

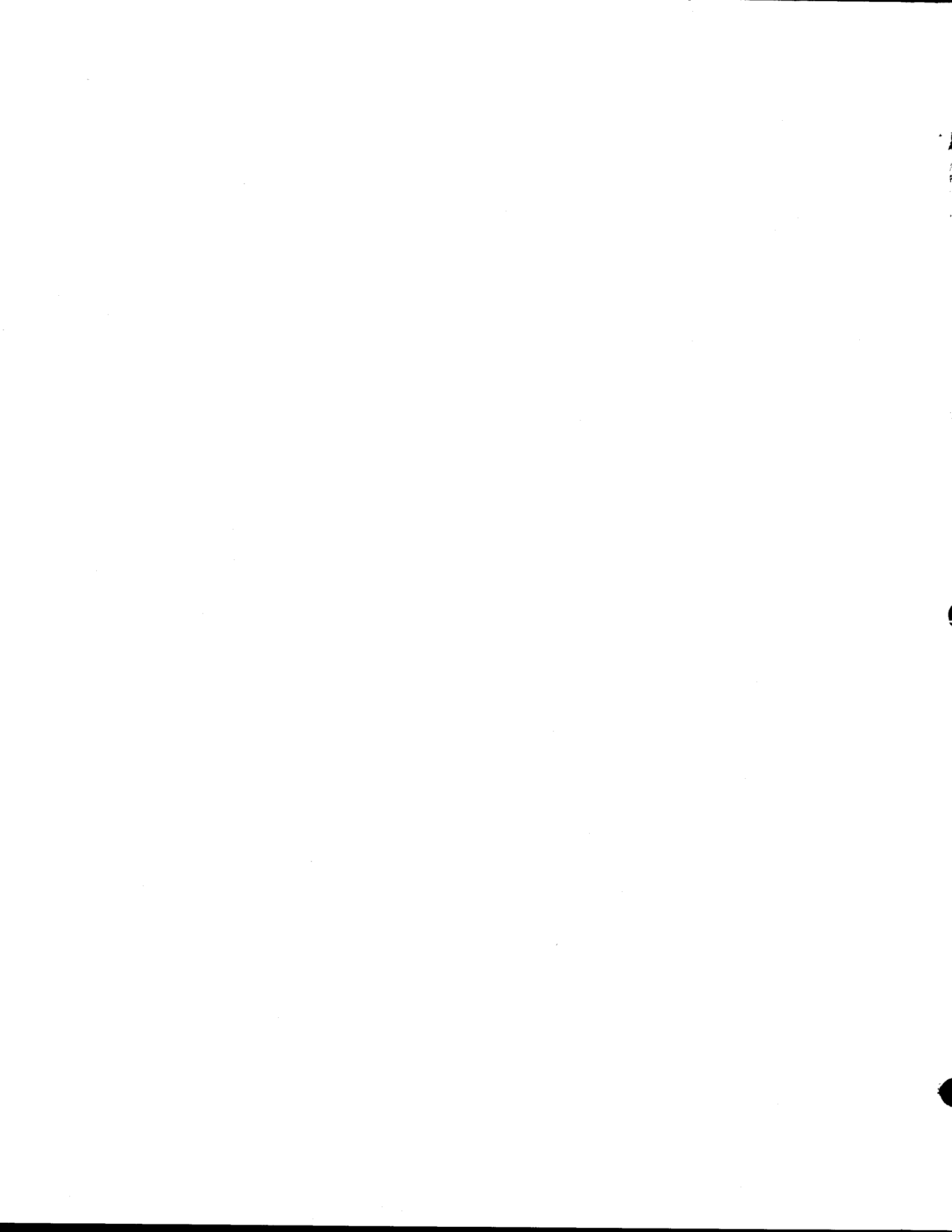


5th PRIORITY PROJECT LIST REPORT

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LOUISIANA COASTAL WETLANDS CONSERVATION AND RESTORATION
TASK FORCE

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Coastal Wetlands Planning, Protection and Restoration Act

5th Priority Project List Report

Volume 1 Main Report

Volume 2 Appendices

 Appendix A..... Summary and Complete Text of the CWPPRA

 Appendix B Wetland Value Assessment Methodology and Community Model

 Appendix C..... Engineering

 Appendix D..... Economics

 Appendix E..... Wetland Value Assessments

 Appendix F..... Public Support for Candidate Projects

 Appendix G. Status of Projects from Previous Priority Project Lists



Coastal Wetlands Planning, Protection and Restoration Act

5th Priority Project List Report Table of Contents

	<u>Page</u>
INTRODUCTION.....	1
Study Authority	1
Study Purpose	1
Project Area	2
Study Process	2
The Interagency Planning Groups	3
The Citizen Participation Group	3
Involvement of the Academic Community	4
Public Involvement	4
FORMULATION PROCESS FOR THE PRIORITY PROJECT LIST.....	5
Introduction	5
Identification of Projects	5
Selection of Candidate Projects	6
Evaluation of Candidate Projects	14
Benefit Analysis (Wetland Value Assessment)	14
Design and Cost Analysis	15
Economic Analysis	16
Description of Candidate Projects	19
Lake Borgne Shore Protection (PPO-a/g)	21
Bonnet Carré Outfall Management (XPO-54)	23
Marsh Creation at Bayou Chevee (XPO-69)	25
Marsh Creation with Dedicated Dredging--Wills Point (XBS-17)	27
Pass a Loutre Sediment Mining (PMR-8)	29
Channel Armor Gaps West (XMR-10b)	31
Myrtle Grove Siphon (XBA-48b)	33
Naomi Siphon Outfall Management (BA-3c)	35
Barataria Bay Waterway Bank Protection--East (PBA-12b)	37
Marsh Creation with Dedicated Dredging--Jesuit Bend (XBA-73)	39
Bayou Lafourche Siphon (PBA-20)	42
Grand Bayou/GIWW Freshwater Diversion (TE-10)	45
East Timbalier Island Barrier Island Restoration (XTE-45)	47
Isles Dernieres East Trinity, New Cut Closure (PTE-15b(iv))	49
Bayou De Cade Hydrologic Restoration (PTE-26a)	51
Marsh Creation South of Falgout Canal (XTE-69)	53
Point Chevreuil Shoreline Protection (XAT-3)	55
Oaks/Avery Canals Hydrologic Restoration (PTV-10/XTV-25)	57
Vegetative Plantings in the Chenier Plain (XTV-30)	63
Little Vermilion Bay Sediment Trapping (PTV-19)	65
Marsh Island Hydrologic Restoration and Marsh Creation (TV-5/7) ..	67
Pecan Island Terracing (XME-22)	69
Freshwater Bayou Bank Stabilization (XME-29)	71
Black Bayou Culverts (CS-16)	73
Sweet Lake/Willow Lake Shoreline Protection (CS-11b)	75
Raccoon Island Breakwaters Demonstration (PTE-15b(ii))	77
Wave Dissipation Demonstration at Marsh Island (XTV-30)	79
Wave Dissipation Demonstration at Freshwater Bayou	81
Clovelly Farms Diversion Demonstration	83
Empire Lock Operational & Maintenance Dredging Modification Demo .	85
Vegetative Plantings on Raccoon Island Demonstration	86
North Line Canal Structure (XCS-46)	87
Homeplace Siphons (BA-17b)	87
Point Au Fer Reef Demonstration	87

Coastal Wetlands Planning, Protection and Restoration Act

5th Priority Project List Report
Table of Contents
(continued)

	<u>Page</u>
Project Selection Process	88
Ranking Criteria	88
Rationale for Selection	93
Selected Projects	96
Naomi Siphon Outfall Management (BA-3c)	97
Little Vermilion Bay Sediment Trapping (PTV-19)	101
Grand Bayou/GIWW Freshwater Diversion (TE-10)	105
Bayou Lafourche Siphon (PBA-20)	113
Myrtle Grove Siphon (PBA-48b)	121
Sweet Lake/Willow Lake Shoreline Protection (CS-11b)	125
Marsh Creation with Dedicated Dredging at Bayou Chevee (XPO-69)	129
Freshwater Bayou Bank Stabilization (XME-29)	133
Raccoon Island Breakwaters Demonstration	137

Coastal Wetlands Planning, Protection and Restoration Act

5th Priority Project List Report
Table of Contents
(continued)

List of Tables

No.	Title	Page
1	Membership of the Citizen Participation Group	3
2	Candidate Project Selection Meetings	6
3	Ranking of Nominees for the Pontchartrain Basin	8
4	Ranking of Nominees for the Breton Sound Basin	9
5	Ranking of Nominees for the Mississippi River Delta Basin	9
6	Ranking of Nominees for the Barataria Basin	10
7	Ranking of Nominees for the Terrebonne Basin	11
8	Ranking of Nominees for the Atchafalaya Basin	12
9	Ranking of Nominees for the Teche/Vermilion Basin	12
10	Ranking of Nominees for the Mermentau Basin	13
11	Ranking of Nominees for the Calcasieu/Sabine Basin	20
12	Candidate Projects for the 5 th Priority Project List	18
13	Ranking Criteria	88
14	Candidate Project Ranking	92
15	Project Categorization Based on Systemic Effects	94
16	5 th Priority Project List	95
17	Possible Schedule of Allocations for Phased Projects	95

List of Figures

No.	Title	Page
1	GIWW Discharge vs. Atchafalaya River Discharge	107
2	Predicted Surface Water Elevations Along Bayou Lafourche (Profile)	116
3	Predicted Surface Water Elevations Along Bayou Lafourche at Donaldsonville (Cross Section)	117
4	Predicted Surface Water Elevations Along Bayou Lafourche at Napoleonville (Cross Section)	118
5	Predicted Surface Water Elevations Along Bayou Lafourche at Thibodaux (Cross Section)	119

List of Plates

Plate 1	Candidate Location Map
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List of Appendices

Appendix A.....Summary and Complete Text of the CWPPRA
Appendix B.....Wetland Value Assessment Model Appendix
Appendix C.....Engineering Appendix
Appendix D.....Economics Appendix
Appendix E.....Wetland Value Assessment Results Appendix
Appendix F.....Public Support for Candidate Projects
Appendix G.....Status of Projects from Previous Priority Project Lists

Coastal Wetlands Planning, Protection and Restoration Act
5th Priority Project List Report

INTRODUCTION

The State of Louisiana contains 40 percent of the Nation's coastal wetlands, but is experiencing 80 percent of the Nation's coastal wetland loss. The widespread and complex nature of the coastal wetland loss problem, coupled with the diversity of agencies involved and numerous alternatives proposed, has led many in Federal, state, and local government, as well as the general public, to the conclusion that a comprehensive approach is needed. The Coastal Wetlands Planning, Protection and Restoration Act (Public Law 101-646) was signed into law by President Bush on November 29, 1990, to address the need for a comprehensive approach to this significant environmental problem.

This report documents the implementation of Section 303(a) of the cited legislation.

STUDY AUTHORITY

Section 303(a) of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA, or the Breaux-Johnston Act), displayed in Appendix A, directs the Secretary of the Army to convene the Louisiana Coastal Wetlands Conservation and Restoration Task Force to:

. . . initiate a process to identify and prepare a list of coastal wetlands restoration projects in Louisiana to provide for the long-term conservation of such wetlands and dependent fish and wildlife populations in order of priority, based upon the cost-effectiveness of such projects in creating, restoring, protecting, or enhancing coastal wetlands, taking into account the quality of such coastal wetlands, with due allowance for small-scale projects necessary to demonstrate the use of new techniques or materials for coastal wetlands restoration.

STUDY PURPOSE

The purpose of this study effort was to prepare the 5th Priority Project List (PPL) and transmit the list to Congress, as specified in Section 303(a)(3) of the CWPPRA. Section 303(b) of the act calls for preparation of a comprehensive restoration plan for coastal Louisiana; that effort was completed in November 1993, with the submission of the Louisiana Coastal Wetlands Restoration Plan.

PROJECT AREA

Plate 1 is a map which delineates the Louisiana coastal zone. The entire coastal area, which comprises all or part of 20 Louisiana parishes, is considered to be the CWPPRA project area. To facilitate the study process, the coastal zone was divided into nine hydrologic basins, as shown on the map.

STUDY PROCESS

The Interagency Planning Groups.

Section 303(a)(1) of the CWPPRA directs the Secretary of the Army to convene the Louisiana Coastal Wetlands Conservation and Restoration Task Force, to consist of the following members:

- the Secretary of the Army (Chairman)
- the Administrator, Environmental Protection Agency
- the Governor, State of Louisiana
- the Secretary of the Interior
- the Secretary of Agriculture
- the Secretary of Commerce.

The State of Louisiana is a full voting member of the Task Force except for selection of the Priority Project List [Section 303(a)(2)], as stipulated in President Bush's November 29, 1990, signing statement (Appendix A). In addition, the State of Louisiana may not serve as a "lead" Task Force member for design and construction of wetlands projects of the priority project list.

In practice, the Task Force members named by the law have delegated their responsibilities to other members of their organizations. For instance, the Secretary of the Army authorized the commander of the Corps' New Orleans District to act in his place as chairman of the Task Force.

To assist it in putting the CWPPRA into action, the Task Force established the Technical Committee and the Planning and Evaluation Subcommittee. Each of these bodies contains the same representation as the Task Force--one member from each of the five Federal agencies and one from the State. The Planning and Evaluation Subcommittee is responsible for the actual planning of projects and preparation of the November 1993 comprehensive restoration plan, as well as the other details involved in the CWPPRA process (such as development of schedules, budgets, etc.); the subcommittee makes recommendations to the Technical Committee and lays the groundwork for decisions which will ultimately be made by the Task Force. The Technical Committee reviews all materials prepared by the subcommittee, makes appropriate revisions, and provides recommendations to the Task Force. The Technical Committee operates at an intermediate level between the planning details considered by the subcommittee and the policy matters dealt with by the Task Force, and often formalizes procedures and formulates policy for the Task Force.

The Planning and Evaluation Subcommittee established several working groups to evaluate projects for priority project lists and the restoration plan. The Environmental Work Group was charged with estimating the benefits (in terms of wetlands created,

protected, enhanced, or restored) associated with various projects. The Engineering Work Group reviewed project cost estimates for consistency. The Economic Work Group performed the economic analysis which permitted comparison of projects on the basis of their cost effectiveness. The Monitoring Work Group established a standard procedure for monitoring of CWPPRA projects and developed a monitoring cost estimating procedure based on project type.

The Citizen Participation Group.

The Task Force also established a Citizen Participation Group to provide general input from the diverse interests across the coastal zone: local officials, landowners, farmers, sportsmen, commercial fishermen, oil and gas developers, navigation interests, and environmental organizations. The Citizen Participation Group was formed to promote citizen participation and involvement in formulating priority project lists and the restoration plan. The group meets at its own discretion, but may at times meet in conjunction with other CWPPRA elements, such as the Technical Committee. The purpose of the Citizen Participation Group is to maintain consistent public review and input into the plans and projects being considered by the Task Force and to assist and participate in the public involvement program. The membership of the Citizen Participation Group is shown in Table 1.

Table 1

Membership of the Citizen Participation Group

Gulf Coast Conservation Association	Concerned Shrimpers of America
Coalition to Restore Coastal Louisiana	Gulf Intracoastal Canal Association
Lake Pontchartrain Basin Foundation	Louisiana Association of Soil and Water Conservation Districts
Louisiana Farm Bureau Federation, Inc.	Louisiana Landowners Association
Louisiana League of Women Voters	Louisiana Nature Conservancy
Louisiana Oyster Growers and Dealers Association	Louisiana Wildlife Federation, Inc.
Midcontinent Oil and Gas Association	New Orleans Steamship Association
Oil and Gas Task Force (Regional Economic Development Council)	Police Jury Association of Louisiana
Organization of Louisiana Fishermen	

Involvement of the Academic Community.

While the agencies sitting on the Task Force possess considerable expertise regarding Louisiana's coastal wetlands problems, the Task Force recognized the need to incorporate another invaluable resource: the state's academic community. The Task Force therefore retained the services of the Louisiana Universities Marine Consortium (LUMCON) to provide scientific advisors to aid the Environmental Work Group in performing Wetland Value Assessments. This Academic Assistance Group also assists the Task Force in carrying out the two feasibility studies authorized by the Task Force in March 1995: the Louisiana Barrier Shoreline study (managed by the Louisiana Department of Natural Resources) and the Mississippi River Sediment, Nutrient, and Freshwater Redistribution study (managed by the Corps of Engineers).

Public Involvement.

Even with its widespread membership, the Citizen Participation Group cannot represent all of the diverse interests affected by Louisiana's coastal wetlands. The CWPPRA public involvement program provides an opportunity for all interested parties to express their concerns and opinions and to submit their ideas concerning the problems facing Louisiana's wetlands. The Task Force has held at least six public meetings each of the last four years to obtain input from the public. In addition, the Task Force distributes a semiannual newsletter with information on the CWPPRA program and on individual projects.

FORMULATION PROCESS FOR THE PRIORITY PROJECT LIST

INTRODUCTION

The planning effort associated with the CWPPRA initially proceeded simultaneously along two tracks. Section 303(b) of the act calls for the development of a comprehensive restoration plan for Louisiana's coastal wetlands. This long term plan was developed over a three-year period, with the report (the *Louisiana Coastal Wetlands Restoration Plan*) completed in November 1993. Section 303(a), on the other hand, deals with projects which can be implemented within a short period of time. This section requires that any project selected for a priority project list be substantially complete within five years of its appearance on a list. The intent of this section is to provide a rapid response to the loss of coastal wetlands. The first Priority Project List was to be submitted within one year of enactment of the CWPPRA, with subsequent lists to be prepared annually.

Section 303(a) actually requires that priority project lists be submitted only until such time as the comprehensive restoration plan called for in section 303(b) has been prepared. Projects can then be drawn from the comprehensive plan. In practice, however, the Task Force has found the annual priority list process to be an effective means of developing projects and has continued to use that process--without the five-year implementation limit.

The one-year time limit associated with developing a priority project list necessitated a deviation from the usual plan formulation process. Rather than beginning with a clean slate, it was preferable to begin with projects which were already developed to some degree--if possible, projects on which some planning had already been done. The projects on the Priority Project List submitted in November 1991 fell into this category.

Preparation of subsequent lists involved somewhat more lead time than did the first list and employed a more traditional approach. This section describes the process by which the 5th Priority Project List was developed.

Development of the 5th list was a three-stage process: selection of candidate projects, evaluation of candidate projects, and selection of the priority project list.

IDENTIFICATION OF PROJECTS

Projects considered for the 5th list were derived from the *Louisiana Coastal Wetlands Restoration Plan*. In the restoration plan, an identification number was assigned to each project to help keep track through the screening and evaluation process. Each project received a two-letter code to identify its basin; these codes are shown below.

PO	Pontchartrain	AT	Atchafalaya
BS	Breton Sound	TV	Teche/Vermilion
MR	Mississippi River Delta	ME	Mermentau
BA	Barataria	CS	Calcasieu/Sabine
TE	Terrebonne		

Projects which were originally part of the State's Coastal Wetlands Conservation and Restoration Plan use these two letters followed by a number. Projects which were derived from the scoping meetings held in the fall of 1991 are identified by a "P" ("public") preceding the two-letter code (e.g., PPO-52, PTV-18).

Plan formulation meetings held from February through May 1992 were an additional source of projects for consideration for priority project lists. Projects which were proposed during and after these meetings are identified with an "X" (e.g., XTE-41).

The CWPPRA provides for revision of the comprehensive restoration plan as appropriate, and the Task Force considers such revisions on an annual basis. Some projects which have been added to the plan are not specific to one project area, but rather may be applied at any appropriate site on a coastwide basis. These projects are designated "CW," followed by a numerical identifier.

SELECTION OF CANDIDATE PROJECTS

Candidate projects are those which the Task Force will evaluate in some detail in order to choose a priority project list. The Planning and Evaluation Subcommittee selects a number of candidate projects as the first step in priority project list development.

In May 1995 the Planning and Evaluation Subcommittee held a series of meetings for the selection of candidate projects. The meetings were held according to the following schedule.

Table 2
Candidate Project Selection Meetings

Location	Date	Hydrologic Basins
New Orleans	May 16	Pontchartrain, Mississippi River Delta, and Breton Sound
Thibodaux	May 18	Barataria, Terrebonne, and Atchafalaya
Abbeville	May 22	Teche-Vermilion and Mermentau
	May 23	Calcasieu/Sabine

The public was invited to participate in these meetings, not only by commenting on projects nominated by the CWPPRA agencies, but also by nominating projects of their own. The sole

requirement for nomination was that a project must be listed in the *Louisiana Coastal Wetlands Restoration Plan*. The subcommittee selected the candidate projects from among the nominees at each of the three meetings.

The number of candidate projects to be taken from each basin was determined in advance by the Planning and Evaluation Subcommittee (at a meeting on May 2, 1995). The subcommittee considered the acres of wetlands in each basin, the rate of loss in each basin, and the number of Breaux-Johnston Act projects already approved for each basin. The number of candidates the subcommittee agreed to select from each basin is shown below.

Pontchartrain	2	Atchafalaya	1
Breton Sound	2	Teche/Vermilion	2
Mississippi River	1	Mermentau	2
Barataria	4	Calcasieu/Sabine	2
Terrebonne	4		

Selection of the candidates was accomplished by having each agency rank the nominees, assigning the most points to what it regarded as the most worthwhile project. The projects awarded the most points in each basin were then selected as candidate projects, with the number of projects varying as shown above. The rankings for the nominees in each basin are displayed in tables 3 through 11.

In all, 22 candidate projects were chosen to be evaluated in detail; these were the projects from which the 5th Priority Project List would be selected. In addition, the Planning and Evaluation Subcommittee decided 11 demonstration projects (some proposed by the agencies, some proposed by the public) merited consideration for the 5th Priority Project List. By Task Force policy, the total cost of demonstration projects for any list is generally limited to about \$2 million.

A lead federal agency was then assigned to each candidate project. The lead agency was responsible for developing the project more fully and producing designs and cost estimates. The lead agencies furnished design information to the Environmental Work Group, which performed a Wetland Value Assessment for each candidate project. The section entitled "Evaluation of Candidate Projects" summarizes the information developed by the lead agencies in this process.

Table 3
 Ranking of Nominees for the
 Pontchartrain Basin

Project	No.	Sponsor	COE	EPA	DNR	Points Awarded				Total
						NRCS	NMFS	FWS		
LaBranche East	PPO-9	COE	4	2		2				8
† Bayou Chevee Marsh Restoration	XPO-69	COE	5	1	5	1			3	18
† Bonnet Carre' Outfall Management	XPO-54	NMFS	3	5	2				5	19
Alligator Point Hydrologic Restoration	PO-15	NRCS			3	4			5	12
† Lake Borgne Shore Protection	PPO-2a/g	NRCS	2	3	4	3			2	18
MR-GO Marsh Creation	FPO-38a	NRCS				5			2	8
	XPO-38	St B								0
Lake Borgne Shore Protection	PPO-2b	St B			1				1	2
Lake Borgne Shore Protection	PPO-2c	St B								0
Lake Borgne Shore Protection	PPO-2d	St B	1	4						5
Lake Borgne Shore Protection	PPO-2e	St B								0
Lake Borgne Shore Protection	PPO-2f	St B								0
MR-GO Marsh Creation	XPO-72	St B								0
MR-GO Bar Wetland Creation	XPO-73	St B								0
Bayou Bienvenue Marsh	XPO-74	St B								0
Lake Borgne at Bayou Dupre	XPO-95	St B								0
B. LaLoutre-MRGO Wetlands	XPO-96	St B								0
Artificial Barrier Islands	XPO-66	St B								0
† Artificial Reef (Seagrass)	XPO-98	PC								Demo
L. Borgne Land Bridge Shore Protection	PPO-2x	NO								0

Projects marked with a "†" were accepted as candidate projects.

COE: Corps of Engineers
 EPA: Environmental Protection Agency
 DNR: Department of Natural Resources
 NRCS: Natural Resources Conservation Service
 NMFS: National Marine Fisheries Service
 FWS: United States Fish and Wildlife Service

St B: St. Bernard Parish
 PC: Private Citizen
 NO: City of New Orleans

Table 4
 Ranking of Nominees for the
 Breton Sound Basin

Project	No.	Sponsor	Points Awarded					Total	
			COE	EPA	DNR	NRCS	NMFS		FWS
† White's Ditch Siphon and Management	BS-4c	NMFS*	3	4	5	3	5	4	24
† Marsh Restoration at Wills Point	XBS-17	COE*	4	5	4	4	3	3	23
Mississippi River Diversion at Bohemia	BS-1a/b	NMFS	2	3	3	2	4	5	19
Marsh Restoration at Ft. St. Philip	XBS-16	COE	5	2	2	1	1	2	13
Bayou Lamoque Outfall Management	BS-5	NRCS	1	1	1	5	2	1	11

Table 5
 Ranking of Nominees for the
 Mississippi River Delta Basin

Project	No.	Sponsor	Points Awarded					Total	
			COE	EPA	DNR	NRCS	NMFS		FWS
Denny's Bay Diversion	XMR-15	FWS							
Benny's Bay Diversion	PMR-5	COE							
† Channel Armor Gap West	XMR-10b	COE							
† Boudin Bags Bank Protection		NRCS							Demo
† Empire Lock Operation Modification		DNR							Demo

Projects in this basin were not ranked; by vote of the Planning and Evaluation Subcommittee, the Channel Armor Gap project, XMR-10b, was selected.

