4TH PRIORITY PROJECT LIST REPORT

PREPARED BY:

LOUISIANA COASTAL WETLANDS CONSERVATION AND RESTORATION TASK FORCE

December 1994

Coastal Wetlands Planning, Protection and Restoration Act

4th Priority Project List Report

December 1994

Coastal Wetlands Planning, Protection and Restoration Act

4th Priority Project List Report

Coastal Wetlands Planning, Protection and Restoration Act

4th Priority Project List Report
Table of Contents

4th Priority Project List Report
Table of Contents
(continued)

4th Priority Project List Report
Table of Contents
(continued)

List of Tables

Coastal Wetlands Planning, Protection and Restoration Act

4th Priority Project List Report
Table of Contents
(continued)

List of Plates

List of Appendices

Coastal Wetlands Planning, Protection and Restoration Act

4th 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 (PL 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), 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 4th 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 this 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 all 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 assists in formulating 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 (Appendix E).

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 Scientific 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 scientific 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.

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 plans to distribute 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 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 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 through 1995.

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 the second (submitted in November 1992), third (submitted in November 1993), and fourth lists, which involved somewhat more lead time than did the first list, employed a more traditional approach. This section describes the process by which the fourth list was developed.

IDENTIFICATION OF PROJECTS

Projects considered for the fourth 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).

SCREENING OF PROPOSED PROJECTS

The procedure used in developing the 2nd and 3rd Priority Project Lists involved the use of the basin teams which had been established by the Task Force to formulate the comprehensive restoration plan called for by the CWPPRA. From among hundreds of proposed projects, each team nominated a number of projects from its basin. These nominees were then presented to the public in a series of meetings across the coastal zone. The Planning and Evaluation Subcommittee considered the comments made at these meetings when it selected candidate projects from among the nominees; these candidates were to be evaluated in detail for consideration for the priority project list. Following the evaluations, the Task Force made the final selection of priority list projects.

This procedure was modified in January 1994 with the intent of increasing the level of public involvement in the selection process. The Planning and Evaluation Subcommittee held three meetings for the purpose of selecting candidate projects for the 4th Priority Project List. These were held in Lake Charles , Thibodaux, and New Orleans. Each meeting was held over a two-day period to provide ample time for consideration of projects.

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. Tables 2 through 10 show the projects nominated for each basin, along with an estimate of the cost and benefits of each project. (The "Status" column in each table shows whether a project is considered to be a critical part of its basin's restoration plan or a supporting part, and also whether it is considered to be a short-term or a long-term solution. The determinations were made by the basin teams in assembling the Louisiana Coastal Wetlands Restoration Plan.)

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 three projects gathering the most points were then named as the candidate projects from that basin. The rankings for the nominees in each basin are displayed in tables 11 through 17.

In all, 22 candidate projects were chosen to be evaluated in detail; these were the projects from which the 4th 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 4th 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 2
Potential Candidate Projects for the 4th Priority Project List
Pontchartrain Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Net Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
PO-11	Cutoff Bayou Hydrologic Restoration	Critical-Short	103	503	722,000	7,000	1,400	DNR/SCS
PO-13	Tangipahoa Shore Protection	Critical-Short	142	627	4,850,000	34,200	7,700	SCS
PO-15	Alligator Point Marsh Restoration	Critical-Short	139	1,489	1,575,000	11,300	1,100	DNR/SCS
PPO-4	Eden Isles East Marsh Restoration	Support-Long	1,092	1,494	8,856,000	8,100	5,900	NMFS
XPO-48a	Tennessee Williams Canal Bank Mod	Support-Short	70	122	269,000	3,800	2,200	EPA
XPO-48b	Hope Canal Bank Modification	Support-Short	160	281	290,000	1,800	1,000	EPA
XPO-51	Mancha WMA Hydrologic Rest	Critical-Short	486	1,195	1,021,000	2,100	900	DNR/USACE
XPO-69	Bayou Chevee Shoreline Protection	Critical-Short	468	1,367	2,672,000	5,700	2,000	USACE/USFWS
XPO-80a	Lower Pearl River Sediment Trapping	Support-Short	55	2,940	660,000	12,000	200	EPA
XPO-83	Lake Athanasio Spit	Critical-Short	99	1,713	895,000	9,000	500	NMFS/USACE
XPO-84	St. Malo Hydrologic Restoration	Critical-Short	2	122	658,000	329,000	5,400	NMFS
XPO-88	Point Platt Sediment Trapping	Support-Short	74	1,138	1,199,000	16,200	1,100	EPA
XPO-93	Marsh Creation w/ Biosolids Demo	Demonstration	NA	NA	NI	NA	NA	USACE
XPO-92	Shore Prot Demo @ Bayou Chevee	Demonstration	NA	NA	NI	NA	NA	USACE
PPO-2b	Lk Borgne SP South of B Bienvenue	Critical-Short	41	91	578,000	14,100	6,400	Public
PPO-2d	Lk Borgne SP East of Shell Beach	Support-Short	246	383	1,664,000	6,800	4,300	Public
PPO-2g	Lk Borgn SP Chef to GIWW Bypass	Critical-Short	81	96	1,708,000	21,100	17,800	Public

DNR Louisiana Department of Natural Resources
EPA U.S. Environmental Protection Agency
NMFS National Marine Fisheries Service
SCS Soil Conservation Service
USACE U.S. Army Corps of Engineers
USFWS U.S. Fish and Wildlife Service
NA Not Available

Table 3
Potential Candidate Projects for the 4th Priority Project List
Breton Sound Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
BS-1a/b	Rest of Bohemia Div & Oufall Mgt	Support-Short	124	658	1,642,000	13,200	2,500	NMFS/USACE
BS-5	Bayou Lamoque Outfall Management	Support-Short	350	555	317,000	900	600	DNR/SCS/USACE
BS-6	Pump Outfall Mgy of N Lake Lery	Support-Short	169	746	2,241,000	13,300	3,000	DNR/SCS
PBS-6	Grand Bay Crevasse	Support-Short	364	800	1,563,000	4,300	2,000	DNR/EPA/NMFS/SCS/USACE

Table 4
Potential Candidate Projects for the 4th Priority Project List
Mississippi River Delta Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
MR-2	Pass a Lourtre Sediment Fencing	Support-Short	1,500	1,817	2,666,000	1,800	1,500	DNR/USACE (dropped)
FMR-4	Tiger Pass Dredged Material Disposal	Support-Short	415	457	4,434,000	10,700	9,700	DNR/USACE (dropped)
PMR-5	Benny's Bay Diversion	Support-Short	10,761	12,125	6,328,000	600	500	EPA (dropped)
PMR-8	Pass a Lourtre Sediment Mining	Support-Short	118	252	1,247,000	10,600	4,900	USACE
XMR-12	Beneficial Use Hopper Dredged Mat	Demonstration	NA	NA	NA	NA	NA	DNR
XMR-14	Miss River Dredged Matarial Dispos	Support-Long	NA	NA	NA	NA	NA	DNR (dropped)

Table 5
Potential Candidate Projects for the 4th Priority Project List
Barataria Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Net Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
BA-3c	Naomi Outfall Management	Critical-Short	840	1,640	1,428,000	1,700	900	DNR/SCS/USACE/USFWS
BA-10	Davis Pond Outfall Management	Critical-Long	580	1,610	6,525,000	11,300	4,100	USACE
BA-12	Grand/Spanish Pass Diversion	Critical-Long	NA	NA	NA	NA	NA	NMFS
PBA-12	Barataria Bay WW Bank Protection	Support-Short	140	190	1,762,000	12,600	9,300	SCS
PBA-34	Maintain Bayou L'Ours Ridge	Support-Short	780	2,780	2,327,000	3,000	800	DNR/SCS/USACE
PBA-36	Lagan Freshwater Diversion	Critical-Long	NA	NA	NA	NA	NA	NMFS
PBA-38	Shell Island Segmented Breakwaters	Support-Short	510	1,580	22,060,000	43,300	14,000	DNR
XBA-1a	West Grand Terre Sediment Replenish	Critical-Short	440	450	7,934,000	18,000	17,600	EPA
XBA-1b	East Grand Terre Sediment Replenish	Critical-Short	380	400	7,441,000	19,600	18,600	EPA
XBA-1d	Cheniere Ronquille Sediment Replenish	Critical-Short	180	190	2,368,000	13,200	12,500	NMFS

Table 6
Potential Candidate Projects for the 4th Priority Project List
Terrebonne Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
TE-10/XTE-	Grand Bayou/GIWW	Critical-Short	1,825	4,929	5,515,000	3,000	1,100	DNR/SCS/USFWS
PTE-3	HNC Bank Stabilization	Critical-Short	311	1,059	1,600,000	5,100	1,500	USACE
PTE-15	Isles Dernieres Restoration	Critical-Short	1,050	1,864	33,188,000	31,600	17,800	EPA
PTE-15bii	Restore Isles Dernieres (Breakwaters)	Critical-Short	NA	NA	NA	NA	NA	DNR/SCS
PTE-26	Upper B Penchant Watershed Mgmt	Critical-Short	10,600	49,153	50,000,000	4,700	1,000	NMFS
XTE-45	Restoration of Timbalier Island	Critical-Short	NA	NA	NA	NA	NA	NMFS
XTE-54b	Flotant Marsh Creation/Enhancement	Demonstration	NA	NA	NA	NA	NA	DNR/SCS
XTE-57	South Pointe au Chien Hydro Rest	Critical-Short	610	1,285	805,000	1,300	600	USACE
XTE-58	South Bully Camp	Critical-Short	1,401	3,109	1,879,000	1,300	600	USACE
XTE-64	Avoca Island Sediment Diversion	Support-Short	413	1,030	922,000	2,200	900	NMFS
XTE-66	Sediment Conveyance Dist System	Demonstration	550	1,080	1,228,000	2,200	1,100	EPA
XTE-67b	East Timbalier to West Belle Pass	Critical-Short	NA	NA	NA	NA	NA	DNR/SCS
	Avoca Island Siphon Distribution	Demonstration	NA	NA	NA	NA	NA	EPA (dropped)

Table 7
Potential Candidate Projects for the 4th Priority Project List
Atchafalaya Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
XAT-4	Established Wetland Management	Support-Long	800	800	300,000	400	400	DNR
XAT-5a	Sediment Distribution	Demonstration	NA	NA	NA	NA	NA	EPA
XAT-8	Dredge Sediment into Wax Lake Outlet	Support-Short	40	2,070	1,530,000	38,300	700	DNR/USACE

Table 8
Potential Candidate Projects for the 4th Priority Project List
Teche/Vermilion Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
TV-1	Shark Island Shore Protection/HR	Critical-Short	463	593	7,559,000	16,300	12,700	DNR/SCS/USACE
TV-5/7	Marsh Island Marsh Creation/HR	Critical-Short	512	1,090	2,328,000	4,500	2,100	USACE/DNR/NMFS
PTV-19	Little Vermilion Bay Sediment Trap	Critical-Short	27	1,200	600,000	22,200	500	EPA/NMFS
PTV-13	Marsh S. of GIWW, Ver R to Week B	Critical-Long	NA	NA	NA	NA	NA	EPA
PTV-14	Marsh S. of GIWW, Ver R to Com C	Critical-Long	NA	NA	NA	NA	NA	EPA
PTV-4	Vermilion River SP -- Live Oak	Support-Short	7	70	300,000	42,900	4,300	SCS
PTV-8	Avery Canal to Weeks Island Veg	Support-Short	128	173	242,000	1,900	1,400	NMFS
XTV-27	Freshwater Bayou Bank Stab	Support-Short	61	61	1,925,000	31,600	31,600	DNR/SCS/USACE
	Marsh Island Sediment Demo	Demonstration	NA	NA	NA	NA	NA	EPA (dropped)
XTV-30	Marsh Island Wave Break Device	Demonstration	NA	NA	NA	NA	NA	LDWF/Public
XTV-25	Oaks Canal Bank Protection	Support-Short	120	125	1,069,000	8,900	8,600	Public

Table 9
Potential Candidate Projects for the 4th Priority Project List
Mermentau Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
PME-4	White Lake Diversion	Critical-Short	126	1,133	2,000,000	15,900	1,800	EPA/NMFS
XME-19	Old Vermilion Lock Overflow	Critical-Short	NA	NA	NA	NA	NA	NMFS (Dropped)
XME-20	Schooner Bayou Bypass Structure	Critical-Short	NA	NA	468,000	NA	NA	NMFS
XME-42	Hog Island Freshwater Introduction	Critical-Short	1,274	2,264	2,000,000	1,600	900	DNR/USACE
PME-1	GIWW Bank Protection	Support-Short	178	178	3,160,000	17,800	17,800	EPA
XME-17	North Canal to Mermentau	Support-Short	221	241	6,300,000	28,500	26,100	USFWS/NMFS
XME-22	Pecan Island Terracing	Support-Short	23	1,007	1,700,000	73,900	1,700	USACE/EPA
XME-35a	Shore Protection, Unbrella Bay	Support-Short	74	78	1,100,000	14,900	14,100	DNR
XME-35b	Shore Protection, Mallard Bay	Support-Short	74	78	900,000	12,200	11,500	DNR
XME-36	Tebo Point	Support-Short	9	11	200,000	22,200	18,200	SCS
XME-38	Grand Volle to Bear Lake	Support-Short	204	242	1,000,000	4,900	4,100	USACE/DNR
XME-44	GIWW Bank Stabilization	Support-Short	20	23	620,000	31,000	27,000	SCS (Dropped)
XME-41	Grand Cheniere Levee	Support-Long	NA	NA	900,000	NA	NA	SCS
XME-40	North Little Pecan Bayou	Support-Short	117	767	1,400,000	12,000	1,800	Public
XME-39	Mud Lake Levee Repair	Support-Long	NA	NA	750,000	NA	NA	Public
CS-16	Black Bayou Bypass	Critical-Short	115	1,661	4,600,000	40,000	2,800	Public
XME-29	Freshwater Bayou Bank Stab	Support-Short	118	118	3,763,000	31,900	31,900	Public

Table 10
Potential Candidate Projects for the 4th Priority Project List
Calcasieu/Sabine Basin

Project No.	Project Name	Status	Acres Created, Protected and Restored	Acres Benefitted	Cost ($)	Cost per Acre ($/Ac)	Cost per Benefitted Acre ($/Ac)	Sponsoring Agency
PCS-14	Kelso Bayou Structure	Critical-Short	34	319	1,587,000	46,700	5,000	SCS
XCS-44	West Cove Canal Plug	Critical-Short	52	985	253,000	4,900	300	USACE
XCS-48f	Structure Near Long Point Bridge	Critical-Short	52	3,672	526,000	10,100	100	USACE
XCS-51/44	Mine CSC and Plug West Cove Canal	Critical-Short	235	1,056	1,929,000	8,200	1,800	EPA/NMFS
CS-11b	Sweet Lake/Willow Lake Shore Prot	Critical-Short	294	4,477	2,626,000	8,900	600	DNR/USACE
PCS-26	Perry Ridge Shore Protection	Critical-Short	109	657	3,886,000	35,700	5,900	SCS
XCS-50	St. John's Island	Support-Short	137	295	1,934,000	14,100	6,600	NMFS
CS-10	Grand Lake Ridge Area	Support-Short	662	832	1,177,000	1,800	1,400	DNR/SCS
CS-14	Tripod Bayou	Support-Short	51	190	1,127,000	22,100	5,900	DNR/SCS
XCS-36	Compost Demonstration Project	Demonstration	10	10	250,000	25,000	25,000	EPA
XCS-49	Turner's Bay Vegetative Plantings	Support-Short	18	18	287,000	15,900	15,900	NMFS
XCS-45	Mine Ship Channel Disposal	Critical-Short	NA	NA	NA	NA	NA	EPA
XCS-54	Goose Lake Restoration	Critical-Short	34	105	1718000	50,500	16,400	Public

Table 11
Ranking of Potential Candidate Projects for the 4th Priority Project List
Pontchartrain Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
PO-11	Cutoff Bayou Hydrologic Restoration		4			4	3	11
PO-13	Tangipahoa Shore Protection		3			3		6
PO-15	**Alligator Point Marsh Restoration**		**5**	**2**		**5**		**12**
PPO-4	**Eden Isles East Marsh Restoration**	**5**		**4**	**5**		**5**	**19**
XPO-48a/b	Tennessee Williams/Hope Canal	4					2	6
XPO-51	Mancha WMA Hydrologic Rest		1	5			1	7
XPO-69	Bayou Chevee Shoreline Protection			3	1	2		6
XPO-80a	Lower Pearl River Sediment Trapping							
XPO-83	Lake Athanasio Spit				4			4
XPO-84	St. Malo Hydrologic Restoration	1			2			3
XPO-88	Point Platt Sediment Trapping	2						2
PPO-2g	Lk Borgne SP Chef to GIWW Bypass							
PPO-2b	**Lk Borgne SP South of B Bienvenue**	**3**	**2**	**1**	**3**	**1**	**4**	**14**
PPO-2d	Lk Borgne SP East of Shell Beach							
Demonstration Projects								
XPO-93	Marsh Creation w/ Biosolids Demo							
XPO-92	Shore Prot Demo @ Bayou Chevee							

Table 12
Ranking of Potential Candidate Projects for the 4th Priority Project List
Breton Sound Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
BS-1a/b	Rest of Bohemia Div & Oufall Mgt	2	2	1	3	1	2	11
BS-5	**Bayou Lamoque Outfall Management**	**1**	**3**	**4**	**2**	**3**	**3**	**16**
BS-6	**Pump Outfall Mgy of N Lake Lery**	**4**	**4**	**2**	**1**	**4**	**1**	**16**
PBS-6	**Grand Bay Crevasse**	**3**	**1**	**3**	**4**	**2**	**4**	**17**

Table 13
Ranking of Potential Candidate Projects for the 4th Priority Project List
Barataria Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
BA-3c	**Naomi Outfall Management**	**3**	**2**	**5**	**3**	**2**	**5**	**20**
BA-10	Davis Pond Outfall Management							
BA-12	Grand/Spanish Pass Diversion	4		2	4			10
BA-16	Bayou Segnette Wetland Protection			1	2	1		4
PBA-12	**Barataria Bay WW Bank Protection**	**1**	**5**		**1**	**5**	**2**	**14**
PBA-34	**Maintain Bayou L'Ours Ridge**		**4**	**4**		**4**	**4**	**16**
PBA-36	Lagan Freshwater Diversion							
PBA-38	Shell Island Segmented Breakwaters		3	3		3	3	12
XBA-1a	West Grand Terre Sediment Replenish							
XBA-1b	East Grand Terre Sediment Replenish	2						2
XBA-1d	Cheniere Ronquille Sediment Replenish	5	1		5		1	12

Table 14
Ranking of Potential Candidate Projects for the 4th Priority Project List
Terrebonne Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
TE-10/XTE-49	**Grand Bayou/GIWW**		**3**	**5**		**4**	**5**	**17**
PTE-3	HNC Bank Stabilization	3		2	2	1	1	9
PTE-15	Isles Dernieres Restoration	5	4		4		2	15
PTE-15bii	**Restore Isles Dernieres (Breakwaters)**	**4**	**5**	**3**	**3**	**5**	**4**	**24**
PTE-26	Upper B Penchant Watershed Mgmt	1		1	1			3
XTE-45/67b	**Restoration of Timbalier Island**	**2**	**2**	**4**	**5**	**3**	**3**	**19**
XTE-57	South Pointe au Chien Hydro Rest							
XTE-58	South Bully Camp		1			2		3
XTE-64	Avoca Island Sediment Diversion							
XTE-67b	East Timbalier to West Belle Pass							
Demonstration Projects								
XTE-54b	Flotant Marsh Creation/Enhancement							
XTE-66	Sediment Conveyance Dist System							

Table 15
Ranking of Potential Candidate Projects for the 4th Priority Project List
Teche/Vermilion Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
TV-1	Shark Island Shore Protection/HR		4	1		4	2	11
TV-5/7	**Marsh Island Marsh Creation/HR**	**1**	**3**	**5**	**4**	**3**	**5**	**21**
PTV-19	**Little Vermilion Bay Sediment Trap**	**5**		**3**	**5**		**4**	**17**
PTV-13	Marsh S. of GIWW, Ver R to Week B	2						2
PTV-14	Marsh S. of GIWW, Ver R to Com C							
PTV-4	Vermilion River SP -- Live Oak		2		1	2		5
PTV-8	Avery Canal to Weeks Island Veg	3		2	3			8
XTV-27	**Freshwater Bayou Bank Stab 2**		**5**	**4**		**5**	**3**	**17**
XTV-25	Oaks Canal Bank Protection	4	1		2	1	1	9

Table 16
Ranking of Potential Candidate Projects for the 4th Priority Project List
Mermentau Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
PME-4	White Lake Diversion	4			2			6
XME-19	Old Vermilion Lock Overflow							
XME-20	Schooner Bayou Bypass Structure							
XME-42	Hog Island Freshwater Introduction				3		4	7
PME-1	**GIWW Bank Protection**	**3**	**5**	**1**		**4**	**5**	**18**
XME-17	North Canal to Mermentau		2	3		1		6
XME-22	Pecan Island Terracing	5			4			9
XME-35a	Shore Protection, Unbrella Bay							
XME-35b	Shore Protection, Mallard Bay							
XME-36	Tebo Point							
XME-38	Grand Volle to Bear Lake			2			1	3
XME-44	GIWW Bank Stabilization							
XME-41	Grand Cheniere Levee		4			5	3	12
XME-40	North Little Pecan Bayou							
XME-39	Mud Lake Levee Repair							
CS-16	**Bayou Black Bypass**	**1**	**1**	**5**	**5**	**2**	**2**	**16**
XME-29	**Freshwater Bayou Bank Stab Phase 3**	**2**	**3**	**4**	**1**	**3**		**13**

Table 17
Ranking of Potential Candidate Projects for the 4th Priority Project List
Calcasieu/Sabine Basin

Project No.	Project Name	EPA	DNR	USFWS	NMFS	SCS	USACE	Total
PCS-14	Kelso Bayou Structure		2			2		4
XCS-44	West Cove Canal Plug							
XCS-48f	Structure Near Long Point Bridge		1			1	2	4
XCS-51/44	**Mine CSC and Plug West Cove Canal**	**5**		**5**	**4**		**3**	**17**
CS-11b	**Sweet Lake/Willow Lake Shore Prot**	**1**	**4**	**3**	**1**	**5**	**5**	**19**
PCS-26	**Perry Ridge Shore Protection**		**5**	**4**	**3**	**4**	**4**	**20**
XCS-50	St. John's Island	2						2
CS-10	Grand Lake Ridge Area		3	1		3		7
CS-14	Tripod Bayou				2			2
XCS-49	Turner's Bay Vegetative Plantings	3		2	5		1	11
XCS-45	Mine Ship Channel Disposal (East)	4						4
XCS-54	Goose Lake Restortion Project							

EVALUATION OF CANDIDATE PROJECTS

Wetland Value Assessment Methodology and Community Models

I. INTRODUCTION

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 Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) of 1990. 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/or 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.

II. WVA CONCEPT

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, 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 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 (Attachments 1-4) have been developed for determining the suitability of Louisiana coastal wetlands in 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 <u>all</u> fish and wildlife species utilizing a given marsh type over a year or longer. Earlier attempts to capture other wetland functions and values such as storm-surge protection, flood water storage, water quality functions and nutrient import/export were abandoned due to the difficulty in defining unified model relationships and meaningful model outputs for such

a variety of wetland benefits. However, the ability of a Louisiana coastal wetland to provide those functions and values may be generally assumed to be positively correlated with fish and wildlife habitat quality as predicted through the WVA.

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.

III. COMMUNITY MODEL VARIABLE SELECTION

Habitat variables considered appropriate for describing habitat quality in each wetland type were selected according to the following criteria:

1) the condition described by the variable had to be important in characterizing fish and wildlife habitat quality in the wetland type under consideration;

2) values had to be easily estimated and predicted based on existing data (e.g., aerial photography, LANDSAT, GIS systems, water quality monitoring stations, and interviews with knowledgeable individuals); and

3) the variable had to be sensitive to the types of changes expected to be brought about by typical wetland projects proposed under the CWPPRA.

Variables for each model were selected through a two part procedure. The first involved a listing of environmental variables thought to be important in characterizing fish and wildlife habitat in coastal marsh or swamp systems.

The second part of the selection procedure involved reviewing variables used in species-specific HSI models published by the U.S. Fish and Wildlife Service. Review was limited to models for those fish and wildlife species known to inhabit Louisiana coastal wetlands, and included models for 10 estuarine fish and shellfish,

4 freshwater fish, 12 birds, 3 reptiles and amphibians, and 2 mammals (Attachment 7). The number of models included from each species group was dictated by model availability.

Selected HSI models were then grouped according to the wetland type(s) used by each species. Because most species for which models were considered are not restricted to one wetland type, most models were included in more than one wetland type group. Within each wetland type group, variables from all models were then grouped according to similarity (e.g., water quality, vegetation, etc.). Each variable was evaluated based on 1) whether it met the variable selection criteria; 2) whether another, more easily measured/predicted variable in the same or a different similarity group functioned as a surrogate; and 3) whether it was deemed suitable for the WVA application (e.g., some freshwater fish model variables dealt with riverine or lacustrine environments). Variables that did not satisfy those conditions were eliminated from further consideration. The remaining variables, still in their similarity groups, were then further eliminated or refined by combining similar variables and/or culling those that were functionally duplicated by variables from other models (i.e., some variables were used frequently in different models in only slightly different format, such as percent marsh coverage, salinity, etc.).

Variables selected from the HSI models were then compared to those identified in the first part of the selection procedure to arrive at a final list of variables to describe wetland habitat quality. That list includes six variables for each of the marsh types and three for the cypress-tupelo swamp (Attachments 1-4).

IV. SUITABILITY INDEX GRAPHS

Suitability Index graphs were constructed for each variable selected within a wetland type. A Suitability Index (SI) graph is a graphical representation of how fish and wildlife habitat quality or "suitability" of a given wetland type is predicted to change as values of the given variable change, and allows the model user to numerically describe, through a Suitability Index, the habitat quality of a wetland area for any variable value. Each Suitability

Index ranges from 0.0 to 1.0, with 1.0 representing the optimum condition for the variable in question.

A variety of resources were utilized to construct each Suitability Index (SI) graph, including personal knowledge of Group members, the species HSI models from which the final list of variables was partially derived, consultation with other professionals and researchers outside the Group, and published and unpublished data and studies. An important "non-biological" constraint on SI graph development was the need to insure that graph relationships were not counter to the purpose of the CWPPRA, that is, the long term creation, restoration, protection, or enhancement of coastal vegetated wetlands. That constraint was most operative in defining SI graphs for Variable 1 under each marsh model (see discussion below).

The process of graph development was one of constant evolution, feedback, and refinement; the form of each Suitability Index graph was decided upon through consensus among Group members.

V. SUITABILITY INDEX GRAPH ASSUMPTIONS

Suitability Index graphs were developed according to the following assumptions:

1. Fresh/Intermediate Marsh Model

Variable V_1- Percent of wetland covered by persistent emergent vegetation (≥ 10 percent canopy cover). Persistent emergent vegetation plays an important role in coastal wetlands by providing foraging, resting, and breeding habitat for a variety of fish and wildlife species; and by providing a source of detritus and energy for lower trophic organisms that form the basis for the food chain. An area with no marsh (i.e., shallow open water) is assumed to have minimal habitat suitability in terms of this variable, and is assigned an SI of 0.1.

Optimum vegetation coverage in a fresh/intermediate marsh is

assumed to occur at 100 percent persistent emergent vegetation cover (SI=1.0). That assumption is dictated primarily by the constraint of not having graph relationships conflict with the CWPPRA's purpose of long term creation, restoration, protection, or enhancement of coastal vegetated wetlands. The Group had originally developed a strictly biologically-based graph defining optimum habitat conditions at marsh cover values between 60 and 80 percent, and sub-optimum habitat conditions at 100 percent cover. However, application of that graph, in combination with the time analysis used later in the evaluation process, often reduced project benefits or generated a net loss of habitat quality through time with the project. Those situations arose primarily when: existing (baseline) emergent vegetation cover exceeded the optimum (> 80 percent); the project was predicted to maintain baseline cover values; and without the project the marsh was predicted to degrade, with a concurrent decline in percent emergent vegetation cover into the optimum range (60-80 percent). The time factor aggravated the situation when the without-project degradation was not rapid enough to reduce marsh cover values significantly below the optimum range, or below the baseline SI, within the 20-year evaluation period. In those cases, the analysis would show net negative benefits for the project, and positive benefits for letting the marsh degrade rather than maintaining the existing marsh. Coupling that situation with the presumption that marsh conditions are not static, and that Louisiana will continue to lose coastal emergent marsh; and taking into account the purpose of the CWPPRA, the Group decided that, all other factors being equal, the WVA should favor projects that maximize emergent marsh creation, maintenance, and protection. Therefore, the Group agreed to deviate from a strict biologically-based habitat suitability graph for V_1 by setting optimum habitat conditions at 100 percent marsh cover.

Variable V_2- Percent of open water area dominated (> 50 percent canopy cover) by aquatic vegetation. Fresh and intermediate marshes often support diverse communities of floating-leaved and submerged aquatic plants that provide important food and cover to a wide variety of fish and wildlife species. A fresh/intermediate open water area with

no aquatics is assumed to have low suitability (SI=0.1). Optimum condition (SI=1.0) is assumed to occur when 100 percent of the open water is dominated by aquatic vegetation. Habitat suitability may be assumed to decrease with aquatic plant coverage approaching 100 percent due to the potential for mats of aquatic vegetation to hinder fish and wildlife utilization; to adversely affect water quality by reducing photosynthesis by phytoplankton and other plant forms due to shading; and contribute to oxygen depletion spurred by warm-season decay of large quantities of aquatic vegetation. The Group recognized, however, that those affects were highly dependent on the dominant aquatic plants species, their growth forms, and their arrangement in the water column; thus, it is possible to have 100 percent cover of a variety of floating and submerged aquatic plants without the above-mentioned problems due to differences in plant growth form and stratification of plants through the water column. Because predictions of which species may dominate at any time in the future would be tenuous, at best, the Group decided to simplify the graph and define optimum conditions at 100 percent aquatic cover.

Variable V_3- Marsh edge and interspersion. This variable takes into account the relative juxtaposition of marsh and open water for a given marsh:open water ratio, and is measured by comparing the project area to sample illustrations (Attachment 5) depicting different degrees of interspersion. Interspersion is assumed to be especially important when considering the value of an area as foraging and nursery habitat for freshwater and estuarine fish and shellfish; the marsh/open water interface represents an ecotone where prey species often concentrate, and where post-larval and juvenile organisms can find cover. Isolated marsh ponds are often more productive in terms of aquatic vegetation than are larger ponds due to decreased turbidities, and, thus, may provide more suitable waterfowl habitat. However, interspersion <u>can</u> be indicative of marsh degradation, a factor taken into consideration in assigning suitability indices to the various Interspersion Types.

A relatively high degree of interspersion in the form of stream courses and tidal channels (Interspersion Type 1, Attachment 5) is assumed to be optimal (SI=1.0); streams and

channels offer interspersion, yet are not indicative of active marsh deterioration. Areas exhibiting a high degree of marsh cover are also ranked as optimum, even though interspersion may be low, to avoid conflicts with the premises underlying the SI graph for variable V_1. Without such an allowance, areas of relatively healthy, solid marsh, or projects designed to create marsh, would be penalized with respect to interspersion. Numerous small marsh ponds (Interspersion Type 2) offer a high degree of interspersion, but are also usually indicative of the beginnings of marsh break-up and degradation, and are therefore assigned a more moderate SI of 0.6. Large open water areas (Interspersion Types 3 and 4) offer lower interspersion values and usually indicate advanced stages of marsh loss, and are thus assigned SI's of 0.4 and 0.2, respectively. The lowest expression of interspersion (i.e., no emergent marsh at all within the project area) is assumed to be least desirable and is assigned an SI=0.1.

Variable V_4- Percent of open water area ≤ 1.5 feet deep in relation to marsh surface. Shallow water areas are assumed to be more biologically productive than deeper water due to a general reduction in sunlight, oxygen, and temperature as water depth increases. Also, shallower water provides greater bottom accessibility for certain species of waterfowl, better foraging habitat for wading birds, and more favorable conditions for aquatic plant growth. Optimum depth in a fresh/intermediate marsh is assumed to occur when 80 to 90 percent of the open water area is less than or equal to 1.5 feet deep. The value of deeper areas in providing drought refugia for fish, alligators and other marsh life is recognized by assigning an SI=0.6 (i.e., sub-optimal) if all of the open water is less than or equal to 1.5 feet deep.

Variable V_5- Mean high salinity during the growing season. It is assumed that periods of high salinity are most detrimental in a fresh/intermediate marsh when they occur during the growing season (defined as March through November, based on dates of first and last frost contained in Soil Conservation Service soil surveys for coastal Louisiana). Mean high salinity is defined as the average of the upper 33 percent of salinity readings taken during a

specified period of record. Optimum condition in fresh marsh is assumed to occur when mean high salinity during the growing season is less than 2 parts per thousand (ppt). Optimum condition in intermediate marsh is assumed to occur when mean high salinity during the growing season is less than 4 ppt.

Variable V_6- Aquatic organism access. Access by aquatic organisms, particularly estuarine fishes and shellfishes, is considered to be a critical component in assessing the "quality" or suitability of a given marsh system to provide habitat to those species. Additionally, a marsh with a relatively high degree of access by default also exhibits a relatively high degree of hydrologic connectivity with adjacent systems, and therefore may be considered to contribute more to nutrient exchange than would a marsh exhibiting a lesser degree of access. The Suitability Index for V_7 is determined by calculating an "Access Value" based on the interaction between the percentage of the project area wetlands considered accessible by estuarine organisms during normal tidal fluctuations, and the type of man-made structures (if any) across identified points of ingress/egress (bayous, canals, etc.). Standardized procedures for calculating the Access Value have been established (Attachment 6). Optimum condition is assumed to exist when all of the study area is accessible and the access points are entirely open and unobstructed. A fresh/intermediate marsh with no access is assigned an SI=0.3, reflecting the assumption that, while fresh/intermediate marshes are important to some species of estuarine fishes and shellfish, such a marsh lacking access continues to provide benefits to a wide variety of other wildlife and fish species, and is not without habitat value.

2. Brackish Marsh Model

Variable V_1- Percent of wetland covered by persistent emergent vegetation (≥ 10 percent canopy cover). Refer to the V_1 discussion under the fresh/intermediate marsh model for a discussion of the importance of persistent emergent vegetation in coastal marshes. The V_1 Suitability Index graph in the brackish marsh model is identical to that in

the fresh/intermediate model.

Variable V_2- Percent of open water area dominated (> 50 percent canopy cover) by aquatic vegetation. Like fresh/intermediate marshes, brackish marshes have the potential to support aquatic plants that serve as important sources of food and cover for a wide variety of wildlife. However, brackish marshes generally do not support the amounts and kinds of aquatic plants that occur in fresh/intermediate marshes (although certain species, such as widgeon-grass, can occur abundantly under certain conditions). Therefore, a brackish marsh entirely lacking aquatic plants is assigned an SI=0.3. It is assumed that optimum open water coverage of aquatic plants in a brackish marsh occurs at 100 percent aquatic cover.

Variable V_3- Marsh edge and interspersion. The Suitability Index graph for edge and interspersion in the brackish marsh model is the same as that in the fresh/intermediate marsh model.

Variable V_4- Open water depth in relation to marsh surface. As in the fresh/intermediate model, shallow water areas in brackish marsh habitat are assumed to be important. However, brackish marsh generally exhibits deeper open water areas than fresh marsh due to tidal scouring. Therefore, the SI graph is constructed so that lower percentages of shallow water receive higher SI values relative to fresh/intermediate marsh. Optimum open water depth condition in a brackish marsh is assumed to occur when 70 to 80 percent of the open water area is less than or equal to 1.5 feet deep.

Variable V_5- Average annual salinity. The suitability index graph is constructed to represent optimum average annual salinity condition at between 0 ppt and 10 ppt. The Group acknowledges that average annual salinites below 6 ppt will effectively define a marsh as fresh or intermediate, not brackish. However, the suitability index graph makes allowances for lower salinities (i.e., < 6 ppt) to account for occasions when there is a trend of decreasing salinities through time toward a more intermediate condition. Implicit in keeping the graph at optimum for salinites less than 6

ppt_ is the assumption that lower salinites are not detrimental to a bracksih marsh. However, average annual salinites greater than 10 ppt are assumed to be progressively more harmful to brackish marsh vegetation, as illustrated in the downward sloping right leg of the suitability index graph. Average annual salinities greater than 16 ppt are assumed to be representative of those found in a saline marsh, and thus are not considered in the brackish marsh model.

Variable V_6- Aquatic organism access. The general rational and procedure behind the V_6 Suitability Index graph for the brackish marsh model is identical to that established for the fresh/intermediate model. However, brackish marshes are assumed to be more important as providers of habitat to estuarine fish and shellfish than fresh/intermediate marshes. Therefore, a brackish marsh providing no access is assigned an SI of 0.1.

3. Saline Marsh Model

Variable V_1- Percent of wetland covered by persistent emergent vegetation (≥ 10 percent canopy cover). Refer to the V_1 discussion under the fresh/intermediate marsh model for a discussion of the importance of persistent emergent vegetation in coastal marshes. The V_1 Suitability Index graph in the saline marsh model is identical to that in the fresh/intermediate and brackish models.

Variable V_2- Percent of open water area dominated (> 50 percent canopy cover) by aquatic vegetation. Refer to the V_2 discussion under the brackish marsh model for a discussion of persistent emergent vegetation in more saline coastal marshes. The V_2 Suitability Index graph in the saline marsh model is identical to that in the brackish model.

Variable V_3- Marsh edge and interspersion. The Suitability Index graph for edge and interspersion in the saline marsh model is the same as that in the fresh/intermediate and brackish marsh models.

Variable V_4- Open water depth in relation to marsh surface. The Suitability Index graph for open water depth in the saline marsh is similar to that for brackish marsh, where optimum conditions are assumed to occur when 70 to 80 percent of the open water area is less than or equal to 1.5 feet deep. However, at 100 percent shallow water, the saline graph yields an SI= 0.5 rather than 0.6 for the brackish model. That change reflects the increased abundance of tidal channels and generally deeper water conditions prevailing in a saline marsh due to increased tidal influences, and the importance of those tidal channels to estuarine organisms.

Variable V_5- Average annual salinity. The Suitability Index graph is constructed to represent optimum salinity conditions at between 9 ppt and 21 ppt. The Group acknowledges that average annual salinites between 9 and 12 ppt will effectively define a marsh as brackish, not saline. However, the suitability index graph makes allowances for lower salinities (i.e., < 12 ppt) to account for occasions when there is a trend of decreasing salinities through time toward a more brackish condition. Implicit in keeping the graph at optimum for salinites less than 12 ppt is the assumption that lower salinites (9-12 ppt) are not detrimental to a saline marsh. Average annual salinites greater than 21 ppt are assumed to be slightly stressful to saline marsh vegetation, as illustrated in the downward sloping right leg of the suitability index graph.

Variable V_6- Aquatic organism access. The Suitability Index graph for aquatic organism access in the saline marsh model is the same as that in the brackish marsh model.

4. Cypress-Tupelo Swamp Model

Variable V_1- Water regime. Four water regime categories are described for the cypress-tupelo swamp model. The optimum water regime for a cypress-tupelo swamp is assumed to be seasonal flooding (SI=1.0); seasonal flooding with periodic drying cycles is assumed to contribute to increased nutrient cycling (primarily through oxidation and decomposition of accumulated detritus), increased vertical structure

complexity (due to growth of other plants on the swamp floor), and increased recruitment of dominant overstory trees. Semipermanent flooding is also assumed to be desirable, as reflected in the SI=0.8 for that water regime category. Permanent flooding is assumed to be the least desirable (SI=0.2).

Variable V_2- Water flow/exchange. This variable attempts to take into consideration the amounts and types of water inputs into a cypress-tupelo swamp. The Suitability Index graph is constructed under the assumption that abundant and consistent riverine input and water flow-through is optimum (SI=1.0), because under that regime the full functions and values of a cypress-tupelo swamp in providing fish and wildlife habitat are assumed to be maximized. Habitat suitability is assumed to decrease as water exchange between the swamp and adjacent systems is reduced. A swamp system with no water exchange (e.g., an impounded swamp where the only water input is through rainfall and the only water loss is through evapotranspiration and ground seepage) is assumed to be least desirable, and is assigned an SI= 0.2.

Variable V_3- Average high salinity. Average high salinity is defined as the average of the upper 33 percent of salinity measurements taken during a specified period of record. Because baldcypress is salinity-sensitive, optimum conditions for baldcypress survival are assumed to occur at average high salinities less than 1 ppt. Habitat suitability is assumed to decrease rapidly at average high salinities in excess of 1 ppt.

VI. HABITAT SUITABILITY INDEX FORMULA

The final step in WVA model development was to construct a mathematical formula that combines all Suitability Indices for each wetland type into a single Habitat Suitability Index (HSI) value. Because the Suitability Indices range in value from 0.0 to 1.0, the HSI also ranges in from 0.0 to 1.0, and is a numerical representation of the overall or "composite" habitat quality of the particular wetland study area being evaluated. The HSI formula defines the aggregation of Suitability Indices in a manner unique

to each wetland type depending on how the formula is constructed.

Within an HSI formula, any Suitability Index can be weighted by various means to increase the power or "importance" of that variable relative to the other variables in determining the HSI. Additionally, two or more variables can be grouped together into subgroups to further isolate variables for weighting.

In constructing HSI formulas for the marsh models, the Group recognized that the primary focus of the CWPPRA is on vegetated wetlands, and that some marsh protection strategies could have adverse impacts to estuarine organism access. Therefore, the Group made an *a priori* decision to emphasize variables V_1, V_2, and V_6 by grouping and weighting them together. Weighting was facilitated by treating the grouped variables as a geometric mean. Variables V_3, V_4, and V_5 were grouped to isolate their influence relative to V_1, V_2, and V_6.

For all marsh models, V_1 receives the strongest weighting. The relative weights of V_2 and V_6 differ by marsh model to reflect differing levels of importance for those variables between the marsh types. For example, the amount of aquatic vegetation was deemed more important in the context of a fresh/intermediate marsh than in a saline marsh, due to the relative contributions of aquatic vegetation between the two marsh types in terms of providing food and cover. Therefore, V_2 receives more weight in the fresh/intermediate HSI formula than in the saline HSI formula. Similarly, the degree of estuarine organism access was considered more important in a saline marsh than a fresh/intermediate marsh, and V_6 receives more weight in the saline HSI formula than in the fresh/intermediate formula.

As with the Suitability Index graphs, the Habitat Suitability Index formulas were developed by consensus among the Group members.

VI. BENEFIT ASSESSMENT

The net benefits of a proposed project are estimated by predicting

future habitat conditions under two scenarios: with the proposed project in place and without the proposed project. Specifically, predictions are made as to how the model variables will change through time under the two scenarios. Through that process, HSI's are established for baseline (pre-project) conditions and for future-with- and future-without-project scenarios for selected "target years" throughout the expected life of the project. Those HSI's are then multiplied by the acreage of wetland type known or expected to be present in the target years to arrive at Habitat Units.

Habitat Units (HU's) represent a numerical combination of quality (HSI) and quantity (acres) existing at any given point in time. The "benefit" of a project can be quantified by comparing HU's between the future-with and future-without-project scenarios. The difference in HU's between the two scenarios represents the net benefit attributable to the project in terms of habitat quantity and quality.

The HU's resulting from the future-with- and future-without-project scenarios are annualized, averaged out over the project life, and compared to determine the net gain in average annual HU's (AAHU's) attributable to the project. Net gain in AAHU's is then combined with annualized cost data to arrive at a cost per AAHU for the evaluated project. That figure is compared to the same figure from other projects in order to rank all proposed projects in order of cost per AAHU.

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Fresh/Intermediate Marsh

Vegetation:

Variable V_1 Percent of wetland area covered by emergent vegetation (≥ 10% canopy cover).

Variable V_2 Percent of open water area dominated (> 50% canopy cover) by aquatic vegetation.

Interspersion:

Variable V_3 Marsh edge and interspersion.

Water Depth:

Variable V_4 Percent of open water area ≤ 1.5 feet deep, in relation to marsh surface.

Water Quality:

Variable V_5 Mean high salinity during the growing season (March through November).

Aquatic Organism Access:

Variable V_6 Aquatic organism access.

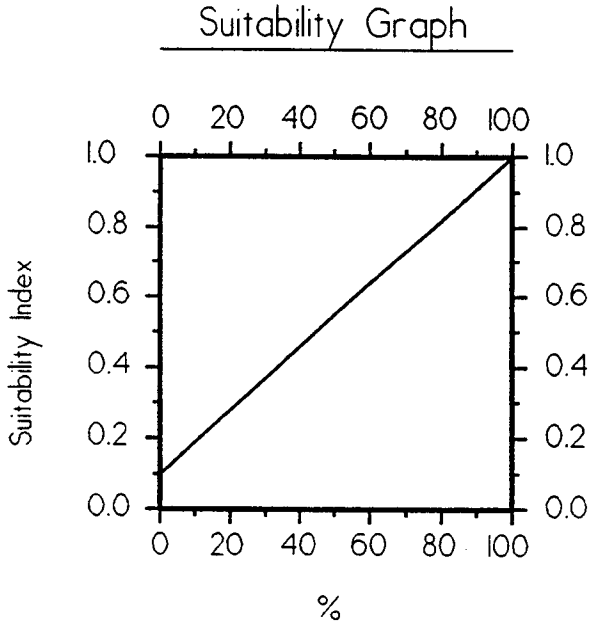
HSI Calculation:

$$HSI = \frac{\left[3.5 \times (SIV_1^{3} \times SIV_2^{1.2} \times SIV_6^{0.5})^{(1/4.7)}\right] + \left[\frac{(SIV_3 + SIV_4 + SIV_5)}{3}\right]}{4.5}$$

Attachment 1

FRESH/INTERMEDIATE MARSH

Variable V_1 Percent of wetland area covered by emergent vegetation (≥ 10% canopy cover).

