within the Federal standard base plan. If the oyster leases were acquired and extinguished, it is likely that the many of the sites could be used for beneficial use within CEMVN's O&M Federal standard base plan. In November 2006, the Louisiana Legislature established the Louisiana Oyster Lease Acquisition and Compensation Program (OLACP), LSA-R.S. 56:432.1 and LAC 43:I:850-869, which enables the State of Louisiana to acquire oyster leases within the direct impact area of a coastal protection, conservation, or restoration project. The BUDMAT Program qualifies as such a project. However, it is important to note that it is the sole responsibility of the non-Federal sponsor of the Barataria Bay Waterway, Louisiana, navigation project to provide lands, easements, rights-of-way, relocations, and disposal areas (LERRDs), including acquisition costs of any oyster leases, for the Federal standard base plan. Therefore, since funds from the BUDMAT Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard, BUDMAT Program funds can only be used to acquire oyster leases for beneficial use sites that are clearly outside the scope of the Federal standard base plan disposal alternative.

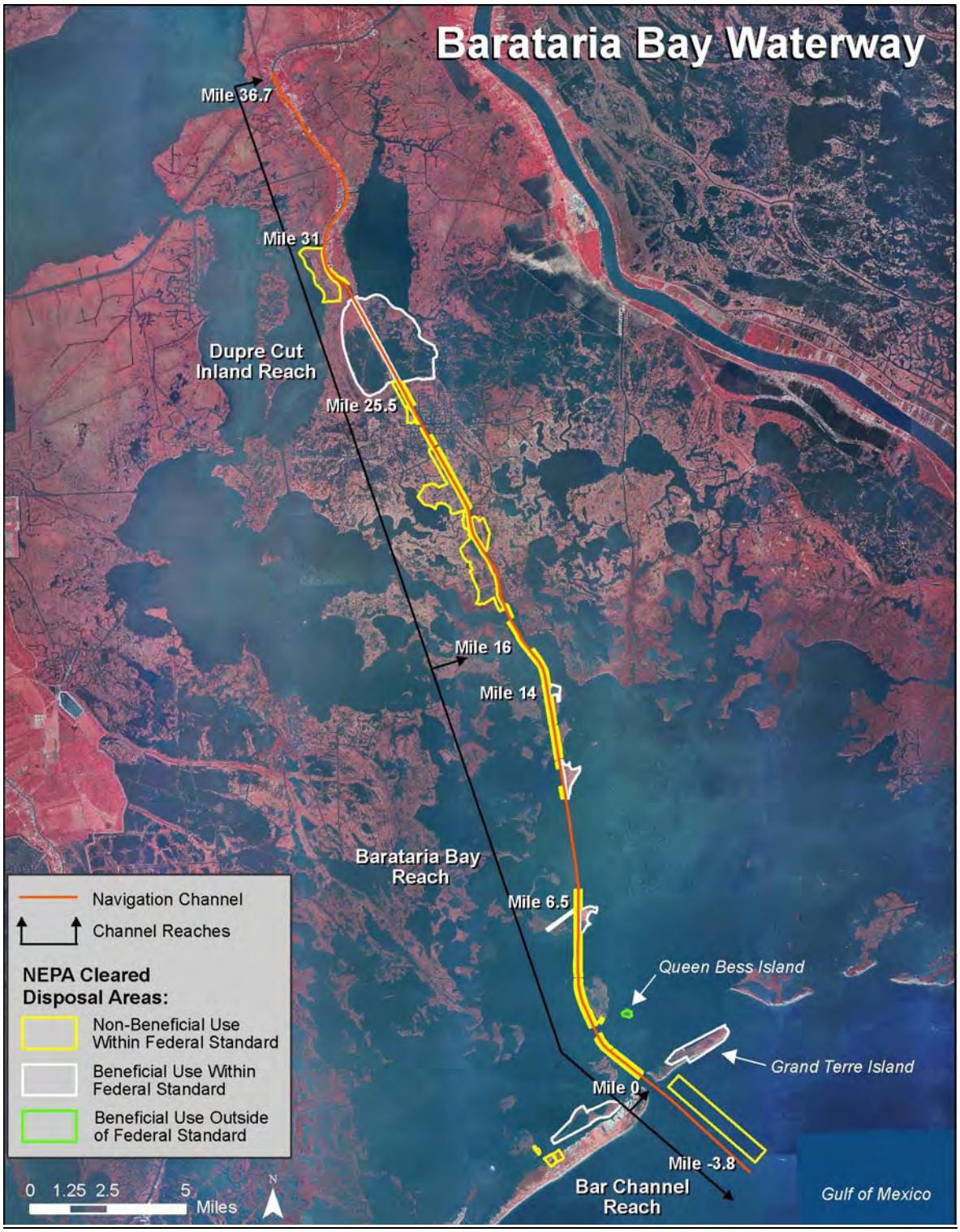

Figure 2-6. Barataria Bay Waterway, LA Navigation Channel

2.3.3.2 Mississippi River, Baton Rouge to the Gulf of Mexico, LA and Mississippi River Outlets, Venice, LA – Baptiste Collette Bayou and Tiger Pass – Figure 2-7

Currently 100 percent of the dredged material from maintenance of Baptiste Collette Bayou, Tiger Pass, and South Pass is beneficially used within the Federal standard to restore wetlands and to create and maintain islands for colonial nesting seabirds. Dredged material from the New Orleans harbor is placed into deep water disposal areas in the Mississippi River.

Figure 2-7. Mississippi River, Baton Rouge to the Gulf of Mexico, LA and Mississippi River Outlets, Venice, LA Navigation Channels

Prior to 2002, both hopper and hydraulic cutterhead pipeline dredges were used during annual maintenance of discontinuous reaches of Southwest Pass. From 1975 to 2002, dredged material removed using cutterhead pipeline dredges was used beneficially for bank nourishment and wetland restoration adjacent to the navigation channel in East Bay and West Bay. Since 2002, only hopper dredges are used for maintenance dredging in Southwest Pass; however, cutterheads are used to mine the hopper dredge disposal area at the head of Pass A Loutre. Dredged material from mining the Pass A Loutre disposal area is placed within the Delta National Wildlife Refuge to create/restore habitat for nesting waterfowl and to restore wetlands.

As stated above, since FY 2002, only hopper dredges have been used for maintenance dredging work in the Southwest Pass (SWP) reach of the Mississippi River. Hopper dredges in SWP either work in the dredge-and-haul dredging mode, or in the agitation dredging mode. Hopper dredges working between Mile 4.0 Above Head of Passes (AHP) and Mile 11.0 Below Head of Passes (BHP) dredge-and-haul to an open water, Section 404 disposal site at the head of Pass a Loutre and South Pass. Hopper dredges working between Mile 11.0 BHP and Mile 18.8 BHP dredge-and-haul to the designated ocean dredged material disposal site (ODMDS). Hopper dredges working in the jetty channel and the bar channel (mile 18.8 BHP to Mile 22.0 BHP) do agitation dredging and/or dredge-and-haul to the designated ODMDS. Agitation dredging involves filling a hopper dredge to capacity and allowing it to overflow. Fine sediments released into surface waters are carried out of the mouth of river to the Gulf of Mexico. Coarser/heavier sediments collect in the hopper and are ultimately hauled to the ODMDS. The above dredging and disposal alternative represents the Federal standard for the SWP dredging reach. As shown in table 2-6, only the dredged material from mining the Pass A Loutre disposal area is used beneficially within the Federal standard and accounts for about 6% of the total material dredged in SWP.

In 2007, CEMVN undertook a theoretical investigation of the feasibility and cost-effectiveness of performing pump-out disposal operations for hopper dredges working in the Southwest Pass (SWP) of the Mississippi River as a means to increase the beneficial use of O&M dredged material removed from SWP. The final November 2007 report entitled “Mississippi River-Southwest Pass Hopper Dredge Pump-Out Review” can be found in Appendix A. The results of this investigation show that, for purposes of maintaining the entire SWP channel (13,000,000 cy assumed for this investigation), the hopper dredge pump-out method is significantly more expensive than the current method of dredge-and-haul open water disposal. If all dredging were performed with hopper dredge pump-out disposal operations, the cost of SWP maintenance dredging would increase by about $ 18,718,093 annually for an incremental cost of $1.44 per cubic yard of material dredged. The investigation did identify that the most cost-effective hopper dredge pump-out dredging reach is located between Mile 10.0 Below Head of Passes (BHP) and Mile 13.0 BHP. However, the report concluded that actual costs for hopper pump-out operations in this dredging reach alone cannot be accurately determined until specific plans and specifications are developed, advertised and bids received.

Assuming 4,000 cy of dredged material is required to create one acre of wetland and using the average quantity per event from table 2-6 and the frequency of dredging from table 2-7, there is the potential to create an additional 39,000 acres of wetlands over a ten-year period using maintenance dredged material from the SWP reach of the Mississippi River. This is in addition to the beneficial use that is currently being conducted within the Federal standard in the Baptiste Collette, Tiger Pass

and South Pass reaches of the Mississippi River. However, as the total cost for the BUDMAT Program is $100 million including planning, design and construction, funding limitations would prevent the full potential from ever being realized. Even at the low range of incremental cost per cubic yard of material placed (i.e., $1/cy), only 8 to 9 million cy of the available 15 million cy in SWP each year could be used beneficially. This would entail focusing the entire BUDMAT Program only on the material dredged from SWP and potentially creating about 21,000 acres of wetlands over the ten-year BUDMAT Program.

2.3.3.3 Bayou Lafourche, LA (Port Fourchon) – Figure 2-8

In FY 2001, the Corps constructed the Port Fourchon navigation project, extending from the upper limit of the Port complex to the -27' mean lower low water (MLLW) contour in the Gulf of Mexico. Approximately every 5 years, maintenance dredging is performed within the inland portion of the channel and entails the removal of approximately 850,000 cubic yards. This material is used 100 percent beneficially within the Federal standard for the creation of marsh either in the CWPPRA –

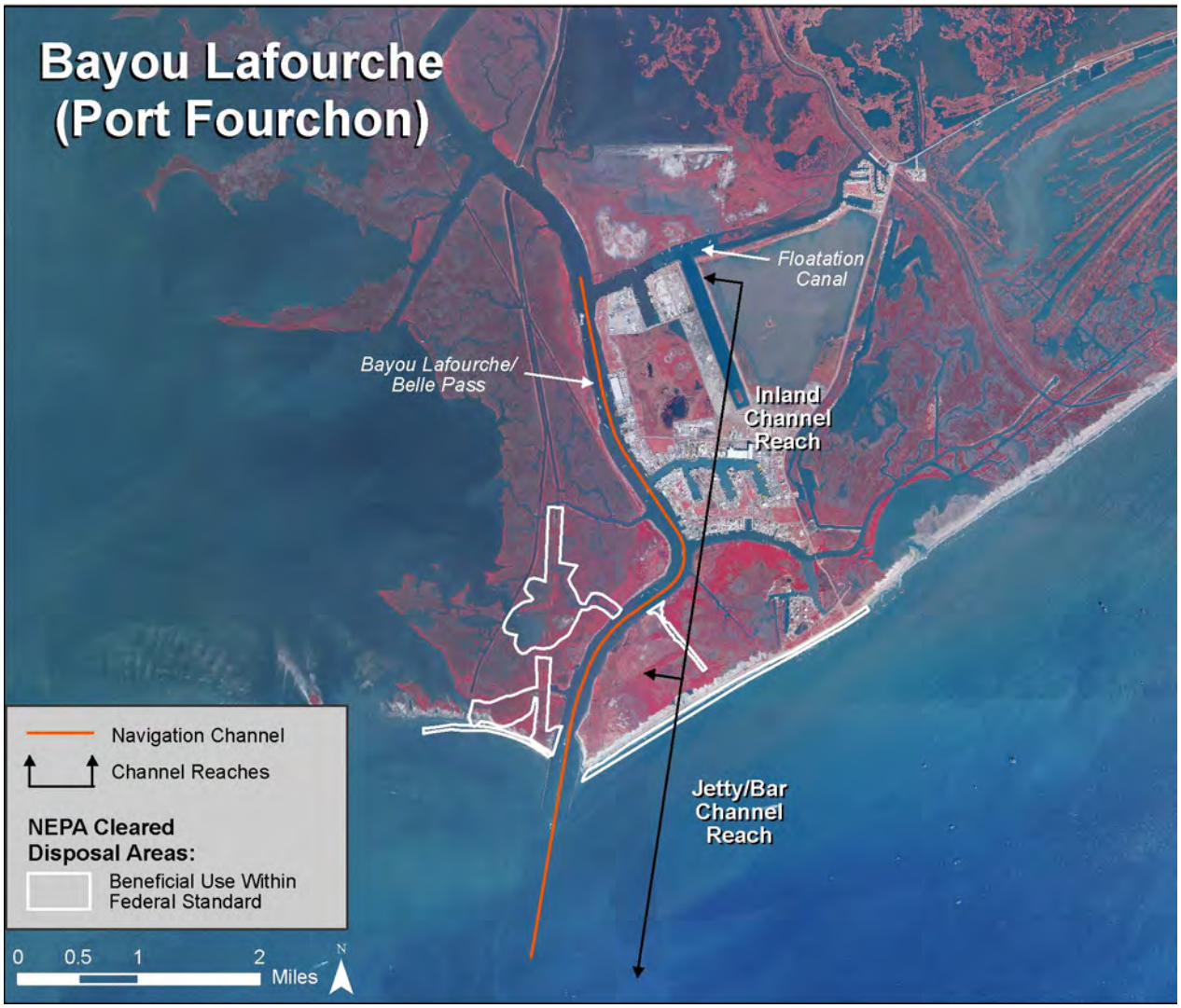

Figure 2-8. Bayou Lafourche, LA (Port Fourchon) Navigation Channel

West Belle Pass project area, as was recently performed in FY 06, or in the east and west beaches of the Gulf shoreline adjacent to the Belle Pass/ Bayou Lafourche channel. For future dredging, the Corps and the Lafourche Port Commission are currently pursuing a potential marsh creation site immediately north of Floatation Canal and the Port's latest area of development. This site could be used for placement of material dredged from the northern portion of the inland channel for marsh creation, while the material dredged from the lower portion would be placed along the Gulf shorelines for beach nourishment. Approximately every 1 to 2 years, maintenance dredging is performed within the bar channel and entails the removal of approximately 640,000 cubic yards. This material is also used 100 percent beneficially within the Federal standard for nourishment of the west and east beaches adjacent to Belle Pass/ Bayou Lafourche. The last maintenance event was performed in the fall of 2008.

2.3.3.4 Atchafalaya River and Bayous Chene, Boeuf and Black, LA – Figures 2-9 and 2-10

This project provides for a channel 20 feet deep over a bottom width of 400 feet from the -20 foot MLG contour in the Gulf of Mexico up through the Atchafalaya Bay and the Lower Atchafalaya River, then continuing to its northern reaches along the Bayous Chene, Boeuf, and Black. The Atchafalaya River and Bayous Chene, Boeuf and Black, LA, project can be divided into four reaches as follows: the Avoca Island Cutoff-Bayous Chene, Boeuf and Black (CBB) reach; the Lower Atchafalaya River – Horseshoe reach; the Atchafalaya Bay reach, and the Atchafalaya River bar channel reach. While sporadic dredging is performed on the northern bayou reaches, annual dredging is normally performed on three specific reaches of the lower project alignment; namely the bar channel reach, the bay channel reach and the Horseshoe reach. Within the Federal standard, a portion (approx. 22 percent) of the dredged material from maintenance of the Avoca Island Cutoff-Bayous Chene, Boeuf, and Black reach is placed into shallow open waters of Avoca Island for wetlands development while the remainder is placed into confined and semi-confined disposal facilities. All dredged material from maintenance of the Lower Atchafalaya River-Horseshoe reach is placed unconfined in open water and unconfined in open water adjacent to the banks for wetlands development within the Federal standard. Additionally, all dredged material from maintenance of the Atchafalaya Bay reach, consisting predominately of sand, is placed to construct artificial delta lobes to provide habitat for nesting waterfowl with wetlands on the margins within the Federal standard. In the Atchafalaya River bar reach, dredged material suitable for stacking from the upper end of the channel (approx. 20 percent) is used to create and maintain islands for colonial nesting seabirds within the Federal standard. The remaining material from the bar reach (approx. 80 percent) is placed into the ocean dredged material disposal site on the west side of the channel since the high levels of very fine silts and clays which characterize this dredged material make it a poor candidate for potential marsh creation. Lastly, dredged material from the maintenance of the Berwick Bay Harbor, located adjacent to Morgan City, Louisiana, is either placed unconfined in open water areas or in commercial sand pits.

Assuming 4,000 cy of dredged material is required to create one acre of wetland and using the average quantity per event from table 2-6 and the frequency of dredging from table 2-7, there is the potential to create an additional 2,251 acres of wetlands over the ten-year BUDMAT Program using maintenance dredged material from the Bayous Chene, Boeuf and Black reach. This is in addition to the beneficial use that is currently being conducted within the Federal standard in the bar, bay, and Horseshoe Bend reaches of the channel.

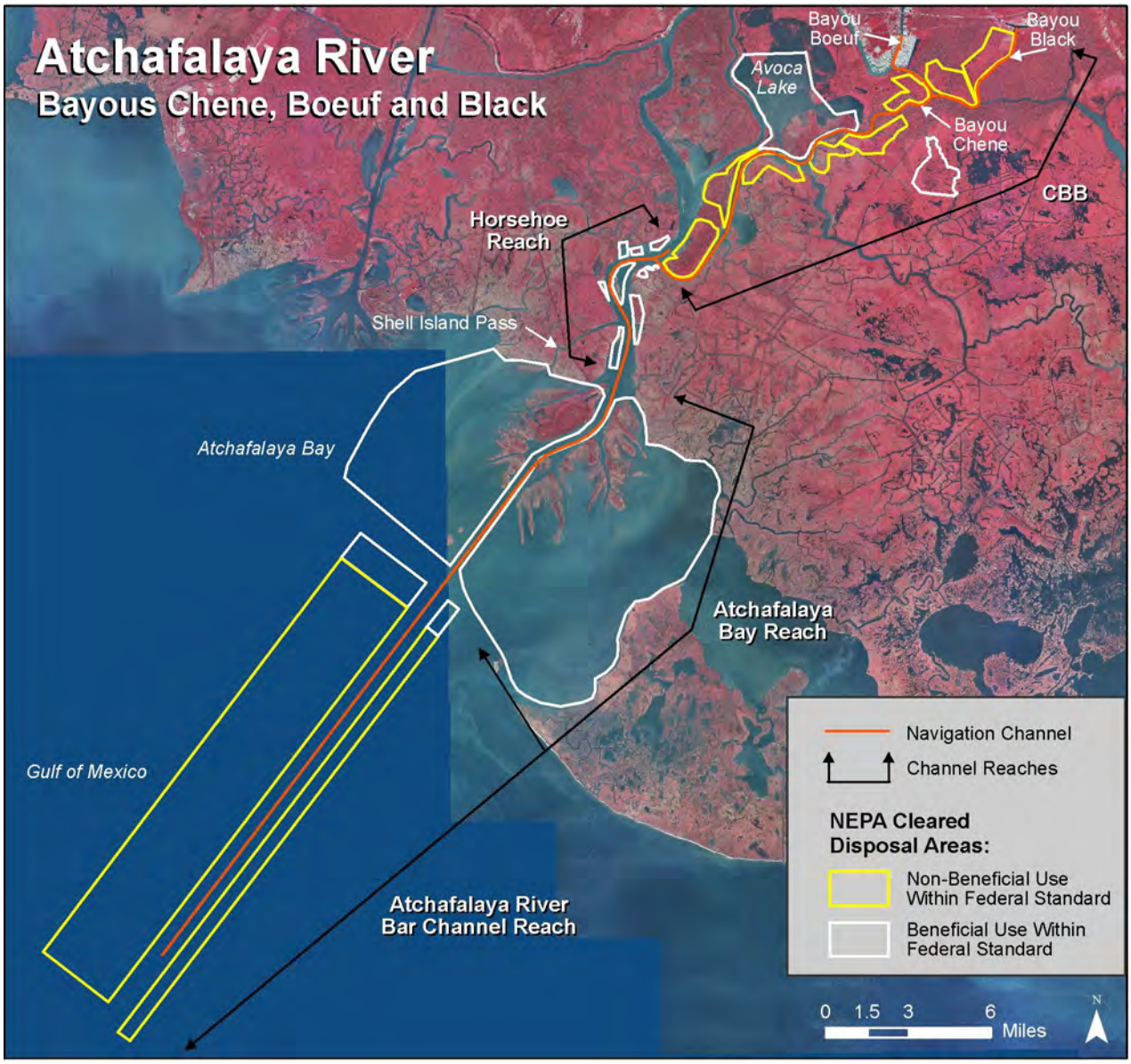

Figure 2-9. Atchafalaya River and Bayous Chene, Boeuf and Black, LA Navigation Channels

Potential beneficial use projects that have been recently investigated by CEMVN in coordination with the state are discussed below.

The Horseshoe reach of channel appears to have the greatest potential for additional beneficial use of dredged material outside of the Federal standard. That is, the required annual dredging of approximately 1.2 million cubic yards of predominantly sandy material is ideal for either wetland creation or bird island creation. With additional incremental funding, dredged material could be piped either north to Avoca Lake or south to the Atchafalaya Bay for potential wetland creation areas.

Avoca Lake, an open water potential disposal area to the north would require approximately a 10-mile length of disposal pipeline and associated booster pumping capacity to accomplish marsh

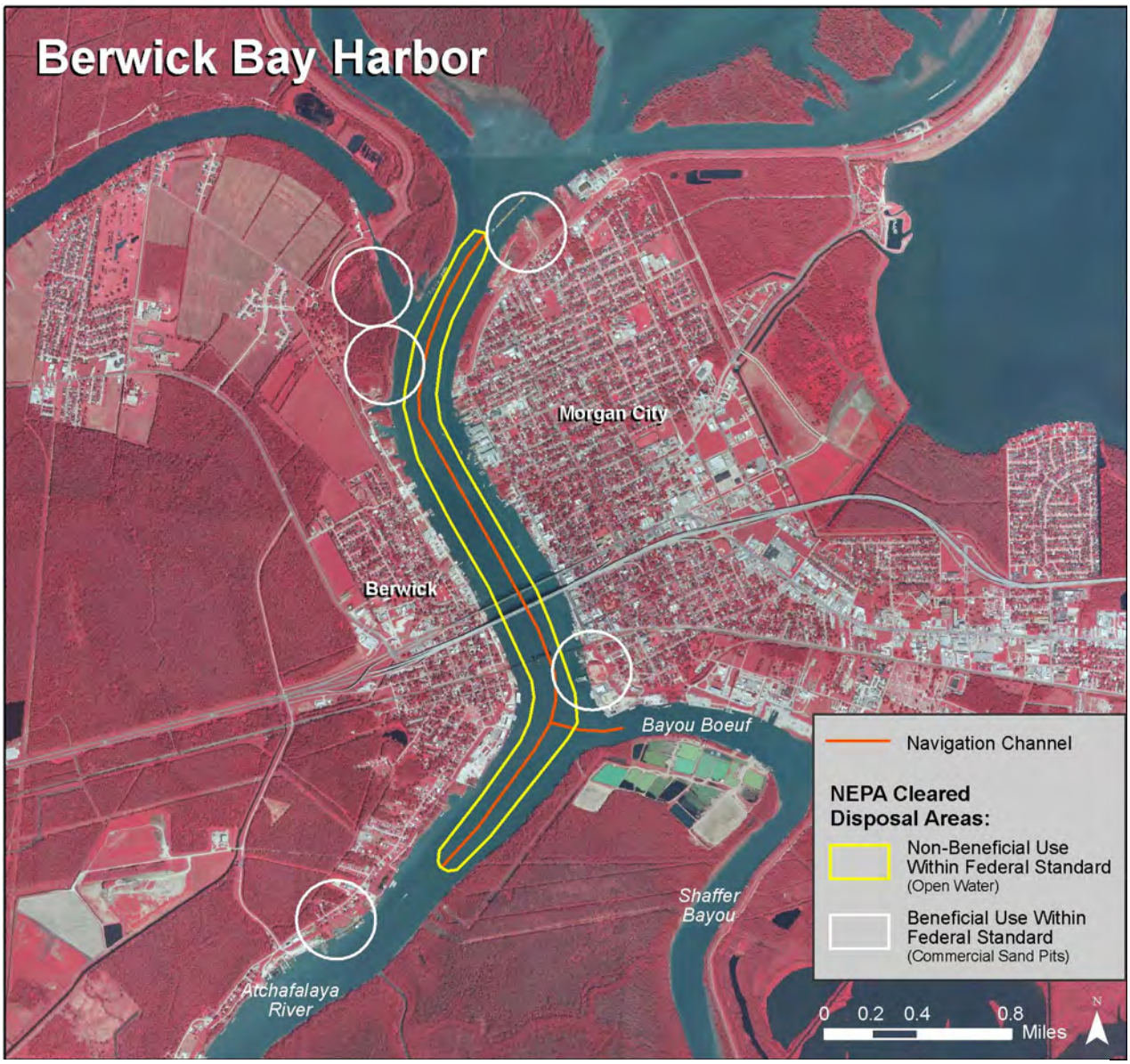

Figure 2-10. Atchafalaya River, Berwick Bay Harbor, LA

creation with material dredged from the Horseshoe reach. Using the entire 1.2 million yards of dredged material, it is approximated that 150 acres could be constructed per cycle at an estimated incremental cost of $9.70 per cubic yard of material dredged (Oct/Nov 2007 price levels). Again, the entire BUDMAT Program estimated budget of $10M per year for ten years could be consumed by focusing on this channel reach alone. Note that this beneficial use option does require earthen retention features.

Southern disposal of this Horseshoe reach material could potentially entail piping the material through Shell Island Pass to the near shore Atchafalaya Bay for wetlands development and bird island creation. This disposal plan would require a dredge disposal pipeline length of approximately 6-7 miles, and mimic the ongoing disposal activities currently being used in the Bay

Channel reach of dredging which is unconfined disposal, requiring no retention structures. Incremental cost estimates for this disposal plan are approximately $4.60 per cubic yard of dredged material (Oct/Nov 2007 price levels), and could result in the creation of approximately 135 acres per dredging cycle.

2.3.3.5 Houma Navigation Canal (HNC), LA – Figure 2-11

This project provides maintenance of 40.5 miles of authorized navigation channel from Houma, Louisiana to the -18.0 foot contour in the Gulf of Mexico. The inland reach (northern 26.6 miles) and the bay channel reach (10.0 miles) are maintained at -15' MLG by 150 feet width, while the Bar channel (outer 3.9 miles) is maintained at -18' MLG by 300 feet width. Dredged material from the inland reach (Mile 36 – Mile 10) of the Houma Navigation Canal is placed into both upland confined disposal facilities (approx. 60 percent) and into shallow open water areas adjacent to the channel (40 percent) for wetlands development within the Federal standard. Placement option selected is dependent on availability of disposal easements and distance from dredging site to potential wetlands development placement sites. In the Terrebonne Bay reach (Mile 10.0 – Mile 0), approximately 44 percent of dredged material is placed unconfined into open water adjacent to channel for wetland restoration within the Federal standard and the remaining material is placed in open water west of the navigation channel. The presence of numerous oyster leases in this reach of the channel precludes more beneficial use of the dredged material within the Federal standard. If the oyster leases were acquired and extinguished, it is likely that the many of the sites could be used for beneficial use within CEMVN's O&M Federal standard base plan. In November 2006, the Louisiana Legislature established the Louisiana Oyster Lease Acquisition and Compensation Program (OLACP), LSA-R.S. 56:432.1 and LAC 43:I:850-869, which enables the State of Louisiana to acquire oyster leases within the direct impact area of a coastal protection, conservation, or restoration project. The beneficial use of dredged material qualifies as such a project. However, it is the sole responsibility of the non-Federal sponsor of the HNC navigation project to provide lands, easements, rights-of-way, relocations, and disposal areas (LERRDs), including acquisition costs of any oyster leases, for the Federal standard base plan. Therefore, since funds from the BUDMAT Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard, BUDMAT Program funds can only be used to acquire oyster leases for beneficial use sites that are clearly outside the scope of the Federal standard base plan disposal alternative. Dredged material from the bar channel/Cat Island Pass reach (Mile 0 to Mile -3.9) is only beneficially used on Wine

Island if incremental funding is available from Sec. 204 of WRDA 1992, as amended, or if a non-Federal sponsor provides 100 percent of the incremental cost for placement; otherwise, the dredged material from this reach is placed unconfined at two single point discharge sites in open water adjacent to the channel to the west.

Assuming 4,000 cy of dredged material is required to create one acre of wetland and using the average quantity per event from table 2-6 and the frequency of dredging from table 2-7, there is the potential to create an additional 2,208 acres of wetlands over the ten-year BUDMAT Program using maintenance dredged material from the inland, bay, and bar reaches of the Houma Navigation Canal. This is in addition to the beneficial use that is currently being conducted within the Federal standard in the inland and bay reaches of the canal.

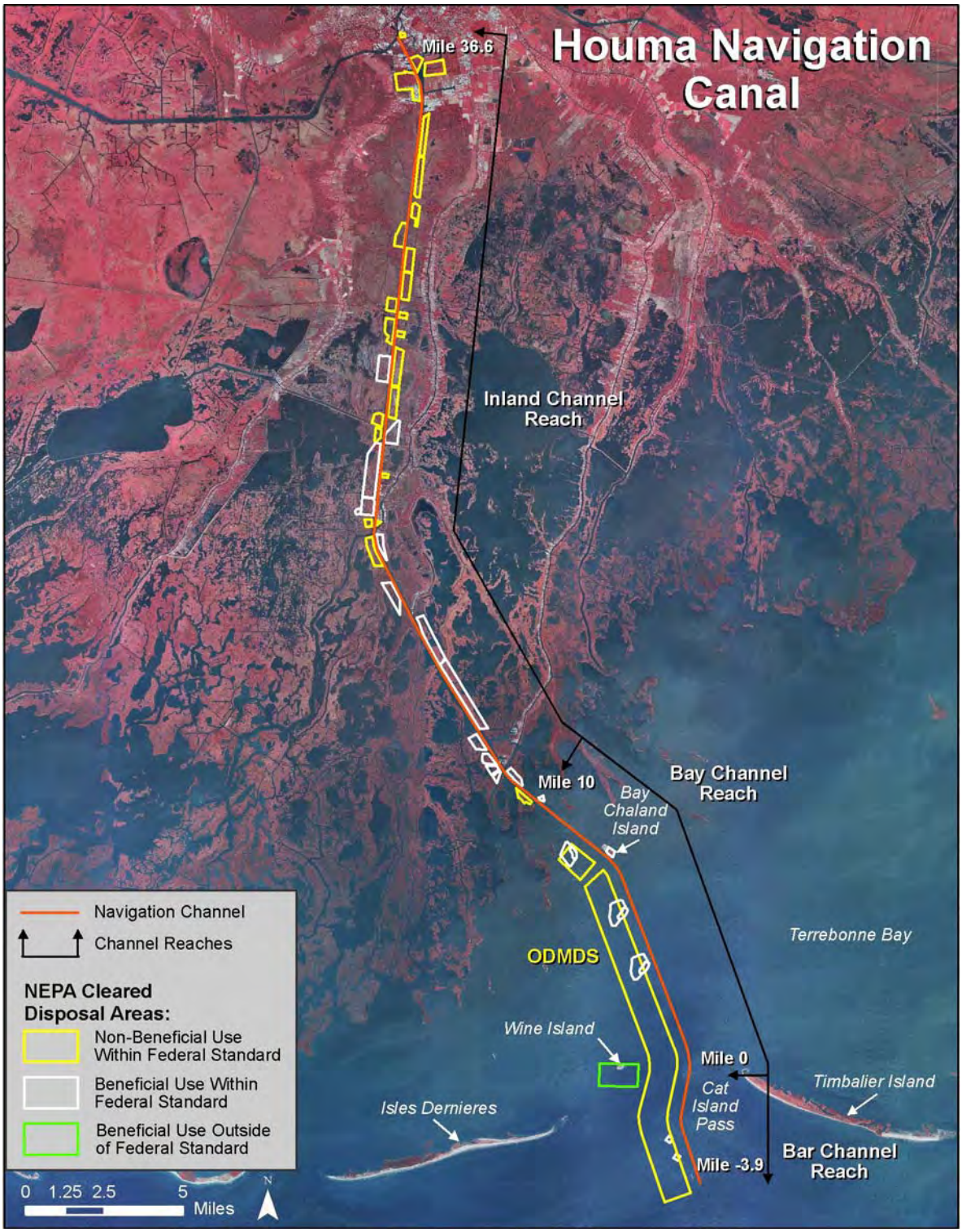

Figure 2-11. Houma Navigation Canal, LA Navigation Channel

Historically, previous efforts have been made to use the dredged materials from the bay and bar reaches beneficially with additional incremental funding. On two occasions, materials dredged from the Cat Island Pass reach (bar channel) have been transported to the remnants of Wine Island, located immediately west of the bar channel, under the CAP 204 program for island restoration. These events occurred in FY 91 and 93. During FY 03, the Corps solicited for bids for the maintenance dredging of the bar channel, with plans to place the dredge material at a feeder berm location immediately southeast of the Wine Island rock cell. However, only one contractor submitted a bid which was nearly 200 percent above the Government estimate. Thus, the solicitation had to be cancelled and the job was re-solicited with the disposal plan revised to allow for the dredge material to be placed at one or two single point discharge sites located within the EPA approved ocean dredged material disposal site (ODMDS). Recently, material from the lower portion of the Terrebonne Bay reach was disposed of within the rock containment dike at Wine Island during maintenance dredging performed in FY 07. This was able to be accomplished as the LDNR, at the request of the local sponsor – Terrebonne Parish, was able to provide additional funding that supplemented the Corps' Federal budget and paid for the incremental cost to place this material within the Wine Island rock cell rather than within the adjacent open water disposal site. However, the majority of this material did not remain within the cell as the material within the bay channel consist primarily of very fine silts and clays, in contrast to the material that is dredged within the bar channel which is coarser in nature and proven to be more suitable for placement either within the Wine Island rock cell or Wine Island feeder berm. Disposal for beneficial use at Bay Chaland Island was initially performed during O&M dredging in FY 93. For this contract, earthen closures were constructed using adjacent borrow and dredge material from a portion of the channel placed within the shallow open water areas at Bay Chaland Island. In FY 95, a rock containment cell was constructed and dredge material again placed within the confines of this rock cell for creation and nourishment of wetlands. During FY 98 O&M dredging, additional dredge material was again placed within the existing rock cell, and in FY 02 the original rock cell was expanded towards the north and dredge material placed within the newly constructed rock cell. During O&M dredging performed in FY 05, additional material was again placed within the rock cell constructed in FY 02.

Several alternatives exist for the potential beneficial use of dredged materials from the bay and bar reaches. As stated above, and shown in table 2-6, material from the bar channel reach is coarser in nature, and likely more suitable for placement in the vicinity of the barrier islands than the bay channel material.

The bay channel reach, approximately 10 miles in length, presents two potential disposal considerations, namely pumping distance and material characteristics, which must be considered when formulating a beneficial use disposal plan. Material from this reach could be pumped south to the existing barrier islands for island restoration, and/or north to the existing broken interior marsh shoreline. As fine grain materials are not conducive to barrier island restoration, a large portion of the bay channel material would likely be better suited for interior marsh development. In an effort to best balance pumping distances required, along with character of material encountered by reaches, it is assumed that approximately the northern 6 miles of bay channel dredged material would be pumped north for the creation and restoration of interior marshes, and that the lower 3-4 miles would be pumped to the existing Isles Dernieres and Timbalier barrier islands.