* Co-sponsored with DNR

Projects marked with a "†" were accepted as candidate projects.

COE: Corps of Engineers
 EPA: Environmental Protection Agency
 DNR: La. Department of Natural Resources
 NRCS: Natural Resources Conservation Service
 NMFS: National Marine Fisheries Service
 FWS: United States Fish and Wildlife Service

Table 6
 Ranking of Nominees for the
 Barataria Basin

Project	No.	Sponsor	Points Awarded							Total
			EPA	FWS	DNR	COE	NRCS	NMFS		
† Dedicated Dredging at Jesuit Bend	XBA-73	DNR	6	3	4	1	7	4	25	
Empire Lock Operating Procedure Mod	XBA-74	DNR	1	7	5	2	5	3	23	
† Myrtle Grove Siphon	PBA-48a	NMFS*	4	5	6	7	6	6	34	
† City Price Freshwater Div (Homeplace)	BA-17b	NMFS	3	4	2	6	3	7	25	
Nairn Marsh Creation	XBA-50	EPA	5	2	1	5	1	1	15	
† Bayou Lafourche Diversion	PBA-20	EPA*	7	6	7	4	4	5	33	
Dedicated Dredging East of the Pen	XBA-75	COE	2	1	3	3	2	2	13	
† Clovelly Farms Diversion		NRCS							Demo	

* Co-sponsored with DNR

Projects marked with a "†" were accepted as candidate projects.

COE: Corps of Engineers
 EPA: Environmental Protection Agency
 DNR: La. Department of Natural Resources
 NRCS: Natural Resources Conservation Service
 NMFS: National Marine Fisheries Service
 FWS: United States Fish and Wildlife Service

Demo: Clovelly Farms Diversion (NRCS)

Table 7
 Ranking of Nominees for the
 Terrebonne Basin

Project	No.	Sponsor	Points Awarded							Total
			EPA	FWS	NMFS	COE	NRCS	DNR		
† Barrier Island Restoration	PTE-15b(iv)	EPA*	7	2	7	4	2	7	29	
with Ship Shoal Material	TE-11a									
† Timbalier Island Restoration	XTE-45	NMFS	5	4	6	3	3	5	26	
† Bayou DeCade Hydrologic Restoration	PTE-26a	NRCS	3	7	4	2	7	2	25	
Bayou LaCarpe Hydro Rest	TE-7d(i)	NRCS	1	5	1	1	5	1	14	
South Falgout Canal Freshwater Intro	XTE-55a	FWS	2	6	3	6	4	3	24	
† Dedicated Dredging South of Falgout Canal	XTE-69	COE	6	3	5	7	1	4	26	
East Timbalier Island Restoration	XTE-45/67c	Lfrch	4	1	2	5	6	6	24	
† Vegetative Plantings on Raccoon Island		NRCS							Demo	

Projects marked with a "+" were accepted as candidate projects.

COE: Corps of Engineers

EPA: Environmental Protection Agency

DNR: La. Department of Natural Resources

Lfrch: Lafourche Parish

NRCS: Natural Resources Conservation Service

NMFS: National Marine Fisheries Service

FWS: United States Fish and Wildlife Service

Table 8
 Ranking of Nominees for the
 Atchafalaya Basin

Project	No.	Sponsor	Points Awarded						Total
			COE	EPA	DNR	NRCS	NMFS	FWS	
† Point Chevreuil Shore Protection	XAT-3	NRCS							
† Point au Fer Reef Reconstruction	XAT-11	PC							Demo

By vote of the Planning and Evaluation Subcommittee, the Point Chevreuil Shore Protection project was named a candidate project and the Point au Fer Reef project was accepted as a demonstration project.

Table 9
 Ranking of Nominees for the
 Teche-Vermillion Basin

Project	No.	Sponsor	Points Awarded						Total
			COE	EPA	DNR	NRCS	NMFS	FWS	
† Vegetative Plantings	XIV-30	DNR	1	3	6	3	4	6	23
Avery Canal Shoreline Prot	PIV-10	NRCS	5	5	1	6	2	4	23
Salt Point North Shore Prot	TV-4s	NRCS	4	4	2	1	1	2	14
† Freshwater Bayou Hydro Restoration	XIV-27	NRCS	3	6	3	2	3	5	22
† Oaks Canal Hydro Restoration	XIV-25	NRCS	6	2	5	4	6	3	26
Weeks Bay Shoreline Prot	TV-10	PC	2	1	4	5	5	1	18

Demonstration Projects
 Freshwater Bayou Bank Protection (Tire Structure)
 Marsh Island Demonstration

Projects marked with a "†" were accepted as candidate projects.

COE: Corps of Engineers
 EPA: Environmental Protection Agency
 DNR: La. Department of Natural Resources
 PC: Private Citizen
 NRCS: Natural Resources Conservation Service
 NMFS: National Marine Fisheries Service
 FWS: U.S. Fish and Wildlife Service

Table 10
 Ranking of Nominees for the
 Mermentau Basin

Project	No.	Sponsor	Points Awarded					Total
			EPA	COE	DNR	NRCS	NMFS	
† Mermentau Wtr Level Cntrl	PME-7	DNR						
† Pe. an Island Terracing	XME-22	NMFS						
† Freshwater Bayou Hydro Restoration	XME-29	NRCS						

Only three projects were nominated. As there is some uncertainty concerning the availability of sufficient information to evaluate the PME-7 project, and because the XME-22 project has been previously evaluated, all three projects were accepted as candidates for this basin.

Table 11
 Ranking of Nominees for the
 Calcasieu/Sabine Basin

Project	No.	Sponsor	Points Awarded					Total
			EPA	COE	DNR	NRCS	NMFS	
† North Line Canal Hydro Restoration	XCS-53	COE	1	1	3	4	5	19
Alkali Ditch HR	XCS-46	COE	4	2	1	5	4	18
† Sweet and Willow Lakes HR	CS-11b	NRCS	5	4	5	3	1	21
Northwest Gum Cove HR	XCS-48	NRCS	3	3	4	1	3	15
Oyster Bayou HR	PCS-12/18	NRCS	2	5	2	2	2	17

Projects marked with a "†" were accepted as candidate projects.

COE: Corps of Engineers
 EPA: Environmental Protection Agency
 DNR: La. Department of Natural Resources
 PC: Private Citizen
 NRCS: Natural Resources Conservation Service
 NMFS: National Marine Fisheries Service
 FWS: U.S. Fish and Wildlife Service

EVALUATION OF CANDIDATE PROJECTS

Benefit Analysis (Wetland Value Assessment)

The Wetland Value Assessment (WVA) methodology is a quantitative, habitat-based assessment methodology developed for use in prioritizing project proposals submitted for funding under the Breaux-Johnston Act. The WVA quantifies changes in fish and wildlife habitat quality and quantity that are projected to be brought about as a result of a proposed wetland enhancement project. The results of the WVA, measured in Average Annual Habitat Units (AAHU's), can be combined with economic data to provide a measure of the effectiveness of a proposed project in terms of annualized cost per AAHU gained.

The WVA was developed by the Environmental Work Group (Group) assembled under the Planning and Evaluation Subcommittee of the CWPPRA Technical Committee; the Group includes members from each agency represented on the CWPPRA Task Force. The WVA was designed to be applied, to the greatest extent possible, using only existing or readily obtainable data.

The WVA has been developed strictly for use in ranking proposed CWPPRA projects; it is not intended to provide a detailed, comprehensive methodology for establishing baseline conditions within a project area. Some aspects of the WVA have been defined by policy and functional considerations of the CWPPRA; therefore, user-specific modifications may be necessary if the WVA is used for other purposes.

The WVA is a modification of the Habitat Evaluation Procedures (HEP) developed by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 1980). HEP is widely used by the Fish and Wildlife Service and other Federal and State agencies in evaluating the impacts of development projects on fish and wildlife resources. A notable difference exists between the two methodologies, however, in that HEP generally uses a species-oriented approach, whereas the WVA utilizes a community approach.

The WVA has been developed for application to the following coastal Louisiana wetland types: fresh marsh (including intermediate marsh), brackish marsh, saline marsh, and cypress-tupelo swamp. Future reference in this document to "wetland" or "wetland type" refers to one or more of those four communities.

The WVA operates under the assumption that optimal conditions for fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of:

1. a list of variables that are considered important in characterizing fish and wildlife habitat:
 - a. V_1 --percent of wetland covered by emergent vegetation,
 - b. V_2 --percent open water dominated by submerged aquatic vegetation,

- c. V₃--marsh edge and interspersion,
- d. V₄--percent open water less than or equal to 1.5 feet deep,
- e. V₅--salinity, and
- f. V₆--aquatic organism access.

2. a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values; and

3. a mathematical formula that combines the Suitability Index for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

The Wetland Value Assessment models have been developed for determining the suitability of Louisiana coastal wetlands for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. Models have been designed to function at a community level and therefore attempt to define an optimum combination of habitat conditions for all fish and wildlife species utilizing a given marsh type over a year or longer.

The output of each model (the HSI) is assumed to have a linear relationship with the suitability of a coastal wetland system in providing fish and wildlife habitat.

A comprehensive discussion of the WVA methodology is presented in Appendix E.

Designs and Cost Analysis.

During the plan formulation process, each of the Task Force agencies assumed responsibility for developing designs, and estimates of costs and benefits for a number of candidate projects. The cost estimates for the projects were to be itemized as follows:

- 1. Construction Cost
- 2. Contingencies
- 3. Engineering and Design
- 4. Supervision and Administration
- 5. Supervision and Inspection (Construction Contract)
- 6. Real Estate
- 7. Operation and Maintenance
- 8. Monitoring

In addition, each lead agency was to provide a detailed itemized construction cost estimate for each project. These estimates are shown in Appendix C.

An Engineering Work Group was established by the Planning and Evaluation Subcommittee, with each Federal agency and the State of

Louisiana represented. The work group reviewed each estimate for accuracy and consistency.

When reviewing the construction cost estimates, the work group verified that each project feature had an associated cost and that the quantity and unit price for those items were reasonable. In addition, the work group reviewed the design of the projects to determine whether the method of construction was appropriate and the design feasible.

All of the projects were assigned a contingency of 25 percent because detailed information such as soil borings, surveys, and--to a major extent--hydrologic data were not available, in addition to allowing for variations in unit prices.

Engineering and design, supervision and administration, and supervision and inspection costs were reviewed for consistency, but ordinarily were not changed from what was presented by the lead agency.

Economic Analysis.

The Breaux-Johnston Act directed the Task Force to develop a prioritized list of wetland projects "based on the cost-effectiveness of such projects in creating, restoring, protecting, or enhancing coastal wetlands, taking into account the quality of such coastal wetlands." The Task Force satisfied this requirement through the integration of a traditional time-value analysis of life-cycle project costs and other economic impacts and an evaluation of wetlands benefits using a community-based version of the U.S. Fish and Wildlife Service's Habitat Evaluation Procedure. The product of these two analyses was an Average Annual Cost per Average Annual Habitat Unit figure for each project, which was used as the primary ranking criterion. The method permits incremental analysis of varying scales of investment and also accommodates the varying salinity types and habitat quality characteristics of project wetland outputs.

The major inputs to the cost effectiveness analysis are the products of the lead Task Force agencies and the Engineering and Environmental Work Groups. The various plans were refined into estimates of annual implementation costs and annual Habitat Units (HU).

Implementation costs were used to calculate the economic and financial costs of each wetland project. Financial costs chiefly consist of the resources needed to plan, design, construct, operate, and maintain the project. These are the costs, when adjusted for inflation, that the Task Force uses in budgeting decisions. The economic costs include, in addition to the financial cost, monetary indirect impacts of the plans not accounted for in the implementation costs. Examples would include impacts on dredging in nearby commercial navigation channels, effects on water supplies, and effects on nearby facilities and structures not reflected in right-of-way and acquisition costs.

The stream of economic costs for each project was brought to present value and annualized at the current discount rate, based on a 20-year project life. Beneficial environmental outputs were annualized at a zero discount rate and expressed as average annual habitat units (AAHU). These data were then used to rank each plan

based on cost per AAHU produced. Annual economic costs were also calculated on a per acre basis. Financial costs were adjusted to account for projected levels of inflation and used to monitor overall budgeting and any future cost escalations in accordance with rules established by the Task Force.

Following the review by the Engineering Work Group, costs were expressed as first costs, fully funded costs, present worth costs, and average annual costs. The Average Annual Cost per Average Annual Habitat Unit criterion was derived by dividing the average annual cost for each wetland project by the Average Annual Habitat Units (AAHU) for each wetland project. The average annual costs figures are based on 1996 price levels, a discount rate of 7.63 percent, and a project life of 20 years. The fully funded cost estimates developed for each project were used to determine how many projects could be supported by the funds expected to be available in fiscal year 1996. The fully funded cost estimates include operation and maintenance and other compensated financial costs.

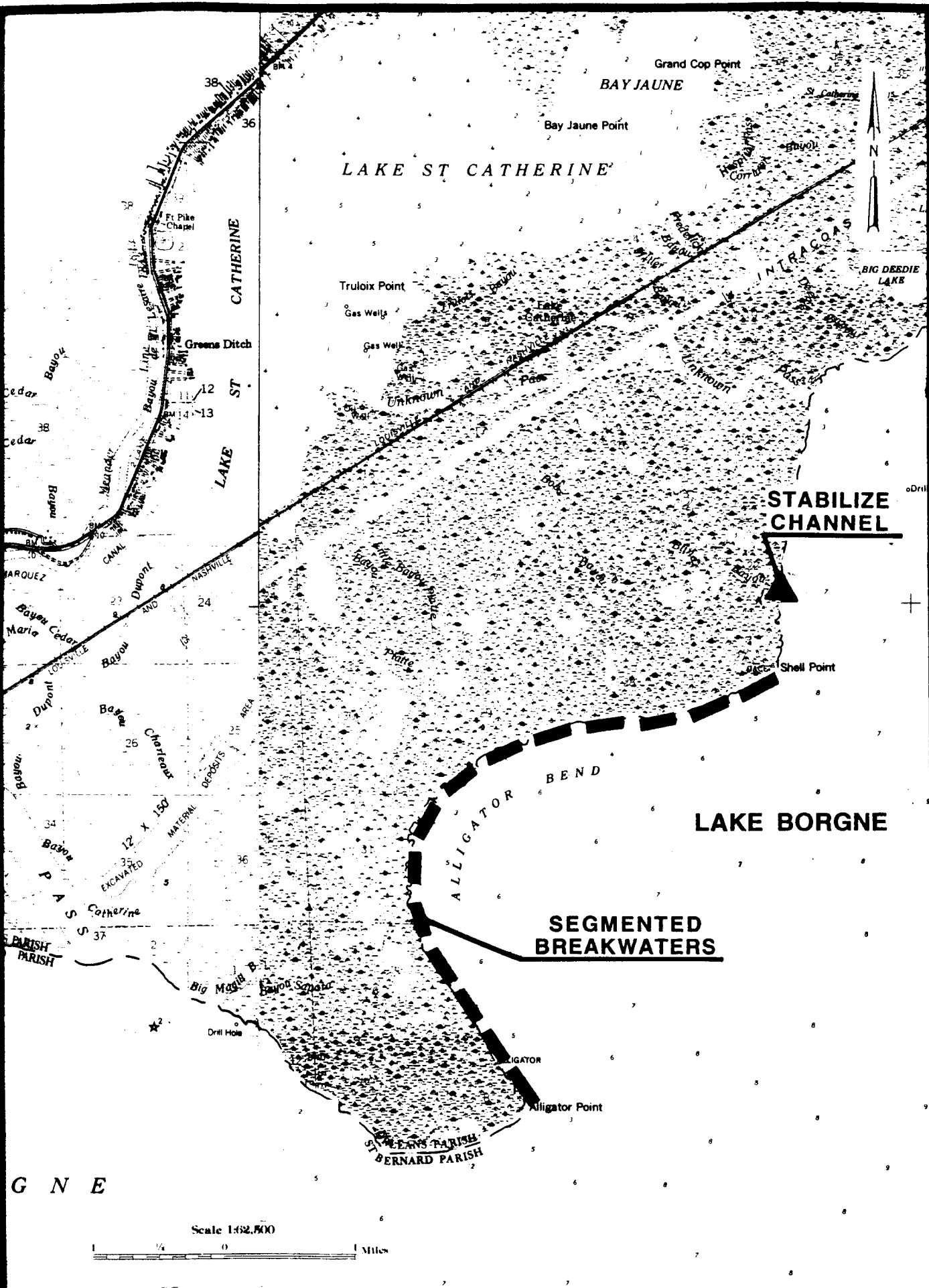
Table 12
Candidate Projects for the 5th Priority Project List

Project No.	Project Name	Average Annual Acres (AAA)	Average Annual Habitat Units (AAHU's)	Average Annual Cost (\$ X 1,000)	Average Annual Cost/AAHU (\$/AAHU)	Fully Funded Cost (\$ X 1,000)	Sponsoring Agency
PPO-2a/g	Lake Borgne Shore Protection	199	131	601.9	4,595	6,194	NRCS
XPO-69	Marsh Creation at Bayou Chevee	165	121	285.6	2,360	2,891	USACE
XPO-54	Bonnet Carré Outfall Management	97	66	948.5	14,371	15,248	USACE
XBS-17	Wills Point Marsh Creation	287	157	451.2	2,874	4,528	USACE
XMR-10b	Channel Armor Caps West	273	357	444.1	1,244	4,552	USACE
PMR-8	Pass a Loutre Sediment Mining	132	125	178.7	1,430	1,816	USACE
PBA-201	Bayou Lafourche Siphon (w/Cutoff Structure)	925	1,069	2,434.0	2,277	23,670	EPA
PBA-20	Bayou Lafourche Siphon Inc (w/o Cutoff Structure)	225	499	2,285.0	4,579	22,256	EPA
PBA-48a	Siphon at Myrtle Grove	588	527	1,467.7	2,785	15,526	NMFS
XBA-73	Jesuit Bend Marsh Creation	171	97	522.1	5,382	5,213	USACE
BA3c/PBA-12b	Naomi Outfall Mgmt and BBMW East Bank Prot	473	676	339.2	502	4,090	NRCS
PBA-12b	Barataria Bay WW East Bank Prot.	114	129	220.2	1,707	2,303	NRCS
BA-3c	Naomi Outfall Management	633	379	129.0	340	1,744	NRCS
TE-10/XTE-49	Grand Bayou/GIWW Freshwater Diversion	1,609	771	397.1	515	5,136	USFWS
PTE-15b(iv)	New Cut/East Trinity Island Rst	541	384	2,067.0	5,383	19,080	EPA
PTE-15b(iv) 1	Barrier Island Rst, New Cut Only (Inc 1)	541	118	598.0	5,068	5,861	EPA
PTE-15b(iv) 2	Barrier Island Rst, w/o Ship Shoal	541	384	1,298.0	3,380	12,022	EPA
PTE-26a	Bayou DeCade Hydrologic Restoration	42	74	350.1	4,731	4,154	NRCS
XTE-45	Timballier Barrier Island Restoration	300	230	657.2	2,857	6,582	NMFS
XTE-69	Marsh Creation near Falgout Canal	194	122	429.7	3,522	4,310	USACE
XAT-3	Point Chevreuil Shore Protection	38	16	228.1	14,256	2,559	NRCS
XTV-30	Vegetative Plantings in the Chenier Plain	362	246	170.8	694	1,829	NRCS
PTV-10/XTV-25	Oaks/Avery Canal Hydrologic Restoration	12	118	216.2	1,832	2,673	NRCS
PTV-19	Little Vermillion Bay Sediment Trapping	238	149	86.1	578	940	NMFS
TV-5/7	Marsh Island Hydrologic Rst and Marsh Creation Inc 3	233	452	366.1	810	4,056	USACE
XME-22	Pecan Island Terracing	221	240	217.3	905	2,220	NMFS
XME-29	Freshwater Bayou Bank Stabilization	262	248	392.2	1,581	3,999	NRCS
CS-16	Black Bayou Diversion	440	592	863.0	1,458	9,051	USACE
CS-11b	Sweet Lake/Willow Lake Hydrologic Restoration	126	261	455.9	1,747	4,763	NRCS
XCS-46	North Line Canal Structure (dropped by lead agency)						USACE/USFWS
BA-17b	Siphon at Home Place/ City Price (dropped: not feasible)						NMFS

EPA: Environmental Protection Agency
 NMFS: National Marine Fisheries Service
 NRCS: Natural Resources Conservation Service (formerly Soil Conservation Service)
 USFWS: US Fish and Wildlife Service
 USACE: US Army Corps of Engineers

DESCRIPTION OF CANDIDATE PROJECTS

This Section provides a description of each of the candidate projects including: location, justification, objectives, features, cost, benefits, and a map identifying the project area and project features.



LAKE BORGNE SHORE PROTECTION (PPO-a/g)

Lake Borgne Shore Protection (PPO-2a/g)

Location

This 3,564-acre brackish marsh project area is located in Orleans Parish on the land bridge separating Lake Borgne and Lake Pontchartrain, between Alligator Point and Shell Point.

Objective

The long-term shoreline erosion rate in the area is 9.4 feet per year. However, most of the more erosion-resistant lake rim has been lost, resulting in a higher current erosion rate closer to 20 feet per year.

Project Features

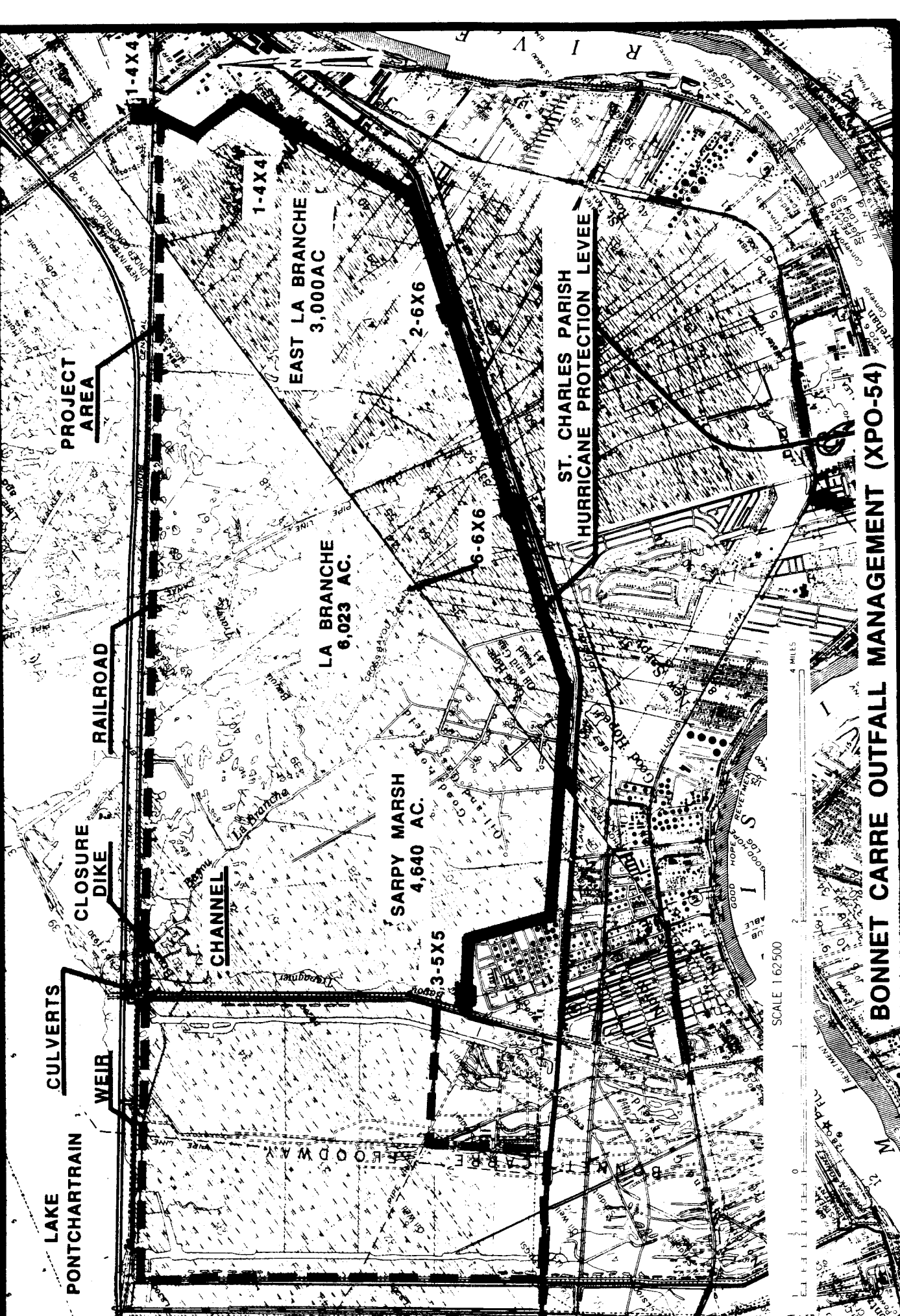
The project consists of constructing approximately 5 miles of segmented breakwaters about 300 feet offshore in two to three feet of water. The breakwaters are approximately seven feet high with a five-foot crown width. The breakwaters will be 175 feet long with 200-foot gaps. A rock liner will be constructed at the mouth of Blind Bayou to stabilize the channel section.