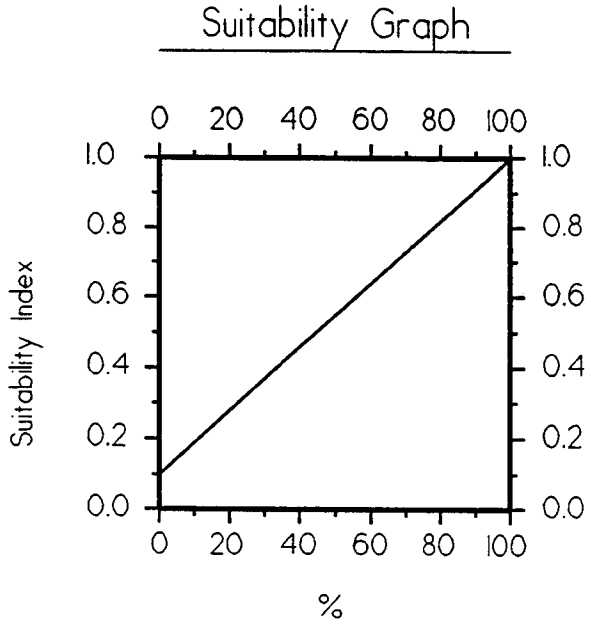


Line Formulas

SI = (0.009 * %) + 0.1

FRESH/INTERMEDIATE MARSH

Variable V_2 Percent of open water area dominated (> 50% canopy cover) by aquatic vegetation.



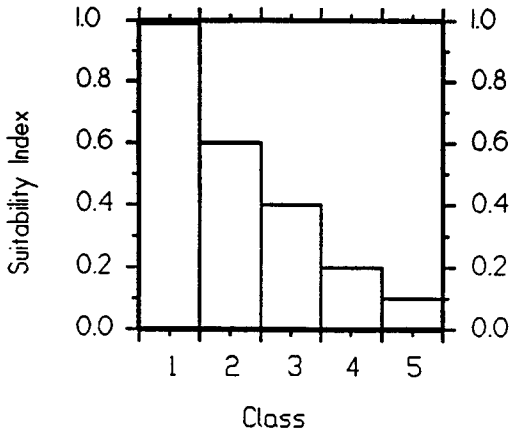
Line Formulas

SI = (0.009 * %) + 0.1

FRESH/INTERMEDIATE MARSH

Variable V_3 Marsh edge and interspersion.

Suitability Graph



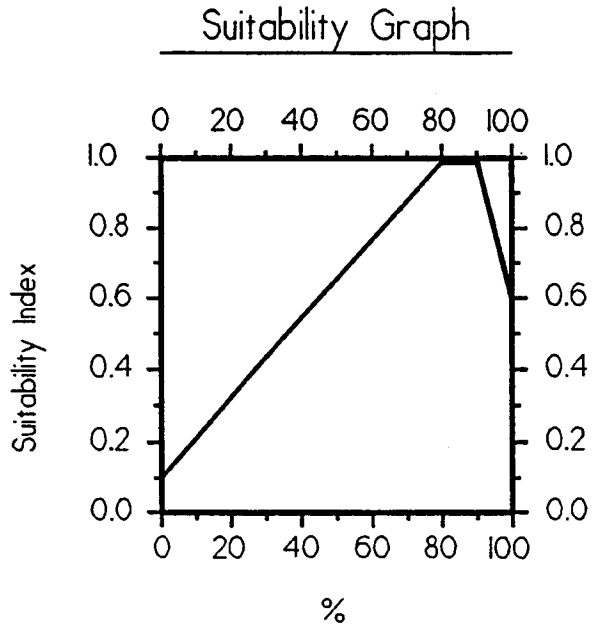
Instructions for Calculating SI for Variable 3:

1. Refer to Attachment 5 for examples of the different interspersion classes (=types).

2. Estimate percent of project area in each class and compute a weighted average to arrive at SIV_3. If the entire project area is solid marsh, assign an interspersion class #1 (SI=1.0). Conversely, if the entire project area is open water, assign an interspersion class #5 (SI=0.1).

FRESH/INTERMEDIATE MARSH

Variable V_4 Percent of open water area ≤ 1.5 feet deep, in relation to marsh surface.



Line Formulas

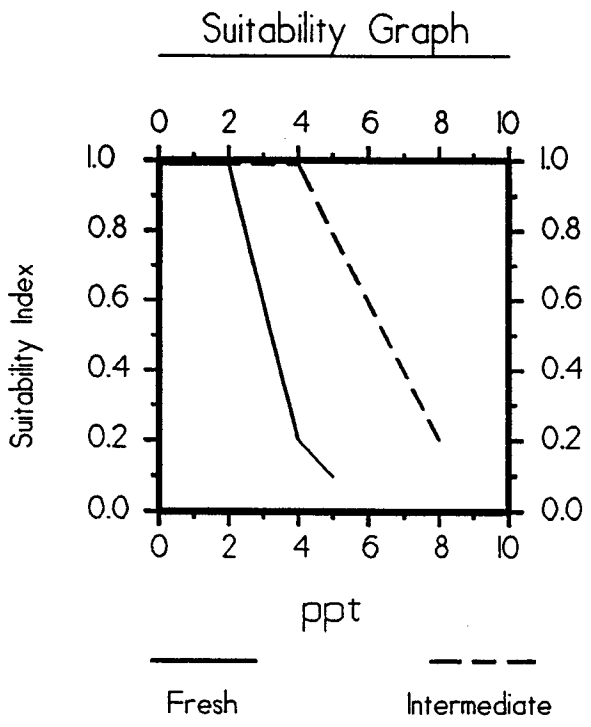
If 0 ≤ % < 80, then SI = (0.01125 * %) + 0.1

If 80 ≤ % < 90, then SI = 1.0

If % ≥ 90, then SI = (-0.04 * %) + 4.6

FRESH/INTERMEDIATE MARSH

Variable V_5 Mean high salinity during the growing season (March through November).



Line Formulas

Fresh Marsh:

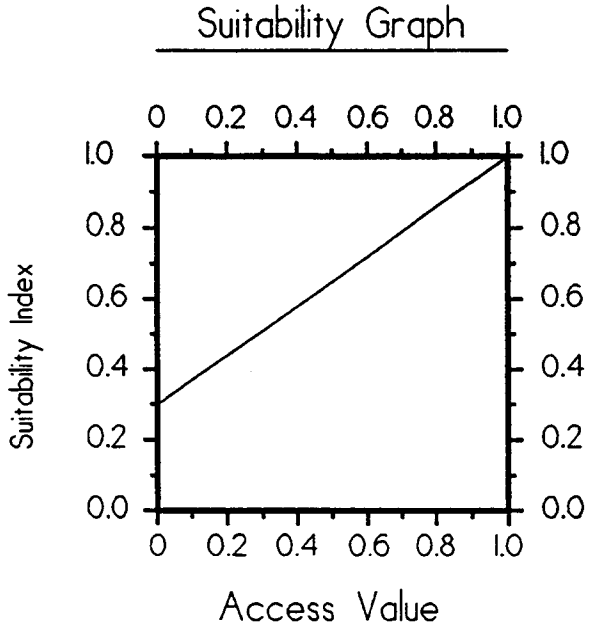
If $0 \leq ppt < 2$, then $SI = 1.0$
If $2 \leq ppt < 4$, then $SI = (-0.4 * ppt) + 1.8$
If $4 \leq ppt \leq 5$ then $SI = (-0.1 * ppt) + 0.6$

Intermediate Marsh:

If $0 \leq ppt < 4$, then $SI = 1.0$
If $4 \leq ppt \leq 8$, then $SI = (-0.2 * ppt) + 1.8$

NOTE: Mean high salinity is defined as the average of the upper 33 percent of salinity readings taken during the period of record.

Variable V_6 Aquatic organism access.



Line Formula

SI = (0.7 * Access Value) + 0.3

NOTE: Access Value = P * R, where "P" = percentage of wetland area considered accessible by estuarine organisms during normal tidal fluctuations, and "R" = Structure Rating.

Refer to Attachment 6 "Procedure For Calculating Access Value" for complete information on calculating "P" and "R" values.

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Brackish Marsh

Vegetation:

Variable V_1 Percent of wetland area covered by emergent vegetation (≥ 10% canopy cover).

Variable V_2 Percent of open water area dominated (> 50% canopy cover) by aquatic vegetation.

Interspersion:

Variable V_3 Marsh edge and interspersion.

Water Depth:

Variable V_4 Percent of open water area ≤ 1.5 feet deep, in relation to marsh surface.

Water Quality:

Variable V_5 Average annual salinity.

Aquatic Organism Access:

Variable V_6 Aquatic organism access.

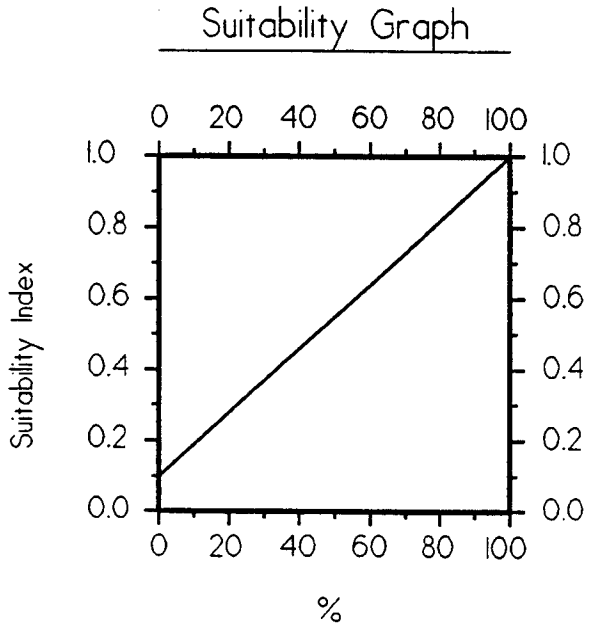
HSI Calculation:

$$HSI = \frac{\left[3.5 \times (SIV_1^3 \times SIV_2 \times SIV_6)^{(1/5)}\right] + \left[\frac{(SIV_3 + SIV_4 + SIV_5)}{3}\right]}{4.5}$$

Attachment 2

BRACKISH MARSH

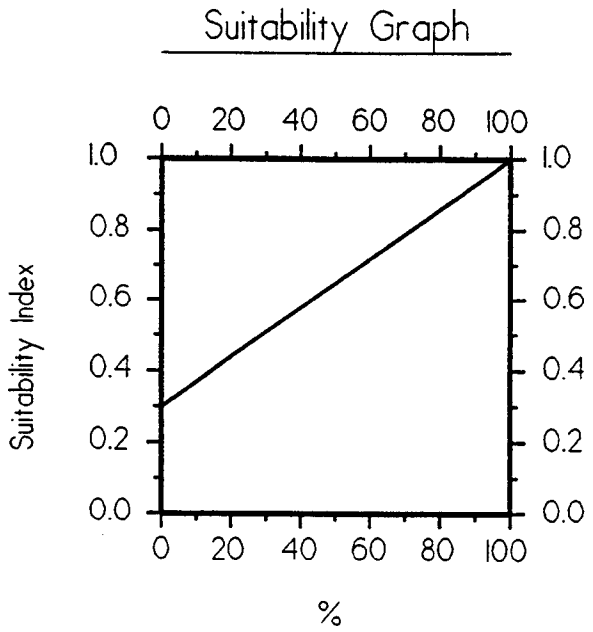
Variable V_1 Percent of wetland area covered by emergent vegetation (≥ 10% canopy cover).



Line Formulas

SI = (0.009 * %) + 0.1

Variable V_2 Percent of open water area dominated (> 50% canopy cover) by aquatic vegetation.



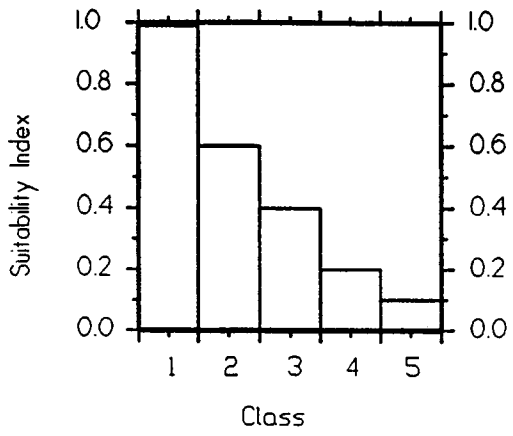
Line Formulas

SI = (0.007 * %) + 0.3

BRACKISH MARSH

Variable V_3 Marsh edge and interspersion.

Suitability Graph



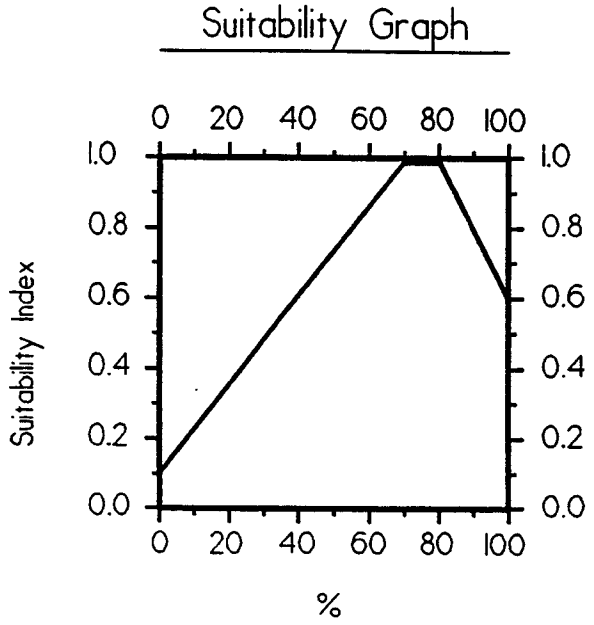
Instructions for Calculating SI for Variable 3:

1. Refer to Attachment 5 for examples of the different interspersion classes (=types).

2. Estimate percent of project area in each class and compute a weighted average to arrive at SIV_3. If the entire project area is solid marsh, assign an interspersion class #1 (SI=1.0). Conversely, if the entire project area is open water, assign an interspersion class #5 (SI=0.1).

BRACKISH MARSH

Variable V_4 Percent of open water area ≤ 1.5 feet deep, in relation to marsh surface.



Line Formulas

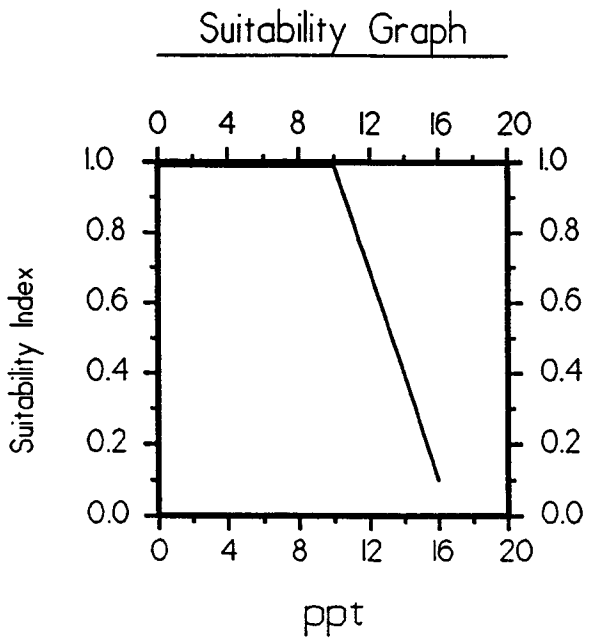
If 0 ≤ % < 70, then SI = (0.01286 * %) + 0.1

If 70 ≤ % < 80, then SI = 1.0

If % ≥ 80, then SI = (-0.02 * %) + 2.6

BRACKISH MARSH

Variable V_S - Average annual salinity.



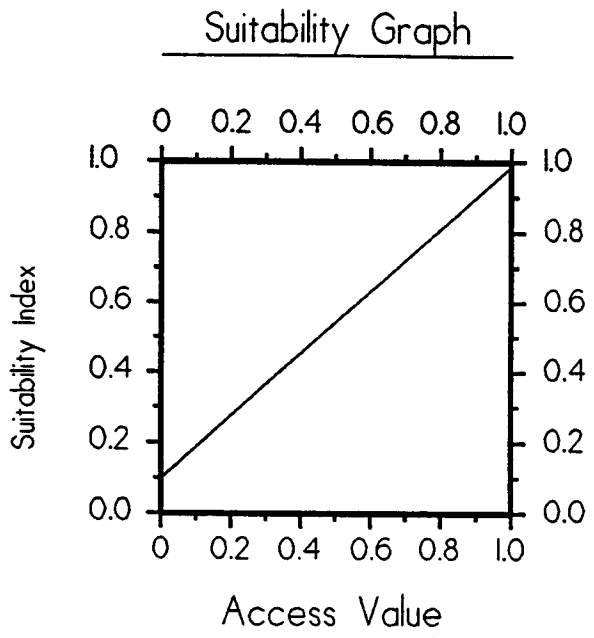
Line Formulas

If $0 \leq ppt < 10$, then $SI = 1.0$

If $ppt \geq 10$, then $SI = (-0.15 * ppt) + 2.5$

BRACKISH MARSH

Variable V_6 Aquatic organism access.



Line Formula

SI = (0.9 * Access Value) + 0.1

Note: Access Value = P * R, where "P" = percentage of wetland area considered accessible by estuarine organisms during normal tidal fluctuations, and "R" = Structure Rating.

Refer to Attachment 6 "Procedure For Calculating Access Value" for complete information on calculating "P" and "R" values.

Revised May 2, 1994

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Saline Marsh

Vegetation:

Variable V_1 Percent of wetland area covered by emergent vegetation (≥ 10% canopy cover).

Variable V_2 Percent of open water area dominated (> 50% canopy cover) by aquatic vegetation.

Interspersion:

Variable V_3 Marsh edge and interspersion.

Water Depth:

Variable V_4 Percent of open water area ≤ 1.5 feet deep, in relation to marsh surface.

Water Quality:

Variable V_5 Average annual salinity.

Aquatic Organism Access:

Variable V_6 Aquatic organism access.

HSI Calculation:

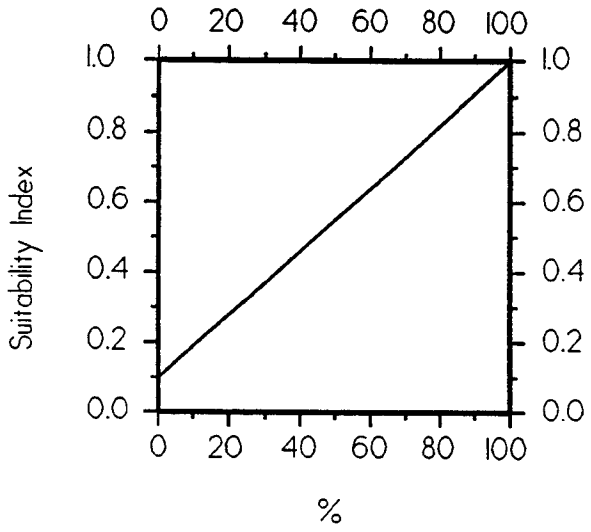
$$HSI = \frac{\left[3.5 \times (SIV_1^{3} \times SIV_2^{0.5} \times SIV_6^{1.2})^{(1/4.7)}\right] + \left[\frac{(SIV_3 + SIV_4 + SIV_5)}{3}\right]}{4.5}$$

Attachment 3

SALINE MARSH

Variable V_1 Percent of wetland area covered by emergent vegetation (≥ 10% canopy cover).

Suitability Graph

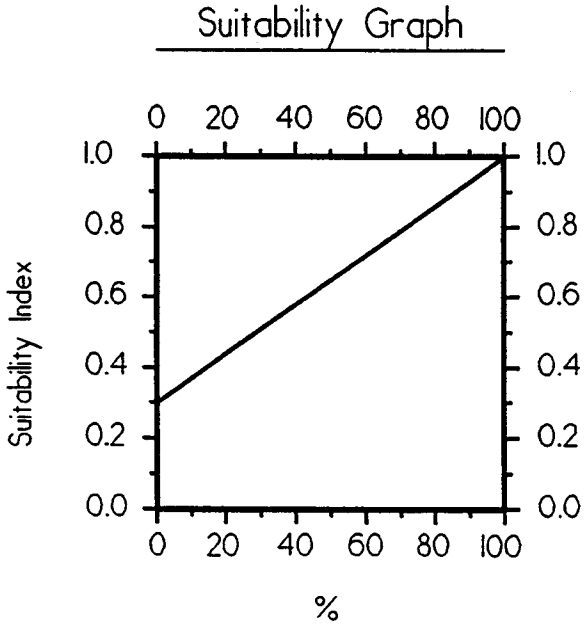


Line Formulas

SI = (0.009 * %) + 0.1

SALINE MARSH

Variable V_2 Percent of open water area dominated (> 50% canopy cover) by aquatic vegetation.



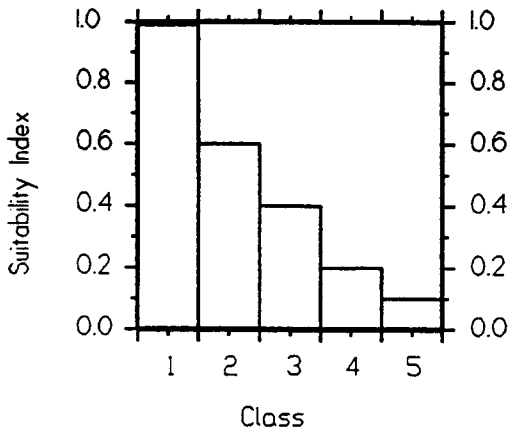
Line Formulas

SI = (0.007 * %) + 0.3

SALINE MARSH

Variable V_3 - Marsh edge and interspersion.

Suitability Graph

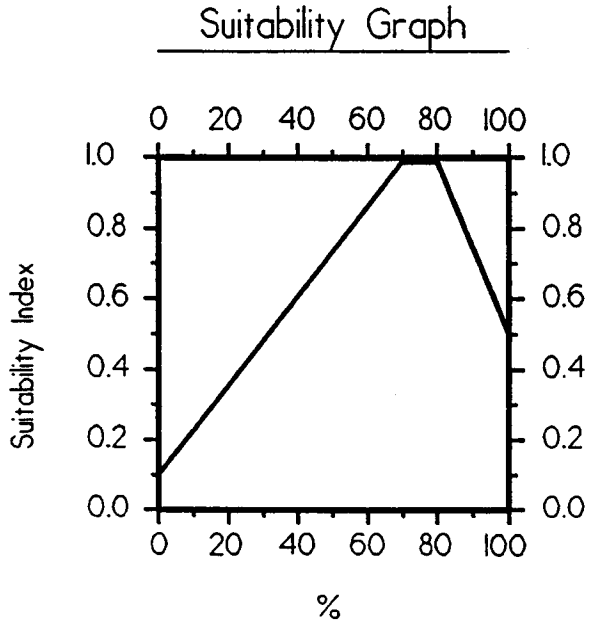


Instructions for Calculating SI for Variable 3:

1. Refer to Attachment 5 for examples of the different interspersion classes (=types).

2. Estimate percent of project area in each class and compute a weighted average to arrive at SIV_3. If the entire project area is solid marsh, assign an interspersion class #1 (SI=1.0). Conversely, if the entire project area is open water, assign an interspersion class #5 (SI=0.1).

Variable V_4 Percent of open water area ≤ 1.5 feet deep, in relation to marsh surface.



Line Formulas

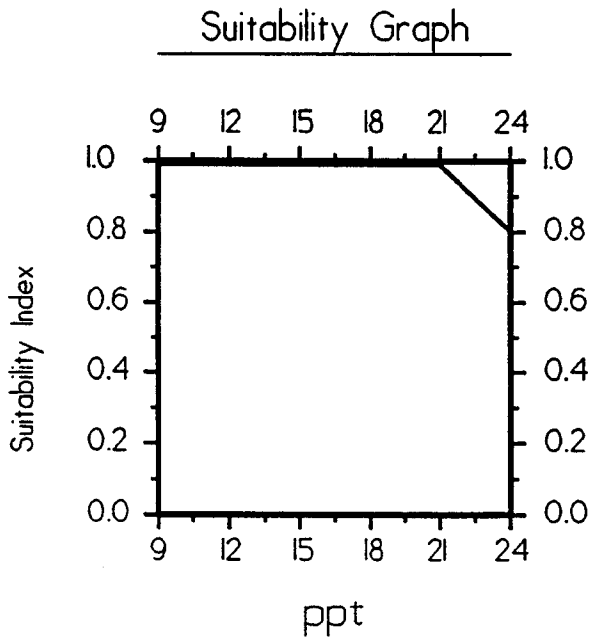
If 0 ≤ % < 70, then SI = (0.01286 * %) + 0.1

If 70 ≤ % < 80, then SI = 1.0

If % ≥ 80, then SI = (-0.025 * %) + 3.0

SALINE MARSH

Variable V_5 Average annual salinity.

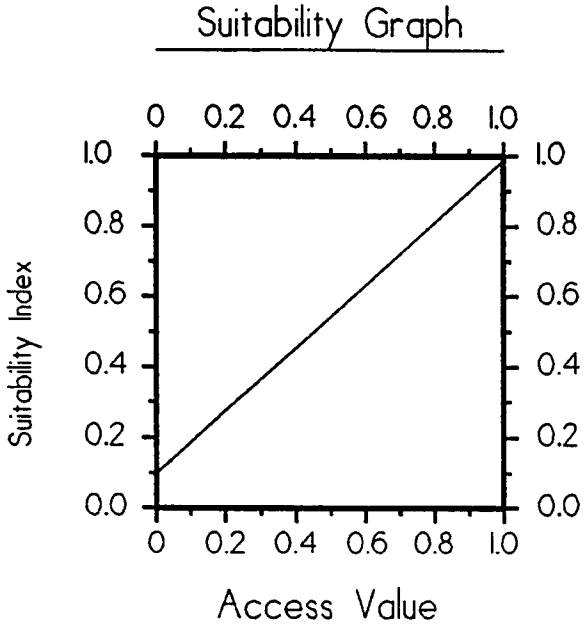


Line Formulas

If 9 ≤ ppt < 21, then SI = 1.0

If ppt ≥ 21, then SI = (-0.067 * ppt) + 2.4

Variable V_6 Aquatic organism access.



Line Formula

SI = (0.9 * Access Value) + 0.1

Note: Access Value = P * R, where "P" = percentage of wetland area considered accessible by estuarine organisms during normal tidal fluctuations, and "R" = Structure Rating.

Refer to Attachment 6 "Procedure For Calculating Access Value" for complete information on calculating "P" and "R" values.

Revised August 6, 1992

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Cypress-Tupelo Swamp

Water Depth and Duration:

Variable V_1 Water regime.

Water Quality:

Variable V_2 Water flow/exchange.

Variable V_3 Average high salinity.

HSI Calculation:

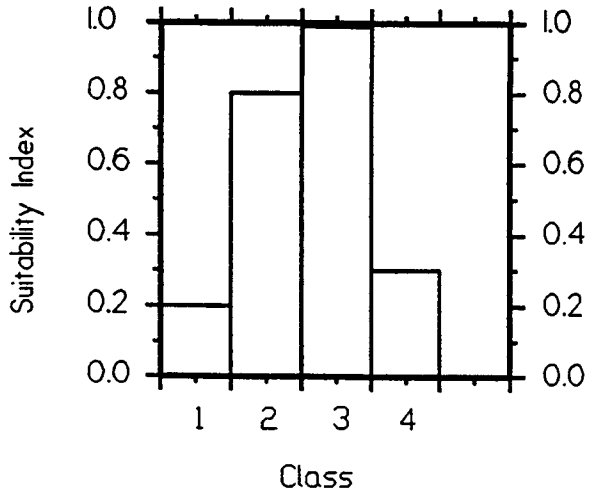
$$HSI = (SI_{V_1} \times SI_{V_2} \times SI_{V_3})^{1/3}$$

Attachment 4

CYPRESS-TUPELO SWAMP

Variable V_1 Water regime.

Suitability Graph



1 - Permanently Flooded: water covers the substrate throughout the year in all years.

2 - Semipermanently Flooded: surface water is present throughout the growing season in most years.

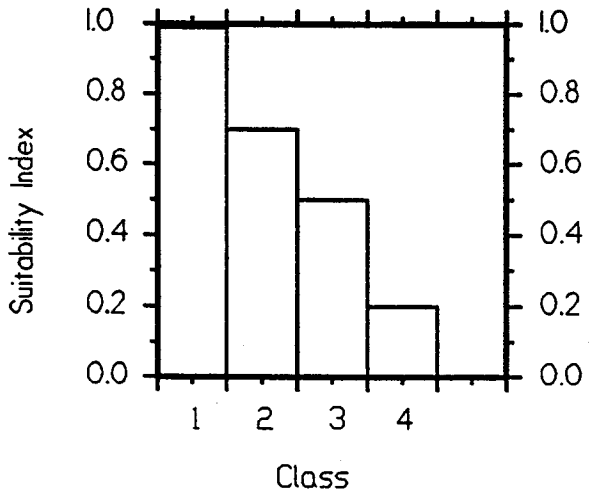
3 - Seasonally Flooded: surface water is present for extended periods, especially in the growing season, but is absent by the end of the growing season in most years.

4 - Temporarily Flooded: surface water is present for brief periods during the growing season, but the water table usually lies well below the surface for most of the season.

CYPRESS-TUPELO SWAMP

Variable V_2 Water flow/exchange.

Suitability Graph



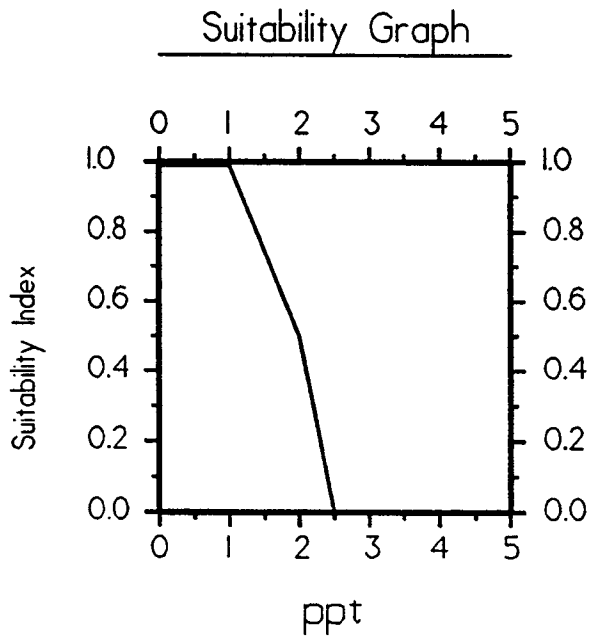
1 - Receives abundant and consistent riverine input and through-flow.

2 - Moderate water exchange, through riverine and/or tidal input.

3 - Limited water exchange, through riverine and/or tidal input.

4 - No water exchange (stagnant, impounded).

Variable V_3 Average high salinity.



Line Formulas

If $0 \leq ppt < 1$, then $SI = 1.0$

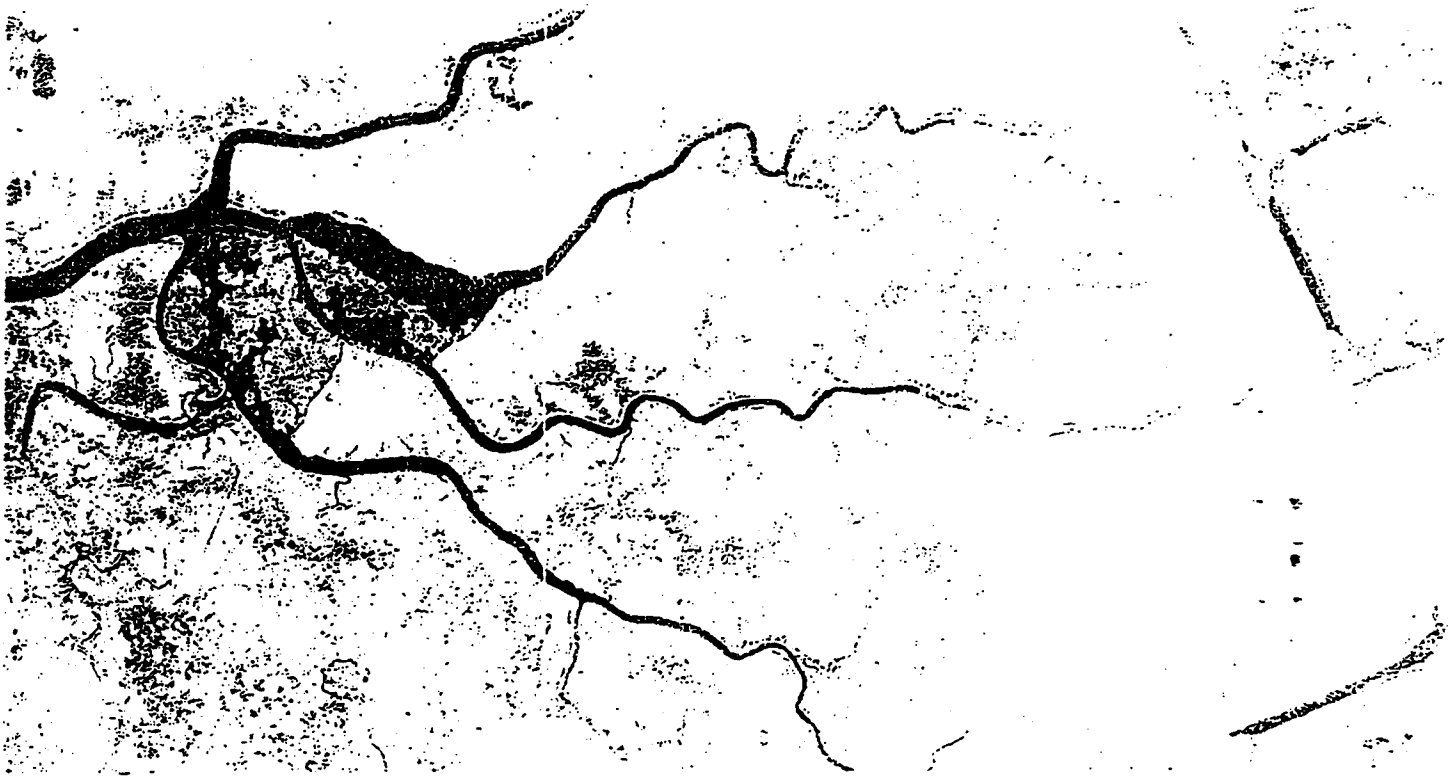
If $1 \leq ppt < 2$, then $SI = (-0.5 * ppt) + 1.5$

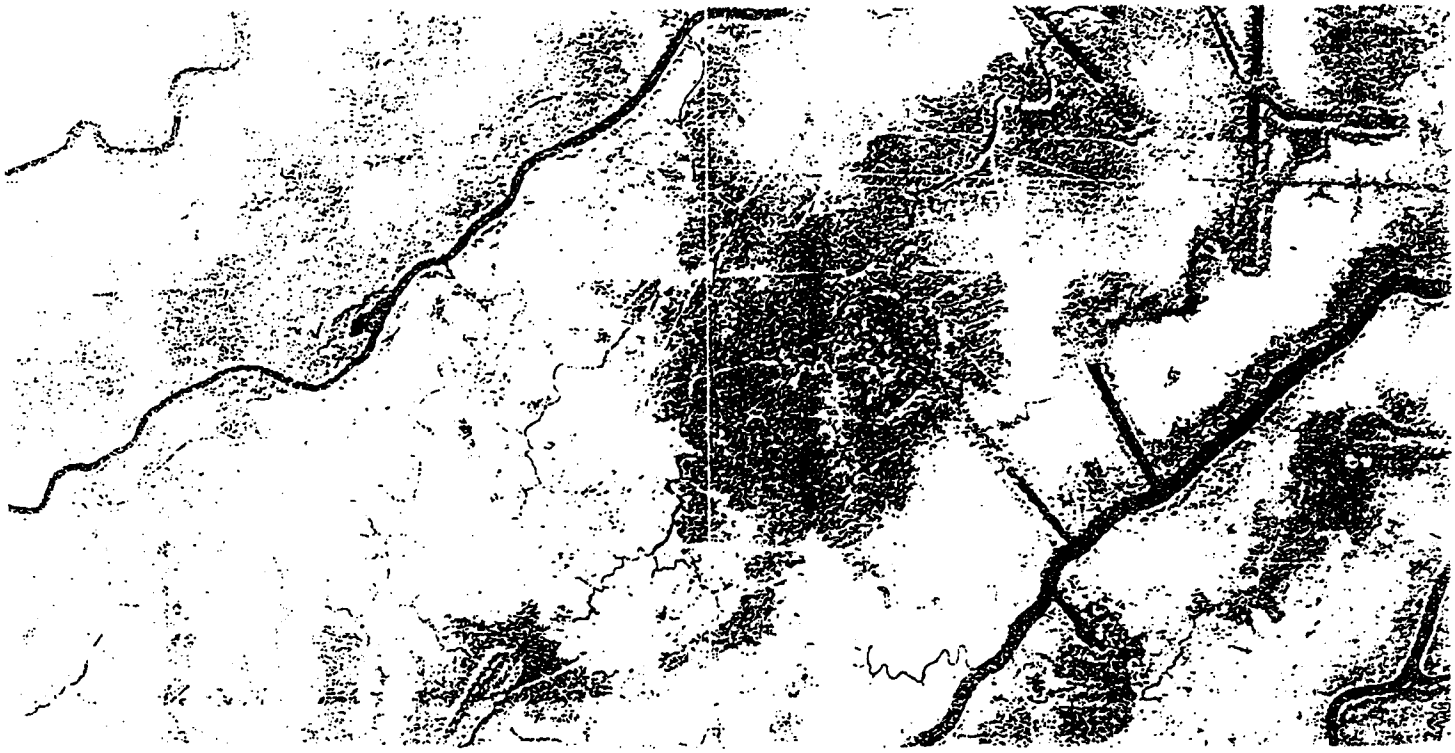
If $2 \leq ppt < 2.5$, then $SI = (-1.0 * ppt) + 2.5$

If $ppt \geq 2.5$, then $SI = 0$

Average high salinity is defined as the average of the upper 33 percent of salinity readings taken during the period of record.

Variable 3-Marsh Interspersion Type 1
Scale 1" = 2000'



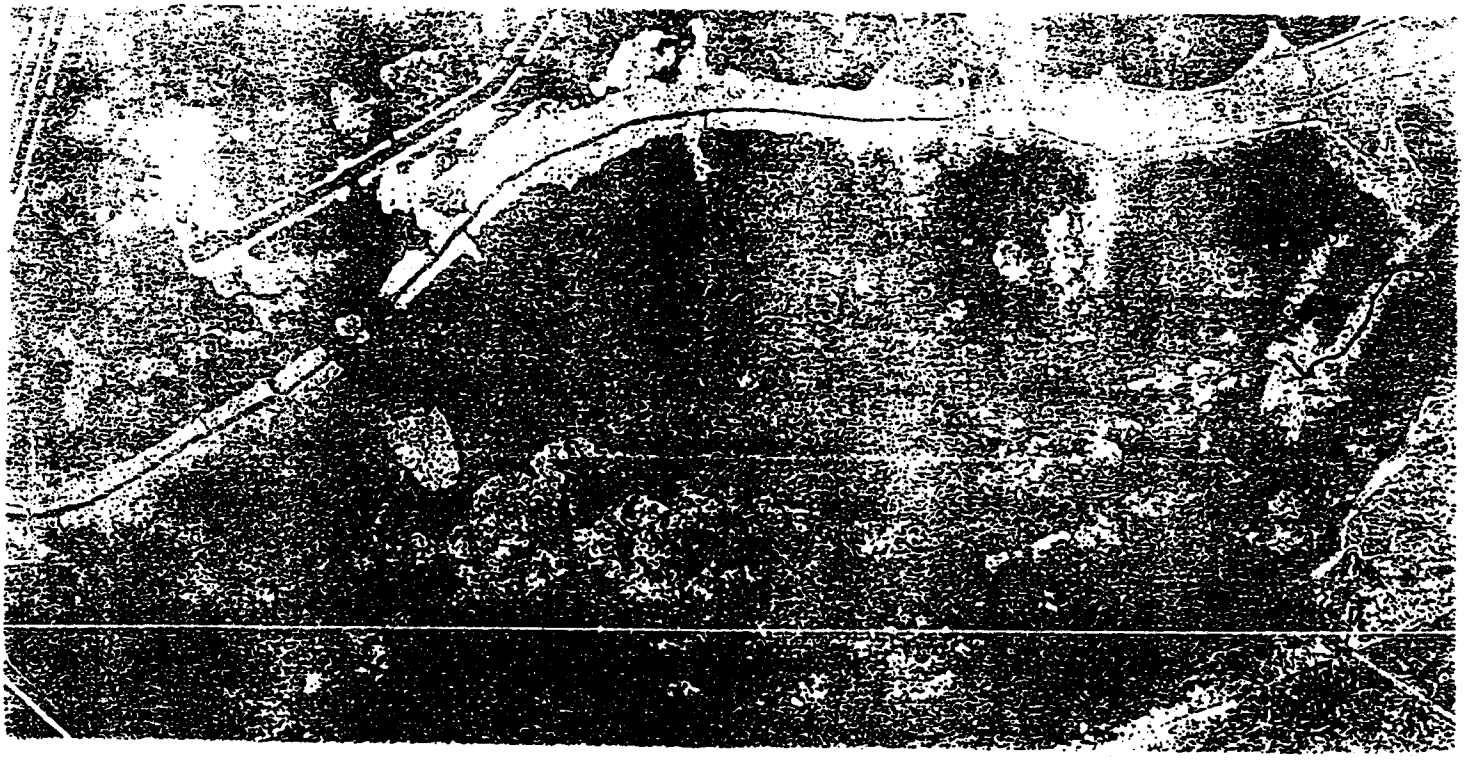


Attachment 5

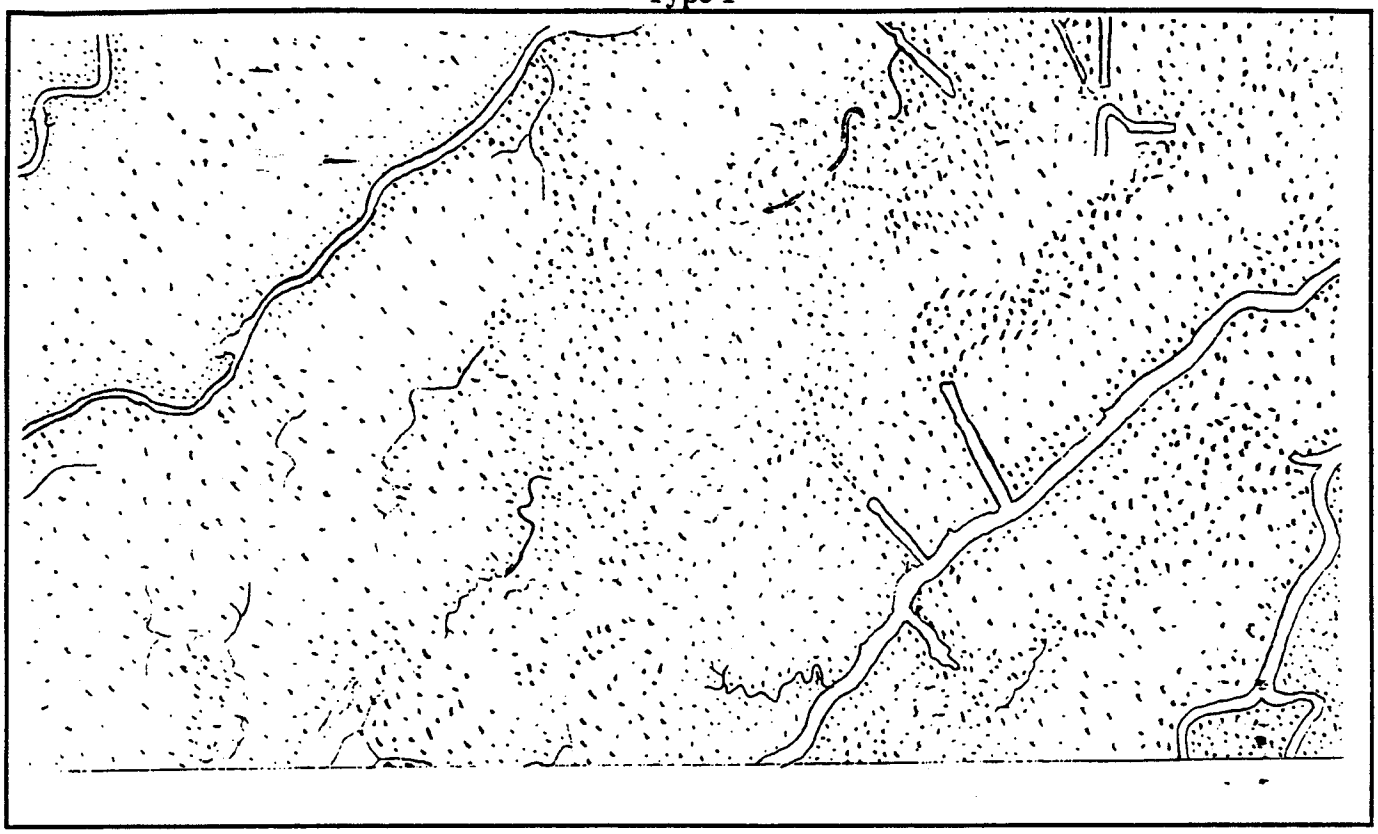
Variable 3 - Marsh Interspersion Type 2
Scale 1" = 2000'