Approximately 1,000,000 cy is estimated to be available for interior marsh creation and approximately 600,000 cubic yards is estimated to be available for back bay marsh creation behind the existing barrier islands. This disposal plan would require a maximum dredge disposal pipeline length of approximately 6-7 miles. Specific disposal sites, including required retention features, would have to be designed for each proposed dredging cycle to accommodate this material. Also to be noted is that dredging operations within the outer reach of the bay channel should be scheduled to take place during non-winter months to provide best possible weather and sea conditions during construction. The incremental cost estimate for the this beneficial use disposal plan is estimated to be approximately $ 2.30 per cubic yard of dredged material (Oct/Nov 2007 price levels), and could result in the creation of approximately 310 acres per dredging cycle (approximately 200 acres within the interior marshes and approx 110 acres of back bay marsh behind the barrier islands). It should be noted that this cost does not include the earthen retention features that would be required and designed during development of the disposal area layout.

Potential beneficial use of material dredged from the HNC – Cat Island Pass Bar channel reach, which is coarser than the bay material and comprised of approximately 30 percent sands and 65 percent silts, could entail restoration of the existing barrier islands located both east and west of the navigation channel (Timbalier Island to the east and Isles Dernieres to the west). Unconfined beach nourishment on the gulf side of the islands and/or back bay marsh creation are both worthy of consideration. Also to be noted is that dredging operations within the bar channel should be scheduled to take place during non-winter months to provide best possible weather and sea conditions during construction. A total of approximately 800,000 cubic yards/cycle of material from the bar channel could be used for island nourishment and/or back bay marsh creation. The incremental cost estimate for these two potential beneficial use disposal plans (Isles Dernieres and Timbalier Island) is estimated to be approximately $ 3.40 per cubic yard and $ 8.60 per cubic yard of dredged material (Oct/Nov 2007 price levels), respectively.

2.3.3.6 Freshwater Bayou, LA – Figure 2-12

The Freshwater Bayou project provides for a -12’ MLG by 125’ channel, extending from its commencement at Mile 161.2W of the GIWW to Freshwater Bayou Lock. Gulf ward of the lock, the channel is authorized to -12’ MLG by 125’ from the lock to Mile 0 (Gulf Shoreline), from which it transitions to a -12’ MLG by 250’ bar channel. Since the project was completed in FY 82, O&M dredging has only been warranted and performed within the gulf entrance channel (bar channel) reach. Maintenance dredging of the bar channel is generally performed on a 2 to 4 year cycle with approximately 1,000,000 cy of predominantly silty material removed each dredging cycle. Original disposal plan called for the placement of material within confined disposal areas along the banks of the waterway, as well as offshore material placed unconfined within an EPA approved ocean dredged material disposal site (ODMDS). The ODMDS was last used in 1990 and since that time the material removed from between the lock and the outer bar channel limit (approximately 5 miles) has been placed along the Gulf shoreline and west of the channel with all material used 100 percent beneficially for beach/shoreline nourishment within the Federal standard.

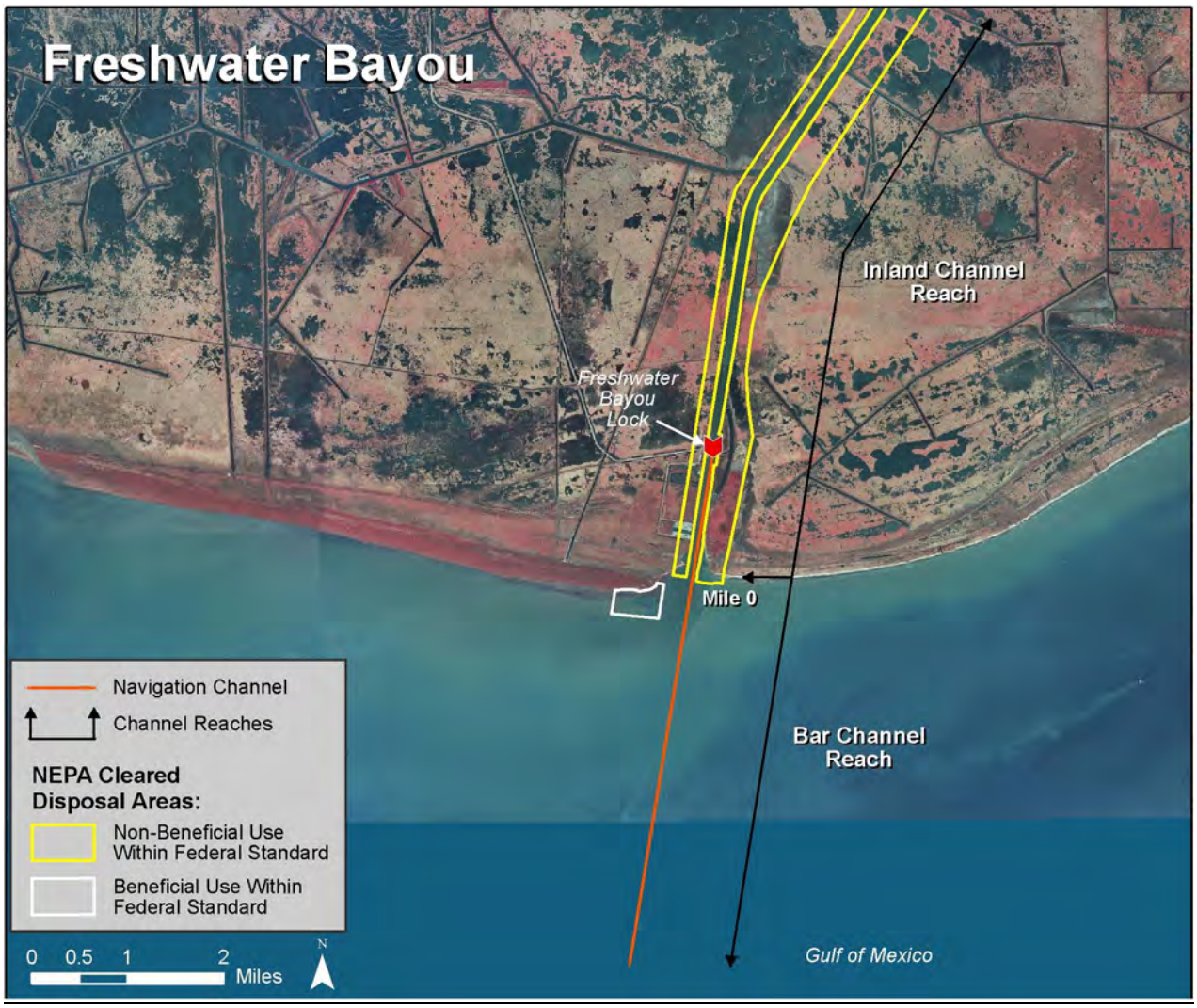

Figure 2-12. Freshwater Bayou, LA Navigation Channel

2.3.3.7 Mermentau River, LA – Figure 2-13

The Mermentau River to the Gulf Navigation Channel, beginning at Mermentau River Mile 6.2 at Grand Chenier, LA and just west of and downstream of the LA Hwy 82 bridge, was constructed by the East Cameron Port Harbor and Terminal District in 1971. At the request of the Cameron Parish government, the Federal Government performed a study to investigate the status of the navigation improvement constructed by the East Cameron Harbor and Terminal District who had requested that the Federal Government assume maintenance of the channel. The interim feasibility report, completed in 1975, recommended that the Federal Government assume the maintenance of the channel upon completion of certain non-Federal conditions. In FY 82, the first O&M dredging event performed by the Corps was awarded. Since then, O&M dredging has been performed on an average 1 to 3 year cycle with an average of approximately 1.3 million cy of material removed from the channel limits. The project calls for the maintenance of a -15' MLG channel over a 100' bottom width between Mile 6.2 (junction of navigation channel with Mermentau River) , through Lower

Mud lake and the land cut area leading to the jetties, and thence a -15' MLG channel over a 200' bottom width through the jetty and Gulf entrance (Bar) channel reach.

Original disposal plan as proposed by the locals, called for the placement of material within confined disposal areas along the banks of the waterway, as well as offshore material placed unconfined within an EPA approved ODMDS. The ODMDS was last used in 1996 and since that time the Corps has required that all material be used beneficially for either marsh creation in Lower Mud Lake or shoreline nourishment immediately adjacent to and behind the west jetty. The last O&M dredging event performed was completed in FY 07 and all the material was used 100 percent beneficially for shoreline nourishment within the Federal standard.

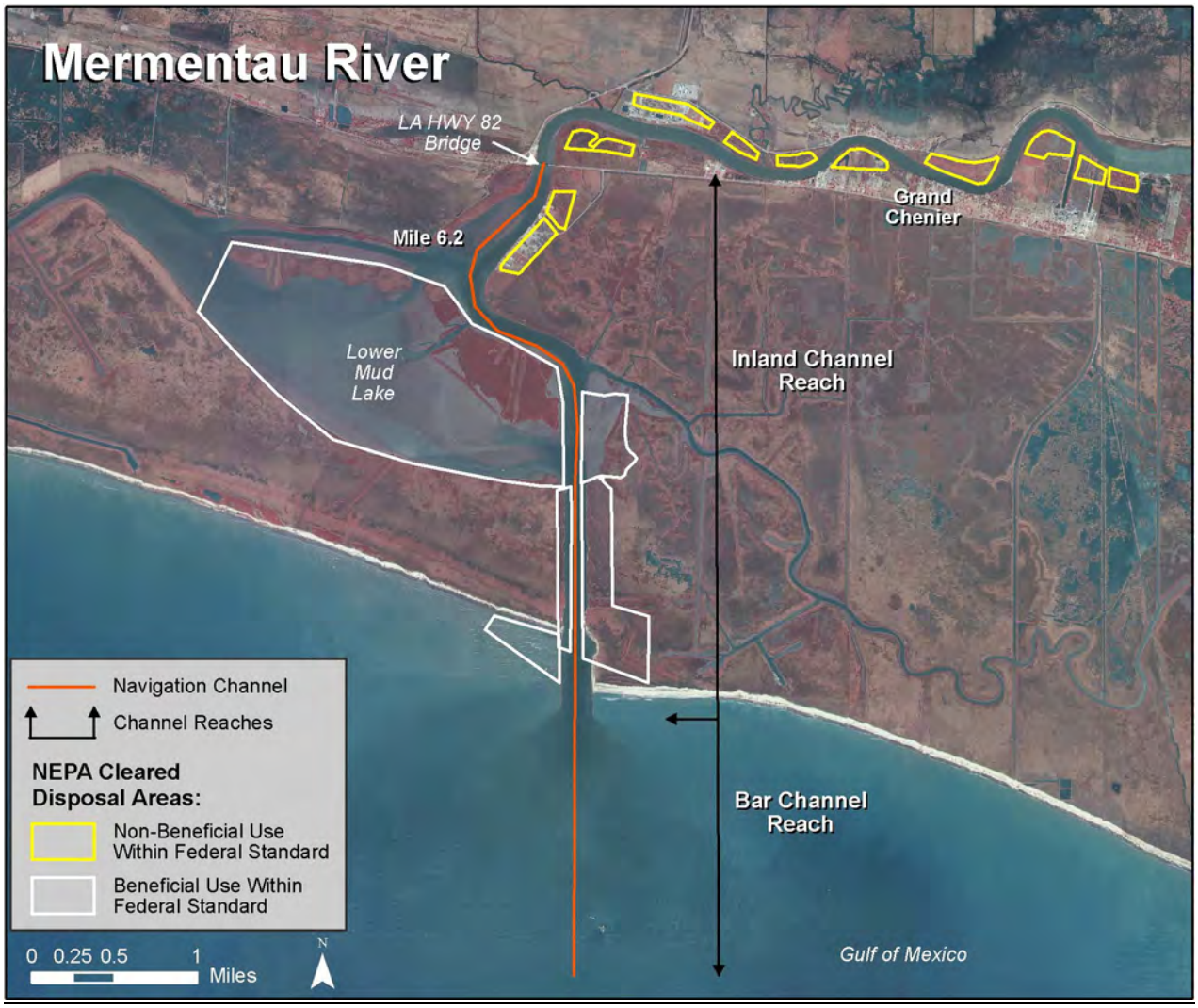

Figure 2-13. Mermentau River, LA Navigation Channel

2.3.3.8 Calcasieu River and Pass, LA – Figure 2-14

The Calcasieu River and Pass Ship Channel was authorized by Congress and construction by the Corps of Engineers was completed in 1968. The project authorized the construction and maintenance of a -40' MLG by 400' wide channel from the Gulf to Mile 34, upper limit of the Port of Lake Charles. From there, the authorized channel extends to the turning basin jump south of the I-10 at Mile 36. This reach, between Miles 34 and 36, is authorized to a depth of -35' MLG by 250' width (excluding flare at Mile 35 and turning basin at Mile 36. The authorized project (Federal standard) for the inland reach includes placement of the dredge material within confined disposal areas adjacent to the channel with retention dikes constructed and maintained as necessary in order to accommodate the dredged material. Over time, as shoaling patterns changed, especially in the reach between Miles 24.5 and 5, requiring more frequent maintenance of the channel in order to provide safe passage for the various petroleum and liquefied natural gas (LNG) facilities that exists along the channel, numerous problems involving stability of retention dikes within a number of disposal areas has become a recurrence. As a result of these problems, the Corps has had to reduce O&M dredging for the reaches between Miles 5 and 24.5 on several occasions. Funding through other means, such as CWPPRA and CAP Section 204, when available, has allowed the Corps to maintain the channel to its full authorized dimensions on a couple of occasions. In the late 1980's, CEMVN began placing some maintenance material at the Sabine National Wildlife Refuge for wetland restoration. Although a majority of the dredged material from routine maintenance continues to be placed into confined disposal facilities, wetland restoration at Sabine National Wildlife Refuge has continued pursuant to Section 1135 of WRDA 1986, Section 204 of WRDA 1992, and CWPPRA.

Assuming 4,000 cy of dredged material is required to create one acre of wetland and using the average quantity per event from table 2-6 and the frequency of dredging from table 2-7, there is the potential to create an additional 11,748 acres of wetlands over the ten-year BUDMAT Program using maintenance dredged material from the three inland reaches of the channel. This is in addition to the beneficial use that is currently being conducted within the Federal standard in the bar reach of the channel.

Several beneficial use projects outside of the Federal standard have been constructed and/or investigated for this navigation channel and are discussed below.

a. Calcasieu River and Pass– Miles 5 to 14

Maintenance dredging of the Calcasieu River Ship Channel, Miles 5 to 14, is regularly maintained by the Corps every 1.5 to 2 years. During each dredging cycle, approximately 3.6 million cubic yards of material are dredged from this reach of the channel via hydraulic cutterhead dredged every 1.5 to 2 years. Beneficial use has been performed on several occasions with maintenance material dredged from within a portion of this reach of the channel, the latest being the CWPPRA – Sabine Refuge Marsh Creation, Cycle 3 project. In order to perform these beneficial use projects, the O&M budget was supplemented by other funding authorities such as the Continuing Authorities Programs (CAP) Section 1135 and Section 204, and CWPPRA, which have allowed for material from a portion of the channel to be pumped via long distance pipeline to

various locations within the Sabine Refuge for marsh creation in lieu of the approved upland confined disposal sites adjacent to the channel which define the Corps' Federal standard.

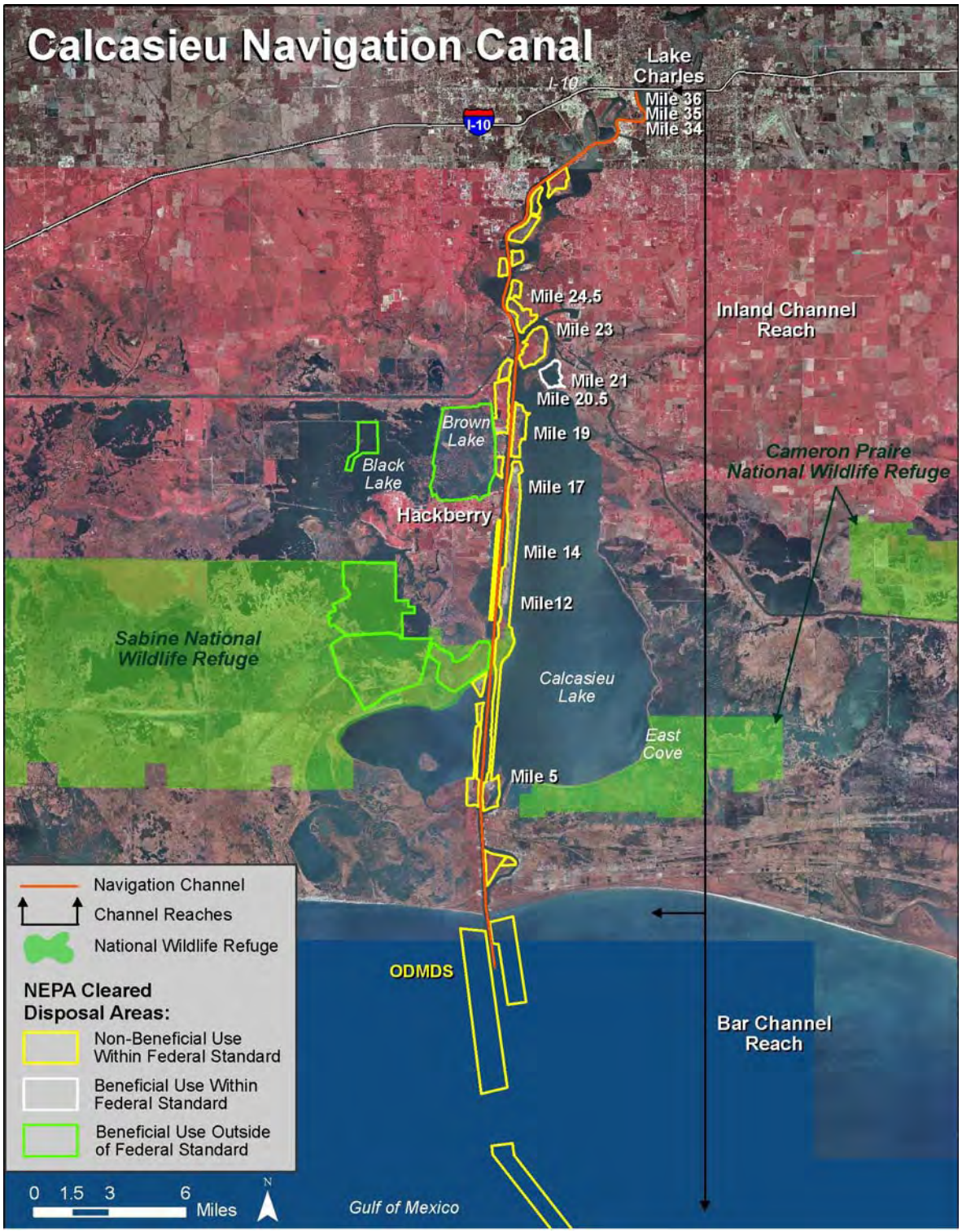

Figure 2-14. Calcasieu River and Pass, LA Navigation Channel

(1) Beneficial Use at Sabine Refuge constructed under the CWPPRA Program

For the CWPPRA Sabine Refuge Marsh Creation project, 2 of the 5 authorized marsh creation sites have been constructed. Approx 1,800,000 gross cubic yards (approx 900,000 cy per cycle as authorized by the CWPPRA Sabine Refuge Marsh Creation project) have been removed from the channel during O&M dredging and placed in the refuge for the creation of approx 400 acres of marsh through the first 2 cycles. The first two cycles (constructed in FY 2000 and FY 2007) entailed transporting the dredged material via temporary pipelines. Material dredged from this reach during O&M dredging consists predominantly of silts and clays that have proven to be very effective for marsh creation. In conjunction with the placement of the dredged material for beneficial use, earthen retaining dikes and weirs have been constructed in order to prevent material from entering private lands adjacent to the Sabine Refuge, as to maximize retention of solids and acres of wetlands created. Soil foundation in the wetland creation areas consist of clays that exist approx 2' below the existing mudline, covered by soft organics, and has provided a good foundation for the construction of stable earthen dikes and weirs used for retention of the dredged material. The water depths within the CWPPRA Sabine Refuge site vary from 1.0' to 1.5', with the elevation of the receiving area ranging from 0 to -0.5' MLG. The targeted range for the elevation of the slurry placed within these sites was between +4' MLG and +4.5' MLG. In most cases, the elevation averaged closer to +3.5 to +4' MLG as the disposal plan for each site allows for the rear earthen weirs to be breached as necessary to allow for excessive water to drain from the primary wetland creation site and allow for the fine suspended sediments to fall out into the adjacent secondary wetland creation area. The additional cost to place this material within the Refuge which falls outside of the Corps' Federal standard has been approx $3.5 million/cycle. The remaining 3 sites will each yield approximately 200 acres of marsh through the placement of approx 900,000 cubic yards each cycle. This will be accomplished via the transport of the material through a permanent pipeline, to be constructed along the right descending bank of the waterway in the Hackberry, LA area. Construction of this permanent pipeline is authorized under and will be funded through CWPPRA and is scheduled to be constructed in FY 09. Upon completion of the project within the five (5) authorized marsh creation sites, approx 1,000 acres of emergent wetlands will have been created along with an estimated 400 acres of shallow water sub-deltaic habitat created immediately outside of each marsh creation site.

Beneficial Use at East Cove

Under CWPPRA Priority Project List (PPL)-17, marsh creation within the Cameron Prairie National Wildlife Refuge was proposed. This candidate project, however, was not selected for further evaluation by the CWPPRA Task Force. Under this project, material dredged between Miles 5 and 12 would have been placed within 2 shallow water areas adjacent to the south shoreline of Calcasieu Lake for marsh creation in two dredging cycles. The CWPPRA would have supplemented the Corps' O&M budget, just as it has for the CWPPRA Sabine Marsh Creation project, and allowed for the material dredged from this reach to be used beneficially for marsh creation in lieu of placement within the upland confined disposal areas. Approximately 1,900,000 gross cubic yards of dredged material would be used beneficially from within this reach via hydraulic cutterhead dredge. Material dredged from this reach during O&M dredging consists predominantly of silts and clays that have proven to be very effective for marsh creation. In conjunction with the placement of the dredged material for beneficial use, earthen retaining dikes

and weirs would be constructed in order to prevent material from entering private lands adjacent to the Refuge, as well as access and drainage canals, in order to maximize retention of solids and acres of wetlands created. Soil foundation in the wetland creation area consists of soft to medium clays that exist approx 1'- 2' below the existing mudline, covered by softer organics, and would provide a good foundation for the construction of earthen dikes and weirs used for retention of the dredged material. The water depths within the site vary from 1.5' to 2.0', with the elevation of the receiving area ranging from approx -1 to -1.5' MLG. The targeted range for the elevation of the slurry placed within these sites would be between +4' MLG and +4.5' MLG, same as that successfully used for the CWPPRA - Sabine Refuge project. As done in the Sabine Refuge, the earthen weirs could be breached as necessary to allow for excessive water to drain from the primary wetland creation site(s) and allow for the fine suspended sediments to fall out into the adjacent secondary wetland creation area, thus providing nourishment to the adjacent wetlands. Approximately 320 acres of emergent wetlands could be created each cycle by placement of material excavated from this reach of the channel within two shallow water areas located in the Cameron Prairie National Wildlife Refuge. Based upon information developed during the preparation of cost estimated for PPL-17, the incremental increase in price per cubic yard for this plan was approx $3.95 (Oct/Nov 2007 price levels).

b. Calcasieu River and Pass– Miles 14 to 24.5

Maintenance dredging of the Calcasieu River Ship Channel, Miles 14 to 24.5, is regularly maintained by the Corps every 1.5 to 2 years. During each dredging cycle, approximately 4,500,000 cubic yards of material are dredged from this reach of the channel via hydraulic cutterhead dredge. Material dredged from this reach consists predominantly of silts and clays that have proven to be very effective for marsh creation. Beneficial use within the Brown Lake marsh creation area has been performed with maintenance material dredged from within this reach on a couple of occasions, the latest being in FY 98. In order to perform these beneficial use projects, the O&M budget was supplemented by the Continuing Authorities Program (CAP) Section 204, which allowed for material from a portion of the channel to be pumped via long distance pipeline to the Brown Lake sites for beneficial use in lieu of the approved upland confined disposal sites adjacent to the channel which define the Corps' Federal standard.

(1) Beneficial Use at Marcantel Marsh Creation Site

Marsh creation within shallow open water property just north of Black Lake and west of the previous Brown Lake marsh creation area, otherwise known as the Marcantel marsh creation site, has been proposed by the Corps and Port of Lake Charles. In order to make this possible, the Port of Lake Charles, local sponsor for the Calcasieu River and Pass navigation project, is pursuing additional funds in the amount of $10 million (a combination of State and Parish CIAP and State surplus funds), which would be used for the additional planning, engineering and design required, as well as pay for the incremental cost to transport material dredged from the channel via long distance pipeline and place the material within the Marcantel Site for beneficial use in lieu of the approved upland confined disposal sites adjacent to the channel which define the Corps' Federal standard. Various alternatives are currently being assessed and costed-out which could include placement of material dredged from either Miles 14.8 to 17, Miles 17 to 21, Miles 19 to 23, or Miles 20.5 to 24.5. Upon completion of these assessments, as well as determining the optimum plan for

use of the state funds, plans and specifications (P&S) for O&M dredging scheduled for award in FY 2009, will include the selected beneficial use plan for the Marcantel Site. Approximately 1,400,000 cubic yards will be excavated via hydraulic cutterhead dredge and transported to the open waters within the Marcantel marsh creation site via long distance pipeline. Soil foundation in the wetland creation area consists of soft to medium clays that exist approx 2'- 3' below the existing mudline, covered by softer organics, and would provide a relatively good foundation for the construction of earthen dikes to be used for retention of the dredged material. The water depths within the site vary from 3.0' to 3.5', with the elevation of the receiving area ranging from approx -2 to -2.5' NAVD 88. The targeted range for the elevation of the slurry placed within this site would be between +4' NAVD 88 and +4.5' NAVD 88. This is slightly lower than the maximum allowed elevation of +6' MLG that was allowed for the FY '98 Browns Lake marsh creation project, constructed during O&M dredging of the Calcasieu Ship Channel. Retention dikes will be constructed as necessary to prevent material from encroaching upon adjacent landowners as well as to maximize retention of solids for marsh creation. Approximately 250 acres of emergent wetlands could be created during this upcoming dredging event at an average incremental increase in price per cubic yard of approx $4 (Oct/Nov 2007 price levels). Following this dredging event, additional funds would be required to supplement the Corps O&M budget for future use of the Marcantel Site for marsh creation efforts.

c. Calcasieu River and Pass– Miles 24.5 to 36

For dredging between Miles 24.5 and 36, unfortunately no potential sites exist for beneficial use of the material dredged from the Calcasieu River Ship Channel. Thus, all material dredged from this reach of the channel will be placed in the approved upland confined disposal sites adjacent to the channel which define the Corps' Federal standard.

By applying ecologically sound principles and restoration methods developed in recent years, and through improved understanding of coastal system processes and ecosystem responses to restoration projects, there is an opportunity for Louisiana and the Nation to reduce the current trend of land loss and move the Louisiana coastal area ecosystem toward a sustainable future.

3.0 PLAN FORMULATION

Efficient implementation of the BUDMAT Program requires development of a process for selecting and constructing future site-specific beneficial use projects in conjunction with dredging operations. Selected projects will use the program's funding for the additional incremental costs above those incurred for disposal of dredged material in accordance with the Federal standard. The program plan produced through this analysis provides a defined process for evaluating beneficial use opportunities, selecting, designing and constructing projects throughout the ten-year term of the BUDMAT Program.

This chapter describes the formulation, evaluation, and selection of alternatives plans for implementation of the BUDMAT Program. Details and implementation requirements of the tentatively selected plan are provided in section 4.0.

The following documents were used throughout the plan formulation process:

a. 2004 LCA Study (referenced above), specifically the following sections:
    1. LCA Management Structure (MR 4, pp 58-66)
    2. Consistency and Coordination (MR 4, pp 67-73)
    3. Adaptive Environmental Assessment and Management (MR 4; pp 73-74)
b. *USACE Planning Guidance Notebook* (ER 1105-02-100), Appendix E, Section 5, Ecosystem Restoration
c. *Continuing Authority Program (CAP)* guidance, including portions related to Section 204, Water Resources Development Act of 1992, as amended, Beneficial Use of Dredged Materials (ER 1105-2-100, Appendix F, Amendment No. 2, 31 January 2007; hereinafter referred to as *CAP Section 204 Guidance*).
d. The joint EPA/USACE document *Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material* (EPA842-B-07-001, October 2007; hereinafter referred to as *EPA/USACE Beneficial Use Planning Manual)*
e. LCA Ecosystem Restoration Plan Chief's Report dated 31 January 2005.

3.1 PLANNING CONSTRAINTS

Planning constraints represent restrictions or limitations that must be considered to identify program alternatives that are feasible and implementable. The planning constraints identified in this study are described in the following discussion.

3.1.1 Limitations of the Availability of Dredged Material for Beneficial Use

a. Authorized Federal navigation channels.

- As stated in Section 7006(d)(1) of WRDA 2007, beneficial use projects implemented under the BUDMAT Program will be in conjunction with "Federally maintained

waterways". Therefore, the authorization for this program precludes consideration of beneficial use projects that are constructed using materials from dedicated dredging operations, including those which utilize sediments from authorized navigation channels

Figures 2- 6 through 2-14 depict each of CEMVN's primary authorized Federal navigation channels. These navigation channels offer the greatest potential for beneficial use due to the frequency of dredging and/or the quantity of material dredged during each maintenance event. (See tables 2-6 and 2-7).

b. Dredged material transport distances using current capabilities and techniques.

Hydraulic pipeline cutterhead dredges have been the primary equipment used for most existing beneficial use projects and this method is cost effective for transporting dredged materials for distances up to several miles. Typically, the pipeline used for transporting beneficial use material is owned by the dredging contractor. Therefore, the pipeline is placed as needed by the contractor and then removed after the dredging and disposal operations are completed. The pipeline is generally steel due to the pressure requirements and the wear and tear of the sediment on the walls of the pipeline. When determining the practical pumping distance, cost (i.e., available funding) is the primary limiting factor. Considerations affecting cost that should be considered when determining the practical pumping distance using current capabilities include, but are not limited to:

- Quantity of dredged material to be placed beneficially – There are large up front/fixed costs to set up and remove the long pipelines, so the more material that is pumped the more cost effective the project becomes.
- Pipeline inventory – There is a finite amount of pipeline currently owned by the dredging companies contracted to maintain CEMVN's authorized navigation channels.
- Booster pump inventory – There is a limited number of booster pumps owned by the dredging companies contracted to maintain CEMVN's authorized navigation channels.
- Dredge production rates – Production rates of dredging operations decrease as the transport distance increases because of the additional energy required for transporting the material.
- Sediment characteristics – Transporting heavier, sandy material decreases the production rate of dredging operations when compared to transporting fine clays and silty material.

The pool of available contractors that can compete for dredging jobs with significant pumping length requirements will depend on the pipeline and booster pump inventories of the dredging contractors. That is, smaller dredging companies may not have the resources to perform beneficial use projects requiring long distance transport of the dredged material. Larger dredging companies may have a limited capability to compete for these projects due to other dredging commitments. Longer dredging times due to decreased production rates or higher energy demands will affect the cost effectiveness of beneficial use projects requiring long distance transport. Based on conversations with industry, as the demand for services to perform beneficial use projects requiring long distance transport increases, the dredging industry will increase their inventory of pipeline and booster pumps to meet that demand.

CEMVN is currently seeking to award a contract for a beneficial use project in the Calcasieu River area wherein the placement site is up to 9 miles from the dredging reach. Two booster pumps

are included in the design of the project to provide additional energy requirements for pumping the sediment this long distance. This will be the greatest distance to date for a beneficial use project constructed in conjunction with CEMVN's O&M program. Previously, the greatest distance pumped was about 6 miles for two beneficial use projects using dredged materials from the Atchafalaya River bay area and the lower Calcasieu River. CEMVN's Cost Engineering Section, in discussions with the dredging industry, opinions that the practical pumping distance using current capabilities and installing and removing pipeline on a project by project basis and using up to two booster pumps is approximately 8 to 11 miles. CEMVN is not aware of past dredging projects in coastal Louisiana which utilized more than two booster pumps. Based on conversations with industry, a practical maximum pumping distance is about 15 miles. As previously stated, while hydraulic pipeline cutterhead dredges have been the primary equipment used for most existing beneficial use projects, other methods such as hopper dredged pump-out or specially modified dustpan dredges have also been utilized for beneficial use projects. Historically, these other methods involve transport distances much less than 15 miles.

Therefore, initially, beneficial use sites in the practical range of 8 to 11 miles, with a maximum of 15 miles from the dredging or pumping location shall be considered for nomination under the BUDMAT Program. Figure 3-1 is a graphical representation of the extent of the BUDMAT Program's initial areas of opportunity delineated by the practical maximum distance of 15 miles. As permanent long distance sediment pipeline projects are constructed or when cost effectiveness for long distance transport techniques improve, the practical maximum transport distance will be increased to cover larger and larger areas of coastal Louisiana for consideration under the BUDMAT Program.

Currently, there are several permanent pipeline projects that are being investigated or constructed in coastal Louisiana. A permanent dredged material disposal pipeline, measuring 3.57 miles in length, will be constructed under the CWPPRA Sabine Refuge Marsh Creation Project (CS-28-2). The pipeline will commence near Mile 13.2 of the Calcasieu River Ship Channel and terminate at the northeastern corner of the Sabine National Wildlife Refuge. The pipeline is to be used for future marsh creation projects in conjunction with the CEMVN's maintenance dredging of the Calcasieu River Ship Channel. The first marsh creation project using the pipeline is planned for 2011. The State of Louisiana is investigating a much larger long distance sediment pipeline project for the lower Mississippi River. The goal of the project is to design and construct an efficient sediment delivery pipeline from a renewable resource in the Mississippi River to strategic locations in Barataria Basin. The project is funded by the Coastal Impact Assistance Program (CIAP) and State surplus funds. The project is estimated to cost upwards of $70 million. Availability of this pipeline could increase the practical transport distance and its availability would be considered in the execution of the BUDMAT Program.