Cost

First Cost	\$6,194,000
Average Annual Cost	\$602,000
Fully Funded Cost	\$6,194,000

Benefits

Average Annual Habitat Units	131
Average Annual Acres	199



BONNET CARRE OUTFALL MANAGEMENT (XPO-54)

Bonnet Carré Outfall Management (XPO-54)

Location

The project is located on the southern shore of Lake Pontchartrain in St. Charles Parish, Louisiana. The project area includes the Bonnet Carré Spillway, the Sarpy Swamp, and the LaBranche Wetlands (11,368 acres).

Justification

The Bonnet Carré Spillway was constructed in 1932 to divert flood flows, thus preventing the river stage at the Carrollton gauge in New Orleans from exceeding 20 feet MSL. The spillway has been operated in 1937, 1945, 1950, 1973, 1975, 1979, and 1983, an average of once every nine years.

The structure contains 350 bays, with each bay containing 20 timber needles. During high river stages, water leaks through the low sill bays into the spillway and Lake Pontchartrain. Typically, this leakage occurs in March, April, and May, and occasionally in February. On average, leakage occurs roughly three out of four years. Water which leaks through the low sill bay could be routed to nourish the LaBranche Wetlands.

Objectives

The objective of the project is route the water which leaks through the Bonnet Carré Spillway structure into the LaBranche Wetlands. The target flow for the LaBranche Wetlands is 1,500 cfs.

Project Features

Project features include:

1. a 10,500-foot rock weir at the intersection of Lake Pontchartrain and the spillway;
2. 3 8-ft by 10-ft gated concrete culverts through the east guide levee;
3. a 1,500-foot outfall channel connecting the culverts to Bayou LaBranche; and
4. a closure dike at the confluence of Bayous LaBranche and Trepagnier.

Cost

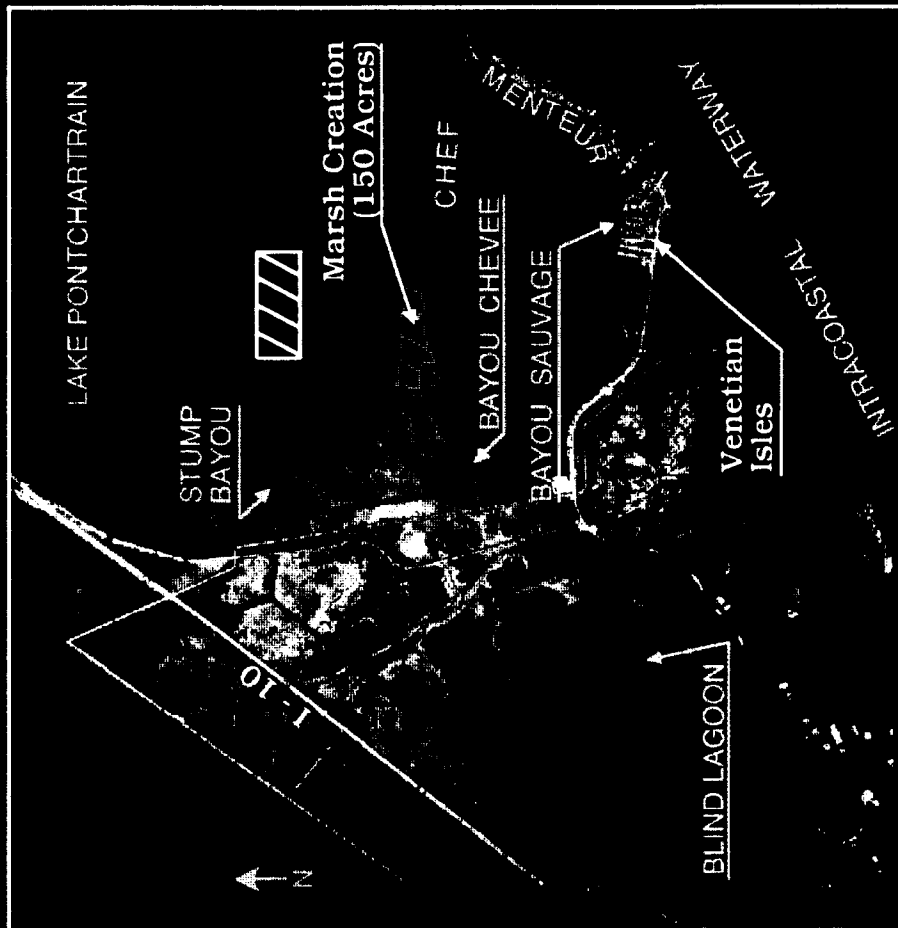
First Cost	\$6,320,000
Average Annual Cost	\$949,000
Fully Funded Cost	\$15,248,000

Benefits

Average Annual Habitat Units	66
Average Annual Acres	97

Marsh Creation at Bayou Chevee (XPO - 69)

 Borrow Area



Marsh Creation at Bayou Chevee (XPO-69)

Location

The project is located at the eastern end of Lake Pontchartrain in Orleans Parish, Louisiana. The marsh creation site is between Bayou Chevee and Chef Menteur Pass and is part of the Bayou Sauvage National Wildlife Refuge. The project area consists of brackish marsh in which shoreline erosion rates have ranged from 10 to 20 feet per year.

Objectives

The objective of the project is to create new vegetated wetlands and nourish deteriorated marsh in the Bayou Sauvage National Wildlife Refuge with dredged sediments from Lake Pontchartrain.

Project Features

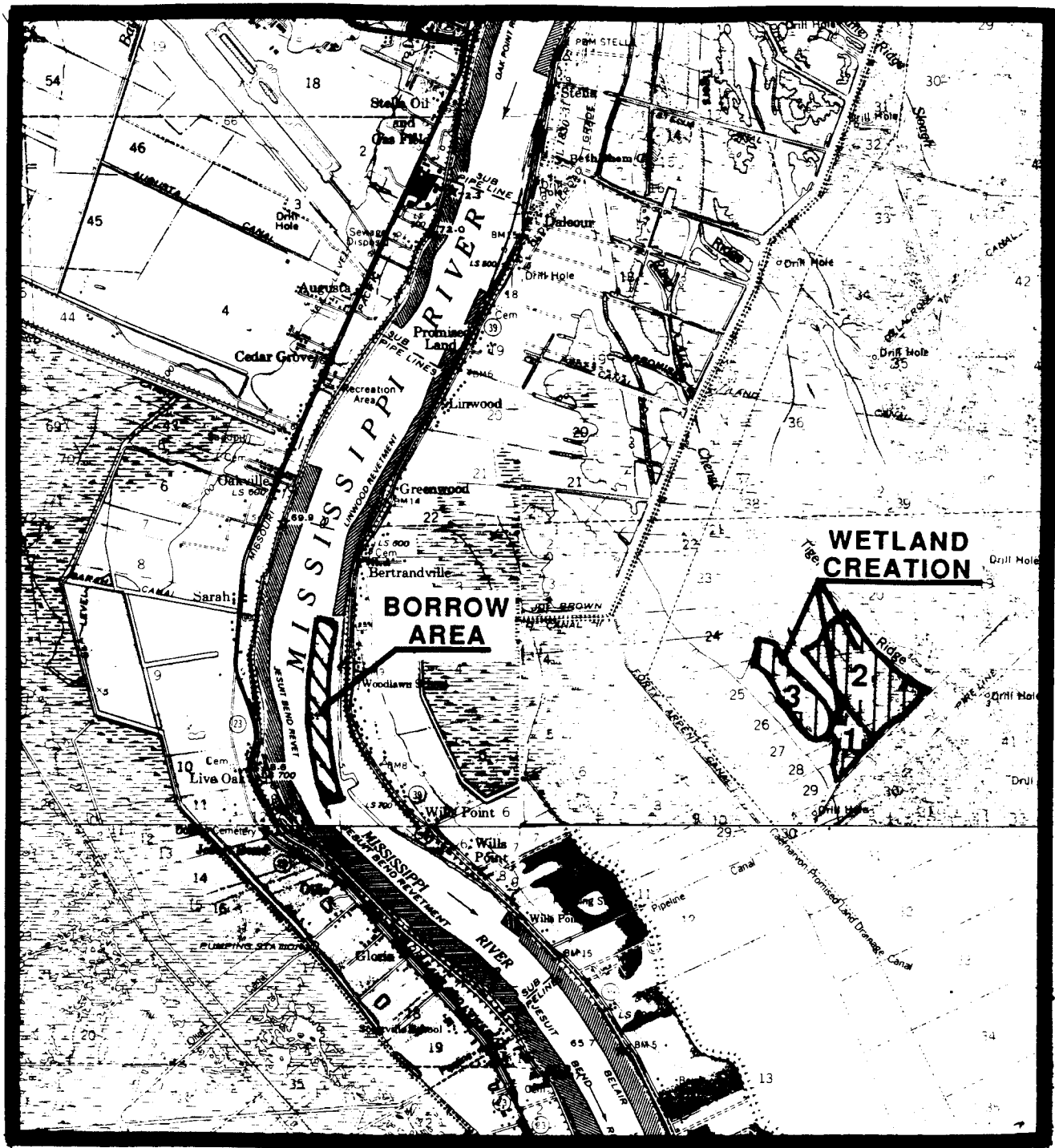
The project consists of constructing a 5,000-foot earthen dike from Bayou Chevee to a point adjacent to Chef Menteur Pass. The dike will be constructed to elevation 6.0 feet NGVD and will have a crown width of 10 feet. Dikes in the back of the project area (approximately 7,500 feet) will be constructed to elevation 3.0 feet NGVD. Approximately 1,950,000 cubic yards of material will be excavated from a borrow site in Lake Pontchartrain by a hydraulic cutterhead pipeline dredge to create 150 acres of marsh. The bottom elevation in the project area is approximately -4.0 feet NGVD.

Cost

First Cost	\$2,596,000
Average Annual Cost	\$286,000
Fully Funded Cost	\$2,891,000

Benefits

Average Annual Habitat Units	121
Average Annual Acres	165



Marsh Creation with Dedicated Dredging at Wills Point (XBS-17)

Marsh Creation with Dedicated Dredging--Wills Point (XBS-17)

Location

The project is located in Plaquemines Parish, Louisiana, on the east bank of the Mississippi River approximately one mile east of Wills Point (mile 68 AHP). The site is mainly shallow open water between natural historic ridges (Tigers Ridge and River Aux Chenes).

Justification

The project site is in close proximity to the Mississippi River with its resource of sediments available for marsh creation. The project will introduce new sediments into the marshes adjacent to the Mississippi River to create new wetlands.

Objectives

The objective of the project is to create marsh in the shallow open water area between natural ridges with material dredged from the Mississippi River.

Project Features

Approximately 2,756,000 cubic yards of material will be excavated from the river to create 320 acres of wetlands. The material will be pumped to an initial height of one to two feet above the adjacent marsh and will eventually settle to marsh elevation. The existing ridges and banks will act as retention dikes for the sands and silts dredged from the river. Access from the river to the wetland creation area will be along the back levee paralleling Joe Brown Canal. The dredge pipe will be jacked and bored under Louisiana Highway 39.

The borrow material will be obtained from the Mississippi River directly across from the Jesuit Bend Revetment. Material will be taken from the low water line to the -50 to -70-foot contour. Hydrographic surveys of the area show material available for borrow.

Cost

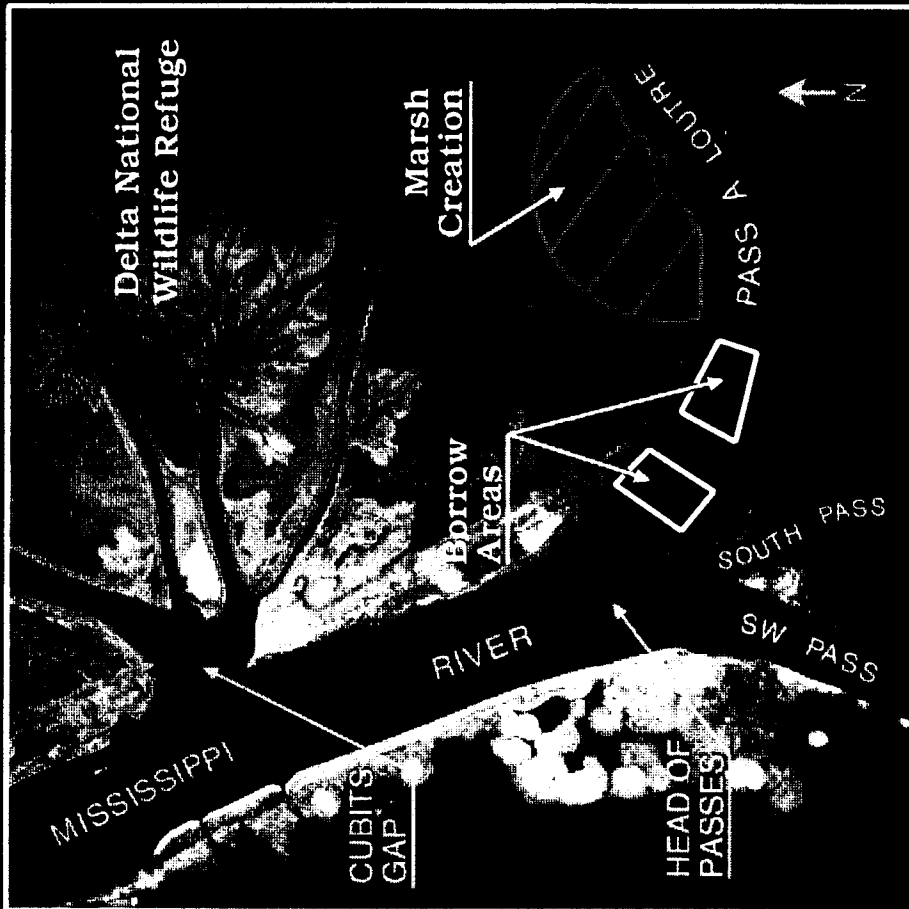
First Cost	\$4,139,000
Average Annual Cost	\$451,000
Fully Funded Cost	\$4,528,000

Benefits

Average Annual Habitat Units	157
Average Annual Acres	287

Pass A Loutre Sediment Mining

(PMR - 8)



Pass a Loutre Sediment Mining (PMR-8)

Location

The project is located in Pass a Loutre of the Mississippi River bird's foot delta in Plaquemines Parish, Louisiana. The project area consists of 300 acres of fresh/intermediate marsh and open water.

Justification

Material dredged from the Mississippi River at Head of Passes is deposited in Pass a Loutre and South Pass. Although this material has historically travelled through the passes and contributed to marsh creation, Pass a Loutre has recently lost depth and is decreasing in size. This material can be dredged and deposited along the pass to create wetlands in open water areas.

Objectives

The objective of the project is to create wetlands utilizing dredged material from Pass a Loutre. Concurrently, the removal of the material from Pass a Loutre will increase its flow carrying capability.

Project Features

Approximately 800,000 cubic yards of dredged material will be excavated from the designated borrow areas within Pass a Loutre and will be deposited unconfined in the shallow open water area behind the left descending bank of the pass to create wetlands. The material will be deposited into three mounds to a maximum elevation of +3.0 feet mean low gulf (MLG). After consolidation the material will settle to a final elevation between +2.0 and +2.5 feet MLG. No dredged material will be deposited upon existing wetland above an elevation of +2.0 feet MLG. The project will create approximately 150 acres of emergent fresh/intermediate marsh. The total area benefited, including minor deposition, is 300 acres.

Cost

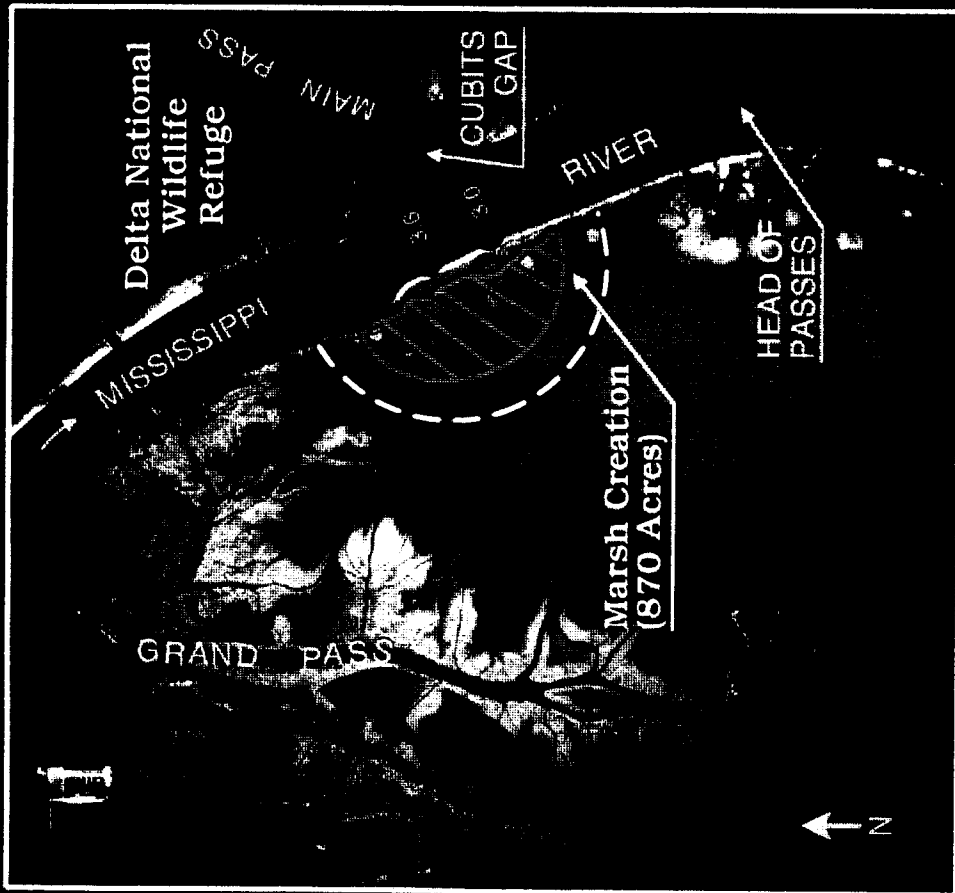
First Cost	\$1,586,000
Average Annual Cost	\$179,000
Fully Funded Cost	\$1,816,000

Benefits

Average Annual Habitat Units	125
Average Annual Acres	132

Channel Armor Gap West (XMR - 10b)

--- Project Area Boundary
Existing Gaps, Miles 3.6
& 3.0 AHP Enlarge
to 300 ft.



Channel Armor Gaps West (XMR-10b)

Location

The project is located on the west bank of the Mississippi River at mile 3.0 Above Head of Passes (AHP) and mile 3.6 AHP. The project outfall area encompasses approximately 900 acres within a 5,000-foot arc of the diversion sites in the upper West Bay area of the Mississippi River delta.

Justification

Within the project area there are currently two armored gaps through the bank of the river. The existing gap located at river mile 3.6 AHP is 100 feet wide, with sheetpile walls on either side and a rock-armored bottom at elevation 0 feet NGVD. The existing gap located at river mile 3.0 AHP is 100 feet wide, with a sheetpile wall on the north side and a rock-armored berm to the south. This gap is also armored along its bottom at elevation 0 feet NGVD. Both gaps and their side walls extend into the bank approximately 420 feet. The common outfall area for these gaps extends outward some 5,000 feet in an arc fashion. The area is characterized by shallow open water with bottom elevations ranging between 1.25 feet NGVD adjacent to the natural river bank and 0.5 feet at 5,000 feet out from the cuts. Recent measurements of flow indicated a volume of 1,000 cubic feet per second (cfs) in each gap. Conditions at the time of the measurements included a river stage of 3.5 feet at Venice, Louisiana, a stage occurrence exceeded less than 15 percent of the time. The measurements were also taken early on a falling tide, which would represent a high tailwater. It was also observed that a significant decrease in turbidity occurred between the immediate outflow of the diversions and the endpoint of solid SAV coverage some 5,000 feet westward.

Objectives

The objective of this project is to enlarge the cross-section of the existing gaps to deliver a flow of 2,500 cfs in each cut for a river stage which can be met or exceeded 50 percent of the time. This increase in flow will make available, on average, an additional 1,800 cubic yards of suspended sediment per day. Giving allowances for partial retention and compaction, this additional volume of sediment should result in the accumulation of 2.1 million cubic yards of sediment over the 20-year project life, which translates into about 870 acres of emergent wetlands.

Project Features

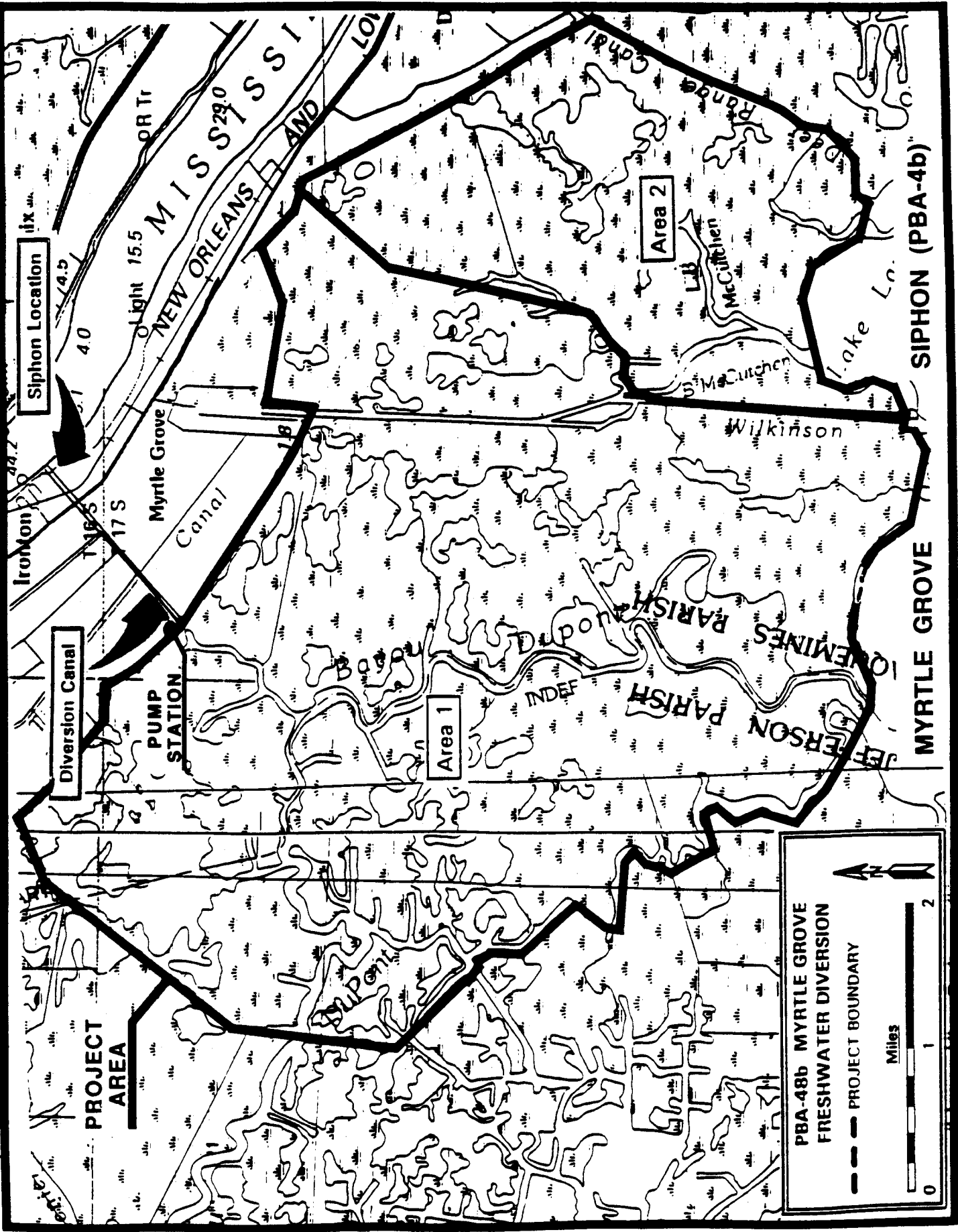
The project design calls for the removal of two hundred feet of existing bank protection adjacent to each armor gap. One sheetpile guidewall in each existing gap will be removed. The gaps will then each be widened from 100 to 300 feet, and the sheetpile walls and bottom armor will be replaced.