– Variable 3 - Marsh Interspersion Type 3
Scale 1" = 2000'

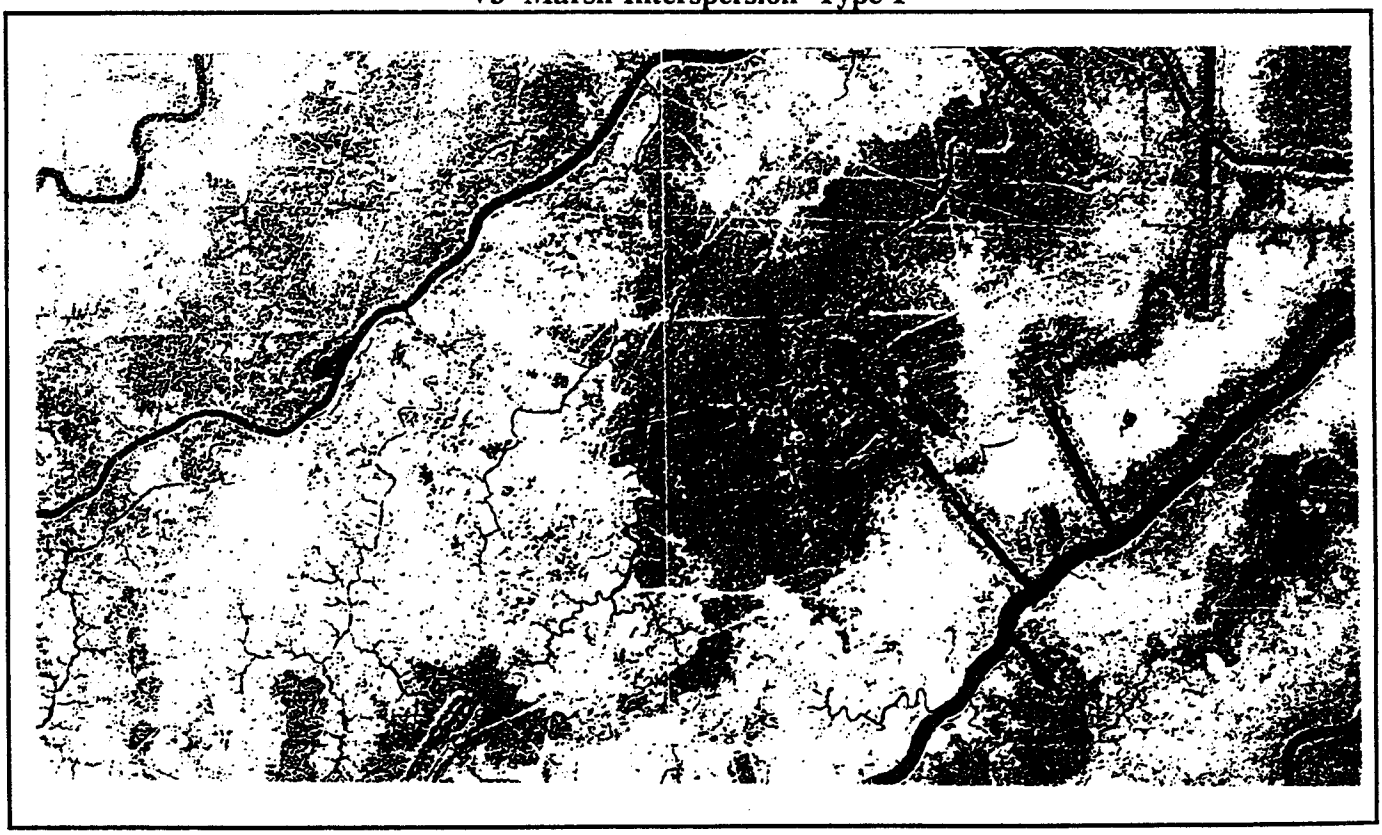
Variable 3 - Marsh Interspersion Type 4
Scale 1" = 2000'



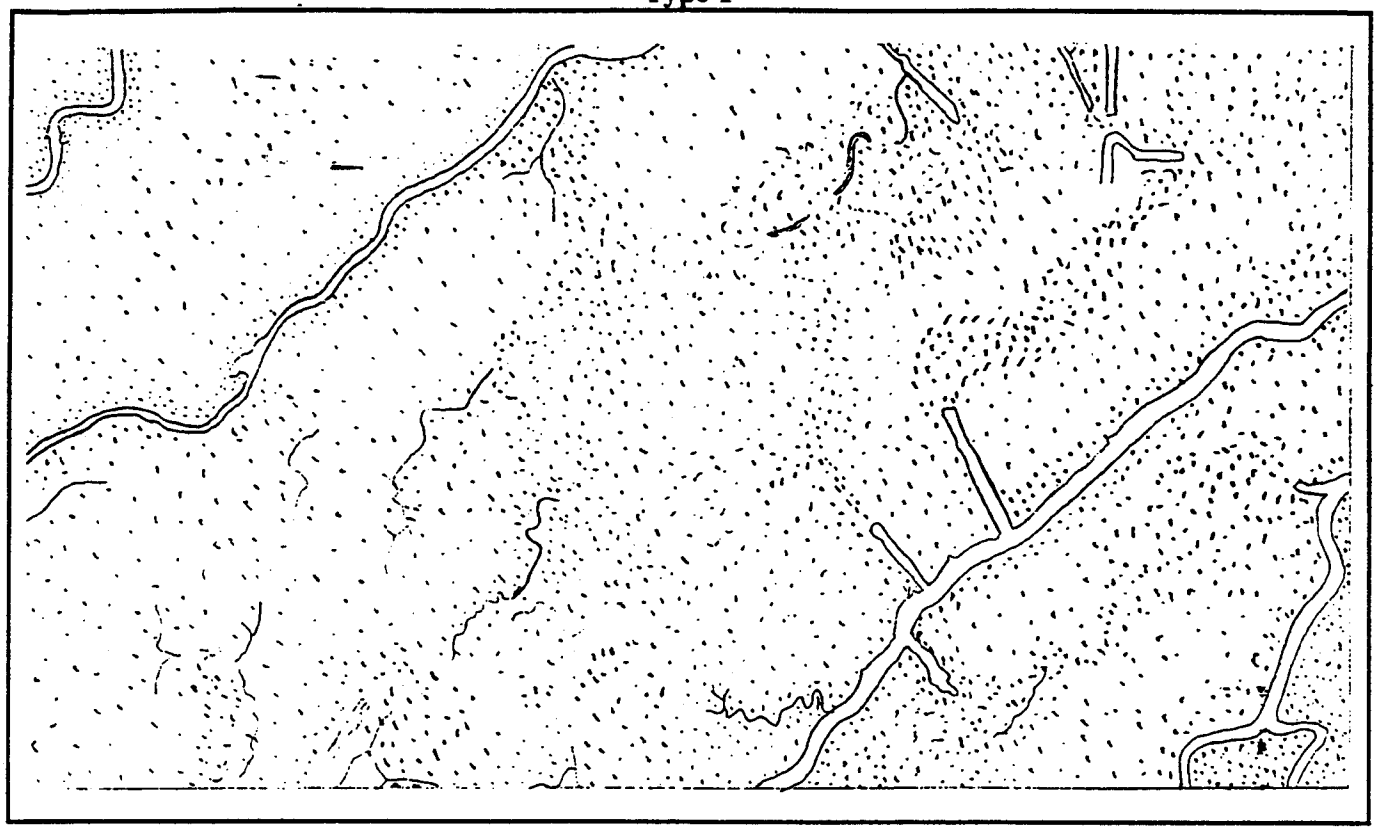
V3 Marsh Interspersion
Type 1



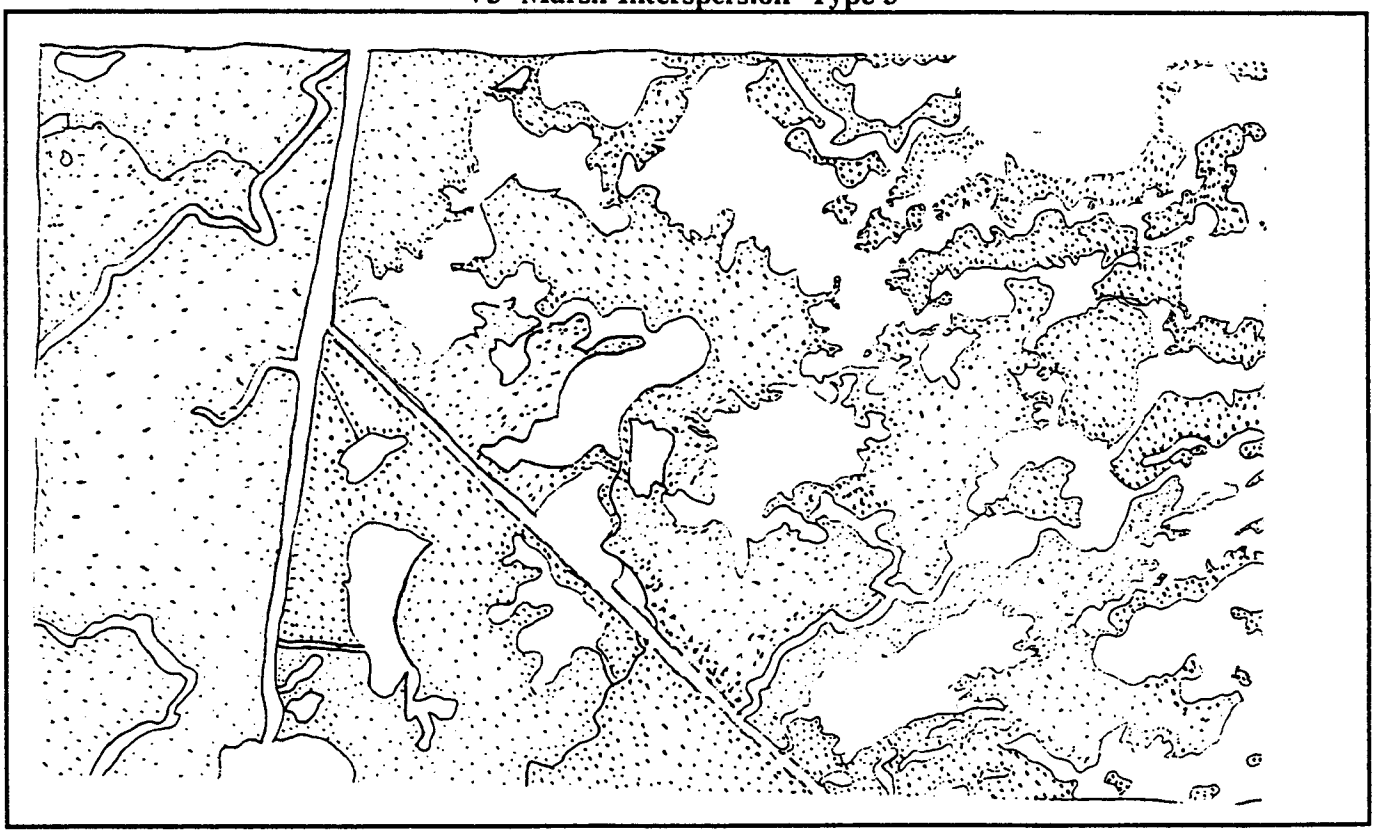
V3 Marsh Interspersion Type 1



V3 Marsh Interspersion
Type 1



V3 Marsh Interspersion Type 3



Revised June 2, 1993

PROCEDURE FOR CALCULATING ACCESS VALUE

1. Determine the percent of wetland area accessible by estuarine organisms during normal tidal fluctuations (P) for baseline (TY0) conditions. P may be determined by examination of aerial photography, knowledge of field conditions, or other appropriate methods.

2. Determine the Structure Rating (R) for each project structure as follows:

Structure Type	Rating
open system	1.0
rock weir set at 1ft BML[1], w/ boat bay	0.8
rock weir with boat bay	0.6
rock weir set at ≥ 1ft BML	0.6
slotted weir with boat bay	0.6
open culverts	0.5
weir with boat bay	0.5
weir set at ≥1ft BML	0.5
slotted weir	0.4
flapgated culvert with slotted weir	0.35
variable crest weir	0.3
flapgated variable crest weir	0.25
flapgated culvert	0.2
rock weir	0.15
fixed crest weir	0.1
solid plug	0.0001

For each structure type, the rating listed above pertains only to the standard structure configuration and assumes that the structure is operated according to common operating schedules consistent with the purpose for which that structure is designed. In the case of a "hybrid" structure or a unique application of one of the above-listed types (including unique or "non-standard" operational schemes), the WVA analyst(s) may assign an appropriate Structure Rating between 0.0001 and 1.0 that most closely approximates the relative degree to which the structure in question would allow ingress/egress of estuarine organisms. In those cases, the rational used in developing the new Structure Rating shall be documented.

3. Determine the Access Value. Where multiple openings <u>equally</u> affect a common "accessible unit", the Structure Rating (R) of

[1] Below Marsh Level

Attachment 6

the structure proposed for the "major" access point for the unit will be used to calculate Access Value. The designation of "major" will be made by the Environmental Work Group. An "accessible unit" is a defined as a portion of the total accessible area that is served by one or more access routes (canals, bayous, etc.), yet is isolated in terms of estuarine organism access to or from other units of the project area. Isolation factors include physical barriers that prohibit further movement of estuarine organisms, such as natural levee ridges, and spoil banks; and dense marsh that lacks channels, trenasses, and similar small connections that would, if present, provide access and intertidal refugia for estuarine organisms.

Access Value should be calculated according to the following examples (Note: for all examples, P for TY0 = 90%. That designation is arbitrary and is used only for illustrative purposes; P could be any percentage from 0% to 100%):

a. One opening into area; no structure.

Access Value = P
= .90

b. One opening into area that provides access to the entire 90% of the project area deemed accessible. A flapgated culvert with slotted weir is placed across the opening.

Access Value = P * R
= .90 * .6
= .54

c. Two openings into area, each capable by itself of providing full access to the 90% of the project area deemed accessible in TY0. Opening #2 is determined to be the major access route relative to opening #1. A flapgated culvert with slotted weir is placed across opening #1. Opening #2 is left unaltered.

Access Value = P
= .90

Note: Structure #1 had no bearing on the Access Value calculation because its presence did not reduce access (opening #2 was determined to be the major access route, and access through that route was not altered).

d. Two openings into area. Opening #1 provides access to an

accessible unit comprising 30% of the area. Opening #2 provides access to an accessible unit comprising the remaining 60% of the project area. A flapgated culvert with slotted weir is placed across #1. Opening #2 is left open.

Access Value = weighted avg. of Access Values of the two accessible units

$$= ([P_1*R_1] + [P_2*R_2])/(P_1+P_2)$$
$$= ([.30*0.6] + [.60*1.0])/(.30+.60)$$
$$= (.18 + .60)/.90$$
$$= .78/.90$$
$$= .87$$

Note: $P_1 + P_2 = .90$, because only 90 percent of the study area was determined to be accessible at TY0.

e. Three openings into area, each capable of providing full access to the entire area independent of the others. Opening #3 is determined to be the major access route relative to openings #1 and #2. Opening #1 is blocked with a solid plug. Opening #2 is fitted with a flapgated culvert with slotted weir, and opening #3 is left open.

Access Value = P
= .90

Note: Structures #1 and #2 had no bearing on the Access Value calculation because their presence did not reduce access (opening #3 was determined to be the major access route, and access through that route was not altered).

f. Three openings into area, each capable of providing full access to the entire area independent of the others. Opening #2 is determined to be the major access route relative to openings #1 and #3. Opening #1 is blocked with a solid plug. Opening #2 is fitted with a flapgated culvert with slotted weir, and opening #3 is fitted with a fixed crest weir.

Access Value = $P * R_2$
= .90 * .6
= .54

Note: Structures #1 and #3 had no bearing on the Access Value calculation because their presence did not reduce access. Opening #2 was determined beforehand to be the major access route; thus, it was the flapgated culvert with slotted weir across that opening that actually served to limit access.

g. Three openings into area. Opening #1 provides access to an accessible unit comprising 20% of the area. Openings #2 and #3 provide access to an accessible unit comprising the remaining 70% of the area, and within that area, each is capable by itself of providing full access. However, opening #3 is determined to be the major access route relative to opening #2. Opening #1 is fitted with an open culvert, #2 with a flapgated culvert with slotted weir, and #3 with a fixed crest weir.

$$\text{Access Value} = ([P_1*R_1] + [P_2*R_3])/(P_1+P_2)$$

$$= ([.20*.7]+[.70*.6])/(.20+.70)$$
$$= (.14 + .42)/.90$$
$$= .56/.90$$
$$= .62$$

h. Three openings into area. Opening #1 provides access to an accessible unit comprising 20% of the area. Opening #2 provides access to an accessible unit comprising 40% of the area, and opening #3 provides access to the remaining 30% of the area. Opening #1 is fitted with an open culvert, #2 a flapgated culvert with slotted weir, and #3 a fixed crest weir.

$$\text{Access Value} = ([P_1*R_1]+[P_2*R_2]+[P_3*R_3])/(P_1+P_2+P_3)$$

$$= ([.20*.7]+[.40*.6]+[.30*.1])/(.20+.40+.30)$$
$$= (.14+.24+.03)/.90$$
$$= .41/.90$$
$$= .46$$

Published Habitat Suitability Index (HSI) Models Consulted for Variables for Possible Use in the Wetland Value Assessment Models

Estuarine Fish and Shellfish

pink shrimp
white shrimp
brown shrimp
spotted seatrout
Gulf flounder
southern flounder
Gulf menhaden
juvenile spot
juvenile Atlantic croaker
red drum

Reptiles and Amphibians

American alligator
slider turtle
bullfrog

Mammals

mink
muskrat

Freshwater Fish

channel catfish
largemouth bass
red ear sunfish
bluegill

Birds

clapper rail
great egret
northern pintail
mottled duck
coot
marsh wren
great blue heron
laughing gull
snow goose
red-winged blackbird
roseate spoonbill
white-fronted goose

Attachment 7

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.

Most projects contained estimates of costs for real estate activities; however, many projects that are located in open water did not require a real estate cost estimate.

Monitoring costs for each project were estimated by the Monitoring Work Group. Monitoring program information is included as Appendix E.

Economic Analysis.

The CWPPRA 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 a Cost per 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 Cost per 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 1993 price levels, a discount rate of 8 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 1995. The fully funded cost estimates include operation and maintenance and other compensated financial costs.

The cost component of the cost-effectiveness criterion was based on the following procedures and assumptions:

a. Average annual costs represent the sum of direct and known indirect construction and operating costs, discounted over time.

b. Construction or first costs include many different cost elements besides actual construction of a project, such as engineering and design, inspection, contingencies, and real estate (land, easements, rights-of-way, and relocations) and administration.

c. Operating or ongoing costs for a project include many different cost elements besides direct operation and maintenance, including environmentally related costs. The cost elements include monitoring, replacement or closure, and induced dredging. Note that operating costs are not counted if they are part of an existing program which would not be expanded because of the project.

d. The discount rate used to account for the time value of money was 8 percent. Operating costs extend through 20 years from the base, which is also the time when first costs are considered fully amortized. Costs (and benefits) beyond 20 years are not considered.

e. The funding requirements for each project were based on the current dollar value of the construction and operating costs, except that costs paid for by sources other than the CWPPRA were not included. Whereas average annual costs assume no inflation over time, the calculation of funding requirements does include an inflation adjustment. Project benefits are not adjusted over time, *i.e.*, they are not considered to inflate nor are they discounted to give extra value to near-term habitat gains.

The results of the economic analysis are presented in Table 18.

The following section presents summary information on each of the candidate projects.

Table 18
Candidate Projects for the 4th Priority Project List

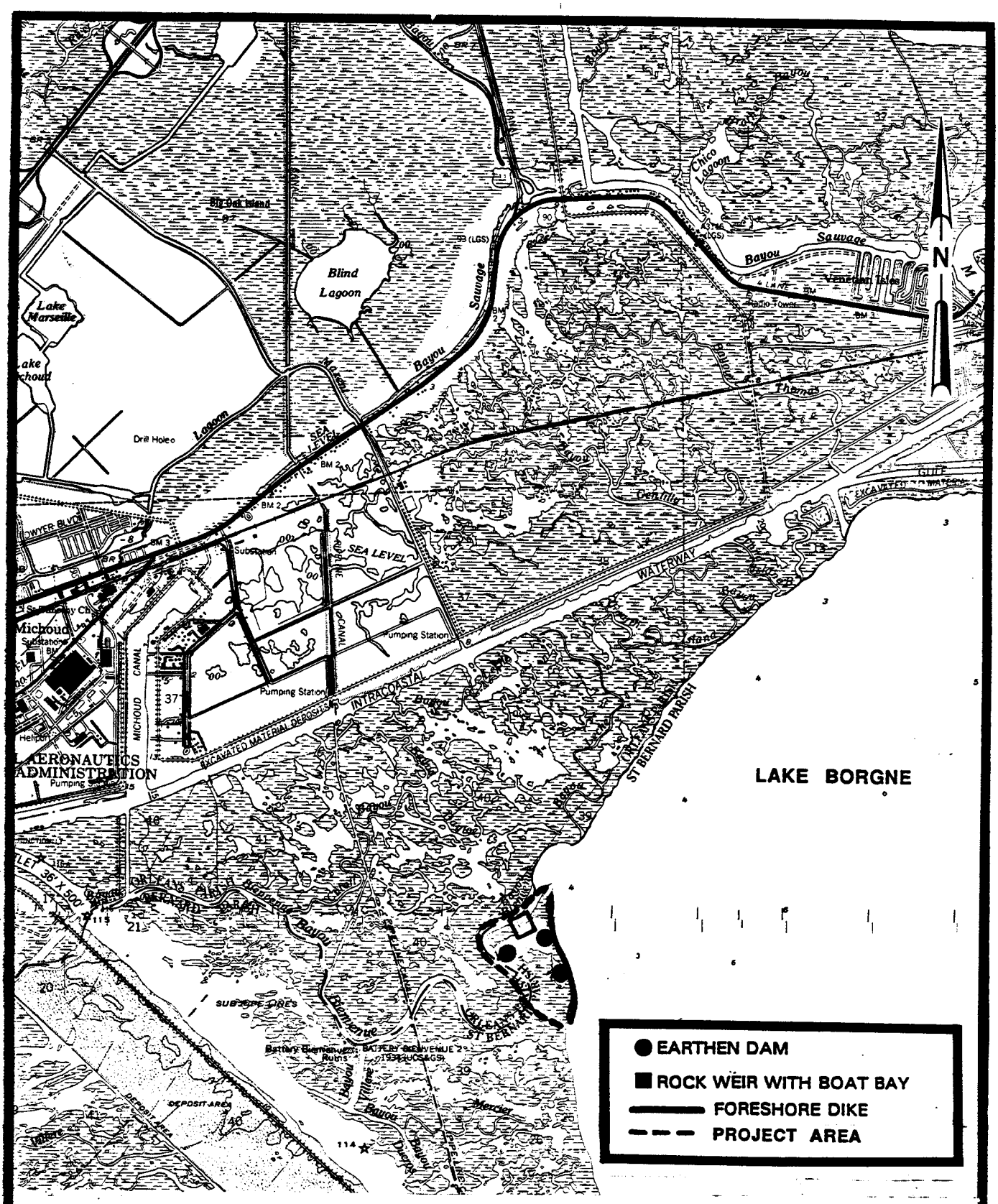
Project No.	Project Name	Average Annual Cost ($)	Average Annual Habitat Units (AAHU's)	Avg Annual Cost/AAHU ($/AAHU)	Average Annual Acres	Net Acres After 20 Years	Fully Funded Cost ($ X 1000)	Cummulative Fully Funded ($ X 1000)	Sponsoring Agency	Status	
PPO-4	Eden Isles East Marsh Restoration	363,500	1,253	290	934	1,454	5,019	5,019	NMFS	4th PPL	*
PCS-26	Perry Ridge Bank Protection	220,700	624	354	632	1,203	2,224	7,243	NRCS	4th PPL	*
BA-3c	Naomi Outfall Management	139,700	379	369	334	633	1,857	9,100	NRCS	4th PPL	
PBA-34	Bayou L'Ours Ridge Hydrologic Restoration	184,100	467	394	387	737	2,419	11,519	NRCS	4th PPL	*
TE-10/XTE-49	Grand Bayou /GIWW Freshwater Introduction	406,000	771	527	844	1,609	5,181	16,700	USFWS	4th PPL	
PTV-19	Little Vermilion Bay Sediment Trapping	110,100	149	739	238	441	1,133	17,833	NMFS	4th PPL	
TV-5/7	Marsh Island Marsh Creation & Hydrologic Restoration	354,700	452	785	233	408	3,907	21,740	USACE	4th PPL	
PBS-6	Grand Bay Crevasse	256,800	257	999	333	634	2,469	24,209	USACE	4th PPL	*
PMR-8	Pass a Loutre Sediment Mining	162,800	125	1,302	132	120	1,633	25,842	USACE	4th PPL	
CS-16	Black Bayou Culverts	849,300	592	1,435	440	837	8,296	34,138	USACE	4th PPL	
PBA-12b	Barataria Bay Waterway Bank Protection (East)	220,900	128	1,726	114	217	2,361	36,499	NRCS	4th PPL	
BS-5	Bayou Lamoque Outfall Management	95,700	39	2,454	31	59	1,048	37,547	NRCS		
XME-29	Freshwater Bayou Bank Stabilization	628,100	248	2,533	262	511	8,038	45,585	USACE		
PO-15	Alligator Point Marsh Restoration	190,300	73	2,607	30	58	2,555	48,140	NRCS		
PBA-12a	Barataria Bay Waterway Bank Protection (West)	204,400	63	3,244	122	232	2,195	50,335	NRCS	4th PPL	*
CS-11b	Sweet Lake/Willow Lake Shoreline Protection	423,400	119	3,558	70	138	4,917	55,252	USACE		
XTE-45/67b	East Timbalier Barrier Island Restoration	617,800	140	4,413	140	215	5,752	61,004	NMFS	4th PPL	*
XTV-27	Freshwater Bayou Bank Stabilization	782,700	173	4,524	354	739	10,109	71,113	USACE		
PME-1	GIWW Bank Stabilization	115,100	25	4,604	3	7	1,270	72,383	USACE		
PPO-2b	Lake Borgne Shoreline Protection	228,200	45	5,071	63	81	2,504	74,887	NRCS		
XCS-44/51	Plug West Cove Canal	80,800	15	5,387	6	11	1,033	75,920	USFWS		
BS-6	Lake Lery Hydrologic Restoration	158,500	26	6,096	22	37	1,904	77,824	NRCS		
PTE-15bii	Raccoon Island Breakwaters	248,500	14	17,750	22	26	2,631	80,455	NRCS		
	Demonstration Projects										
PPO-21	N.O. East Marsh Creation for Stormwater Treatment	NA	NA	NA	NA	NA	1,203	NA	EPA		
XPO-92a	Bayou Chevee Shoreline Protection Demo	NA	NA	NA	NA	NA	1,566	NA	USACE		
XPO-92b	Lake Borgne South of Bayou Bienvenue Shore Prot Demo	NA	NA	NA	NA	NA	253	NA	USACE		
XPO-93	Marsh Creation with Biosolids	NA	NA	NA	NA	NA	891	NA	EPA		
XTE-54b	Flotant Marsh Fencing Demonstration	NA	NA	NA	NA	NA	367	NA	NRCS	4th PPL	*
XAT-5a	Marsh Creation w/ Flexible Dredge Pipe Demonstration	NA	NA	NA	NA	NA	318	NA	EPA		
XTE-66	Sediment Distribution System Demonstration	NA	NA	NA	NA	NA	1,311	NA	EPA		
XTV-30	Wave Dissipation Demo at Marsh Island Demonstration	NA	NA	NA	NA	NA	335	NA	NRCS		
XCS-36	Compost Demonstration	NA	NA	NA	NA	NA	371	NA	EPA	4th PPL	*
XCS-56	Plowed Terraces Demonstration	NA	NA	NA	NA	NA	300	NA	NRCS	4th PPL	*
XMR-12	Beneficial Use of Hopper Dredged Material Demo	NA	NA	NA	NA	NA	300	NA	USACE	4th PPL	*

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

* Indicates priority set by the state of Louisiana (Department of Natural Resources) on projects to cost share with funds established under Louisana Act 6.

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.



PPO-2B LAKE BORGNE SHORE PROTECTION SOUTH OF BIENVENUE

Lake Borgne Shore Protection South of Bayou Bienvenue (PPO-2b)

Location:

This project is located in St. Bernard Parish on the west Lake Borgne shore south of Bayou Bienvenue.

Justification:

The long-term shoreline erosion rate for this area is 9.4 feet per year. However, most of the more erosion-resistant lake rim has been lost, and erosion is occurring at a rate approaching 20 ft/yr. At this rate, it will not be long before shoreline breaches result in a total loss of this marsh area.

Objective:

The project is designed to protect a 200-acre saline marsh and open water habitat from rapid loss due to shore erosion and tidal scour.

Project Features:

The structural components are as follows:

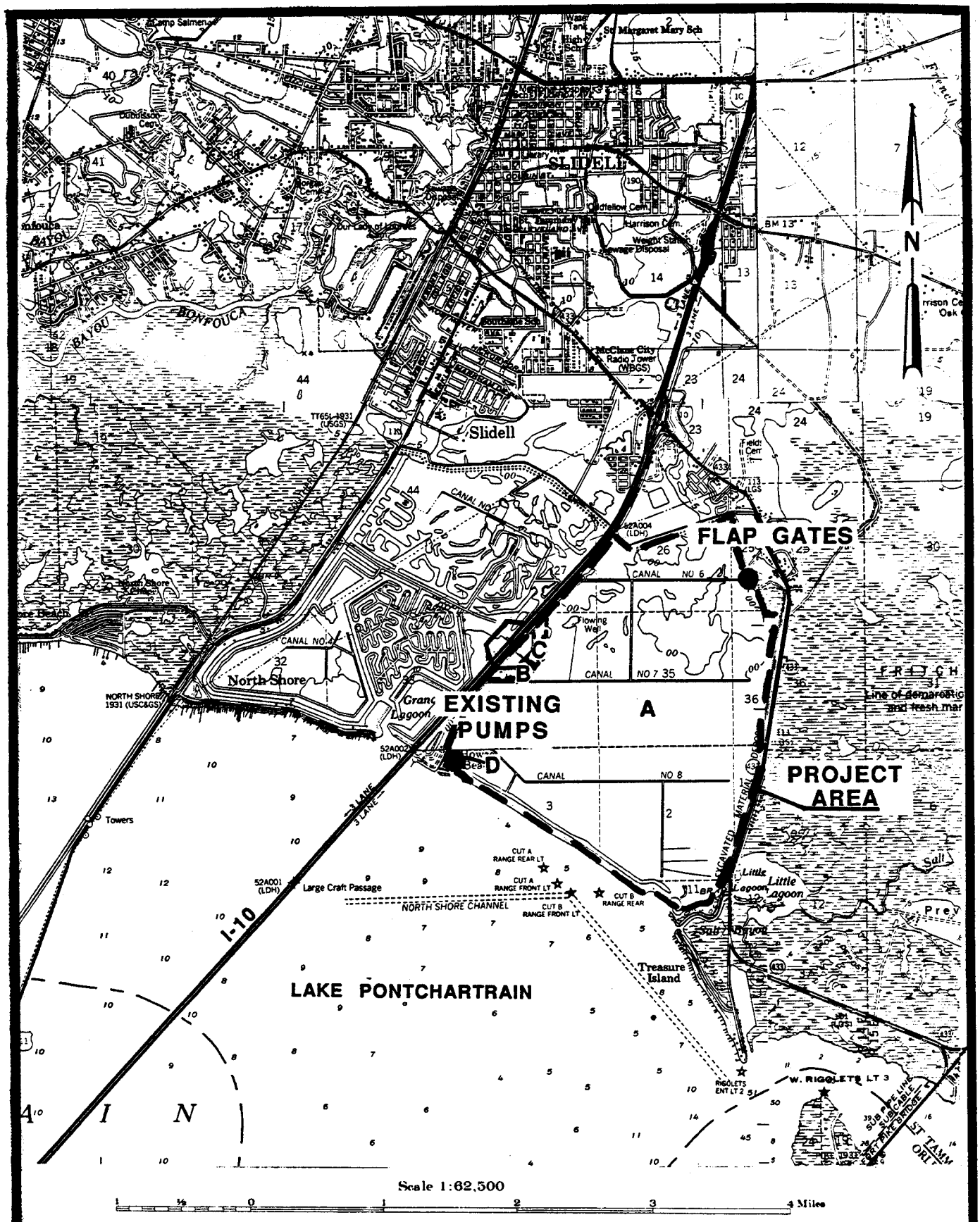
1. install one mile of foreshore dike 40 to 60 feet offshore in 3 to 4 feet of water;
2. close two shoreline breaches on Lake Borgne. The northern breach is approximately 50 feet wide and 3 feet deep. The southern breach is approximately 100 feet wide and 3 feet deep;
3. close two additional breaches on Bayou Bienvenue. These breaches are roughly 100 feet and 400 feet wide and between 3 and 4 feet deep; and
4. install a fixed crest rock weir in the channel connecting an open water area to Bayou Bienvenue.

Cost:

First Cost	$1,978,000
Average Annual Cost	$228,200
Fully Funded Cost	$2,504,000

Benefits:

Average Annual Habitat Units	45
Average Annual Acres	63
Acres Created, Protected, or Restored	81



PPO-4 EDEN ISLES EAST MARSH RESTORATION

Eden Isles East Marsh Restoration (PPO-4)

Location:

The project area is in western St. Tammany Parish, Louisiana, between Interstate 10 and Louisiana Highway 433, and adjacent to Lake Pontchartrain. The project area consists of four parcels of land, tracts A, B, C, and D. The southern limit of the project site abuts Lake Pontchartrain, where a protection levee 12 feet high forms the boundary. The perimeter of inland portions of the project area is delineated by levees lower than the one along the lake. Approximately 52,000 feet of man-made canals drain the area, and all are linked to a parish drainage pumping station, in the southwest corner of the site.

Land Classification	Acres
Drainage Canals (open water)	22
Fresh Marsh	149
High lands (area above 1.5 NGVD)	223
Fastlands (wet pasture)	2,536
Total	2,930

Justification:

The area was leveed and drained for farming in the early 1920's but apparently had been abandoned by the early 1950's when the levees failed. The area was a shallow bay until the 1970's, when the area was converted to fastlands by the combined use of levees, drainage canals, and the pumping station.

Objective:

The project objective is to restore 2,536 acres of drained fastlands to wetlands by purchasing the property, modifying the operation of the pump so that a large portion of the area would be flooded, and then actively managing water levels to maximize marsh creation.

Project Features:

The management plan calls for active water level management, through the use of the existing drainage pumps, to maintain a controlled level of -1.0 foot NGVD. However, the key in determining the final and best water level elevation will be the monitoring program.

Cost:

First Cost	$2,131,000
Average Annual Cost	$363,500
Fully Funded Cost	$5,019,000

Benefits:

Average Annual Habitat Units	1,253
Average Annual Acres	934
Acres Created, Protected, or Restored	1,454

PO-15 ALLIGATOR POINT MARSH MANAGEMENT

Alligator Point Marsh Restoration (PPO-15)

Location:

The project is located in eastern Orleans Parish, Louisiana. The project area boundaries, which encompass approximately 11,800 acres of brackish marsh and open water (9,400 and 2,400 acres respectively), are Lake Borgne to the south, the GIWW to the north, Chef Menteur Pass to the east, and Deedie Bayou to the west.

Justification:

The natural hydrology of the project area was disrupted by the construction of the GIWW and the alternate route to the GIWW, along with minor alternations from trapping trainasses and cutoffs, and the construction of a railroad north of the project area. The result has been a reduction in freshwater input into the area from the Pearl River basin. This has caused marsh loss and a shift in habitat type from an intermediate wetland to a deteriorating brackish marsh. In addition, shoreline erosion on Lake Borgne has been measured at approximately 5 feet per year with Lake Borgne threatening to blow out several critical areas on the eastern portion of the project area.

Objective:

The objective of the project is to restore the area to a more natural hydrologic regime by installing weirs and spoil banks to reduce tidal fluctuations and the loss of fresh water from local precipitation. A portion of the eastern shoreline will be stabilized to prevent shoreline erosion in critical areas.

Project Features:

Structural components of the plan include:

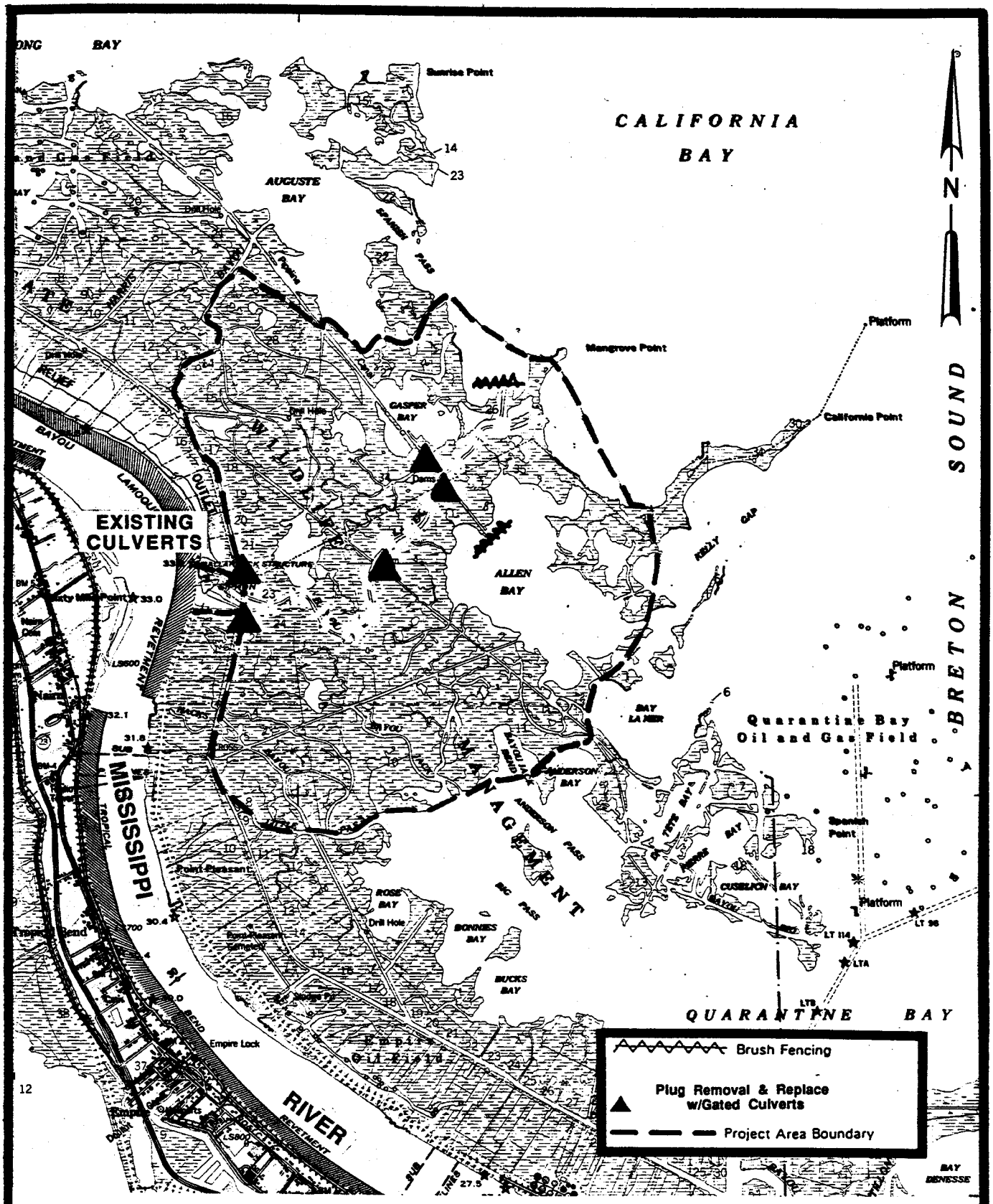
1. eight shell armored earthen dams;
2. 1,200 feet of shoreline stabilization along the portion of the eastern shoreline;
3. 4,000 feet of spoil bank repair;
4. five timber or steel sheetpile fixed crest weirs; and
5. one fixed crest rock weir on Blind Bayou.

Cost:

First Cost	$1,464,000
Average Annual Cost	$190,300
Fully Funded Cost	$2,555,000

Benefits:

Average Annual Habitat Units	73
Average Annual Acres	30
Acres Created, Protected, or Restored	58



BS-5 BAYOU LAMOQUE OUTFALL MANAGEMENT

Bayou Lamoque Diversion Outfall Management (BS-5)

Location:

The Bayou Lamoque Diversion Outfall Management area is located on the east bank of the Mississippi River east of Nairn, Louisiana, in Plaquemines Parish. The project area is bounded by the Mississippi River to the west, California Bay to the east, Auguste Bayou to the north, and Anderson Bay to the south. The area encompasses 6,267 acres of saline marsh and open water habitat.

Justification:

The existing Bayou Lamoque structures consist of four 10- by 10-foot and four 12- by 12-foot box culverts. The structures are operated by the Louisiana Department of Wildlife and Fisheries and are open between the months of January and August.

Outfall management of the diverted waters provides an opportunity to realize the full benefits of the fresh water and sediments available through the existing diversion. Management involves the control of water levels and direction of flow to increase dispersion and retention time of fresh water, nutrients, and some sediment in the marsh.

Project Features:

Structural components of the plan are as follows:

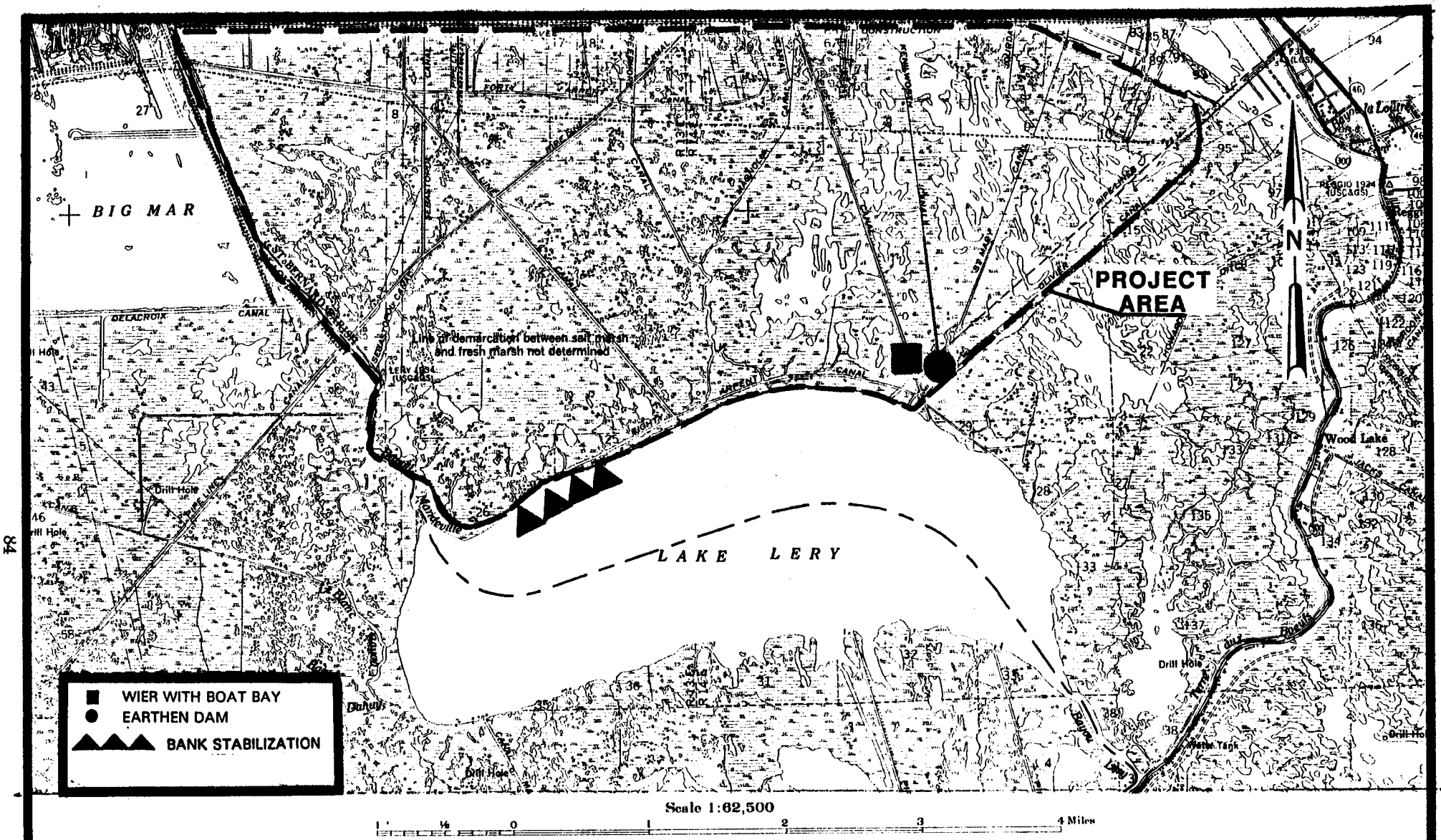
1. remove five pipeline canal plugs and place rock liners, flap-gated culverts or screw-gated culverts for freshwater introduction;
2. construct 4,000 feet of brush fencing at two locations; and
3. provide a hydraulic gate-operating power tool to reduce the effort required to manually open or close all screwgates.