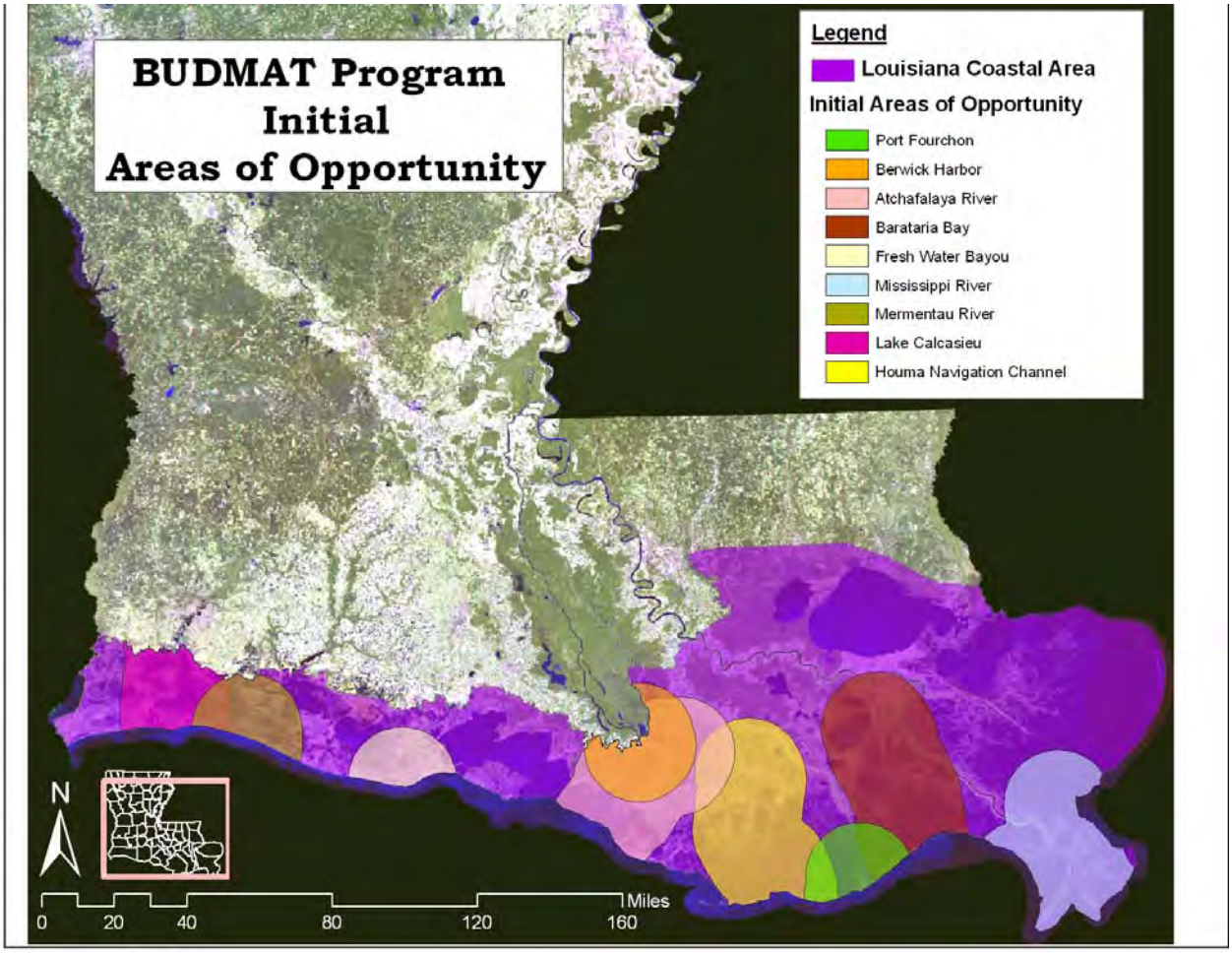

Figure 3-1. BUDMAT Program Initial Areas of Opportunity

c. Dredged material that is logistically excluded from beneficial use.

As shown in table 2-6, approximately 14.6 million cubic yards (mcy) of material is dredged annually from the Mississippi River crossings. Crossings are described as either shallow or deep draft and refer to areas that experience shoaling (i.e., deposition of material) primarily due to the meandering geometry of the Mississippi River. To maintain authorized navigation channel depths, these crossings require routine annual maintenance dredging. The shallow draft crossings, located between Mississippi River miles 235 and 300 above the head of passes (AHP), and depicted in figure 3-2 are maintained to a depth of 9 feet. The deep draft crossings, located between Mississippi River miles 114 and 234 AHP, and depicted in figure 3-3 are maintained to a depth of 40 feet. Dredging at the crossings is accomplished by disposing of the material back into the Mississippi River in deeper nearby downstream water areas or by simply resuspending (i.e., agitating) the material so that the material is transported downstream via the river currents. With the possible exception of the Fairview crossing, located at river mile 115 AHP and near the Labranche wetlands, there is little opportunity to use this material beneficially in coastal Louisiana in a cost effective manner due to the distance of these upstream dredging operations from coastal Louisiana. That is, it is more cost-effective to allocate the BUDMAT Program funding to opportunities provided by dredging operations located within the Louisiana coastal area. Thus, until

Figure 3-2. Lower Mississippi River Shallow Draft Crossings

Figure 3-3. Lower Mississippi River Deep Draft Crossings

such a time as new cost effective techniques for transporting dredge material long distances are developed, beneficial use projects utilizing the material dredged from the Mississippi River crossings above river mile 115 AHP are not candidate projects for the BUDMAT Program. It should also be realized that since the material dredged from the crossings is deposited back into the Mississippi River, the material is eventually transported downstream to locations where beneficial use is more cost effective.

The construction authorization language in WRDA 2007 requires that the BUDMAT Program consider the use of sediments from the Illinois River system. These sediments could come from dredging by the State of Illinois or O&M dredging by the USACE Rock Island District, as the WRDA 2007 only stipulates "sediment from the Illinois River System" and not who is doing the dredging. The State of Illinois has used their dredge material beneficially on various projects within their state. However, the use of these materials beyond the Illinois state boundary presents several issues including the transportation costs of moving the material approximately 1,200 miles from Illinois to beneficial use sites in Louisiana. In addition, there are laws and regulations governing the interstate transport of soil. As stated in section 3.1.3, the potential for introduction or spread of invasive plant species are highly unlikely or not anticipated, respectively, from the beneficial use of sediment from the Illinois River System.

The transportation costs of moving sediments from Illinois to Louisiana greatly increases the incremental cost of a beneficial use project. Before Hurricane Katrina in August 2005, the Illinois Department of Natural Resources and the Louisiana Department of Natural Resources began cooperating in the development of a marsh creation demonstration project in order to assess the viability of using sediment dredged and transported from Illinois to create marsh in the coastal zone of Louisiana. The demonstration project included the proposed transport of approximately 4,800 cubic yards of material donated to the project and transported from Illinois in four (4) barges. At that time it was estimated to cost $24,000 per barge for transporting the dredged material via the Mississippi River. As each barge holds approximately 1,200 cy of dredged material, that would equate to a incremental cost of $20 per cubic yard of dredged material transported and does not include the incremental costs associated with placement of the dredged material at a beneficial use site within the coastal zone of Louisiana. Costs associated with barge transport are presented in table 3-1 and were taken from the Engineer Manual 1110-2-5026, Beneficial Uses of Dredged Material, December, 1987. The costs were indexed to April 2008 dollars for this study. The table demonstrates that while there are economies of scale savings associated with increasing volumes of material being transported 250 miles, the savings are not appreciable. Furthermore, the table shows that regardless of quantities transported, the transportation costs increases as the distance increases. It is therefore unlikely that the incremental costs of transporting sediment from Illinois would decrease much below the $20 per cubic yard estimated for the demonstration project.

Additionally, the interstate transport of soil is Federally regulated because it can contain disease agents and pests such as animal and plant viruses, bacteria, fungi, nematodes, noxious weeds, and the life stages of destructive insects. Soil from all foreign countries and from many states in the U.S. can be transported across state lines and deposited into the environment only if conditions and safeguards prescribed by the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS), Circular Q.330.300-1, Soil (Jan 2008) are met. Federal requirements for interstate transfer of soils include transport in leak-proof containers that can withstand shipping.

Table 3-1. Barge Transport, Quantities and Distances

Quantity cu. yd.	Transport Distance (miles)	Cost, $/cu.yd. Barge transportation system*
500,000	10	$ 7.85
	20	$ 9.99
	100	$ 14.98
	250	$ 23.56
1,000,000	10	$ 9.29
	20	$ 9.99
	100	$ 14.28
	250	$ 22.83
3,000,000	10	$ 8.59
	20	$ 9.29
	100	$ 14.28
	250	$ 23.37
5,000,000	10	$ 8.94
	20	$ 9.29
	100	$ 13.93
	250	$ 22.48
*	Cost Indexed to April 2008 dollars	
Source: Urban Research and Development Corp ((1980)		

The soil must be treated before disposal or further use in the U.S. Two treatments are authorized for soil: (1) Dry heat at 250º F for at least two hours, (2) Steam heat at the same temperature for 30 minutes with 15 pounds of pressure (USDA APHIS Circular Q-330.300-1). Consultation with the USDA and the States of Louisiana and Illinois should occur prior to the actual movement of any soil. It is possible this consultation could result in a policy that allows the importation of soil from site-specific locations without one of the above treatment procedures. However, permitting requirements would further add to the incremental cost of utilizing Illinois sediments in coastal Louisiana.

As stated in section 2.3.3., CEMVN has a reasonable potential to use an additional 20 mcy of material dredged under CEMVN's O&M Program beneficially per year if funding was available. However, assuming BUDMAT Program funding of $10 million per year for ten years, there is not enough funding in the BUDMAT Program to fund even the beneficial use of this additional 20 mcy of dredged material. If the BUDMAT Program was to absorb the cost of transporting the Illinois River sediments, then even less funding would be available for the actual placement of dredged

material for beneficial use projects such as marsh restoration or marsh nourishment, barrier island restoration, or ridge restoration. Any proposed beneficial use project using Illinois sediments would therefore have to compete for limited funding with other proposed beneficial use projects that do not necessarily involve long distances and/or high transportation costs. Uncertainties in future fuel costs could also impact the likelihood of the Illinois River sediments as a cost effective source of dredged material for restoration of the Louisiana coast. For the above reasons, it is very unlikely that the cost effectiveness of using Illinois River sediments would be anywhere near as effective as using native sediments dredged from Federally maintained navigation channels located in Louisiana.

d. Dredged material that is unsuitable for wetland creation and barrier island restoration.

The sediments from both the Lower Atchafalaya River and Calcasieu River bar channels have high levels of very fine silts and clays and low levels of sand. Fluid mud or fluff also commonly overlays shoal material that accumulates in the bar channels, and is dredged from the channels because it disrupts the steering systems of deep draft vessels. Fluid mud is a dense sediment-laden fluid that contains suspended fine-grained sediments and particle clumps or flocs. The high concentration of fine-grained sediment and flocs within the suspension hinders settling, and contact between particles in the fluid is easily disturbed by wave action or currents. This hindrance to settling by particles within fluid mud coupled with frequent disturbance of the water bottom by wave energy leads to persistent suspensions of fluid mud. Fluid mud suspensions within the bar channels forms definite boundaries with overlaying waters, but has a lower solids content than underlying sediments

Of the 9 mcy dredged annually, approximately 80% of the sediments (7.2 mcy) in the Atchafalaya River bar channel is fluid mud. Likewise, of the 7.5 mcy dredged annually from the Calcasieu River bar channel, approximately 90% of the sediments (6.8 mcy) is fluid mud. Fluid mud is considered by the CEMVN to be unsuitable for beneficial use because of its physical characteristics. Because fined grained sediments and flocs are incorporated in a fluid, it would not be possible to manage the dewatering of dredged fluid mud at the placement sites. Unconfined or confined placement areas along coastal Louisiana would be subject to wind-induced wave energy, and it is unlikely that the material would settle in this continually disturbed coastal environment. Moreover, unconsolidated fluid mud could easily be washed from placement sites by storm tides or tropical events. Thus, the approximate 14 mcy of sediments dredged annually by the CEMVN are not suitable for either wetland creation or barrier island restoration. However, these sediments may be good candidates for nourishing existing wetlands via thin layer placement techniques that are currently being evaluated. In addition, other approaches may be developed over the term of the BUDMAT Program, such as use of synthetic flocculants, to enhance settlement and placement of fine-grained materials at beneficial use sites. Thin layer placement techniques, use of flocculants and other techniques and approaches for beneficial use of fluid mud will be considered over the term of the BUDMAT Program as information becomes available on feasibility and cost-effectiveness from demonstration projects or other suitable sources of information on these issues.

e. Funding limitations

Currently, the minimum incremental placement cost per cubic yard (cy) of material dredged is approximately $1 per cubic yard with sediments dredged from Southwest Pass using a theoretical hopper dredged pump-out scenario. Even if this low incremental cost could be applied to beneficial use projects coast wide, beneficially using an additional 20 mcy of dredged material per year would require funding of approximately $20 million per year. It is estimated that the BUDMAT Program would be funded at $10 million over a 10-year period. Thus, the estimated funding made available through the BUDMAT Program would be insufficient to beneficially use a large portion of dredged material generated in any given year.

3.1.2 Other Constraints on the Beneficial Use of Dredged Material

The other constraints to be considered in the planning of beneficial use projects are listed in the following items.

a. Known hazardous, toxic, and radioactive waste (HTRW) sites are to be avoided

Federal agencies are required to examine and avoid potential problems related to HTRW in accordance with Engineer Regulation 1165-2-132, Water Resources Policies and Authorities - Hazardous, Toxic and Radioactive Waste (HTRW) Guidance for Civil Works Projects. In cases where it is not practicable to avoid HTRW, response or remediation actions must be developed and acceptable to the EPA and state regulatory agencies. The BUDMAT Program will not implement projects at sites with known HTRW concerns.

b. Known cultural resource site operations restrictions are to be avoided

Since the passage of the National Historic Preservation Act of 1966, NEPA, and other National laws, Federal agencies are required to identify and consider impacts to historic properties. In cases where the site cannot be avoided, mitigation measures are developed either to retrieve significant data on the cultural resource or to compensate for the impact. The BUDMAT Program will not implement projects at sites with known cultural concerns.

c. Threatened and endangered (T&E) species operating restrictions will be applied to program planning and implementation of individual projects

Both the U.S. Fish & Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have jurisdiction over T&E species. Formal coordination and preparation of any necessary documentation such as Biological Assessments, if necessary, would be initiated with either or both of these agencies on a specific project-by-project basis, as required, for any project implemented under the BUDMAT Program. These requirements are not anticipated to prevent the consideration or implementation of specific ecosystem restoration projects under the BUDMAT Program; however, certain requirements for avoidance of impacts and protection of critical habitat may be required for planning and implementation of certain projects to ensure protection of T&E species.

d. Potential conflicts with and impacts on authorized projects are to be avoided

Projects included in the BUDMAT Program must not result in unacceptable impacts to existing authorized projects. Potential beneficial use projects that would impact the maintenance and operation of existing authorized projects would be excluded from consideration. For example, a beneficial use project that has a significant probability of resulting in shoaling and increased or additional maintenance for an authorized navigation project would not be considered for inclusion in the BUDMAT Program.

e. Potential conflicts with and impacts on permitted actions are to be avoided, or compensation provided for takings of valid existing rights as identified in the real estate plans for individual projects.

3.1.3 Risk and Uncertainty

There are several risks and uncertainties associated with the formulation of alternatives, plan selection and implementation. The areas of programmatic risks and approaches to risk management in program planning are addressed below.

- Uncertainty of the relative effectiveness and efficiency of BUDMAT Program projects with respect to location, type, and design, including secondary impacts and systemic benefits of individual projects that would occur outside of the project footprint locations. Determination of systemic impacts and benefits related to hydrologic and ecologic function of individual projects is often accompanied by a higher degree of uncertainty than direct benefits and impacts of ecosystem restoration projects.

  The tentatively selected plan includes a programmatic guidance, management, and decision process that will ensure the selection, each year, of cost-effective measures to support beneficial use of dredged materials. The plan also includes feedback mechanisms to support continuous process improvement in the selection, design, and implementation of projects under the BUDMAT Program.

- Uncertainty associated with the solicitation and screening processes for identifying and assessing which candidate projects will proceed to design. The solicitation and screening processes would be carried out before detailed assessments of project benefits and costs are available.

  The tentatively selected plan addresses these uncertainties by relying on solicitation and screening processes that consider both preliminary outputs and costs in the screening of potential beneficial use projects. Cost-effectiveness and project outputs are then optimized through the project-specific planning and design analyses for the projects.

- Uncertainty associated with the schedule of future dredging activities including non-routine and emergency dredging events.

  The tentatively selected plan provides for coordination with CEMVN's dredging operations on an annual basis, and includes provisions for designing projects that maximize use of dredged materials from near-term anticipated projects.

- Uncertainty of annual funding levels to be appropriated by Congress through the 10-year life of the program.

  The tentatively selected plan is designed to have flexibility from year to year, such that design and implementation of beneficial use projects will maximize the use of any and all available funds appropriated on an annual basis.

The following are uncertainties described in the LCA Study that are also germane to the planning and execution of the BUDMAT Program:

- Determining relative sea level change due to subsidence and the processes that contribute to the overall rate of change within the coastal region. Accurate elevations across the coastal area are necessary for documenting and modeling subsidence and sea level change. The LCA Science and Technology (S&T) Program, also authorized by WRDA 2007, is directing the "Sea-Level Rise in the Northern Gulf of Mexico" as detailed at http://el.erdc.usace.army.mil/lcast. The latest information generated from the LCA S&T Program Office will be utilized in designing beneficial use projects implemented under the BUDMAT Program,

- Methods and outcomes from sediment delivery via long distance pipelines. Uncertainty about the cost-effectiveness of using conventional dredging techniques to transport large quantities of sediment long distances from sediment sources would need to be addressed prior to its wide spread use in LCA restoration efforts. Conventional dredging equipment typically requires large pipelines for transport of sediment. However, there are uncertainties about how the material can be transported efficiently over long distances and ultimately distributed within marsh habitats.

- When marine sediment is used, the effects of using highly saline material as they relate to creating various features for restoration projects should also be considered. Saline materials may be available for creation of features that would have a desirable hydrologic function, but that may not support freshwater ecosystem requirements, such as supporting vegetation of freshwater habitats. This concern should be addressed in evaluation of sources for marsh creation, restoration of maritime forests, and restoration of freshwater cheniers. Uncertainties regarding the time required for soil to leach out salts and increase organic matter content in order to make the soils suitable for the establishment of freshwater vegetation would need to be resolved prior to using this technique on a large scale.

- Combining techniques of marsh platform creation and freshwater/sediment diversion. Individually, marsh creation and diversion techniques have been utilized successfully along the Louisiana coast. Combined, these two techniques may provide even greater results by creating land quickly while sustaining it in the face of relative sea level change. When creating a marsh platform alone, the area is filled to a height that will settle to marsh elevation after dewatering and compaction have occurred. When combined with a diversion, however, it may be more effective to build the platform to a lower elevation and allow the diversion to build the platform to a more natural elevation for marsh establishment. The best combination of initial platform height and diversion operation that

would minimize cost and maximize benefits would need to be determined. In addition, availability of material for placement based on dredging schedules would have to be considered in the development of synergistic restoration projects.

- Sediment sources for reestablishment of barrier islands and land bridges. Focused research and restoration projects already completed in the Louisiana coastal area have contributed to an understanding about the most effective and sustainable island geometry design. However, several issues remain regarding the potential sources of the large quantities of sediment that would be required to re-establish or restore coastal barrier islands. The sources of sand must be quantified and different transport mechanisms tested to determine a cost-effective approach to individual projects. Studies to determine the type of sediment (percentage of sand/silt/clay) used for barrier islands and back barrier marsh creation are needed to address this uncertainty.

- Risk of storm impacts decreasing benefits provided by specific projects. Individual beneficial use projects each incur some risk of having the reconstructed environment and the project benefits decreased by storm impacts. Shoreline restoration projects in particular are vulnerable to storm impacts. However, the storm surge associated with these impacts are often reduced inland of the affected shoreline reach. In general, probabilistic evaluations are used to address the risks to projects associated with storm erosion, and storm surge protection benefits can be evaluated through hydraulic modeling.

- Potential for Introduction of Invasive Plant Species from Illinois River Dredged Material. There is the possibility that sediment dredged from the Illinois River backwaters could be available for restoration projects in coastal Louisiana through an Illinois State program. Of major concern is the potential for transfer and/or spread of invasive biota from Illinois to Louisiana. The LCA Science & Technology (S&T) Office sponsored a technical report entitled "Potential for Introduction of Invasive Plant Species into Louisiana from Illinois River Dredged Material – ERDC/EL TR-08-21" and published in June 2008 by the U.S. Army Corps of Engineers, Engineer Research and Development Center. Although the potential for introduction of new invasive plant species or the reintroduction of currently present invasive plant species are highly unlikely or not anticipated, respectively, the report recommended further investigations such as pre-project species surveys, seed bank studies, early warning rapid response plans, and site monitoring, before implementing any initial beneficial use projects utilizing dredged material from the Illinois River. The report can be found in its entirety at:

  http://libweb.erdc.usace.army.mil/uhtbin/cgisirsi/PQTM71voSY/ERDC_VBG/314060008/523/1095 .

The program alternatives described in the following section have been developed with consideration of the risks and potential approaches to mitigation of these uncertainties. The BUDMAT Program will also be implemented using the principles of Adaptive Management (AM) and a "lessons learned" approach in the selection and implementation of beneficial use projects. Where past performance of BUDMAT and other restoration projects indicate certain restoration approaches or types of restoration opportunities provide more benefit from use of dredged material

for ecosystem restoration, then these findings will be used to reduce risk and uncertainty in the program.

3.2 PLAN FORMULATION RATIONALE

The process of developing, evaluating and selecting alternatives for formulating the structure of the BUDMAT Program is guided by the following objectives:

1) National Objectives: actions that address the Nation's interests in water resources are defined through the types of benefits provided by programs and projects that serve the national interest in economic development and ecosystem restoration.
2) Planning Objectives: the planning process is carried out to meet planning objectives through the use of specific procedures and guiding principles in the evaluation and selection of alternatives.
3) BUDMAT Program Objectives: the specific areas to be addressed by the selected program alternative are defined as the program objectives.

The following sections document the role of each type of objective in the planning process. The first two sets of objectives form the basis for the execution of the planning process, while the program objectives provide the criteria that are used to evaluate the program alternatives and to identify the Tentatively Selected Plan, which is described in detail in section 4.

3.2.1 National Objectives

The national or Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. Contributions to national economic development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the nation. For ecosystem restoration projects, alternatives are evaluated using contributions to the National Environmental Restoration (NER) on the basis of cost effectiveness and incremental cost analyses of the possible restoration alternatives and significance of ecosystem outputs (benefits) that accrue in the planning area and the rest of the nation..

By law and Administration policy, environment protection and restoration, navigation and flood damage reduction are the primary missions of the Corps of Engineers. The need to reduce the loss of Louisiana coastal wetlands has been recognized by the Administration and U.S. Congress. Recent congressional acts have included the Coastal Wetlands Planning, Protection and Restoration Act program (CWPPRA or "Breaux Act"), which provides for targeted funds through 2019 to be used for planning and implementing projects that create, protect, restore and enhance wetlands in coastal Louisiana. The Coastal Impact Assistance Program (CIAP) was authorized by Section 384 of the Energy Policy Act of 2005, to assist coastal producing states and their political subdivisions (parishes, counties, and boroughs) in mitigating the impacts from Outer Continental Shelf (OCS) oil and gas production. Louisiana is one of the six coastal states selected to receive funds under this

appropriation to implement this program. On November 8, 2007, the U.S. Congress passed the Water Resources Development Act of 2007, which includes provisions to authorize the LCA near-term plan including the programmatic authorization of the Beneficial Use of Dredged Material (BUDMAT) Program.

3.2.2 Study Objectives

The national objectives are general statements and not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. These study objectives reflect the problems and opportunities and represent desired positive changes in the "without project" conditions. The study objectives are specified as follows:

a. Articulate and align the goals, planning objectives, and procedures of the BUDMAT Program with restoration priorities of the LCA Study. The specific program goals are described in section 3.2.3.

b. Provide program management and decision-making processes to solicit, select, plan and implement site-specific beneficial use projects on an annual basis. The decision process will rely on a matrix of relevant criteria that considers cost, opportunity (based on USACE O&M maintenance dredging of authorized navigation channels), and the ecosystem restoration objectives identified in the 2004 LCA Study. Application of the decision matrix will be used to prioritize candidate beneficial use projects in coordination with CEMVN's dredging activities.

The intent of this programmatic study is to develop, evaluate and select a recommended program structure and execution procedures that best meet the objectives of the program. It is not the purpose of this study to evaluate and select site-specific beneficial use projects. As a result, in the formulation and comparison of the program alternatives, no site-specific data (cost, economic, environmental benefits, etc.) were available to support plan formulation or analysis. However, specific methodologies to evaluate all of these factors (and to develop robust, cost-effective designs documents) for future projects have been evaluated and compared to ensure that the objectives of the USACE Planning process and the BUDMAT Program are met. Briefly, this document:

1. Addresses various program management requirements and functions for implementation of the program;
2. Uses the Plan Formulation process to identify Alternative Plans, including the No-Action Plan, for evaluation in the programmatic report/EIS; and
3. Develops and recommends a *programmatic guidance, management, and decision process* for the BUDMAT Program to ensure a systematic, objective, and streamlined approach for selection of beneficial use sites consistent with the USACE planning process and applicable CAP Section 204 Guidance.

The programmatic guidance, management, and decision process must take into consideration the USACE Federal budget cycle and CEMVN's annual priorities for conducting channel maintenance.

Since the focus of this programmatic study report addresses the overall guidance, decision rules, and management procedures that will be applied during the life of the program, subsequent planning and design documents will tier off of this study report and the companion programmatic EIS for future site-specific projects. For example, site-specific beneficial use project design reports will be used to document the selection and design process for individual beneficial-use sites. Similarly, project-level NEPA documents are expected to tier off of the BUDMAT PEIS to document thorough environmental evaluation of each beneficial use site recommended for implementation under the BUDMAT Program.

3.2.2.1 Environmental Operating Principles

The Corps of Engineers employs a set of environmental operating principles to govern all of the organization's missions and interactions. Viewed as a whole, these principles outline a path for conducting planning studies and implementing and operating constructed projects that recognizes the important link between environmental stewardship and sustainable economic productivity.

By implementing these principles, the Corps of Engineers will continue its efforts to develop the scientific, economic and sociological measures to judge the effects of its projects on the environment and to seek better ways of achieving environmentally sustainable solutions. The principles are consistent with the National Environmental Policy Act, the Army's Environmental Strategy with its four pillars of prevention, compliance, restoration and conservation, and other environmental statutes and Water Resources Development Acts that govern Corps activities. The Environmental Operating Principles (EOP) are:

1. Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.

2. Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of USACE programs and act accordingly in all appropriate circumstances.

3. Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.

4. Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.

5. Seeks ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.

6. Build and share an integrated scientific, economic, and social knowledge base that supports a greater understanding of the environment and impacts of our work.

7. Respect the views of individuals and groups interested in USACE activities, listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the Nation's problems that also protect and enhance the environment.

3.2.2.2 Corps of Engineers Campaign Plan

The U.S. Army Corps of Engineers (USACE) has developed a Campaign Plan to establish our command priorities, focus our transformation initiatives, measure and guide our progress, and adapt to the needs of the future. The goals of the Campaign Plan are 1) deliver USACE support to combat, stability and disaster operations through forward deployed and reachback capabilities, 2) deliver enduring and essential water resource solutions through collaboration with partners and stakeholders, 3) deliver innovative, resilient, sustainable solutions to the Armed Forces and the Nation, and 4) build and cultivate a competent, disciplined, and resilient team equipped to deliver high quality solutions.

The BUDMAT Program was conceived as part of the 2004 LCA Ecosystem Restoration Study. In addition to authorizing the BUDMAT Program, WRDA 2007 mandates the development of a comprehensive plan for protecting, preserving, and restoring the coastal Louisiana ecosystem to include the framework of a long-term program integrated with hurricane and storm damage reduction, flood damage reduction, and navigation activities that provide for the comprehensive protection, conservation, and restoration of the wetlands, estuaries, barrier islands, shorelines, and related land and features of the coastal Louisiana ecosystem, including protection of critical resources, habitat, and infrastructure from the effects of a coastal storm, a hurricane, erosion, or subsidence. The BUDMAT Program will therefore be integrated into this comprehensive plan.

In-depth technical review of the study results included both Agency Technical Review and External Peer Review. Additionally, input was received from various state and Federal agencies, private contractors, and local stakeholders. The state and Federal agencies were an integral part of the project study team.

The team provided effective and transparent communication with the public and state and Federal agencies. Several public meetings have been held, and local stakeholders have been kept apprised of project status. State and Federal agencies, as part of the study team, have been involved in the development of the alternatives, and knowledgeable of the impacts of each alternative. The team collaborated with other government agencies, industry, and stakeholders to improve the project planning process.

3.2.3 Planning Objectives

The planning objectives of the BUDMAT Program provide the basis for evaluating program alternatives and program plan selection.

The BUDMAT Program planning objectives are:

(1) to cost effectively increase the beneficial use of material dredged from federally maintained waterways at a total cost of $100 million over a 10-year period.

(2) to address the critical needs of the LCA Program by soliciting, selecting, planning, designing, and constructing individual ecosystem restoration projects that use material dredged from the federally maintained waterways to:

- restore and create coastal landscape features such as, but not limited to, marshes, ridges, and islands that provide wildlife and fisheries habitat with emphasis on ecological and hydrologic functions that support the ecosystem of coastal Louisiana.

- reduce the loss of existing coastal landscape features such as, but not limited to, marshes, ridges, and islands to help sustain the ecosystem of coastal Louisiana.

- provide protection to Louisiana's coastal infrastructure.

Based on these planning objectives, beneficial use under the BUDMAT Program does not include upland disposal or disposal to solely support industrial or commercial activities such as disposal into commercial sand pits. Ecosystem restoration projects implemented under the BUDMAT Program may provide incidental or secondary benefits such as storm damage risk reduction; however, these secondary or indirect benefits will not be assessed or considered in the selection of beneficial use projects. As noted previously, funds from the Beneficial Use of Dredged Material Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal Standard. The Federal standard for dredged material disposal is the least costly alternative, consistent with sound engineering practices and meeting applicable Federal environmental statutes.

3.3 LCA PLAN MANAGEMENT STRUCTURE

The BUDMAT Program is only one component of the LCA Plan authorized by WRDA 2007. Therefore, the BUDMAT Program will be managed under the larger LCA Plan Management structure as described in the 2004 LCA Study - Main Report, Section 4.3 Plan Management

The purpose of the LCA Management Plan (Management Plan) is to maximize attainment of the planning objectives for restoration of Louisiana's coastal wetlands. This management plan and structure describe how various entities would be integrated into the planning and decision-making process during the LCA Plan implementation. This proposed management structure would also facilitate communication and coordination between the Federal and state agencies in the implementation of broader coastal restoration efforts and programs.

This section of the report describes the working relationships between the various entities and their respective roles and responsibilities to facilitate efficient management of coastal restoration activities. Due to the significance and magnitude of wetlands losses and the far reaching national extent of the problems generated by coastal Louisiana land losses over the next 50 years, a Washington-level Task Force is needed to fully address the issues.

For each of the groups involved in the implementation of the LCA Program (figure 3-4), the purpose, structure, and roles and responsibilities are described. The groups include:

Headquarters, a Program Management Team, a Program Execution Team, a Task Force, the Assistant Secretary, a Regional Working Group, and a S&T Office. Figure 3-4 depicts their overall relationship and the interaction that would be needed to achieve coastal restoration and consistency.

Management of the LCA restoration efforts would also include a decision support system that relies on clearly defined procedures to assess uncertainties and develop alternatives for the decision making process. The decision support system would be developed with and implemented by the program teams, and outputs from the system would be reported to the Program Management Team, who would be responsible for program-level decisions. The decision support system would be

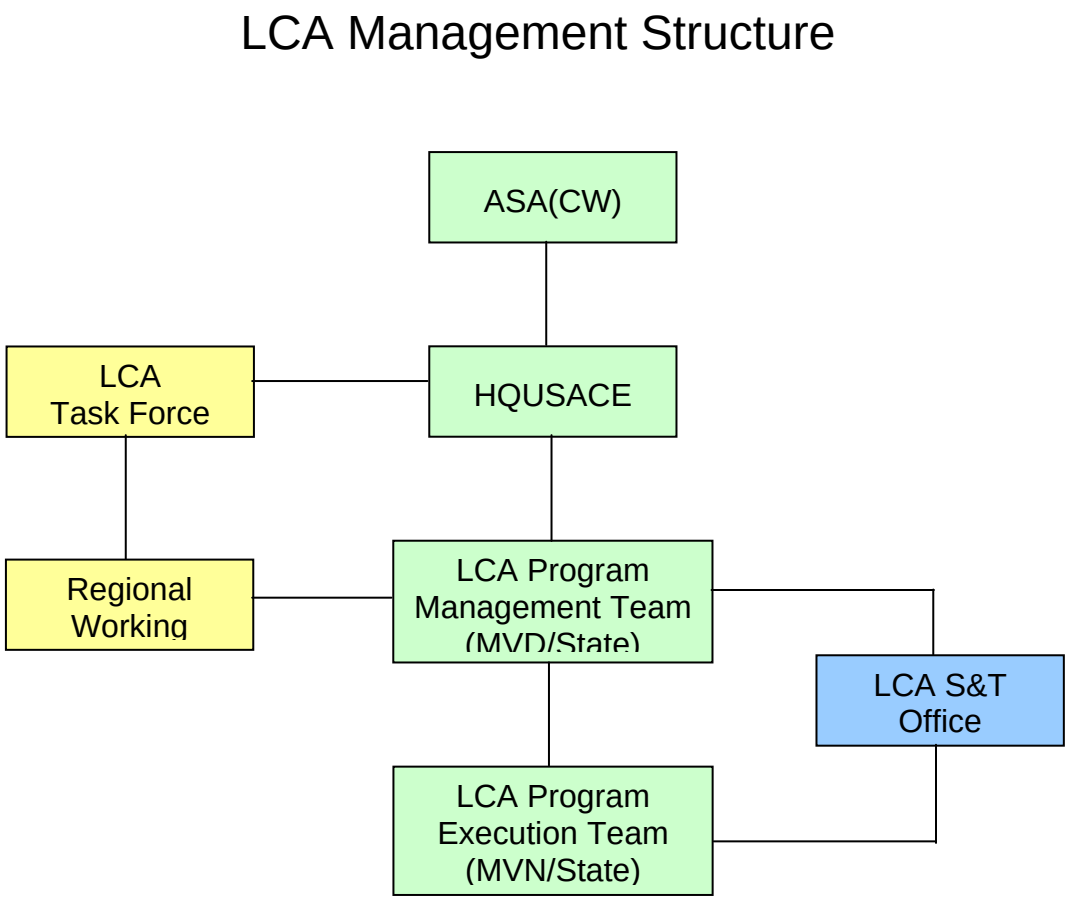

Figure 3-4. Louisiana Coastal Restoration Management Structure

developed to explicitly identify constraints and tradeoffs among new projects, existing and backlogged projects and other planning and regulatory decisions made that affect the implementation and effectiveness of restoration efforts. Program planning efforts would support informed decision making in recognition of the interdependencies among actions and the tradeoffs in outcomes affecting the recreational and commercial uses of the working coast.

The components of the LCA management structure that would be directly involved in the execution of the BUDMAT Program include the Headquarters, U.S. Army Corps of Engineers, the LCA Program Management Team (PMT) and the LCA Program Execution Team (PET). The roles

of these management structure components are provided in the following sections, while the overall LCA management structure is fully presented in the discussion of the Tentatively Selected Plan presented in section 4 of this study.

3.3.1 Headquarters, U.S. Army Corps of Engineers

Headquarters would provide leadership in policy review, compliance, and funding strategies for Louisiana coastal restoration. Headquarters formed an interdisciplinary regional integration team that would participate in the study, comprised of policy, planning, and programs staff. Headquarters would also:

- Expedite review and policy decisions;
- Coordinate with agencies at the Washington level;
- Provide leadership in the resolution of issues;
- Recommend approval to the Secretary of the Army for annual LCA budget requirements;
- Prepare Chief's reports for obtaining authorizations;
- Review requests for approval under programmatic authority; and
- Provide lead for administrative support to the Task Force.