Cost

First Cost	\$4,027,000
Average Annual Cost	\$444,000
Fully Funded Cost	\$4,552,000

Benefits

Average Annual Habitat Units	357
Average Annual Acres	273



SIPHON (PBA-4b)

MYRTLE GROVE

**PBA-48b MYRTLE GROVE
FRESHWATER DIVERSION**

--- PROJECT BOUNDARY

Miles
0 1 2

Myrtle Grove Siphon (PBA-48b)

Location

The project is located near the community of Myrtle Grove on the west bank of the Mississippi River in Plaquemines Parish, Louisiana. The project area encompasses approximately 15,900 acres of brackish wetlands (41 percent marsh and 59 percent water).

Justification:

Levee construction has stopped the annual flooding that historically nourished surrounding wetlands with sediment, nutrients, and fresh water. Dredging of oilfield and pipeline canals, in conjunction with navigation channels, has provided avenues for salt water from the gulf to intrude into low salinity brackish and intermediate marshes in the central Barataria Basin. Since 1956, this area has lost more than 8,000 acres of marsh and has been converted from a fresh to a brackish habitat. One way to address the present hydrologic problem within the estuary is to reintroduce river water into the basin.

Objective

The objective of the project is to introduce Mississippi River water into the Barataria Basin.

Project Features

The diversion system consists of a siphon to divert a maximum discharge of 2,100 cfs into the project area. The system consists of eight six-foot-diameter pipes, a vacuum pipe, and an outfall channel. In addition, the project will include the following components:

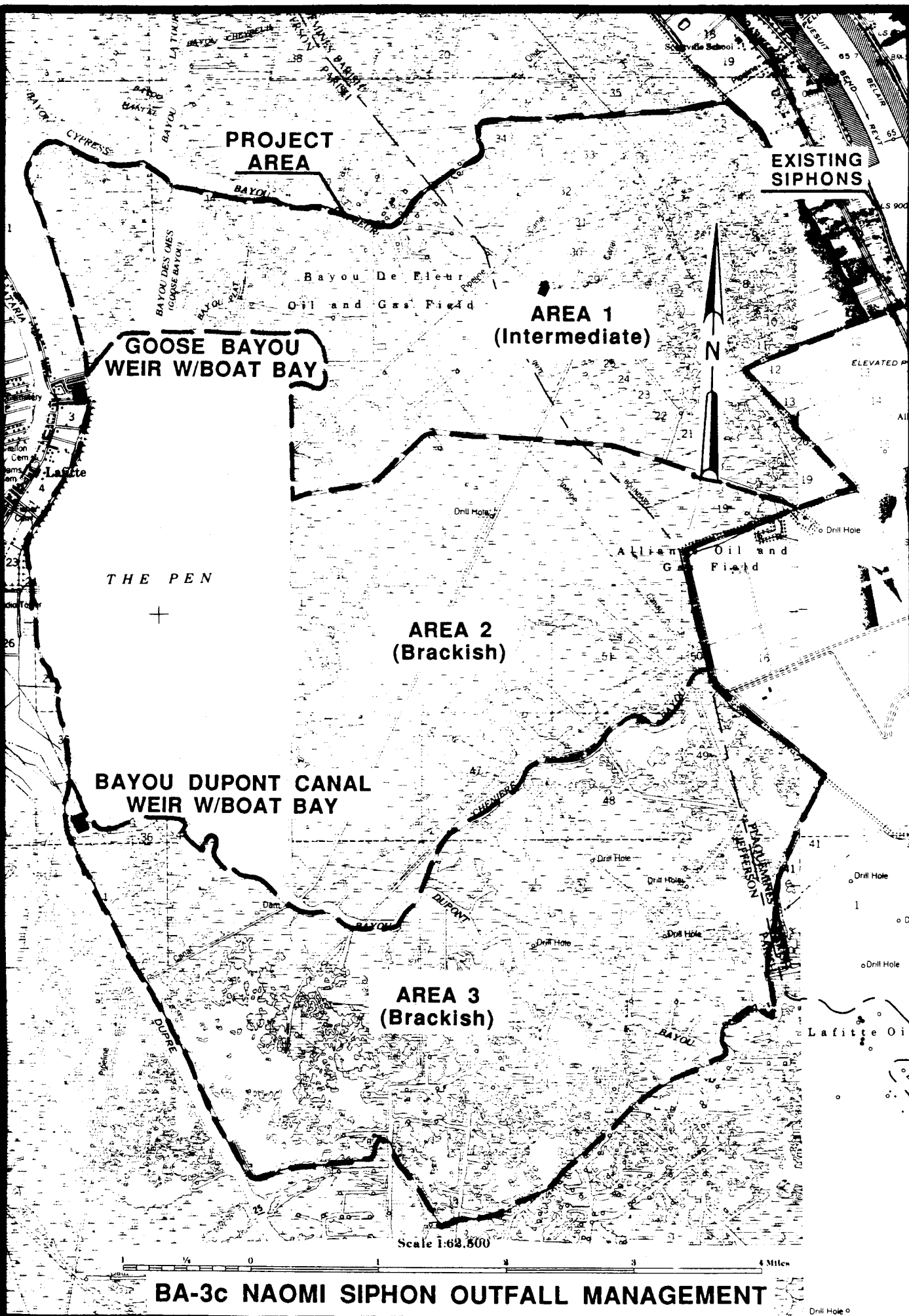
1. One mile of leveed and armored outfall channel. The existing drainage ditch extending southwest across the Citrus Lands property from Ironton will be enlarged for this purpose. This will also require passing through the existing hurricane protection levee.
2. A new pump station to handle intercepted drainage.
3. A low-level fixed-crest weir near the headwaters of Bayou Dupont to facilitate flow over the marsh.

Cost

First Cost	\$13,120,000
Average Annual Cost	\$1,468,000
Fully Funded Cost	\$15,526,000

Benefits

Average Annual Habitat Units	527
Average Annual Acres	588



BA-3c NAOMI SIPHON OUTFALL MANAGEMENT

Naomi Siphon Outfall Management (BA-3c)

Location

The project area is located in Plaquemines and Jefferson Parishes, Louisiana, and encompasses 26,000 acres of intermediate and brackish wetland. The existing Naomi (Lareussite) Siphon is located near the community of Naomi on the west bank of the Mississippi River.

Justification

Construction of the Mississippi River levee effectively stopped annual flooding that served to nourish the surrounding marshes with sediments, nutrients, and fresh water. Dredging of oilfield and pipeline canals, in conjunction with construction of major navigation channels such as the Barataria Bay Waterway, has provided avenues for salt water from the Gulf of Mexico to intrude into low salinity brackish and intermediate marshes in the central Barataria Basin.

The existing diversion consists of eight 72-inch-diameter siphons, a discharge pond, and a single outfall channel. These siphons have a maximum combined discharge of 2,144 cfs. The siphons divert sediment-laden water from the Mississippi into the wetlands to retard saltwater intrusion and enhance wetland productivity. The siphons have been operating since February 1993. The operational schedule calls for all eight pipes to be open from May through February, with two pipes remaining open during the months of March and April.

Outfall management of the diverted waters provides an opportunity to realize the full benefits of the fresh water and sediments available through the existing siphons.

Objective

The objective of the project is to manage the outfall of the existing siphons by controlling the movement of the diverted waters to pass through existing marshes for maximum sediment retention and nutrient uptake.

Project Features

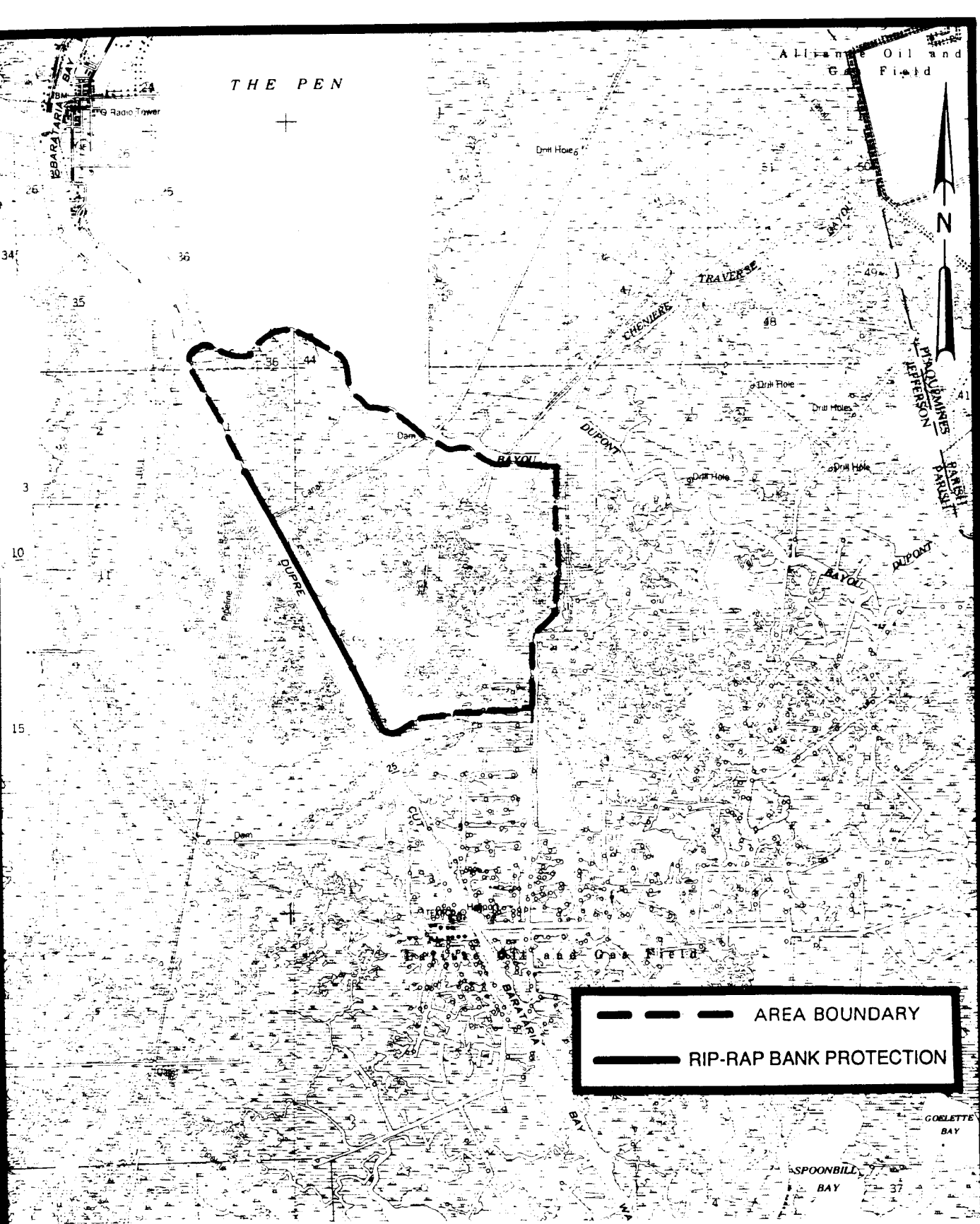
The outfall management plan calls for constructing a weirs with boat bays on the Goose Bayou Canal and on Bayou Dupont. The estimated dimensions for the weir at Goose Bayou are 425 feet by 11 feet. The weir will be set 6 inches below marsh level with a 20-foot-wide by 6-foot-deep boat bay. The estimated dimensions for the weir at Bayou Dupont are 300 feet by 21 feet. The weir will be set 6 inches below marsh level with a 20-foot-wide by 6-foot-deep boat bay.

Cost

First Cost	\$967,000
Average Annual Cost	\$129,000
Fully Funded Cost	\$1,744,000

Benefits

Average Annual Habitat Units	379
Average Annual Acres	633



PBA-12b BARATARIA BAY WATERWAY BANK PROTECTION (EAST)

Barataria Bay Waterway Bank Protection--East (PBA-12b)

Location

The project is located in Jefferson Parish, Louisiana, on the east bank of the portion of the Barataria Bay Waterway known as the Dupre Cut. The project area encompasses approximately 2,790 acres of brackish marsh and open water habitat.

Justification

The banks of the Dupre Cut have deteriorated considerably due to erosion from vessel wakes. Large breaches in the banks have exposed the adjacent marsh to increased water exchange and rapid changes in salinity.

Objective

The objective of the project is to rebuild the east bank of the Dupre Cut to protect the marsh from excessive water exchange and subsequent erosion.

Project Features

A rock dike will be constructed along 10,200 linear feet of the east bank of the Barataria Bay Waterway.

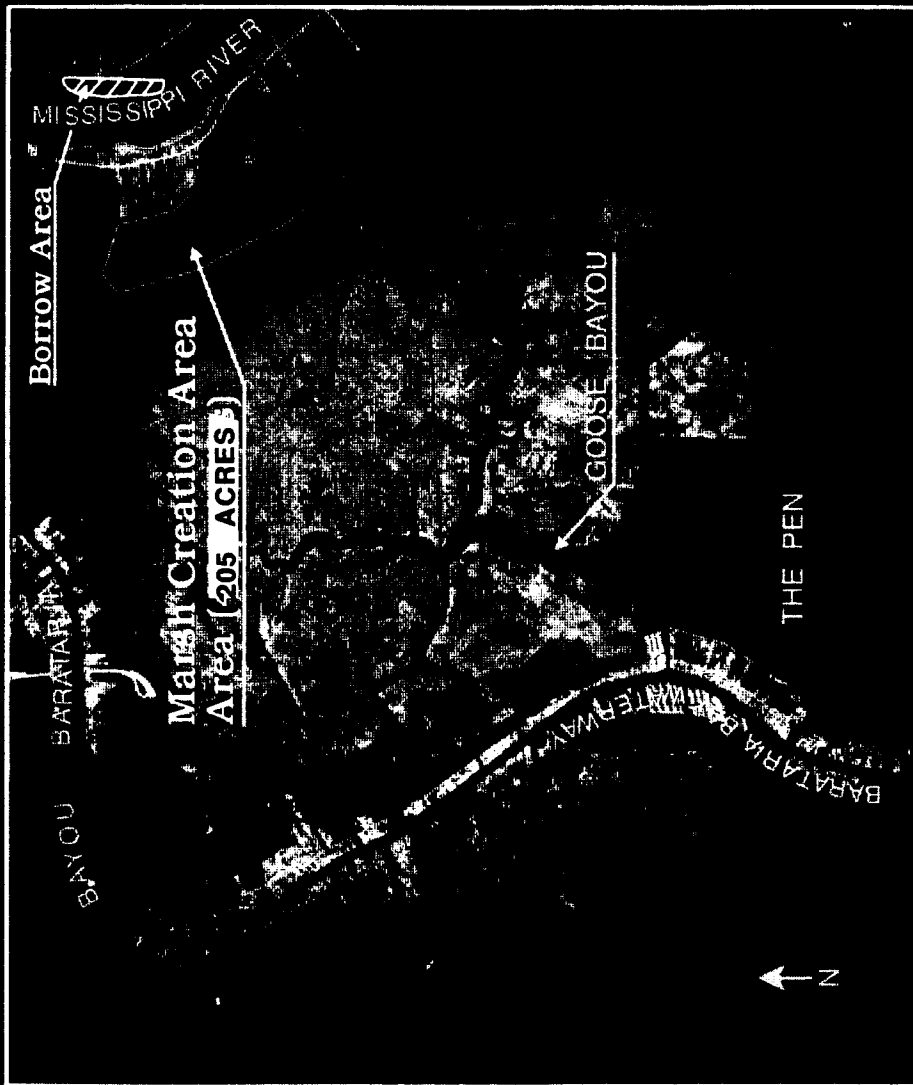
Cost

First Cost	\$1,981,000
Average Annual Cost	\$220,000
Fully Funded Cost	\$2,303,000

Benefits

Average Annual Habitat Units	128
Average Annual Acres	114

**Marsh Creation
with
Dedicated
Dredging
Jesuit Bend
(XBA - 73)**



Marsh Creation with Dedicated Dredging--Jesuit Bend (XBA-73)

Location

The project is located in Plaquemines Parish, Louisiana, on the west bank of the Mississippi River near Jesuit Bend (mile 68 to 69 AHP). The marsh creation site is a failed agricultural impoundment.

Justification

The project site is in close proximity to the Mississippi River, with its resource of sediments available for marsh creation. The project will introduce sediments into the marshes adjacent to the Mississippi River to create new wetlands.

Objectives

The objective of the project is to create marsh with material dredged from the Mississippi River.

Project Features

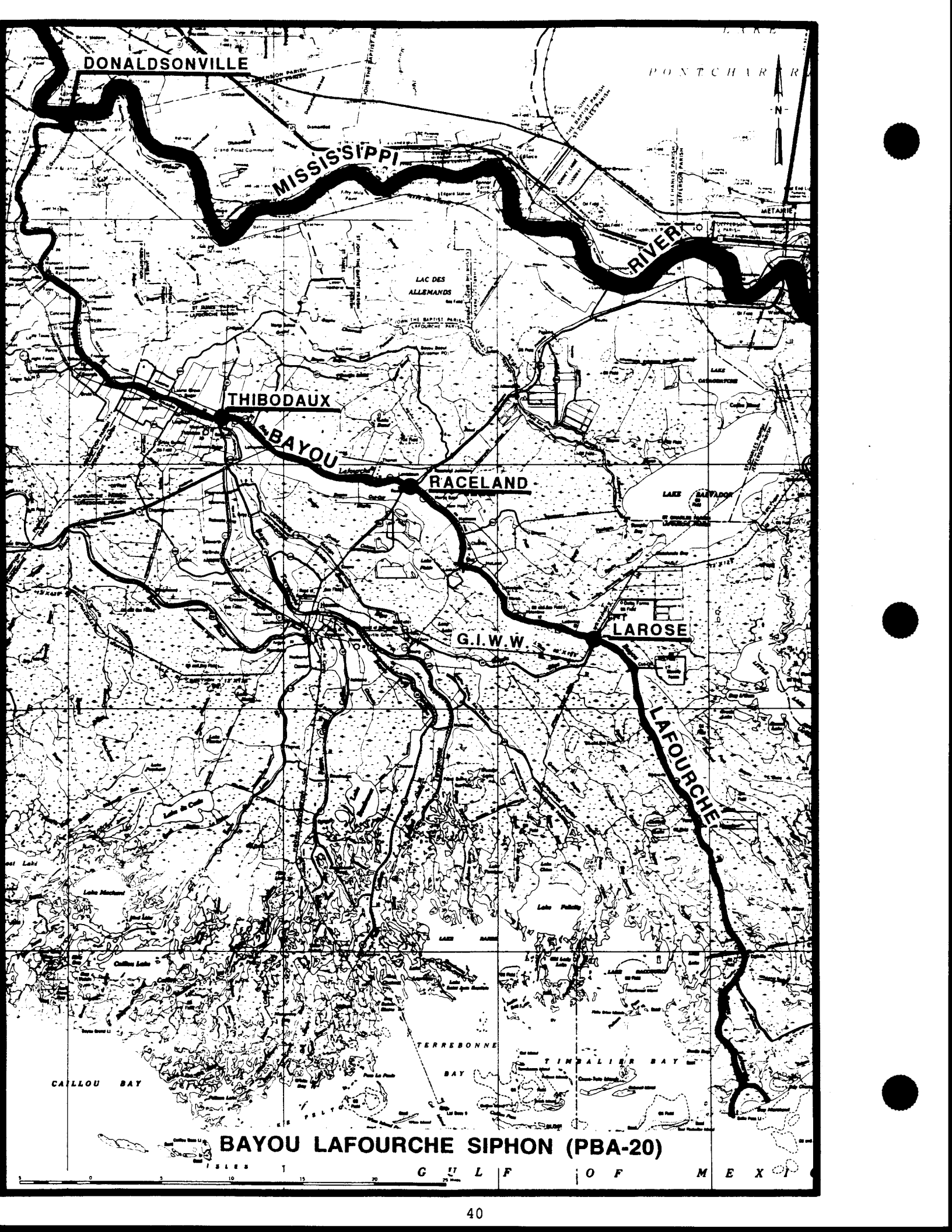
Approximately 2,364,000 cubic yards of material will be excavated from the proposed borrow site located at Jesuit Bend to create 205 acres of wetlands in the failed agricultural impoundment. Sediments will be hydraulically dredged along the left descending bank of the channel between the low water line and the 70-foot bottom contour. The material will be hydraulically transported across the river and deposited at an elevation conducive to marsh development. Dredged material would be placed to an initial elevation of 3.5 feet NGVD and is expected to consolidate to a final design elevation of 2.0 feet NGVD. A retention dike will be necessary on the western and northern sides of the project. Access from the river to the wetland creation area will be adjacent and parallel to Ollie Canal. The dredge pipe will be jacked and bored under Louisiana Highways 23 and 11 and under the Missouri Pacific Railroad.

Cost

First Cost	\$4,788,000
Average Annual Cost	\$522,000
Fully Funded Cost	\$5,213,000

Benefits

Average Annual Habitat Units	97
Average Annual Acres	171



DONALDSONVILLE

PONTCHARTRAY

MISSISSIPPI

RIVER

THIBODAUX

BAYOU

RACELAND

G.I.W.W.

LAROSE

LAFOURCHE

CALLOU BAY

TERREBONNE

BAY

TIMPALIER BAY

BAYOU LAFOURCHE SIPHON (PBA-20)

GULF OF MEXICO

Bayou Lafourche Siphon (PBA-20)

Location

Bayou Lafourche follows a 107-mile course from the Mississippi River at Donaldsonville, Louisiana, to the Gulf of Mexico. The project benefited area is divided into three areas, with a total project area of 28,843 acres of fresh to intermediate marsh.

Justification

Bayou Lafourche served as the main channel of the Mississippi River from the 2nd century to the 12th century. When the river changed its course, Bayou Lafourche became a minor distributary. In 1904 a dam was constructed across the bayou at its connection with the Mississippi River at Donaldsonville to control downstream flooding. The need for fresh water for municipal and industrial purposes led to the installation of a pump station at Donaldsonville in 1954. Operated by the Bayou Lafourche Freshwater District, the pump station has the capability of transferring 342 cfs of fresh water from the Mississippi River to Bayou Lafourche. The virtual elimination of fresh water and sediments has allowed saltwater to encroach inland, causing extremely high wetland loss rates in the Barataria and Terrebonne basins.

Objective

The objective of the project is divert fresh water with associated sediments and nutrients from the Mississippi River into Bayou Lafourche. The design maximum discharge rate is 2,000 cfs.

Project Features

1. The siphon system will involve the installation of eight 72-inch-diameter pipes. The discharge point into Bayou Lafourche will be modified to accommodate the additional flow, the upper reaches of the bayou will be armored to eliminate bank souring, and energy dissipating structures will be installed downstream to control the velocity of the water flowing in the bayou.
2. The Louisiana Highway 3089 crossing at Bayou Lafourche will be replaced by a pile support bridge. Louisiana Highways 1 and 308 will be elevated at their intersection with the Missouri Pacific Railroad bridge at Donaldsonville. The railroad bridge itself will require modification to accommodate additional flow and the new highway elevation.
3. Several engineering alternatives will be examined during the project design to correct any channel bank stability problems along the lower reaches of the bayou, including bulkheads, slope stabilization fabrics, and channel armoring.
4. Segments of the bayou will be dredged and the existing weir at Thibodaux will be removed.

Cost

First Cost	\$20,411,000
Average Annual Cost	\$2,360,000
Fully Funded Cost	\$24,487,000

Benefits

Average Annual Habitat Units	499
Average Annual Acres	225

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Grand Bayou GIWW Freshwater Diversion (TE-10)

Location

This 26,530-acre project area is a fresh/intermediate and low salinity brackish wetland located in Lafourche Parish, Louisiana. The area is located west of Galliano and south of Larose and includes part of the Pointe au Chien Wildlife Management Area.

Justification

Incidental impoundment by oilfield access canals and well slips, in conjunction with increased saltwater inflow from the Cutoff Canal and Grand Bayou Canal, has resulted in widespread and dramatic loss of marsh in the project area. The introduction of fresh water, nutrients, and fine sediments into the marshes east of Grand Bayou Canal and Cutoff Canal will reduce saltwater intrusion and its associated marsh loss.