Cost:

First Cost	$735,000
Average Annual Cost	$95,700
Fully Funded Cost	$1,048,000

Benefits:

Average Annual Habitat Units	39
Average Annual Acres	31
Acres Created, Protected, or Restored	59



BS-6 LAKE LERY HYDROLOGIC RESTORATION

Lake Lery Hydrologic Restoration (BS-6)

Location:

This project is located in St. Bernard Parish, Louisiana, encompassing 6,500 acres of intermediate marsh between the St. Bernard Ridge and Lake Lery. The project encompasses two distinct subareas: the western portion (Area 1) includes 1,000 acres of intermediate marsh and open water habitat, and the eastern portion (Area 2) includes 5,500 acres of intermediate marsh and open water habitat.

Justification:

By construction of the Mississippi River levee, man has effectively stopped annual flooding that served to nourish the surrounding marshes with sediments, nutrients, and fresh water. Construction of the Mississippi River Gulf Outlet in 1963 breached the La Loutre ridge and accelerated saltwater intrusion into Bayou Terre aux Boeufs, Lake Lery, and numerous canals in the project area. As a result, this area is currently suffering marsh loss at a rate of approximately 8 acres per year.

The Caernarvon Freshwater Diversion structure is located in close proximity to the project area, and field observations suggest that the marsh is benefiting from fresh water, sediment, and nutrients passing through the structure. However, wetland benefits to this area from Caernarvon may be reduced upon implementation of the Caernarvon Outfall Management Plan (BS-3a) authorized for funding under the CWPPRA second priority list. For this reason, additional measures are necessary to help protect this area from continued land loss.

Objective:

This plan has the dual objective of stabilizing a blowout on Lake Lery and restoring a more natural hydrologic regime where the marsh has been adversely impacted by canal dredging (area near Kenilworth, St. Mary, and Olivier Canals). The objectives would be achieved by installing structures to reduce tidal exchange, promote freshwater retention, and halt shoreline erosion.

Project Features:

Structural components of the project are:

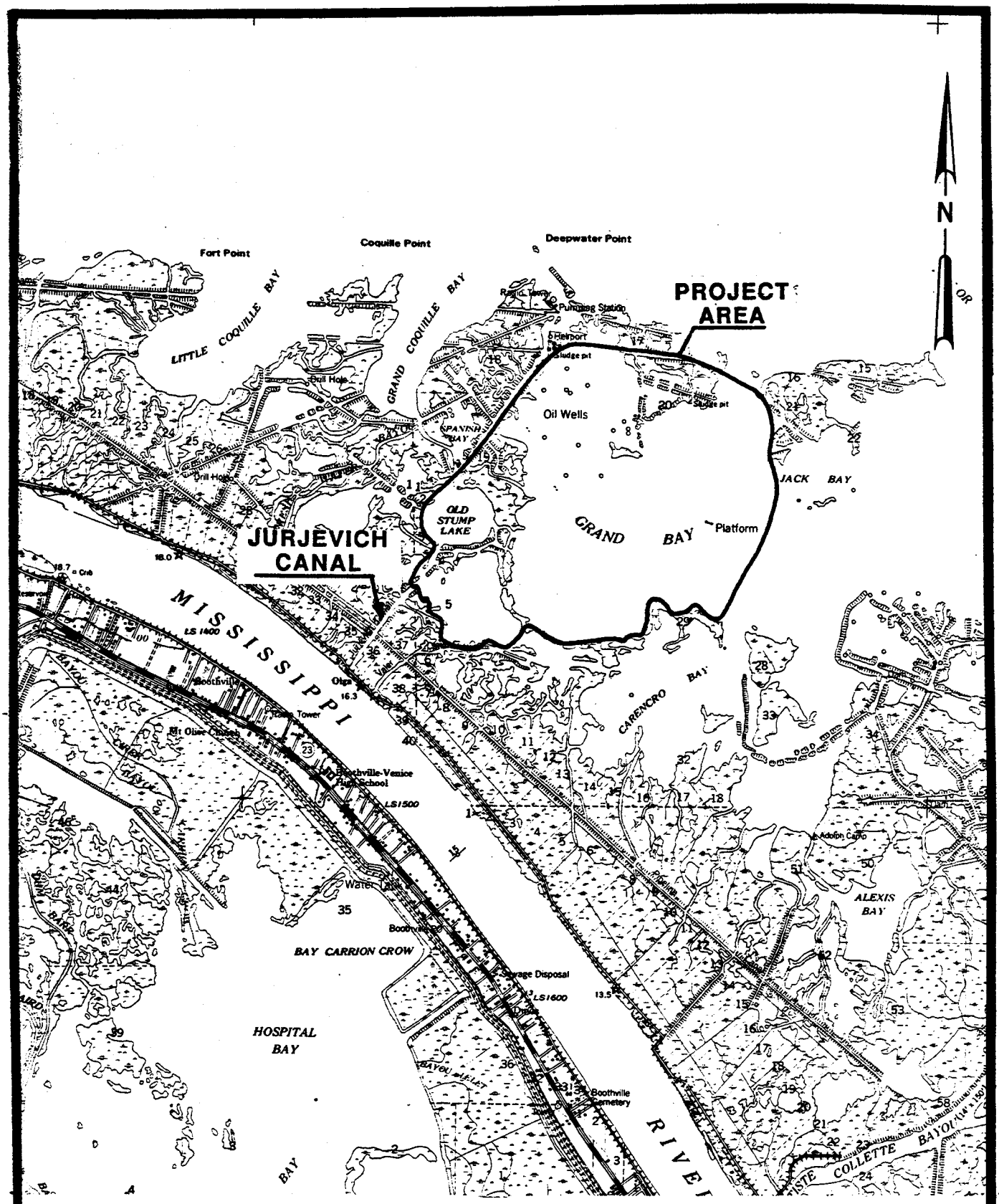
1. approximately 3,700 feet of rip-rap stone revetment to repair a blowout on the north shore of Lake Lery;
2. a slotted weir with a boat bay on the eastern pipeline canal; and
3. a rock weir at the confluence of the Kenilworth, St. Mary, and Olivier Canals.

Cost:

First Cost	$1,267,000
Average Annual Cost	$158,500
Fully Funded Cost	$1,904,000

Benefits:

Average Annual Habitat Units	26
Average Annual Acres	22
Acres Created, Protected, or Restored	37



PBS-6 CREVASSE DEVELOPMENT AT GRAND BAY

Crevasse Development at Grand Bay (PBS-6)

Location:

The project is located at the Jurjevich Canal near Mississippi River Mile 16.3 Above Head of Passes, in Plaquemines Parish, Louisiana. The project area consists of 3,150 acres of brackish marsh and 3,150 acres of saline marsh.

Justification:

Grand Bay and adjacent marshes experienced significant freshwater and sediment input with annual Mississippi River flooding until artificial levees were constructed along the river bank. Subsequently, rocks were placed along the river banks to stabilize the channel. Construction of a rock lined opening through the rocks would reestablish a pathway for fresh water and sediment into Grand Bay and the adjacent marshes. Grand Bay is a semi-enclosed body of water which will maximize sediment retention and marsh creation.

Objectives:

The object of the project is to create, restore, and enhance wetlands in the area of Grand Bay by constructing a lined cut through the rocks at the head of the Jurjevich Canal. Sediment from the Mississippi River will eventually create a delta splay in Grand Bay.

Project Features:

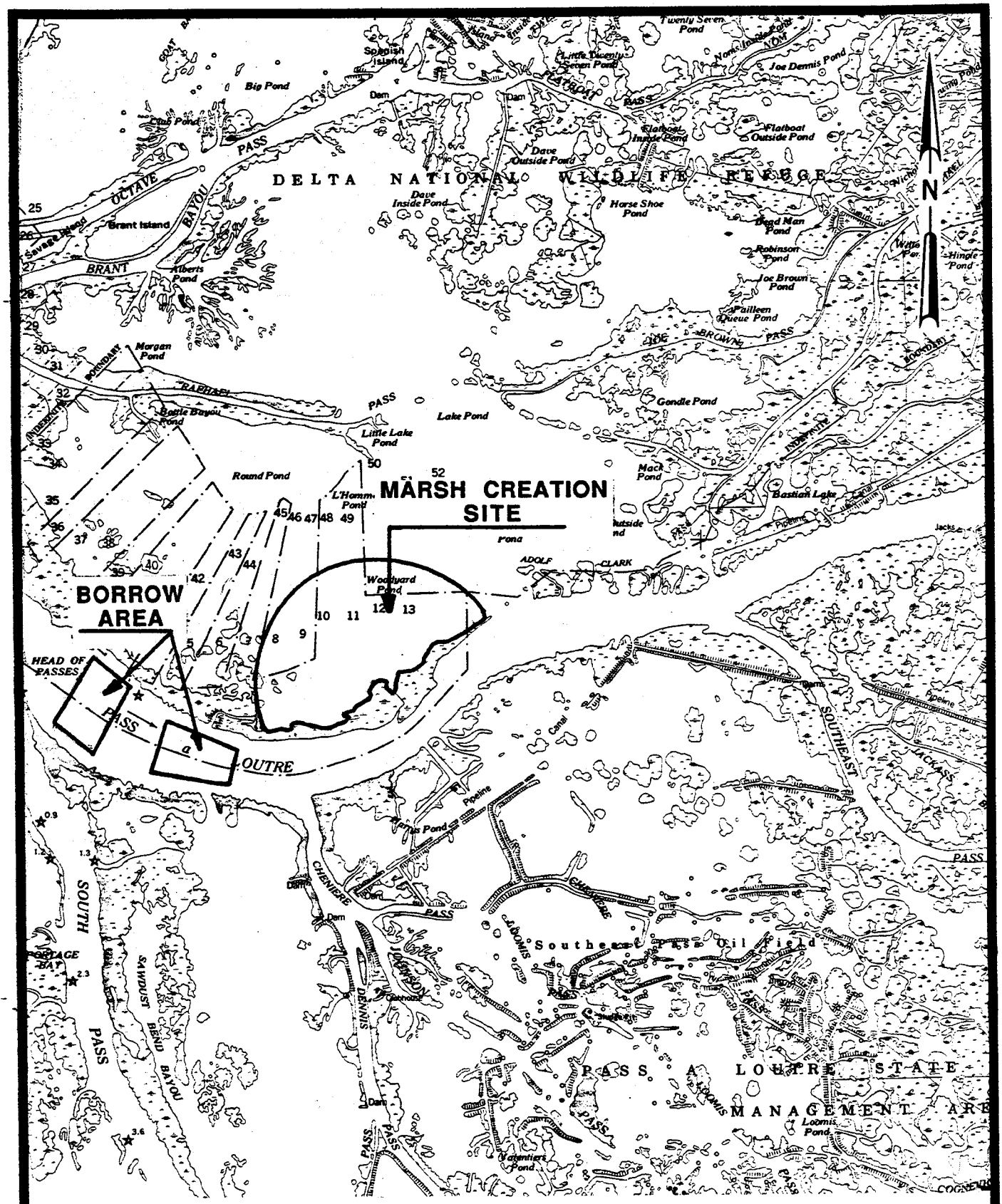
The project will consist of rearranging approximately 1,500 tons of rock at the head of the Jurjevich canal, allowing an estimated maximum of 20,000 cubic feet per second (cfs) of Mississippi River water into the canal, Grand Bay, and adjacent wetlands. The entrance of the canal will be lined with additional rock to prevent scouring of the canal. In addition, two pipelines crossing the Jurjevich Canal will be relocated.

Cost:

First Cost	$2,080,000
Average Annual Cost	$256,800
Fully Funded Cost	$2,469,000

Benefits:

Average Annual Habitat Units	257
Average Annual Acres	333
Acres Created, Protected, or Restored	634



PMR-8 PASS-A-LOUTRE SEDIMENT MINING

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. However, 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:

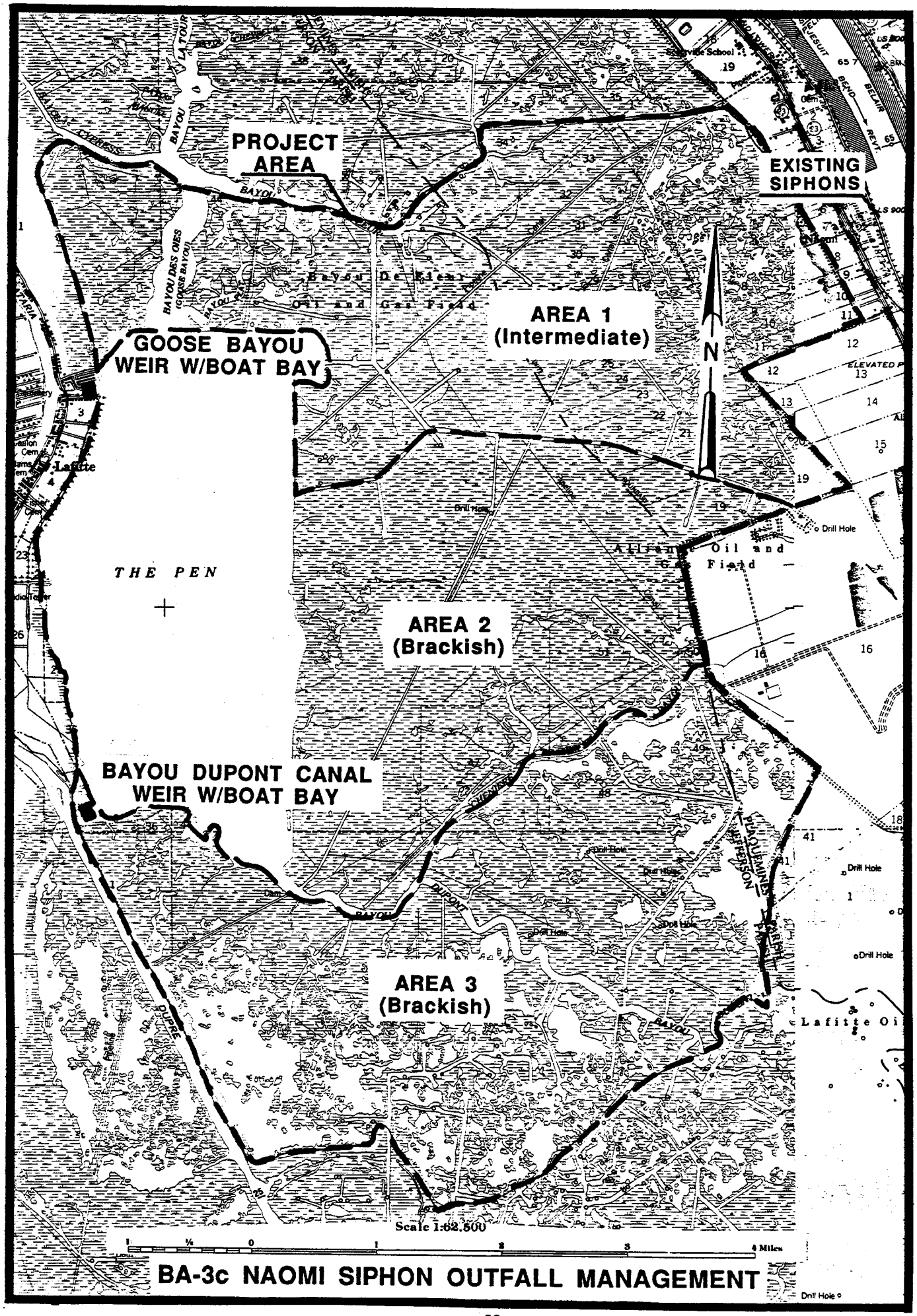
Approximately 800,000 cubic yards of dredged material will be excavated from the designated borrow areas within Pass-a-Loutre and will be deposited unconfined in the shallow open water area behind the left descending bank of the pass to create wetlands. The material will be deposited into 3 mounds to 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 35 acres of emergent fresh/intermediate marsh and 80 acres of subaerial wetland. The total area benefited, including minor deposition, is 380 acres.

Cost:

First Cost	$1,425,000
Average Annual Cost	$162,800
Fully Funded Cost	$1,633,000

Benefits:

Average Annual Habitat Units	125
Average Annual Acres	132
Acres Created, Protected, or Restored	120


PROJECT AREA
EXISTING SIPHONS
AREA 1 (Intermediate)
GOOSE BAYOU WEIR W/BOAT BAY
THE PEN
AREA 2 (Brackish)
BAYOU DUPONT CANAL WEIR W/BOAT BAY
AREA 3 (Brackish)
N
Scale 1:62,500
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 along 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 west bank 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.

Project Features:

The outfall management plan calls for the following structural components.

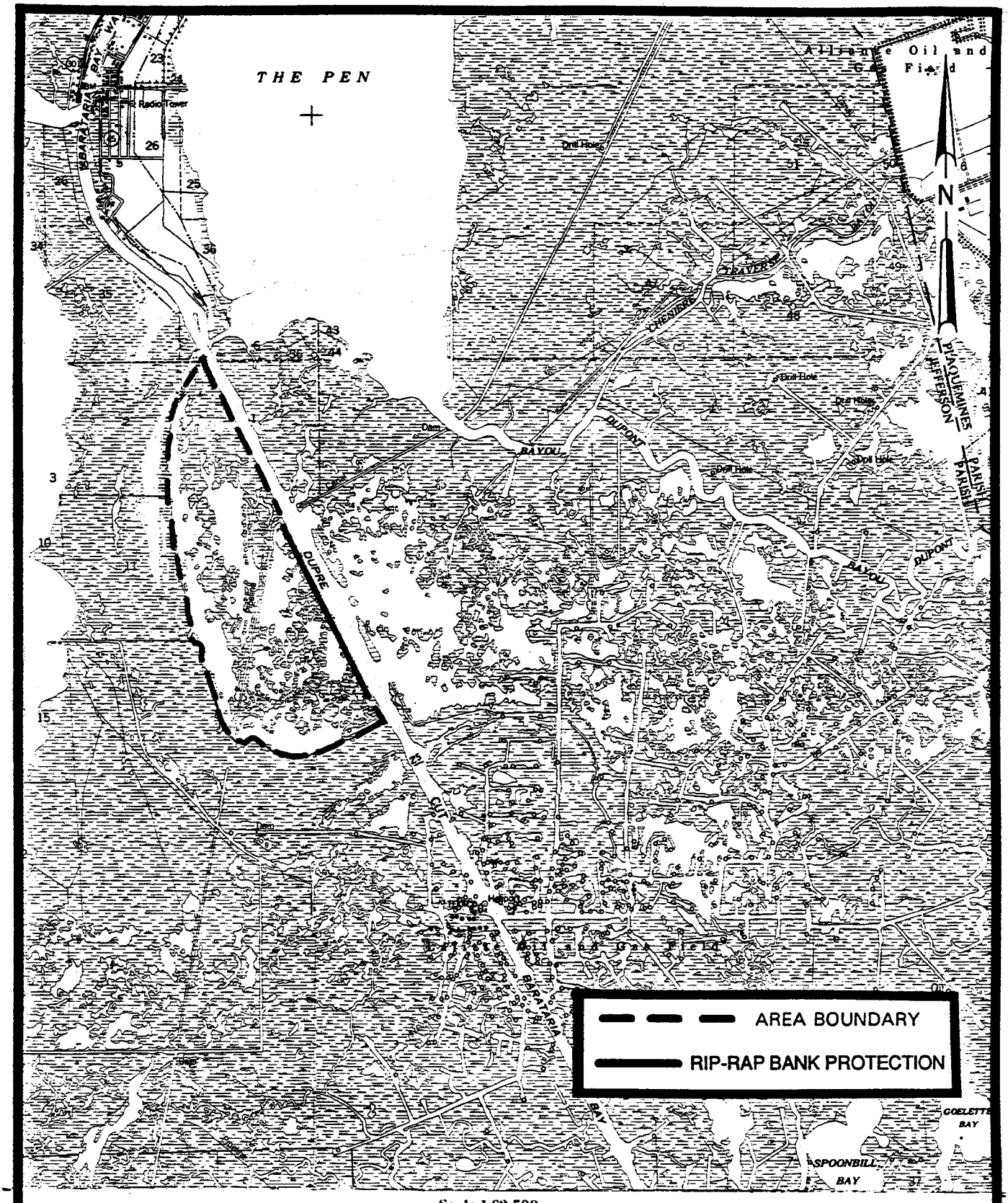
1. Constructing a weir with a boat bay on the Goose Bayou Canal. The estimated weir dimensions are 425 feet by 11 feet. The weir will be set six inches below marsh level with a 20-foot-wide by 6-foot-deep boat bay.
2. Constructing a weir with a boat bay on the Bayou Dupont Canal. The estimated weir dimensions are 300 feet by 21 feet. The weir will be set six inches below marsh level with a 20-foot-wide by 6-foot-deep boat bay.

Cost:

First Cost	$1,026,000
Average Annual Cost	$139,700
Fully Funded Cost	$1,857,000

Benefits:

Average Annual Habitat Units	379
Average Annual Acres	334
Acres Created, Protected, or Restored	633



PBA-12a BARATARIA BAY WATERWAY BANK PROTECTION (WEST)

Barataria Bay Waterway Bank Protection--West (PBA-12a)

Location:

The project is located in Jefferson Parish, Louisiana, on the west bank of the Dupre Cut portion of the Barataria Bay Waterway. The project area encompasses approximately 1,800 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 west bank of the Dupre Cut to protect the marsh from excessive water exchange and subsequent erosion.

Project Features:

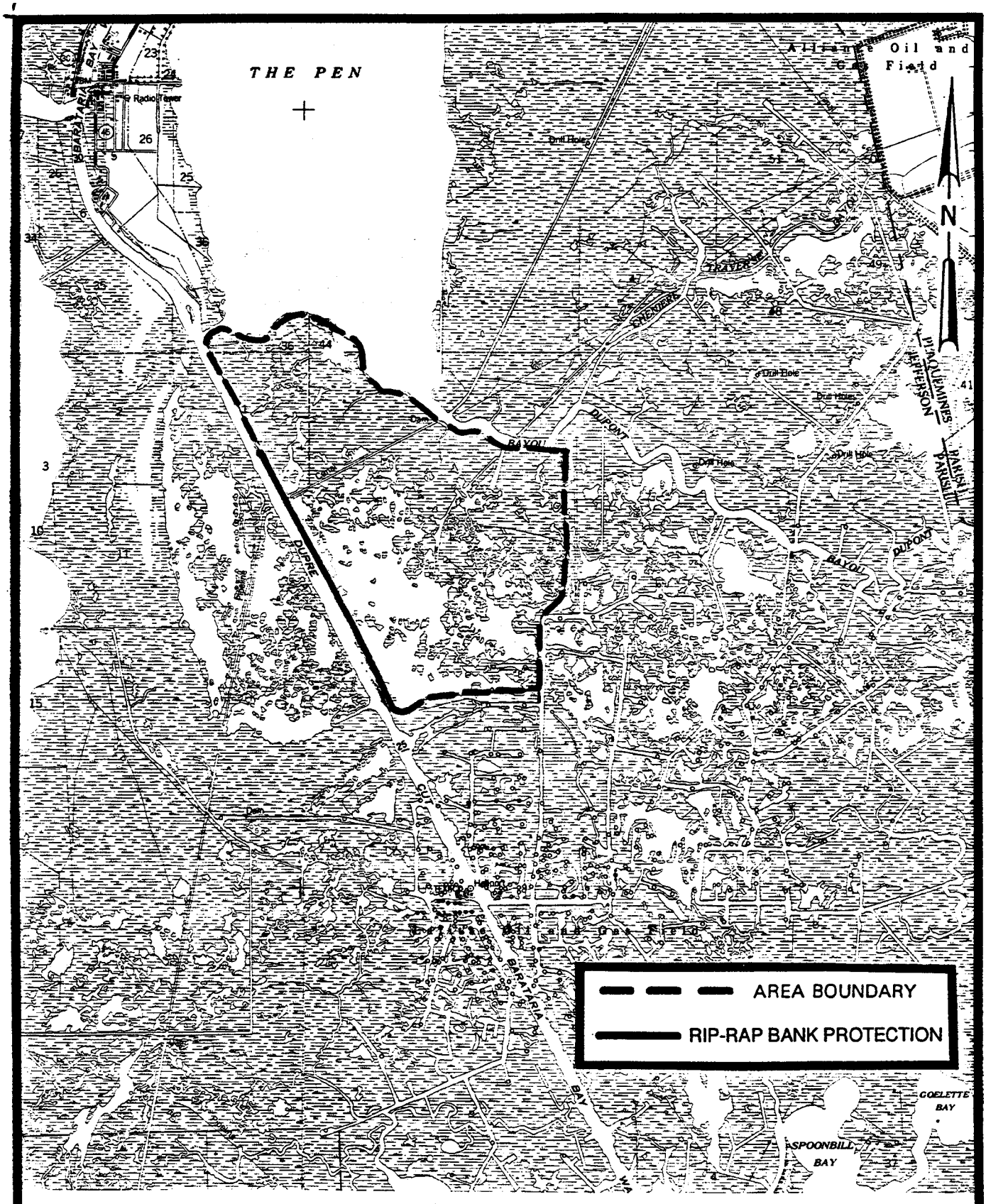
A rock dike will be constructed along 9,400 linear feet of the west bank of the Barataria Bay Waterway.

Cost:

First Cost	$1,786,000
Average Annual Cost	$204,400
Fully Funded Cost	$2,192,000

Benefits:

Average Annual Habitat Units	63
Average Annual Acres	122
Acres Created, Protected, or Restored	232



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 Dupre Cut portion of the Barataria Bay Waterway. 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:

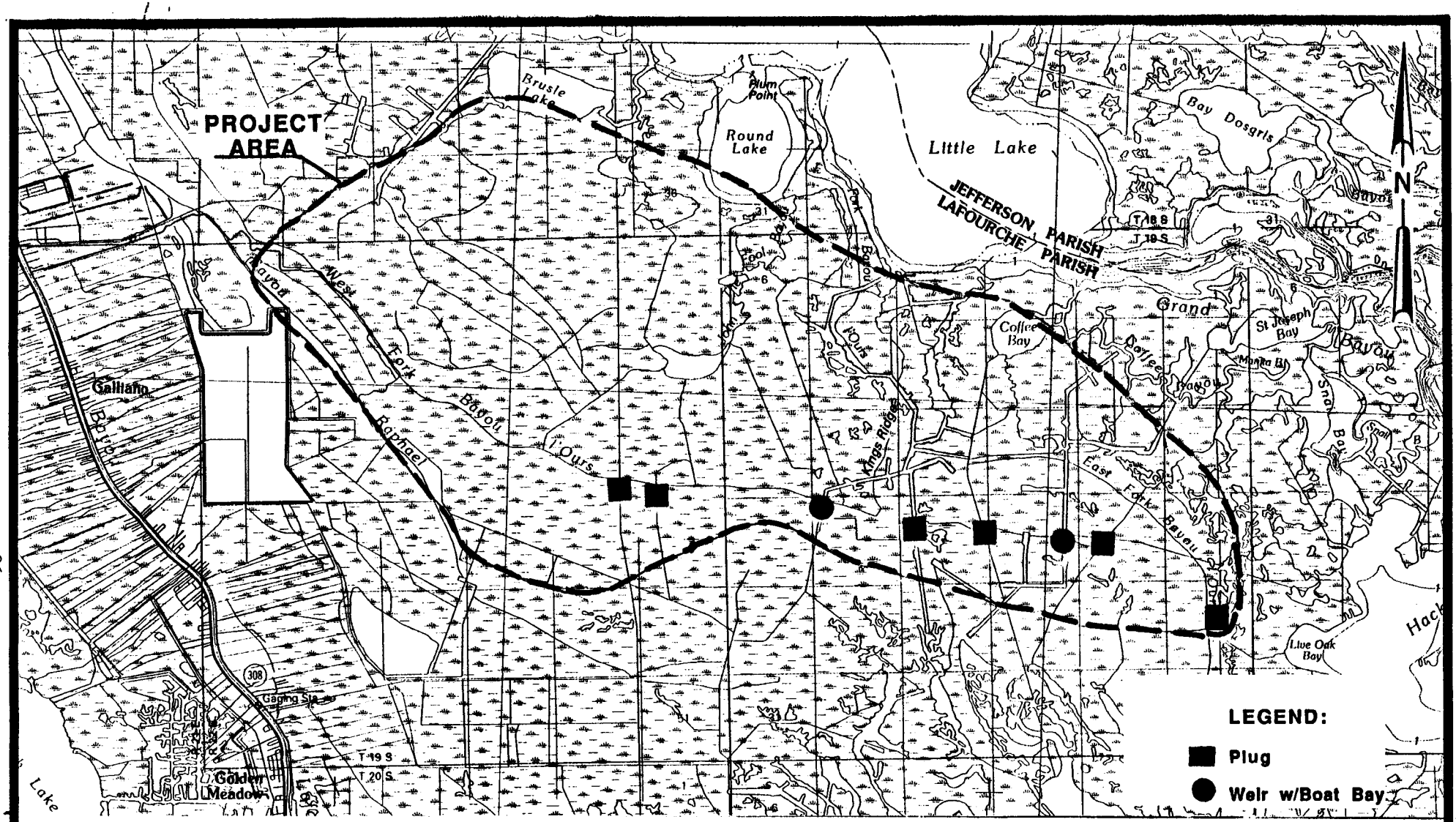
A rock dike will be constructed along 10,200 linear feet of the east bank of the Barataria Bay Waterway.

Cost:

First Cost	$1,936,000
Average Annual Cost	$220,900
Fully Funded Cost	$2,361,000

Benefits:

Average Annual Habitat Units	128
Average Annual Acres	114
Acres Created, Protected, or Restored	217



PBA-34 BAYOU L'OURS RIDGE HYDROLOGIC RESTORATION

Bayou L'Ours Ridge Hydrologic Restoration (PBA-34)

Location:

The project is located in Lafourche Parish east of La. Hwy. 1, northeast of Golden Meadow. The project area encompasses 24,765 acres of brackish marsh and open water habitat.

Justification:

Bayou L'Ours was historically a distributary of Bayou Lafourche. The natural levees of this bayou created the L'Ours subbasin, which has been breached by access and pipeline canals. The breaches have increased tidal exchange, reduced freshwater retention, and increased salinities in the marshes within the upper subbasin. Fresh water currently being introduced from forced drainage areas is not effectively retained because of the ridge breaches.

Objective:

Repairing or reducing the breaches by using plugs and water control structures will restore the hydrologic integrity of the ridge.

Project Features:

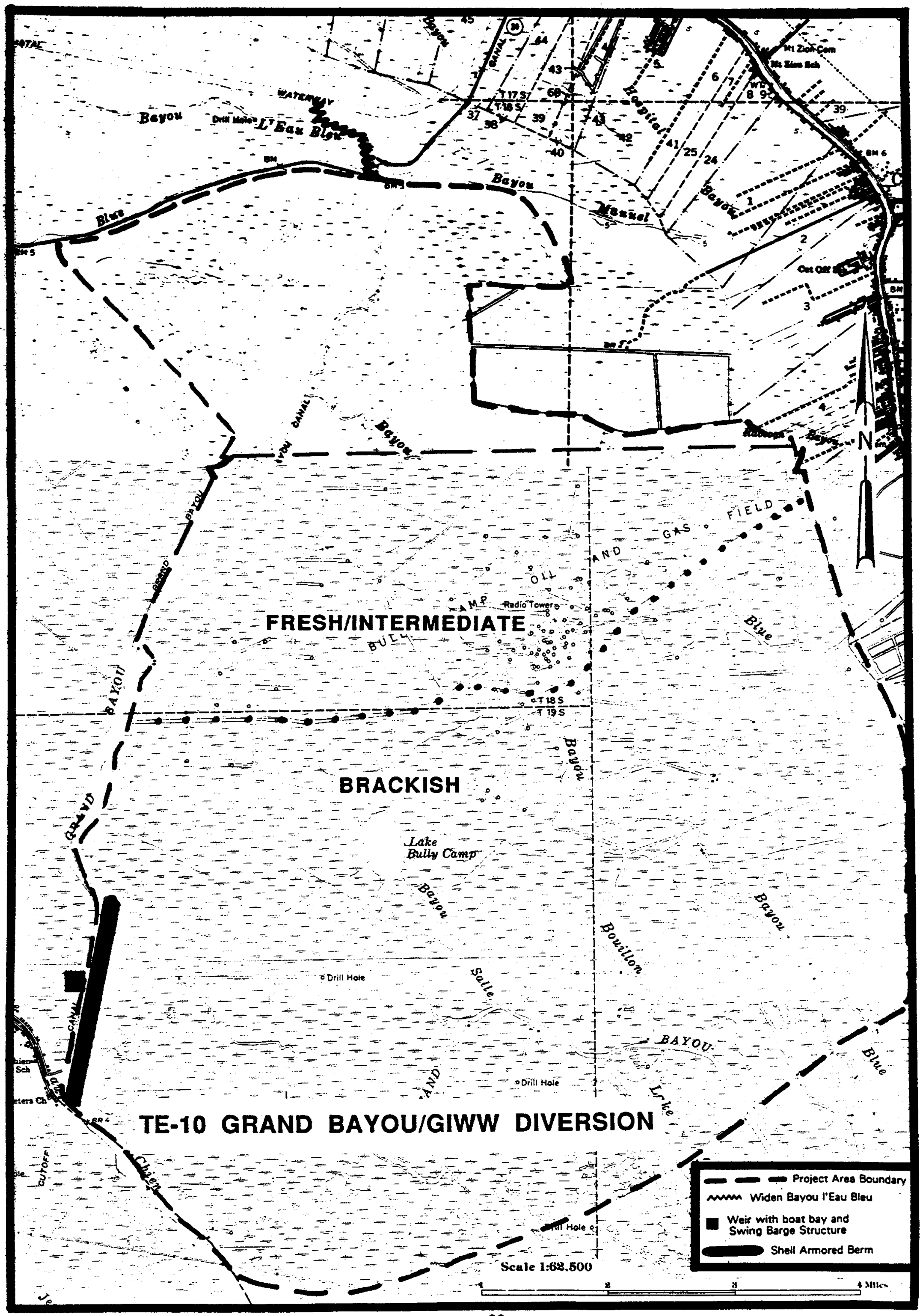
Along the Bayou L'Ours Ridge, six plugs and two water control structures with boat bays will be constructed.

Cost:

First Cost	$1,320,000
Average Annual Cost	$184,100
Fully Funded Cost	$2,419,000

Benefits:

Average Annual Habitat Units	467
Average Annual Acres	387
Acres Created, Protected, or Restored	737


FRESH/INTERMEDIATE
BRACKISH
TE-10 GRAND BAYOU/GIWW DIVERSION
Bayou L'Eau Bleu
Drill Hole
Bayou Blue
Bayou Mauzel
Hospital
OIL AND GAS FIELD
Radio Tower
T 18 S
T 19 S
GRAND BAYOU
Lake Bully Camp
Bayou Bouillon
Bayou Salle
Bayou Blue
Project Area Boundary
Widen Bayou l'Eau Bleu
Weir with boat bay and Swing Barge Structure
Shell Armored Berm
Scale 1:62,500
N

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:

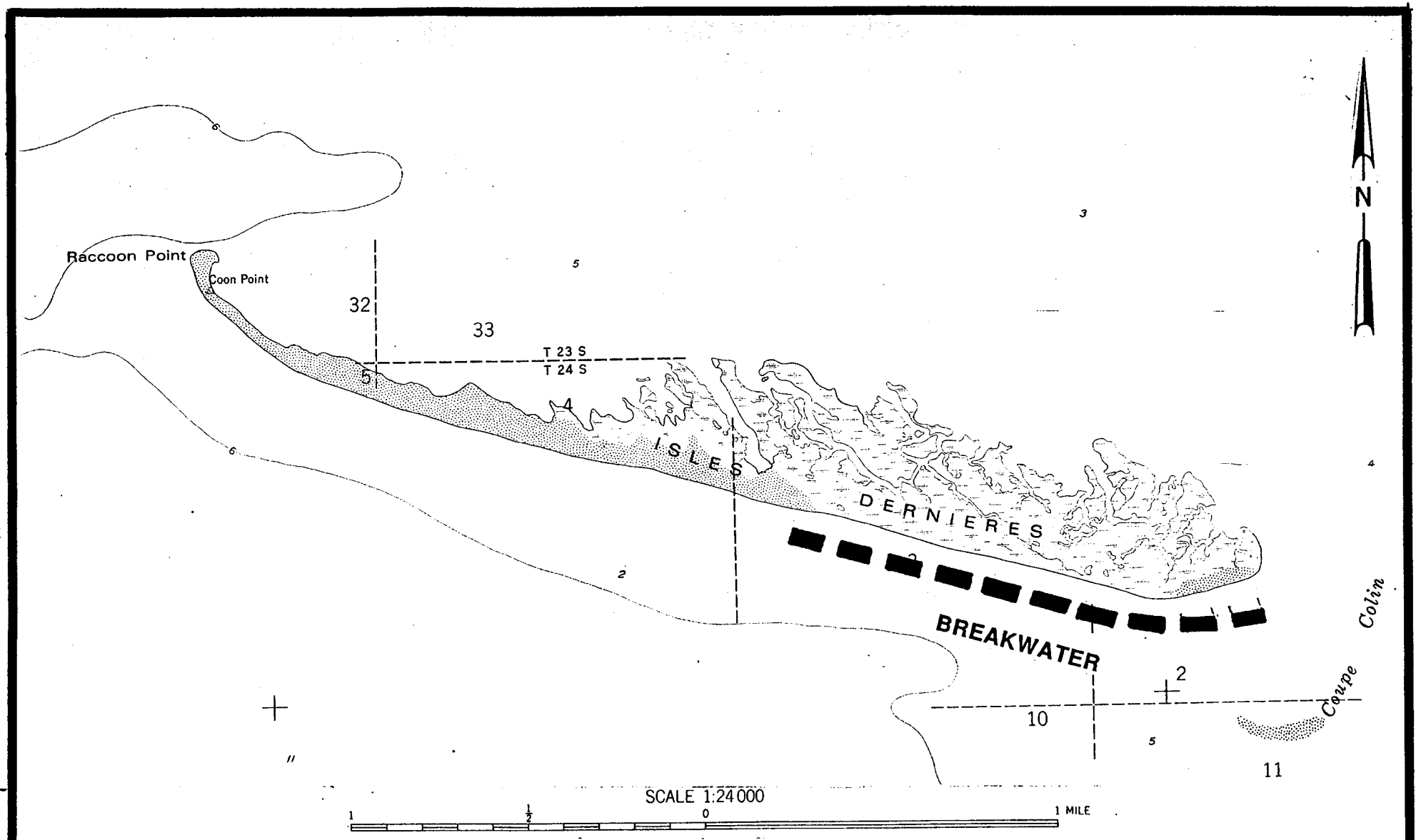
The existing cross section of Bayou l'Eau Bleu will be enlarged by deepening the channel from 6 feet to 9 feet over a length of 5,000 feet, allowing additional fresh water from the GIWW into the project area. To prevent the fresh water from escaping through Grand Bayou Canal, a sheet pile weir with a 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	$406,000
Fully Funded Cost	$5,181,000

Benefits:

Average Annual Habitat Units	771
Average Annual Acres	844
Acres Created, Protected, or Restored	1,609



PTE-15bii RACCOON ISLAND BREAKWATERS

Raccoon Island Breakwaters (PTE-15bii)

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 salt water 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 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, compactual 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 with segmented breakwaters.

Project Features:

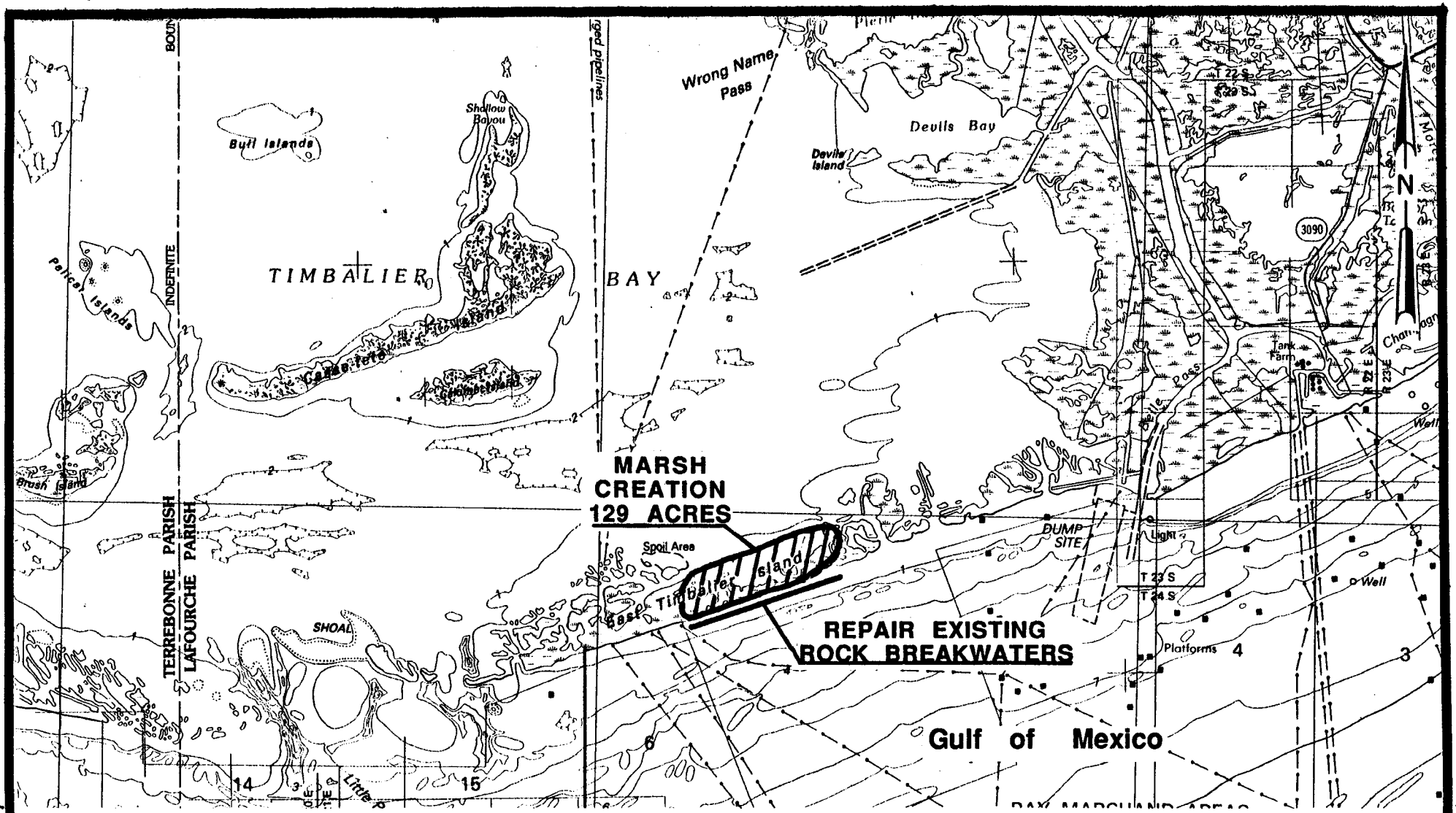
Construct ten offshore segmented breakwaters using large limestone rock. These breakwaters are to be placed in water at a depth of 4 to 6 feet with a design elevation of 4.0 feet NGVD. The breakwater will have crown dimensions of 10 feet wide and 175 feet long. The breakwaters will be placed on 450-foot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

Cost:

First Cost	$2,129,000
Average Annual Cost	$248,500
Fully Funded Cost	$2,631,000

Benefits:

Average Annual Habitat Units	14
Average Annual Acres	22
Acres Created, Protected, or Restored	26



XTE-45/67b EAST TIMBALIER BARRIER ISLAND RESTORATION

East Timbalier Island Barrier Island Restoration (XTE-45/67b)

Location:

East Timbalier Island, situated in Lafourche Parish, is a part of an island chain that fronts Terrebonne and Timbalier bays. Half of the 400-acre island is vegetated.

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 salt water 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 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, compactual 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 objectives are to strengthen and thus increase the life expectancy of East Timbalier Island beyond the present estimate of 11 years by placing dredged material along its landward shoreline.

Project Features:

The project will involve mining 1,875,000 cubic yards of sediment and placing the material from the center of the island eastward for 6,000 feet, with a width of 935 feet and an elevation of 3 feet above mean sea level. Disposal will be along the landward shoreline of East Timbalier Island abutting the landward line of rocks. According to Suter et al., 1991, good quality sands are located immediately seaward of the island. In addition, this project includes placing additional rock on the existing breakwater in front of the island. This increase in elevation of the breakwater will help protect the created area from erosion.