3.3.2 Program Management Team

The Program Management Team would include the Director of Task Force Hope or an equivalent representative from the Corps of Engineers Mississippi Valley Division (CEMVD), the chairperson of the Coastal Protection and Restoration Authority (CPRA) for the State of Louisiana, and a representative of the S&T Office. With the support of the Program Management Team, the Program Manager (Commander, Mississippi Valley Division/President, Mississippi River Commission) would manage the LCA Program in close coordination with the State of Louisiana, and perform the following duties:

- Coordinate interagency program efforts through Regional Work Group forum;
- Complete upward reporting requirements to Headquarters;
- Submit the annual LCA program budget to Headquarters;
- Provide annual program funding to the Program Execution Team with program execution guidance;
- Review annual AM and program reports to develop future programmatic guidance;
- Approve S&T Office efforts in support of the LCA Program;
- Prioritize S&T Office efforts in support of on-going studies and construction;
- Support CEMVN's need for technical resources within and outside the Division including independent technical review teams;
- Provide reports to the Task Force on LCA Program activities and execution;
- Participate in issue resolution conferences, alternative formulation briefings, teleconferences and other formal briefings;
- Provide leadership in ensuring quality assurance and policy compliance; and
- Establish program review teams as necessary.

3.3.3 Program Execution Team

The purpose of the Program Execution Team is to formulate, design, and implement the LCA Plan components. It would also provide a forum for the many Federal and state agencies working on coastal restoration efforts to interact and to share resources.

CEMVN and the state (through CPRA) lead the Program Execution Team. The Program Execution Team would oversee and execute all project level coastal restoration activities. The overall Program Execution Team would include additional Federal and state agency members. The members of the team would efficiently and expeditiously manage studies and construction through appropriate implementation strategies. Each organization brings to the team a particular area(s) of expertise.

The Program Execution Team may make recommendations that it deems warranted to the Program Management Team on matters that the Program Execution Team generally oversees and executes, including suggestions to avoid potential sources of dispute. The Program Management Team in good faith shall consider the recommendations of the Program Execution Team. The Program Management Team has the discretion to accept, reject, or modify the Program Execution Team's recommendations.

Team members would assist in the preparation of reports and the reports' submission to the Program Management Team. One specific reporting responsibility of the Program Execution Team would be the Program Report to Congress (RTC). The purpose of the RTC would be to provide Congress with 1) the status and progress of implementation of the LCA Plan, 2) any recommended changes to procedures for implementing the LCA Plan, 3) changes to the scope, cost, and structure of the LCA Plan, including the addition or removal of projects, 4) recommendations to improve the overall execution and management of the plan, and 5) any other information or recommendations regarding the plan. A RTC would be prepared by CEMVD and CEMVN, in collaboration with the state, and would be approved by Headquarters and the Secretary of the Army prior to submittal to Congress.

The Program Execution Team would make recommendations to the CEMVN District Engineer and the Program Manager for the following:
• Coordinate and conduct coastal consistency review of reports and documents for all CEMVN activities (i.e., feasibility reports) in the Louisiana coastal area;
• Prepare LCA Program Reports to Congress as required (for approval through the Program Manager;
• Prepare project cost share agreements for approval and execution by designated authority;
• Produce Project Management Plans (PMPs), Project decision documents/Feasibility Reports for approval and/or authorization of projects;
• Dialogue with the S&T Office during scoping of feasibility studies to identify S&T support requirements;
• Produce preconstruction engineering and design (PED) scope documents, Plans & Specifications (P&S), and environmental compliance documents;
• Review periodic AM monitoring reports, provide recommendations to the Program Manager, and implement guidance provided;

• Conduct all scoping meetings, public information meetings, and issue resolution activities;
• Prepare the Program Execution annual budget; and
• Submit the consolidated Program Execution and Science and Technology budget to the Program Manager.
• Carry out BUDMAT Program functions to identify and evaluate beneficial use projects and make recommendations to the PMT for project studies and implementation.

3.4 BUDMAT PROGRAM FUNCTIONAL REQUIREMENTS AND PROGRAM STRUCTURE

At the beginning of the plan formulation process, the Project Delivery Team (PDT) identified the functions that must be carried out under the BUDMAT Program. Once the program functions were identified, plan formulation was carried out to develop and evaluate program alternatives.

3.4.1 BUDMAT Program Functional Requirements

The evaluation of functional requirements for the BUDMAT Program carried out by the PDT determined that the plan formulation process must address the following functional requirements:

- The overall structure of the program must be specified, based on existing program structures or a program structure developed to address the BUDMAT Program objectives.
- The annual process for soliciting candidate projects to identify potential BUDMAT projects.
- The annual process for screening which candidate projects will be carried forward for project design. This screening process must provide the methodology for ensuring that the candidate projects that have the greatest potential to provide ecosystem restoration benefits in a cost effective manner consistent with the objectives of the BUDMAT Program are recommended for further site-specific project planning and design, including real estate planning and environmental studies.
- The process for planning and design of projects identified through solicitation and screening must specify the procedures for development and evaluation of project alternatives, including an analysis of the ecologic benefits and cost-effectiveness of the alternatives.
- The annual process for selecting which projects with completed designs will be recommended for construction. This selection process must ensure that only cost effective projects consistent with the objectives of the BUDMAT Program are recommended for construction.

3.4.2 Development and Evaluation of Program Structure Alternatives

Initial plan formulation was carried out to develop preliminary program structure alternatives for the BUDMAT Program. The PDT identified two basic approaches for development of program structure alternatives: 1) adopt program structures based on existing ecosystem restoration programs for coastal Louisiana, and 2) formulate new program structures to implement the BUDMAT Program. First, the PDT evaluated existing program alternatives to determine whether these alternatives address the objectives and functions of the BUDMAT Program.

3.4.2.1 Preliminary Program Alternatives Based on Existing Programs

No-Action Alternative

Under the No Action alternative, it is assumed that no BUDMAT Program would be implemented. The No-Action Plan would result in the future-without project conditions in the study area, as summarized in section 2.2. The No-Action Plan alternative provides the basis for comparison of the benefits and costs of the other program alternatives, and is also required for compliance with the requirements to evaluate environmental impacts, as documented in the PEIS.

Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) Based Alternative

Under this alternative, the processes for identifying, selecting and implementing beneficial use projects would rely on the CWPPRA planning, design and construction procedures. The CWPPRA Program includes an interagency task force that directs the work of several specialized committees and working groups, all of which are staffed by USACE, EPA, the U.S. Fish and Wildlife Service (U.S. Department of the Interior), the Natural Resources Conservation Service (U.S. Department of Agriculture) and the National Marine Fisheries Service (U.S. Department of Commerce). The Regional Planning Group (RPG) conducts public meetings to identify potential ecosystem restoration projects in coastal Louisiana. The Technical Committee then selects among nominated projects to make initial list of candidate projects including one to two projects in each basin within the coastal area.

The Engineering and Environmental Working Groups, along with the Academic Advisory Committee then conduct field trips to evaluate project areas, develop and refine project features, estimate project benefits using the Wetland Value Analysis (WVA) method to provide Average Annual Habitat Units (AAHUs), update project information sheets and refine planning, design and construction costs. The CWPPRA prioritization process utilizes the weighted scoring of eight criteria to develop one numerical scoring for each candidate restoration project. The eight criteria with their respective weights are:

(1) Cost-effectiveness (20%)
(2) Area of Need/High Loss Area (15%)
(3) Implementability (15%)
(4) Certainty of Benefits (10%)
(5) Sustainability (10%)
(6) Riverine/Freshwater Input (10%)
(7) Sediment Input (10%)
(8) Maintaining or Establishing Landscape Features (10%)

The process for identification of potential projects, initial assessment of costs and benefits and prioritization using the selection criteria typically has a duration of 9 months. Projects recommended through the prioritization process and authorized for planning and design by the CWPPRA Task Force then undergo feasibility studies, NEPA analysis and design efforts prior to selection of projects for construction. These processes require up to four years for completion to prepare construction-ready projects. The CWPPRA Task Force then selects projects with completed designs for construction, monitoring, operation and maintenance.

Continuing Authorities Program (CAP) Section 204 Beneficial Use of Dredged Material Based Alternative

This alternative includes following the guidelines established for the CAP Program for implementing projects under Section 204 of the Water Resources and Development Act of 1992, also known as the CAP Section 204 Program. Under the CAP Section 204 Program, projects are nominated for consideration by non-Federal sponsors willing to participate in the cost share requirements for the project. Upon receipt of the letter of intent, USACE would assess the proposed project to determine whether it falls within the authorization provided for the CAP program. A preliminary cost estimate for the project and scope of the study are then developed.

The CAP Section 204 Program has some flexibility in the planning process used to determine the project alternative that will proceed to the design and construction stage. As specified in ER 1105-2-100, Planning Guidance Notebook, Appendix F, Section I, Paragraph F-3, "Simplified evaluation procedures may be adopted for low risk/low cost projects and when the consequences of failure are minimal and do not pose a threat to human life or safety." Feasibility studies are completed for larger, more complex projects or where considerable risks are present. All planning efforts must follow the Six Step Planning Process, and must provide an evaluation of ecosystem restoration outputs and costs for the alternative plans.

Once the project alternatives have been identified, they are presented in the Alternatives Formulation Briefing (AFB). The purpose of the AFB is to ensure that plans have been properly formulated, legal and policy issues have been identified and a consensus on resolution has been reached, and the Major Subordinate Command (MSC) concurs with the plan that will likely proceed into the design and implementation phase. For the U.S. Army District, New Orleans, the MSC is the U.S. Army Mississippi Valley Division.

After the AFB, the feasibilty study report is then completed. Benefit and cost, risk and uncertainty, cost effectiveness, and incremental cost analyses that were carried out using procedures appropriate for the scope and complexity of the project will be included in the study report. Concurrent with the study report preparation, documentation of environmental impacts and public participation are carried out, as required by the National Environmental Policy Act of 1969 (NEPA) and other applicable statutes. The planning process must be conducted to consider opportunities to reasonably avoid or minimize adverse environmental impacts and to identify mitigation requirements. Selection of the alternative for design and construction must be based on an assessment of cost-effectiveness and incremental cost analysis (CE/ICA) that identifies the plan whose incremental cost over other alternatives are justified by the incremental environmental benefits provided.

Under the CAP Section 204 Program, once a recommended plan has been identified, the project decision document is prepared and forwarded through the USACE District Commander to MSC Command for review and approval. The transmittal letter certifies that the USACE policies and regulations for approval of CAP projects have been complied with, provides a summary of findings, conclusions and rationale for approving the decision document, and certifies that the project is justified and policy compliant, or has received the necessary waivers. As specified in ER 1105-2-100, Appendix F, the decision document must address the requirements of Appendix F on page F-15, at a minimum to include:

- a clear description of the recommended plan; demonstration of the project justification based on standard Corps project justification criteria for the particular project purpose in accordance with the general guidance applicable to the project purpose(s)
- documentation of the results of any request for a waiver for deviation from policy
- documentation of compliance with appropriate Federal, State, and local environmental and regulatory requirements such as NEPA, etc.,
- a completed Real Estate Plan consistent with applicable requirements of ER 405-1-12
- financial analysis and certifications that the non-Federal sponsor can fulfill obligations for construction, operation, maintenance repair and rehabilitation for the project
- the feasibility level Agency Technical Review certification
- the District Counsel statement of legal sufficiency for the decision documentation and NEPA process.

3.4.2.2 Evaluation of Preliminary Program Structure Alternatives

To be considered for implementation, potential program structure alternatives must meet two requirements:

1. The program structure must provide a program focus that meets the objectives of the BUDMAT Program, as described in section 3.2.3
2. The program structure must provide procedures to carry out the functions of the BUDMAT Program listed in section 3.4.1

The PDT evaluated the existing program structures using these requirements to identify the components of existing programs that could be adopted or modified for the BUDMAT Program. Making use of existing programs or program elements would allow the program partners to take advantage of previous experience in carrying out similar program functions while reducing the uncertainty and level of effort associated with developing and implementing the BUDMAT Program.

Comparison of Preliminary Program Structure Alternatives to BUDMAT Program Objectives

The PDT first considered the compatibility of existing program structures with the BUDMAT Program objectives to provide for ecosystem restoration in coastal Louisiana using the material provided by dredging operations at federally maintained waterways.

The No Action Alternative was found not to provide any contribution towards achieving the objective of the BUDMAT Program. However, the No Action Alternative is carried forward in the study to meet the planning requirements to analyze future without project conditions, and to meet the requirements of the accompanying NEPA document. The No Action Alternative provides a baseline for assessing the outputs and cost effectiveness of other alternatives.

The CWPPRA Based Alternative at least partially addresses the objectives of the BUDMAT Program through its demonstrated performance in identifying, selecting, designing and implementing ecosystem restoration projects in coastal Louisiana. However, the PDT determined that the CWPPRA Based Alternative could not be shown to be fully consistent with the objectives of the BUDMAT Program, based on the fact that the program addresses a variety of ecosystem restoration projects, selects projects based on a number of considerations that do not address the opportunity to use dredged material generated by maintenance operations, and its program processes have not been carried out in strict coordination with scheduled and anticipated dredging events that provide material for beneficial use across coastal Louisiana.

The CAP Section 204 Program Based Alternative partially addresses the objectives of the BUDMAT Program through its demonstrated performance in selecting, designing and implementing ecosystem restoration projects in coastal Louisiana that make use of the opportunities provided by dredged material from federally maintained waterways. The program structure and processes provide the framework for formulating and evaluating project alternatives, identifying cost-effective and justifiable restoration plans, and completing designs and implementing restoration projects in conjunction with ongoing dredging operations. BUDMAT Program functions that are not addressed by the existing CAP Program, such as solicitation and screening of projects, are discussed in the following section.

Based on the PDT's determination that the existing programs would partially address the objectives of the BUDMAT Program, the team compared the existing programs to the required BUDMAT Program functions identified in section 3.4.1. Table 3-2 identifies components of the existing programs that address the BUDMAT Program functions and that could be adopted or modified for the BUDMAT Program. This evaluation determined that the CWPPRA Based alternative partially addresses the requirements for the project solicitation, while the CAP Section 204 Based alternative meets the BUDMAT Program requirements for project planning and design. To complete the plan formulation for the program structure, the PDT then developed the Customized Program alternative that incorporates the relevant existing program elements and provides the additional functions needed for program implementation. The Customized Program alternative for the BUDMAT Program structure is described in the following section.

3.4.2.3 Customized Program Alternative

The Customized Program alternative would utilize a proactive, streamlined approach to achieve the objectives of the BUDMAT Program. The approach is adapted from the decision-making process outlined in the EPA/USACE Beneficial Use Planning Manual (EPA, USACE 2007). This alternative will proactively conduct project selection and planning processes to provide completed plans and specifications that can be incorporated into dredging contracts when the O&M maintenance dredging that provides material for the projects is carried out. This approach contributes to the effective implementation of the BUDMAT Program, as it ensures beneficial use projects are aligned with the opportunities provided by maintenance dredging operations. This alternative focuses on project selection criteria and design requirements that are applicable to projects that beneficially use dredged material.

Table 3-2. Evaluation of Existing Program Alternatives Based on BUDMAT Program Function					
Program Alternatives	BUDMAT Program Function				Plan Formulation Results
	Project Solicitation	Project Screening	Planning and Design	Selection for Construction	
CWPPRA Based	Alternative partially addresses BUDMAT requirements. Coast-wide scope of outreach and solicitation process allows consideration of relevant opportunities. CWPPRA process of nomination by basin is not aligned with dredging opportunities.	Alternative does not address BUDMAT requirements. Screening does not identify candidate projects based on dredging opportunities. Project ranking requires more time than what is anticipated under the BUDMAT Program to coordinate with dredging schedules.	Alternative partially addresses BUDMAT requirements. Addresses plan formulation, alternative evaluation and selection requirements. Includes consideration of project types not relevant to BUDMAT.	Alternative partially addresses BUDMAT requirements. Alternative provides basis for selecting projects for construction, but also includes specific considerations not related to BUDMAT based on program composition and agency participation	Carry forward selected parts of project solicitation and screening for consideration in the BUDMAT Program.
CAP Section 204 Based	Letter of intent and study initiation processes do not meet BUDMAT Program requirements for project solicitation because the alternative does not include consideration of program objectives and program-wide opportunities for beneficial use.	Alternative does not meet BUDMAT Program requirements to screen projects based on dredging opportunities. Also, the alternative does not provide a basis for prioritizing planning and design among multiple potential projects based on program objectives.	Alternative meets BUDMAT Program requirements to provide planning and design processes appropriate for the type and complexity of projects while ensuring cost-effective, justifiable plans are produced for the site-specific projects.	Alternative does not provide a basis for selecting among completed designs for construction based on BUDMAT Program objectives. Backlog of CAP projects and lack of regional focus indicate that the alternative is not consistent with BUDMAT Program requirements.	Carry forward CAP Section 204 Planning and Design components for incorporation into BUDMAT Program.

The EPA/USACE Planning Manual provides two basic approaches for planning beneficial use projects: 1) a generic approach that relies on a pre-determined set of selection criteria for planning beneficial use projects, and 2) a customized approach that allows adoption of selection criteria for selection of beneficial use projects based on the constraints, opportunities and other considerations that apply to beneficial use projects. The generic approach for selection-criteria development was not selected for the Customized Program alternative because the generic criteria provided in the EPA/USACE Beneficial Use Planning Manual are not all appropriate or applicable to the BUDMAT Program. For example, considerations of funding availability and legal authority are not germane to the selection of individual projects under the BUDMAT Program. However, several of the other generic criteria, such as human and ecological benefits, feasibility, and cost, are appropriate for consideration in the development of a customized approach for implementation of the BUDMAT Program.

The customized approach for selection-criteria development was therefore selected for development of the Customized Program alternative. Using an approach that follows the basic procedures of the 5-step collaborative process for criteria development described in the EPA/USACE Beneficial Use Planning Manual, the multi-agency Project Delivery Team (PDT) identified potential selection criteria and evaluated their applicability for prioritizing and selecting beneficial use projects. The PDT determined that two levels of evaluation criteria were needed. First, a set of initial screening criteria are used to identify suitable candidate projects, which are then ranked by additional screening criteria to determine program priorities for selecting projects for planning and design. The Customized Program Alternative also includes the process for selecting completed designs for construction in concert with dredging operations. These processes are described in detail in sections 3.5 through 3.8.

3.4.3 Comparison of Final Program Structure Alternatives

Based on the evaluation of the initial alternatives in section 3.4.2, two final alternative plans were compared using the four criteria (acceptability, completeness, effectiveness, and efficiency) specified in the USACE Planning Guidance Notebook. These two final alternatives were the No-Action Alternative and the Customized Program alternative. Alternatives considered in any planning study, not just ecosystem restoration studies, should meet minimum subjective standards of these criteria in order to qualify for further consideration and comparison with other plans.

Under the No Action alternative, CEMVN's current O&M budgets would continue to provide for the beneficial use of approximately 15.4 million cubic yards (mcy) of the total 64 mcy dredged by CEMVN annually. Substantial deterioration of wetlands and marshes would continue in the study area. The negative impacts of this deterioration include but are not limited to exposure of oil and gas infrastructure, exposure of utility infrastructure, reduced water quality, reduced wildlife and fisheries habitat, reduced quality of wildlife and fisheries habitat, reduced storm surge protection, and increased salinity intrusion.

Under the Customized Program alternative, more dredged material would be disposed beneficially. A range of 3,400 – 21,000 acres of wetlands could be created over the 10-year, $100 million Customized Program. The number of acres created is tied directly to dredge material transport and placement costs. Environmental conditions would improve through the creation

and/or restoration of marsh and wetlands. The economic condition in the area would improve due to long term improvement in fisheries and wildlife. The negative impacts of deterioration of marshes and wetlands would be reduced through increased land cover, increased habitat, improved water quality, increased surge protection, and reduced saltwater intrusion.

3.4.3.1 Acceptability

Acceptability is the extent to which the alternative plans are acceptable in terms of applicable law, regulations and public policies. "An ecosystem restoration plan should be acceptable to state and Federal resource agencies, and local government. There should be evidence of broad based public consensus and support for the plan." (ER 1105-02-100, Appendix E, p. E-162).

3.4.3.1.1 No-Action Alternative

The no action alternative is acceptable in terms of public law and regulation in that it violates neither. However it does not meet the acceptability criterion because it does not address the public policy, previously documented in the LCA Study and further defined in the EPA/USACE Beneficial Use Planning Manual, of the need for increased use of dredged materials for beneficial use.

3.4.3.1.2 Customized Program Alternative

With the passage of WRDA 2007, and through previous authorizations for the LCA Study, implementation of the Customized Program will meet the criterion for acceptability with respect to applicable laws. By incorporating CAP Section 204 guidance and the EPA/USACE Beneficial Use Planning Manual, the Customized Program meets the acceptability criterion with respect to regulations. Finally, the Customized Program alternative was developed in coordination with local, state and Federal stakeholders. It has received positive encouragement and support from state and Federal resource agencies. Further support for the Customized Program is evidenced by the adoption of Policy Statement 513 (PS 513) by the American Society of Civil Engineers' Board of Direction on April 27, 2006. PS 513 on the beneficial use of dredged material states that "all dredged sediment should be used beneficially unless it is clearly impractical to do so." The policy statement concludes, "dredged sediment should not be wasted, it should be used beneficially as a routine method of business." In summary, the Customized Program is an acceptable alternative to local, state, and Federal organizations and the public at large, and meets the acceptability criterion.

3.4.3.2 Completeness

Completeness is the extent to which an alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planning objectives. It is an indication of the degree that the outputs of the plan are dependent upon the actions of others. Plans that require substantial activity by others in order to achieve their objectives are not likely to be complete. "The plan must provide and account for all necessary investments or other actions needed to ensure the realization of the planned restoration outputs…Real estate, O&M, monitoring, and sponsorship factors must be considered." (ER 1105-02-100, Appendix E, p. E-162).

3.4.3.2.1 No-Action Alternative

The no-action alternative does not meet the completeness criterion because it does not provide any means to realize the planning objectives of this program; namely to optimize and increase the beneficial use of dredged material from the maintenance of CEMVN's authorized navigation channels.

3.4.3.2.2 Customized Program Alternative

The Customized Program is complete in that it is a stand alone program. While the BUDMAT Program is inherently linked to CEMVN's maintenance dredging activities, it is a distinctly separate program with funding to cover the disposal activities for separate, cost-shared, individual beneficial use projects above and beyond the disposal activities that are covered under the USACE O&M dredging Federal standard. Additionally, the Customized Program will enhance the overall goals of coastal restoration by complimenting other restoration efforts such as CWPPRA and LaCPR.

3.4.3.3 Effectiveness

Effectiveness is the extent to which an alternative plan contributes to achieving the planning objectives. "An ecosystem restoration plan must make a significant contribution to addressing the specified restoration problems or opportunities (i.e., restore important ecosystem structure or function to some meaningful degree." (ER 1105-02-100, Appendix E, p. E-163).

3.4.3.3.1 No-Action Alternative

The no-action alternative does not meet the effectiveness criterion because it does not achieve the planning objective of maximizing usage of dredged materials.

3.4.3.3.2 Customized Program Alternative

By providing only the funding to cover the disposal activities for separate, cost-shared, individual beneficial use projects above and beyond the disposal activities that are covered under the USACE maintenance dredging Federal standard, the Customized Program is extremely effective for promoting the use of dredged material beneficially. The effectiveness of increased use of dredged materials to enhance ecosystem restoration is documented in the EPA/USACE Beneficial Use Planning Manual and has been proven effective through previous CAP Section 204 and similar studies and projects. Potential benefits of implementing the program include:

- Improvements to regional ecosystems through creation of marsh habitats.
- Reduction of further erosion of inland marshes and habitats through the creation of marshes and other landscape features that will mitigate the effects of storm surges and other effects of tropical weather systems.
- Reduction of losses to infrastructure, property, and human life through the creation of marshes and other landscape features that will mitigate the effects of storm surges and other effects of tropical weather systems.

- Economic opportunities through the creation of fish habitats and nursery areas.
- Potential creation of recreational features, thereby enhancing potential tourism industry in the area.

3.4.4 Efficiency

Efficiency is the extent to which an alternative plan is the most cost effective means of achieving the objectives. "An ecosystem restoration plan must represent a cost-effective means of addressing the restoration problem or opportunity. It must be determined that the plan's restoration outputs cannot be produced more cost-effectively by another agency or institution." (ER 1105-02-100, Appendix E, p. E-163).

3.4.4.1 No-Action Alternative

The no-action alternative does not achieve the objectives of the program. Therefore, the cost effectiveness of this alternative cannot be evaluated.

3.4.4.2 Customized Program Alternative

The Customized Program will achieve its objectives by providing the most benefits for the costs incurred to select, plan, design and implement the beneficial use projects. Because the Customized Program adopts the planning and design process for projects established for the CAP Section 204 Program, alternatives for each project will be developed and analyzed to identify the most cost-effective plan for implementation. In addition, the selected plans for each project will be evaluated to ensure that the cost is reasonable, based on costs and benefits provided by similar projects that have also been completed in coastal Louisiana. Because the program must also select among multiple candidate beneficial use projects for planning and design studies, a preliminary evaluation of cost-effectiveness will also be a factor in the screening of candidate projects, as presented in section 3.6

3.4.5 Program Structure Alternative Selection

Based on the comparison evaluation provided above, the Customized Program alternative plan is tentatively selected because it is the only plan that meets all four evaluation criteria: acceptability, completeness, effectiveness, and efficiency.

3.5 FORMULATION OF THE PROJECT SOLICITATION PROCESS

The BUDMAT Program must provide a process for identifying candidate projects that can be evaluated for the project design and construction phases. As described in section 3.4.2, the PDT evaluated existing program alternatives with respect to their capability to solicit potential projects for the BUDMAT Program. Of the existing program alternatives, the CWPPRA Based Alternative was found to partially satisfy the requirements for the BUDMAT Program. In addition to the

CWPPRA-based solicitation process, the PDT identified two additional opportunities to solicit candidate projects that could be incorporated into the Customized Program Alternative:

- Solicitation of candidate projects for the BUDMAT Program at meetings of the Coastal Protection and Restoration Authority
- Coordination of project solicitation for the BUDMAT Program with the annual CEMVN Environmental Dredging Conference

Approaches for the project solicitation process must meet the functional requirements presented in the following section.

3.5.1 Requirements for the Solicitation Process

The various approaches identified for developing the project solicitation process available to the BUDMAT Program must address the functional requirements identified by the PDT. These requirements include:

• Scheduling Requirements – The amount of time that would be necessary to setup, coordinate and execute the project solicitation process is an important consideration in identifying an approach that meets the requirements of the BUDMAT Program. The PDT determined that the solicitation process should include input at the annual Environmental Dredging Conference held in May of each year. This provides four months to complete the screening of nominated projects and to carry out project selection so that design studies and related efforts could be initiated at the start of the next Federal fiscal year.

• Comprehensiveness – This consideration indicates to what extent the approach would address beneficial use projects throughout Louisiana on a coast wide basis. By identifying opportunities for beneficial use across coastal Louisiana, the solicitation process would allow the BUDMAT Program to identify the restoration opportunities that provide the most benefits and that are best aligned with the program objectives.

3.5.2 Evaluation of Approaches for the Solicitation Process

Based on the requirements for the BUDMAT Program identified during plan formulation for the Customized Program alternative, the approaches for project solicitation were evaluated against each of the implementation considerations and those evaluations are described below.

• Utilize CWPPRA Program - This approach would take advantage of the CWPPRA Task Force meetings, currently conducted on a quarterly basis, to solicit candidate beneficial use projects for the BUDMAT Program. The schedule requirements would be minimal for implementation of this approach as the only involvement would be short presentations providing information on the process for nominating projects for the BUDMAT Program. The CWPPRA Program participants have relevant experience and expertise in ecosystem restoration throughout coastal Louisiana and

nominations solicited through the CWPPRA Program are very likely to be comprehensive in nature. The solicitation presentations would convey that the BUDMAT Program is focused on upcoming dredging opportunities, and is not limited to a set number of potential candidate projects to be identified in each basin of coastal Louisiana.

• Utilize CPRA Program - This approach would take advantage of the Coastal Protection and Restoration Authority meetings, currently conducted on a monthly basis, to solicit candidate beneficial use projects for the BUDMAT Program. The schedule requirements would be minimal for implementation of this approach as the only involvement would be short presentations providing information on the process for nominating projects for the BUDMAT Program. Like the CWPPRA Program, the CPRA participants have relevant experience and expertise in ecosystem restoration throughout coastal Louisiana and nominations solicited through the CPRA Program are very likely to be comprehensive in nature.

• Utilize Environmental Dredging Conference - This approach would take advantage of the CEMVN Environmental Dredging Conference that is held each year in the month of May to solicit candidate beneficial use projects for the BUDMAT Program. The schedule requirements would be minimal for implementation of this approach as the only involvement would be short presentations providing information on the process for nominating projects for the BUDMAT Program. The conference participants have relevant experience and expertise in using dredged materials for ecosystem restoration throughout coastal Louisiana and nominations solicited through the conference are very likely to be comprehensive in nature. Additionally, as the conference is primarily a partnering conference with dredging stakeholders, the nominated projects would likely be science based or based on professional judgment.

Based on the above evaluation, the PDT determined that the project solicitation process for BUDMAT could be coordinated with the quarterly meetings of the CWPPRA Task Force, the annual environmental dredging conference, and CPRA monthly meetings. Coordination of the BUDMAT project solicitation process with these existing efforts would provide the following advantages:

- The USACE, local sponsor and cooperating agency representatives with relevant experience and expertise in ecosystem restoration throughout coastal Louisiana would be able to solicit project nominations without having to plan and carry out a separate effort solely to address this program requirement for the BUDMAT Program.
- The CWPPRA Program has an established public outreach process that could be adapted to include outreach for the BUDMAT project solicitation process in a manner that insures potential projects nominated by the public are considered in the solicitation and screening processes.
- The existing programs provide opportunities to carry out the project solicitation process in a manner that ensures a sufficient pool of candidate projects is available for consideration for design and construction over the term of the BUDMAT Program. A number of Federal and state agencies and local governments have performed work to identify and develop ecosystem restoration projects in coastal Louisiana that have not been authorized or funded for construction. Therefore, solicitation of pre-existing project plans for beneficial use projects that have not yet been constructed, or that could benefit from placement of

additional materials generated through O&M dredging operations would be an added benefit of utilizing existing environmental restoration programs.

3.5.3 Minimum Submittal Requirements for Nominated Projects

The project solicitation process could result in a large number of nominated projects. In order to efficiently evaluate nominated projects it is therefore necessary to define minimal requirements for nominating projects. Projects that do not satisfy the minimal requirements will not be carried forward to the screening phase of nominated projects since basic information about the project was not provided. The minimum requirement for nominating a project is a factsheet with a map showing the proposed beneficial use site placement area. The factsheet should include:

1) Proposed Project Name
2) Project Location
3) Problem Statement
4) Project Description with Purpose/Goals
5) Navigation channel reach to be dredged for beneficial use source material
6) Distance of beneficial use site from navigation channel dredging reach
7) Project Originator and Contact Information

Although the above lists identifies the minimal requirements, any additional information provided on a proposed project would be considered in the process to reduce uncertainties in determining which beneficial use projects are recommended for design and construction under the BUDMAT Program.

3.5.4 Initial Screening of Nominated Projects

Those projects that meet the submittal requirements will then be screened by the PET with pass/fail criteria that are meant to ensure that the beneficial use projects meet the minimum goals and objectives, including the authorization and scope, of the BUDMAT Program. BUDMAT Program funding would cover the disposal activities for separate, cost-shared, individual beneficial use projects above and beyond the disposal activities that are covered under the USACE O&M dredging Federal standard. The BUDMAT Program should ensure that the local sponsor responsibilities for the navigation project are not assumed by the BUDMAT Program. Likewise, the BUDMAT Program should ensure that its funding will not be used to satisfy the requirements of the Federal standard disposal alternative.

The initial screening criteria are described below.

1) Proposed beneficial use project is clearly above the Federal standard base plan for disposal of dredged material as part of the operations and maintenance of authorized Federal navigation channels

2) There is no knowledge of or reason to believe that hazardous, toxic, or radioactive wastes (HTRW) exist at the proposed placement sites of a beneficial use project

3) There are no known or suspected cultural resources at the proposed placement sites of a beneficial use project

4) The navigation channel reach for the source material for a proposed beneficial use project is scheduled to be dredged under the CEMVN O&M program within 3 years (projects scheduled for dredging during later operations would be reconsidered in the future)

5) The distance from the dredging reach of the navigation channel (or the terminus of an existing permanent long distance sediment pipeline) to the placement site of a proposed beneficial use project is less than the practical maximum distance as described in section 3.1.1.b.

6) There is not already a beneficial use project being planned or designed that would use the identical sediment generated by the upcoming scheduled maintenance dredging event.

The interagency PET would strive to reach consensus on applying each of the above screening criteria to the proposed projects. All team members would meet to address any variations in outcomes of the screening and selection processes, and would review all information used and assumptions made to produce the screening and selection results. Categorical rankings for all criteria would be evaluated in order to achieve consistency and agreement among team members in the decision-making processes. In addition, the criteria and definitions have been clarified and refined to ensure the screening and selection processes rely on information available for evaluation of candidate projects.

In those rare instances when consensus is not reached, then as the respective cost share partners, the representatives on the PET from the USACE and the OCPR, in consultation with the PMT, will decide on whether to carry the project forward for future consideration under the BUDMAT Program. That is, as both the USACE and the OCPR must share in the cost of any beneficial use project implemented under the BUDMAT Program, both parties must agree to implement any given project. In order to proceed to the next phase, screening of proposed beneficial use projects for design, the above criteria must all be met with a response of “Yes” or “True”. Otherwise, the proposed beneficial use will be dropped from further consideration during this annual screening process.

3.6 FORMULATION OF THE PROJECT SCREENING PROCESS FOR DESIGN

The preliminary evaluation of program alternatives demonstrated the need to provide a process to select candidate projects for design that address program objectives. For the project screening process for design, three aspects of the process must be specified:

1) The composition of the team that will carry out the project selection process to recommend specific candidate projects for design,
2), The criteria used to select projects for design, including the conditions used to assign values to each criterion and the procedure used to compare rankings of candidate projects, and

3) The method that would be used to evaluate criteria in the selection of project locations for design.

3.6.1 Method for Assessment of Criteria in Project Screening for Design

In addition to the composition of the team conducting the selection process, the specific method used to evaluate candidate projects with respect to program objectives must be provided in sufficient detail to guide program implementation. The PDT determined that project screening could be carried out by assigning a categorical value to candidate projects for each project screening criterion.

The category ranking of candidate projects for each program objective criterion is compatible with the type and quality of data routinely available for candidate projects. The examples of cost-effectiveness and protection of infrastructure demonstrates the suitability of the method for this implementation requirement. Candidate projects typically do not have sufficient quality and quantity of data for estimating unit costs per amount of restoration provided (i.e., cost in dollars per AAHU). Because direct measures of ecological function outputs are not generally available for evaluation of candidate projects during the screening process, ranges of values for site conditions, such as the amount of wetland area to be restored in acres and preliminary estimates of cost can be used to assign the relative cost-effectiveness of a candidate project to a particular category based on historical performance or the professional judgment of the PET. In addition, categorical assignment of values allows consideration of the effective range of values for program objectives for different types of projects. For example, the cost per unit area restoration feature varies with the type of feature being restored or created, with barrier shoreline projects generally having much higher unit costs per acre than marsh creation/restoration projects. By assigning categorical rankings for criteria such as cost-effectiveness, the differences in types of projects can be considered in the definition of the ranges assigned to each category. In the case of infrastructure protection, the location of a candidate project indicates the general potential to provide protection, and proximity of a project to critical infrastructure can be used as a categorical basis for assessing this criterion. Based on these considerations, categorical ranking of candidate projects is consistent with available data at this stage of the program.