Objective

The objective of the project is to introduce fresh water from the GIWW via Bayou l'Eau Bleu and to prevent that fresh water from escaping through Grand Bayou Canal.

Project Features

The existing cross section of Bayou l'Eau Bleu will be enlarged by deepening the channel from 6 feet to 9 feet over a length of 5,000 feet, allowing additional fresh water from the GIWW into the project area. To prevent the fresh water from escaping through Grand Bayou Canal, a sheet pile weir with a boat bay connected to a submersible swing barge will be constructed on the south side of the Cutoff Canal near Bayou Pointe au Chien. A low armored berm will be placed on the east bank of the Cutoff Canal. The berm will be 30 feet wide and set at 1.5 feet above the existing marsh elevation.

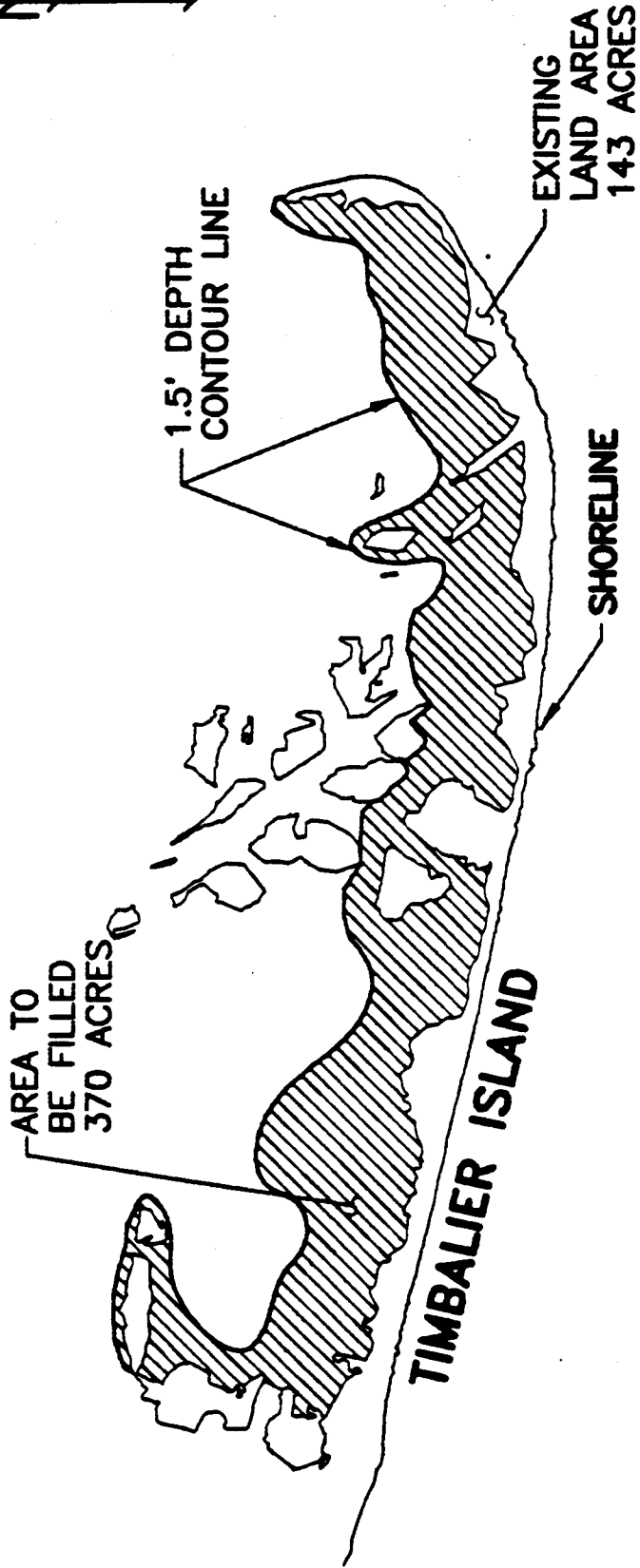
Cost

First Cost	\$2,959,000
Average Annual Cost	\$397,000
Fully Funded Cost	\$5,136,000

Benefits

Average Annual Habitat Units	771
Average Annual Acres	1,609

TERREBONNE BAY



GULF OF MEXICO



**XTE-45 TIMBALIER BARRIER
ISLAND RESTORATION**

East Timbalier Island Barrier Island Restoration (XTE-45)

Location

East Timbalier Island, situated in Lafourche Parish, is part of an island chain that fronts Terrebonne and Timbalier bays. Much of the island, which covers approximately 1,035 acres, is vegetated.

Justification:

Louisiana's barrier islands play an important role in protecting Louisiana's estuaries and their surrounding wetlands from the destructive forces of high wave energy, storm surges, and salt water intrusion. The habitats provided by barrier islands are extremely valuable as mammal and migratory song bird resting sites, waterfowl feeding and nesting areas, and protected aquatic nursery sites.

The width and length of Timbalier Island are rapidly diminishing as it slowly migrates landward. The width of the island decreased by 7,340 feet from 1956, when it was 31,680 feet wide, to 24,340 feet in 1988. If Timbalier Island is not protected and the average long-term loss rate continues (25 acres per year), then the island will disappear by 2035. The eastern end will disappear by 2004 because it is narrower, has lower elevation, and has less vigorous plant cover and therefore is more vulnerable to erosion than the western end.

Objective

The objectives are to strengthen and thus increase the life expectancy of East Timbalier Island beyond the present estimate of 9 years by placing dredged material behind the eastern third of the island.

Project Features

The project calls for mining 1,790,000 cubic yards of sediment and placing the material from the seawall eastward for 14,000 feet, with an average width of 600 feet at an elevation of 1 foot above mean sea level. Disposal will be along the landward shoreline of the eastern end of the island and will fill in all water bottoms shallower than 1.5 feet. The project will create 370 acres of marsh. The material for the project will be dredged from the Little Pass Timbalier ebb tidal delta which is about 2 to 4 miles southeast of the project area. The material is 98 percent sand. The estimated volume of the sand body is 119,000,000 cubic meters, with an average thickness of 2 meters and no overburden.

Cost

First Cost	\$6,071,000
Average Annual Cost	\$657,000
Fully Funded Cost	\$6,582,000

Benefits

Average Annual Habitat Units	231
Average Annual Acres	300

Isles Dernieres Restoration
East Trinity, New Cut Closure (PTE-15b(iv))

Location

The project is located on the east end of Trinity Island of the Isle Dernieres chain in Terrebonne Parish, Louisiana. The project area is 1,112 acres, of which 488 acres is saline marsh and 624 acres is open water.

Justification

Louisiana's barrier islands play an important role in protecting Louisiana's estuaries and their surrounding wetlands from the destructive forces of high wave energy, storm surges, and salt water intrusion. The habitats provided by barrier islands are extremely valuable as mammal and migratory song bird resting sites, waterfowl feeding and nesting areas, and protected aquatic nursery sites. If the rate of coastal erosion measured between 1978 and 1988 continues unabated, Trinity Island will disappear by the year 2007.

Objective

The objective of the project is to restore and elevate the island dunes and add width to the island by constructing wetlands behind the dunes to enhance the island's physical integrity. In addition, New Cut, formed by Hurricane Juan and enlarged by Hurricane Andrew, will be closed. Two sources of borrow material were investigated: Ship Shoal and back bay. In one scenario, Ship Shoal material was to be used for dune and dike construction and back bay material would be used for the constructed wetlands. In the other scenario, no Ship Shoal material would be used.

Project Features

1. New Cut will be closed by constructing a front dune to elevation 8 MLG (width of 450 feet and length of 5,000 feet).
2. Construct a dune on the eastern end of Trinity Island that is 350 feet wide and 9,500 feet long. The dune will be constructed to elevation 8 MLG.
3. Construct a containment back dike and 86 acres of back bay marsh behind New Cut.
4. Construct 124 acres of back bay marsh on the eastern portion of Trinity Island.
5. Nourish the existing broken marsh on the northern side of the island with dredged material. The dunes and constructed wetlands will be seeded with appropriate plant species.

Cost

	<u>With Ship Shoal Material</u>	<u>W/O Ship Shoal Material</u>
First Cost	\$18,233,000	\$11,437,000
Average Annual Cost	\$2,067,000	\$1,298,000
Fully Funded Cost	\$19,080,000	\$12,022,000

Benefits

Average Annual Habitat Units	384
Average Annual Acres	541

Bayou De Cade Hydrologic Restoration (PTE-26a)

Location

The project is located on the banks of Bayou De Cade in Terrebonne Parish, Louisiana. The project area is 3,794 acres of intermediate marsh.

Justification

The banks of Bayou De Cade have severely eroded, providing a direct hydrologic connection between the bayou and higher salinity waters to the south. In addition, oil field canals have increased tidal exchange and provide a direct route for saltwater intrusion.

Objective

The objective of the project is to restore the banks of Bayou De Cade to protect the flotant marsh to the north from saltwater intrusion.

Project Features

1. Plug an oil field canal upon abandonment by the oil company.
2. Maintain two existing fixed-crest weirs.
3. Install a rock liner to stabilize a channel cross section.
4. Install a rock plug.
5. Install five sheetpile fixed-crest weirs.
6. Stabilize 69,480 feet of bank on Bayou De Cade.

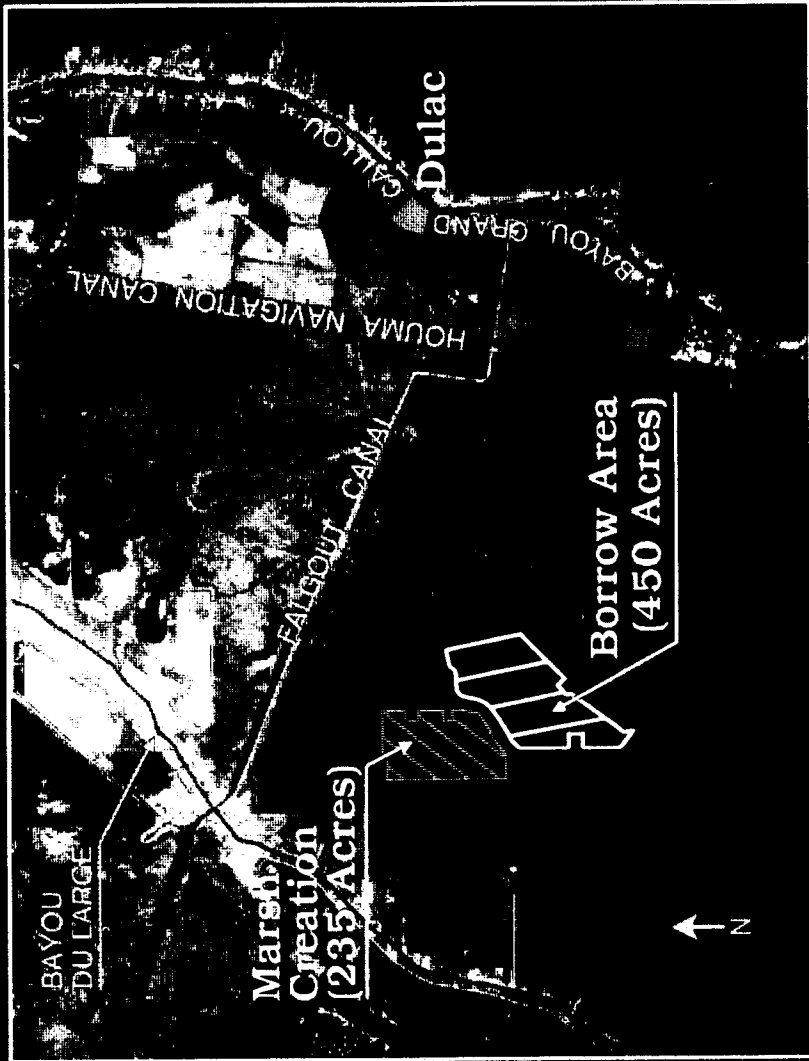
Cost

First Cost	\$2,924,000
Average Annual Cost	\$350,000
Fully Funded Cost	\$4,154,000

Benefits

Average Annual Habitat Units	74
Average Annual Acres	42

Marsh
Creation
South of
Falgout Canal
(XTE - 69)



Marsh Creation South of Falgout Canal (XTE-69)

Location

The project is located near the intersection of Bayou Du Large and Falgout Canal in Terrebonne Parish, Louisiana.

Justification

Oil and gas exploration, in conjunction with numerous other causes of wetland loss, has left a distinct landscape in southern Louisiana. In the Falgout Canal area, shallow open water areas are separated into cells by remnant spoil banks of oil and gas access canals. Large-scale freshwater and sediment sources are nonexistent in this part of the Terrebonne basin because of its isolation from the Mississippi and Atchafalaya Rivers, resulting in an absence of sediment for marsh creation. However, these cell-like patterns provide an opportunity to create new emergent marsh in one cell from materials borrowed from an adjacent cell. The resulting landscape habitat will be emergent wetlands, deep and shallow open water, and high spoil banks, interconnected by canals.

Objectives

The objective of the project is to create wetlands with dredged material in an wetland environment where a source of sediments from a river is not available. The project will create wetlands and deep and shallow water habitat within the same area. Numerous opportunities exist within southeast Louisiana to create this type of habitat.

Project Features

The project consists of creating 235 acres of wetlands in a shallow open water area south of Falgout Canal. Approximately 2,500,000 cubic yards of material will be excavated from adjacent shallow open water. The borrow area would be excavated to a depth of approximately 15 feet. Existing oil and gas canal spoil banks will be used as much as possible to contain the material; however, 10,000 feet of dike will be raised and 2,800 feet of new dikes will be constructed in the marsh area. Access to the site is through the existing oil and gas canals. The wetland creation area will be constructed to an initial elevation of approximately 3 feet NGVD. Final elevation of the area after compaction and consolidation will be approximately 1.5 feet NGVD. The assumed bottom elevation of the open water area to be used for both borrow and marsh creation is about -2 feet NGVD.

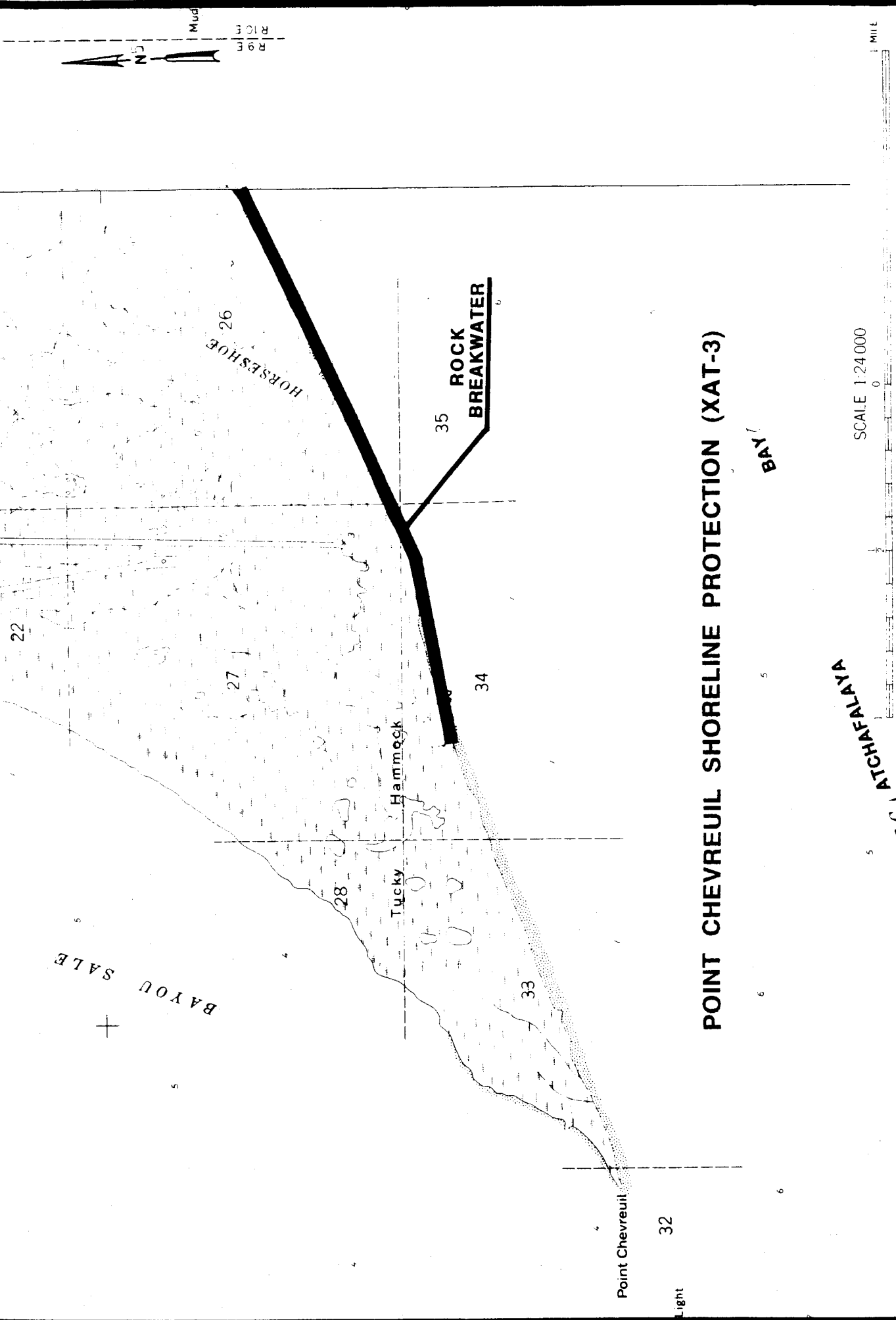
Cost

First Cost	\$3,935,000
Average Annual Cost	\$430,000
Fully Funded Cost	\$4,310,000

Benefits

Average Annual Habitat Units	122
Average Annual Acres	194

POINT CHEVREUIL SHORELINE PROTECTION (XAT-3)



Point Chevreuil Shoreline Protection (XAT-3)

Location

The project is located between Point Chevreuil and the Wax Lake Outlet in the northwest portion of Atchafalaya Bay in St. Mary Parish, Louisiana. The project area is 60 acres (52 acres of marsh and 8 acres of water).

Justification

Erosion in the project area has occurred as a result of wave action from boat traffic, tidal surges along the shoreline, tidal fluctuation, and subsidence. This has killed vegetation, causing mudflats to become open water as erosion accelerates. By preventing the retreat of the shoreline into interior ponds and bayous, the integrity of the marsh will be maintained.

Objective

The objective of the project is to protect the shoreline from further erosion.

Project Features

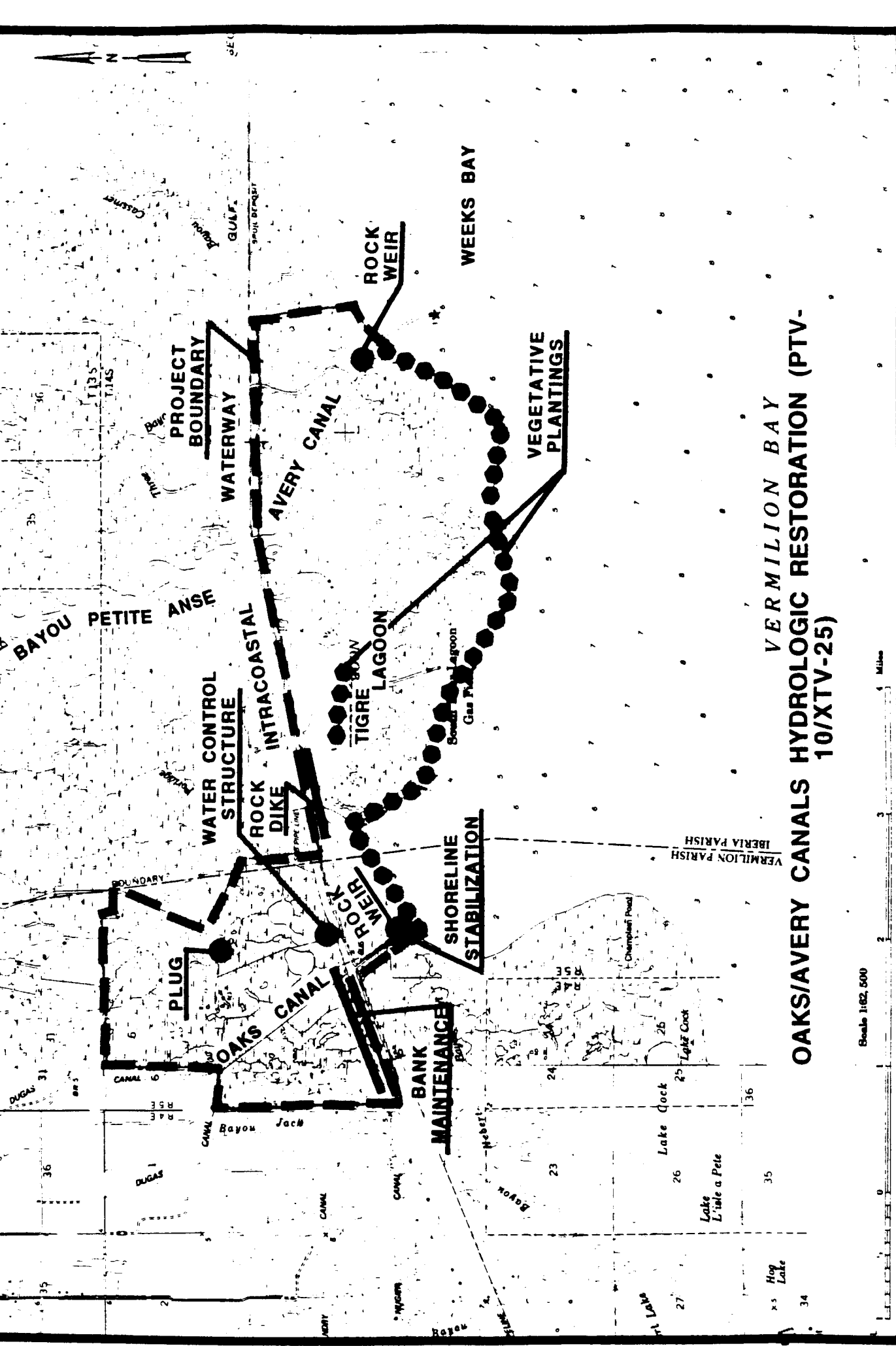
The project calls for the installation of 10,000 feet of limestone rock foreshore dike placed approximately 100 feet off the existing shoreline.

Cost

First Cost	\$2,009,000
Average Annual Cost	\$228,000
Fully Funded Cost	\$2,559,000

Benefits

Average Annual Habitat Units	16
Average Annual Acres	38



**VERMILION BAY
OAKS/AVERY CANALS HYDROLOGIC RESTORATION (PTV-
10/XTV-25)**

Scale 1:62,500

Miles

0 1 2 3 4 5

Oaks/Avery Canals Hydrologic Restoration (PTV-10/XTV-25)

Location

Oaks Canal is located in the extreme southeastern portion of Vermilion Parish in the northeast portion of Vermilion Bay. Avery Canal is located in southwestern Iberia Parish on the northern Vermilion Bay shoreline. The total project area is 5,365 acres.

Justification

Oaks and Avery Canals were constructed in the late 1920's. The maximum depth at the time of construction was six feet. Avery Canal is currently 400 feet wide and 28 feet deep, and Oaks Canal is about 145 feet wide and 22 feet deep. Reducing the size of these canals will reduce the discharge through the canals.

Project Features

1. Rock weir across Oaks Canal about 250 feet north of the mouth of the canal at Vermilion Bay.
2. Bankline stabilization along Oaks Canal to protect against excessive flow velocities downstream of the weir. Riprap will be placed beginning at the structure and extend about 150 feet into Vermilion Bay for a total length of 400 feet per side.
3. Bank stabilization along the GIWW. A freestanding dike section of riprap material will be placed about 25 to 30 feet from the existing bank to provide protection from large boat wakes. About 1,200 feet of protection will be placed on the south bank in the area where Bayou Petite Anse exits Tigre Lagoon and enters Vermilion Bay. An additional 4,800 feet of protection would be placed on the north bank of the GIWW west of Oaks Canal, where the absence of spoil bank material exposes the marsh to erosion from navigation traffic.
4. A fixed crest weir in a manmade channel 1,900 feet east of Oaks Canal and 900 feet north of the GIWW. An existing spoil bank extending from the structure south to the GIWW will be refurbished to prevent by-passing of the structure.
5. An earthen plug in an opening through the north embankment of an oilfield canal along the Union Oil Canal in the northeast section of the project area, north of the GIWW.
6. Spoilbank maintenance along incremental sections of embankment on the western side of the Union Oil Canal. Approximately 500 feet requires immediate attention, while another 500 feet will be addressed during the life of the project.
7. A rock weir in Avery Canal about 50 feet south of its intersection with Three Bayou between the GIWW and Vermilion Bay. The crest of the weir will be set 10 feet below mean low tide.
8. Vegetative plantings along the north shore of Vermilion Bay from Oaks Canal to Avery Canal and along the south bank of Bayou Petite Anse through Tigre Lagoon.