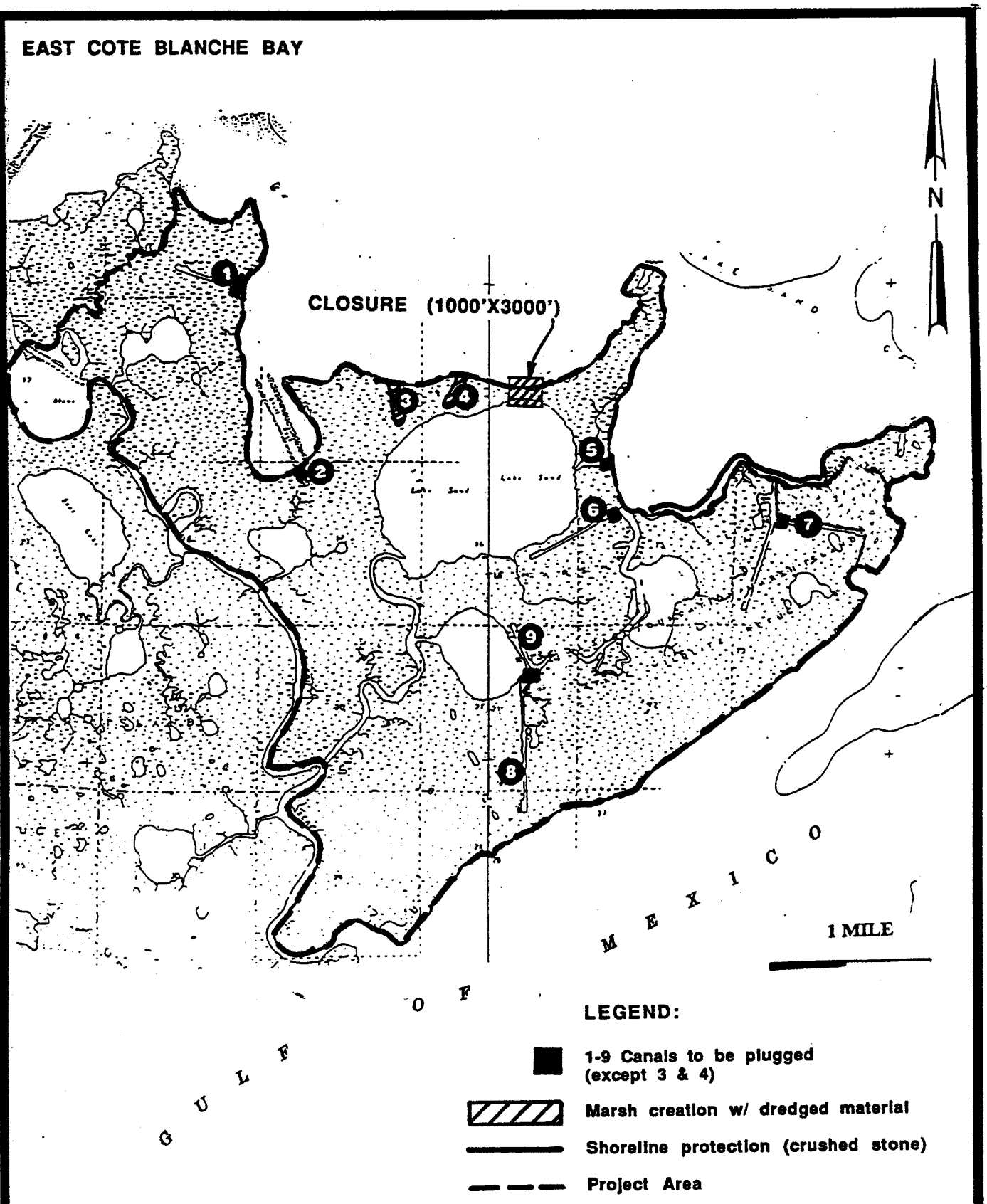
The project will create 129 acres of island in an area dominated by shallow water and small tidal channels and will link the east and west segments of the island.

Cost:

First Cost	$5,258,000
Average Annual Cost	$617,800
Fully Funded Cost	$5,752,000

Benefits:

Average Annual Habitat Units	140
Average Annual Acres	140
Acres Created, Protected, or Restored	215



TV-5/7 MARSH ISLAND HYDROLOGIC RESTORATION AND MARSH CREATION

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:

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.

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.

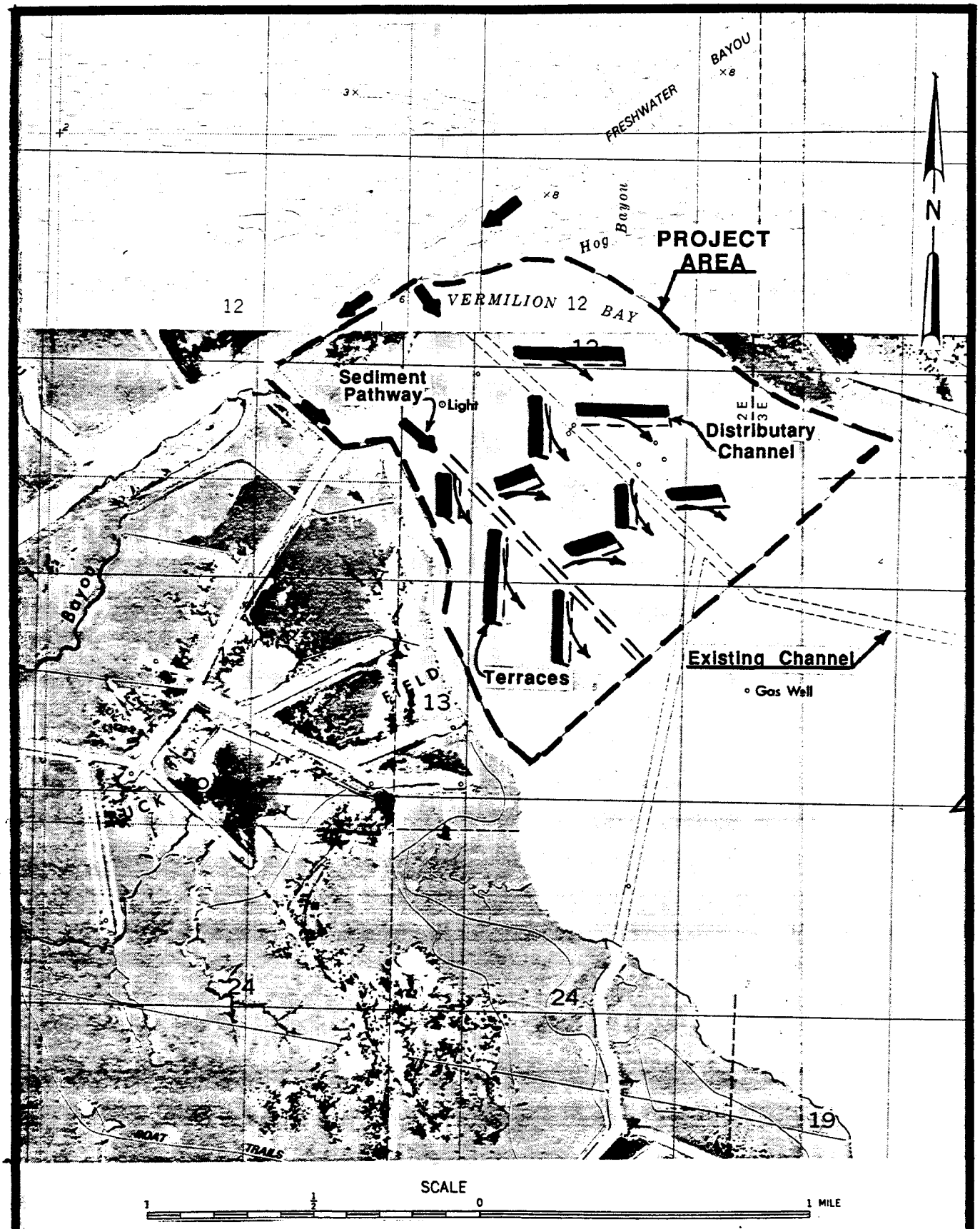
The northeast shoreline of the island will be protected by placing crushed stone on approximately 2,000 feet of existing shoreline.

Cost:

First Cost	$2,963,000
Average Annual Cost	$354,700
Fully Funded Cost	$3,907,000

Benefits:

Average Annual Habitat Units	452
Average Annual Acres	233
Acres Created, Protected, or Restored	408



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 and 68 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 and consequently reduced 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 enhanced and 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 within a few years.

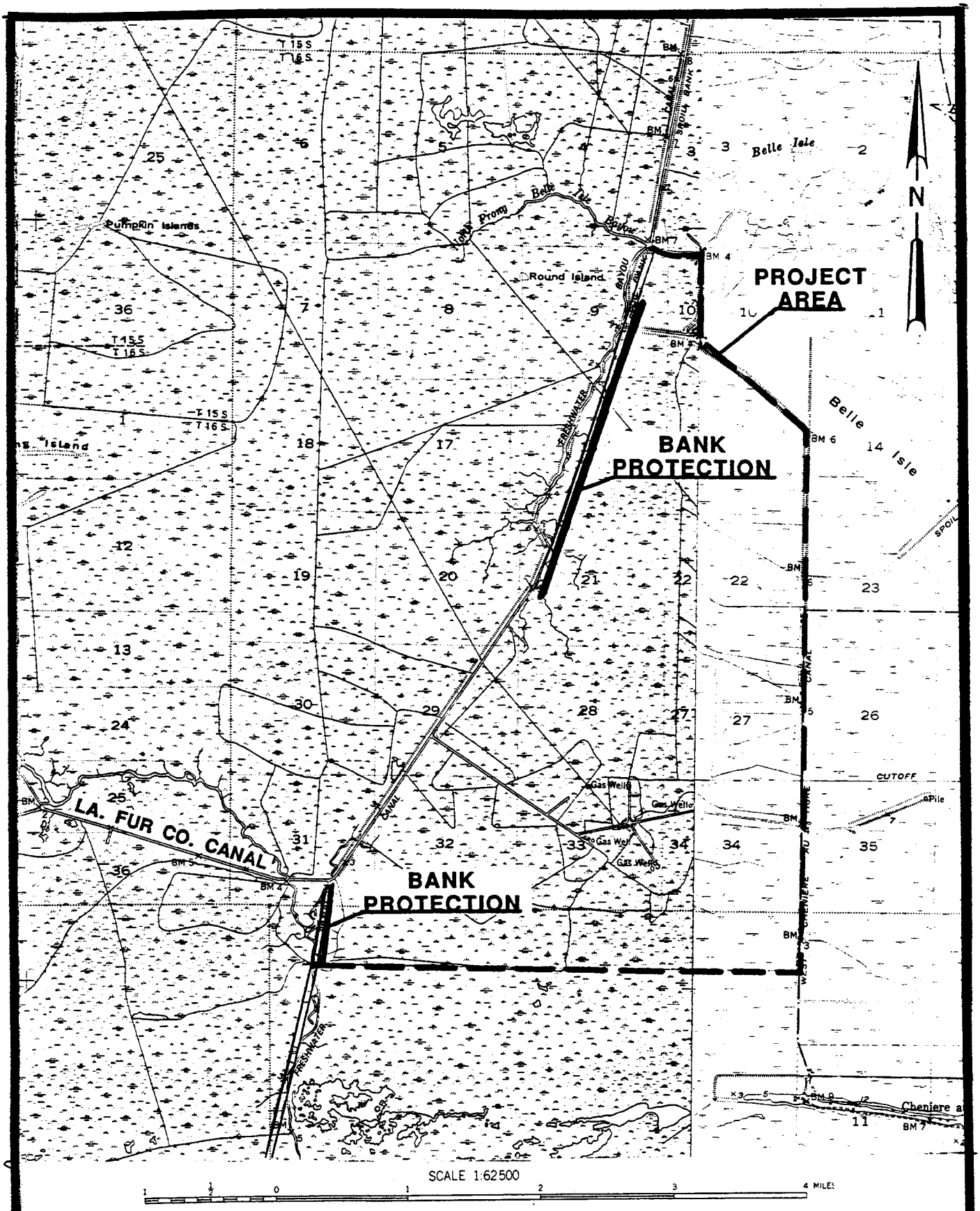
The wind-wave energy level in the bay may be preventing some of the existing subaqueous levees from becoming subaerial features and is also responsible for shoreline erosion. Therefore, the dredged material will be placed as a low-elevation levee or terrace along the landward flank of each dredged distributary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

Cost:

First Cost	$951,000
Average Annual Cost	$110,100
Fully Funded Cost	$1,133,000

Benefits:

Average Annual Habitat Units	149
Average Annual Acres	238
Acres Created, Protected, or Restored	441



XTV-27 FRESHWATER BAYOU STABILIZATION

Freshwater Bayou Bank Stabilization (XTV-27)

Location:

The project is located along the east bank of Freshwater Bayou in Vermilion Parish, Louisiana. The project area consists of approximately 7,700 acres of fresh/intermediate marsh. Approximately 7,000 acres are emergent marsh and 700 acres are open water. The limits of the project are from Belle Island Bayou and North Prong to an area just south of Humble Canal.

Justification:

Increased tidal exchange, wave action, and saltwater intrusion have accelerated erosion along the banks of Freshwater Bayou. In some areas, spoil banks have been breached. The spoil banks along the southern reach of the project area separate the bayou from several interior marsh ponds. If the banks are breached, the interior marsh loss rate will increase because of increased tidal scour and saltwater intrusion.

Objective:

The objective of the project is to protect the marsh from bank erosion and saltwater intrusion.

Project Features:

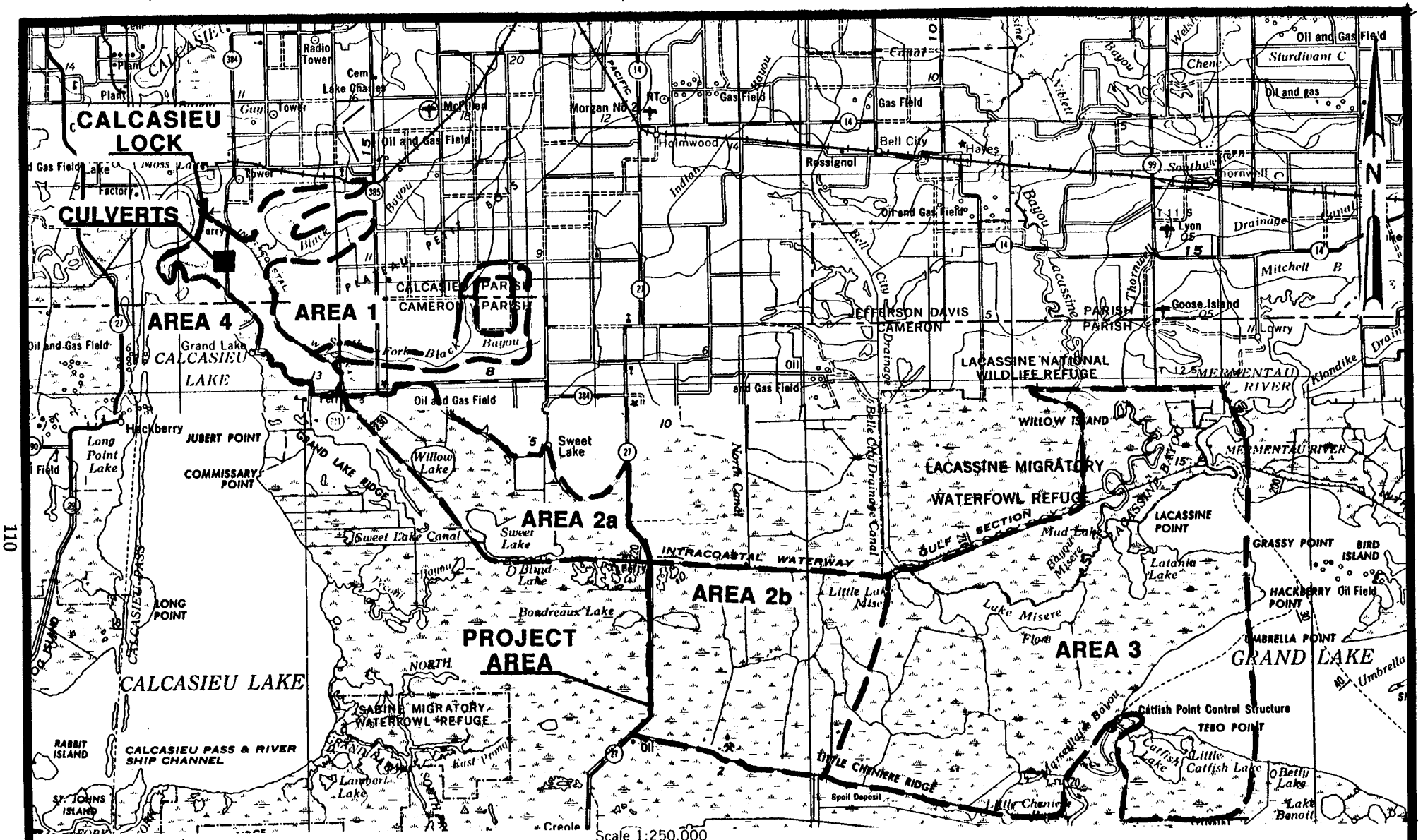
A rock dike will be constructed along 15,500 feet of Freshwater Bayou Canal. The dike will not be continuous but will only be placed in areas where the existing spoil bank has eroded away and in areas where breaching of the spoil bank is imminent.

Cost:

First Cost	$5,303,000
Average Annual Cost	$782,700
Fully Funded Cost	$10,109,000

Benefits:

Average Annual Habitat Units	173
Average Annual Acres	354
Acres Created, Protected, or Restored	739



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:

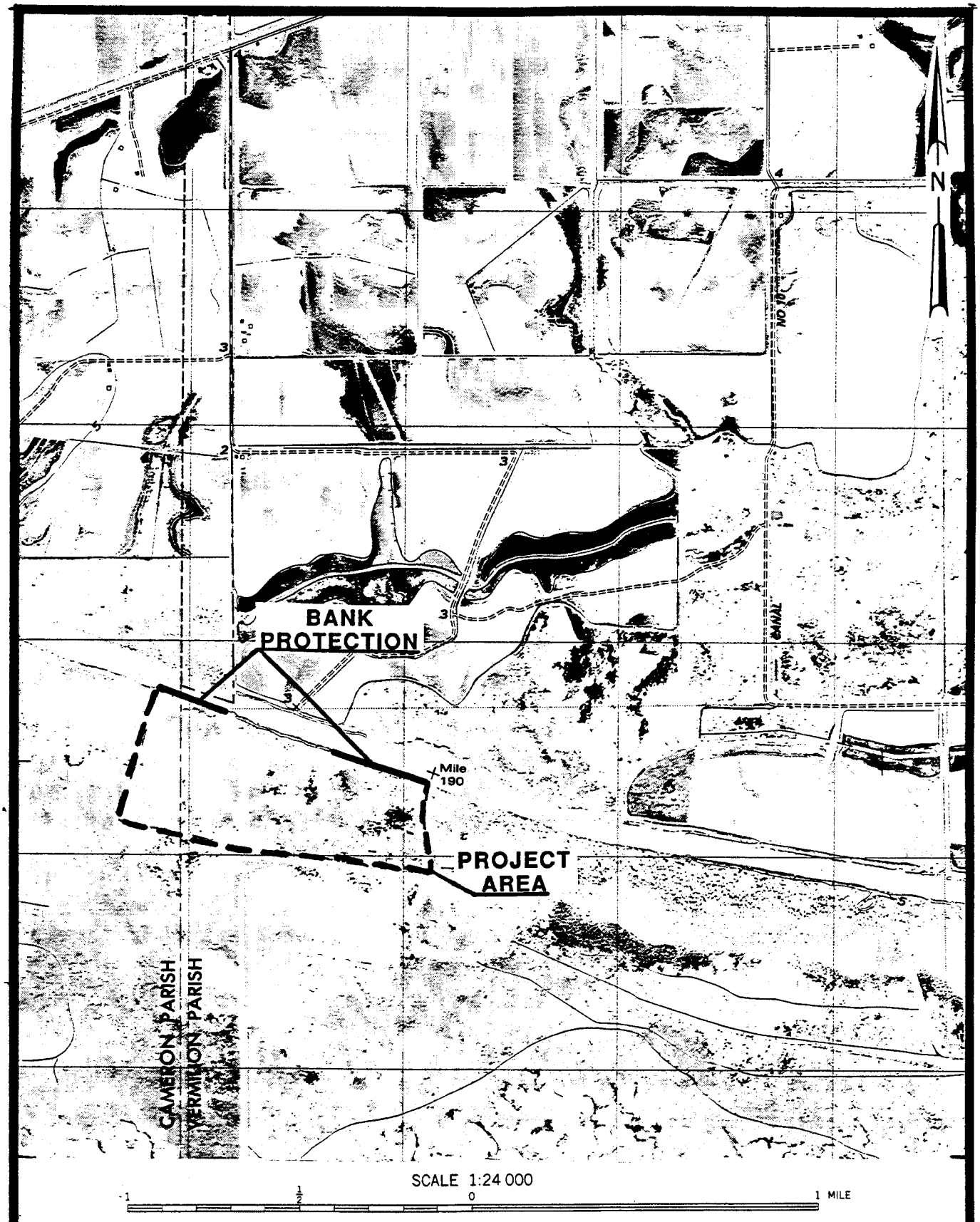
The project consists of constructing five 10- by 10-foot concrete box culverts with sluice gates in Black Bayou. Highway 384, which presently blocks the bayou, will be relocated over the culverts. The culverts will be opened when the differential head across the structure will allow it to drain water 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	$6,705,000
Average Annual Cost	$849,300
Fully Funded Cost	$8,296,000

Benefits:

Average Annual Habitat Units	592
Average Annual Acres	440
Acres Created, Protected, or Restored	837



PME-1 GIWW BANK PROTECTION

GIWW at Amoco Bank Stabilization (PME-1)

Location:

The project is located along the bank of the Gulf Intracoastal Waterway (GIWW) in Cameron and Vermilion Parishes, Louisiana. The project area consists of approximately 200 acres of fresh/intermediate marsh (195 acres of marsh and 5 acres of open water).

Justification:

Increased tidal exchange, wave action, and saltwater intrusion have accelerated erosion along the banks of the GIWW.

Objective:

The objective of the project is to protect the marsh from bank erosion and saltwater intrusion. Much of the project area from the Florence Canal to the western edge of the Amoco property is a high (one to five feet) bank created by disposal of material from the GIWW. The bank width varies from about 200 feet to 800 feet. The western half of the the project area (mile 187.5 to 190.5) is bounded by a nearly continuous trainasse spoil bank about one-half mile south of the GIWW. At the western end of the Amoco property, there are two inlets just west of the GIWW mile 190. If the GIWW bank is breached in this area, saltwater intrusion and tidal scour will compromise the marsh management plan for the area.

Project Features:

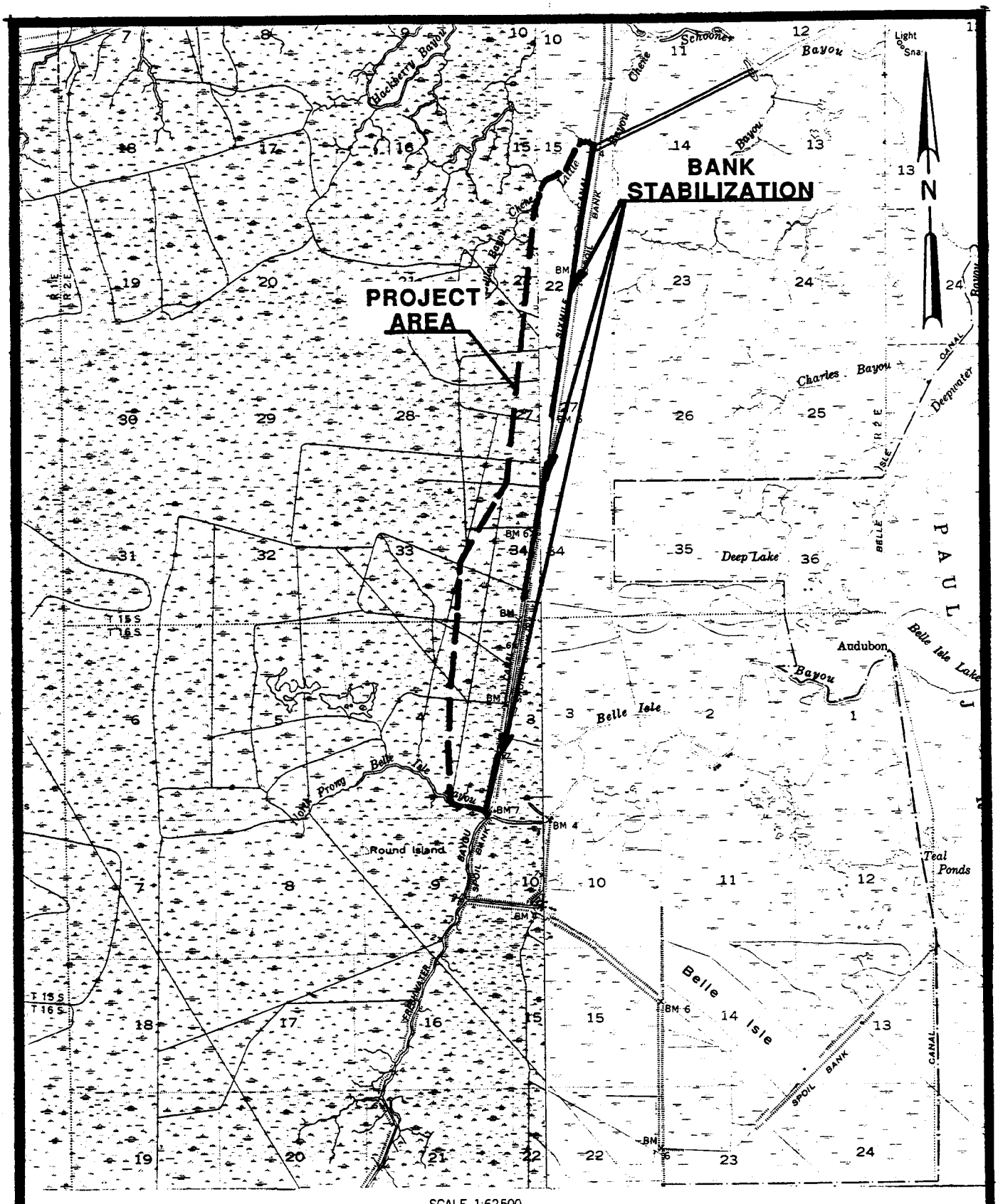
A rock dike will be constructed along 2,500 feet of the GIWW. The dike will not be continuous but will only be placed in areas where the existing spoil bank has eroded away and in areas where breaching of the spoil bank is imminent.

Cost:

First Cost	$805,000
Average Annual Cost	$115,100
Fully Funded Cost	$1,270,000

Benefits:

Average Annual Habitat Units	25
Average Annual Acres	3
Acres Created, Protected, or Restored	7



XME-29 FRESHWATER BAYOU BANK STABILIZATION

Freshwater Bayou Bank Stabilization (XME-29)

Location:

The project is located along the west bank of Freshwater Bayou in Vermilion Parish, Louisiana. The project area extends along 29,000 feet of Freshwater Bayou, from its confluence with Six Mile Canal to North Prong/Belle Island Bayou. The project area includes 1,547 acres of fresh/intermediate marsh and 177 acres of open water.

Justification:

Increased tidal exchange, wave action, and saltwater intrusion have accelerated erosion along the banks of Freshwater Bayou. In some areas, spoil banks have been breached. The spoil banks along the southern reach of the project area separate the bayou from several interior marsh ponds. If the banks are breached, the interior marsh loss rate will increase because of increased tidal scour and saltwater intrusion.

Objective:

The objective of the project is to protect the marsh from bank erosion and saltwater intrusion.

Project Features:

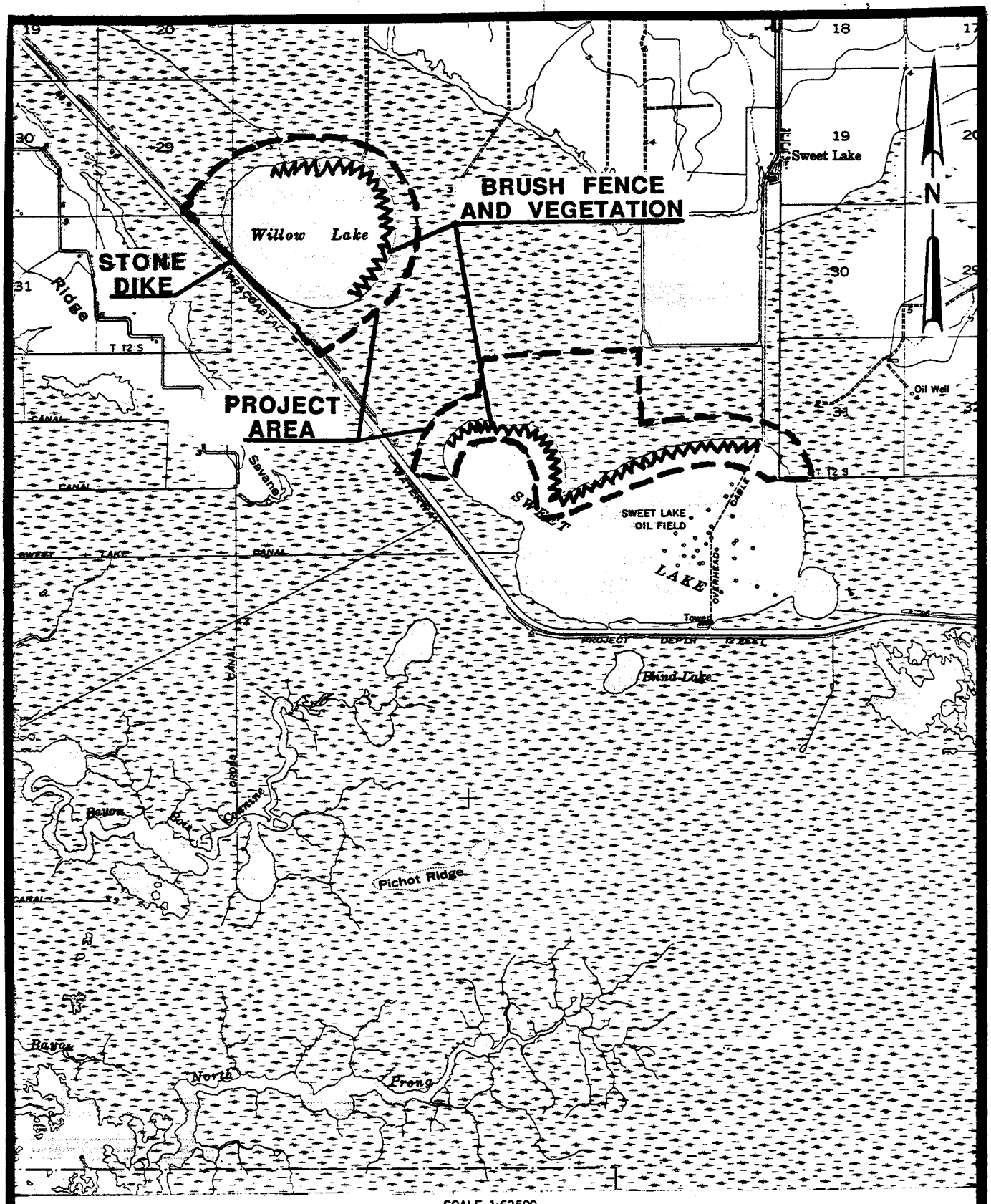
A rock dike will be constructed along 12,500 feet of Freshwater Bayou Canal. The dike will not be continuous but will only be placed in areas where the existing spoil bank has eroded away and in areas where breaching of the spoil bank is imminent.

Cost:

First Cost	$4,270,000
Average Annual Cost	$628,100
Fully Funded Cost	$8,038,000

Benefits:

Average Annual Habitat Units	248
Average Annual Acres	262
Acres Created, Protected, or Restored	511



CS-11b SWEET LAKE/WILLOW LAKE

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

Location:

The project is located along the Gulf Intracoastal Waterway (GIWW) at approximately mile 225 in Cameron Parish, Louisiana. The project area consists of approximately 4,200 acres, with 920 acres of fresh/intermediate marsh and 3,280 of open water.

Justification:

The northern bankline of the GIWW has eroded into Sweet Lake for approximately 1.3 miles, and into Willow for approximately 0.5 miles, increasing turbidity in the waters of the lakes. Severe wind-induced wave erosion is also occurring along the northern, northwestern, and eastern shorelines of the lakes, where high water levels are impacting the adjacent marshes. Closing the breach of the GIWW at Willow Lake will reduce the water exchange between the two water bodies, decreasing the lake turbidity and encouraging the growth of submerged aquatic vegetation. Protecting the shoreline of the two lakes will prevent erosion along the lakes' shorelines.

Objective:

The object of the project is to restore the hydrologic boundary between Willow Lake and the GIWW and to prevent the erosion of the lake rims of Sweet and Willow lakes.

Project Features:

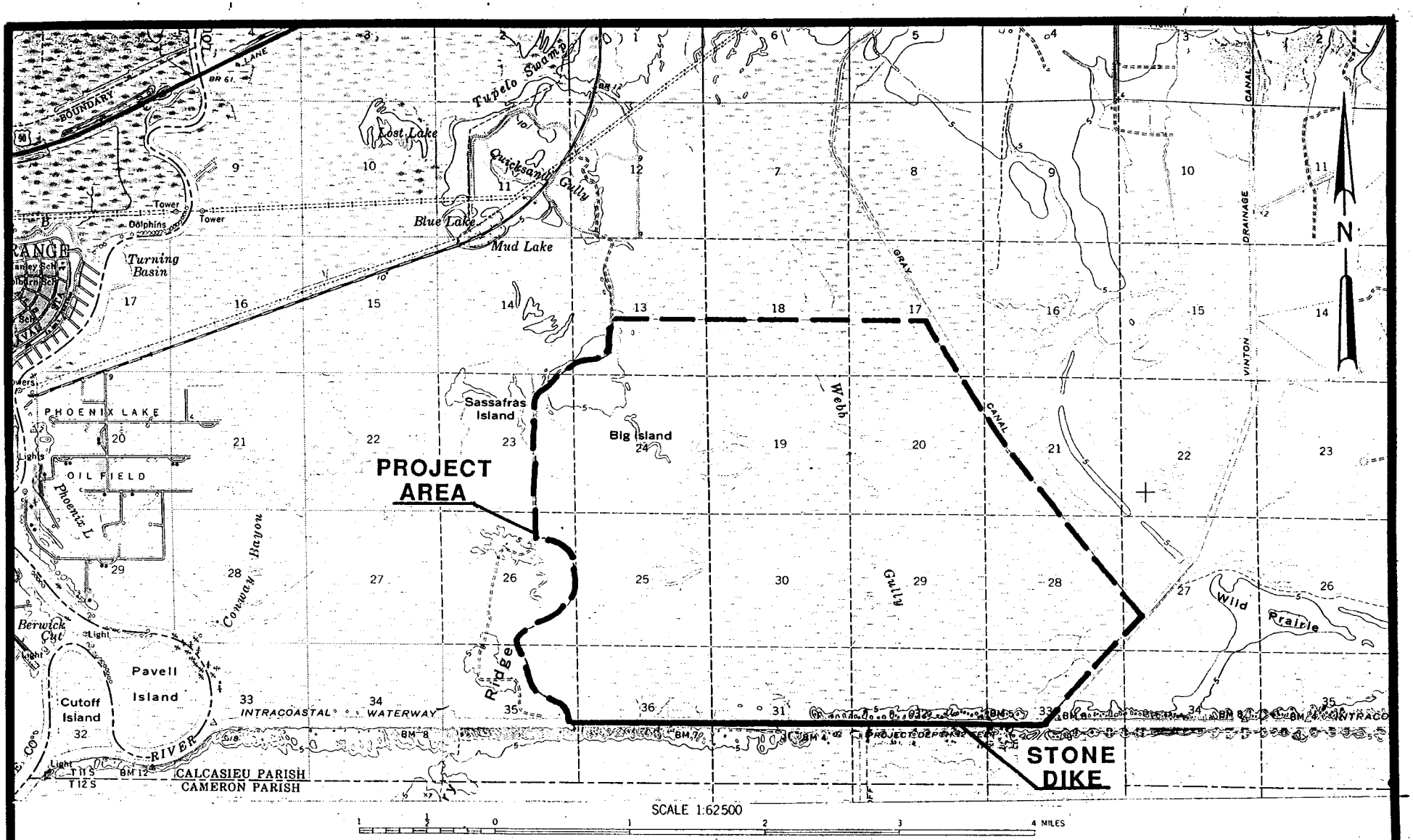
A 5,000-foot-long rock dike will be constructed along the northern bank of the GIWW at Willow Lake. The dike will be constructed to elevation 4.0 feet NGVD. Approximately 26,000 feet of brush fencing and vegetative planting will be placed along the rims of Willow and Sweet lakes.

Cost:

First Cost	$3,295,000
Average Annual Cost	$423,400
Fully Funded Cost	$4,917,000

Benefits:

Average Annual Habitat Units	119
Average Annual Acres	70
Acres Created, Protected, or Restored	138



PCS-26 PERRY RIDGE BANK PROTECTION

Perry Ridge Bank Protection (PCS-26)

Location:

The project is located in Calcasieu Parish north of the GIWW and consists of 5,945 acres of fresh/intermediate marsh. It is bounded by the GIWW on the south, Vinton Drainage Ditch and Gray Canal on the east, Perry Ridge on the west, and higher elevations to the north.

Justification:

Construction of the GIWW has greatly increased tidal exchange, particularly in areas where dredged material disposal was insufficient to provide bank protection. This section of the GIWW allows use of double-wide barges, thereby exacerbating the problem. This has resulted in interior marsh loss through increased energies and tidal scour of the fragile organic soils, especially when salt water is able to intrude into fresh areas.

Objective:

The objective of the project is to reduce tidal scour, wave action from boats, and saltwater intrusion by repairing the northern bank of the GIWW.

Project Features

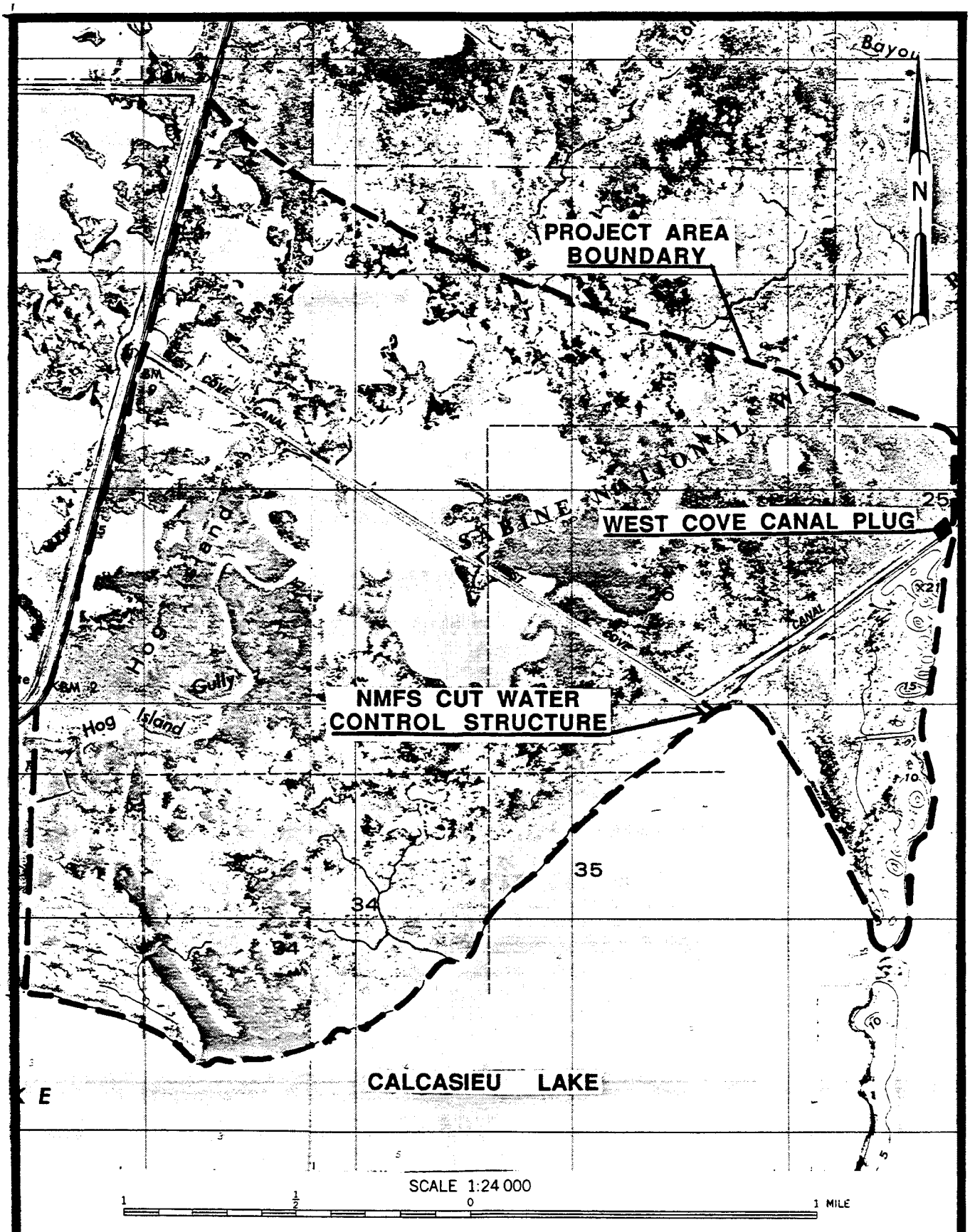
The project involves placement of rip-rap along low areas of the northern bank of the GIWW from Perry Ridge to Vinton Drainage Canal. The material will be placed similarly to the work done along the GIWW adjacent to Blind Lake. Some overtopping of the dike will allow sediments to be deposited behind the dike.

Cost:

First Cost	$1,883,000
Average Annual Cost	$220,700
Fully Funded Cost	$2,224,000

Benefits:

Average Annual Habitat Units	624
Average Annual Acres	632
Acres Created, Protected, or Restored	1,203



XCS-44/51 PLUG WEST COVE CANAL

Plug West Cove Canal (XCS-44/51)

Location:

The project is located on the Sabine National Wildlife Refuge near the Calcasieu Ship Channel and Calcasieu Lake. The project area consists of approximately 2,700 acres of saline marsh.

Justification:

The natural hydrology in the project area has been altered by the the dredging of the West Cove Canal and Shell Canal. The natural sediment delivery and deposition mechanisms in the interior marshes have been reduced, and the marshes have experienced a conversion from brackish to saline.

Objective:

The objective of the project is to restore the historical hydrology of the area to the extent possible.

Project Features:

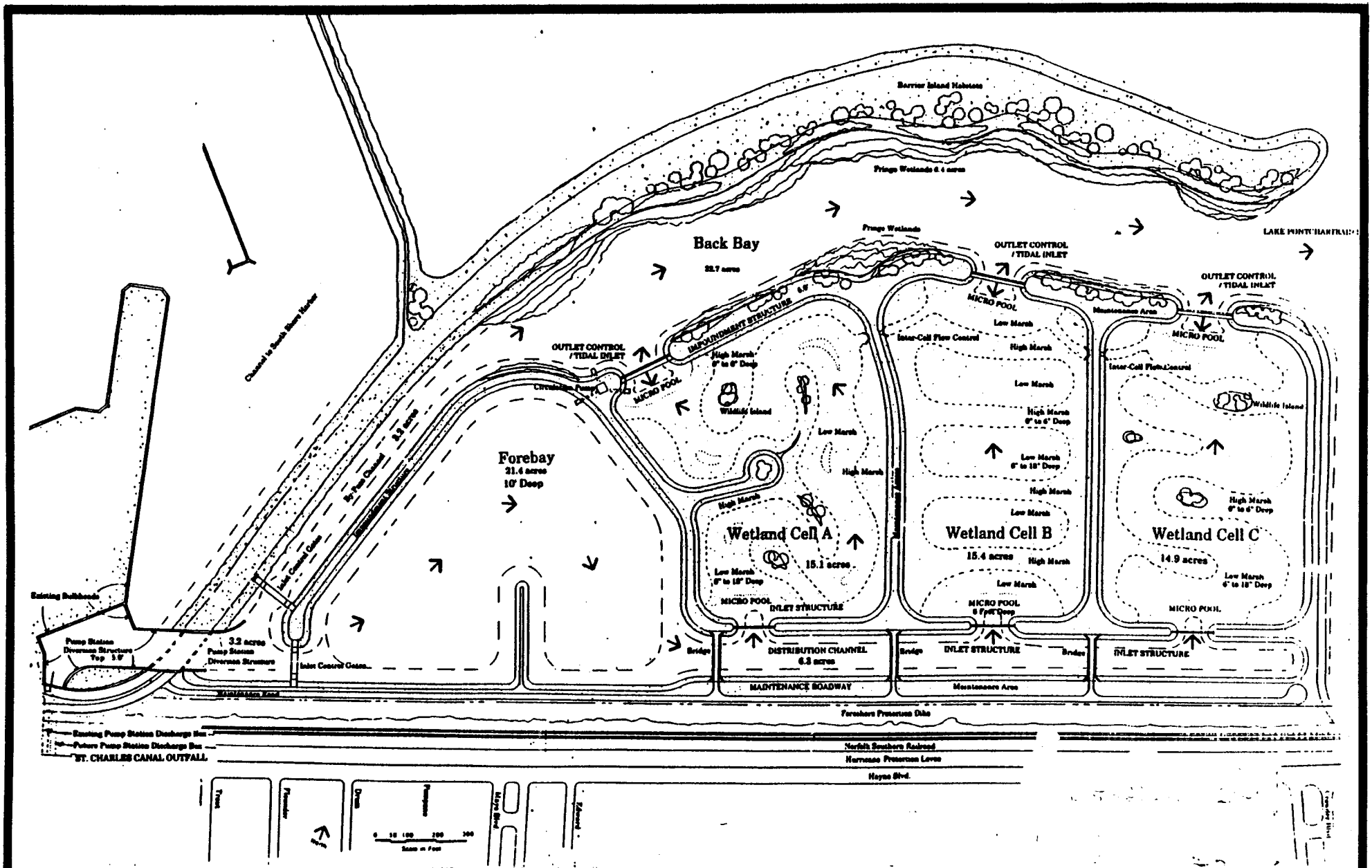
The West Cove Canal will be plugged with a combination steel sheetpile and earthen backfill. The side exposed to the Calcasieu Ship Channel will be armored. The cross section of the canal known as the NMFS cut will be stabilized using steel sheetpile and rip rap. The cross section will be held to 90 percent of the cross section of the new West Cove Canal Water Control Structure (not yet completed). This would serve to help reactivate Hog Island Gully Bayou, which was essentially abandoned after the more efficient West Cove Canal was dredged.

Cost:

First Cost	$592,000
Average Annual Cost	$80,800
Fully Funded Cost	$1,033,000

Benefits:

Average Annual Habitat Units	15
Average Annual Acres	6
Acres Created, Protected, or Restored	11



PPO-21 NEW ORLEANS EAST MARSH CREATION FOR STORMWATER TREATMENT

New Orleans East Marsh Creation for Stormwater Treatment (PPO-21)

Location:

The project is located on the Orleans Parish lakefront, east of South Shore Harbor in Orleans Parish, Louisiana.