3.6.2 Criteria and Value Assignments for Project Screening for Design

3.6.2.1 Development of Screening Criteria

Criteria for screening potential beneficial use projects are included in the project screening process based on two considerations:

- Relevance of each criterion to the objectives of the BUDMAT Program, and
- Ability of the criteria for identifying potential projects that will ultimately provide ecosystem restoration benefits in a cost-effective manner.

The criteria for screening potential projects to be carried forward to the project design process include:

- Protection of critical landscape features
- Protection of infrastructure
- Relative cost-effectiveness
- Synergy with other restoration projects
- Implementability

This set of screening criteria was determined to be sufficient for selection of projects for design based on the following considerations. The solicitation process conducted to identify potential projects for consideration is anticipated to produce a candidate list of approximately 20 projects per year. Based on anticipated annual funding for planning and design activities under the BUDMAT Program (i.e., approximately 15% or $1.5 M per year), it was determined that typically only 3 or 4 of these candidate projects would be selected each year for planning and design. Therefore the process to select projects for design must be sufficiently representative of final project characteristics to identify the 3 or 4 candidate projects to be recommended for planning and design studies.

Protection of Critical Landscape Features

Basis for Inclusion as a Screening Criterion. This criterion is adopted directly from the programmatic objectives of the 2004 LCA Study, which provided the basis for the authorization of the BUDMAT Program. Categorical rankings can be assigned for this criterion based on the information that will be available for candidate projects identified from the solicitation process. Critical landscape features were identified in the 2004 LCA Study as features that contribute to the hydrologic and ecologic functions of coastal Louisiana, including natural geomorphic structures such as barrier islands, distributary ridges, cheniers, land bridges and beach and lake rims. Critical landscape features have been identified in the both the LaCPR report (USACE 2009) and the State's Comprehensive Master Plan for a Sustainable Coast (CPRA 2007). Figure 3-5 shows the preliminary inventory of critical landscape features in coastal Louisiana. These features are essential to maintaining the integrity of coastal ecosystems because they contribute to the stability of diverse habitats throughout the region and in many instances represent the first line of defense against marine influences and tropical storm events. This criterion can be effectively used to categorize candidate beneficial use sites because projects that restore degraded or breached critical landscape features provide a direct contribution towards this objective. This benefit can be qualitatively and directly determined by examining maps of potential project sites. In addition, partial benefits provided by candidate projects that address land loss that threatens the integrity and function of these features can also be identified through evaluation of the spatial relationships of potential beneficial use project areas, land loss rates and the extent of the critical landscape features.

Basis for Assigning Values. Potential projects are evaluated using this criterion based on their ability to preserve or restore the function and continuity of the critical landscape features. Because the critical landscape features are generally elongated or linear in form, their function as barriers to encroachment of salt water, high current velocities, and wave energies of the marine environment

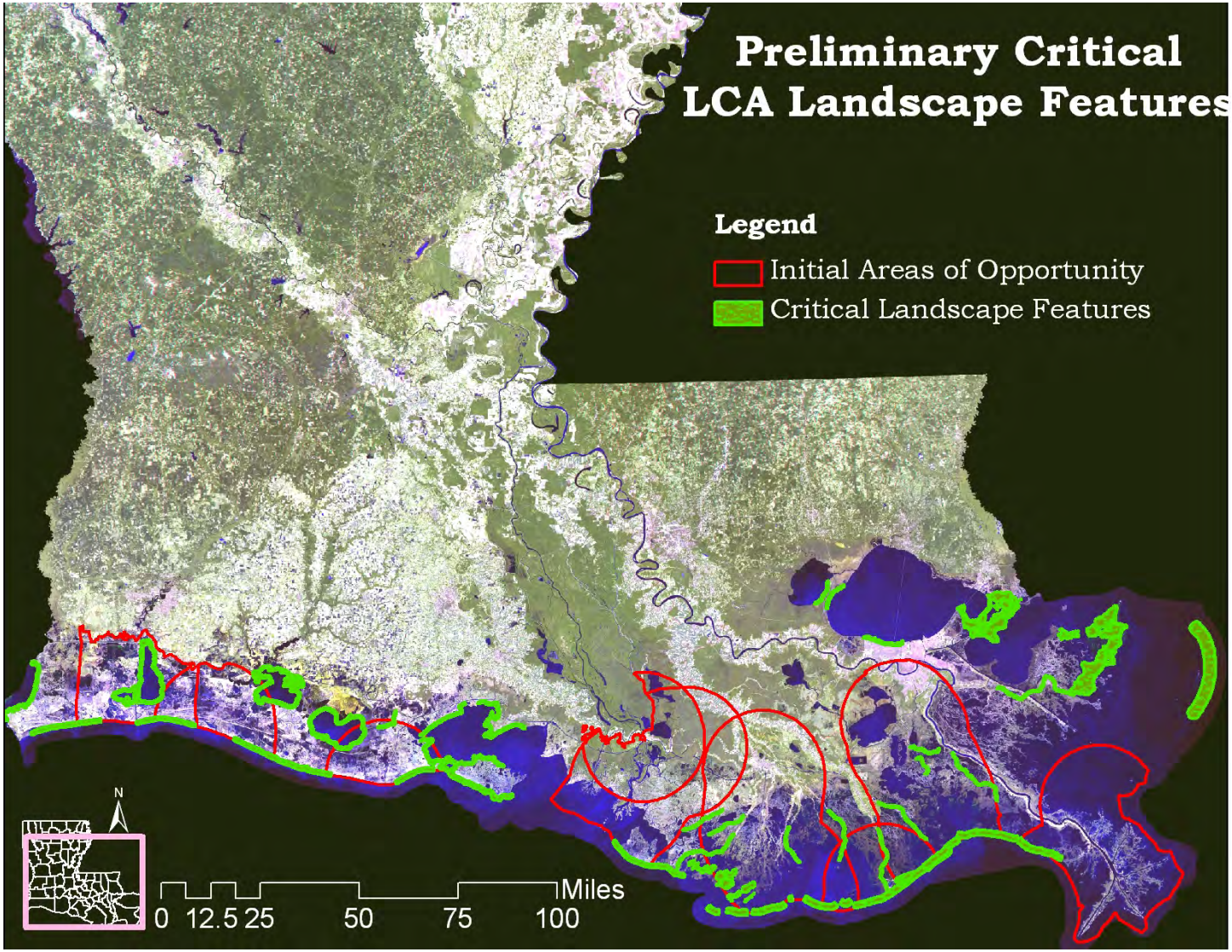

Figure 3-5. Critical Landscape Features in the Louisiana Coastal Area

are dependent on their continuity and structural integrity. Potential beneficial use projects can be evaluated based on their ability to restore or preserve these aspects of critical landscape features. The ranking of this criterion is based only on direct impacts to the critical landscape features caused by shoreline erosion and interior land loss. Indirect effects are not considered in the ranking of projects for this criterion because of the lack of information and complexity of analyses required to evaluate these indirect effects, which would often include intensive data collection and detailed modeling that are beyond the scope and resources that would be available to carry out the screening process. Examples of indirect effects on critical landscape features include decreased storm surge or altered tidal currents in the area of critical landscape features.

Assignment of High Values for Restoration/Protection of Critical Landscape Features. A potential project would be given a high ranking for this criterion where the potential project addresses a degraded or lost segment of a feature that restores their continuity and integrity with respect to surrounding areas where the landscape still retains its form and function. For example, if a land bridge has been breached by shoreline erosion or interior land loss and a potential project would restore the breached segment, then the candidate project would be ranked with a high score. Similarly, where a candidate beneficial use project would restore or replace lost marsh at an area where shoreline erosion or interior land loss has resulted in open water adjacent to a unbroken landscape feature, a high score would also be assigned.

Assignment of Medium Values for Restoration/Protection of Critical Landscape Features. To receive a medium ranking for this criterion, a candidate project must meet one of the following conditions. It must restore a degraded or lost segment of a critical landscape feature that partially contributes to the historic extent of the feature, or it must address shoreline erosion or interior land loss that will threaten the integrity and continuity of the feature within the next 10 years if currently observed loss rates continue over that time period. This time frame is based on the programmatic objective of the LCA Plan to address critical restoration needs in the near term (i.e., within the next 5 to 10 years). These restoration efforts would contribute to the function provided by the landscape features, but do not provide as much contribution to the program objective as candidate projects that qualify for a high ranking. In addition, providing protection for a future threat to the integrity of the feature is a lower priority than projects that completely restore the continuity and function of features that have already been impacted by land loss processes.

Assignment of Low Values for Restoration/Protection of Critical Landscape Features. Potential projects that restore non-continuous portions of critical landscape features or that restore adjacent wetlands along non-continuous segments of these features would be given a ranking of low for this criterion. Restoration or protection of isolated portions of these features do not provide any demonstrated benefit because these projects would not restore the function and continuity of critical landscape features, or would not provide protection from near-term foreseeable land loss that would threaten the features. Candidate beneficial use projects that do not address land loss that has breached or degraded landscape features, or that do not protect these features from land loss over the next 10 years do not provide a clearly demonstrable benefit towards achieving this programmatic goal. Beneficial use projects that are not in the vicinity of critical landscape features where this criterion is considered relevant would also be ranked as low for this criterion.

Protection of Infrastructure

Basis for Inclusion as a Screening Criterion. Similar to protection of critical landscape features, this criterion is adopted directly from programmatic objectives of the 2004 LCA Study. That study identified protection of vital socioeconomic resources as a program objective for ecosystem restoration in the LCA program. While this objective addresses a number of socioeconomic resources and values, such as communities, economic activities and cultural values, critical infrastructure was determined to be the only component of this objective that can be inventoried and assessed for screening of potential projects in the BUDMAT Program. Categorical rankings can be assigned for this criterion based on the information that will typically be available for candidate projects identified from the solicitation process. Protection of infrastructure would reduce the increased risk of damage to cultures, communities, business and industry, and flood protection from erosion and coastal flooding. It is estimated that accelerated land loss and ecosystem degradation places over $100 billion of infrastructure at increased risk due to damage from erosion and coastal flooding. Critical infrastructure elements have been identified in the both the LaCPR report (USACE 2009) and the State's Comprehensive Master Plan for a Sustainable Coast (CPRA 2007).

Elements of critical infrastructure include:

- Public facilities including public highways or roads, railroads, and public utilities
- Levees, floodwalls, pump stations and other flood control and storm damage risk reduction features that serve a public purpose
- Active oil and gas production, transport and processing facilities that serve a public purpose or aid in the interstate transportation of mineral resources

Figure 3-6 shows the preliminary inventory of critical infrastructure in coastal Louisiana. This benefit can be qualitatively and directly determined by examining maps of potential project sites. In addition, partial benefits provided by candidate projects that address land loss that threatens critical infrastructure can also be identified through evaluation of potential beneficial use project areas.

Basis for Assigning Values. Potential projects are evaluated using this criterion based on their ability to preserve or restore the integrity and use of critical infrastructure. Like critical landscape features, the critical infrastructure elements are generally elongated or linear in form, and their functions are dependent on their continuity and structural integrity. Similar to the considerations for critical landscape features, the ranking of this criterion is based only on direct impacts to the critical infrastructure caused by shoreline erosion and interior land loss. Indirect effects in the area of critical infrastructure are not considered in the ranking of projects for this criterion because of the lack of information and complexity of analyses required to evaluate these indirect effects.

Assignment of High Values for Protection of Infrastructure. A potential project would be given a high ranking for this criterion where the potential project would address a degraded or lost land area that has resulted in open water adjacent to or threatening the stability and use of infrastructure components, such as man-made levees for hurricane and flood damage risk reduction, roads, and communities. For example, if a candidate project would restore degraded or lost marsh where the shoreline has eroded and threatens the stability of a roadway, or where the adjacent open water

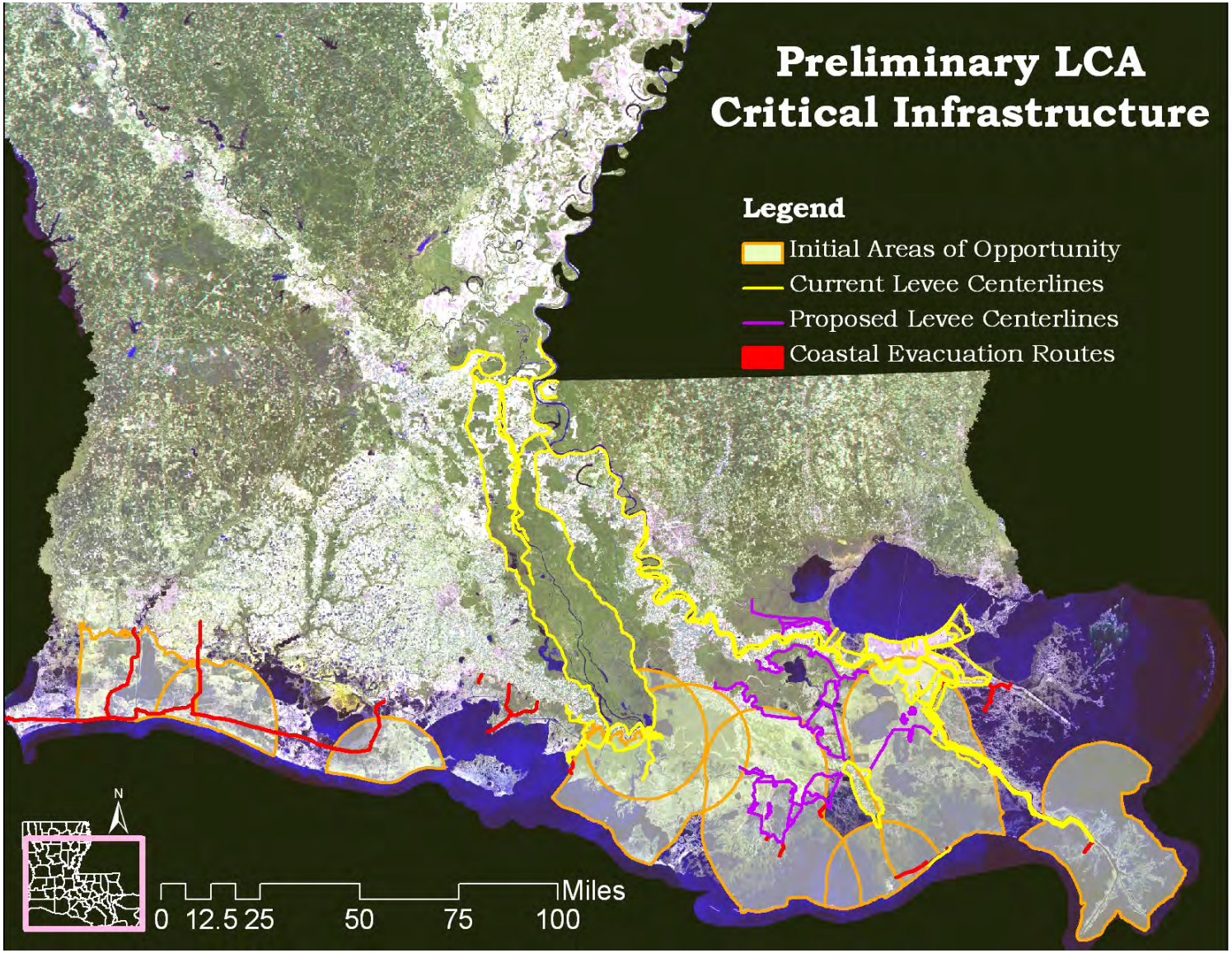

Figure 3-6. Critical Infrastructure in the Louisiana Coastal Area

results in coastal flooding of a community not associated with tropical storms, then the candidate project would be ranked with a high score.

Assignment of Medium Values for Protection of Infrastructure. To receive a medium ranking for this criterion, a project must address shoreline erosion or interior land loss that would threaten the integrity and use of a component of critical infrastructure within the next 10 years, based on currently observed land loss rates. These restoration efforts would contribute to the protection of critical infrastructure, but do not provide the same degree of restored protection that restoring or replacing land at locations where open water and coastal flooding are already threatening infrastructure, and therefore do not provide as much contribution to the program objective as candidate projects that qualify for a high ranking.

Assignment of Low Values for Protection of Infrastructure. Potential projects that do not provide any demonstrated benefit by protecting critical infrastructure would be given a low ranking for this criterion. Candidate beneficial use projects that restore degraded or lost land areas that do not address land loss that threatens critical infrastructure, or that do not protect infrastructure from land loss over the next 10 years, do not provide a clearly demonstrable benefit towards achieving this programmatic goal. Beneficial use projects that are not in the vicinity of critical infrastructure where this criterion is considered relevant would also be ranked as low for this criterion.

Relative Cost-Effectiveness

Basis for Inclusion as a Screening Criterion. Typically, the benefits provided by ecosystem restoration projects are measured as ecologic output, which is expressed as habitat value. These measures of ecological output, such as Average Annual Habitat Units (AAHU) are determined during ecological modeling such as Wetland Value Assessments (WVA), which will not be available for most candidate projects at the time the screening process is carried out. However, the areal extent of a restoration project is generally proportional to its ecological output. Therefore, for the purpose of screening projects for cost-effectiveness, the size of the project in acres or linear feet will be used. The relative cost-effectiveness criterion is based on the ratio of the preliminary estimated cost to the size of the output for candidate projects being considered for detailed design studies, expressed in dollars per acre of wetland or dollars per linear foot of shoreline.

Basis for Assigning Values. For each candidate project where project costs have not been previously estimated, a rough order of magnitude (ROM) construction cost estimate will be prepared by the PET, based on the volume of dredged material to be transported, transport distance, placement costs, and construction costs for containment or other pre-placement features of the project. Additional costs for the project will be estimated at 40% of the ROM construction estimate to provide for contingencies, engineering and design, environmental compliance, supervision, monitoring and real estate costs. Where available, previously prepared cost estimates will be reviewed for consistency and updated to determine the cost-effectiveness of those candidate projects. The cost-effectiveness categories were defined based on the historical information on unit costs of previous projects compiled from CWPPRA and the CAP Section (204) programs. Because shoreline restoration and wetland restoration projects have different construction costs and project configurations, and provide different ecological and hydrologic functions, different ranking scales were developed to compare project sizes for assigning categorical values for this criterion. For

projects with shoreline restoration and back barrier marsh creation components, each component of the project would be scored using the cost-effectiveness categories for each type of feature which would be combined to evaluate the overall cost-effectiveness of the project.

The ranges of project cost-effectiveness for each ranking value were selected so that potential projects with a similar distribution of cost-effectiveness to the historic range of projects would be effectively sorted based on this consideration. The range of costs per acre for each value ranking of wetlands projects are based on a statistical analysis of similar CWPPRA projects performed in 2007 and approved by the CWPPRA Technical Committee. The cost-effectiveness ranges used by CWPPRA were revised to account for the increased cost of project construction since the criteria were developed in 2004. The revised cost ranges adapted from the CWPPRA program provide an even distribution among five categories. Because the BUDMAT rankings will be performed on a more preliminary estimate of cost-effectiveness, the ranges for this criterion have been adjusted from the CWPRRA definitions to provide an equal distribution into three categories, high, medium and low.

The ranges for the cost-effectiveness rankings for shoreline projects are based on a historical analysis of the range of costs per length of shoreline segment addressed. Because the distribution of costs were analyzed for previously constructed or authorized projects, the distribution and the category boundaries for the rankings are based on the overall range of unit costs for projects that were justified based on the benefits provided.

Assignment of High Values for Relative Cost-Effectiveness. The historical range of project sizes similar to the projects anticipated in of the BUDMAT Program indicate that the most cost-effective third of projects are less than $28,000 per acre for marsh creation/restoration projects and less than $500 per linear feet for shoreline restoration/nourishment projects. Therefore, potential beneficial use projects that fall within these ranges are ranked as high with respect to cost effectiveness.

Assignment of Medium Values for Relative Cost-Effectiveness. The historical range of project sizes similar to the projects anticipated in the BUDMAT Program indicate that the middle third of projects fall within the range of $28,000 per acre to $103,000 per acre for marsh creation/restoration projects and $500 per linear foot to $1,000 per linear foot for shoreline restoration/ nourishment projects. Therefore, potential beneficial use projects that fall within these ranges are ranked as medium with respect to cost effectiveness.

Assignment of Low Values for Relative Cost-Effectiveness. The historical range of project sizes similar to the projects anticipated in the BUDMAT Program indicate that the lower third of projects are greater than $103,000 per acre for marsh creation/restoration projects and more than $1,000 per linear foot for shoreline restoration/ nourishment projects. Therefore, potential beneficial use projects that fall within these ranges are ranked as low with respect to cost effectiveness.

Synergy With Other Restoration Projects

Basis for Inclusion as a Screening Criterion. Candidate projects that potentially have synergy with other restoration projects are likely to provide greater long-term benefits to the ecosystem, and benefits are more likely to include secondary effects that extend beyond the footprint of the project features. Candidate projects for design that potentially would enhance benefits provided by other restoration projects or that would be positively affected by the outputs of other projects would be considered higher priorities for being carried forward to the design process. In addition, areas managed as wildlife habitat may also receive benefits from or provide benefits to beneficial use projects, and are considered in the evaluation of synergy for beneficial use projects. Existing or authorized restoration projects within the initial areas of opportunity for beneficial use projects are shown on figure 3-7, and existing wildlife management areas are shown on figure 3-8.

Basis for Assigning Values. Potential projects that would receive benefits from other projects or wildlife management areas are identified based on their being located within the area of influence of another project. For example, if a potential marsh restoration project is located within an area that would receive nutrients, sediment or salinity control benefits as a result of a constructed or authorized riverine diversion project, that candidate project would be considered to have synergy with the diversion project. Similarly, if a candidate beneficial use project was planned to repair breaches in a barrier shoreline that prevents tidal exchange and salt-water intrusion into an estuary, the project would provide synergy with back barrier marsh creation projects in the area that would be influenced by the shoreline project. Because of the qualitative nature of the relationship between projects and its dependency on consideration of secondary benefits of projects, only high or low values would be assigned for this criterion.

Assignment of High Values for Synergy With Other Projects. The candidate projects under the BUDMAT Program would be given a high score for synergy based on their location within an area that receives benefits from other constructed or authorized projects or management areas, or if the candidate project provides benefits to other constructed or authorized restoration projects or management areas. To receive a ranking of high for this criterion, a project must provide or receive known benefits that are historically attributable to the type of project or management area providing the benefit.

Examples of benefits that contribute to synergy between projects include salinity control, sediment input, and delivery of nutrients provided by a diversion, or reduced salt water encroachment or reduced tidal range and wave action provided by a restored landscape feature. The zone of benefits provided by a project must be based on monitoring data or modeling of outputs for the project. Any benefit provided by another project, such as nutrients or salinity control, must be within the known range that helps sustain the habitat type to be provided by the project that receives the benefit. For example, if a candidate project is located within a zone where it is expected to receive a particular nutrient at a level of up to 0.5 mg/L, but a higher concentration of the nutrient is needed to promote vegetative growth, then the project would not be given a high score for synergy. Similarly, if a candidate beneficial use project would provide a benefit to another existing or authorized project, such as reduced salinity or tidal range, the benefit to the other project must be based on an assessment of historic conditions or performance of similar projects that demonstrate the benefit

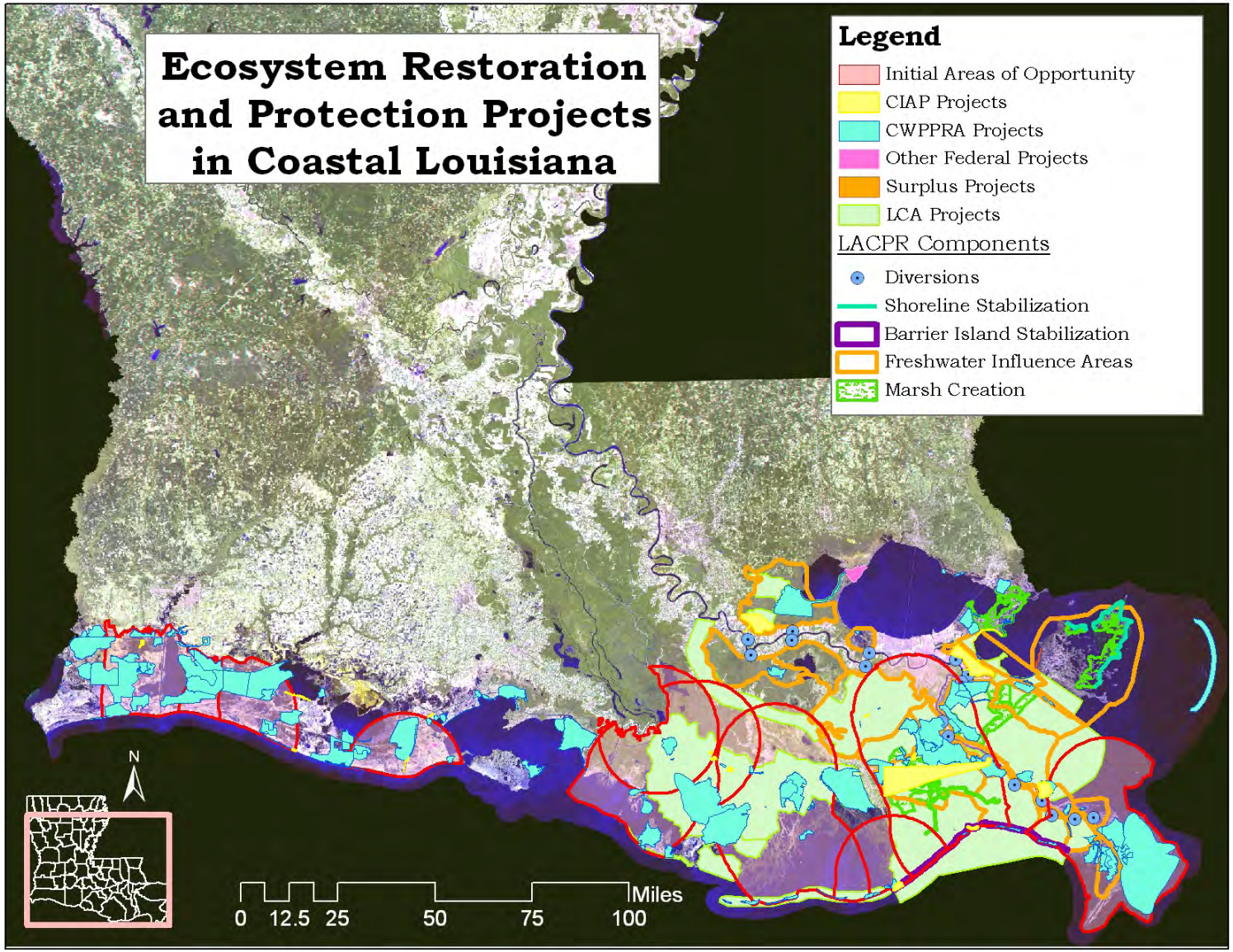

Figure 3-7. Ecosystem Restoration and Protection Projects in Coastal Louisiana

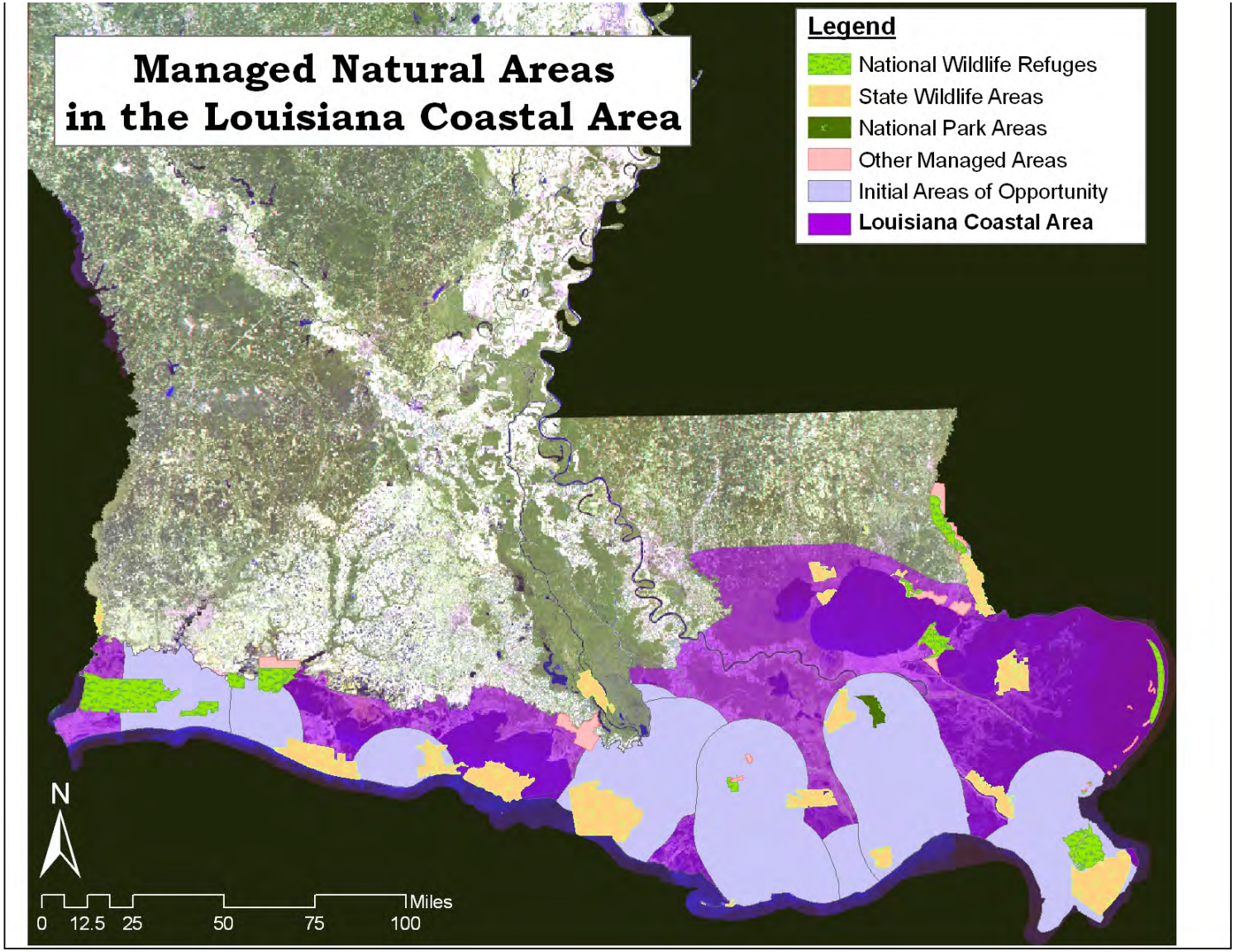

Figure 3-8. Managed Wildlife Areas in Coastal Louisiana

will be provided to another project with a high degree of certainty and would therefore contribute to the synergy between the projects.

Assignment of Low Values for Synergy With Other Projects. Candidate projects under the BUDMAT Program that do not receive benefits from other authorized or constructed projects, or that do not provide benefits to other projects, would be given a ranking of low for this criterion. Projects that provide or receive questionable or uncertain benefits are not considered to contribute to synergy between the projects. If modeling efforts or monitoring results for authorized or constructed projects do not demonstrate benefits that provide synergy, or historical information does not indicate that the restored feature would provide an increase in benefits for either the candidate BUDMAT project or that the other restoration project, then a score of low would be assigned for this criterion.

Implementability

Basis for Inclusion as a Screening Criterion. Candidate projects undergoing the screening process would also be evaluated for implementability. Implementability is the expectation that a project has no serious impediment(s) precluding its timely implementation. Issues that may pose risks for cost growth or schedule delays would be considered in screening of projects to be carried forward to the design process. Potential issues that indicate more complex project implementation include relocation of infrastructure, complex real estate interests at the project location, major public concerns, or any unique, site-specific issues that would make design and construction of a candidate project more complex and difficult to implement. Because beneficial use projects must be planned and designed in coordination with upcoming dredging schedules at authorized channels, candidate projects with issues that could not be resolved prior to the associated dredging operation would not be carried forward for design and construction.

Basis for Assigning Values. The ranking of implementability for candidate projects considers the schedule requirements for completion of project design studies and other pre-construction requirements, such as acquisition of necessary real estate interests. In addition, the customized BUDMAT Program structure relies on the project planning and design process that has been developed for the CAP Section 204 program. Therefore, projects with more complex and challenging implementation requirements can not be reliably coordinated with upcoming dredging events. Based on the historical performance of similar restoration projects, the PDT determined that complex real estate and relocations issues present the most risk of increased cost and schedule for completion of pre-construction activities. In addition, the PDT determined that additional consideration should be given to other site-specific issues. For example, a project that may be feasible and justifiable based on other program objectives may have issues that conflict with completing design and pre-construction work to coordinate with dredging events, such as protection and mitigation of temporary impacts to critical habitat of endangered species. Other site-specific issues would be considered by the PET, based on historic performance for completion of pre-construction activities for other projects that encountered similar implementation issues.

Assignment of High Values for Implementability. Candidate projects with no identified implementation issues would be assigned a value of high for this criterion. Projects with no issues would present a relatively high level of certainty that pre-construction activities could be completed

prior to the anticipated dredging event that would provide the dredged material for project construction.

Assignment of Medium Values for Implementability. Candidate projects with one identified implementation issue would be assigned a value of medium for this criterion. Projects with one implementation issue would present some risk to completion of pre-construction activities prior to the associated dredging event. However, if only one issue is identified, additional resources to address the issue could be requested early in the project design process to ensure the project could be constructed when the dredging event occurred.

Assignment of Low Values for Implementability. Potential beneficial use projects with more than one identified implementation issue would be assigned a value of low for this criterion. Projects with more than one implementation issue would present considerable risks that are difficult to control and would therefore hinder completion of pre-construction activities prior to the associated dredging event. In addition, the more complex setting of the candidate project would not be appropriate for the streamlined design process adopted from the CAP Section 204 program for implementation of straightforward projects.

3.6.2.2 Screening Criteria Totals and Recommendations for Design

For each of the criteria included in the process to select projects for completion of design studies, categorical rankings and definitions have been developed, based on the distribution of these characteristics in projects previously carried out under existing ecosystem restoration programs and the relationship of the ranges of values for each criterion to the candidate projects potential to address the objectives of the BUDMAT Program. The rankings for assignment of projects to categorical values for each criterion are presented in table 3-3.

To complete the process to select projects for design, the PET would assign values to each candidate project for all of the above ranking criteria. For each project, criteria receiving a ranking of high would be assigned a numerical score of 5, those ranked as medium would receive a numerical score of 3, and low values would be given a score of 1. The numerical values would be totaled to identify the top 3 to 4 projects that would be recommended to the PET for completion of the design phase using the CAP Section 204 process. The PET would send this list to the PMT for consideration.

The documentation provided to support the recommendations would include:

- The list of candidate projects nominated from the solicitation process
- The PET rankings assigned to each candidate project for the screening criteria and the basis for assignment of the rankings
- A summary of the deliberations and selection of projects that were assigned tie scores that were further refined to determine the list of recommended projects for the design process.