Cost

First Cost	\$1,640,000
Average Annual Cost	\$216,000
Fully Funded Cost	\$2,673,000

Benefits

Average Annual Habitat Units	118
Average Annual Acres	12

Vegetative Plantings in the Chenier Plain (XTV-30)

Location

The project includes five separate vegetative planting projects in the Chenier Plain.

1. Little Vermilion Bay (PTV-7b) is located in the northwest portion of Vermilion Bay and has a project area of 264 acres.
2. Cypremort Point to Avery Island (PTV-8) is located along approximately 9 miles of the northwest Vermilion and Weeks Bay shoreline and has a project area of 271 acres.
3. Big Burn (ME-6) is located along the east side of Highway 27 just south of the GIWW. The total project area is 545 acres.
4. White Lake (XME-38b) is located on the southwest rim of White Lake and has a project area of 940 acres.
5. Broussard Lake (CS-15) is located about 3.5 miles northwest of Creole on the east side of the Cameron-Creole Watershed. The project area is 481 acres.

Justification

The major problem in each of these project areas is shoreline erosion.

Project Features

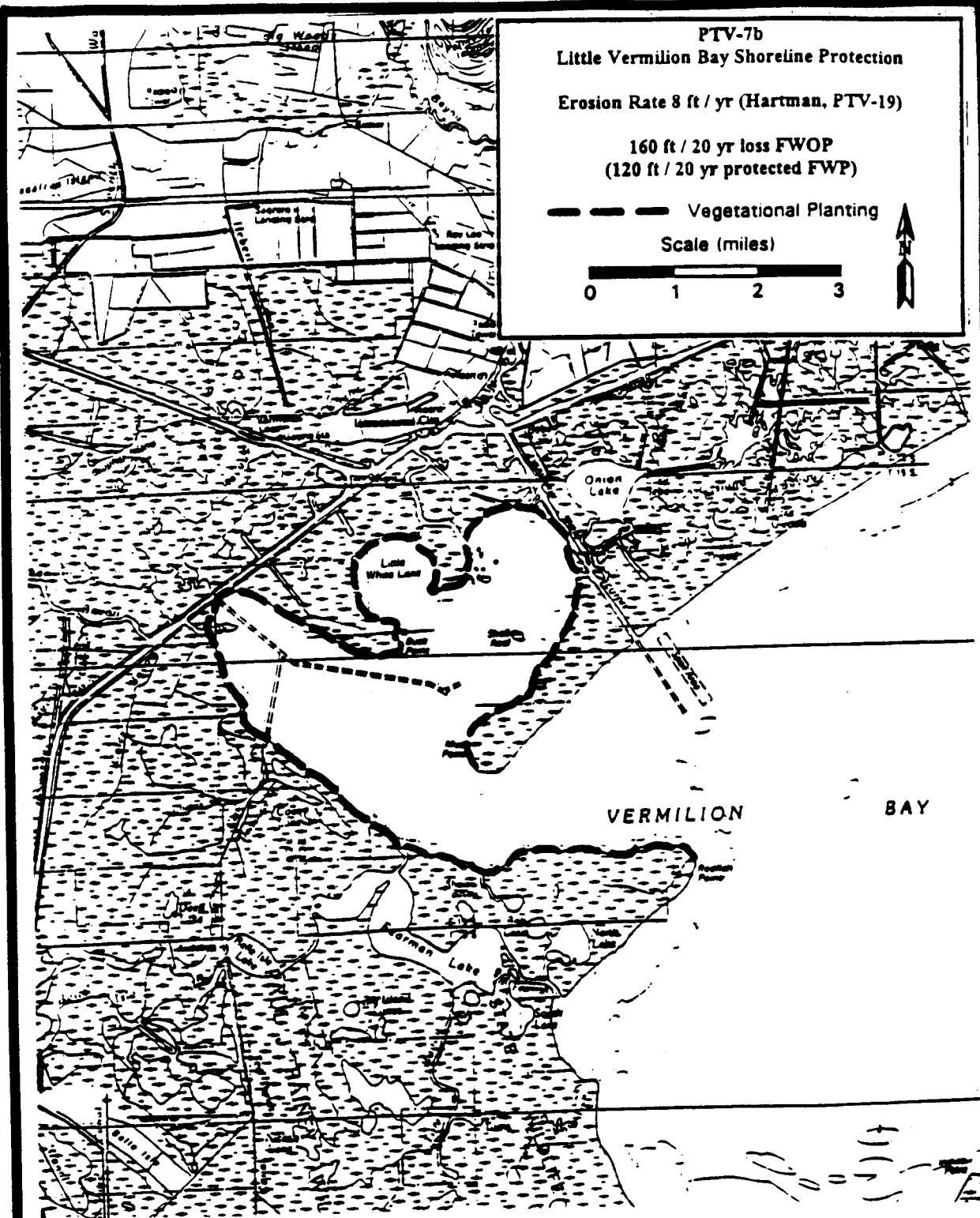
1. Little Vermilion Bay (PTV-7b)--plant 21,350 gallon plugs of smooth cordgrass (*Spartina alterniflora*) along the high water mark at 5-foot spacings. Included in the project is a 50 percent re-planting.
2. Cypremort Point to Avery Island (PTV-8)--planting in three areas with *Spartina alterniflora* at 5-foot spacings. Included in the project is a 50 percent re-planting.
3. Big Burn (ME-6)--plant about 69,000 linear feet of California bullwhip (*Scirpus californicus*) in open water. Of this, 34,000 feet will be in a checkerboard terrace pattern in the central portion of the project area and 35,000 feet will be in two rows of the inner perimeter of the central area along the shoreline. Plants will be in one-gallon containers spaced on 5-foot centers.
4. White Lake (XME- 38b)--plant 163,680 feet of *Scirpus californicus* in double rows. Plants will be in one-gallon containers spaced on 5-foot centers.
5. Broussard Lake (CS-15)--Two areas will be planted with *Scirpus californicus*. The first area will be a checkerboard terrace 4,000 ft by 1500 ft with 500-ft spacings between rows. Along the shoreline, 14,000 ft will also be planted. The second planting area consists of two checkerboard terraces; a 3,000- by 2,000-ft terrace with 500-ft spacing between plant rows and a 2,500- by 500-ft terrace with 500-ft spacing between plant rows.

Cost

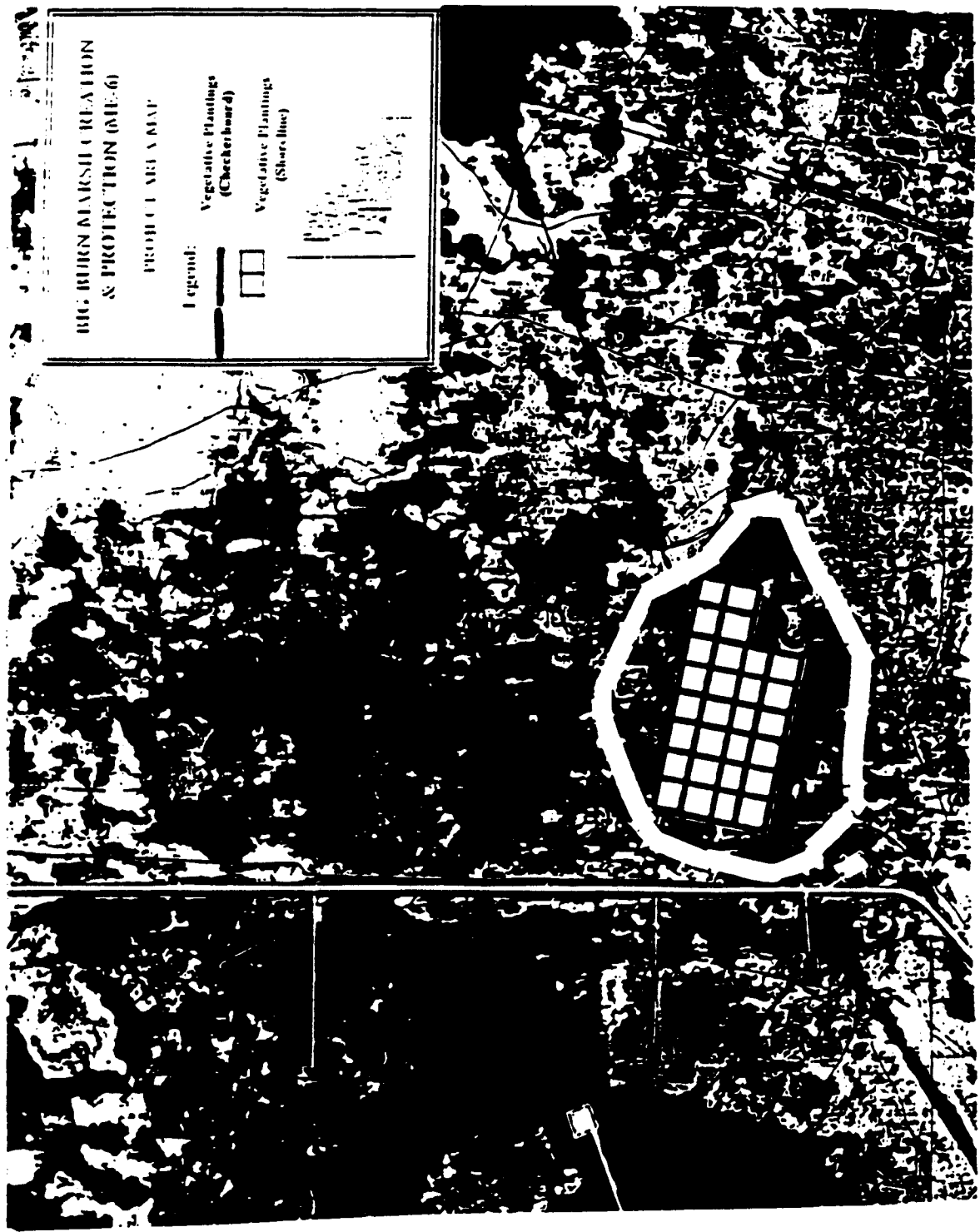
First Cost	\$1,423,000
Average Annual Cost	\$171,000
Fully Funded Cost	\$1,829,000

Benefits

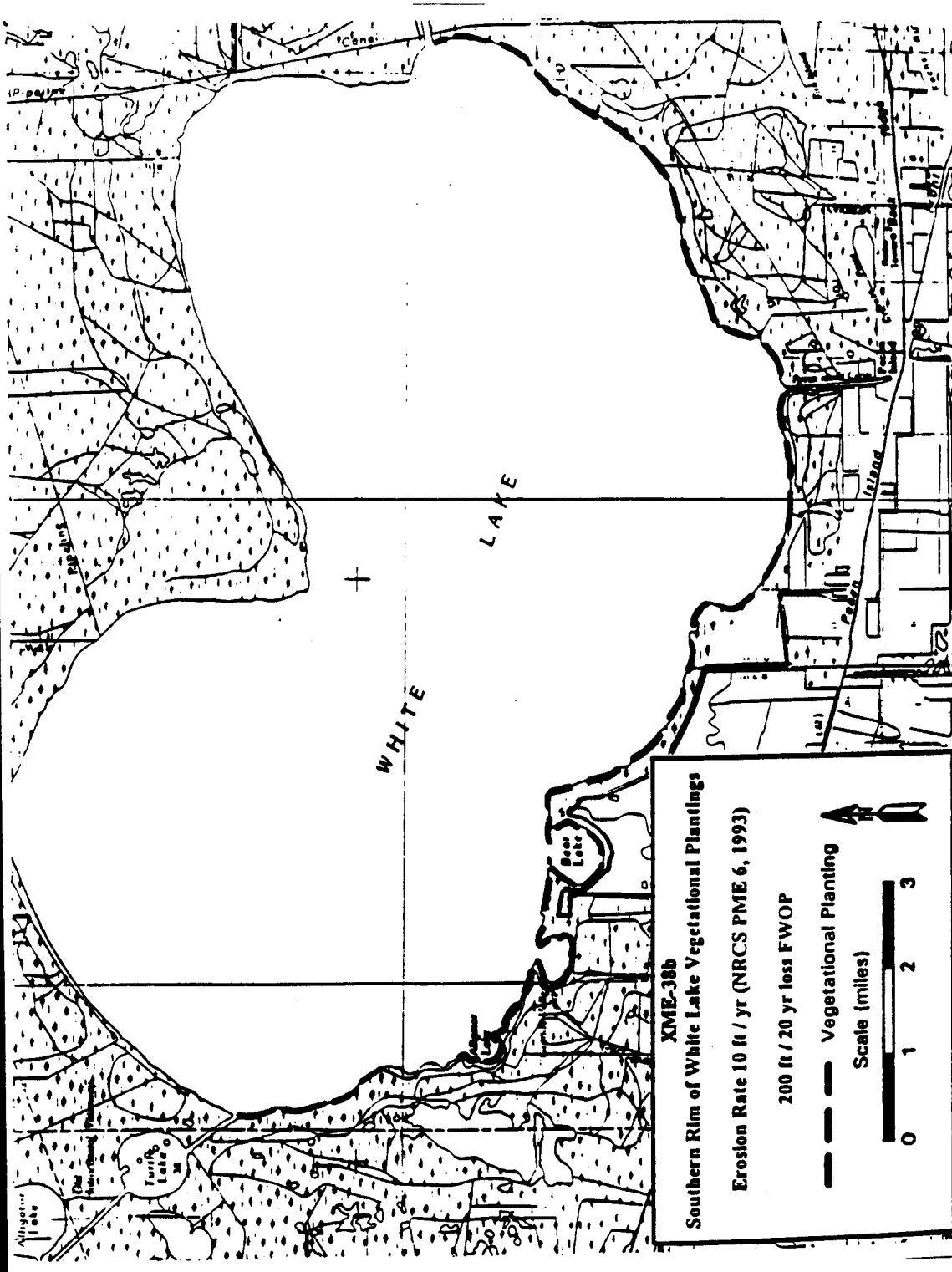
Average Annual Habitat Units	246
Average Annual Acres	362



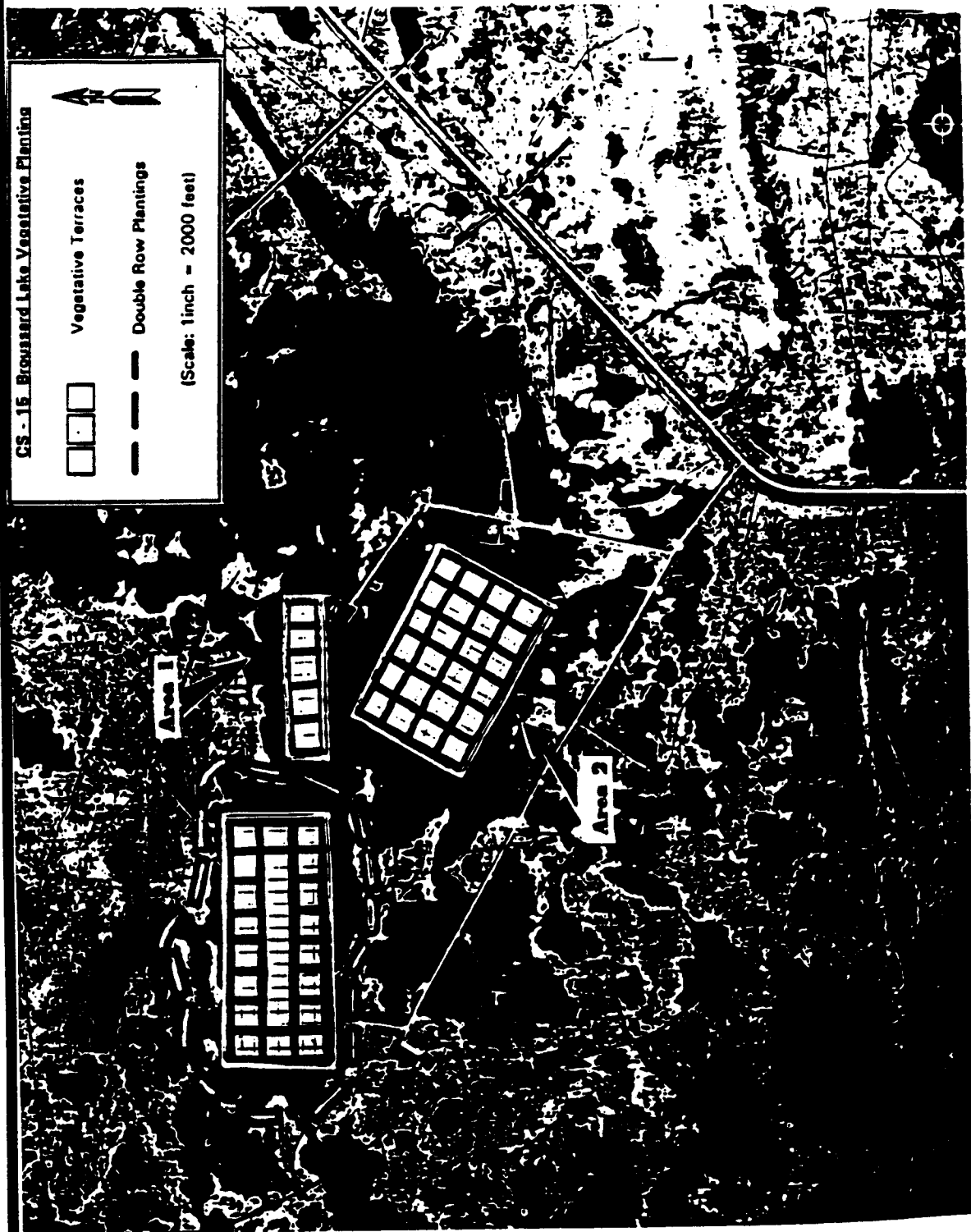
VEGETATIVE PLANTINGS IN LITTLE VERMILION BAY (PTV-7b)



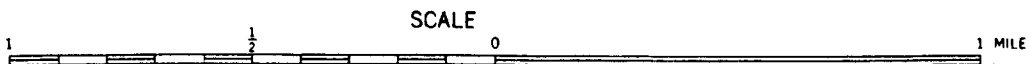
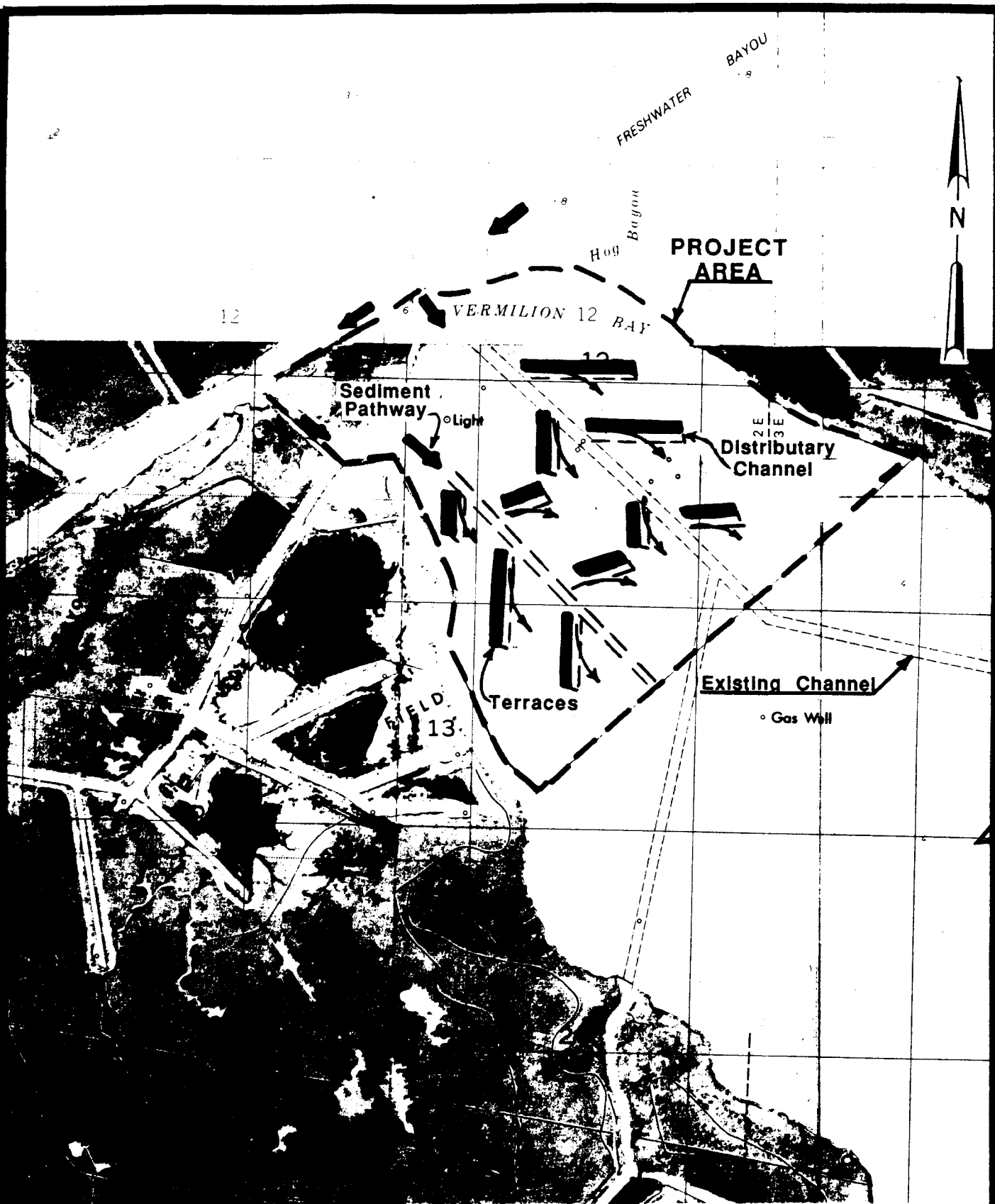
BIG BURN MARSH CREATION (ME-6)



WHITE LAKE VEGETATIVE PLANTINGS (XME-38b)



BROUSSARD LAKE VEGETATIVE PLANTINGS (C/S-15)



PTV-19 LITTLE VERMILION BAY SEDIMENT TRAPPING

Little Vermilion Bay Sediment Trapping (PTV-19)

Location

The project is located in Little Vermilion Bay, a shallow western arm of Vermilion Bay. The project area consists of 897 acres of shallow bay bottom, 3 acres of vegetated spoil mounds, and 64 acres of emergent marsh.

Justification

Prior to 1839, marshes fringing Little Vermilion Bay would have been brackish to saline. After this date fresh water from the Atchafalaya River started to reach Atchafalaya Bay, reducing salinities. After the infilling of the Atchafalaya Basin, sediments started to be transported down the Atchafalaya to the bay. Under strong southeasterly winds, sediment-rich waters from the Atchafalaya Bay reach Little Vermilion Bay, and thus sediments from bay waters are deposited in the project area. However, the most important hydrologic change for this area was the dredging of the GIWW and Freshwater Bayou. The GIWW is a conduit for sediment-rich waters from Wax Lake Outlet to Little Vermilion Bay. Since the early 1970's about 3 feet of sedimentation has occurred in the project area.

Objective

By dredging a system of distributary channels off of two man-made channels that cross the bay from Freshwater Bayou, sedimentation will be induced in shallow areas away from the main channels to eventually create emergent marsh, and the existing shoreline will be protected from wave erosion.

Project Features

Two man-made channels, 6 to 8 feet deep and 100 to 200 feet wide, cross the project site from the GIWW to the deeper outer bay. Associated with each channel are subaqueous levees representing both redistributed spoil material and natural sedimentation. Thus, the two channels are very efficient conduits of sediment from Freshwater Bayou to the open bay. The dredging of a distributary channel system will facilitate spreading of the sediment load over a wide area. Because the sedimentation rate presently exceeds subsidence, the spreading of sediments could cause large parts of the bay to become subaerial.

The wind-wave energy level in the bay may be preventing some of the existing subaqueous levees from becoming subaerial features and is also responsible for shoreline erosion. Therefore, the dredged material will be placed as a low-elevation levee or terrace along the landward flank of each dredged distributary to protect the depositional area associated with the channel landward of the terrace.