Justification:

Over the past decades, wetlands along the east New Orleans shoreline have declined. As of 1984, there were 14 acres of wetlands along the entire 4.8 miles of shoreline. Within the project area, which covers 0.7 miles of shoreline, one acre of wetlands and two acres of submerged aquatics remain. The discharge of storm water from the St. Charles Drainage Canal continues to impact the shoreline's submerged aquatics.

Water quality improvements to stormwater discharged into the Lake Pontchartrain will reduce the population of the blue-green algae and allow for contact recreation in the waters in the vicinity of the project.

Objective:

The objective of the project is to use constructed wetlands to treat stormwater discharged from the St. Charles Drainage Canal.

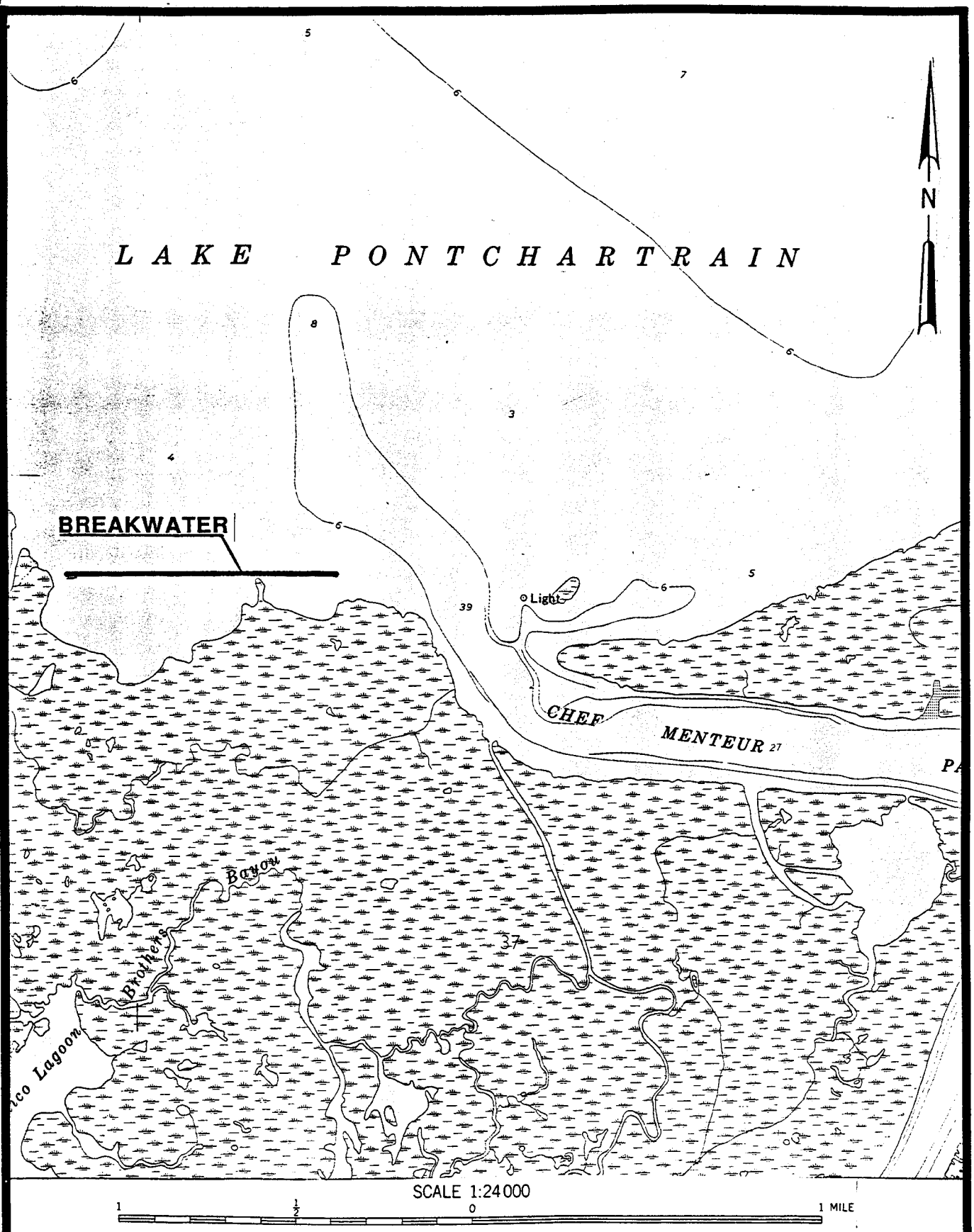
Project Features:

A series of three wetland vegetation cells (45.5 acres), preceded by a forebay (21.4 acres) and flowing into a back bay (22.7 acres), will be constructed near the shore of Lake Pontchartrain. Material to build the wetlands will come from a designated borrow source in Lake Pontchartrain. A barrier will be constructed fronting the created wetlands.

Cost:

First Cost	$1,000,000
Average Annual Cost	$141,400
Fully Funded Cost	$1,203,000

Note: The cost shown is only a portion the total project cost of approximately $19,000,000. Other sources of funding would be required to fund the project.



XPO-92a BAYOU CHEVEE SHORELINE PROTECTION DEMONSTRATION

Bayou Chevee Shoreline Demonstration Project (XPO-92a)

Location:

The project is located at the eastern end of Lake Pontchartrain in Orleans Parish, Louisiana. The center of the project site is located at latitude 30° 06′ and longitude 89° 50′.

Objective:

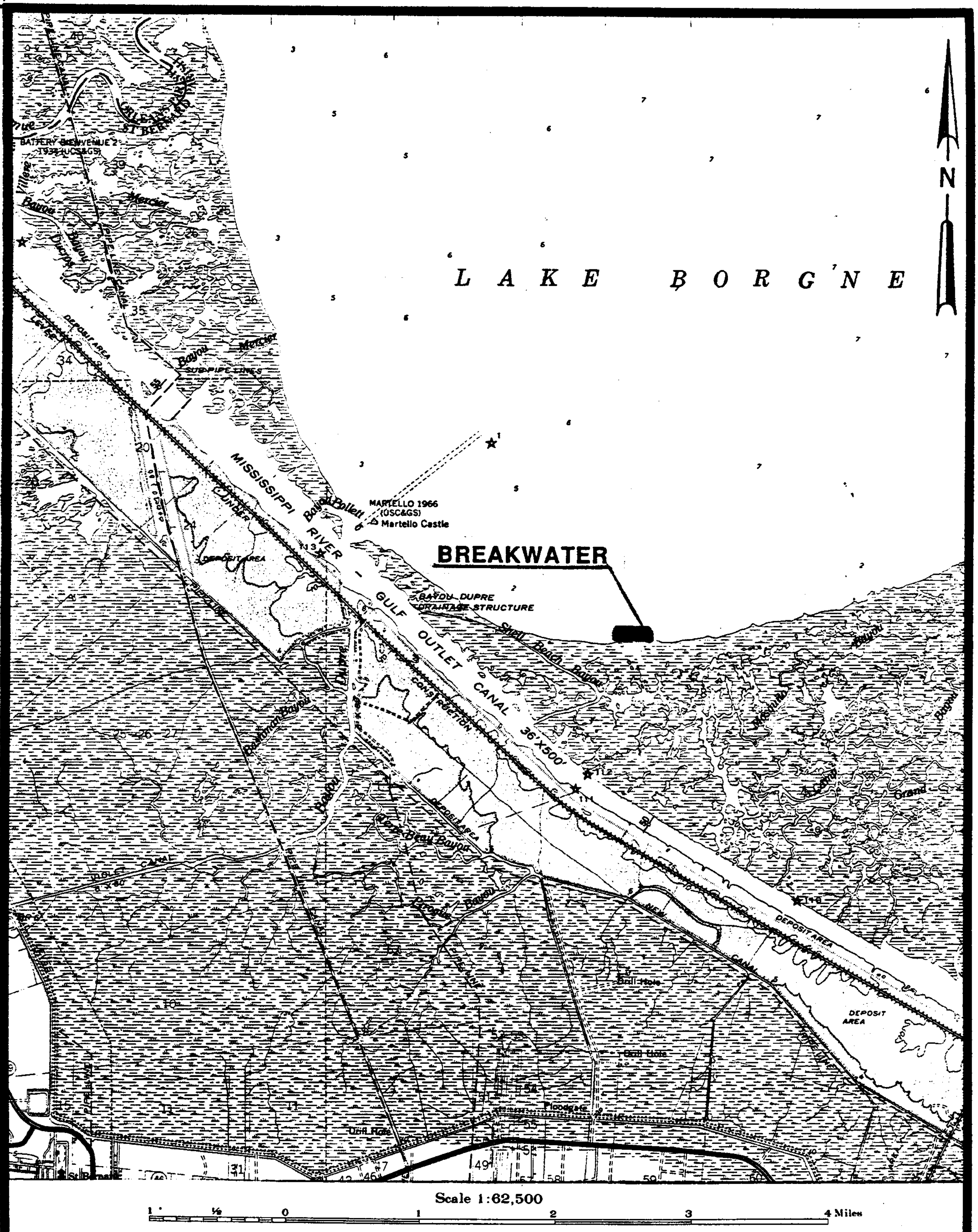
The objective of the demonstration project is to measure the performance of alternative designs for shoreline project. Over a period of 10 years, the project will be monitored and each design section evaluated with respect to its first cost to construct, reliability, effectiveness, and durability.

Project Features:

The project consists of approximately 2,800 feet of breakwaters over a project length of 4,000 feet. Three types of shoreline protection measures will be constructed. The protection will consist of 56 dike segments, 50 feet long with 20-foot gaps. Four designs will be utilized: stone dike with no berms; stone dike with berms; timber/tire structure; and all timber structure.

Cost:

First Cost	$1,427,000
Average Annual Cost	$164,500
Fully Funded Cost	$1,566,000



XPO-92b LAKE BORGNE SHORELINE PROTECTION DEMONSTRATION

Lake Borgne Shoreline Demonstration Project (XPO-92b)

Location:

The project is located along the south shore of Lake Borgne in St. Bernard Parish, Louisiana. The center of the project site is located at 29° 56′ and longitude 89° 48′.

Justification:

An opportunity exists to use waste products from local industries as a material for shoreline protection. Currently pipe casting yards have available pipe, which is unusable for appropriate applications for various reasons (damaged ends, odd lengths). This pipe is then broken up and disposed of. This pipe may be used as an alternative to rocks or timber bulkheads as a construction material for shoreline protection projects.

Project Features:

The project consists of 500 linear feet of breakwater using concrete arch pipe for the construction material. Two sections will be tested, a linear alignment and a staggered alignment. Each section will consist of 50-foot segments with a 10-foot gap. The 42-inch concrete pipe will be driven approximately 2 feet into the lake bottom and protrude approximately 2 feet. Current cost and designs assume that the pipe will be donated by the manufacturer.

Cost:

First Cost	$212,000
Average Annual Cost	$26,600
Fully Funded Cost	$253,000

XPO-93 MARSH CREATION WITH BIOSOLIDS DEMONSTRATION

Marsh Creation with Biosolids (XPO-93)

Location:

The project is located adjacent to the sewage treatment plant operated by the Sewerage and Water Board of New Orleans in the southeastern section of New Orleans. It is situated on the left descending bank of the Mississippi River near the Orleans Parish boundary line with St. Bernard Parish.

Objective:

The objective of the project is to use municipal biosolids to increase the organic matter and nutrient content of otherwise suitable substrates to promote rapid vegetation recolonization in degraded or artificial wetlands. This initial demonstration project will occur in a controlled environment, but could be useful for wetlands restoration throughout coastal Louisiana, drawing upon biosolids produced in all major metropolitan areas. The project will identify the biosolids/substrate matrix which is best suited for wetlands restoration. This matrix will be defined in geotechnical terms so that future projects will not be limited to the substrate used in this demonstration.

Project Features:

A levee will be constructed to create a protected area within which the controlled experiments can take place. The area within the levee will be subdivided into three main sections. Each cell will contain a different substrate with which to mix the biosolids. All runoff and drainage will be returned to the treatment plant.

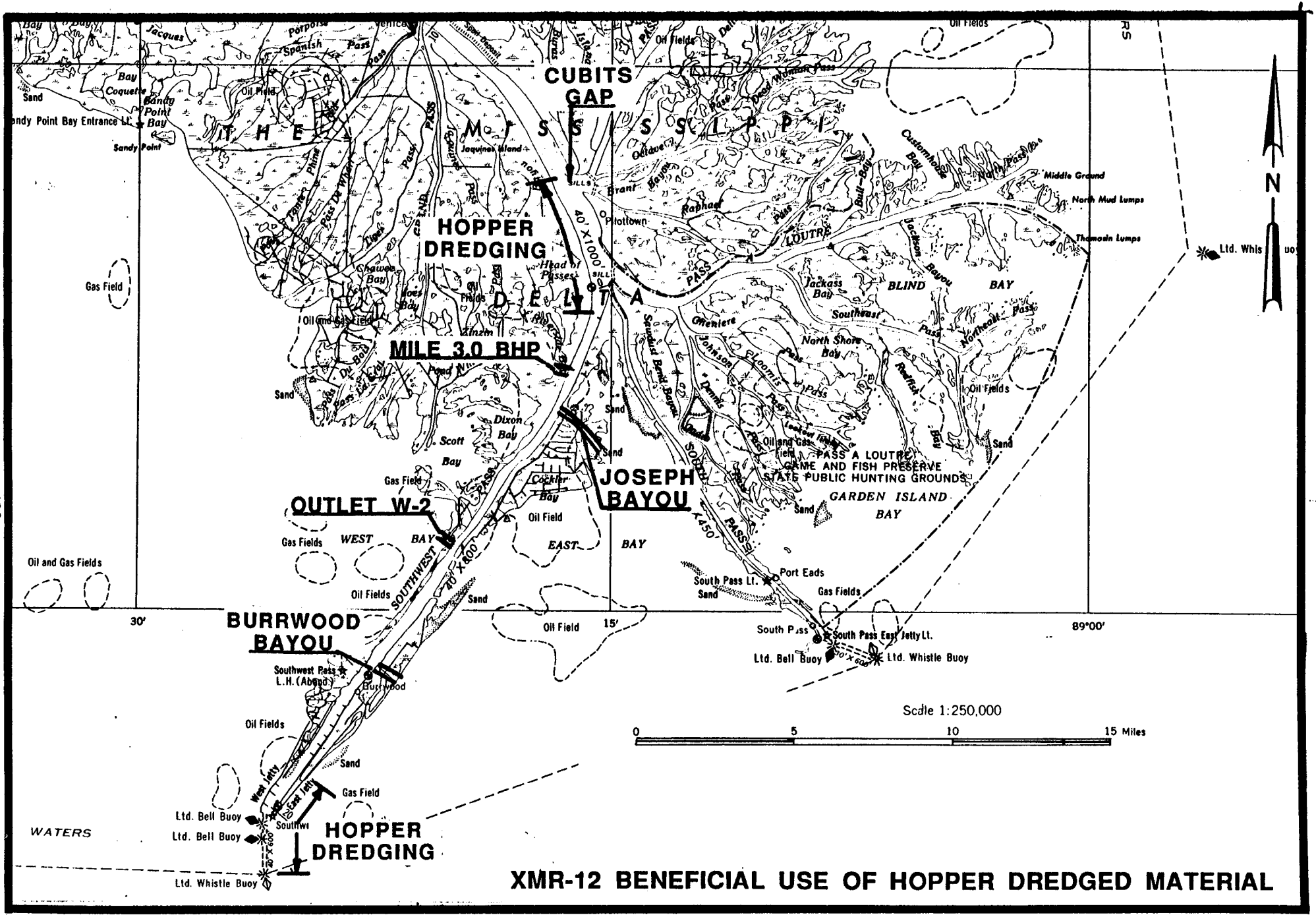
One cell will receive ash generated from the incineration of biosolids at the adjacent sewage treatment plant; the second cell will receive sediments dredged from within the levee perimeter; and the third cell will receive a mixture of ash and sediment. It will take approximately one year to accumulated enough ash for mixing of the biosolids to begin.

The biosolids used in the project will meet EPA's highest standards for biosolid reuse (Class A, exceptional quality). In each cell the biosolids will be mechanically mixed at different ratios with the substrates to achieve the ideal level of organic matter in the matrix.

Each cell will be planted with appropriate wetland vegetation. During the second year of the project, geotechnical and vector attraction studies will be performed as well as monitoring for vegetation growth and stormwater runoff quality.

Cost:

First Cost	$760,000
Average Annual Cost	$91,400
Fully Funded Cost	$891,000


CUBITS GAP
HOPPER DREDGING
MILE 3.0 BHP
JOSEPH BAYOU
OUTLET W-2
BURRWOOD BAYOU
HOPPER DREDGING
THE MISSISSIPPI DELTA
PASS A LOUTRE GAME AND FISH PRESERVE STATE PUBLIC HUNTING GROUNDS
GARDEN ISLAND BAY
WEST BAY
EAST BAY
Scale 1:250,000
0 5 10 15 Miles
N
XMR-12 BENEFICIAL USE OF HOPPER DREDGED MATERIAL

130

Beneficial Use of Hopper Dredged Material (XMR-12)

Location:

The project is located in the Mississippi River bird's foot delta, in Plaquemines Parish, Louisiana.

Justification:

Data from the 1994 dredging cycle show that 11,800,000 cubic yards of material were removed from the area between Cubits Gap and Head of Passes. Hopper dredges remove this material and place it in the entrance to Pass-a-Loutre and South Pass. Placing this material in the pass slightly increases the sediment load and potentially serves to enhance natural wetland development.

Currently, ocean dumping is the method used to maintain the lower jetty and bar channel of the Mississippi River. Without constant and continual maintenance, shoaling quickly would result in the loss of project depths, which would, in turn, adversely affect the shipping industry. During the dredging season, hopper dredges must maintain high production to maintain project depths. To facilitate this production, the agitation method of dredging is used when conditions permit, and the ocean disposal site is used when conditions do not permit agitation dredging. In 1994, 11,900,000 cy of material was dredged in the jetty and bar channels. This material was either placed in ocean disposal sites or removed through agitation.

Objective:

The objective of the demonstration project is to evaluate alternative methods of directly creating wetlands using material dredged by hopper dredges for maintenance of the navigation channel.

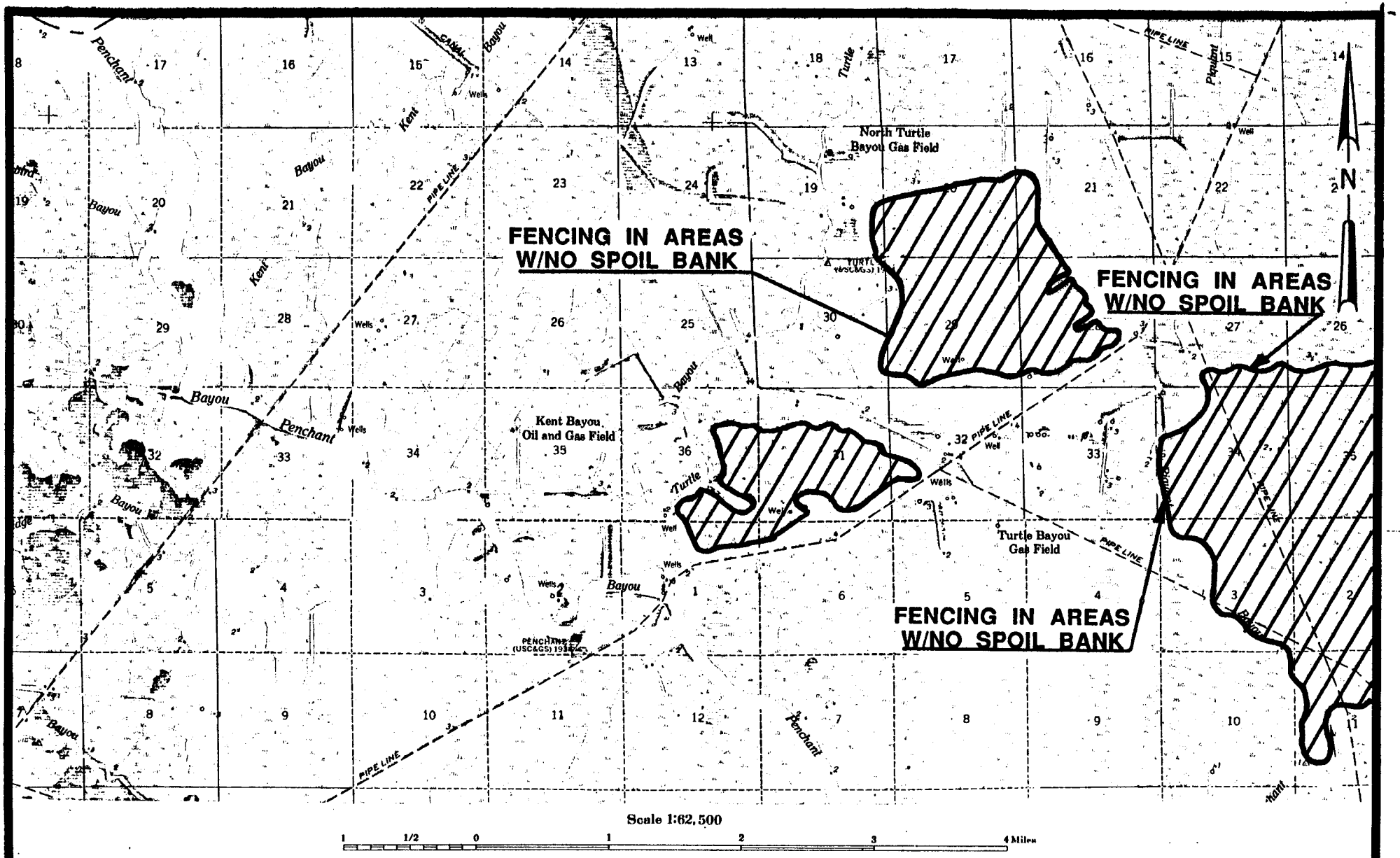
Project Description:

The Pass-a-Loutre Sediment Mining (PMR-8) project will mine 800,000 cubic yards of material from Pass-a Loutre and directly create approximately 35 acres of emergent wetland above elevation 1.5 MLG and 80 acres of subaerial wetland. The total area of benefit, including minor deposition, is 380 acres. Additionally, increased flows through Pass-a-Loutre will help carry sediment to crevasses and sediment fences constructed in the Wildlife Refuge areas. In effect, the Pass-a-Loutre Sediment Mining project redredges material dredged and dumped by the hoppers. In lieu of using a cutter head dredge to in effect redredge the material, directly pumping the material out of the hopper to create wetlands will be an alternative investigated. Issues still to be resolved will be the availability of a suitable location outside the navigation channel and the high cost of pump-out operations.

Another alternative to be considered will be to dump the hopper load in the crevasse or near the crevasse mouth, allowing the material to be pulled through the crevasse and into the adjacent wetlands. Hydrographic surveys indicate that the crevasse with the greatest depth at the mouth is Outlet W-2; however, Joseph Bayou appears to have a greater width, which will be important for the dredge to actually be able to get into the crevasse.

Cost:

The Task Force approved a total project cost not to exceed $300,000.



XTE-54b FLOTANT MARSH FENCING DEMONSTRATION

Flotant Marsh Fencing Demonstration (XTE-54b)

Location:

The project is located twenty miles west of Houma, Louisiana, in Terrebonne Parish. The project area comprises two units totaling 1,256 acres of fresh marsh.

Justification:

Breaches in canal spoil banks have exposed the fragile flotant marshes in the project area to the unnatural water exchange of deep-water canals. This process has caused severe erosion and subsequent fragmentation of the emergent marsh. The organic nature of the soils often prohibits the installation of water control structures or overflow banks to provide protective measures for erosion control.

Objective:

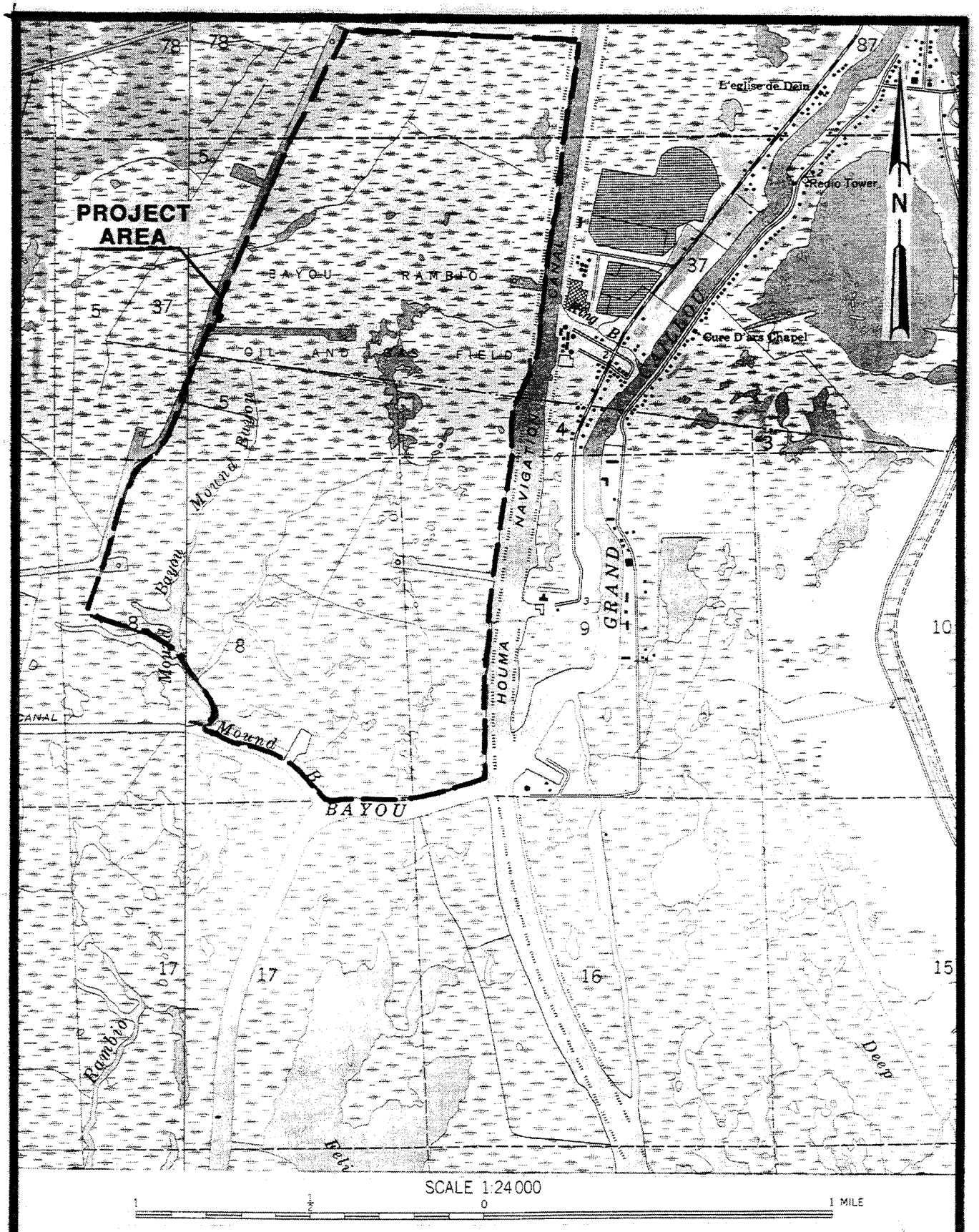
The primary objective of this project is to determine the effectiveness of different fencing techniques in conserving and restoring floating marshes as an alternative to depositing fill material for repairing banks or installing water control structures.

Project Features:

The units selected for this project will have two or three sides enclosed by spoil banks and the remaining side enclosed by different types of fencing. The fencing will be tied to existing spoil banks and all remaining openings will be closed by fencing. A control area will be identified, monitored, and analyzed. Approximately 10,000 feet of fencing will be constructed.

Cost:

First Cost	$303,000
Average Annual Cost	$38,100
Fully Funded Cost	$367,000



XTE-66 SEDIMENT DISTRIBUTION SYSTEM DEMONSTRATION PROJECT

Sediment Distribution System Demonstration (XTE-66)

Location:

The project location is west of the Houma Navigation Canal (HNC) near its junction with Bayou Grand Caillou, extending north for a distance of approximately 11,500 feet, and extending west from the bank of the HNC to an existing oil and gas access canal for a distance of approximately 4,000 feet. The project area is approximately 1,400 acres and is in Terrebonne Parish, Louisiana.

Justification:

Sediments are critical to the long term and widespread viability of the Louisiana coastal wetlands. It has been well documented that the processes of sea level rise and subsidence are slowly inundating coastal wetlands. The natural process for mitigating against this submergence is a build up of the marsh substrate through deposition of vegetative matter and sediments. The long-term enhancement, building, and restoration of wetlands require enhanced sedimentation. The problem is especially severe in the Terrebonne Basin. This project continues the efforts to lead to the development of a system for introducing sediment into deficit areas that cannot benefit from sediment or freshwater diversions.

To replace the loss of naturally supplied sediments, sediment conveyance and distribution systems must be developed. The application of conveyed sediments to wetlands for optimum creation and restoration lacks well established and evaluated technologies. This project will evaluate and demonstrate the effectiveness of gravity driven overland flow as a means of supplying sediments that most nearly mimics natural processes.

Objective:

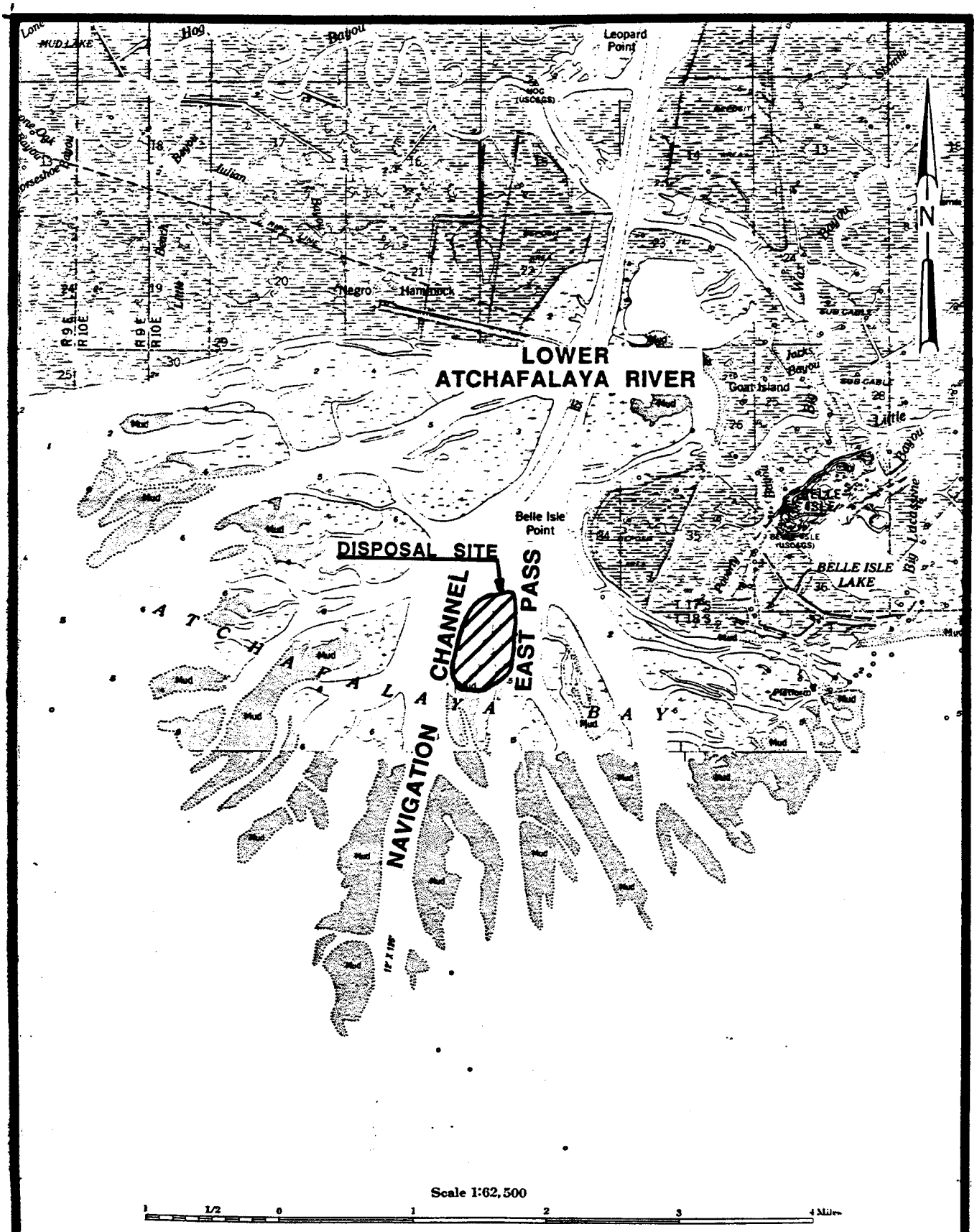
The objective of the project is to apply sediment to restore and enhance an area of brackish marsh and to test the effectiveness of a gravity driven overland flow system for the direct application of sediment as a wetland creation and enhancement technique. The project will evaluate the potential for use as part of a needed regional and coastal sediment conveyance system. The project will test cost effectiveness and determine how specified amounts of deposition can be obtained over a wide area of wetlands having different plant densities.

Project Features:

The project consists of hydraulic pumping slurred sediments into a pipeline placed along the inside of the bank of the HNC. The pipeline will be perforated at intervals to produce a one-dimensional flow into the wetlands. The project will involve pumping approximately 200,000 to 300,000 cubic yards of sediment into the 1,400-acre project area. Slurries of various concentrations, discharges, and duration will be applied at several points along the length of the project. Various sediments will be used, including bottom material from the HNC and the upper flocculent layer.

Cost:

First Cost	$1,198,000
Average Annual Cost	$136,300
Fully Funded Cost	$1,311,000



XTA-5a MARSH CREATION WITH FLEXIBLE DREDGE PIPE

Marsh Creation with Flexible Dredge Pipe (XAT-5)

Location:

The project is located in the Atchafalaya Bay, in the lower southeast corner of St. Mary Parish, Louisiana. The project is located in the central portion of the Atchafalaya Delta.

Justification:

For the last few years, dredged material has been used beneficially to create over 300 acres annually. The proposed demonstration project will further improve the technology for beneficially using dredged material to create wetlands.

Objective:

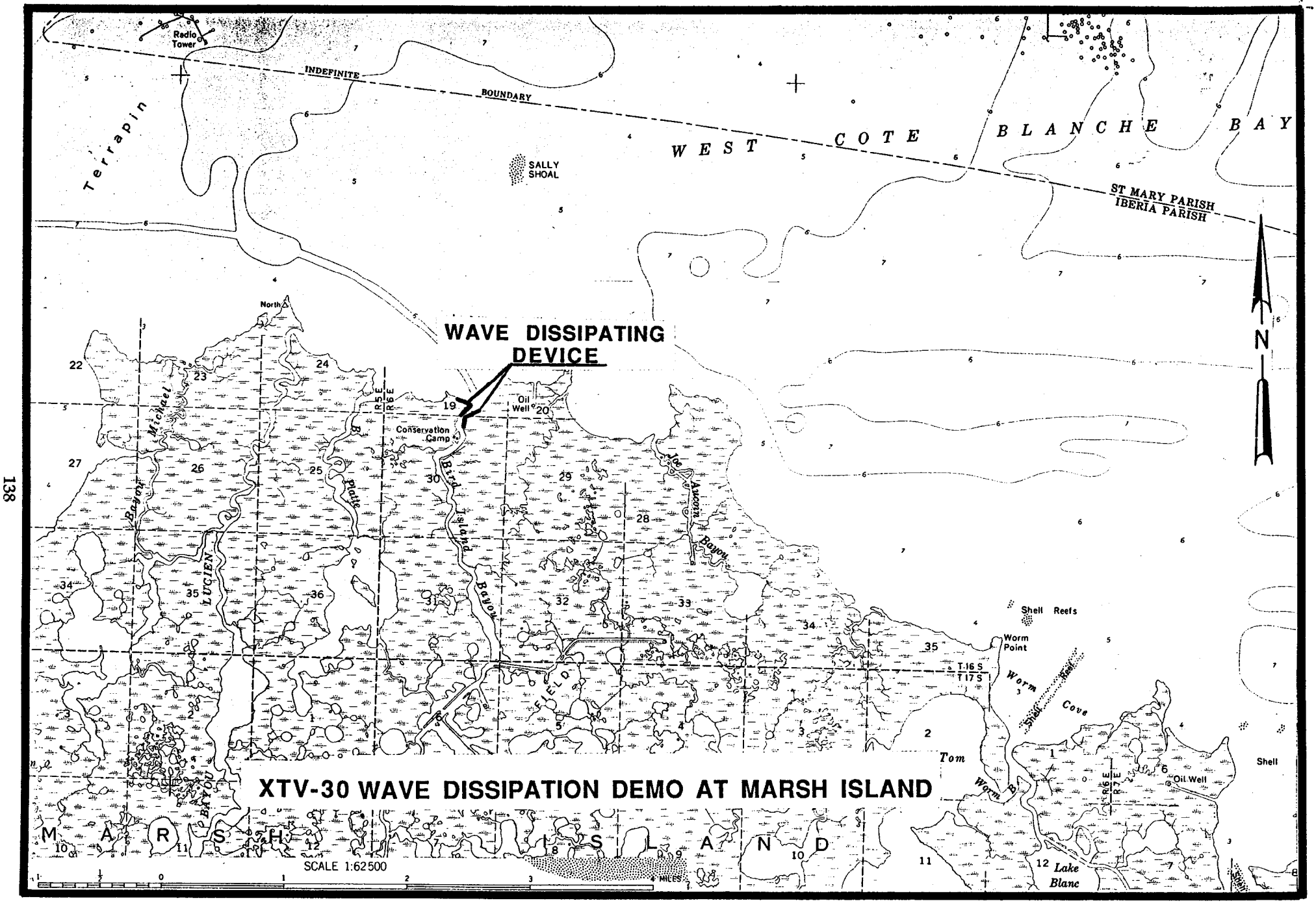
The objective of the project is to create wetlands using flexible hoses attached to a marsh buggy so that material can be spread in thin layers and the disposal areas can be changed quickly.

Project Features:

The project will use 200,000 cubic yards of dredged material to form delta lobes in crescent shapes, with maximum elevations at the upstream midstream of the crescent and elevations decreasing to the tips. The lobes will be created in a pattern similar to that of natural delta lobes so the distributary channels will become active between the lobes.

Cost:

First Cost	$234,000
Average Annual Cost	$32,700
Fully Funded Cost	$318,000



XTV-30 WAVE DISSIPATION DEMO AT MARSH ISLAND

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 founds 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:

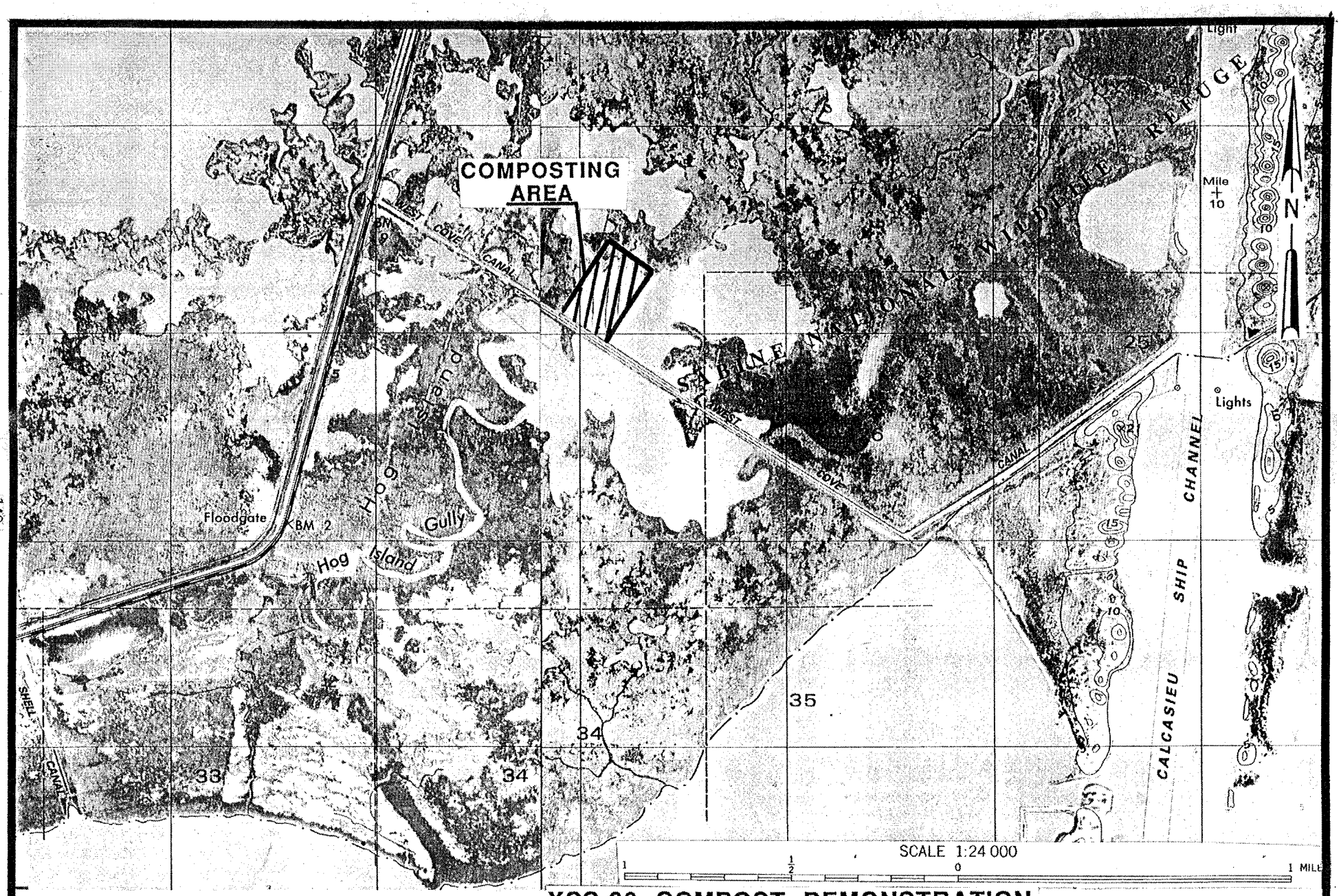
1. Effectively reduce wave energies and prevent shoreline erosion;
2. Have as few limitations as possible with regard to:
   a. site accessibility,
   b. unstable soil foundations,
   c. corrosive environments,
   d. longevity, and
   e. the magnitude of wave energy;
3. Be structurally stable with little 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	$244,000
Average Annual Cost	$33,100
Fully Funded Cost	$335,000



XCS-36 COMPOST DEMONSTRATION

Compost Demonstration Project (XCS-36)

Location:

The project area is located on the Sabine National Wildlife Refuge in Calcasieu Parish, Louisiana, 1,500 feet east of Louisiana Highway 27 on the north side of Hog Island Gully.

Justification:

Prior to the channelization of Louisiana's waterways and construction of the levee system, brush material flowed naturally during annual flood events into the wetlands and was deposited by the calmed waters. The Compost Demonstration project was conceived to demonstrate and develop the technologies to reintroduce compost material into the wetland system to nourish and enhance marshes. The demonstration will provide the basis to create the technology and scientific data base to develop the recipe for compost in wetlands for the various hydrologic basins in Louisiana. Earlier research provided by Louisiana State University Wetland Research Center indicates very positive results of compost under laboratory conditions

Objective:

The objective of the project is to demonstrate under field conditions the degree of influence which compost has in establishing vegetation on newly deposited sediment and dredged material within a previously open water area. The project will initiate and document methods of transportation and placement of the compost material. The new technology will provide for new markets and alternatives for disposal of the compost material which now burdens landfills.