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Table 3-3. Categorical Rankings and Basis for Project Selection Criteria

Categorical Rankings and Basis for Project Selection Criteria		
Condition		**Value**
Protection of Critical Landscape Features		
The project restores continuity and function of critical landscape features, OR Restores wetlands that protect the continuity and function of critical landscape features from open water adjacent to the features		High
The project would extend the continuity of critical landscape features along all or part of their former extent OR The project would restore wetlands at locations where continued wetlands loss or shoreline erosion would threaten the continuity of critical landscape features within 10 years, based on current land loss rates.		Medium
The project does not restore or protect critical landscape features from land loss projected to occur within the next 10 years.		Low
Protection of Infrastructure		
Restores wetlands that protect the continuity and function of critical infrastructure from open water adjacent to the features or from non-storm coastal flooding		High
The project would restore wetlands at locations where continued wetlands loss or shoreline erosion would threaten the continuity of critical infrastructure within 10 years, based on current land loss rates.		Medium
The project does not protect critical infrastructure from current or future land losses expected to occur within the next 10 years.		Low
Relative Cost-Effectiveness		
Marsh Creation/Restoration	*Shoreline Restoration/Nourishment*	
Less than $28,000 /net acre	Less than $500 / linear foot	High
$28,000 - $103,000 / net acre	$500 - $1,000 / linear foot	Medium
Greater than $103,000 /net acre	Greater than $1,000 / linear foot	Low
Synergy with Other Restoration Projects		
The project provides certain or known benefits that protects or contributes to the benefits of other restoration projects (e.g., shoreline protection, reduced salinity intrusion, reduced storm surge impacts on other projects) OR The project receives certain or known benefits from other restoration projects (e.g., wetlands receive input or enhanced salinity gradient from a freshwater diversion project)		High
The project does not provide certain or known benefits that protect or contribute to the benefits of other restoration projects AND The project does not receive certain or known benefits from other restoration projects		Low

Categorical Rankings and Basis for Project Selection Criteria	
Condition	**Value**
Implementability	
The project has no identified issues that would make project implementation more complex (relocations, complex real estate, site-specific issues)	High
The project has one identified issue that would make project implementation more complex (relocations, complex real estate, site-specific issues)	Medium
The project has multiple issues that would make project implementation more complex (relocations, complex real estate, site-specific issues)	Low

3.7 FORMULATION OF THE PROJECT DESIGN PROCESS

The Project Delivery Team recommends that the design process for the BUDMAT Program should follow the guidelines specified for the Continuing Authorities Program (CAP), Beneficial Uses of Dredged Material, Section 204. Section 204 was first authorized by the Water Resources Development Act of 1992 and provides authority for the Corps of Engineers to restore, protect and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized navigation project. Since 1996, Section 204 has successfully been used throughout coastal Louisiana, from the Calcasieu River to the Mississippi River Gulf Outlet, to implement beneficial use projects in conjunction with CEMVN's O&M program.

Engineer Regulation 1105-2-100, Planning Guidance Notebook, Appendix F: Continuing Authorities Program (CAP) provides the policy and procedural guidelines for planning, design, and implementation of projects pursued under the legislative and administrative provisions of the CAP program. Additionally, Appendix F of ER 1105-2-100 was amended on January 31, 2007, and new implementation processes were applied to all CAP projects initiated after January 31, 2006. Appendix F states that "alternative plans should be developed to the level of detail necessary to select a justified, acceptable, and implementable plan that is consistent with Federal law and polity and, to the extent that law and policy permit, consistent with the goals of the non-Federal sponsor. Benefit and cost, risk and uncertainty, cost effectiveness, and incremental cost analyses will be undertaken using procedures appropriate for the scope and complexity of the project". Simplified evaluation procedures are allowed for low risk/low cost projects and when the consequences of failure are minimal and do not pose a threat to human life or safety. Therefore, prior to construction, decision documents similar to the planning and design analysis described in Appendix F will be prepared for each beneficial use project recommended for implementation under the BUDMAT Program.

The one-step planning and design process shall include project formulation, analysis, justification, and design of the site-specific beneficial use project. The project design document to be produced shall include real estate agreements/plans, NEPA coordination / environmental compliance documents, and a design package consisting of drawings in a format that can be readily incorporated in to CEMVN's O&M bid package for the navigation channel's maintenance dredging contract. Appendix F specifies that at a minimum, the following decision documents and supporting documents shall be required for each beneficial use project:

- a clear description of the recommended plan
- demonstration of the project justification based on standard USACE/CPRA project justification criteria for the particular project purpose in accordance with the general guidance applicable to the project purpose(s)
- documentation of the results of any request for a waiver for deviation from policy
- documentation of compliance with appropriate Federal, state, and local environmental and regulatory requirements such as NEPA, etc.
- a completed Real Estate Plan consistent with the requirements of Chapter 12, ER 405-1-12
- the CPRA Self-Certification of Financial Capability
- CEMVN Real Estate certification that CPRA has the capability to acquire and provide the required real estate interests
- a detailed description of CPRA's local cooperation requirements
- identification of the anticipated operation, maintenance, repair, replacement, and rehabilitation activities, including estimated costs, if applicable
- the CEMVN Counsel statement of legal sufficiency for the decision documentation and NEPA process

Various types of beneficial projects such as wetland/marsh creation, chenier ridge restoration, barrier island restoration, and beach nourishment may be implemented under the BUDMAT Program. The amount of site-specific information available for beneficial use sites will vary widely. In some cases, similar nearby beneficial use projects may have been previously constructed and some of the required design parameters such as target elevations and boring logs, may be available. The level of design necessary for beneficial use projects implemented under the BUDMAT Program will also vary widely with projects ranging from the simple, unconfined hopper pump-out marsh creation projects from the Mississippi River Southwest Pass reach to the more complex projects such as barrier island restoration. Designs would include the appropriate documentation to justify the methodology of data collection, calculations, and all site-specific design parameters. Therefore, once a beneficial use site has been approved for design, a Project Management Plan (PMP) will be developed and mutually agreed to by CEMVN and CPRA to address the scope of the design tasks, including CPRA's in-kind contributions, required to complete the project design document. Upon design completion, the Federal or non-Federal sponsor that was not the design lead, shall be allowed to review and comment before the design is finalized. It is anticipated that a typical planning and design effort will be completed in approximately one year.

During the planning and design process, if the study team determines that a project would not have reasonable costs, or would not provide the anticipated benefits, or would have unacceptable impacts, then the study team would document these findings and the project would be dropped from further consideration. Determination of the reasonableness of costs and the anticipated benefits of projects will rely primarily on the analysis of benefits provided by the WVA analysis. The WVA quantifies changes in fish and wildlife habitat quality and quantity that are projected to emerge or develop as a result of a proposed wetland enhancement project. The results of the WVA, measured in Average Annual Habitat Units (AAHUs), can be combined with economic data to provide a measure of the effectiveness of a proposed project in terms of annualized cost per AAHU protected and/or gained. The community models (a) identify the individual model variables, (b) assign a suitability index (scale 0-1.0) to conditions for each variable, and (c) include the equation for calculating the habitat suitability index (HSI). The HSIs, habitat units (HUs), and average annual

habitat units (AAHUs) are calculated based on projected HUs and HSIs projected over the period of analysis, and converted to an annual average over the period of analysis (typically 50 years).

Because restoration projects are constructed in dynamic environments and are subject to ongoing physical and ecological processes, the HUs and HSIs will be estimated over the period of analysis for project benefits using the WVA. This approach to restoration projects is consistent with the USACE Ecosystem Restoration Policy (ER 1165-2-501) that indicates ecosystem restoration projects will be designed and constructed to "partially or fully reestablish the attributes of a naturalistic, functioning and self-regulating system." Changes in the footprint of the restoration features may result in changes in benefits over time, including increased benefits as changes in wetland morphology and function may provide higher quality habitats and support more complex communities, even though the footprint and characteristics of the restoration feature may change due to the interaction of the feature with dynamic ecosystem processes, such as sediment transport, plant growth and community succession. Based on these considerations, traditional Operation and Maintenance (O&M) activities will not typically be planned or considered in the assessment of benefits or plan selection for beneficial use projects.

3.8 FORMULATION OF THE PROJECT SELECTION PROCESS FOR CONSTRUCTION

The Customized Program Alternative for BUDMAT must provide a process to select which projects with completed designs will be recommended for construction during the upcoming dredging cycle. The selection process for construction must specify the selection criteria, including the definitions and the conditions used to rank the projects associated with upcoming dredging operations.

Beneficial use project considered for construction will have completed designs prepared in sufficient detail to support detailed cost estimates and that provide documentation for solicitation of construction contracts. The completed designs will also document the precise locations, quantities and types of habitats and restoration features to be constructed. Because the project designs to be considered for construction will be limited to those project locations for which the source material will be dredged during the upcoming year, a specific subset of completed project designs will be available for selection for construction in each year of the program. In addition, the construction funding expected to be available during each year of the program is expected to limit the number of projects selected for construction to four or fewer beneficial use projects per year.

Based on these considerations, the project selection for construction process will typically be carried out to select a small number of projects for construction from an available set of candidate sites. For example, if $8.5 million is available for the BUDMAT Program's construction budget in any given year, and the typical project costs range from $2 million to $4 million in incremental construction costs, then three to four projects would be selected for construction. If more project designs are available for construction, then the selection process must reliably identify those candidate projects for construction that best meet the program objectives.

The PDT determined that the primary consideration in selection of projects for construction should be the cost-effectiveness of the candidate projects, as measured in total project cost per quantity of ecosystem restoration output provided. A more representative assessment and comparison of cost-effectiveness can be made for projects that have been through the planning and design process because more detailed and accurate information on both project costs and benefits are produced during the planning and design process. Project-specific engineering and design work completed for the candidate projects provides more certainty in the estimated costs of projects. In addition, during the planning process detailed evaluations of the ecosystem restoration outputs for alternative project plans are developed using the WVA process. This community based approach considers the quantity and function of restored habitats provided by project plans. The combination of both detailed costs and ecosystem restoration outputs allows the candidate projects being considered for construction to be compared on a direct basis. Because of the greater confidence in these evaluations of candidate projects, cost-effectiveness can be used to compare projects directly, rather than assigning categorical rankings that were used in the screening process conducted prior to completion of detailed project cost estimates and environmental benefits.

Sustainability of project features is an important consideration in evaluating project effectiveness, and this aspect of project performance is reflected in the ranking of projects for cost-effectiveness. Because ecosystem restoration outputs determined through the WVA process are determined over a defined period of analysis and averaged over that time horizon, projects with similar size and scope that provide ecosystem restoration benefits that persist over the period of analysis will rank more highly for cost-effectiveness. Based on this consideration, ranking projects by their cost-effectiveness as determined using the WVA methodology also includes consideration of sustainability in the selection of project designs for construction.

To complete the process to select projects for construction, the PET would rank the projects in order from most to least cost-effective, as expressed as total project cost per ecosystem restoration output, as expressed in AAHUs. In addition, the PET would give additional consideration to two factors:

- Uniqueness of the restoration opportunity (e.g., if a project construction opportunity is available for a navigation channel reach that is dredged infrequently, a higher priority may be assigned for that project)
- Availability of construction funds for the planning cycle and project costs (e.g., Remaining available construction funds are less than the incremental cost of the next highest ranked project remaining for consideration and where projects with lower rankings could be constructed with the remaining available construction funding)

The PET would then prepare a set of recommended projects to be carried forward for the construction process and would send this list to the PMT for consideration. The documentation provided to support the recommendations would include:

- The PET ’s basis for recommending projects for construction, including cost-effectiveness, uniqueness of restoration opportunity and availability of construction funding
- The subset of completed designs for which the source material for beneficial use will be dredged during the upcoming year

4.0 DESCRIPTION OF THE TENTATIVELY SELECTED PLAN

As described in Section 3.0, the plan formulation process resulted in the identification of the Customized Program alternative as the Tentatively Selected Plan (TSP). This section describes the plan implementation, funding and program management requirements for the BUDMAT Program. Final development of the TSP resulted in a detailed set of implementation procedures that would be used in the BUDMAT Program to identify individual projects for planning, design and construction.

The BUDMAT Program as described in this report is a small but important element of the authorized LCA Plan. The applicable LCA Plan near-term objectives will be addressed by identifying and executing beneficial use projects that protect and/or restore critical landscape features and/or protect critical infrastructure of coastal Louisiana where delaying action would result in a "loss of opportunity" to achieve restoration and/or result in much greater restoration costs. Beneficial use projects constructed under the program will be cost-effective, based on an analysis of estimated total project costs and project benefits that consider the ecological values, quantities and duration of benefits that would be provided by each project. The capability of potential beneficial use projects to work in concert with other restoration features authorized under the LCA Plan will also be considered in program execution. This consideration would increase the total benefits provided by projects that are synergistic with each other, and would contribute to the sustainability of both the projects and the coastal ecosystem. The BUDMAT Program will carry out coastal ecosystem restoration projects in conjunction with ongoing O&M dredging operations. Further details will be included in an implementation plan that will be done during the ensuing phase of this program element.

Throughout the decision-making and program implementation process, consideration will be given to the cumulative outputs of the individual projects and their contribution to overall restoration of the ecosystem of coastal Louisiana. As projects are implemented, their performance will be monitored and evaluated and these results will guide the ongoing program implementation, in coordination with the Federal agencies, and in full coordination with the LCA Science and Technology group within an adaptive management framework. The program alternatives described in the following section have been developed with consideration of the risks and potential approaches to mitigation of these uncertainties. The BUDMAT Program will also be implemented using the principles of Adaptive Management and a "lessons learned" approach in the selection and implementation of beneficial use projects. Where past performance of BUDMAT and other restoration projects indicate certain restoration approaches or types of restoration opportunities provide more benefit from use of dredged material for ecosystem restoration, then these findings will be used to reduce risk and uncertainty in the program.

4.1 BUDMAT PROGRAM MANAGEMENT

The BUDMAT Program is only one component of the LCA Plan authorized by WRDA 2007. Therefore, the BUDMAT Program will be managed under the larger LCA Plan Management structure as described in the 2004 LCA Study – Main Report, Section 4.3 Plan Management. The 2004 LCA Study – Main Report, Section 4.3 provides the details on the composition and roles of the various components of the LCA Program Management Structure, including Headquarters

USACE, the LCA Program Management Team, and the LCA Program Execution Team. In addition, the LCA Study provides the composition and roles of advisory bodies, including the LCA Task Force, the Regional Working Group and the LCA Science and Technology (S&T) Office. A summary of the LCA Program Structure relevant to the execution of the BUDMAT Program is provided in the following discussion.

The purpose of the LCA Management Plan (Management Plan) is to maximize attainment of the planning objectives for restoration of Louisiana's coastal wetlands. This management plan and structure describe how various entities would be integrated into the planning and decision-making process during the LCA Plan implementation. This management structure also facilitates communication and coordination between the Federal and state agencies in the implementation of broader coastal restoration efforts and programs. This section of the report describes the working relationships between the various entities and their respective roles and responsibilities to facilitate efficient management of coastal restoration activities, including the execution of the BUDMAT Program.

For each of the groups involved in the implementation of the LCA Program (see figure 4- 1), the purpose, structure, and roles and responsibilities are described. The groups include: Headquarters, a Program Management Team (PMT), a Program Execution Team (PET), a Task Force, the Assistant Secretary, a Regional Working Group (RWG), and a Science & Technology (S&T) Office. Figure 4-1 depicts their overall relationship and the interaction that would be needed to achieve coastal restoration and consistency. However, current implementation guidance for Section 7004 of WRDA of 2007 directs that "No effort will be undertaken to set up a Task Force unless funds are specifically appropriated for such work." The implementation guidance directs that the Regional Working Group and Washington Level Principals will communicate and solicit input from the agencies involved in LCA implementation.

4.1.1 Program Management Team

The Program Management Team (PMT) would include the Director of Task Force Hope or an equivalent representative from the Corps of Engineers, Mississippi Valley Division (CEMVD), the chairperson of the Coastal Protection and Restoration Authority (CPRA) for the State of Louisiana, and a representative of the S&T Office. With the support of the Program Management Team, the Program Manager (Commander, Mississippi Valley Division/President, Mississippi River Commission) would manage the LCA Program in close coordination with the State of Louisiana, and perform the following duties:

- Coordinate interagency program efforts through RWG forum;
- Complete upward reporting requirements to Headquarters;
- Submit the annual LCA program budget to Headquarters;
- Provide annual program funding to the Program Execution Team with program execution guidance;
- Review annual Adaptive Management (AM) and program reports to develop future programmatic guidance;

• Approve S&T Office efforts in support of the LCA Program;
• Prioritize S&T Office efforts in support of on-going studies and construction;
• Support CEMVN's need for technical resources within and outside the Division including independent technical review teams;
• Provide reports to the Task Force on LCA Program activities and execution;
• Participate in issue resolution conferences, alternative formulation briefings, teleconferences and other formal briefings;
• Provide leadership in ensuring quality assurance and policy compliance; and
• Establish program review teams as necessary.

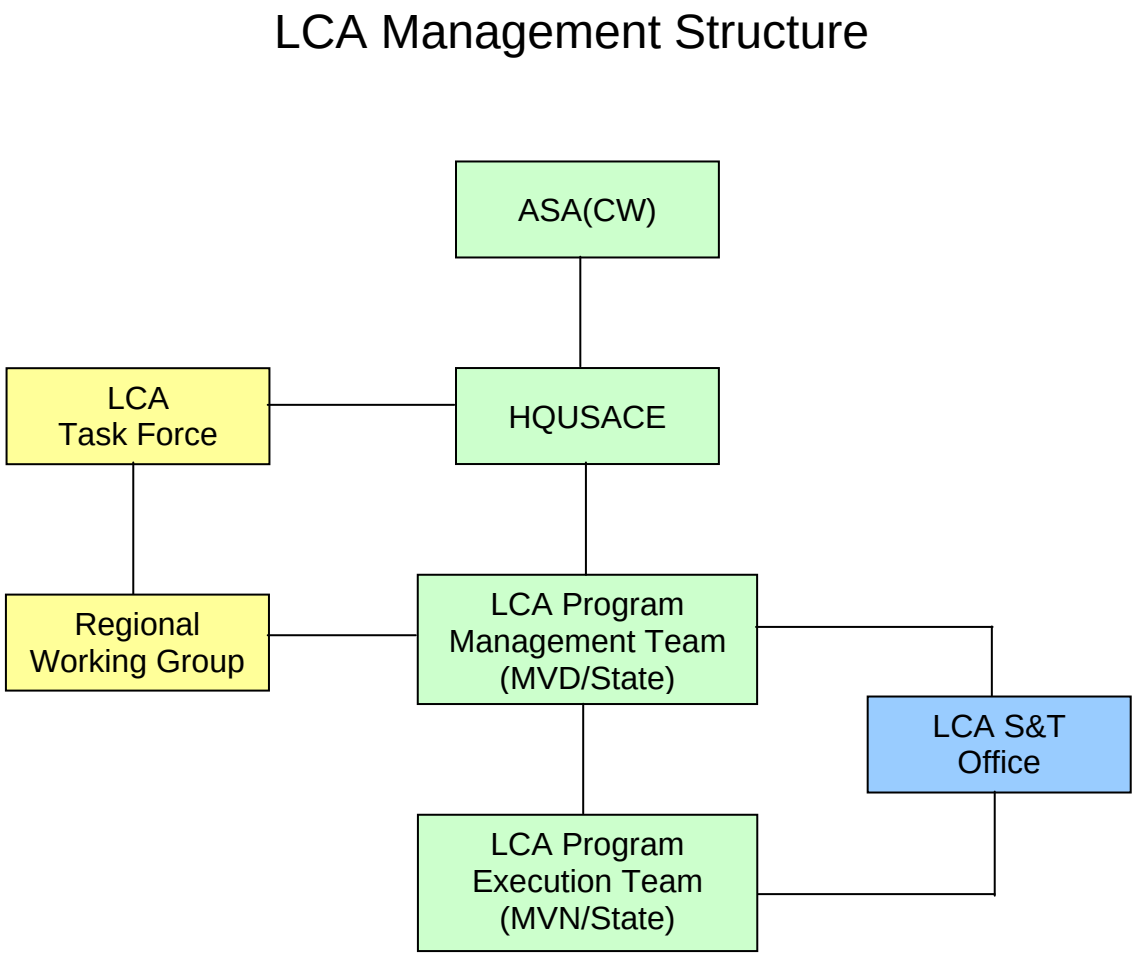

Figure 4-1. Louisiana Coastal Restoration Management Structure

4.1.1.1 Delegation of the BUDMAT Program

Engineer Regulation 1105-2-100, Planning Guidance Notebook, Appendix F: Continuing Authorities Program (CAP) allows for the Mississippi Valley Division Commander to approve

project decision documents provided the documents are in compliance with law and policy. The regulation further states that document approval authority may not be delegated to the District Commander. Following these guidelines, the PDT has determined that the BUDMAT Program will produce decision documents for projects under this authorized program that are supported by the same level of planning studies and that are similar in complexity, execution risks and demonstration of benefits and reasonable costs as projects executed under the CAP. Based on these considerations, the approval of candidate beneficial use projects for both design and construction could be delegated to the PMT in a manner that is consistent with the CAP and other authorized programs where project implementation decisions are delegated to the appropriate MSC. If document approval authority is not delegated to the Mississippi Valley Division Commander, approval of candidate beneficial use projects for design and construction could be granted by the Coastal Louisiana Ecosystem Protection and Restoration Task Force described below or by the Secretary of the Army (or the Secretary's designee).

4.1.1.2 WRDA Implementation Guidance for Coastal Louisiana Ecosystem Protection and Restoration Task Force

As documented in the WRDA 2007 Implementation guidance, the New Orleans District and Mississippi Valley Division have successfully engaged the regional representatives of the Federal and State agencies at Regional Working Group meetings throughout the Louisiana Coastal Protection and Restoration study process. Also, the Corps' Headquarters has successfully engaged the Washington Level Federal Principals throughout the study process. These meetings have been an efficient and effective way to communicate and solicit input from the agencies. The Corps will continue to engage the Federal and State agencies through these groups for the Louisiana Coastal Area study. No effort will be undertaken to set up a Task Force unless funds are specifically appropriated for such work.

4.1.2 Program Execution Team

The purpose of the Program Execution Team (PET) is to formulate, design, and implement the LCA Plan components. It would also provide a forum for the many Federal and state agencies working on coastal restoration efforts to interact and to share resources.

CEMVN and the State (through CPRA) lead the Program Execution Team. The Program Execution Team would oversee and execute all project level coastal restoration activities. The overall Program Execution Team would include additional Federal and state agency members. The members of the team would efficiently and expeditiously manage studies and construction through appropriate implementation strategies. Each organization brings to the team a particular area(s) of expertise.

The Program Execution Team may make recommendations that it deems warranted to the Program Management Team on matters that the Program Execution Team generally oversees and executes, including suggestions to avoid potential sources of dispute. The Program Management Team in good faith shall consider the recommendations of the Program Execution Team. The Program Management Team has the discretion to accept, reject, or modify the Program Execution Team's recommendations.

Team members would assist in the preparation of reports and the reports' submission to the Program Management Team. One specific reporting responsibility of the Program Execution Team would be the Program Report to Congress (RTC). The purpose of the RTC would be to provide Congress with 1) the status and progress of implementation of the LCA Plan, 2) any recommended changes to procedures for implementing the LCA Plan, 3) changes to the scope, cost, and structure of the LCA Plan, including the addition or removal of projects, 4) recommendations to improve the overall execution and management of the plan, and 5) any other information or recommendations regarding the plan. A RTC would be prepared by CEMVD and CEMVN, in collaboration with the state, and would be approved by Headquarters and the Secretary of the Army prior to submittal to Congress.

The Program Execution Team would make recommendations to the CEMVN District Engineer and the Program Manager for the following:

• Coordinate and conduct coastal consistency review of reports and documents for all CEMVN activities (i.e., feasibility reports) in the Louisiana coastal area;
• Prepare LCA Program Reports to Congress as required (for approval through the Program Manager;
• Prepare project cost share agreements for approval and execution by designated authority;
• Produce Project Management Plans (PMPs), Project decision documents/Feasibility Reports for approval and/or authorization of projects;
• Dialogue with the S&T Office during scoping of feasibility studies to identify S&T support requirements;
• Produce PED scope documents, Plans & Specifications (P&S), and environmental compliance documents;
• Review periodic AM monitoring reports, provide recommendations to the Program Manager, and implement guidance provided;
• Conduct all scoping meetings, public information meetings, and issue resolution activities;
• Prepare the Program Execution annual budget; and
• Submit the consolidated Program Execution and Science and Technology budget to the Program Manager.

4.2 ANNUAL PROCESSES FOR IMPLEMENTATION OF THE BUDMAT PROGRAM

The following procedures will be used to solicit, screen, and select candidate beneficial use projects for planning and design and to select construction-ready beneficial use projects for construction in conjunction with that year's O&M scheduled dredging activities. The two selection processes will be carried out concurrently over the life of the BUDMAT Program. Each year in the month of May, CEMVN conducts an Environmental Dredging Conference to inform the public and dredging stakeholders of the proposed O&M activities for the following fiscal year. The conference purpose is not only to provide information on next year's scheduled dredging O&M activities, but to solicit input from the public and the dredging stakeholders on how the dredged material could be used beneficially. Therefore, this conference will be used to initiate the annual processes for

implementation of the BUDMAT Program. The annual processes for implementation of the BUDMAT Program are illustrated in figure 4-2.

4.2.1 Solicitation and Initial Screening of Candidate Projects

As discussed in section 3.5, the Project Execution Team (PET) will solicit candidate beneficial use projects from the public, to include local landowners, municipalities, parishes and State officials, through the public outreach component of the BUDMAT Program and in coordination with the quarterly meetings of the CWPPRA Task Force, CEMVN's environmental dredging conference held in May of each year, and the CPRA monthly meetings. Candidate projects may include, but would not be limited to, beneficial use projects planned and designed under other coastal restoration programs that are ready to be constructed. Thus, candidate projects are expected to be nominated for consideration under the BUDMAT Program throughout the year and the identification of potential beneficial use sites will be based on local knowledge, professional judgment, and public input.

Prior to the May environmental dredging conference, the BUDMAT PET will review the previous year's activities with respect to ecosystem restoration efforts in coastal Louisiana to leverage the lessons learned to improve the planning, design, and implementation of beneficial use projects implemented under the BUDMAT Program. Sources for lessoned learned will include, but not be limited to, the S&T Office's periodic AM reports and the results/outputs of the CWPPRA and state only ecosystem restoration programs. Therefore, the PET will, on an annual basis, review both the minimum submittal requirements for nominated projects and the initial criteria for screening those nominated projects. The minimum requirements and screening criteria will be revised accordingly to ensure that the beneficial use projects meet the minimum goals and objectives, including authorization and scope, of the BUDMAT Program.

Specifically, the maximum practical transport distance for dredged material, as currently described in section 3.1.1.b, will be reevaluated each year. As permanent long distance sediment pipeline projects are constructed or when cost effectiveness for long distance transport techniques improve, the practical maximum transport distance will be increased to cover larger and larger areas of coastal Louisiana for consideration under the BUDMAT Program. In addition, any revisions to

Dredged Material Management Plans (DMMPs) that adjust the Federal standard for dredged material disposal at waterways in coastal Louisiana will be incorporated into the definition of the Federal standard for determining whether BUDMAT would provide incremental funding for specific beneficial use projects.

Candidate beneficial use projects will be screened, using the initial screening criteria described in section 3.5.4, shortly after the environmental dredging conference. Projects that satisfy the initial screening criteria will then be screened for design as discussed in the following section.

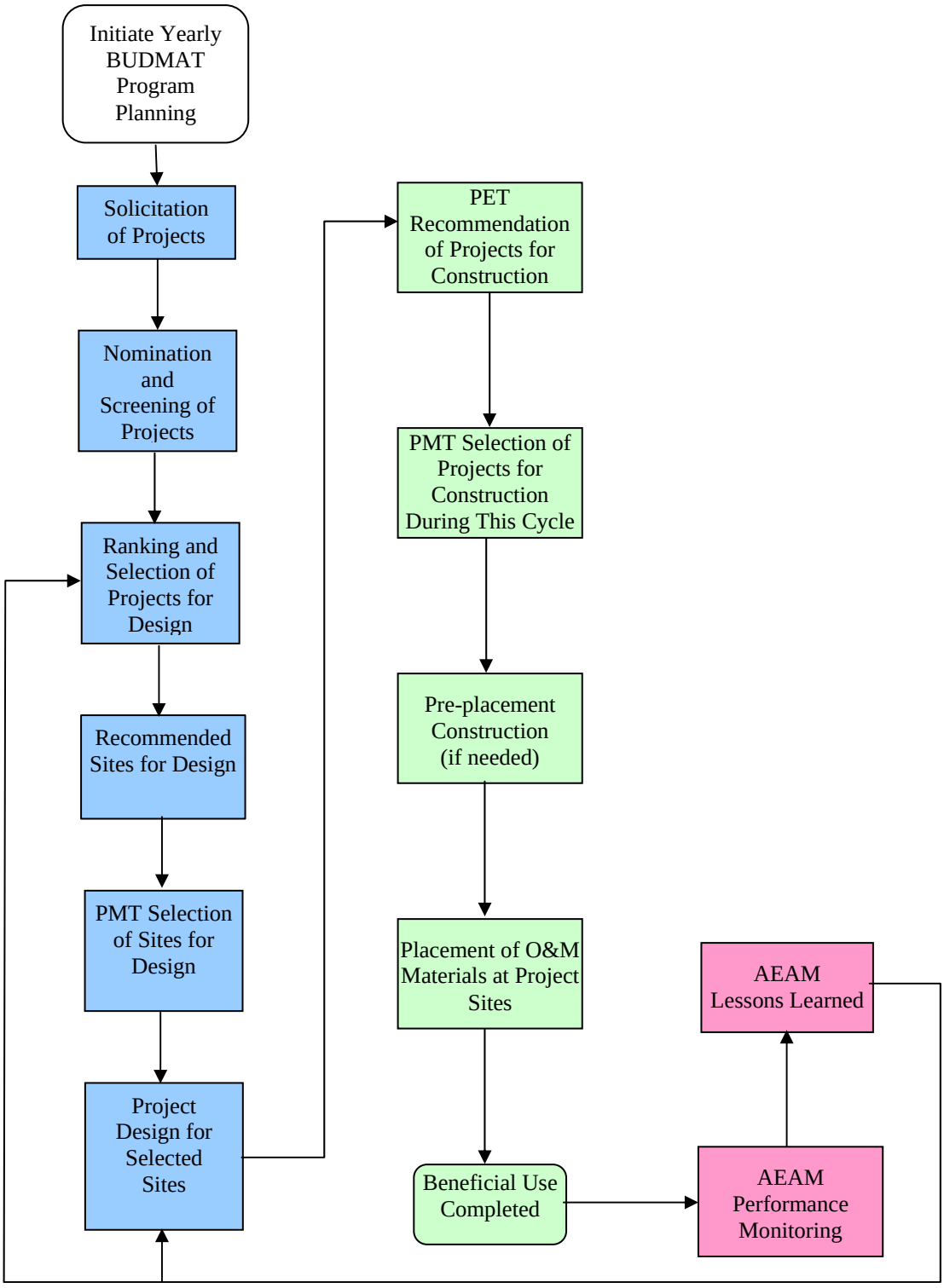

Figure 4-2. Annual Processes for the BUDMAT Program

4.2.2 Screening of Candidate Projects for Planning and Design

For candidate beneficial use projects that pass through the initial screening process, the PET will, as discussed in section 3.6, apply categorical rankings to each project for the following selection criterion:

- Protection of Critical Landscape Features
- Protection of Infrastructure
- Relative Cost-Effectiveness
- Synergy with Other Restoration Projects
- Implementability

The rankings and basis for assignment of projects to categorical values for each criterion are presented in table 3-3. Candidate projects planned and designed under other coastal restoration programs that are ready to be constructed would still be required to go through the categorical ranking process for selection for design to ensure they meet the minimum goals and objectives, including authorization and scope, of the BUDMAT Program.

Prior to ranking the candidate projects, the BUDMAT PET will review the previous year's activities with respect to ecosystem restoration efforts in coastal Louisiana to leverage the lessons learned to improve the planning, design, and implementation of beneficial use projects implemented under the BUDMAT Program. Sources for lessoned learned will include, but not be limited to, the PET's annual Adaptive Management (AM) review of BUDMAT project success monitoring data and the results/outputs of the CWPPRA and state only ecosystem restoration programs.

The PET will, on an annual basis, review both the necessity of each criteria and range of the categorical values for each criteria above taking into consideration advances in technology for the transportation and placement of sediment, changing environmental conditions and planning goals, and the relative cost effectiveness of ecosystem restoration projects. Annual review and revision of the criteria, including updating of maps and inventories of critical landscape features, critical infrastructure and projects that may be synergistic with beneficial use projects and their associated categorical values will ensure that the beneficial use projects meet the minimum goals and objectives, including authorization and scope, of the BUDMAT Program.

After ranking of the candidate projects using the screening criteria listed above, the projects would then be assigned numerical scores based on the following value assignments for each criterion's ranking: High = 5, Medium = 3, and Low = 1. The total of the numerical values for each project would then be used to list the candidate projects in order based the project numerical totals. If multiple projects with identical overall rankings are identified that must be reduced in number to meet the target number of projects to be recommended for design, the PET will evaluate the projects with tie scores using their best professional judgment to identify the projects with similar scores that are to be recommended for design based on the probability that the candidate projects will provide a greater contribution to the program objectives and that have a lower execution risk, based on the information available to the PET. The ranking, evaluation and

screening of projects will be considered for all candidate projects throughout coastal Louisiana. Screening and selection of candidate restoration projects will not be performed to identify and fund projects located within each sub-basin or channel reach because the objective of the BUDMAT program is to identify and implement the best-opportunities to use dredged material and to design and construct the most cost-effective projects using the available resources.

The PET would then prepare a set of recommended projects to be carried forward for the design process and would send this list to the PMT for consideration. The documentation provided to support the recommendations would include:

- The list of candidate projects nominated from the solicitation process for consideration.
- The PET rankings assigned to each candidate project for the selection criteria and resulting total numerical scores.
- A summary of the deliberations and selection of projects that were assigned tie scores that were further refined to determine the list of recommended projects for the design process.

There is not a minimum score for screening of projects for planning and design. The ranking process was developed to identify the candidate restoration opportunities that best meet the relevant program objectives for coastal ecosystem restoration identified in the LCA study. Any decision not to implement a candidate project will be based on the preliminary screening of candidate restoration opportunities and the assessment of reasonableness of costs and benefits carried out during the planning process for individual projects.

If delegated approval authority, the PMT would approve projects for further design efforts under the BUDMAT Program. Otherwise the PMT would submit their recommendations to a higher level authority for review and approval. In order to utilize all of the construction funding available in any given year, the recommendations and approvals of beneficial use projects for design will be made concurrently with the recommendations and approvals of beneficial use projects for construction.