Cost

First Cost	\$753,000
Average Annual Cost	\$86,000
Fully Funded Cost	\$940,000

Benefits

Average Annual Habitat Units	149
Average Annual Acres	238

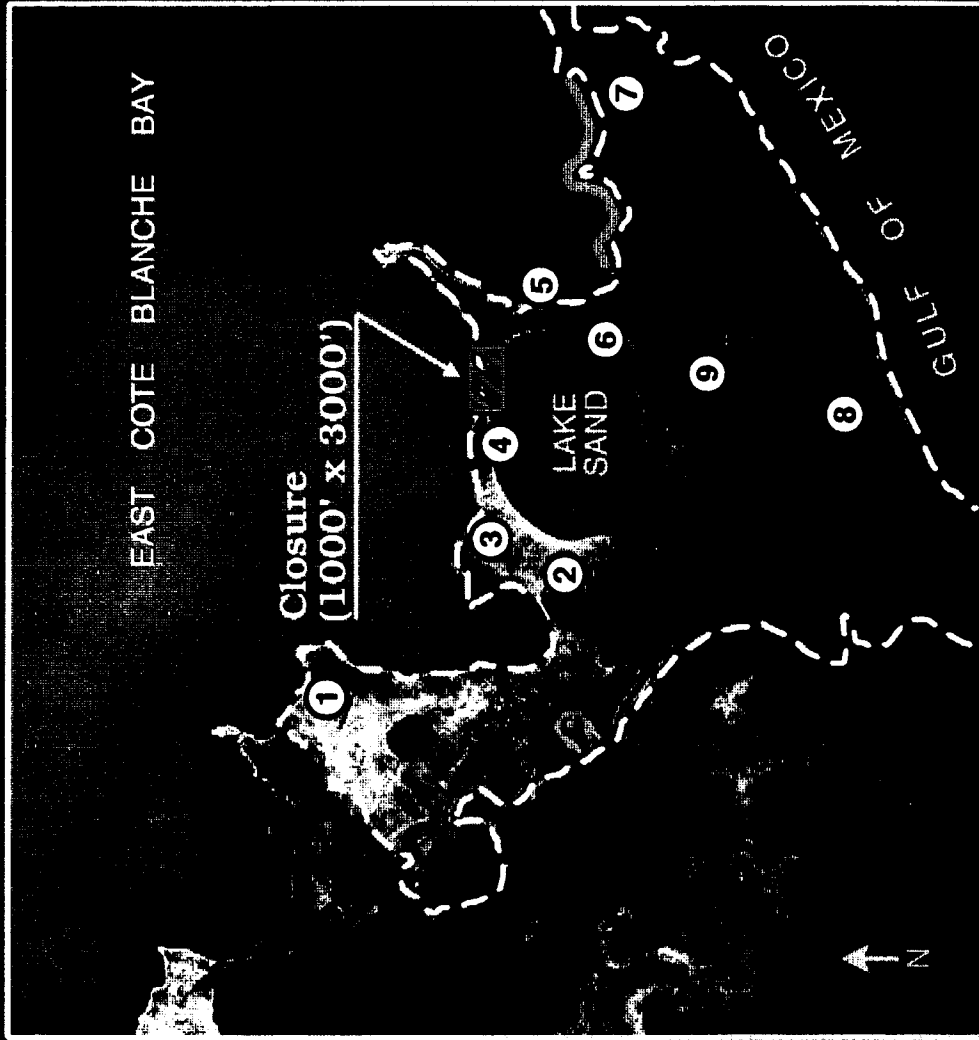
**TV - 5/7 Marsh Island
Hydrologic
Restoration
and
Marsh Creation**

1 - 9 Canals to be
Plugged
(except 3 & 4)

Marsh Creation
w/ Dredged Material

Shoreline Protection
(crushed stone)

Project Area



Marsh Island Hydrologic Restoration and Marsh Creation (TV-5/7)

Location

Marsh Island Refuge, located in Iberia Parish, Louisiana, is a 70,000-acre island that is bordered on the north by Vermilion Bay and East and West Cote Blanche bays and on the south by the Gulf of Mexico. The project area consists of approximately 6,700 acres, of which 5,035 acres are brackish marsh and 1,665 acres are water bottoms.

Justification

Natural erosional processes and subsidence along the northeast shoreline of Marsh Island have led to the deterioration of the north rim of Lake Sands. Historically, Lake Sands and other lakes on the island supported significant amounts of submerged aquatic vegetation. Presently the lakes are void of aquatic vegetation due to the effects of increased tidal exchange and turbidity. Oil and gas access canals have accelerated the interior marsh loss rates by increasing tidal exchange.

Objective

The objective of the project is to stabilize the northeast shoreline of the island to prevent the interior marshes from being exposed to the forces of East Cote Blanche Bay. In addition, nine oil and gas access canals will be plugged or filled to restore the natural hydrology of the area.

Project Features

1. A breach of the Lake Sands shoreline will be closed by constructing a perimeter retention dike and hydraulically pumping 58,500 cubic yards of material from Cote Blanche Bay into a 1,000-by-3,000-foot cell. The initial elevation of the 70-acre closure will be 3.0 feet NGVD. The closure will settle to marsh elevation within a period of six months.

2. Nine abandoned oil field canals will be plugged or filled. Canals 3 and 4 will be filled with dredged material to an initial elevation of 3.0 feet NGVD. The remaining canals will be plugged at their entrances using a combination of earth core with 2 feet of armor stone.

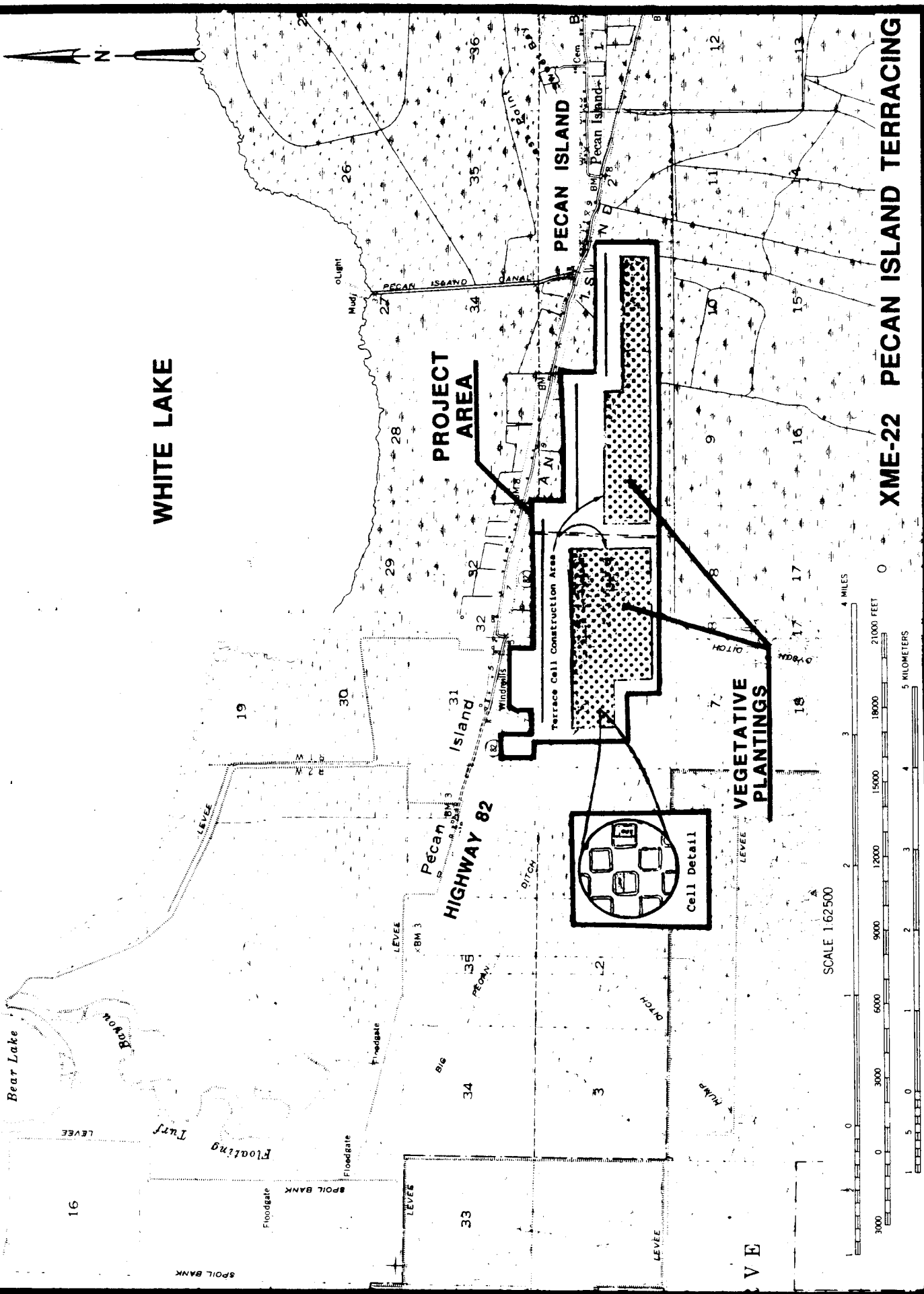
3. The northeast shoreline of the island will be protected by placing crushed stone on approximately 2,000 feet of existing shoreline.

Cost

First Cost	\$3,137,000
Average Annual Cost	\$366,000
Fully Funded Cost	\$4,056,000

Benefits

Average Annual Habitat Units	453
Average Annual Acres	233



WHITE LAKE

PROJECT AREA

HIGHWAY 82

PECAN ISLAND

VEGETATIVE PLANTINGS

Cell Detail

SCALE 1:62,500

XME-22 PECAN ISLAND TERRACING

Pecan Island Terracing (XME-22)

Location

The project area is located in Vermilion Parish, Louisiana, just south of Louisiana Highway 82 at Pecan Island.

Justification

The project area covers approximately 1,950 acres in an area that was formerly pasture land. The marsh was transformed in the mid 1950's to pasture by the construction of dikes around the perimeter and draining the interior. Deterioration, and ultimately the loss, of the perimeter levee has resulted in the entire area converting into shallow open water with sporadic small islands. The terracing project offers an opportunity to reclaim this area.

Objective

The objective of the project is to create new marsh by constructing earthen terraces.

Project Features

The project consists of constructing terraces in a rectangular grid pattern over a 1,950-acre area. The earthen cells will consist of dredged bottom material deposited in berms approximately 2.5 feet high. Each cell will have a perimeter dimension of 200 feet on each side. Approximately 482 cells will be constructed. Openings will be left in each cell, allowing sediment laden water to move into the cell, where soil particles will settle out of suspension in the stilled water.

Smooth cordgrass sprigs will be placed 1 per 5 linear feet of terracing on both sides of each terrace (154,000 sprigs). Seashore paspalum will be planted every 2 feet on the crest of the terraces. Additionally, within each cell 2 rows of California bullrush will be planted on 5-foot centers. A total of 28,900 plants will be placed within the cells. North of the terracing area, four rows (17,300 feet) of California bullrush will be planted on 5-foot centers (13,840 plants).

Cost

First Cost	\$1,963,000
Average Annual Cost	\$217,000
Fully Funded Cost	\$2,220,000

Benefits

Average Annual Habitat Units	240
Average Annual Acres	221

Freshwater Bayou Bank Stabilization (XME-29)

Location

The Freshwater Bayou bank stabilization project is located in Vermilion Parish, Louisiana, from Freshwater Bayou's confluence with Six Mile Canal south to North Prong Canal along the west bank of Freshwater Bayou for approximately 23,350 feet, protecting 1,724 acres.

Justification

The project area consists of 1,724 acres of managed marsh adjacent to and west of the Freshwater Bayou Channel. The Freshwater Bayou Channel was originally excavated with a 300-foot top width in the early 1960's. In 1995, the top width varied from 700 to 800 feet wide. The widening of this channel is being caused by extensive offshore boat traffic. In the 1960's, there were a large spoil bank protecting the marsh from the channel, but through the years this spoil bank protection has been lost and the channel is threatening to breach into the marsh and connect to several interior lakes. Constructing a continuous rock dike in the channel approximately 100 feet from the existing shoreline would restore approximately 53 acres of marsh by trapping sediment, while protecting the 1,724 acres of intermediate marsh behind it. The rock dike would also prevent uncontrolled tidal flux and saltwater intrusion into the Mermentau Basin.

Objectives

The objectives of the project are to prevent Freshwater Bayou Channel from eroding into the intermediate marshes in the 1,370-acre managed area to the west of the channel, to prevent uncontrolled tidal flux and saltwater intrusion into this area, and to trap sediment behind the rock dike and rebuild the marsh area that has been lost. A major objective of this project is to protect the integrity of the Mermentau River basin, by preventing interior ditches from connecting Freshwater Bayou to the Old Intracoastal Canal.

Project Features

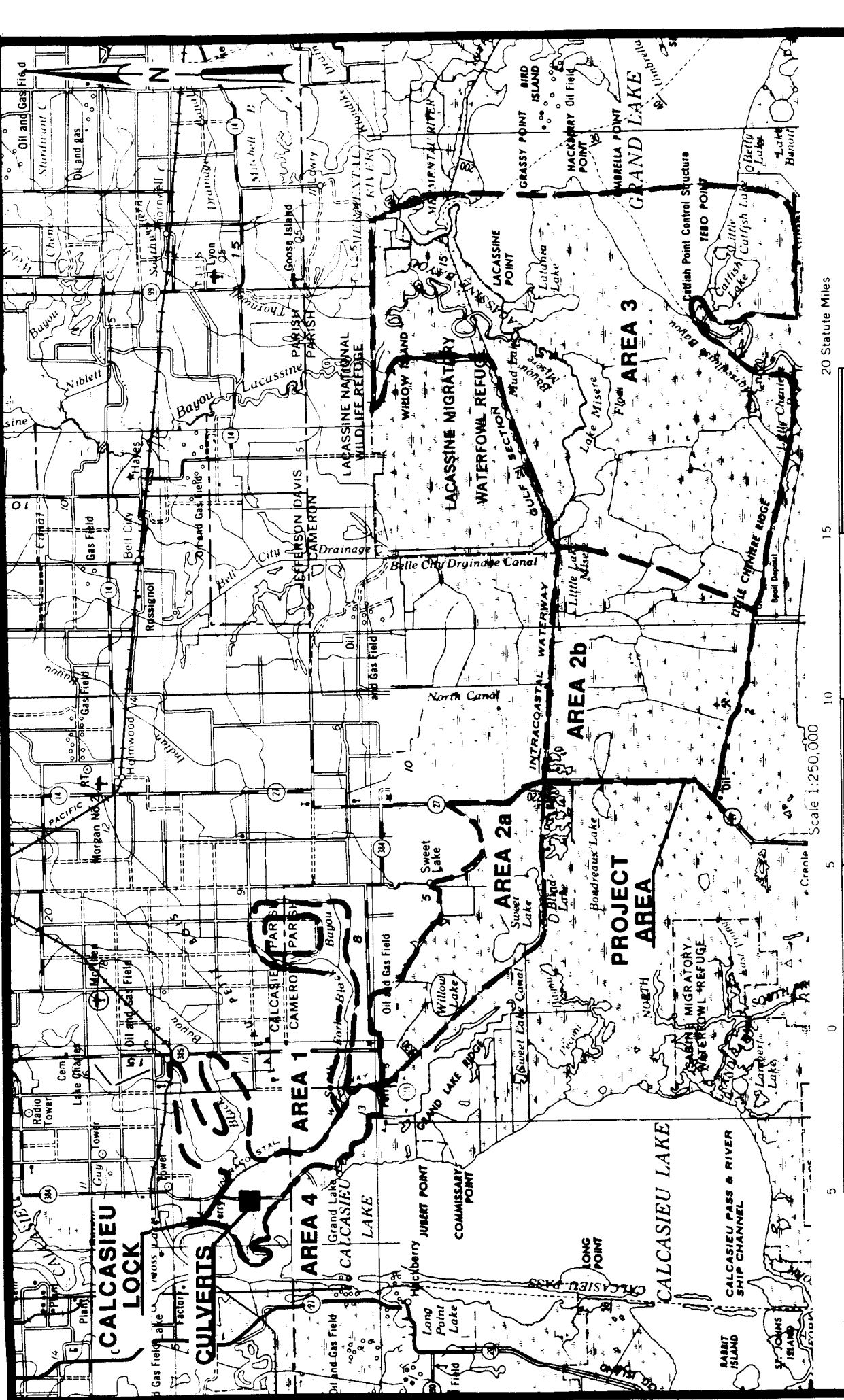
On the west bank of Freshwater Bayou a continuous rock dike will be constructed approximately 100 feet from the existing bankline. The length of the project is 23,350 feet.

Cost

First Cost	\$3,545,000
Average Annual Cost	\$628,100
Fully Funded Cost	\$3,999,000

Benefits

Average Annual Habitat Units	248
Average Annual Acres	262



CS-16 BLACK BAYOU CULVERTS HYDROLOGIC RESTORATION

Black Bayou Culverts (CS-16)

Location

The project is located at the point where Louisiana State Highway 384 crosses Black Bayou just south of the Calcasieu Lock, in Calcasieu Parish, Louisiana. The bayou is closed by a dam on which the highway has been constructed. The project area encompasses 107,100 acres of mainly fresh/intermediate marsh.

Justification

Wave induced shoreline erosion, ponding, and marsh breakup are occurring in the marshes surrounding the Grand and White Lakes area in the Mermentau Basin. High water levels contribute to marsh loss in the basin.

Objective

The objective of the project is to reduce marsh loss in the 107,100-acre project area by reducing water levels by approximately 3 inches in Area 1 (5,100 acres), 2 inches in Area 2 (34,700 acres), and 1 inch in Area 3 (65,900 acres). In addition, project Area 4 (1,500 acres) will benefit from the introduction of fresh water from the GIWW. Water level lowering will relieve waterlogging stresses on wiregrass and fresh maidencane marshes in the area, reducing the overall land loss. The reduced water levels will increase submerged vegetation. The project will also provide fresh water to the brackish marsh area west of Highway 387 in the northern portion of Calcasieu Lake.

Project Features

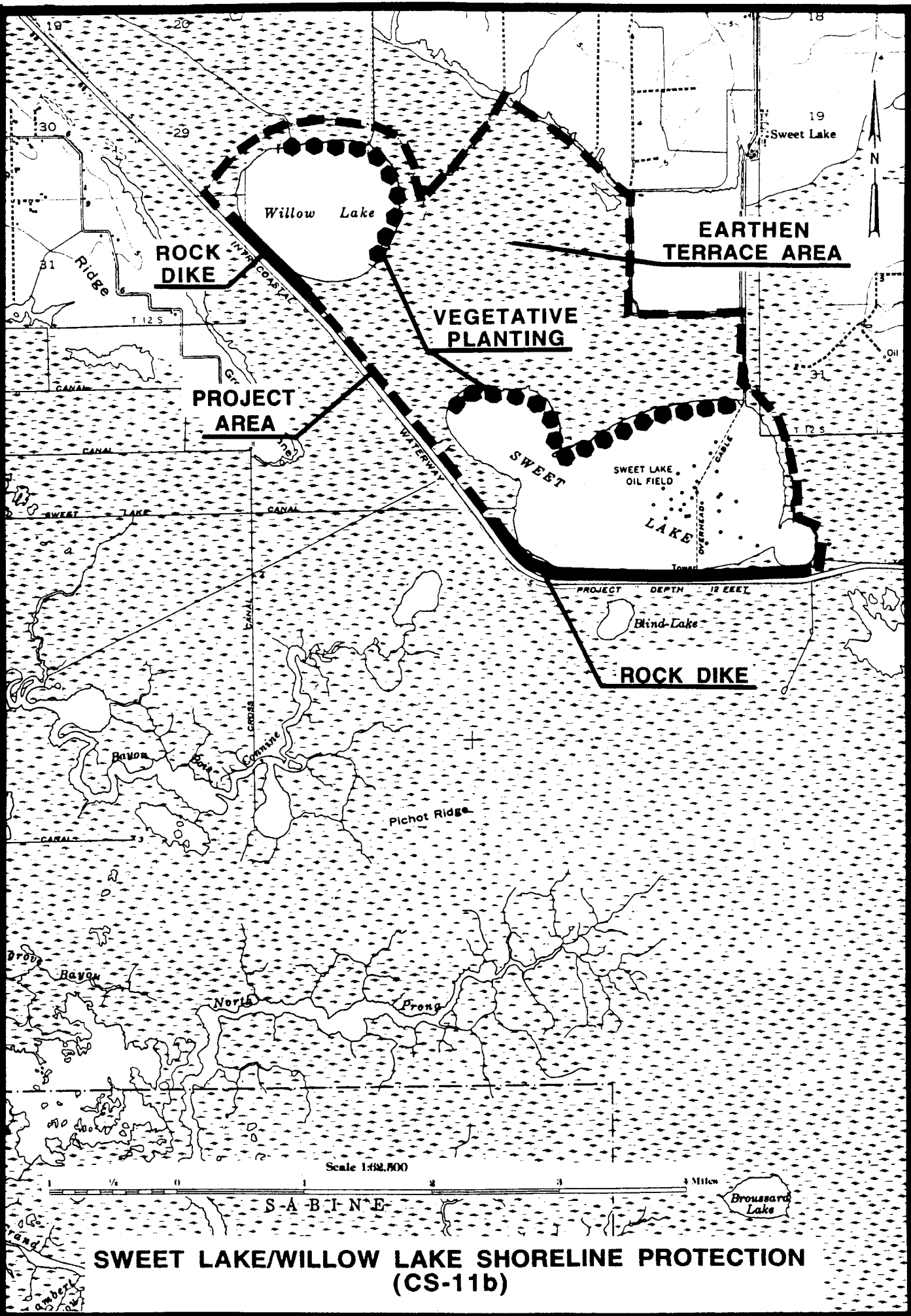
The project consists of constructing five 10- by 10-foot concrete box culverts with sluice gates in Black Bayou. Highway 384, which presently blocks the bayou, will be relocated over the culverts. The culverts will be opened when the differential head across the structure will allow it to drain water from east to west (i.e., drain water from the Mermentau Basin into the Calcasieu/Sabine Basin). Operation of the structure will be in coordination with Calcasieu Lock and the Schooner Bayou and Catfish Point control structures.

Cost

First Cost	\$7,022,000
Average Annual Cost	\$863,00
Fully Funded Cost	\$9,051,000

Benefits

Average Annual Habitat Units	592
Average Annual Acres	440



SWEET LAKE/WILLOW LAKE SHORELINE PROTECTION (CS-11b)

Sweet Lake/Willow Lake Shoreline Protection (CS-11b)

Location

The Sweet Lake/Willow Lake Shoreline and Bank Protection project is located north of and adjacent to the Gulf Intracoastal Waterway (GIWW), about three miles west of the Louisiana Hwy. 27 bridge at Gibbstown and six miles southeast of Grand Lake, Louisiana, in Cameron Parish.

Justification

The north bank of the GIWW has eroded into Sweet Lake for approximately 1.3 miles, and into Willow Lake for approximately 0.5 miles, increasing turbidity in the waters of these lakes. Severe wind induced erosion is also occurring along the northern and northwestern Sweet Lake shorelines, where high water levels are impacting the adjacent marshes north of the lake.

Objective

The project objectives are to reestablish the shoreline, and natural hydrologic boundary, between Sweet Lake and the GIWW, to reduce lake turbidity and tidal exchange, and to halt erosion and trap sediments needed to rebuild marsh along the northern and northwestern shorelines of Sweet Lake.

Project Features

Project features include:

1. Constructing rock breakwaters tied into the remaining land to reestablish the former bankline of the GIWW adjacent to Sweet Lake (2.7 miles) and Willow Lake (0.8 miles).
2. Constructing 25,000 linear feet of earthen terraces across deteriorated marsh area north of Sweet Lake.
3. Planting California bulrush (*Scirpus californicus*) along the shoreline of Sweet Lake and on constructed earthen terraces.