Project Features:

The project will collect, process, transport, and place into a wetland area between 7,000 and 9,000 cubic yards of compost material. The design will require the construction of three sections with four cells per section. Each section will be 400 feet long, 25 feet wide, and completely enclosed by a brush fence. Each cell will be 20 feet wide and 100 feet long. The contents of each section will be as follows:

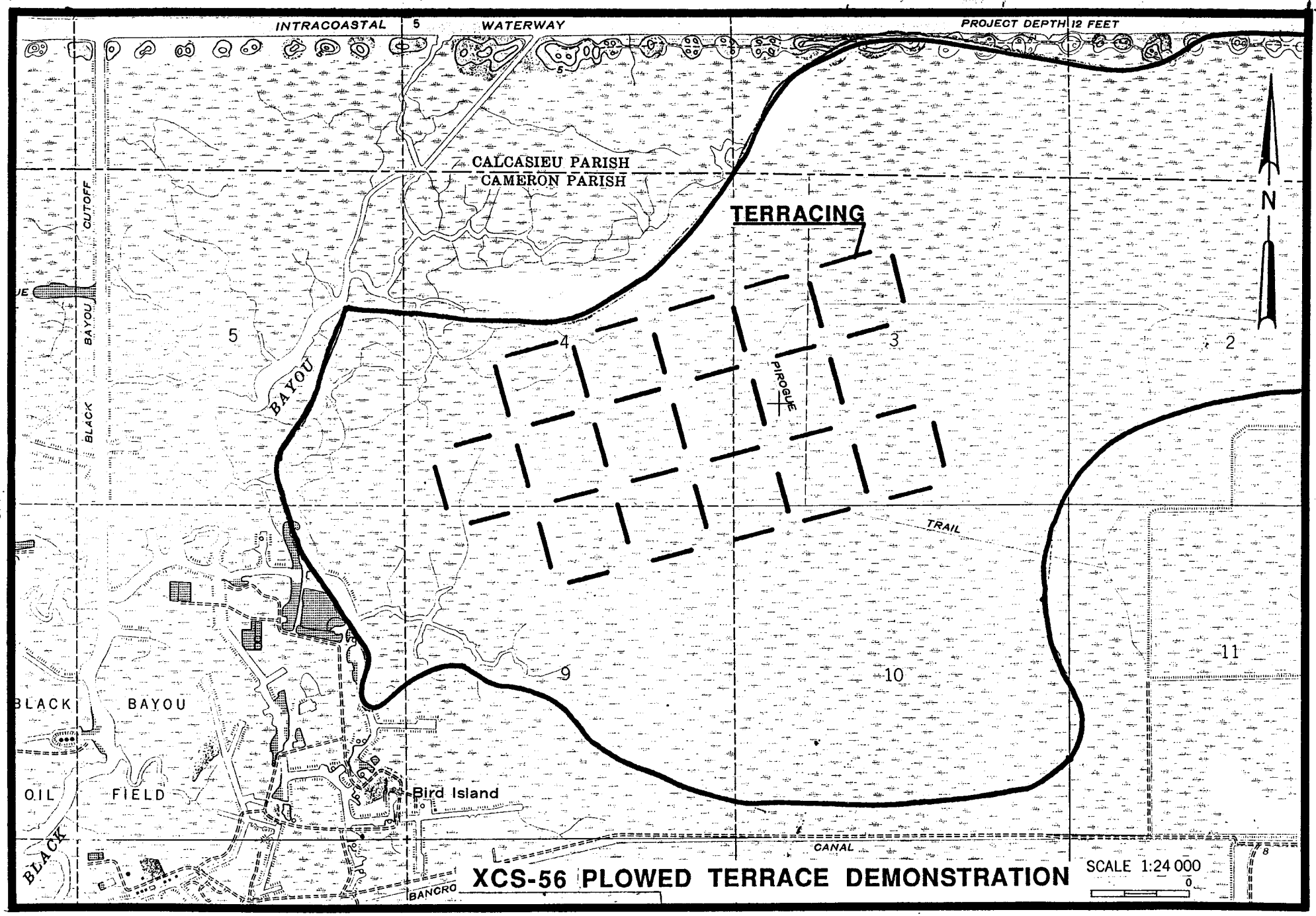
Cell 1 100% dredged material and 0% compost;
Cell 2 50% dredged material and 50% compost;
Cell 3 90% dredged material and 10% compost;
Cell 4 0% dredged material and 100% compost.

The project will require that the elevation of each section be raised to a 1.5-foot height at mean tide. The water depth in the project area should be between 0.5 feet and 1.5 feet. Material in each cell will be layered in the following manner:

Layer 1 Small brush up to 1 inch diameter up to 6 inches deep;
Layer 2 Whole leaves approximately 12 inches deep to act as a filter medium;
Layer 3 Small brush up to 1 inch in diameter approximately 6 inches deep to anchor material in high water;
Layer 4 Ground leaves and brush at a depth of 6 to 9 inches deep.

Cost:

First Cost	$321,000
Average Annual Cost	$38,700
Fully Funded Cost	$371,000


INTRACOASTAL WATERWAY
PROJECT DEPTH 12 FEET
CALCASIEU PARISH
CAMERON PARISH
TERRACING
N
BLACK BAYOU CUTOFF
BAYOU
BLACK BAYOU
PIROGUE
TRAIL
BLACK BAYOU OIL FIELD
Bird Island
CANAL
BLACK
BANCRO
XCS-56 PLOWED TERRACE DEMONSTRATION
SCALE 1:24 000
0
5
4
3
2
9
10
11
8

Plowed Terrace Demonstration (XCS-56)

Location:

The project area is located in Cameron Parish approximately 24 miles southwest of Lake Charles. It will be installed within unit NO-13 of the Calcasieu/Sabine River Basin Study.

Justification:

Cameron Parish alone has over 60,000 acres of eroded wetlands that are now shallow, turbid, open water areas and have soil types suitable for plow-constructed earthen terraces. This practice could be perfected to be applied to many areas across the Louisiana coast.

Objective:

The project is designed to develop and demonstrate a nontraditional procedure for constructing earthen terraces in shallow open water areas. The terraces will serve as wave-stilling, sediment-trapping structures and provide a medium base for the establishment of emergent vegetation. If successful, this technique will provide a less expensive method of constructing earthen terraces than the traditional method using excavation equipment.

Project Features:

Construction of 38 earthen terraces using a specially designed fabricated plow pulled with a marsh buggy. The terraces will each be 500 feet in length for a total of 19,000 feet. Each terrace will be 2.5 feet in height, with a 3-foot top width and a 9-foot bottom width. The terraces will be built in water varying from 6 inches to 24 inches in depth. The terraces will settle to a final height of marsh elevation. Immediately following construction, each terrace will be vegetated with smooth cordgrass (*Spartina alterniflora*).

Cost:

First Cost	$252,000
Average Annual Cost	$30,100
Fully Funded Cost	$300,000

SELECTED PROJECTS

Rationale for the Selection of Priority List Projects.

The list of projects selected by the Task Force is not a simple compendium of the most cost effective of the candidate projects. The Wetland Value Assessment, while it is the best tool presently available for evaluating wetland projects, is not perfect; like all models, it suffers from any number of weaknesses. In addition to the errors which are unavoidably inherent in the model (since our knowledge of wetlands is less than all-encompassing), there is the problem of the quality of the data available for input. Every attempt was made to ensure that data were as accurate as possible, but the demands created by evaluating a large number of proposals in a short period of time did not permit adherence to the feasibility study process. As a consequence, any number of factors other than cost effectiveness were taken into account by the Planning and Evaluation Subcommittee, the Technical Committee, the Citizen Participation Group, and the Task Force in arriving at the 4th Priority Project List. Not all of these are rigorously quantifiable elements. Primary among these factors are consistency with long-term goals and the degree of public support, especially as demonstrated by local governments.

At the November 28, 1994, Technical Committee meeting, the Louisiana Department of Natural Resources outlined to the CWPPRA agencies, a new state position on wetlands restoration. With three priority lists already approved and the Restoration Plan complete, the direction of the CWPPRA priority project list should be consistent with building a systematic program and with the state's Economic and Environmental Blueprint. Restoration projects should yield macro-scale or interbasin results, or should support such ends. Key elements outlined in the blue print are: beneficial use of dredged material; diversion of fresh water and sediments; and restoration of barrier islands. Funds to perform bank stabilization on Federal maintenance channels should be pursued through other means and not with state wetlands trust funds. While the state's philosophy could not be fully realized with individual projects recommended on the 4th Priority Project List, the Department of Natural Resources believes the projects it supports will move the restoration effort in the direction of state-wide impacts.

The State of Louisiana anticipates that funds available for the Louisiana Department of Natural Resources to cost share on this year's CWPPRA projects will be approximately $5,000,000. With the Federal/non-federal cost share specified in the act of 75 percent/25 percent, the state will only be able to support a construction program of approximately $20,000,000. Federal revenues into the CWPPRA have typically run approximately $35,000,000 annually, with $5,000,000 dedicated to planning activities. Thus, approximately $15,000,000 in Federal funds are unobligated. With this in mind, the Task Force approved in excess of $40,000,000 in restoration projects to afford other non-federal sponsors the opportunity to partner with the Task Force to construct worthy restoration projects.

At the November 28, 1994, Technical Committee meeting, the state, based on their new philosophy and funding limitations, expressed support for the following projects: Eden Isles East Marsh Restoration (PPO-4), East Timbalier Island

Restoration (XTE-45/67b), Grand Bay Crevasse (PBS-6), Barataria Bay Waterway Bank Stabilization--West (PBA-12a), Perry Ridge Bank Stabilization (PCS-26), Bayou L'Ours Ridge Hydrologic Restoration (PBA-34), Beneficial Use of Hopper Dredged Material Demonstration (XMR-12), and Compost Demonstration (XCS-36).

As a first level of screening, each agency identified the projects it felt were worthy of support, taking into account the state supported projects, cost effectiveness, and other factors. The results are shown in Table 19.

Table 19
Agency Support for 4th Priority Project List Candidates

Project	EPA	NMFS	NRCS	USACE	USFWS	LDNR	Total
PPO-4 Eden Isles Marsh Rest	+	+	+	+	+	+	6
BA-3c Naomi Outfall Mgmt	-	+	+	+	+	-	4
PCS-26 Perry Ridge Bank Protection	-	+	+	+	+	+	5
TE-10 Grand Bayou/GIWW Dvrsn	-	-	+	+	+	-	3
PBA-34 Bayou L'Ours Ridge	+	+	+	+	+	+	6
PTV-19 Little Vermilion Bay Sediment Trap	+	+	-	+	-	-	3
TV-5 Marsh Island Rstrtn and Marsh Creation	+	+	+	+	+	-	5
PBS-6 Grand Bay Crevasse	+	+	+	+	+	+	6
PMR-8 Pass a Loutre Sediment Mining	+	+	-	+	+	-	4
CS-16 Black Bayou Culverts	-	-	+	+	+	-	3
PBA-12a Barataria Bay Wtrwy Bank Protection--West	+	+	+	+	+	+	6
BS-5 Bayou Lamoque Outfall Mgmt	-	-	+	-	-	-	1
XME-29 Freshwater Bayou Bank Protection	-	-	+	+	-	-	2
PO-15 Alligator Point Hydro Restoration	-	-	+	+	-	-	2
CS-11b Sweet/Willow Lakes	-	-	+	+	-	-	2
XTE-45 E. Timbalier Island Restoration	+	+	+	-	-	+	4
XTV-27 Freshwater Bayou Bank Protection	-	-	+	-	-	-	1
PME-1 GIWW/Amoco Bank Restoration	-	-	+	-	-	-	1
PPO-2b Lake Borgne Shore Protection	-	-	+	+	-	-	2
XCS-44 Plug West Cove Canal	-	-	-	-	-	+	1
BS-6 Lake Lery Hydrologic Restoration	-	-	+	-	-	-	1
PTE-15bii Raccoon Island Breakwaters	-	-	+	-	-	+	2

Nine of the candidate projects were supported by a majority of the agencies. These projects were then ranked by the agencies in order to assign an overall

priority to the list. The rankings assigned by the agencies are shown in Table 20 (a higher number indicates a higher priority).

Table 20
Agency Rankings of Projects
with Majority Support

Project	EPA	NRCS	USFWS	USACE	NMFS	LDNR	Total
PPO-4 Eden Isles Marsh Rest	6	2	9	9	8	8	42
PBA-34 Bayou L'Ours Ridge	3	7	6	4	6	7	33
PBS-6 Grand Bay Crevasse	8	4	3	5	7	5	32
XTE-45 E. Timbalier Island Restoration	9	3	1	1	9	9	32
PCS-26 Perry Ridge Bank Protection	2	9	7	2	5	6	31
PBA-12a Barataria Bay Wtrwy Bank Protection--West	7	8	5	3	4	3	30
TV-5 Marsh Island Rstrtn and Marsh Creation	5	6	4	7	3	4	29
BA-3c Naomi Outfall Mgmt	1	5	8	8	1	1	24
PMR-8 Pass a Loutre Sediment Mining	4	1	2	6	2	2	17

The Technical Committee noted that three projects not supported by the state received support from 3 agencies and were within the top 10 candidate projects evaluated during the planning process in terms of cost effectiveness. Although the state was unable to commit to cost sharing on these project, the projects were considered worthy of Federal support. The committee placed these projects on the list so that other potential cost share partners would be provided an opportunity to sponsor the projects. Therefore, the following projects were added to the recommended list: Grand Bayou/GIWW Diversion (TE-10), Little Vermilion Bay Sediment Trapping (PTV-19), and Black Bayou Culverts (CS-16).

The Technical Committee met on December 8, 1994, to discuss and make a recommendation to the Task Force on demonstration projects for the 4th Priority Project List. Following a discussion of the eleven demonstration projects, the Marsh Creation with Flexible Dredge Pipe (XAT-5a) was withdrawn from consideration at the request of the EPA (the Federal lead agency). The committee realized that the technology to be demonstrated by the project was already being used; therefore, the project was not necessary. The Technical Committee then ranked the remaining ten demonstration projects in order of priority, assigning 10 points to each agency's preferred project and descending from there. The points assigned to each project were summed to determine the overall ranking, with the top four projects to be recommended to the Task Force. The results of the demonstration project ranking are shown in Table 21. The top four projects are noted.

Table 21
Agency Rankings of Demonstration Projects

	Project	USACE	EPA	NRCS	USFWS	LDNR	NMFS	Total
PPO-21	N.O. East Marsh Creation for Strmwtr Mgmt	5	8	1	1	6	1	22
XPO-92a	Bayou Chevee Shore Protection	6	4	5	5	3	2	25
XPO-93	Marsh Creation with Biosolids	8	6	2	4	4	3	27
XTE-54b	Flotant Marsh Fencing	7	5	9	10	2	8	*41
XTE-66	Sediment Distribution System	2	7	4	3	5	5	26
XTV-30	Wave Dissipation	4	3	8	7	1	6	29
XCS-36	Marsh Creation with Compost	10	9	3	2	9	4	*37
XCS-56	Plowed Terraces	3	2	10	9	7	10	*41
XMR-12	Beneficial Use of Hopper Dredged Material	9	10	6	6	10	9	*50
PTE-15bii	Raccoon Island Breakwaters	1	1	7	8	8	7	32

* Indicates top four priority projects

On December 16, 1994, the Louisiana Coastal Wetlands Conservation and Restoration Task Force met to select the projects for the 4th Project Priority List. The Task Force accepted the Technical Committee's recommendation but added an additional project, Barataria Bay Waterway Bank Protection--East (PBA-12b). The Task Force's selections are shown in Table 22, ranked in order of cost effectiveness. Plate 1 gives the locations of the projects. The Task Force decided that for projects approved for the 4th list but not supported by the state (noted in the table), local sponsors other than LDNR would be afforded an opportunity to provide the cost-sharing match; otherwise, these projects would automatically become candidates for the next priority project list.

Detailed project descriptions for the selected projects are presented in the next section, along with summary benefit and cost information.

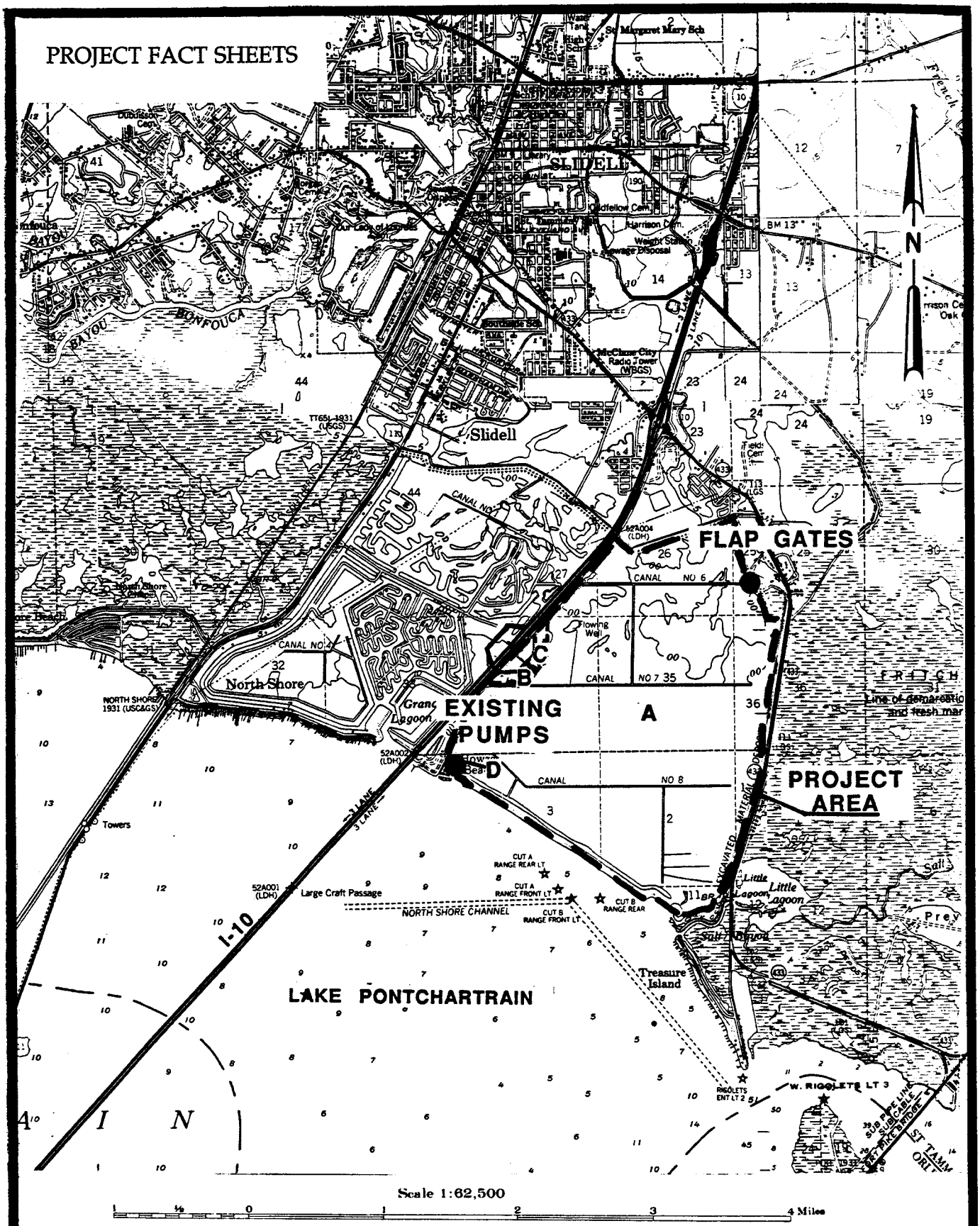
Table 22
Task Force Project Rankings for the 4th Priority Project List

Project No.	Project Name	Average Annual Cost ($)	Average Annual Habitat Units (AAHU's)	Avg Annual Cost/AAHU ($/AAHU)	Average Annual Acres	Net Acres After 20 Years	Fully Funded Cost ($ X 1000)	Cummulative Fully Funded ($ X 1000)	Sponsoring Agency	
PPO-4	Eden Isles East Marsh Restoration	363,500	1,253	290	934	1,454	5,019	5,019	NMFS	*
PBA-34	Bayou L'Ours Ridge Hydrologic Restoration	184,100	467	394	737	737	2,419	7,438	NRCS	*
PBS-6	Grand Bay Crevasse	256,800	257	999	333	634	2,469	9,907	USACE	*
XTE-45/67b	East Timbalier Barrier Island Restoration	617,800	140	4,413	140	215	5,752	15,659	NMFS	*
PCS-26	Perry Ridge Bank Protection	220,700	624	354	632	1,203	2,224	17,883	NRCS	*
PBA-12a	Barataria Bay Waterway Bank Protection (West)	204,400	63	3,244	122	232	2,195	20,078	NRCS	*
TV-5/7	Marsh Island Marsh Creation & Hydrologic Restoration	354,700	452	785	233	408	3,907	23,985	USACE	
BA-3c	Naomi Outfall Management	139,700	379	369	334	633	1,857	25,842	NRCS	
PMR-8	Pass a Loutre Sediment Mining	162,800	125	1,302	132	120	1,633	27,475	USACE	
CS-16	Black Bayou Culverts	849,300	592	1,435	440	837	8,296	35,771	USACE	
TE-10/XTE-49	Grand Bayou /GIWW Freshwater Introduction	406,000	771	527	844	1,609	5,181	40,952	USFWS	
PTV-19	Little Vermilion Bay Sediment Trapping	110,100	149	739	238	441	1,133	42,085	NMFS	
PBA-12b	Barataria Bay Waterway Bank Protection (East)	220,900	128	1,726	114	217	2,361	44,446	NRCS	

Task Force Demonstration Project Rankings

Project No.	Project Name	Average Annual Cost ($)	Average Annual Habitat Units (AAHU's)	Avg Annual Cost/AAHU ($/AAHU)	Average Annual Acres	Net Acres After 20 Years	Fully Funded Cost ($ X 1000)	Cummulative Fully Funded ($ X 1000)	Sponsoring Agency	
XMR-12	Beneficial Use of Hopper Dredge Material	NA	NA	NA	NA	NA	300	300	USACE	*
XCS-56	Plowed Terraces Demo	NA	NA	NA	NA	NA	300	600	NRCS	*
XTE-54b	Flotant Marsh Fencing Demo	NA	NA	NA	NA	NA	367	967	NRCS	*
XCS-36	Compost Demo	NA	NA	NA	NA	NA	371	1,338	EPA	*

EPA: Environmental Protection Agency USACE: US Army Corps of Engineers
NMFS: National Marine Fisheries Service USFWS: US Fish and Wildlife Service
NRCS: Natural Resources Conservation Service (formerly Soil Conservation Service)
* Indicates priority set by the state of Louisiana (Department of Natural Resources) on which projects to cost share with funds established under Louisiana Act 6.



PPO-4 EDEN ISLES EAST MARSH RESTORATION

Eden Isles East Marsh Restoration (PPO-4)

Proposed by: U.S. Department of Commerce, National Marine Fisheries Service

PROJECT DESCRIPTION

Location

The project area is in western St. Tammany Parish, between Interstate 10 and Louisiana Highway 433, and adjacent to Lake Pontchartrain. The area's center is approximately latitude 30° 15′ and longitude 89° 46′. The project area consists of four parcels of land, tracts A, B, C, and D. Tracts A and D form one large impoundment that is crossed by drainage canals. Tracts B and C lie between Interstate 10 and a service road and drain into the same canal as the remainder of the property.

Land Classification	Acres
Drainage Canals (open water)	22
Fresh Marsh	149
High lands (area above 1.5 NGVD)	223
Fastlands (wet pasture)	2,536
Total	2,930

The southern limit of the project site abuts Lake Pontchartrain where a protection levee 12 feet high forms the boundary. The perimeter of inland portions of the project area is delineated by levees lower than the one along the lake. Approximately 52,000 feet of man-made canals drain the area and all are linked to a parish drainage pumping station, in the southwest corner of the site.

The area was leveed and drained for farming in the early 1920's but apparently had been abandoned by the early 1950's when the levees failed. The area was a shallow bay until the 1970's, when the area was converted to fastlands by the combined use of levees, drainage canals, and the pumping station.

O'Neil (1949) described the area as a "brackish three-cornered grass marsh." Lambou (1952) recorded the following dominant plant species: wiregrass (*Spartina patens*), leafy threesquare (*Scirpus maritimus*), three-cornered grass (*Scirpus olneyi*), black needle rush (*Juncus roemerianus*), Jamaica sawgrass (*Cladium jamaicense*), cattail (*Typha latifolia*), roseau (*Phragmites communis*), bulltongue (*Sagittaria lancifolia*), pickerelweed (*Pontederia cordata*), coontail (*Ceratophyllum demersum*), southern naiad (*Najas guadalupensis*), widgeongrass (*Ruppia maritima*), wild-celery (*Vallisneria americana*), dwarf spikerush (*Eleocharis parvula*), white waterlily (*Nymphaea odorata*), and alligatorweed (*Alternanthera philoxeroides*).

Currently the area is managed for cattle grazing (approximately 20 head).

Justification

Prior to the 1920's the area consisted of approximately 2,400 acres of brackish marsh and 500 acres of intermediate marsh. At present the area has value only to cattle and terrestrial animals. Wetland and aquatic species utilize the drainage

canals, which compose only 0.8 percent of the area. Current value to fish populations is minimal. However by changing the drainage pump operation so that the area is flooded and then manipulating water levels, this area could be restored to a functional wetland.

In 1952, Lambou reported the following fish species in the area at all times: alligator gar (*Lepisosteus spatula*), spotted gar (*Lepisosteus oculatus*), longnose gar (*Lepisosteus osseus*), yellow bass (*Morone mississippiensis*), largemouth bass (*Micropterus salmoides*), blue crab (*Callinectes sapidus*), redear sunfish (*Lepomis microlophus*), stumpnose bream (*Lepomis punctatus*), and freshwater shrimp. Speckled trout (*Cynoscion nebulosus*), redfish (*Sciaenops ocellataus*), croaker (*Micropogonias undulatus*) and saltwater shrimp (*Penaeus*) were seasonal users of the area. At that time, the area was naturally flooded from Lake Pontchartrain due to numerous breaks in the levees. Over a 4-month period (July through October), Lambou (1952) measured water level fluctuations of almost 4 feet, due to both tidal and meteorological forcing.

Objectives

The project objective is to restore 2,536 acres of drained fastlands to wetlands by purchasing the property, manipulating the pump so that a large portion of the area would be flooded, and then actively managing water levels to maximize marsh creation.

Project Features

Geologically the soil profile consists of 12 to 18 inches of old marsh material overlying compacted Late Pleistocene/Early Holocene sands and silts. The latter material forms a solid base and does not significantly compact when dewatered. This site has generally not undergone the dramatic vertical height loss due to compaction that typifies other sites around Lake Pontchartrain. The southeastern quarter of the project area has elevations of -3 to -4 feet NGVD (Lee and Van Beek, 1994). Assuming that mean water levels for Lake Pontchartrain are +1 foot NGVD, these water bodies would be up to 5 feet deep if the area were directly opened to the lake. This depth range is similar to that reported by Lambou in 1952; his maps reveal that a large lake occurred in this portion of the project area.

According to Lee and Van Beek (1994), 96 percent of the property (excluding approximately 40 acres of canal banks) would be flooded at mean Lake Pontchartrain water levels if the project site were directly reconnected to Lake Pontchartrain. Additionally, their data showed that 83 percent of the flooded areas would be greater than 1.5 feet in depth. Since water depths greater than an average of 1.5 feet deep inhibit significant aquatic vegetation colonization, the proposed wetland restoration/habitat management plan calls for active water level management, through the use of the existing drainage pumps, to maintain a controlled level of 1.0 foot NGVD. At this level, 1,445 acres would be flooded, with 1,091 acres being covered with water. Additionally, holding the water level below the average for the lake would provide a buffer against flooding the existing infrastructure and prolonged flooding of wetlands, in case rainfall ever exceeded pump capacity.

However, the key in determining the final and best water level elevation will be the monitoring program.

Potential future modifications include: (1) the direct connection to Lake Pontchartrain, which would provide some emergent vegetation, and significant submerged vegetation, and provide for estuarine fish and shellfish utilization of the area; this would also drastically reduce operational costs; (2) the beneficial disposal of dredged material from the North Shore Channel to create marsh elevations landward of the levee along Lake Pontchartrain; and (3) routing water treatment plant discharge water into the northern portion of the project area.

At various sites within the area, artificial levees may have to be breached to establish drainage connections. In other locations, existing levees may have to be strengthened.

ANTICIPATED BENEFITS

Marsh Benefits

The project will restore an impounded fastland to wetlands and shallow open water by utilizing a pump to keep water levels at -1 foot NGVD. Approximately 1,450 acres of fresh/intermediate marsh will be restored in the area and this marsh should remain for the 20-year project life. Without this project, the entire 2,536 area would be developed, with no wetlands present in 20 years.

Submerged Aquatic Vegetation Benefits

Nearly 1,100 acres of shallow water will be formed; approximately 930 acres will be shallow enough to be colonized by submerged aquatic vegetation.

Average Annual Habitat Units

This project would produce 1,253 average annual habitat units.

Other Significant Benefits

Wetland restoration will greatly add to the aesthetic value of surrounding developments. The new wetland, being close to the Oak Harbor/Eden Isles development and Slidell, lends itself for the development of ecotourism. Activities could include fishing, hunting, bird watching, wildlife viewing, and marsh canoe trails.

The project is located in the St. Tammany Parish Planned Corridor Overlay District. The purpose of this district is to provide for the protection of the scenic benefits of the area and to provide for continuity and regulatory control of land uses. Strong local approval from area wildlife and environmental organizations supports this restoration effort.

Water quality in Lake Pontchartrain could be improved by allowing the waste water from the Slidell sewage treatment plant to filter through this new wetland.

ANTICIPATED ADVERSE AFFECTS

Types of Acres Adversely Affected

None.

Conflict with Other Programs

No conflict is anticipated with the present activity of the grazing of a few cattle. No conflict should exist with the parish's drainage program, as the pump station would still function although under a different drawdown regime.

COSTS

Item	Amount ($)
Project Area Purchase	
(2,390 acres @ $648.00/acre)	1,900,000
Purchase Parcel Between	
Tracts A & D (2.4179 acres)	2,000
Construction Cost	75,000
Contingencies	19,000
Subtotal	1,996,000
Engineering and Design	70,000
Supervision and Administration	35,000
Supervision and Inspection	30,000
Total	2,131,000
Annual Charges	
Operation, Maintenance & Taxes	70,000
Project Monitoring	4,325

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Feb 96
Construction Start Date	May 96
Construction Finish Date	Aug 96

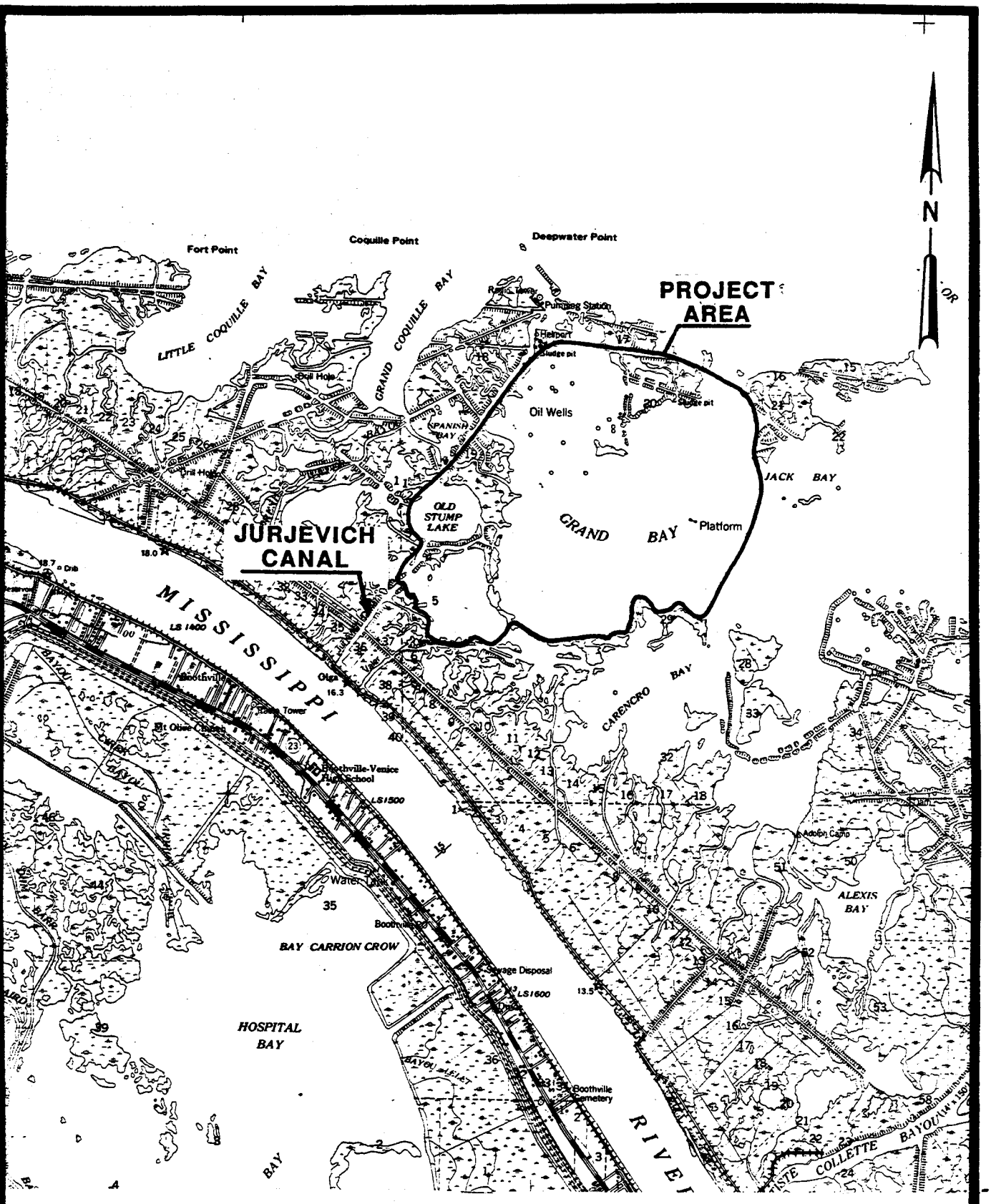
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.



PBS-6 CREVASSE DEVELOPMENT AT GRAND BAY

Grand Bay Crevasse (PBS-6)

Proposed by: U.S. Department of the Army, U.S. Army Corps of Engineers

PROJECT DESCRIPTION

Location

The project is located at the Jurjevich Canal near Mississippi River Mile 16.3 above Head of Passes, in Plaquemines Parish Louisiana. The coordinates of the project are approximately latitude 29° 21′ and longitude 89° 24′. The project area consists of approximately 6,300 acres of brackish and saline marshes and open water.

Justification

Grand Bay and adjacent marshes experienced significant freshwater and sediment input with annual Mississippi River flooding until artificial levees were constructed along the river bank. Subsequently, rocks were placed along the river banks to stabilize the channel. Construction of a rock lined opening through the rocks would reestablish a pathway for fresh water and sediment into Grand Bay and the adjacent marshes. Grand Bay is a semi-enclosed body of water which will maximize sediment retention and marsh creation.

Objectives

The object of the project is to create, restore, and enhance wetlands in the area of Grand Bay by constructing a lined cut through the rocks at the head of the Jurjevich Canal. Sediment from the Mississippi River will eventually create a delta splay in Grand Bay.

Project Features

The project will consist of rearranging approximately 1,500 tons of rock at the head of the Jurjevich canal, allowing an estimated maximum 20,000 cubic feet per second of Mississippi River water into the canal, Grand Bay, and adjacent wetlands. The entrance of the canal will be lined with additional rock to prevent scouring of the canal. In addition, two pipelines crossing the Jurjevich canal will be relocated.

ANTICIPATED BENEFITS

Marsh Benefits

Significant amounts of fresh water from the Mississippi River presently inundate Grand Bay during moderate to high river stages. This water is reaching the area by overtopping the existing rock dikes at the heads of the Jurjevich and Valer Canals. This project will allow additional fresh water and sediment to flow through the Jurjevich Canal by removing the rock dike, increasing the cross-sectional area of the canal at its mouth. In the saline portion of the project area, the additional fresh water will reduce the present loss rate from two percent per year to one percent per year, resulting in a net increase of 78 acres of saline marsh over the 20 year project life.

Without the project, the brackish portion of the project area is expected to accrete about 8 acres of marsh a year as a result of the sediments presently brought in

through the Jurjevich Canal, resulting in a without project loss rate of two percent per year. Therefore, at the end of the 20 year project life 874 acres of marsh will remain.

Removal of rock at the head of the canal will allow enough sediment to be carried to the project area to accrete 24 acres per year in the brackish portion of the project. In addition, the marsh loss rate would be reduced to one percent per year. Thus, at the end of 20 years, there will be 1,430 acres of brackish marsh in the area, or a net gain of 556 acres of brackish marsh.

Therefore, the project will produce a net gain of 634 acres of emergent marsh at the end of the 20-year project life.

Submerged Aquatic Vegetation Benefits

Currently there is no submerged aquatic vegetation in the saline portion of the project area. The additional sediments, nutrients, and fresh water brought in by the project will allow about 5 percent of the 2,755 acres of open water to become vegetated with submerged aquatic vegetation.

In the brackish area, only about five percent of the area contains submerged aquatic vegetation, mainly limited by water depth. The introduction of additional sediments in the brackish project area will decrease water depths so that approximately 20 percent of the open water area will contain submerged aquatic vegetation.

Average Annual Habitat Units

The project will produce 257 average annual habitat units.

Other Significant Benefits

Over the 20-year project life, the sediments, nutrients, and fresh water will increase the amount of marsh edge and interspersion and reduce water depths, making the area more valuable as a fisheries nursery. Reducing salinities in the project area will also increase the area's value for wildlife.

ANTICIPATED ADVERSE EFFECTS

Type(s) and acres of coastal wetlands and other habitats adversely affected by the project.

There are significant oyster resources in the project area. Project implementation could negatively impact the oyster resources in the area by increasing pollution levels and turbidity. Also, splay development will destroy oyster resources in the immediate area of the splay. Costs to compensate oyster fishermen have been included in the project cost.

COST

Item	Amount ($)
Construction Cost	904,000
Contingencies	226,000
Subtotal Construction	1,130,000
Engineering and Design	
Engineering Division	150,000
Cultural Resources	35,000
HTRW Investigation	26,000
Subtotal E & D	211,000
Supervision and Administration	45,000
Supervision and Inspection (Construction Contract)	100,000
Real Estate	167,000
Oyster Leases	427,000
Total	2,080,000

Annual Charges	
Operation and Maintenance	0
Project Monitoring	$8,625

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Aug 96
Construction Start Date	Nov 96
Construction Finish Date	Jan 97

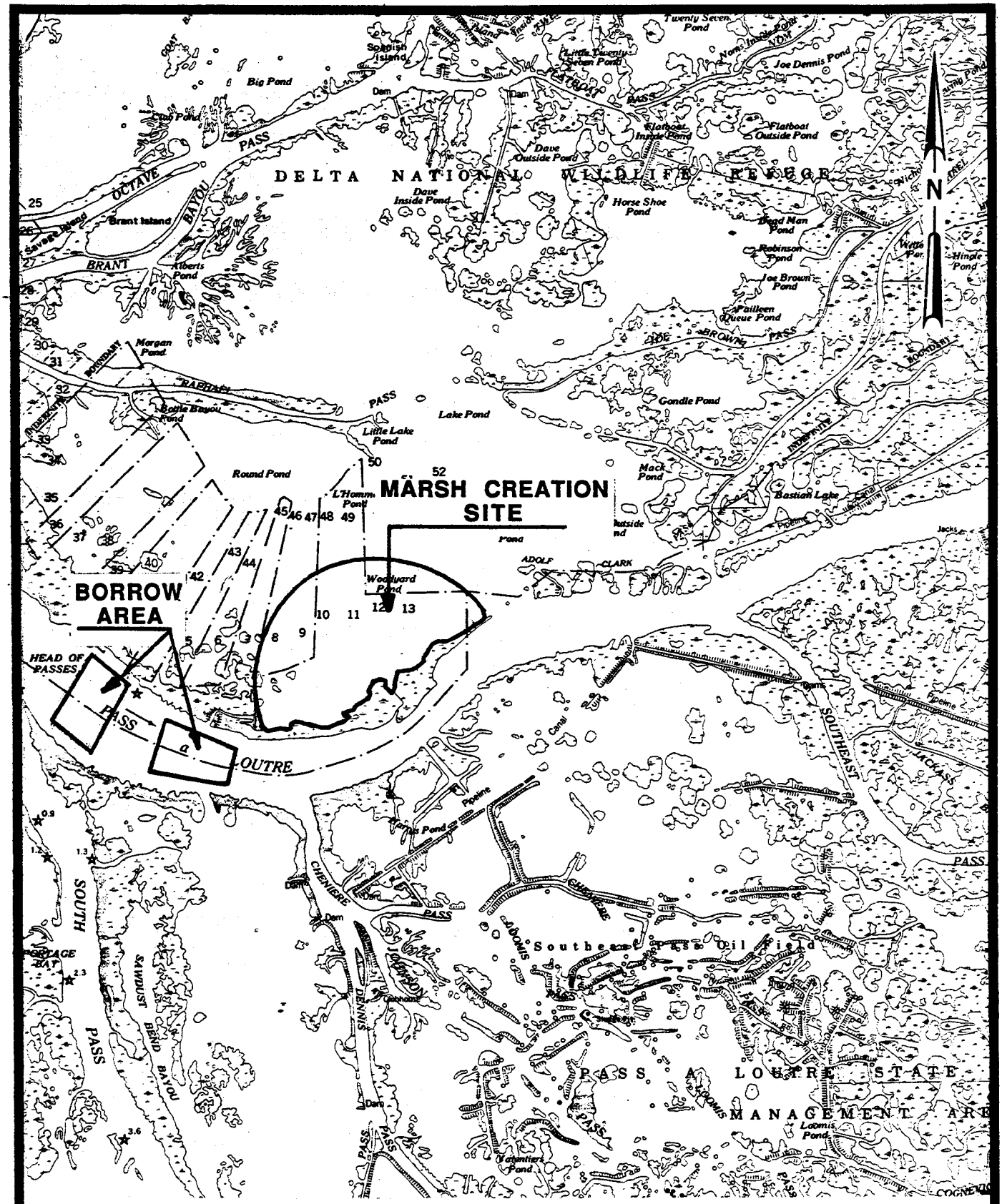
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.



PMR-8 PASS-A-LOUTRE SEDIMENT MINING

Pass-a-Loutre Sediment Mining (PMR-8)

Proposed by: U.S. Department of the Army, U.S. Army Corps of Engineers

PROJECT DESCRIPTION

Location

The project is located in Pass-a-Loutre of the Mississippi River bird's foot delta in Plaquemines Parish. The coordinates of the project are latitude 29° 08', longitude 89° 13'. 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. However, this material can be dredged and deposited along the pass to create wetlands in low lying open water areas.

Objectives

The objective of the project is to create wetland areas utilizing dredged material deposited in Pass-a-Loutre. Concurrently, the removal of the material from Pass-a-Loutre will increases 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 3 mounds to a maximum elevation of +3.0 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.

ANTICIPATED BENEFITS

Marsh Benefits

The project area is presently a pond, mostly about 4 feet deep. Without the project, the area will remain open water despite the construction of the Pass-a-Loutre Crevasse on the 3rd Priority Project List. Dredged material will be placed in the pond to create 150 acres of marsh (35 acres above elevation 1.5 NGVD). The sediments brought in by the Pass-a-Loutre Crevasse will slow loss rates so at the end of 20 years, 120 acres of marsh will still remain.

Submerged Aquatic Vegetation Benefits

Presently no submerged aquatic vegetation is in the pond. The Pass-a-Loutre Crevasse will shallow the area slightly, so at the end of 20 years, 20 percent of the 300 acre project area would contain submerged aquatics. With the project, the dredged material would significantly shallow the 150 acres of water in the project area so that 90 percent would contain submerged aquatic vegetation.

Other Significant Benefits

The created marsh will significantly increase the amount of marsh edge and interspersion within the pond and the dredged material will significantly shallow the pond. Both of these actions will make the area more valuable as a fisheries nursery.

ANTICIPATED ADVERSE EFFECTS

No adverse long term effects would be created due to the placement of sediment. However, short term turbidity problems may occur during project construction.

COST

Item	Amount ($)
Construction	805,000
Contingencies (25%)	201,000
Subtotal	1,006,000
Engineering and Design	
Engineering Division	85,000
Review of P&S Review	10,000
All Other (including Contracting Division)	8,000
Cultural Resources	37,000
HTRW Investigation	26,000
Subtotal (Engineering and Design)	166,000
Supervision and Administration (Program and Project Mgmt)	50,000
Supervision and Inspection (Construction Contract)	125,000
Real Estate	78,000
Total	1,425,000
Operation and Maintenance	0
Annual Charges	
Project Monitoring	4,325

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Mar 95
Construction Start Date	Jun 96
Construction Finish Date	Sep 96

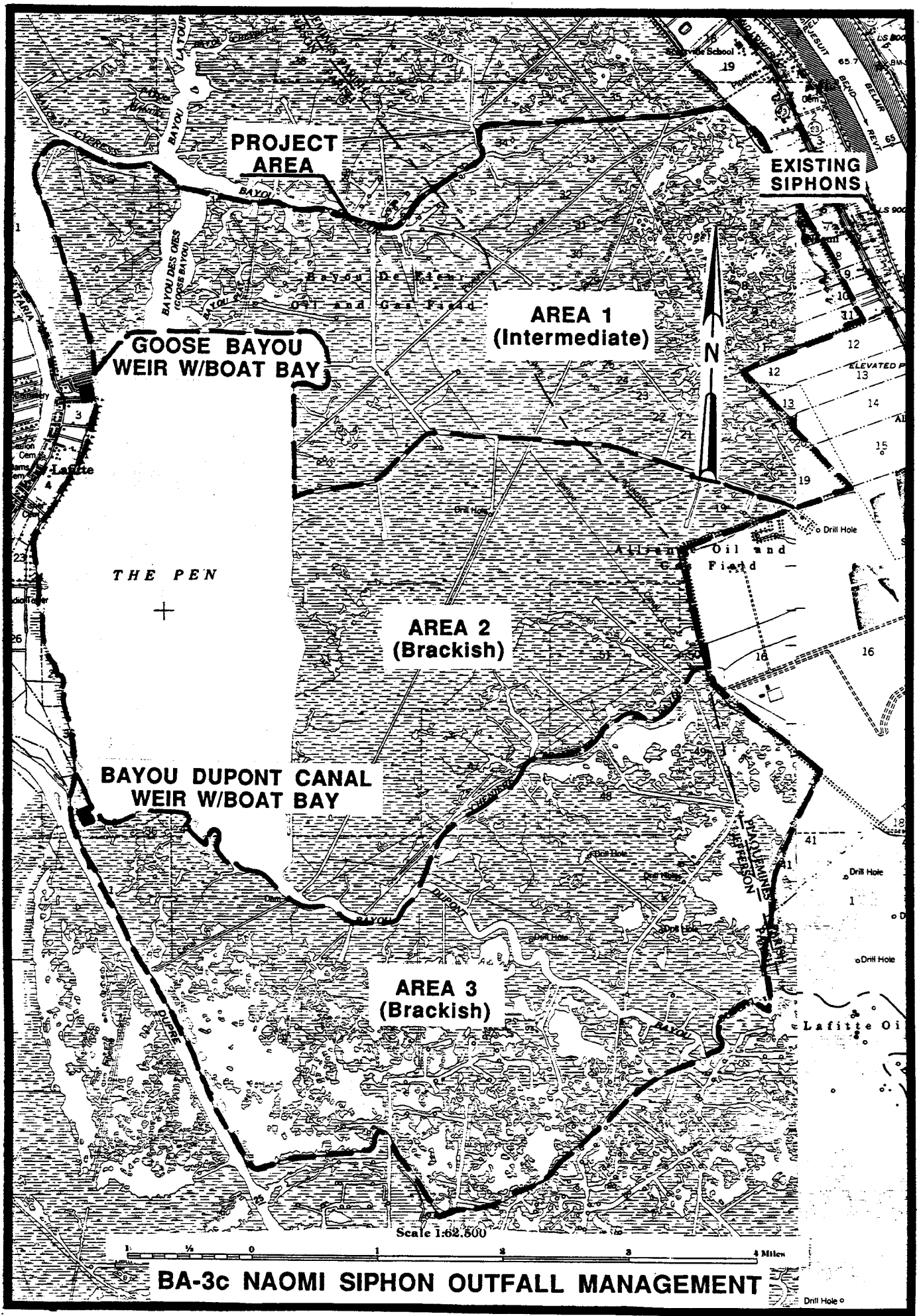
POTENTIAL FUNDING SOURCES

Federal Funding Sources

Other federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act are section's 1135 and 204 of the the Water Resources Development Acts of 1986 and 1992, respectively.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.