4.2.3 Planning and Design Process

As discussed in section 3.7, the process for planning and designing beneficial use projects implemented under the BUDMAT Program would follow the guidelines specified for the Continuing Authorities Program (CAP), Beneficial Uses of Dredged Material, Section 204. Prior to construction, decision documents similar to the planning and design analysis described in Appendix F of Engineer Regulation 1105-2-100, Planning Guidance Notebook, will be prepared for each beneficial use project recommended for implementation under the BUDMAT Program. The one-step planning and design process shall include project formulation, analysis, justification, and design of the site-specific beneficial use project. Designs should include the appropriate documentation to justify the methodology of data collection, calculations, and all site-specific design parameters including potential sea-level change. Engineering Circular 1165-2-211, “Water Resources Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs”, dated July 1, 2009, mandates that all engineering designs include alternatives that are

developed and assessed for the entire range of possible future rates of sea-level change using low, intermediate, and high rates of future sea-level change for both the "with" and "without" project conditions. The PET will leverage the lessons learned from previous restoration efforts to improve the planning and design of beneficial use projects implemented under the BUDMAT Program. Sources for lessoned learned will include, but not be limited to, the S&T Office's periodic AM reports and the results/outputs of the CWPPRA and state only ecosystem restoration programs. Therefore, the PET will, on an annual basis, take into consideration advances in technology for the transportation and placement of sediment, changing environmental conditions and planning goals, and the relative cost effectiveness of ecosystem restoration projects. The annual review and adaptation of revised design criteria for beneficial use projects will ensure that the beneficial use projects meet the minimum goals and objectives, including authorization and scope, of the BUDMAT Program.

Therefore, once a beneficial use site has been approved for design, a Project Management Plan (PMP) will be developed and mutually agreed to by CEMVN and CPRA to address the scope of the design tasks, including CPRA's in-kind contributions, required to complete the project design document. Upon design completion, the Federal or non-Federal sponsor that was not the design lead, shall be allowed to review and comment before the design is finalized. It is anticipated that a typical design effort will be completed in approximately one year.

Candidate projects planned and designed under other coastal restoration programs and that were recommended for selection for design under the BUDMAT Program will require that their existing designs be reviewed to ensure the design process includes the appropriate level of documentation to justify, formulate, and design the site-specific beneficial use project including justification of the methodology of data collection, calculations, and all site-specific design parameters. If the design document is deemed sufficient, the project would then be considered for construction under the BUDMAT Program. Otherwise, a PMP will be developed and mutually agreed to by CEMVN and CPRA to address the scope of the additional design tasks, including CPRA's in-kind contributions, required to complete the project design document.

Selection of the optimal alternative for each project will incorporate National Ecosystem Restoration (NER) analysis as required for ecosystem restoration projects. All Corps water resources projects are evaluated in terms of acceptability, completeness, effectiveness, and efficiency. Ecosystem restoration alternatives are also evaluated on the basis of cost effectiveness and incremental cost analyses (CE/ICA) of the possible restoration alternatives and significance of ecosystem outputs. Outputs (or benefits) are measured by assessing each alternative's contribution to the stock of natural resources. Since these outputs are not readily translatable to dollar terms, traditional monetary benefit-cost analysis can not be performed. Consequently, the CE/ICA method is used for the comparison of ecologic output versus costs. CE/ICA are two distinct analyses that must be conducted to evaluate the effects of alternative plans.

In the cost effective analysis, the combined weighted ecologic outputs, computed on an average annual basis and provided by the ecologic models and benefit assessment protocols, will be documented for each project alternative. Typically, the Wetlands Value Assessment (WVA) model will be utilized for assessing the ecologic outputs of projects selected for design and implementation under the BUDMAT Program. However, if recommended by the LCA S&T Program, other models

may be used. The combined weighted outputs and costs for each project alternative will be sorted in terms of increasing output. The project alternatives will then be assessed according to their ability to produce outputs for a given cost. Cost effective means that, for a given level of output, no other alternative costs less and no alternative yields more output for the same or less cost. The result is a listing of project alternatives that will achieve each benefit level at the lowest cost. Graphing cost effective plans results in a theoretical line, or an "efficient frontier". Alternatives that fall above the line are not efficient in that they have higher costs for the same level of ecologic outputs. The cost-effectiveness assessment and identification of the efficient frontier will be followed by an incremental cost analysis.

Incremental cost is the additional cost for each increase in the level of output. In incremental cost analysis, the subset of cost effective plans are examined sequentially (by increasing scale and increment of output) to ascertain which alternatives are most efficient in the production of environmental benefits. The most efficient plans are called "Best Buys" and provide the greatest increase in output for the least increases in cost. That is, they have the lowest incremental costs per unit of output. Graphing of the Best Buy plans is very useful in identifying where significant increases in costs occur as output levels are increased and can assist decision makers in determining the desirable project scale.

While CE/ICA does not dictate what alternative plan to choose, the information from both analyses can inform decision making by progressively proceeding through the available levels of output to ask whether the next level is worth the additional cost.

4.2.4 Selection of Projects for Construction

Once project design documents have been completed, they will be available for implementing beneficial use projects in conjunction with CEMVN's O&M dredging activities during the upcoming year. It is the intent of the BUDMAT Program to have sufficient project design documents available to utilize all available construction funding per program year.

For the purpose of selecting projects for construction, there are two types of dredging projects: scheduled, maintenance dredging projects and unscheduled dredging projects. Scheduled maintenance dredging projects can be anticipated based on historical dredging records and the Environmental Dredging Conference held in May of each year. Unscheduled dredging projects, including emergency dredging, are not easily predicted as they typically result from tropical storms or industry sail-outs associated with deep draft or large vessels transporting materials or equipment for oil and gas exploration from inland waterways to the Gulf of Mexico. Dredging as a result of a tropical storm is usually considered an "emergency dredging" event because without this dredging, the channel is unsafe for navigation. As a result, emergency dredging projects usually occur with a sense of urgency. Industry sail-outs are typically scheduled around the normal maintenance dredging cycle. However, sometimes, due to delays in funding or weather delays, unscheduled dredging is needed to allow the vessel to navigate the channel without dragging the bottom of the channel. Beneficial use projects using unscheduled dredging, emergency or not, will need to be considered on a case by case basis as the need arises. However, the selection and criteria for determining whether the project should proceed to construction is not necessarily different than that

of a routine scheduled dredging event. Therefore, it is not necessary to reserve funds for unscheduled dredging projects since they are to be judged equally with scheduled dredging projects.

CEMVN's environmental dredging conference in May of each year will provide information regarding which specific reaches of authorized navigation channels are scheduled for dredging under CEMVN's O&M program in the upcoming fiscal year. Because the project designs to be considered for construction will be limited to those project locations for which the source material will be dredged during the upcoming year, only a specific subset of completed project designs will be available for selection for construction in each year of the program.

As discussed in section 3.8, the selection process for construction will be based primarily on the most cost-effective project designs ready for construction in association with the upcoming dredging events. Previously conducted screening would have identified projects for planning and design with consideration of program objectives and related criteria appropriate for the types of information available at that stage of project development. In addition, in the selection of projects to proceed to construction, the PET would give additional consideration to two factors:

- Uniqueness of the restoration opportunity (e.g., if a project construction opportunity is available for a navigation channel reach that is dredged infrequently, a higher priority may be assigned for that project)
- Availability of construction funds for the planning cycle and project costs (e.g., Remaining available construction funds are less than the incremental cost of the next highest ranked project remaining for consideration and where projects with lower rankings could be constructed with the remaining available construction funding)

The PET would then prepare a set of recommended projects to be carried forward for the construction process and would send this list to the PMT for consideration. The documentation provided to support the recommendations would include:

- The subset of completed designs for which the source material for beneficial use will be dredged during the upcoming year
- The PET rankings assigned to each candidate project based on the cost-effectiveness of projects determined during the planning and design process, as expressed in ecosystem restoration outputs, such as AAHUs divided by the total project cost.
- A summary of the deliberations and selection of projects that were further refined to determine the list of recommended projects for the construction process.

If delegated approval authority, the PMT would approve projects for construction under the BUDMAT Program and the plans and specifications for the beneficial use project will be incorporated into the maintenance dredging contract prior to advertisement. Otherwise the PMT would submit their recommendations to a higher level authority for review and approval. In order to utilize all of the construction funding available in any given year, the recommendations and approvals of beneficial use projects for design will be made concurrently with the recommendations and approvals of beneficial use projects for construction.

As stated previously, beneficial use projects proposed for unscheduled dredging events, including emergency operations will need to be considered for construction on a case by case basis

as the need arises. Beneficial use projects with completed designs that would use material from unscheduled dredging events will be ranked using the criteria above, including the two additional factors, and will be compared to the projects already approved for construction for that dredging cycle. Non-scheduled or emergency-related projects that are ranked more highly would then be recommended to replace the previously selected projects. If the non-scheduled dredging related project ranks higher than a project previously approved for construction the PMT, if delegated approval authority, may decide to construct the project associated with non-scheduled dredging in lieu of a previously approved project or projects.

During the first year of implementation for the BUDMAT Program, there will not be sufficient time available to solicit and screen projects for planning and design, complete the required studies and recommend projects for implementation in association with upcoming dredging events. However, a number of candidate beneficial use projects with complete planning and design studies performed under other programs would be available for implementation during the startup phase of the BUDMAT Program. During this initial startup period, the PET would identify available projects ready for construction that could use material provided by upcoming dredging events. The PET would use the selection for construction process described in this section to recommend projects for construction to the PMT. In subsequent years, projects identified and evaluated through the solicitation and screening processes would be carried forward for planning, design and consideration for construction with subsequent dredging events.

4.3 REAL ESTATE

Estates

As previously indicated, design for particular projects will be accomplished through individual project studies. Hence, estates are not proposed at this time. Each decision document prepared will propose the exact estates to be acquired. If due to the nature of the particular project, non-standard estates need to be acquired, approval for those estates will be requested in accordance with the Standard Operating Procedures set forth by Mississippi Valley Division.

Non-Federal Sponsor

The non-Federal sponsor for this programmatic study is the LDNR, acting on behalf of the State of Louisiana. However, the CPRA will be identified as the non-Federal sponsor for the follow-on phase of construction for each of the beneficial use projects implemented under the BUDMAT Program. As the non-Federal sponsor for implementation, CPRA must provide all real estate interests required for each project implemented under the BUDMAT Program i.e., all lands, easements, rights-of-way, relocations, and any other interests, including suitable disposal areas (LERRDs). In addition, CPRA will provide all lands, water bodies, and/or waterbottoms that are owned, claimed, or controlled by the State, as deemed necessary by the Government in consultation with CPRA. CPRA as the non-Federal sponsor for implementation, will receive credit for the value of the LERRDs provided for the project.

Federally Owned and State Owned Lands

The plan may affect Federally-owned lands. For those project features that are located in Federally owned property, CEMVN will secure right of entry from the other Federal agency. The plan feature will impact State of Louisiana lands. For those areas that are owned by the State of

Louisiana, the State will issue a grant of particular use to the USACE providing right of entry to its property. For planning purposes, it is assumed that the State owns the bed and bottoms of navigable waterways, including areas of open water. A detailed determination of ownership of the State, including any political subdivisions of the State, will be made by CPRA in conjunction with the relevant state entities, including the State Land Office, for each particular project implemented under the LCA BUDMAT Program.

Real Estate Costs

Cost estimates will be prepared for each beneficial use project implemented under the BUDMAT Program and will include the estimated value of the LERRDs and incidental costs associated with the acquisition process.

The presence of numerous oyster leases both within and adjacent to some navigation channel limits beneficial use of dredged material within the Federal standard base plan. If the oyster leases were acquired and extinguished, it is likely that the many of the sites could be used for beneficial use within CEMVN's O&M Federal standard base plan. In November 2006, the Louisiana Legislature established the Louisiana Oyster Lease Acquisition and Compensation Program (OLACP), LSA-R.S. 56:432.1 and LAC 43:I:850-869, which enables the State of Louisiana to acquire oyster leases within the direct impact area of a coastal protection, conservation, or restoration project. The BUDMAT Program qualifies as such a project. However, it is important to note that it is the sole responsibility of the non-Federal sponsor of a navigation project to provide lands, easements, rights-of-way, relocations, and disposal areas (LERRDs), including acquisition costs of any oyster leases, for the Federal standard base plan. Therefore, since funds from the BUDMAT Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard, BUDMAT Program funds can only be used to acquire oyster leases for beneficial use sites that are clearly outside the scope of the Federal standard base plan disposal alternative

Appendix B presents a plan for acquisition of lands, easements, and rights-of-way necessary for construction of each specific beneficial use project implemented under the proposed 10-year BUDMAT Program.

4.4 FUNDING

The authorization of the BUDMAT Program in the WRDA 2007 grants the USACE the ability to conduct a program in the coastal Louisiana ecosystem that will beneficially use dredged material from federally maintained waterways in an effort to create and restore Louisiana's wetlands. However, appropriation of funds by Congress is necessary for the BUDMAT Program to be implemented. For purposes of this guidance document, it is assumed that the BUDMAT Program will receive $6.5 million annually for 10 years through Congressional appropriations to cover the Federal share of the BUDMAT Program costs. Likewise it is assumed that the BUDMAT Program will receive $3.5 million annually for 10 years through the Legislature of the State of Louisiana.

The BUDMAT Program costs are those costs incurred for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the ordinary disposal activities that are covered under the USACE O&M dredging operations in accordance with their established base plan for maintenance dredging activities. The base plan is determined by applying the Federal standard which requires disposal or placement activities to be conducted in the least-cost, environmentally-acceptable manner based on sound engineering principles.

4.4.1 Programmatic Funding Concurrent Allocation

Once funds have been appropriated they will be concurrently allocated to two phases: Project Design and Project Construction. The BUDMAT Program is intended to be weighted toward Project Design in initial years in an effort to have multiple beneficial use sites designed and ready for future dredging projects. The proposed initial budget allocation, by fiscal year, can be found in Table 4-1. The weighting shown in Table 4-1 will be modified as the BUDMAT Program progresses based on actual costs of design and construction, in consideration of the following objectives:

1. Provide and maintain a sufficient number of beneficial use sites (with completed design documents) to facilitate optimal use of dredged materials from scheduled and unscheduled dredging projects located throughout the study area.
2. Optimize beneficial use of dredged materials above and beyond the base plan for O&M disposal activities.
3. Optimize the resulting acreage of wetlands, or other coastal landscape features, that are restored, enhanced, or created through the life of the program.

4.4.2 Project Funding

The BUDMAT Program provides funding for: 1) project design documents for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard, and 2) the incremental, additional construction costs required for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE

Table 4-1. Program Funding by Fiscal Year

Program Year (PY)	Project Design	Project Construction
PY 1	30%	70%
PY 2	25%	75%
PY 3	20%	80%
PY 4	15%	85%
PY 5-9	10%	90%
PY 10	0%	100%

O&M maintenance dredging Federal standard. Project design funding will be utilized for screening and planning of potential beneficial use sites; development of environmental documentation in accordance with the National Environmental Policy Act (NEPA); pre-design and design-level site characterization (as required); and development of detailed design documents, including drawings, and specifications for each beneficial use project. Construction costs may include: acquisition of beneficial use site property; potential preparatory work in advance of placement of dredged materials (such as the construction of retention dikes); and the incremental, additional costs for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard.

It is the goal of the BUDMAT Program to use all available funding in the fiscal year for which it was designated. However, in the event some funding is not utilized, it will be carried over to the following year's funding.

4.4.3 Cost Sharing

The State of Louisiana, acting through the Coastal Protection and Restoration Authority of Louisiana (CPRA), will be the non-Federal sponsor for all beneficial use projects implemented under the BUDMAT Program. As a component of the LCA Plan, the cost share for this programmatic study and EIS is 50% Federal and 50% non-Federal. The cost share for the planning, design and construction of beneficial use projects implemented under the BUDMAT Program will be 65% Federal and 35% non-Federal. The CPRA must provide all lands, easements, rights-of-way, utility or public facility relocations, and disposal areas (LERRDs) required for site-specific beneficial use projects implemented under the BUDMAT Program. If required, Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) of projects implemented under the BUDMAT Program would be a 100% CPRA responsibility.

4.5 PUBLIC OUTREACH

Public involvement as required by NEPA regulations would provide the public multiple chances to comment on the BUDMAT Program and site-specific beneficial use projects implemented under the BUDMAT Program. This would include the November 2004 LCA Ecosystem Restoration Program Feasibility Study and PEIS, this BUDMAT Program study and PEIS, and future site-specific beneficial use project design documents, including NEPA documentation and Consistency Determinations. In addition to these opportunities, the CEMVN and CPRA LCA Public Outreach and Involvement co-leaders agree that public involvement should continue throughout the BUDMAT Program. Outreach to the public and feedback from the public are equally important and desired. To achieve this, a strategic communication plan has been developed that emphasizes an open, ongoing, two-way communication process, both formal and informal, between agencies and the various publics during the life of the project.

A Public Involvement Plan will detail the different methods, tools and activities to keep the public informed about the current status and location of beneficial use projects implemented under

the BUDMAT Program. For example, targeted workshops, publications and presentation materials (brochures, videos), an active, current Web site, news releases and exhibits are some of the tools used to inform and engage the public. The Plan will also identify avenues for feedback from the public. In addition to the tools mentioned above, stakeholder and public meetings can be held to address the respective comments or concerns and explain why/why not they were not used in determining beneficial use site recommendations.

4.6 MONITORING, OPERATION AND PROGRAM SUCCESS

If required, Operation, Maintnenance, Repair, Replacement and Rehabilitation (OMRR&R) of projects implemented under the BUDMAT Program would be a 100% CPRA responsibility.

Section 2039 of WRDA 2007 mandates that when conducting a study for a project for ecosystem restoration that the recommended project includes a plan for monitoring the success of the ecosystem restoration. Monitoring plans need not be complex but the scope and duration should include the minimum monitoring actions necessary to evaluate success. Ecological success will be documented through an evaluation of the predicted outcomes as measured against the actual results. The monitoring plan shall include a description of the monitoring activities, the criteria for success, and the estimated cost and duration and/or periodicity of the monitoring efforts as well as specify that monitoring will continue until such time as the Secretary determines that the success criteria have been met. Consistent with WRDA 2007, monitoring shall be a cost-shared project cost for a period of up to a maximum of ten years from completion of construction of a beneficial use project implemented under the BUDMAT Program. Additional monitoring required beyond ten years, if applicable, will be a 100% non-Federal responsibility.

In 1994, CEMVN implemented the large-scale Beneficial Use of dredged material Monitoring Program (BUMP) to quantify the amount of new habitat created and to improve dredge disposal placement techniques to maximize beneficial use. Each year, aerial photography is acquired and digital mosaics are produced for each of the beneficial use sites. GIS habitat analysis and field surveys are conducted to generate habitat change maps. From the analysis, coastal change data quantifies the creation of new coastal lands and other habitats. The field program includes ground truthing operations to verify and update the habitat maps and field monitoring to collect information about vegetation, disposal elevations, and placement practices (configurations and containment) to assess best practices for maximizing habitat benefits from the beneficial use of dredged material. Habitat types are broken into simple classes and sub-classes based on the types of vegetation present: water, wetlands (marsh and forested wetlands), and land (beach, bare, dune, upland, shrub/scrub, and forest).

Currently, under its existing O&M Program, CEMVN conducts aerial flights to obtain aerial photography for each of its beneficial use placement sites on an annual basis. Since 2000 and due to funding constraints, CEMVN no longer funds the analyses of the aerial photography to produce habitat change maps. Additionally, CEMVN no longer conducts a field program including ground truthing and field surveys. It is anticipated that CEMVN will, at a minimum, continue to acquire the aerial photography on an annual basis under the Federal standard.

The analyses of the aerial photography to produce habitat change maps, in conjunction with the ground-truthing and field monitoring, for site-specific beneficial use projects implemented under the BUDMAT Program would be conducted for selected projects based on the project's uniqueness relating to the uncertainty of achieving ecological benefits, environmental setting, timing of placement, placement elevations and configurations. If a beneficial use project is selected for monitoring, baseline data would be collected within one year of placement of the dredged material. Current guidance for the CAP Program states that monitoring will be limited to five years duration and costs will be limited to 1% of the total costs. Therefore, in accordance with the Section 2039 WRDA 2007 guidance and the CAP guidance, the monitoring costs for the BUDMAT Program be limited to a maximum duration of 10 years and a maximum cost of 1 percent of the total costs.

4.6.1 LCA Science & Technology Program

The LCA S&T Program has been tasked with building the LCA System-Wide Assessment and Monitoring Plan (SWAMP). SWAMP will incorporate CWPPRA's existing Coastwide Reference Monitoring System (CRMS) for wetlands which will provide valuable information regarding emergent vegetation, vegetation diversity, and land/water ratio analysis via aerial photography and satellite imagery. Two other components of SWAMP are the CRMS-Water and the Barrier Island Comprehensive Monitoring (BICM) program. Initially, CRMS-Water will provide a single point access to existing inter-agency hydrologic and hydrodynamic data collection efforts coastwide. Ultimately, CRMS-Water will help fill monitoring coverage gaps both from a spatial as well as a parameter standpoint and provide a systematic tool for monitoring and assessment of hydrologic conditions on a coastwide basis. BICM was established to determine long-term changes of barrier island and coastal shoreline morphology and is envisioned to become a rolling effort in the future. BICM will provide resources to evaluate the effectiveness of both current and future restoration projects as well as provide critical information for planning, engineering, and design of future projects.

A major component of the $100 million S&T Program is the S&T Program's Demonstration Projects which were also authorized by WRDA 2007 in the amount of $100 million. The purpose of LCA S&T Program Demonstration Projects is to resolve critical areas of scientific, technical, or engineering uncertainty while providing meaningful restoration benefits whenever possible. After design, construction, monitoring, and assessment of individual demonstration projects, the LCA Program would leverage the lessons learned to improve the planning, design, and implementation of other Louisiana coastal zone restoration projects.

Over the life of the BUDMAT Program, the PET will review the results and recommendations provided by the S&T Program through these regional monitoring efforts, SWAMP, CRMS and BICM, and through demonstration projects to identify types of projects, and management measures and project design features that enhance the outputs of beneficial use projects.

4.6.2 Regional Sediment Management Plan

CEMVN is currently developing a Regional Sediment Management (RSM) Plan for optimizing the uses of sediment. Managing sediment to benefit a region potentially saves money, allows use of

natural processes to solve engineering problems, and improves the environment. As a management method, RSM

- Includes the entire environment, from the watershed to the sea
- Accounts for the effect of human activities on sediment erosion as well as its transport in streams, lakes, bays, and oceans
- Protects and enhances the nation's natural resources while balancing national security and economic needs

As the beneficial use of dredged material is an integral part of any RSM plan, the CEMVN's RSM Plan will include the BUDMAT Program. The LCA S&T Program Office is also taking the lead on developing an Interagency RSM (IRSM) Program to support the coordinated State-Federal development of calibrated sediment budgets, a gauged numerical regional prediction system, and a regional data management structure to assist coastal engineers with data organization, accessibility, and analysis.

4.6.3 Adaptive Management (AM) for the BUDMAT Program

As presented in the above discussion on monitoring for success of BUDMAT projects, most project monitoring will be conducted to determine project success over an initial period upon completion of construction. Because most of the projects are of limited complexity and low risk, the success monitoring efforts will document basic measures of project outputs, such as acreage of wetland provided, data on vegetation types and abundances, soil quality and function, and basic hydrologic parameters. Under most situations, it is anticipated that the success monitoring data provided on the individual projects would not be used to modify or perform additional construction at completed projects. The success data from individual projects do provide the opportunity to optimize the selection and implementation of subsequent projects under the BUDMAT Program.

To initiate AM for the BUDMAT Program, the PET will first carry out the Adaptive Management Setup Phase, as shown on figure 4-3. The primary outputs to be provided by the setup phase are the performance measures, targets and decision criteria that would be used to evaluate the project-specific monitoring data and make decisions regarding the selection and optimization of projects as the program is executed. The PET will document the results of the Setup Phase in the BUDMAT Program AM Plan, which will provide guidance and a standard process for the PET to evaluate types of projects and available management measures on a yearly basis.

During the initiation of each annual cycle to identify, screen and initiate planning and design of new beneficial use projects, the PET will review the available project success data and will make recommendations to the PMT for implementation. Recommendations may include adopting specific types of projects for consideration, based on the success monitoring data. In addition, performance measures that can be incorporated into the project design processes will be compiled and made available to the project design teams so that management measures and project features that are shown to contribute to project success can be considered for upcoming project designs where the project type and setting are appropriate for the features and measures under consideration.

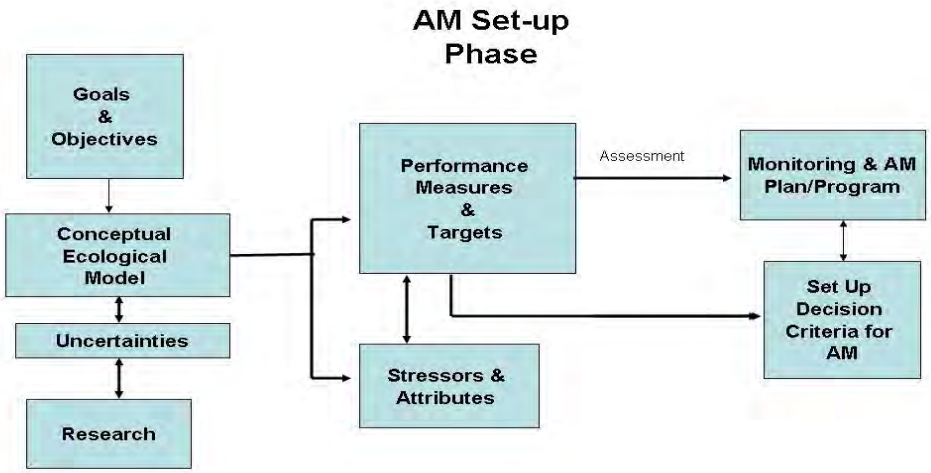

Figure 4-3. Adaptive Management Set-up Phase

The annual review of monitoring data and recommendations for project types and design features to be considered are a programmatic application of adaptive management principles to the execution of individual projects under the program. This programmatic function will require less than one percent of the total annual budget for the program. The overall process for adaptive management implementation is shown on figure 4-4.

4.7 CONSISTENCY AND COORDINATION BETWEEN DEVELOPMENT AND COASTAL RESTORATION AND PROTECTION EFFORTS

From navigation improvements and hurricane protection to residential and commercial construction, development activities can affect the Louisiana coastal environment. Yet, such activities are critical for a healthy and vibrant economy in coastal Louisiana. The challenge, therefore, is to ensure that economic development does not undermine the sustainability of wetlands and coastal ecosystems that are also vital to long-term economic health of the region and Nation. The solution is neither a moratorium on growth in the coastal zone, nor "business as usual."

Project purposes such as hurricane protection, navigation, and economic development must be addressed in a way that is consistent with coastal restoration and protection efforts. Indeed, Section 303(d) of CWPPRA mandates consistency for some important activities:

> *Consistency--- (1) In implementing, maintaining, modifying, or rehabilitating navigation, flood control or irrigation projects, other than emergency actions, under other authorities, the Secretary* [of the Army], *in consultation with the Director* [of the USFWS] *and the Administrator* [of the EPA], *shall ensure that such actions are consistent with the purposes of the restoration plan submitted pursuant to this section.*

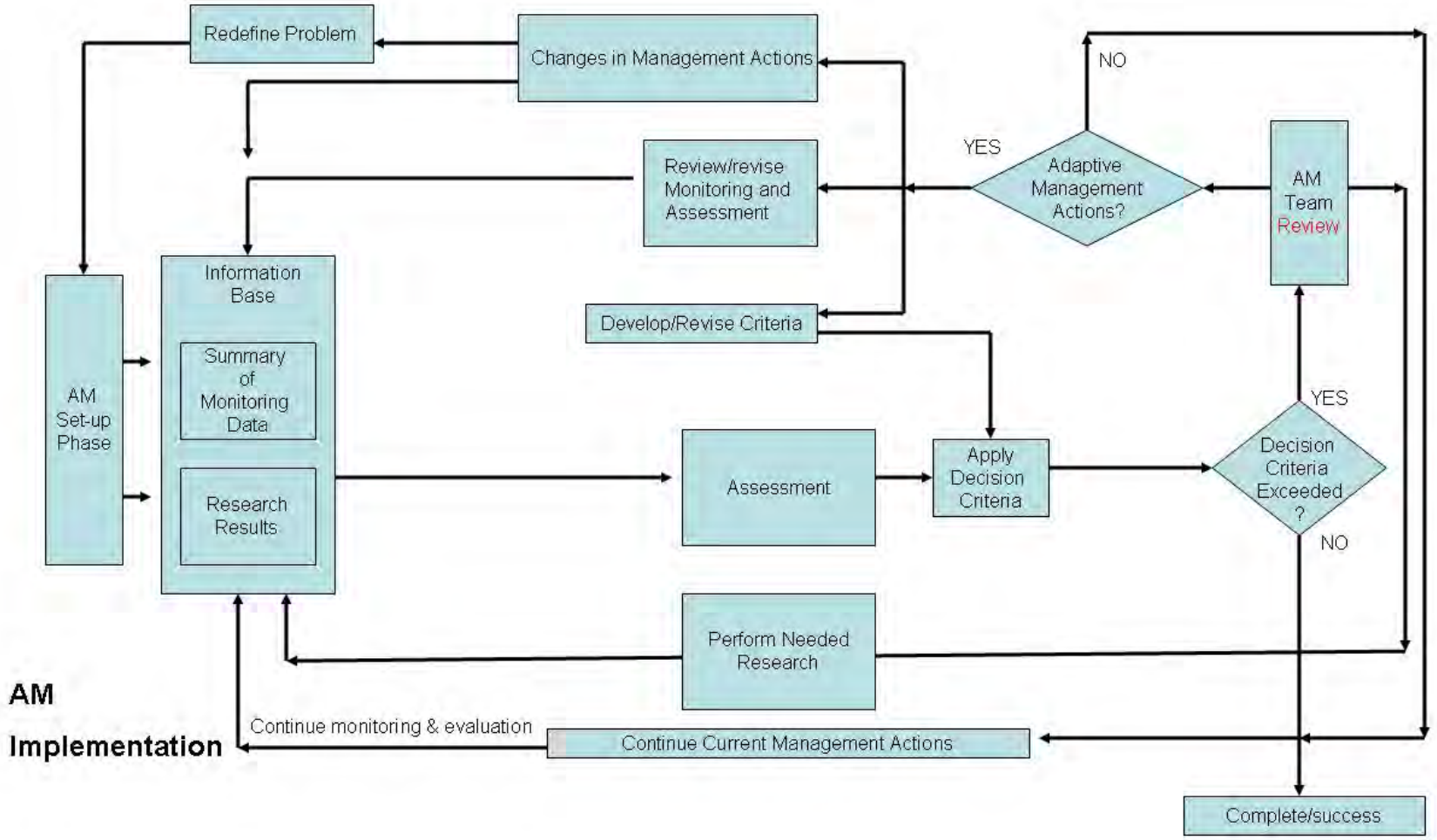

Figure 4-4. Adaptive Management Implementation

Despite efforts to address this important provision, it is acknowledged by many stakeholders that a more thorough and comprehensive effort is needed to ensure consistency across the coast. It is further recognized that the LCA Plan is the appropriate vehicle for initiating such an effort. In order to move towards such consistency, implementation of the LCA Plan would include:

• "Coastal Consistency" reviews by the LCA Program Execution Team of all CEMVN feasibility reports and significant regulatory actions;
• Early coordination between both the state and CEMVN on all projects in the Coastal Area that have potential impacts upon restoration activities;
• Adherence to the Coastal Zone Management Act Federal Consistency Regulations (15 CFR Part 930 Subpart C---Consistency for Federal Agency Activities, 16 U.S.C. 1451 et seq.)

These efforts to enhance internal and external coordination would build upon the significant progress that has already been made as a result of the formation of the interagency (Federal and state) collocated restoration team housed within CEMVN. In implementing the LCA Plan, the state would also work towards consistency with their Coastal Zone Management Plan. A more detailed Consistency Action Plan is included in chapter 6 of the LCA FPEIS. Figure 4-5 indicates the coordination that would be necessary to achieve coastal consistency. Most of these state and Federal programs involving coastal management are under the purview of the agencies represented on the Task Force.

4.8 INSTITUTIONAL REQUIREMENTS

The ten-year, $100M BUDMAT Program was authorized in the Water Resources Development Act (WRDA) 2007. After approval of this study by the Secretary of the Army, the BUDMAT Program would be eligible for construction funding. The BUDMAT Program would be considered for inclusion in the President's budget based: on national priorities, magnitude of the Federal commitment, economic and environmental feasibility, level of local support, willingness of the CPRA to find its share of the project cost and the budget constraints that may exist at the time of funding. Once the report is approved, the USACE and CPRA would enter into a general design agreement for the screening of projects. Once Congress appropriates Federal construction funds, the USACE and CPRA would enter into individual project partnership agreements that would delineate the Federal and non-Federal responsibilities for implementing specific beneficial use projects.

The WRDA of 1986 comprehensively reestablished and redefined the Federal interest in water resources development and, in recognition of the limitations on Federal financial resources, instituted requirements for proportionately greater non-Federal cost-sharing in USACE projects.

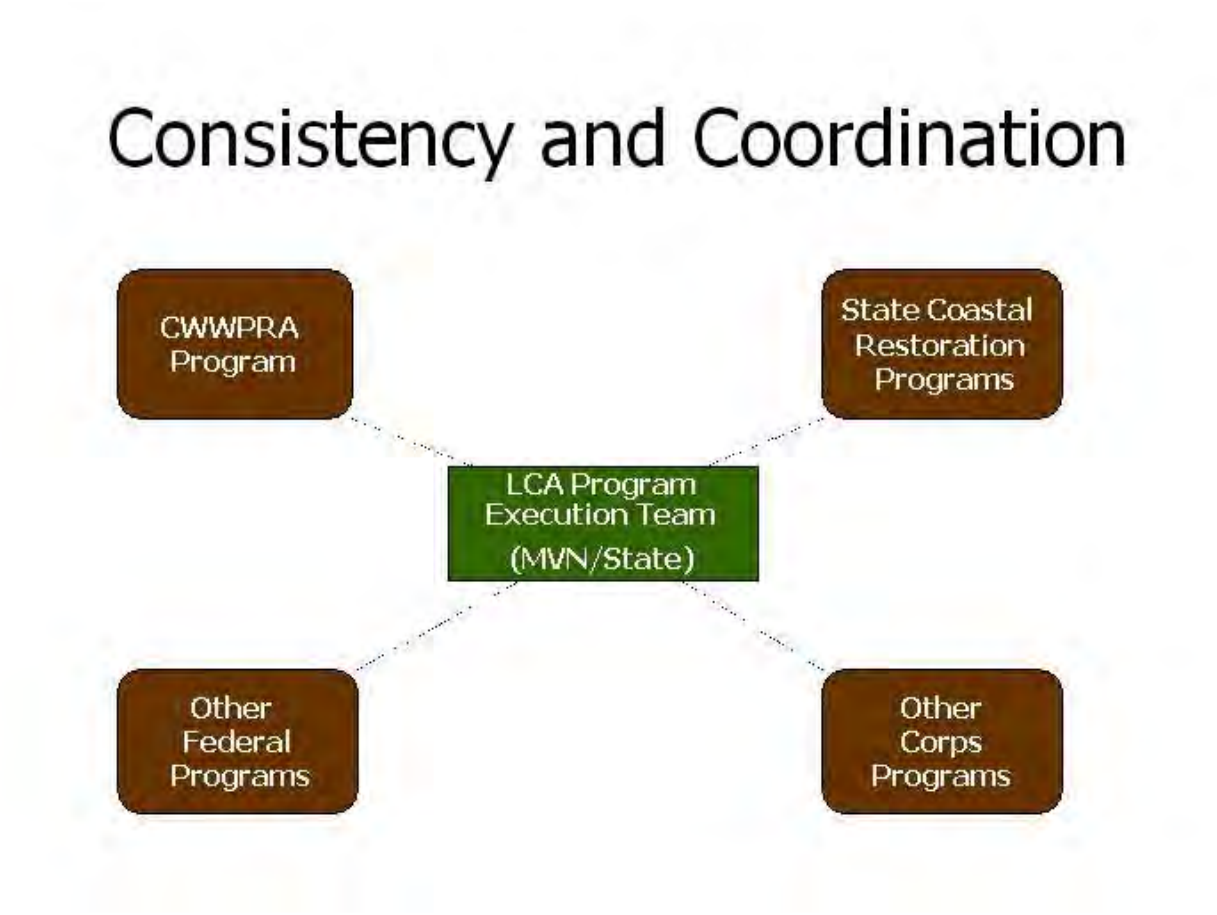

Figure 4-5. Consistency and Coordination

4.9 DIVISION OF RESPONSIBILITIES

4.9.1 Non-Federal Sponsor

The non-Federal sponsor for implementation of the BUDMAT Program is the State of Louisiana, acting through its CPRA. The CPRA would sponsor the selection, planning, design, and implementation of site-specific beneficial use projects under the BUDMAT Program. CPRA has been made aware of and has expressed a complete understanding of the ultimate requirements for implementation of the BUDMAT Program.