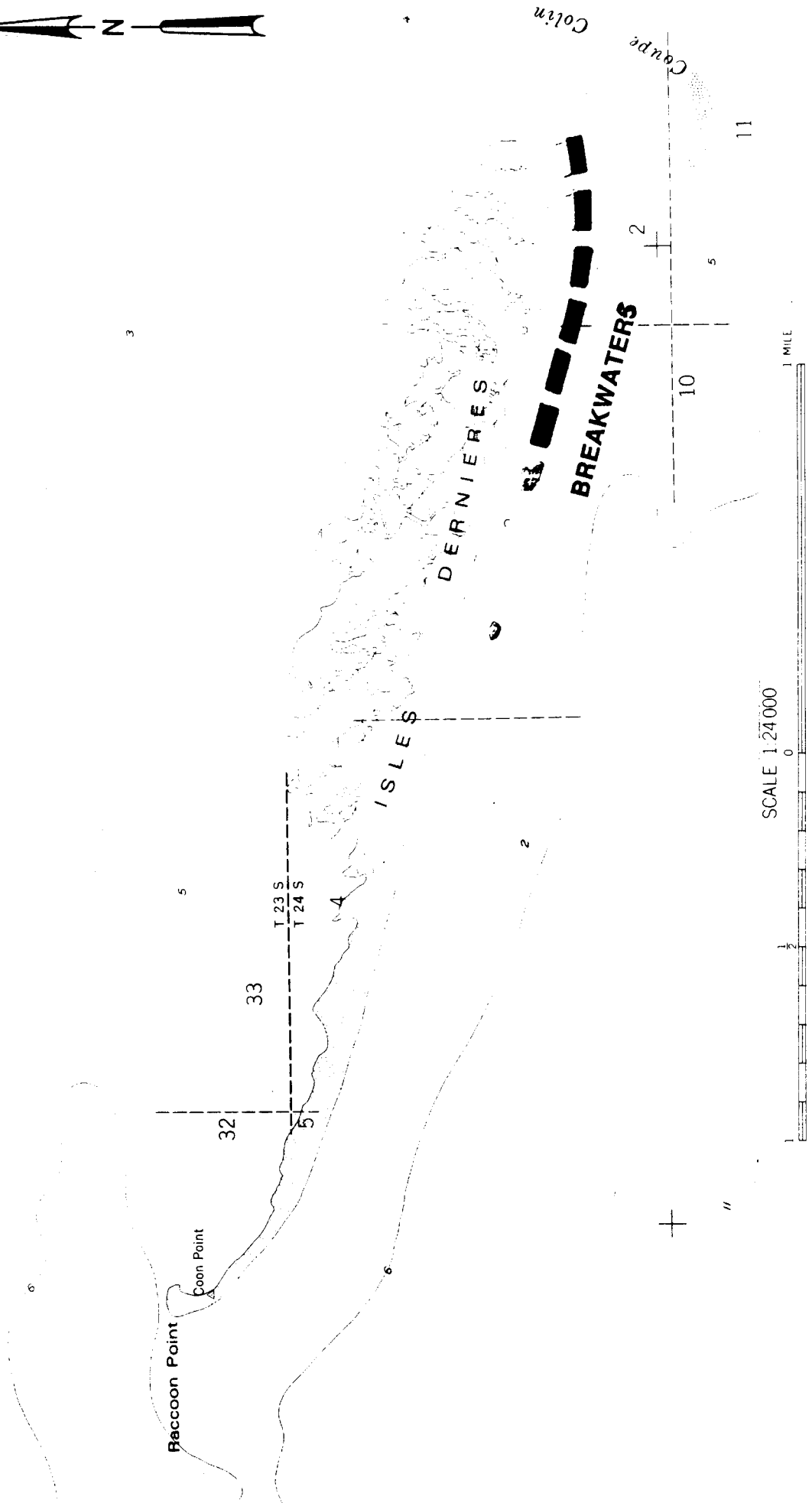
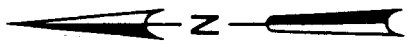
The project will be implemented in two phases. Phase one will provide bank protection to address the most critical 9,500 linear feet along Sweet and Willow Lakes. Phase two will fund the remaining project features.

Cost

First Cost	\$4,124,000
Average Annual Cost	\$456,000
Fully Funded Cost	\$4,763,000

Benefits

Average Annual Habitat Units	261
Average Annual Acres	126



PTE-15bii RACCOON ISLAND BREAKWATERS

Raccoon Island Breakwaters Demonstration (PTE-15b(ii))

Location

This project is located on the southern coast of Terrebonne Parish, Louisiana. Raccoon Island is the western most island in the Isles Dernieres chain.

Justification

Louisiana's barrier islands play an important role in protecting the Terrebonne, Barataria, and St. Bernard estuaries and their surrounding wetlands from the destructive forces of high wave energy, storm surges, and saltwater intrusion. Additionally, there is a positive correlation between the numbers of tidal inlets (total width) and bay tidal prisms. The habitats provided by barrier islands are extremely valuable as mammal and migratory song bird resting sites, waterfowl feeding and nesting areas, and protected aquatic nursery sites.

All of Louisiana's barrier islands are experiencing landward migration, island narrowing, and land loss as a consequence of a complex interaction among global sea level rise, compaction, subsidence, wave and storm processes, inadequate sediment supply, and intense human disturbance. The continued loss of these barrier islands will result in the collapse of the estuaries and wetlands they protect, thus severely disrupting the coastal fisheries.

Objective

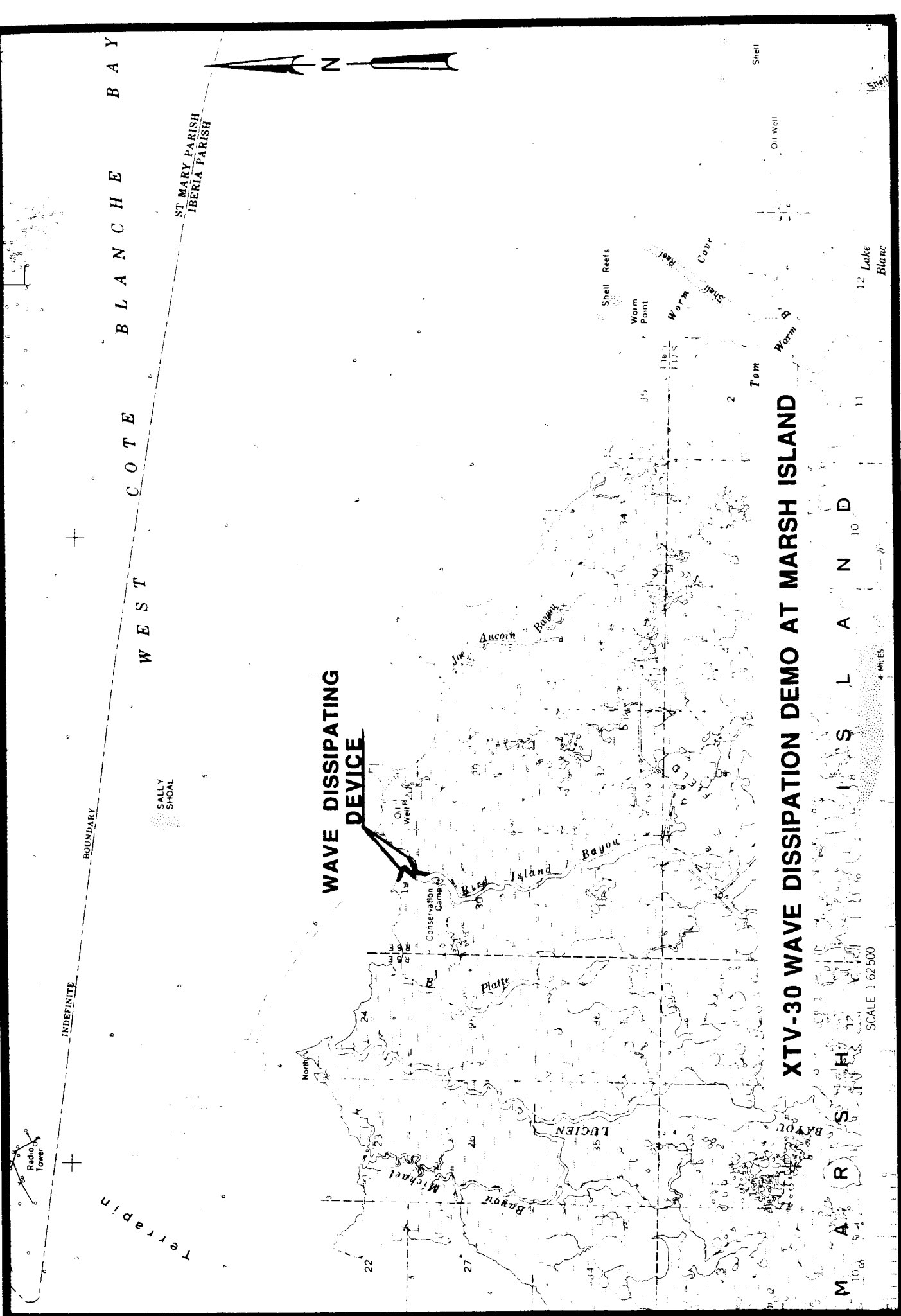
The objective of the project is to protect the newly rebuilt beaches and wetlands of Raccoon Island while demonstrating the effectiveness of segmented breakwaters.

Project Features

Six offshore segmented breakwaters will be constructed using large limestone rock. These breakwaters are to be placed in water at a depth of 4 to 6 feet with a design freeboard of 4.0 feet NGVD. The breakwater will have crown dimensions of 10 feet wide and 175 feet long. The breakwaters will be placed on 450-foot centers with 275-foot gaps.

Cost

First Cost	\$1,345,000
Average Annual Cost	\$150,000
Fully Funded Cost	\$1,498,000



ST MARY PARISH
IBERIA PARISH

WEST COTE BLANCHE BAY

**WAVE DISSIPATING
DEVICE**

XTV-30 WAVE DISSIPATION DEMO AT MARSH ISLAND

M A R S H I S L A N D

SCALE 1:62500

4 MILES

Wave Dissipation Demonstration at Marsh Island (XTV-30)

Location

The site selected for this project is at the mouth of Bird Island Bayou on the north central shore of Marsh Island Refuge. Marsh Island is a wildlife refuge and game preserve located on the southern extremity of Vermilion Bay and West Cote Blanche Bay in Iberia Parish, Louisiana.

Justification

The most common structural measures in use today in Louisiana for shoreline protection are rock, rip-rap armored embankments, and revetments. Although highly effective and long lasting, rock structures have certain limitations which prevent their use in some areas of south Louisiana. The wave dissipating device proposed for this project has, as a minimum, statewide applicability. The structure's bulk weight allows placement on even the softest soil found in south Louisiana. The device can be installed in virtually any location where wave or wake generated erosion poses a problem, including navigational channels and waterways, oilfield canals, lake and bay shorelines, and the gulf shoreline. Because of its modular design and light weight, the device can be transported and installed in limited access, shallow water areas without constructing flotation channels. The modular design also allows the device to be translocated.

Objective

The objective of the project is to conduct a field trial on a conceptual device and measure the product's performance. The device should:

1. Effectively reduce wave energies and prevent shoreline erosion;
2. Have as few limitations as possible with regard to:
 - a. site accessibility,
 - b. unstable soil foundations,
 - c. corrosive environments,
 - d. longevity, and
 - e. the magnitude of wave energy;
3. Be structurally stable with little or no maintenance required during its life expectancy;
4. Be capable of trapping and retaining available sediments behind the structure; and
5. Be economically feasible with respect to the resource being protected.

Project Features

Install 700 feet of the wave dissipating device at the mouth of Bird Island Bayou. Four hundred fifty feet will be installed on the west side, and 250 feet will be installed on the east side of the channel.

Cost

First Cost	\$257,000
Average Annual Cost	\$34,000
Fully Funded Cost	\$340,000

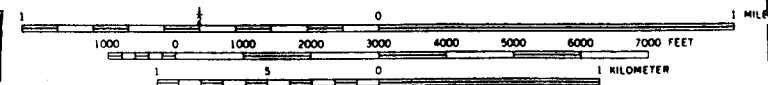


TIRE
BREAKWATER

Freshwater
Bayou



WAVE DISSIPATION DEMONSTRATION AT FRESHWATER BAYOU



Wave Dissipation Demonstration at Freshwater Bayou

Location

The project is located on the east bank of Freshwater Bayou, approximately two miles north of Humble Canal in Vermilion Parish.

Justification

The most common structural measures in use today in Louisiana for shoreline protection are rock, rip-rap armored embankments, and revetments. Although highly effective and long lasting, rock structures have certain limitations which prevent their use in some areas of south Louisiana. The wave dissipating device proposed for this project has, as a minimum, statewide applicability. The structure's bulk weight allows placement on even the softest soil found in south Louisiana. The device can be installed in virtually any location where wave or wake generated erosion poses a problem, including navigational channels and waterways, oilfield canals, lake and bay shorelines, and the gulf shoreline. Because of its modular design and light weight, the device can be transported and installed in limited access, shallow water areas without constructing flotation channels. The modular design also allows the device to be translocated.

Objective

The objective of the project is to conduct a field trial on a conceptual device and measure the product's performance. The device should:

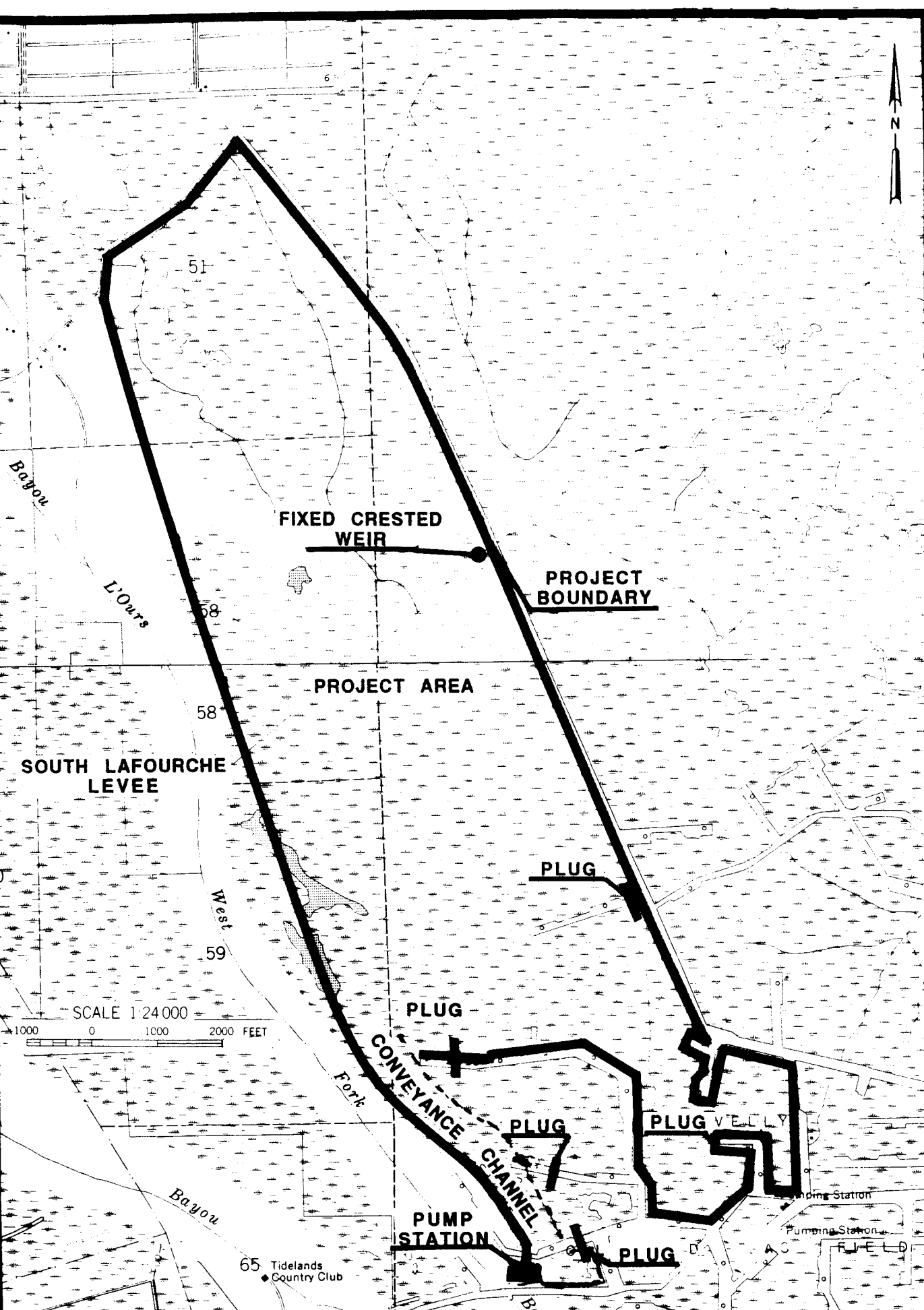
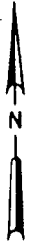
1. Effectively reduce wave energies and prevent shoreline erosion;
2. Have as few limitations as possible with regard to:
 - a. site accessibility,
 - b. unstable soil foundations,
 - c. corrosive environments,
 - d. longevity, and
 - e. the magnitude of wave energy;
3. Be structurally stable with little or no maintenance required during its life expectancy;
4. Be capable of trapping and retaining available sediments behind the structure; and
5. Be economically feasible with respect to the resource being protected.

Project Features

Install 1,300 feet of the wave dissipating device on the eastern bank of Freshwater Bayou.

Cost

First Cost	\$336,000
Average Annual Cost	\$42,000
Fully Funded Cost	\$436,000



SCALE 1:24 000
1000 0 1000 2000 FEET

CLOVELLY FARMS DIVERSION DEMONSTRATION

Clovelly Farms Diversion Demonstration

Location

The project is located on the eastern side of the South Lafourche Levee District between Cutoff and Galliano, Louisiana. The area is bordered on the north by Clovelly Farms, on the west by the Levee District's embankment, and on the east and south by oil field canals. The project area encompasses approximately 1,700 acres.

Justification

The majority of forced-drainage and pump-off levee systems in south Louisiana discharge into either manmade or natural channels which eventually lead into coastal bays or lakes. State and Federal agencies have identified the potential of utilizing these systems to enhance wetlands deteriorating from a lack of fresh water and nutrients. The EPA in 1990 granted the Louisiana Department of Natural Resources funds to conduct a study on the use of runoff discharges in coastal Louisiana for wetland and water quality enhancement. The 1990-91 State Coastal Wetlands Conservation and Restoration Plan identifies "routing of point-source discharges through wetlands to offset saltwater intrusion, enhance vegetation growth, and improve water quality" as a recommended measure for State and Federal action.

Objective

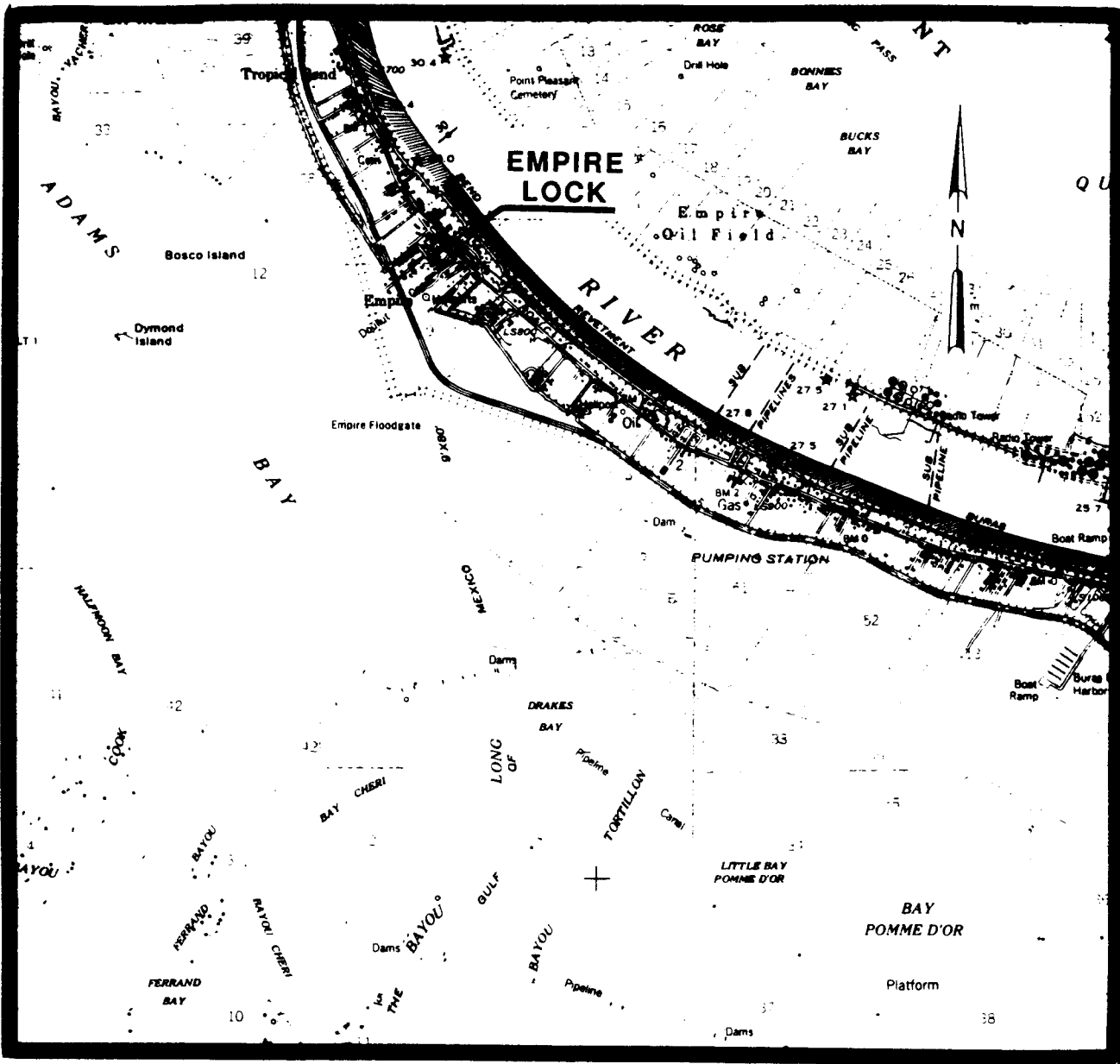
The project proposes to divert the outfall of a 350,000-gpm pump station discharge into the project area to reduce saltwater intrusion, enhance wetland vegetation composition by increasing nutrient quantities, and improve water quality in the area.

Project Features

The proposed construction features are: five armored earthen plugs; 4,000 feet of conveyance channel guide levee; 2,200 feet of spoilbank maintenance; a fixed crest water control structure; and 3,800 feet of spoil bank degradation.

Cost

First Cost	\$558,000
Average Annual Cost	\$64,000
Fully Funded Cost	\$640,000



Empire Lock Operational and Maintenance Dredging Modification Demo

Location

The project is located on the west bank of the Mississippi River in Plaquemines Parish at the Empire Lock.

Justification

In March 1990, the State of Louisiana Department of Transportation and Development, Plaquemines Parish Government, and the Corps of Engineers entered into a Memorandum of Agreement to initiate a pilot project to operate the Empire Lock for small freshwater diversions. A set of lock operating criteria was defined and responsibilities identified. The operational criterion established by DOTD and PPG for the 1990 project was: for river stage below 2.0 feet, gates fully open; and for river stage above 2.0 feet, 3-foot gate opening. DOTD, which operates the lock, was responsible for maintenance dredging of the Dullot Canal. The Corps of Engineers, which is responsible for the Empire Waterway, would be responsible for maintenance dredging of the waterway.

The diversion of water through the Empire Lock caused increased shoaling in the Dullot Canal. DOTD maintenance records indicated that after one year of operating the diversion, 30,000 cubic yards of material were dredged from the canal. However, the canal had not been dredged for a period of approximately 10 years prior to the modified operating scheme. DOTD's cost to dredge the canal was \$70,000.

Using the lock to divert fresh water also caused sediment to build up in the gate recesses. Designs were prepared to try to prevent this problem by modifying the gates and recess.

Objective

The objective of the project is use the Empire Lock to divert fresh water into the surrounding wetlands.

Project Features

The project features include maintenance dredging in the Dullot Canal and modification of the existing gates and recess to prevent sedimentation in the gate recess.

Vegetative Plantings on Raccoon Island Demonstration

Location

The project is located on Raccoon Island in Terrebonne Parish, Louisiana. Raccoon Island is the westernmost island of the Isles Dernieres island chain.

Justification

Raccoon Island is rapidly eroding due to inadequate sediment supply, subsidence, and wave erosion. A portion of Raccoon Island was rebuilt in 1993 after being destroyed by Hurricane Andrew. The demonstration project will use vegetative plantings to stabilize the new sediment pumped on the island in 1993.

Small-scale field trials on Raccoon Island and other locations have shown that vegetative plantings can be an effective restoration technique. Recent developments in artificial seed technology may make a large-scale vegetative planting demonstration project feasible.

Objective

The objective of the project is use artificial seed, a multiyear fertilization and plant replacement program, and other means as a restoration technique.

Project Features

The project features consist of establishing several large vegetation plots by artificial seed and other means. The plots will be monitored and a variety of fertilization and plant replacement programs developed and studied.

Cost

The cost of the project is \$523,000.

Mat Sinking Unit for Bank Stabilization Demonstration

Description

The objective of the project is to demonstrate the utility of the Corps mat sinking unit and articulated concrete mats in stabilizing the banks of navigation channels and shorelines. Investigation has shown that the mat sinking plant is too large and draws too much water to operate in areas other than the Mississippi River; however, a modified plant operation could be used to operate in the desired areas. An analysis of the typical bank to be protected reveals a greater problem. In order for the mats to be effective, a well graded bank with substantial elevation is required. Most areas of marsh do not meet this criterion; thus, a project area would require substantial earth work. In addition, sections of articulated mats were used as foreshore protection along the MRGO in the 1980's. Ship wakes caused the mats to be displaced and the project to fail in a very short period of time. The failed section has been redesigned, but preliminary estimates indicated a significant increase in the costs is expected.