4.9.2 Cost Sharing Requirements

The BUDMAT Program recommended in the report would require non-Federal cost-sharing for implementation. A standard cost share percentage of 65 percent Federal and 35 percent non-Federal is typically applied for civil works construction features. The report of the Chief of Engineers, dated January 21, 2005, recommended that the BUDMAT Program be cost shared in accordance with Section 204 of WRDA 1992. Prior to WRDA 2007, Section 204 mandated a cost share percentage of 75 percent Federal and 25 percent non-Federal be applied for the beneficial use of dredged material projects implemented under the Section 204 Program. However, Section 2037 of WRDA 2007 modified Section 204 to mandate a cost share percentage of 65 percent Federal and 35 percent non-Federal. Therefore, in accordance with Section 2037(c) of WRDA 2007, all work under the BUDMAT Program will be cost shared at 65% Federal and 35% non-Federal. CPRA will provide the lands, easements, rights-of-way, relocations, and disposal areas (LERRDs) necessary for the implementation of a beneficial use project.

Funds from the BUDMAT Program would be used for disposal activities associated with separate, cost-shared, individual ecosystem restoration beneficial use projects that are above and beyond the disposal activities that are covered under the USACE O&M maintenance dredging Federal standard, including costs for monitoring and adaptive management.

4.9.3 Federal Obligations

1. Subject to receiving funds appropriated by the Congress of the United States and using those funds and funds provided by the non-Federal sponsor, expeditiously constructing beneficial use projects under the BUDMAT Program, applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

2. Affording the non-Federal sponsor the opportunity to review and comment on the solicitations for all contracts, including relevant plans and specifications, prior to the Government's issuance of such solicitations. The Government shall consider in good faith the comments of the non-Federal sponsor, but the contents of solicitations and award of contracts shall be exclusively within the control of the Government.

3. To the extent possible, affording the non-Federal sponsor the opportunity to review and comment on all contract modifications, including change orders, prior to the issuance to the contractor of a Notice to Proceed. In those cases where providing the non-Federal sponsor with notification of the contract modification or change order is not possible prior to issuance of the Notice to Proceed, such notification would be provided in writing after the fact at the earliest date possible. The Government shall consider in good faith the comments of the non-Federal sponsor, but the execution of contract modifications, and issuance of change orders, shall be exclusively within the control of the Government.

4. To the extent possible, affording the non-Federal sponsor the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the non-Federal sponsor, but the resolution of contract claims, and

performance of all work on the beneficial use project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

5. Throughout the period of construction, furnishing the non-Federal sponsor with a copy of the Government's Written Notice of Acceptance of Completed Work for each contract for the beneficial use project.

6. After the Government determines that construction of the beneficial use project, or functional portion of the beneficial use project, is complete: 1) notifying the non-Federal sponsor in writing of such determination; 2) furnishing the non-Federal sponsor with an Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual, if applicable; and 3) turning the beneficial use project, or functional portion of the beneficial use project, over to the non-Federal sponsor for operation, maintenance, repair, replacement, and rehabilitation, if applicable.

7. Performing a final accounting to determine the contributions provided by the non-Federal sponsor, and to determine whether the non-Federal sponsor has met its obligations.

4.9.4 Non-Federal Responsibilities

The non-Federal sponsor shall, prior to implementation, agree to perform all of the local cooperation requirements and non-Federal obligations. Local cooperation requirements and non-Federal sponsor obligations include, but are not necessarily limited to:

1. Provide a minimum of 35 percent of total project costs allocated to beneficial use of dredged material;

2. Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material, perform or ensure the performance of all relocations, and construct improvements required on lands, easements, and rights-of-way to enable the disposal of dredged or excavated material that the Government determines to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the projects;

3. Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for each project;

4. Do not use funds provided by a Federal agency under any other Federal program, to satisfy, in whole or in part, the non-Federal share of the cost of the project unless the Federal agency that provides the funds determines that the funds are authorized to be used to carry out the study or project;

5. To the extent that operation and maintenance of a beneficial use project is necessary, the non-Federal sponsor shall operate, maintain, repair, replace, and rehabilitate the project, or

functional portion of the project, including mitigation, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and state laws and regulations and any specific directions prescribed by the Federal Government;

6. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspecting, operating, maintaining, repairing, replacing, rehabilitating, or completing the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall relieve the non-Federal sponsor of responsibility to meet the non-Federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance;

7. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the United States or its contractors;

8. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

9. Assume, as between the Federal Government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

10. Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that would not cause liability to arise under CERCLA;

11. Prevent obstructions of or encroachments on the project (including prescribing and enforcing regulations to prevent such obstruction or encroachments) which might reduce ecosystem restoration benefits, hinder operation and maintenance, or interfere with the project's proper function, such as any new developments on project lands or the addition of facilities which would degrade the benefits of the project;

12. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as would properly reflect total costs of construction of the project, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

13. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5), and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213), which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

14. Comply with all applicable Federal and state laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and all applicable Federal labor standards and requirements, including but not limited to 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701 – 3708 (revising, codifying, and enacting without substantial change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c et seq.); and

15. Comply with all 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. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way necessary for the initial construction, periodic nourishment, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

4.10 VIEWS OF THE NON-FEDERAL SPONSOR

In a letter dated June 3, 2004 that was included as part of the November 2004 Louisiana Coastal Area Ecosystem Restoration Study; the State of Louisiana expressed its intention to share in the costs of implementing the recommendations of that report based on understanding of the current law and administration policy regarding implementation of Federal water resources projects. As included in this Programmatic Study Report for the LCA Beneficial Use of Dredged Material Program, the State of Louisiana continues to voice its support for the LCA Program and specifically the beneficial use of dredged material from federally maintained navigation channels and the recommendations identified in this report.

4.10.1 Streamlined Implementation Processes

While it is important to maintain checks and balances to ensure wise and efficient use of resources, it is also important that program requirements do not preclude a timely response to this urgent problem. The state believes the USACE should develop procedures for preparation and submittal of streamlined decision documents. These procedures should include expedited mechanisms for incorporating projects that have undergone extensive engineering and design efforts under other state and Federal programs. These decision documents should provide adequate assurances that the projects would be effective and cost-efficient in meeting their objectives, but should not be traditional feasibility reports. In addition, WRDA 2007 allows that Title VII projects may be considered economically justified based upon their benefits to the environment. Therefore, these projects may be justified solely on National Ecosystem Restoration benefits; ancillary economic impacts and benefits should be reported. The streamlined process for implementing beneficial use projects proposed in this report addresses our concerns regarding timely implementation of coastal restoration projects.

4.10.2 Program Implementation Cost Share

The State of Louisiana is in full support of the LCA Beneficial Use of Dredged Material Program at current cost share ratio of 65 percent Federal, 35 percent non-Federal, with operations, maintenance, repair, replacement and rehabilitation being a 100 percent non-Federal responsibility, as required in WRDA 2007. However, the state believes that alternative cost share scenarios are appropriate and justified and intends to request of Congress that the non-Federal share of the total LCA Program implementation be set at 25 percent as indicated in January 2005 Chief's Report for the LCA Program, including operations, maintenance, monitoring, repair, replacement, and rehabilitation costs.

Much of the need for restoration can be tied to disruptions of natural processes caused by implementation of existing Federally-authorized projects, which were built under different cost share ratios. Without modification of these projects, further decline of the coastal ecosystem is a certainty. In addition, the nation derives significant benefits from the coastal Louisiana ecosystem: protection for the production and transport infrastructure for about 30 percent of the nation's oil and gas supply; the Nation's second largest commercial fishery; and navigation and port facilities which together support America's number one port complex by tonnage.

If the land loss is not addressed aggressively, there would certainly be National impacts as well, not the least of which is putting the country's energy security at increased risk. Past precedent also shows that WRDA projects to restore the coastal Louisiana ecosystem have been implemented at a 25 percent non-Federal cost. In addition, similarly to provisions in the Comprehensive Everglades Restoration Program, the state believes that it should be allowed to deviate from its cost share percentage for individual program elements as long as the required share of total costs for program implementation is provided.

4.10.3 Credit for Non-Federal In-Kind Contributions

Section 7007(a) of WRDA 2007 authorizes the Secretary to credit, "toward the non-Federal share of the cost of a study or project under this title the cost of work carried out in the coastal Louisiana ecosystem by the non-Federal interest for the project before the date of the execution of the partnership agreement for the study or project." The non-Federal sponsor is eligible for credit for such work toward its share of study or project costs, provided an in-kind Memorandum of Understanding (MOU) is executed prior to the non-Federal sponsor undertaking the work. Also, work carried out after the date of a Design Agreement or Project Partnership Agreement is not eligible for credit. Section 7007(d) provides that any credit provided under Section 7007 toward the non-Federal share of the cost of a Title VII (Louisiana Coastal Area) study or project under Section 7007 may be applied toward the non-Federal share of the cost of any other study or project under that title. USACE implementation guidancefor section 7007 states that any "excess" credit will be applied only toward another study or project that involves the same sponsor. The guidance further states that "excess" study credit will only be applied toward the required non-Federal cash contribution for another study, and "excess" credit for design and construction will only be applied toward the required non-Federal cash contribution for another project.

The State of Louisiana fully supports the LCA Beneficial Use of Dredged Material Program; however, it disagrees with the USACE implementation guidance related to crediting. The state intends to request from Congress that in-kind contribution credit be allowed for work carried out after the date of a Design Agreement or Project Partnership Agreement and that in-kind contributions credit be allowed to carry over between LCA Program components (i.e., studies and projects), provided that provision of in-kind contributions, cash, and LERRDs fulfill the total non-Federal obligations. The state believes this view is consistent with the programmatic rules and allowances currently governing implementation of the Comprehensive Everglades Restoration Program. Furthermore, the state intends to request from Congress that in-kind contributions credit be allowed for the incremental funding it provides for beneficial use projects carried out prior to the implementation of the BUDMAT Program and that credit should be allowed commencing on the date of the Chief's Report (January 31, 2005).

4.10.4 Use of Federal Funds for Non-Federal Cost Share

WRDA 2007, Section 7007(b) states, "The non-Federal interest may use, and the Secretary shall accept, funds provided by a Federal agency under any other Federal program, to satisfy, in whole or in part, the non-Federal share of the cost of the study or project if the Federal agency that provides the funds determines that the funds are authorized to be used to carry out the study or project." In accordance with this section and to the maximum extent allowable by law, the state will apply funds authorized by Congress under the Energy Policy Act of 2005 (Coastal Impact Assistance Program - CIAP) and the Gulf of Mexico Energy Security Act of 2006 (GOMESA) in order to enable the USACE to increase the amount of beneficial use of dredged material already performed by CEMVN.

4.10.5 Use of Oyster Lease Acquisition and Compensation Program

Historically, potential beneficial use sites were not available for disposal of dredged material from the maintenance of Federally authorized navigation channels due to the presence of oyster leases. The State of Louisiana developed the Oyster Lease Acquisition and Compensation Program (OLACP) through RS 56: 432:1 to assist coastal restoration and protection projects by removing the obstacle presented by oyster leases. The non-Federal sponsor, CPRA, will utilize this state program to acquire oyster leases in beneficial use project areas, and thus, increase the potential to use dredged material beneficially. CPRA intends to utilize the costs associated with the acquisition of oyster leases as credit against its share of BUDMAT Program costs. In order for CPRA to utilize OLACP to acquire and extinguish leases, the design, specific location, and timeline for utilization of the disposal areas would need to be developed prior to lease acquisition. In addition, acquisition of leases will be limited to areas which experience "direct impact" as defined in RS 56:432:1: *"the physical location upon which dredging, direct placement of dredged, or other materials, or other work or activities necessary for the construction or maintenance of a project is planned to occur or has occurred*."

4.11 RECOMMENDED CREDIT FOR NON-FEDERAL IN-KIND CONTRIBUTIONS

To the maximum extent allowable by law, the non-Federal sponsor has expressed its desire to fulfill its cost share requirements through in-kind contributions. Credit for such in-kind contributions would require approval by the Secretary of the Army, based on the Secretary's determination that such in-kind contributions are compatible and integral to the project and the costs of such work are allocable, allowable, and reasonable.

Except as otherwise provided for by current Federal laws, regulations, and policies:

1. the total amount of credit for in-kind contributions shall not exceed the relevant component non-Federal share;

2. there shall be no reimbursement for the value of work that may exceed the relevant component non-Federal share;

When the non-Federal sponsor requests credit for in-kind contributions, the source of any funds not originating from the non-Federal sponsor must be identified.

Credit for in-kind contributions would be evaluated based on the provision of documentation by the non-Federal sponsor. The non-Federal sponsor must identify all funding sources not originating from the non-Federal sponsor. All such documentation would be thoroughly reviewed by USACE to determine reasonableness, allocability and allowability of costs. Upon completion of this review, a financial audit would be conducted prior to granting final credit.

The credit afforded to the non-Federal sponsor would be limited to the lesser of the following: (1) actual costs that are auditable, allowable, and allocable to the relevant program or (2) USACE's estimate of the cost of the work allocable to the program had USACE performed the work.

As discussed in section 4.10.3 above, only work performed before the date of a design or project partnership agreement is eligible for in-kind contribution credit in accordance with section 7007 of WRDA 2007.

5.0 PUBLIC INVOLVEMENT

This chapter documents details of the LCA BUDMAT Study's public involvement and coordination efforts, including a description of the scoping process and public concerns.

5.1 PUBLIC INVOLVEMENT PROGRAM

To announce the start of the LCA BUDMAT Program study, a Notice of Intent to prepare a draft programmatic Environmental Impact Statement (EIS) for the Louisiana Coastal Area (LCA) Beneficial Use of Dredged Material Program, Louisiana was published in the Federal Register (Volume 71, Number 126) on June 30, 2006 (http://www.gpoaccess.gov/fr/index.html). The recipients were invited to comment on the results of the earlier completed reconnaissance study and to provide input to the LCA BUDMAT Program study, including the scoping of the environmental issues that should be addressed throughout the study. The notice announced public scoping meetings, which were across coastal Louisiana in early September 2006:

Wednesday, 6 September, 2006 – Morgan City Auditorium
Thursday, 7 September, 2006 – Lake Charles Civic Auditorium
Monday, 11 September, 2006 – University of New Orleans, Lindy Boggs Building
Tuesday, 12 September, 2006 – Larose Civic Center
Wednesday, 13 September, 2006 – Houma Municipal Auditorium

Approximately 93 people attended one of the five evening meetings with 29 people providing oral comments. Thirty written comments were received during a 35-day comment period. The comments fell into ten general categories:

- Shorelines
- Reef / Barrier Islands
- Marshes / Wetlands
- Ridges
- Soils / Geology
- Hydrology
- Monitor / Coordinate
- Dredging concerns in general
- Construction
- Miscellaneous / multiple categories

The majority of the comments received expressed concern for restoring barrier islands as one of the higher priorities. Restoration of marshes / coastal wetlands was the topic that received the second most comments. Numerous sites were nominated as potential project sites along the Calcasieu and Barataria shipping channels. Many of the sites nominated have also been nominated as potential CWPPRA (Coastal Wetlands Planning, Protection, and Restoration Act) sites. Public concerns expressed during the scoping meetings are summarized in Section 5.1.2 below.

5.1.2 Public Concerns

The evaluation of public concerns reflects a range of needs, which are perceived by the public. A number of public concerns have been identified during the course of the study. Initial concerns were expressed in the study authorization. Additional input was received through coordination with the LDNR and subsequently the CPRA, coordination with other agencies, public review of draft and interim products, and through workshops and public meetings. The public concerns that are related to the establishment of planning objectives and planning constraints are

(**Bold type** indicates issues raised by multiple individuals.)

1. How the material is to be used. Recommendations from the public include:

- **Use material to restore barrier islands (more comments related to barrier island restoration than any other need)**
- **Use material for wetland/marsh restoration/nourishment** and plant newly created/restored wetlands with appropriate species to prevent erosion
- **Use material to restore coastal ridges**, including plantings
- **Use material for bank stabilization**
- **Fill all non-used pipeline canals**
- **Use material for shoreline stabilization**
- **Use material for reef restoration**

2. Concerns about site selection:

- Placement sites should be prioritized based on geologic sustainability
- Consider coastal loss rates as the top priority when choosing sites for beneficial use
- Prioritization should be based on repairing the lower habitat value first; i.e., based on the most favorable ecological efficacy
- Set project priorities to areas' need, not based on proximity to the dredging source

3. Concerns about soils, geology, and hydrology. Public recommendations include:

- Use similar soil types so the biota isn't affected by placement of dredged materials
- Screen dredged materials for contaminants according to standards
- Consider hydrology and geology when placing material
- Disposal areas in emerging deltas should be designed to better mimic natural delta splay and allow for a semblance of natural flow patterns

4. General dredging concerns and suggestions:

- Use as much dredged material beneficially as possible
- Harvest sediments that accumulate in point bars and depositional sites
- Build a permanent slurry dredge delivery system from the Mississippi River
- Use all dredged material beneficially, instead of creating "spoil banks"
- Dredge only publicly-owned water bottoms
- Consider the environmental impacts of dredging

5. Concerns and suggestions related to construction:

- **Restore wetlands to an elevation that will allow the restoration of coastal forests**
- Build containment dikes and degrade dikes after marsh creation
- Vegetate areas after placement of fill materials
- Stock pile sediment for later use if no project is ready in the immediate area
- Build permanent infrastructure to convey dredged materials closer to areas of need (long distance transport)
- Created marsh should be designed to avoid continuous tracks of unbroken marsh. Sites should be designed to maximize the amounts of marsh edge.
- Temporary work areas and discharge pipe rights-of-way should be aligned and designed to minimize impacts to natural and created wetlands
- Channels or trenasses should be built into created wetlands to provide acreage of protected heterogeneous habitats
- A variety of intertidal habitats should be included in construction planning
- Disposal sites should be designed to allow a cell to be completely filled in a single dredging cycle so that the newly created habitat will not be continually disturbed by additional cycles

6. Issues related to project management, coordination, and monitoring:

- **Protect beneficial use areas from destruction by private concerns**
- Consistency among programs
- Interagency coordination, as well as coordination within the USACE
- Monitor created/restored areas
- Maintain improved areas so they aren't lost again
- Purchase conservation easements on disposal areas
- Have rights-of-way secured in advance, so when dredged material is available (such as emergency operations), entry into disposal areas will ensure beneficial use
- Consider impacts to commercial and recreational fishing (oysters, shrimp, and fin fish) and coordinate with Louisiana Department of Wildlife and Fisheries to minimize impacts to oyster seedbeds and leases
- Make sure land owners have a reasonable understanding of the project that will be taking place on their land

7. Miscellaneous concerns and suggestions:

- Consider landscape features that would reduce the impacts of storm surge
- No longer use open ocean disposal for dredged materials
- Cumulative impacts and consistency of design, construction, operation, and maintenance of all navigation channels and disposal areas should be fully evaluated

Public involvement is a cornerstone of the LCA program beginning with the Coast 2050 planning process in 1998. An intensive public involvement program has been initiated and maintained throughout the LCA BUDMAT Program study to solicit input from affected Federal, state, and local agencies, Indian tribes, and interested private organizations and individuals.

Scoping meeting public notices were mailed to interested parties in August 2006. The recipients were invited to comment on the results of the earlier completed study and to provide input to the

LCA BUDMAT Program study, including the scoping of the environmental issues that should be addressed throughout the study. The public notice provided three questions as a means of focusing the public's comments and concerns related to the proposed project.

The USACE and the Louisiana Department of Natural Resources hosted the series of five National Environmental Policy Act scoping meetings in September 2006 to solicit public comments as well as to provide information. The meetings, held in Morgan City, Lake Charles, New Orleans, Larose, and Houma, Louisiana, initiated the Programmatic Environmental Impact Statement. The resulting scoping report, available at http://www.lca.gov/budmat.aspx, represents and summarizes the scoping comments expressed at the public scoping meetings, as well as written comments received during the comment period ending October 14, 2006.

5.2 FUTURE PUBLIC INVOLVEMENT

The primary goal of public outreach and involvement for the Beneficial Use of Dredged Material Program is to provide information and gather public input that could impact decisions concerning the project. The LCA Public Outreach and Involvement co-leaders define public outreach as a vehicle for information dissemination and education while public involvement is an open, ongoing, two-way communication, both formal and informal, between agencies and the various publics during the life of a project. The Study team desires that the various publics be informed, learn about, and better understand each other's views, the study process, and project details. Public outreach and involvement is critical in developing the partnerships with various publics and stakeholder groups that facilitate project implementation. Stakeholder groups have been identified as landowners, navigation, oil & gas, local governments, fisheries, Native Americans and Minerals Management Service representatives. The involvement of landowners early in the process is of particular concern as ranking criteria includes landowner agreement. Landowners can also provide valuable suggestions for future beneficial use sites.

The LCA Beneficial Use of Dredged Material Program will continue to build on previous public outreach and involvement efforts conducted throughout the study phase, while focusing on the specific problems, needs, and opportunities for the program area. The following goals for public outreach and involvement have been identified:

- Educate to increase awareness, understanding, and support at a local, regional, and national level.

- Provide and promote effective intra- and interagency communication and support for the report preparation teams.

- Gather input from diverse groups to assist in identifying problems, opportunities, potential solutions, and impacts of the various alternatives.

- Provide extensive opportunities for public participation throughout the decision-making process, including frank discussions of inevitable trade-offs.

- Develop and implement a feedback process to the public concerning how their input has affected decisions such as alternatives development, analysis, and selection of optimum plans.

- Identify and engage public sectors including stakeholders, public officials, and academia to develop relationships critical to successful execution of the analysis, design, and report preparation phases of the work.

- Provide timely information to the public regarding the team's efforts.

- Establish and/or maintain an active role by project managers in the team's outreach and involvement process.

The LCA BUDMAT Program has a Web page at the main LCA Web site, http://www.lca.gov, which can be used to receive public comments. The public has had and will have input through the LCA Study and PEIS, and the LCA BUDMAT Program Study and PEIS, and the site-specific LCA BUDMAT Project Design reports with their NEPA coordination and environmental compliance documentation. The required consistency determinations for projects will also provide another opportunity to receive public input. Outreach efforts will utilize existing opportunities such as CWPPRA meetings, Police Jury meetings, and the Breaux Act Newsflash as a means of reaching target audiences.

In addition to the LCA BUDMAT Web page, various materials have been and will continue to be used to support public involvement/outreach efforts: publications, PowerPoint presentations, news releases/press kits, as well as exhibits and displays.

Public meeting will be held across coastal Louisiana in the late summer/fall 2009 timeframe to present the findings of the LCA BUDMAT Program study and to provide the public an opportunity to express their views on the results and recommendations of the study.

5.3 INSTITUTIONAL INVOLVEMENT

5.3.1 Project Delivery Team

For this study effort, the LDNR is the 50-50 cost-share partner with CEMVN. They have provided, as part of their share, in-kind contributions such as in project management, contract management, engineering, real estate support, outreach and public involvement, and report preparation. Coordination was achieved through various meetings with the Vertical Team, the Framework Development Team, and the PDT. Functional Team Leaders (FTLs) headed the functional units of research (e.g., Engineering Division, Real Estate Division, Project Management, etc.). Additional meetings and conference calls were arranged as necessary.

During the LCA BUDMAT Program study, staff from the LDNR and subsequently the CPRA participated as members of the study team. They participated directly in the study effort and

on the Executive Committee. Additionally several other Federal agencies participated as members of the study team including (1) the U.S. Environmental Protection Agency, Region VI, (2) the U.S. Department of the Interior, Fish and Wildlife Service, (3) the U.S. Department of Commerce, National Marine Fisheries Service, (4) the U.S. Department of Agriculture, Natural Resources Conservation Service, and (5) the U.S. Geological Service.

This involvement has led to support for the implementation of the tentatively selected plan.

6.0 RECOMMENDATIONS

BUDMAT Program Recommendations

Based upon the best available science and engineering, professional judgment, and extensive experience in coastal restoration in Louisiana and beyond, the BUDMAT Program Study identifies, evaluates, and recommends to decision makers an appropriate, coordinated, feasible approach to addressing the opportunities to beneficially used dredged material for ecosystem restoration projects in coastal Louisiana. This BUDMAT Study report provides a complete presentation of the study process, results, and findings; indicates compliance with applicable statutes, executive orders, and policies; documents the Federal and non-Federal interest; and provides a sound and documented basis for decision makers at all levels to evaluate the proposed plan for implementing the BUDMAT Program.

The USACE, Mississippi Valley Division, New Orleans District (the District) has the largest annual channel operations and maintenance (O&M) program in the USACE, with an annual average of 64 million cubic yards (mcy) of material dredged. At this time, approximately 24 percent of this material is used beneficially in the surrounding environment within the Federal standard by the O&M program. The amount of material generated by O&M operations, the volume of material recovered for beneficial use in existing operations, and the potential total volume of material that can be reused varies considerably from year to year, based on the type of dredging operations being performed and their environmental setting. The proposed BUDMAT Program would allow the District to take greater advantage of existing sediment resources made available by maintenance activities to achieve restoration objectives, while ensuring that all projects implemented under this program are cost-effective and contribute towards the overall goals of the LCA Plan for ecosystem restoration in coastal Louisiana.

The following nine authorized Federal navigation channels represent the most significant opportunities for additional beneficial use of dredged material in coastal Louisiana**:**

- Barataria Bay Waterway, LA
- Mississippi River, Outlets at Venice, LA – Tiger Pass and Baptiste Collette
- Mississippi River, Baton Rouge to the Gulf of Mexico, LA –Southwest Pass and South Pass
- Atchafalaya River and Bayous Chene, Boeuf, and Black, LA
- Calcasieu River and Pass, LA
- Houma Navigation Canal, LA
- Bayou Lafourche, LA
- Mermentau River, LA
- Freshwater Bayou, LA

The proposed BUDMAT Program specifies the procedures to solicit, screen, plan, design and construct ecosystem restoration projects using dredged material under the authority provided by WRDA of 2007 for $100 million additional funding over a 10-year period. Based on the authorization limits, it is expected that the BUDMAT Program could attain 21,000 acres (33 square

miles) of newly created wetlands. This recommended plan for implementing the BUDMAT Program represents a significant opportunity to contribute to the accomplishment of the LCA Program objectives. The procedures specified in the recommended plan for the BUDMAT Program would allow the application of funds appropriated through LCA Program under guidelines similar to those of the Continuing Authorities Program (CAP), Beneficial Uses of Dredged Material, defined by Section 204 of the Water Resources Development Act (WRDA) of 1992. Implementation would proceed with a more detailed analysis of the potential beneficial use disposal sites, a process that would be repeated annually within the O&M "Base Plan" cycle.

As the District Engineer, I have considered the environmental, social, and economic effects, the engineering feasibility, and the comments received from other resource agencies and the public during this BUDMAT Program Study effort and plan formulation. Based upon the sum of this information, I am recommending for implementation the BUDMAT Program that includes the program requirements for beneficial use of dredged material to help address the current trend of degradation of Louisiana's coastal ecosystem, support Nationally significant living resources, provide a sustainable and diverse array of fish and wildlife habitats, reduce nitrogen delivery to offshore gulf waters, provide infrastructure protection, and make progress towards a more sustainable ecosystem.

I recommend that the Director of the Civil Works Program approve the recommended BUDMAT Program identified in this study for implementation under the authorization provided by WRDA of 2007. Based on the provided authorization, it is expected that this beneficial use program could contribute to the attainment of up to approximately 21,000 acres of newly created wetlands. I recommend that this program follow this Study's recommended plan for program implementation for the USACE to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized project. Consistent with the CAP Section 204, I recommend that approval authority for implementing beneficial use projects under the BUDMAT Program be delegated to the Commander, Mississippi Valley Division.

COST SHARING AND AGENCY RESPONSIBILITIES

I further recommend Federal and Non-Federal Sponsor responsibilities and cost sharing requirements as set forth in preceding Section 4.9 "Division of Responsibilities" and the credit for non-Federal work-in-kind as set forth in preceding Section 4.9.2 "Cost Sharing Requirements."

The recommendations contained herein reflect the information available at this time and current Department of the Army 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 the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, the state, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity for further comment.

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ABBREVIATIONS AND ACRONYMS

AAHU – Average Annual Habitat Unit(s)
AFB – Alternatives Formulation Briefing (USACE)
AHP – Above Head of Passes (Mississippi River Head of Passes is at River Mile 0)
AM – Adaptive Management
APHIS - USDA Animal and Plant Health Inspection Service
ASTM – American Society for Testing and Materials
BBWW – Barataria Bay Waterway
BHP – Below Head of Passes (Mississippi River Head of Passes is at River Mile 0)
BICM - Barrier Island Comprehensive Monitoring
B.P. - before the present
BU – beneficial use
BUDMAT – Beneficial Use of Dredged Material
BUMP -Beneficial Use of dredged material Monitoring Program
CAA – Clean Air Act of 1963
CAP – USACE Continuing Authorities Program
CBB – Bayous Chene, Boeuf and Black (Atchafayla River)
CEI - Coastal Environments, Inc.
CE/ICA – Cost Effectiveness / Incremental Cost Analysis
CEMVD – Corps of Engineers, Mississippi Valley Division
CEMVN – Corps of Engineers, Mississippi Valley Division, New Orleans District
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CFR – Code of Federal Regulations
CIAP – Coastal Impact Assistance Program
CPRA – Coastal Protection and Restoration Authority of Louisiana
CRMS - Coastwide Reference Monitoring System
CRP – Calcasieu River Pass
cu. yd. – cubic yard(s)
CWA – Clean Water Act
CWPPRA – Coastal Wetlands Planning, Protection, and Restoration Act (the Breaux Act)
cy – cubic yard(s)
DMMP – Dredged Material Management Plan
EA – Environmental Assessment
EFH – Essential Fish Habitat
EIS – Environmental Impact Statement
EOP – Environmental Operating Principles
ERDC – Engineering Research & Development Center (USACE)
ESA – Endangered Species Act of 1973
FEIS – Final Environmental Impact Statement
FONSI – Finding of No Significant Impacts
FPEIS – Final Programmatic Environmental Impact Statement
FR – Federal Regulation
FS – Feasibility Study
ft - feet

FTL – Functional Team Leader
FY – fiscal year
GIWW – Gulf Intracoastal Waterway
GIS - Geographic Information System
GMFMC - Gulf of Mexico Fishery Management Council
GOMESA - Gulf of Mexico Energy Security Act of 2006
GPS – Global Positioning System
ha- hectares
HARN – High Accuracy Reference Network
HDDA - Hopper Dredge open water Disposal Area
HNC – Houma Navigational Canal
HTRW – Hazardous, Toxic, and Radioactive Waste
IRSM - Interagency Regional Sediment Management
LAC – Louisiana Administrative Code
LaCPR – Louisiana Coastal Protection and Restoration Study (USACE)
LCA – Louisiana Coastal Area
LCA Study – November 2004 LCA Ecosystem Restoration Study
LCA Plan – near-term ecosystem restoration Plan recommended in the LCA Study
LDEQ – Louisiana Department of Environmental Quality
LDNR – Louisiana Department of Natural Resources
LDOTD - Louisiana Department of Transportation and Development
LDWF – Louisiana Department of Wildlife and Fisheries
LERRDs – Lands, Easements, Rights-of-Way, Relocations and Disposal Areas
LEQA – Louisiana Environmental Quality Act of 1983
LNG – Liquefied natural gas
LOOP – Louisiana Offshore Oil Port
LSA –R.S. – Lousiana State Administration – Revised Statues
LSU – Louisiana State University
LTMP – Long Term Management Plans
m - meters
MCS – Management Classification System
mcm – million cubic meters
mcy – million cubic yards
$mile^2$ – square miles
MLG – Mean Low Gulf datum
MLLW - mean lower low water datum
MMS - Mineral Management Service (Department of Interior)
MOU – Memorandum of Understanding
MPRSA – Marine Protection Research and Sanctuaries Act
MR – Main Report
MRFSS – Marine Recreational Fishery Statistics Survey
MSA – Metropolitan Statistical Area
MSC - Major Subordinate Command
MVN – U.S. Army Corps of Engineers Mississippi Valley New Orleans District
NAAQS – National Ambient Air Quality Standards
NASA – National Aeronautics and Space Administration

NAVD 88 – North American Vertical Datum 1988
NED – National Economic Development
NEPA – National Environmental Policy Act
NER – National Ecosystem Restoration
NBEM – National Bald Eagle Management
NGS – National Geodetic Survey
NGVD – National Geodetic Vertical Datum (of 1929)
NOAA – National Oceanic and Atmospheric Administration
NPL – National Priority List
NRCS – National Resource Conservation Service
NMFS – National Marine Fisheries Service (part of NOAA, also known as NOAA Fisheries)
NWR – National Wildlife Refuge
OCPR – Office of Coastal Protection and Restoration (Louisiana)
OCS – Outer continental shelf
O&M – Operations and Maintenance
ODMDS - ocean dredged material disposal site
OLACP - Oyster Lease Acquisition and Compensation Program (Louisiana)
OMRR&R - Operation, maintenance, repair, rehabilitation, and replacement
OPEC - Organization of the Petroleum Exporting Countries
P&S – Plans and Specifications
PPA –Project Partnership Agreement
PDT – Project Delivery Team
PED - Preconstruction engineering and design
PEIS – Programmatic Environmental Impact Statement
PET – Project Execution Team
PMP – Project Management Plan(s)
PPL – Priority Project List (CWPPRA)
ppt – parts per thousand
PS – Policy Statement
RCRA – Resource Conservation and Recovery Act
REC - Recognized Environmental Condition
RM – river mile
ROD – Record of Decision
ROM – Rough Order of Magnitude
RSM – Regional Sediment Management
RTC – Report to Congress
RWG – Regional Working Group (LCA Plan)
S & T – Science and Technology
SAV – submerged aquatic vegetation
SIP - State Implementation Plan
SWAMP – System-Wide Assessment and Monitoring Plan (LCA)
SWP – Southwest Pass (Mississippi River)
T&E – Threatened and Endangered Species
TED - turtle excluder device
USACE – United States Army Corps of Engineers
U.S.C. – United States Code

USDA – United States Department of Agriculture
USEPA – United States Environmental Protection Agency
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
VIA - Visual Impact Assessment
VOC – Volatile Organic Compound
VRAP – USACE Visual Resource Assessment Procedure
WVA – Wetlands Value Assessment
WCUS - Waterborne Commerce of the United States
WRDA – Water Resources Development Act