PROJECT AREA
EXISTING SIPHONS
AREA 1 (Intermediate)
GOOSE BAYOU WEIR W/BOAT BAY
THE PEN
AREA 2 (Brackish)
BAYOU DUPONT CANAL WEIR W/BOAT BAY
AREA 3 (Brackish)
Bayou De Cade Oil and Gas Field
Allemands Oil and Gas Field
Lafitte
Drill Hole
N
Scale 1:62,500
BA-3c NAOMI SIPHON OUTFALL MANAGEMENT

Naomi Siphon Outfall Management (BA-3c)

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

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 along 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 west bank 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.

Project Features

The outfall management plan calls for the following structural components.

1. Constructing a weir with a boat bay on the Goose Bayou Canal. The estimated weir dimensions are 425 feet by 11 feet. The weir will be set six inches below marsh level with a 20-foot-wide by 6-foot-deep boat bay.
2. Constructing a weir with a boat bay on the Bayou Dupont Canal. The estimated weir dimensions are 300 feet by 21 feet. The weir will be set six inches below marsh level with a 20-foot-wide by 6-foot-deep boat bay.

ANTICIPATED BENEFITS

Marsh Benefits

The existing siphons supply the area with water, nutrients, and sediments, reducing the historical loss of the intermediate marsh (Area 1) by 75 percent. Therefore, without the outfall management plan, 333 acres of intermediate marsh will be lost over the 20-year project life.

The brackish portion of the area was divided into a northern portion including the Pen and marshes to its east (Area 2) and a southern portion (Area 3). The influence of the siphons is less in these areas, and without the outfall management plan losses will only be reduced by 25 percent, so at the end of 20 years, 677 acres of the northern brackish area will have been lost. The southern brackish area is even further removed from the influence of the siphons, so that loss historical loss rates will only be reduced by five percent. At the end of 20 years 1,733 acres of brackish marsh will be lost.

With the two water control structures in place, sediments, nutrients, and fresh water will not exit the project area so quickly, and the inward flow of salt water will be retarded. In the intermediate portion of the project area, only 83 acres will have been lost in 20 years. Thus, there will be a net preservation of 250 acres of intermediate marsh. Much of the land loss in Area 2 is due to shoreline erosion on the eastern shore of the Pen; the two control structures will only reduce losses by another 25 percent, so at the end of 20 years, 508 acres will remain in the northern brackish area. The net difference of the future with- and without-project conditions results in the preservation of 169 acres of the brackish marsh. In the rapidly degrading, very open, southern brackish marsh, the structures will have little effect, reducing the marsh loss by only 12.5 percent for a net preservation of 219 acres of brackish marsh.

Project implementation will prevent the loss of 250 acres of intermediate marsh and 388 acres of brackish marsh, or 638 total acres.

Submerged Aquatic Vegetation Benefits

The existing siphons will allow 70 percent of the intermediate marsh waters and 55 percent of the brackish waters to contain submerged aquatics. With the two water control structures in place, 85 percent of intermediate waters and 70 percent of the brackish waters will have submerged aquatics.

Average Annual Habitat Units

This project will produce 379 average annual habitat units.

Other Significant Benefits

Over the 20-year project life, greater retention of fresh water, nutrients, and sediments will slightly increase the amount of marsh edge and interspersion and slightly shallow the area over what will occur without the project, making the area slightly more valuable as a fisheries nursery.

ANTICIPATED ADVERSE EFFECTS

Types and acres of coastal wetlands and other habitats adversely affected by the project

No adverse impacts are anticipated.

Conflicts with other projects and programs

No conflicts with other programs are anticipated at this time.

COSTS

Item	Amount ($)
Construction	570,000
Contingencies	143,000
Subtotal	713,000
Engineering and Design	108,000
Supervision and Administration	60,000
Supervision and Inspection	65,000
Real Estate	80,000
Total	1,026,000
Operation and Maintenance (at years 2, 5, 10, and 15)	25,000
Annual Charges	
Project Monitoring	4,325

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	May 96
Engineering and Design Finish Date	Jan 97
Construction Start Date	Mar 97
Construction Finish Date	Aug 97

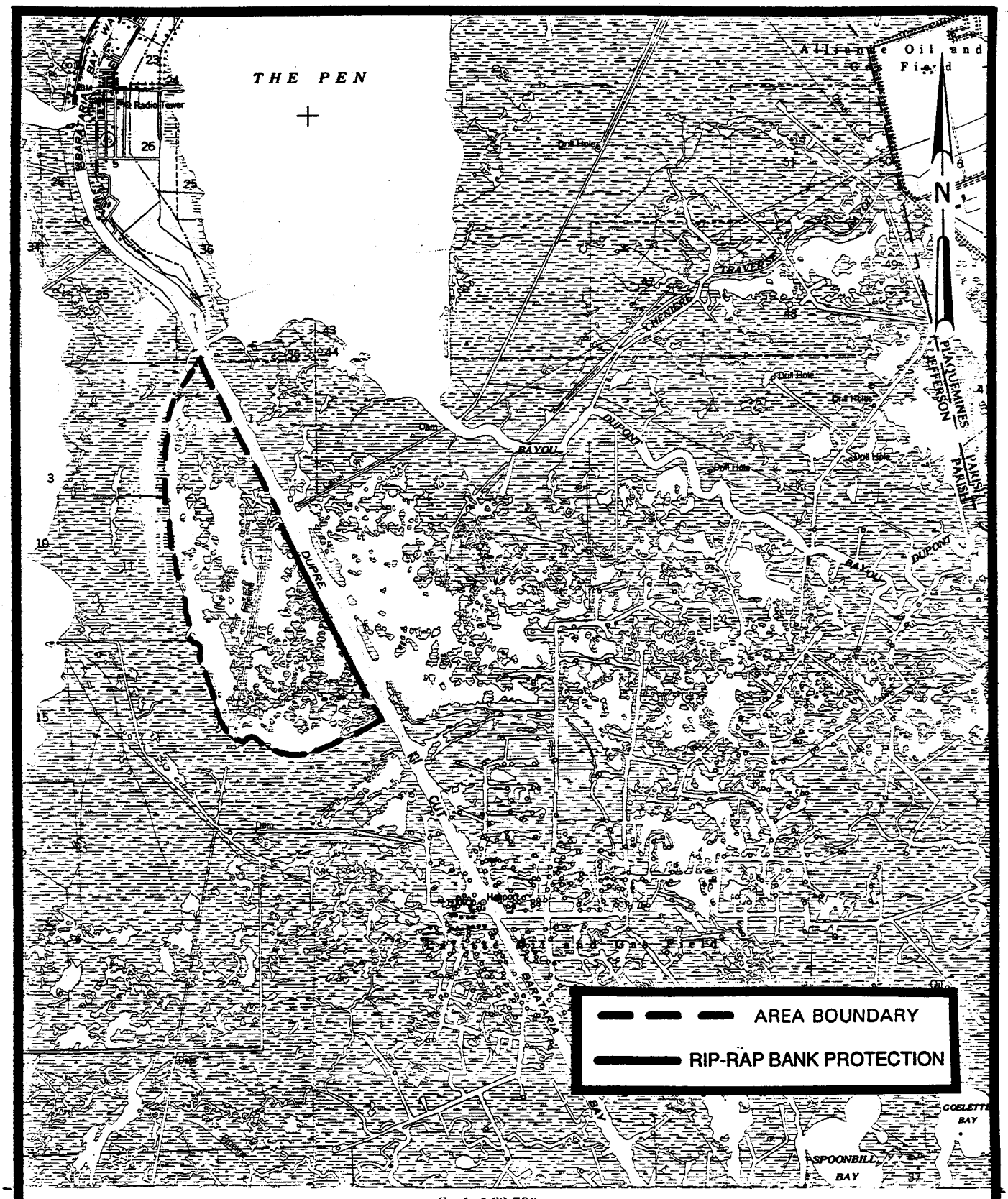
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.



PBA-12a BARATARIA BAY WATERWAY BANK PROTECTION (WEST)

Barataria Bay Waterway Bank Protection (West) PBA-12a

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

Location

The project is located in Jefferson Parish on the west bank of the Dupre Cut portion of Barataria Bay Waterway, north of the Lafitte Oil and Gas Field and south of the Pen. The project encompasses 1,789 acres of brackish marsh and open water habitat. The location of the center of the project is approximately latitude 29° 37′ and longitude 90° 03′.

Justification

The banks of the Dupre Cut have deteriorated considerably due to erosion from vessel wakes. Large breaches have exposed adjacent marsh to increased water exchange and rapid changes in salinity. Approximately 1,500 acres of emergent marsh have been converted to open water with the advancement of marine processes.

Objectives

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

Project Features

A rock dike will be constructed along 9,400 linear feet of the west bank of the Barataria Bay Waterway.

ANTICIPATED BENEFITS

Marsh Benefits

Without the project, the remnants of marsh in the shallow pond along the western side of Dupre Cut and the marsh edge along the ridge at the western edge of the pond will continue to erode due to boat wakes and subsidence. At the end of 20 years, 260 acres of brackish marsh will have been lost. With the erosion protection in place, vessel-generated waves from the waterway will be greatly reduced and marsh loss reduced by 60 percent (104 acres lost). Five percent of the open water is expected to recolonize due to sediment accretion in the still water behind the rock dike. Thus, a net increase of 237 acres of brackish marsh will occur over the 20-year project life.

Submerged Aquatic Vegetation Benefits

About 80 percent the pond is presently filled with submerged aquatics. As the bank of the waterway continues to erode, wave action and turbidity will increase in the pond, reducing the submerged aquatic vegetation cover to 33 percent. With the rock dike in place, the submerged aquatics will rise to 90 percent over the 20-year project life.

Average Annual Habitat Units

This project would produce 63 average annual habitat units.

Other Significant Benefits

Over the next 20 years, the rock dike will increase the amount of marsh edge and interspersion in the area and will prevent the pond from deepening. Both of these actions will make the area more valuable as a fisheries nursery. Salinity will also be reduced, which will increase the value for wildlife.

ANTICIPATED ADVERSE EFFECTS

Types and acres of coastal wetlands and other habitats adversely affected by the project

No adverse impacts are anticipated.

Conflicts with other projects and programs

No conflicts with other programs are anticipated at this time.

COSTS

Item	Amount ($)
Construction Cost	1,157,000
Contingencies	290,000
Subtotal	1,447,000
Engineering and Design	105,000
Supervision and Administration	85,000
Supervision and Inspection	110,000
Real Estate	40,000
Total	1,787,000
Operation and Maintenance (at years 2, 5, 10, and 15)	20,000
Annual Charges	
Project Monitoring	2,150

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Mar 97
Engineering and Design Finish Date	Nov 97
Construction Start Date	Mar 98
Construction Finish Date	Oct 98

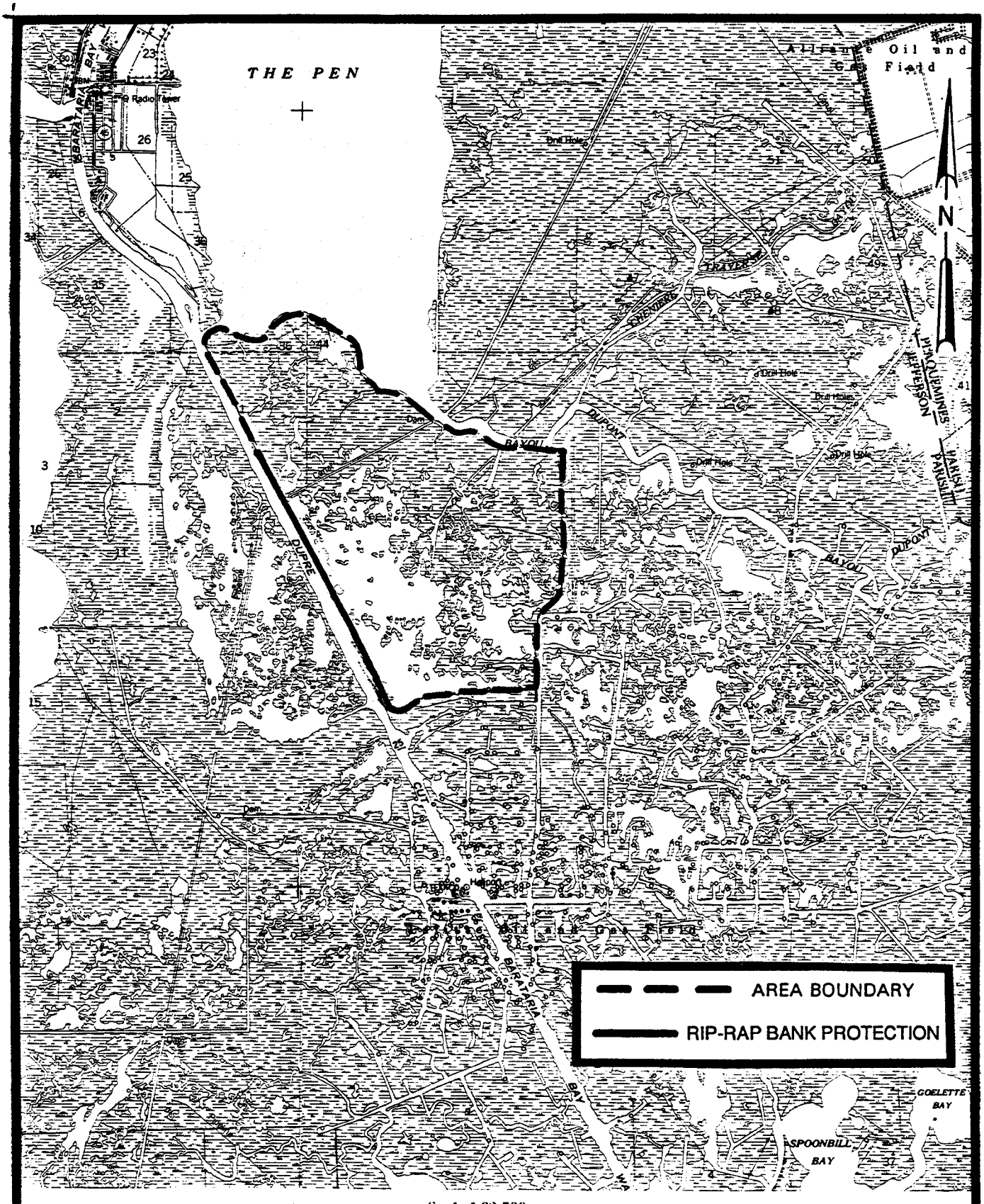
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.



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

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

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

Location

The project is located in Jefferson Parish on the east bank of the Dupre Cut portion of Barataria Bay Waterway, north of the Lafitte Oil and Gas Field and south of the Pen. The project encompasses 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 have exposed adjacent marsh to increased water exchange and rapid changes in salinity. Approximately 1,500 acres of emergent marsh have been converted to open water with the advancement of marine processes.

Objectives

The project objective is to rebuild the east bank of the Dupre Cut to protect the adjacent marsh from unnatural 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.

ANTICIPATED BENEFITS

Marsh Benefits

Without the project, marsh will continue to be lost on the eastern side of the waterway due to boat wakes, subsidence, and saltwater intrusion. Over the next 20 years, 362 acres will be lost. With the dike in place, wave erosion will cease and saltwater intrusion will be reduced so only 145 acres will be lost. The area behind the rock dike is open, so significant accretion of sediment behind the dike is not expected. Therefore, the project will prevent the loss of 217 acres of brackish marsh.

Submerged Aquatic Vegetation Benefits

The east side of the Dupre cut has less submerged aquatics than the west side; only about 35 percent of the open water is covered with aquatics. Without the project, as wave energy, depth, and turbidity increase submerged aquatics will cover only about 20 percent of the area waters. With the project, the area will not deepen and wave energy will decrease, so at the end of 20 years, aquatics will cover about 45 percent of the area waters.

Average Annual Habitat Units

This project will produce 128 average annual habitat units.

Other Significant Benefits

The rock dike will increase the amount of marsh edge and interspersion in the area and will prevent open water areas from deepening over the 20-year project life making the area more valuable as a fisheries nursery. Salinity will also be reduced which will increase the value for wildlife.

ANTICIPATED ADVERSE EFFECTS

Types and acres of coastal wetlands and other habitats adversely affected by the project

No adverse impacts are anticipated.

Conflicts with other projects and programs

No conflicts with other programs are anticipated at this time.

COSTS

Item	Amount ($)
Construction Cost	1,255,000
Contingencies	314,000
Subtotal	1,569,000
Engineering and Design	115,000
Supervision and Administration	92,000
Supervision and Inspection	120,000
Real Estate	40,000
Total	1,936,000
Operation and Maintenance (at years 2, 5, 10, and 15)	20,000
Annual Charges	
Project Monitoring	2,150

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Mar 97
Engineering and Design Finish Date	Nov 97
Construction Start Date	Mar 98
Construction Finish Date	Oct 98

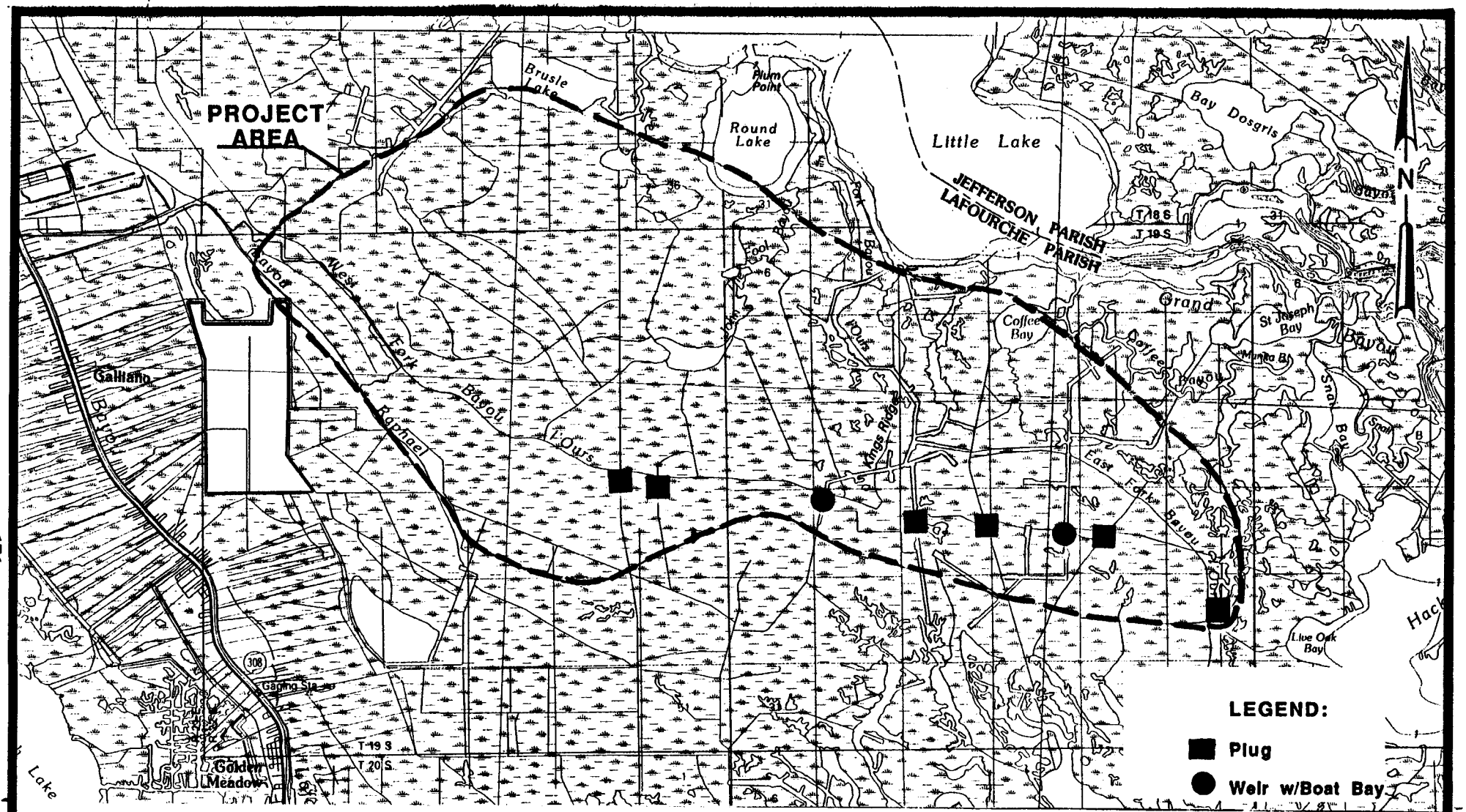
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.



PBA-34 BAYOU L'OURS RIDGE HYDROLOGIC RESTORATION

Bayou L'Ours Ridge Hydrologic Restoration (PBA-34)

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

Location

The project is located in Lafourche Parish east of Louisiana Highway 1, south of Golden Meadow, and north of Leeville. The location of the center of the project is approximately latitude 29° 27′ and longitude 90° 11′. The project area contains 24,765 acres of brackish marsh.

Justification

Bayou L'Ours was historically a distributary of Bayou Lafourche. The natural levees of this bayou created the L'Ours subbasin, which has been breached by access and pipeline canals. The breaches have increased tidal exchange, reduced freshwater retention, and increased salinities in the marshes within the upper subbasin. Fresh water currently being introduced from forced drainage areas is not effectively retained because of the ridge breaches.

Objective

Repairing or reducing the breaches by using plugs and water control structures will restore the hydrologic integrity of the ridge.

Project Features

Plugs will be placed on six canals, and water control structures containing boat bays to accommodate small boat traffic will be installed on two others.

ANTICIPATED BENEFITS

Marsh Benefits

Without the restoration of the ridge, 2,456 acres will be lost due to increased tidal exchange, reduced freshwater retention, and higher salinities. When the integrity of the ridge is reestablished marsh loss will be reduced by 30 percent, so that only 1,720 acres will be lost over the 20-year project life. Therefore, the project will prevent the loss of 736 acres of brackish marsh.

Submerged Aquatic Vegetation Benefits

Presently, 60 percent of the area waters contain submerged aquatics. Without the project, tidal scour will sightly deepen some of the area and submerged aquatics will cover only about 45 percent of the waters. The restoration of the ridge will allow some of the area to become shallower, and submerged aquatics will cover 52 percent of the area waters.

Average Annual Habitat Units

This project will produce 467 average annual habitat units.

Other Significant Benefits

Over the next 20 years, restoration of the ridge will increase the amount of marsh edge and interspersion in the area and prevent the project waters from deepening. Both of these actions will make the area more valuable as a fisheries nursery than it would be without the project. Salinity will also be reduced which should increase the value for wildlife.

ANTICIPATED ADVERSE EFFECTS

Types and acres of coastal wetlands and other habitats adversely affected by the project

No adverse impacts are anticipated.

Conflicts with other projects and programs

No conflicts with other programs are anticipated at this time.

COSTS

Item	Amount ($)
Construction Cost	742,000
Contingencies	186,000
Subtotal	928,000
Engineering and Design	147,000
Supervision and Administration	110,000
Supervision and Inspection	85,000
Real Estate	50,000
Total	1,320,000
Operation and Maintenance (at years 5, 10, and 15)	19,000
Annual Charges	
Project Monitoring	25,875

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Jan 97
Engineering and Design Finish Date	Jan 98
Construction Start Date	May 98
Construction Finish Date	May 99

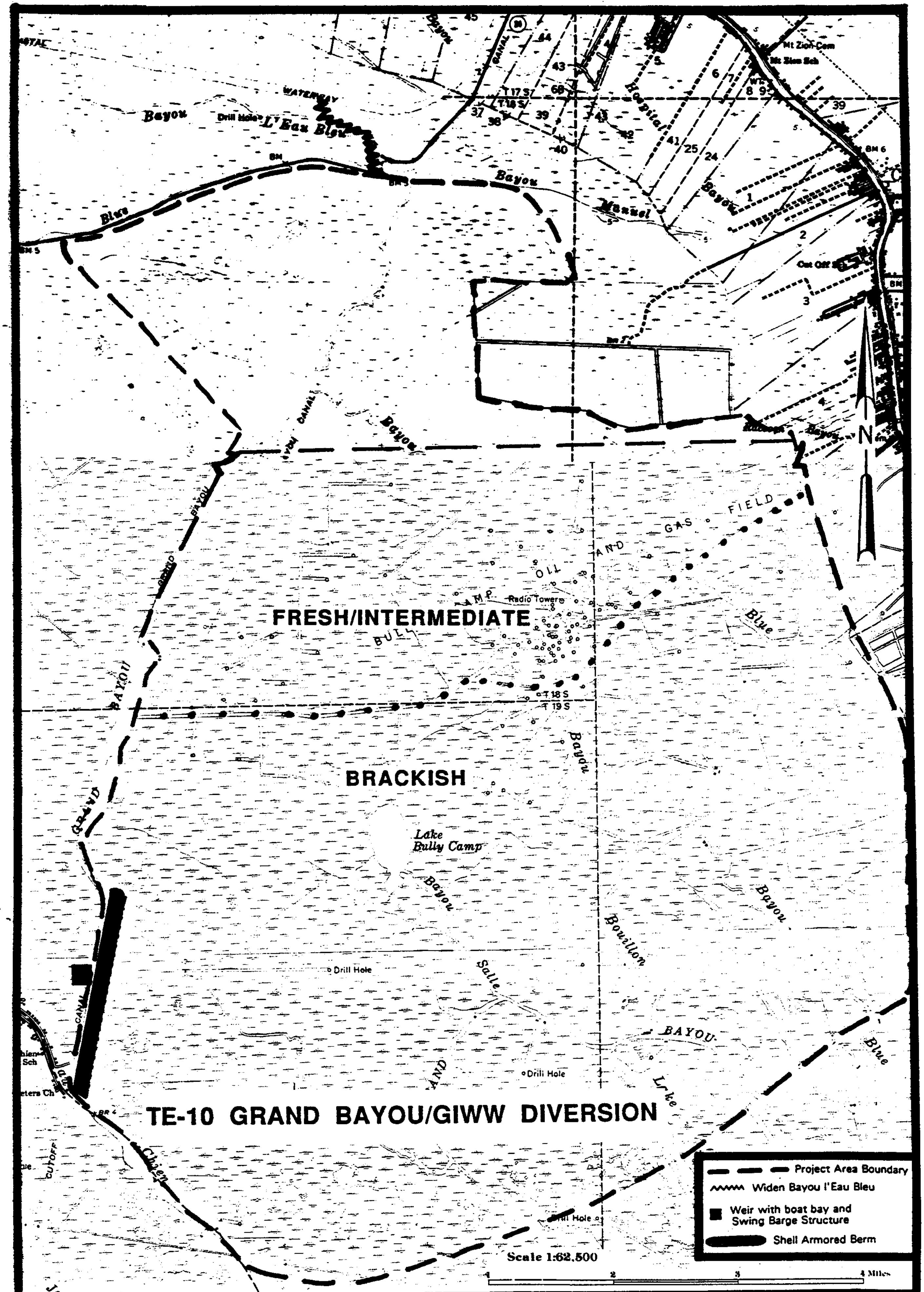
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.


FRESH/INTERMEDIATE
BRACKISH
TE-10 GRAND BAYOU/GIWW DIVERSION
Project Area Boundary
Widen Bayou l'Eau Bleu
Weir with boat bay and Swing Barge Structure
Shell Armored Berm
Scale 1:62,500
Lake Bully Camp
Radio Tower
Drill Hole
OIL AND GAS FIELD
Bayou L'Eau Bleu
Bayou Manuel
Grand Bayou
Bayou Bouillon
Bayou Salle
Lake Chien
N

Grand Bayou GIWW Freshwater Diversion (TE-10)

Proposed by: U.S. Department of the Interior, U.S. Fish and Wildlife Service

PROJECT DESCRIPTION

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.

ANTICIPATED BENEFITS

Marsh Benefits

Without the project, 1,044 acres would be lost in the intermediate area, 2,764 in the large brackish area, and 240 in the smaller brackish area near the weir. Thus, a total of 4,048 acres would be lost due to subsidence, tidal scour and saltwater intrusion over the next 20 years.

With the project, the freshwater introduction and the weir will retain fresh water with its sediments and nutrients and retard the intrusion of salt water. The resulting reductions in loss rates are: 70 percent in the intermediate area, 30 percent in the large brackish area, and 50 percent in the brackish area near the weir. Only 2,200 acres will be lost over the 20-year project life. The net benefit will be the prevention of the loss of 1,848 acres of marsh over 20 years.

Submerged Aquatic Vegetation Benefits

Presently, 75 percent of the intermediate area waters contain submerged aquatics. Without the project, tidal scour and subsidence will slightly deepen some of the area and submerged aquatics will cover only about 60 percent of the waters. The introduction of fresh water and exclusion of salt water will allow submerged aquatics to cover 80 percent of the intermediate area waters.

Presently, about 50 percent of brackish area waters are covered with submerged aquatics. Without project implementation, only 40 percent of the large brackish area and 45 percent of the smaller brackish area is expected to contain aquatics at the end of the project life. With the project, the percentages of submerged aquatic vegetation will increase to 55 percent and 65 percent, respectively.

Average Annual Habitat Units

This project will produce 771 average annual habitat units.

Other Significant Benefits

Over the 20-year project life, the addition of fresh water and reduction in salt water will increase the amount of marsh edge and interspersion in the area and prevent the project waters from deepening. Both of these actions will make the area more valuable as a fisheries nursery. Salinity will also be reduced, which will increase the value for wildlife.

ANTICIPATED ADVERSE EFFECTS

Types and Acres Affected

No adverse effects

Conflicts with other Programs

None

COSTS

Item	Amount ($)
Construction Cost	1,742,000
Contingencies	436,000
Subtotal	2,178,000
Engineering and Design	387,000
Supervision and Administration	75,000
Supervision and Inspection	219,000
Real Estate	100,000
Total	1,093,000
Annual Charges	
Operation and Maintenance	35,000
Project Monitoring	25,875

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Feb 97
Construction Start Date	May 97
Construction Finish Date	May 98

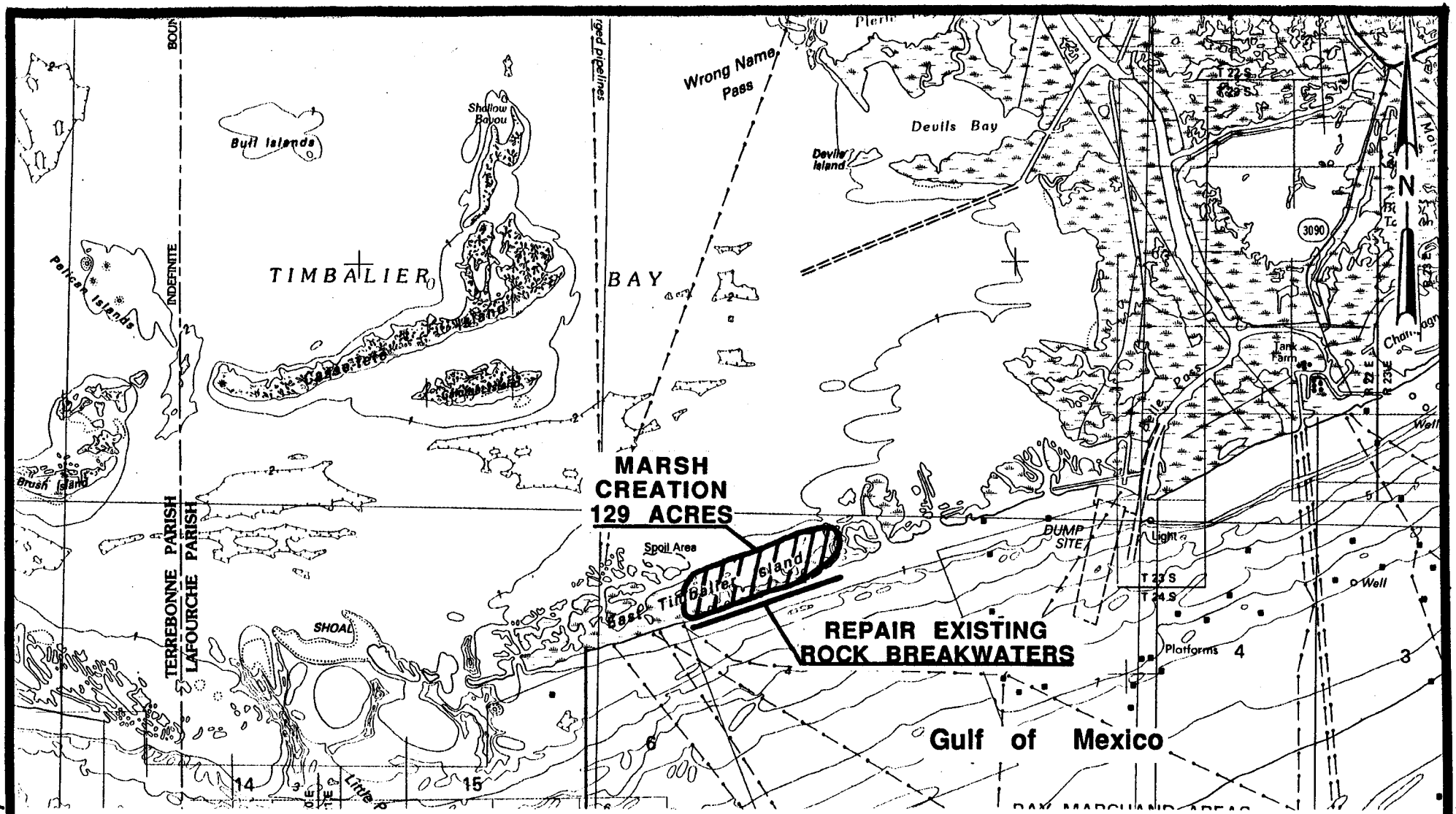
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.



XTE-45/67b EAST TIMBALIER BARRIER ISLAND RESTORATION

East Timbalier Barrier Island Restoration (XTE-67b)

Proposed by: U.S. Department of Commerce, National Marine Fisheries Service

PROJECT DESCRIPTION

Location

East Timbalier Island, situated in Lafourche Parish (centered at 29° 04′ N, 90° 18′ W), is a part of an island chain that fronts Terrebonne and Timbalier bays. Half of the island, which covers approximately 400 acres, is vegetated.

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 (that is, the volume of water that moves in and out on each tidal cycle). 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 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, compactual 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. Additionally, a large number of the oil and gas facilities in the shallow bays are relatively old and were not designed for open sea conditions.

An analysis of wetland loss for the Timbalier subbasin over the two periods 1956-1978 and 1978-1990 (Van Heerden et al., 1993) showed that between 70 and 80 percent of wetland loss over the past 40 years cannot be attributed to an increase in salinity alone. Most marsh loss occurred in areas that did not undergo a succession to more salt tolerant species. This suggests that most land loss in the Timbalier subbasin over the past 40 years is related to submergence as manifested by an increase in the period of inundation, due to increasing tidal prisms, precisely the environmental factor most sensitive to changes in barrier island configuration.

Objective

The objective of the project is to strengthen and thus increase the life expectancy of East Timbalier Island beyond the present estimate of 11 years by placing dredged material along its landward shoreline.

Project Features

The project calls for mining of 1,875,000 cubic yards of sediment and placing the material from the center of the island eastward for 6,000 ft, with a width of 935 feet and an elevation of 3 feet above mean sea level. Disposal will be along the landward shoreline of East Timbalier Island abutting the landward line of rocks.

According to Suter et al., 1991, good quality sands are located immediately seaward of the island. However, a low back levee may have to be constructed to confine the dredged materials.

Assuming a 3:2 cut-to-fill ratio, this project will create 129 acres of barrier island in an area now dominated by shallow water and small tidal channels, and will link the east and west segments of the island to re-establish one island. One of the major lessons learned concerning the response of barrier islands to Hurricane Andrew was that the wider the island, the less it was impacted by the storm. This project will ensure that East Timbalier Island will still be a geomorphic feature of Louisiana 20 years from now.

In addition, this project includes placing additional rock on the existing breakwater in front of the island. This increase in elevation of the breakwater will help protect the created area from erosion. Dredging to access the rock breakwater is unnecessary; water depths within 30 feet of the breakwater exceed 10 feet.

ANTICIPATED BENEFITS

Marsh Benefits

Current estimates predict East Timbalier Island will disappear by the year 1997. The project will create 129 acres of marsh on the island, closing several tidal passes and reconnecting the east and west ends of the island. However, over the 20-year project life, only 61 acres will remain on the island. The island, and the breakwaters fronting the island, provide some benefits to marsh on the mainland by reducing future increased marsh inundation. As the island disappears, 9,180 acres of mainland marsh will experience flooding of more than 16 hours per day. Marsh loss rates on the mainland are expected to increase from 0.61 percent per year to 0.67 percent per year. At year 12, the rock breakwater fronting the island will become ineffective because of subsidence and other factors, increasing the mainland loss rate to one percent per year. Thus, over a 20-year period, 826 acres will be lost. With project implementation the anticipated mainland wetland loss is 672 acres. Thus, the project will preserve 154 acres of mainland marsh over 20 years.

Submerged Aquatic Vegetation Benefits

Currently there is no submerged aquatic vegetation adjacent to this island. However, the mainland marsh waters protected by this island have about 60 percent coverage with submerged aquatic vegetation. Without the project, only about 51 percent will still have aquatics due to deepening of the area. With the project, about 53 percent should have aquatics.

Average Annual Habitat Units

This project will produce 140 average annual habitat units.

Other Significant Benefits

The created and protected marsh will increase the amount of marsh edge, thus making the area more valuable as a fisheries nursery. Preservation of the island will significantly preserve the valuable fisheries in the bays and marshes behind the island.

ANTICIPATED ADVERSE EFFECTS

Types and Acres of Coastal Wetlands and Other Habitats Adversely Affected

None

Conflicts With Other Projects or Programs

None

COSTS

Item	Amount ($)
Construction	3,775,000
Contingencies	944,000
Subtotal	4,719,000
Engineering and Design	475,000
Supervision and Administration	71,000
Supervision and Inspection	471,000
Real Estate	5,000
Total	5,741,000
Annual Charges	
Operation and Maintenance	0
Project Monitoring	4,325

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Feb 96
Construction Start Date	May 96
Construction Finish Date	Nov 96

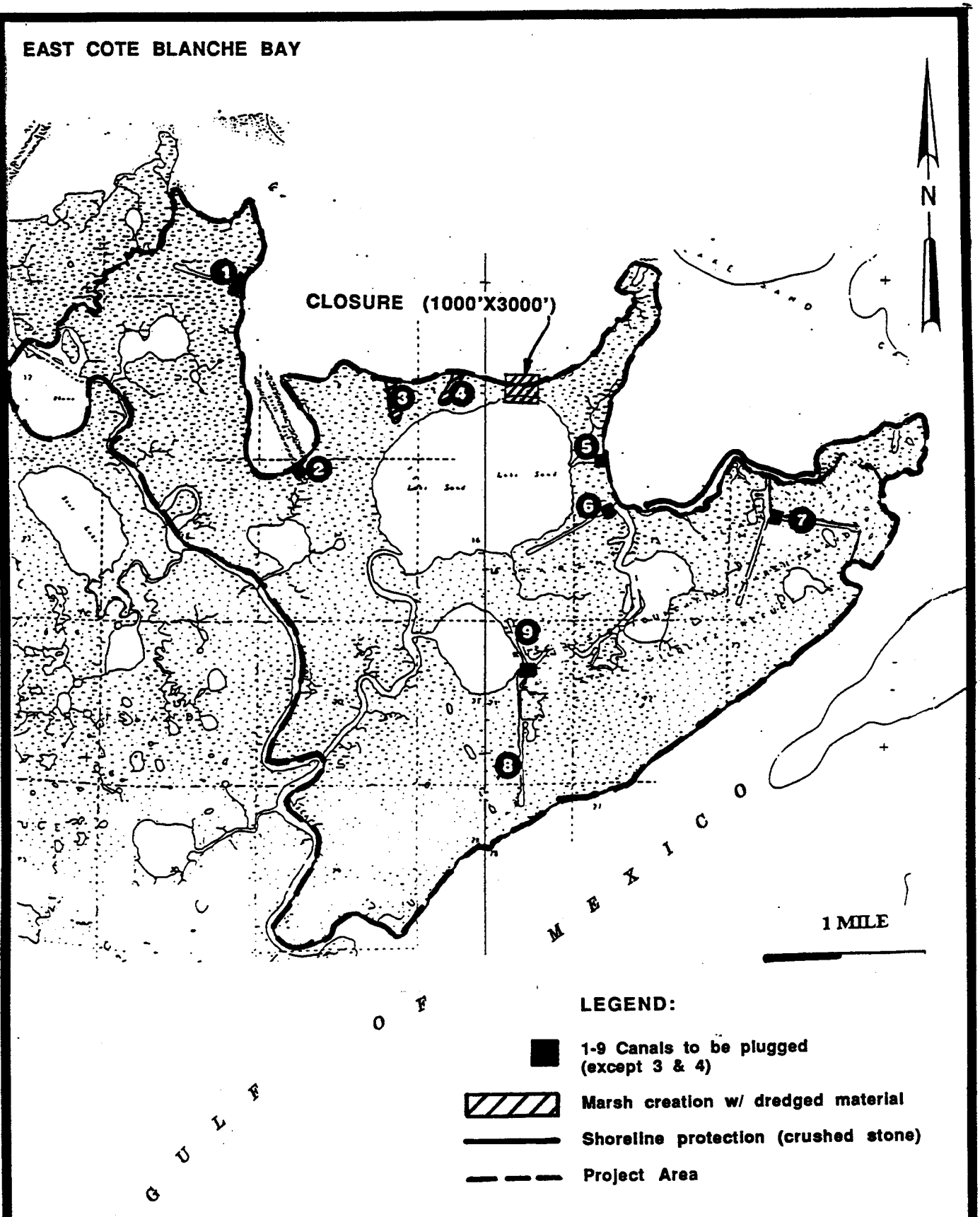
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.



TV-5/7 MARSH ISLAND HYDROLOGIC RESTORATION AND MARSH CREATION

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

Proposed by: U.S. Department of the Army, U.S. Army Corps of Engineers

PROJECT DESCRIPTION

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 is brackish marsh and 1,665 acres is 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

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 the 1,000-foot by 3,000-foot cell. 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.

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 canal will be plugged at their entrance using a combination earth core with two feet of armor stone.

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

Construction of all features would be accomplished within approximately eight months. Approximately six to eight months will be required for consolidation of the dredged material to final design elevations conducive to wetland creation and erosion protection.

ANTICIPATED BENEFITS

Marsh Benefits

Without the project, shoreline erosion will cause the loss of 170 acres in 20 years and interior erosion will cause the loss of 437 acres, resulting in a total of 607 acres of brackish marsh lost.

With the project, 41 acres of marsh will be created by closing the breach in the northern shoreline of Lake Sand and by backfilling two oil field canals. Shoreline erosion along the 2,000 feet of shore protection will be stopped, preserving 170 acres of marsh. Interior marsh loss would be reduced by 50 percent, so only 240 acres will be lost in 20 years. The net project affect is an increase of 408 acres of brackish marsh over the 20-year project life.

Submerged Aquatic Vegetation Benefits

At the present time less than one percent of Lake Sand contains submerged aquatic vegetation. As the breach at Lake Sands widens, these submerged aquatics will disappear. The closure of the breach, reducing tidal scour, and increasing shallow water in the lake will allow 65 percent of the open water to contain submerged aquatic vegetation in 20 years.

Average Annual Habitat Units

This project would produce 452 average annual habitat units.

Other Significant Benefits

Over the next 20 years, closure of the breach and plugging of the canals will increase the amount of marsh edge and interspersion in the area. Increased sedimentation will prevent the project area's waters from deepening making the area more valuable as a fisheries nursery.

ANTICIPATED ADVERSE EFFECTS

No other coastal wetlands or wetland habitats would be adversely affected. The proposed project would not conflict with other wetland creation or protection projects or programs in Louisiana.

COST

Item	Amount ($)
Construction Cost	1,903,000
Contingencies	476,000
Subtotal Construction	2,379,000
Engineering and Design	
Engineering Division	135,000
Cultural Resources	49,000
HTRW	26,000
Local Review, Contracting, etc.	10,000
Subtotal (E & D)	220,000
Supervision and Administration (Programs & Project Mgmt)	50,000
Supervision and Inspection (Construction Division)	238,000
Real Estate	76,000
Total	2,936,000
Operation and Maintenance at year 10	113,000
Annual Charges	
Project Monitoring	21,000

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Aug 96
Construction Start Date	Nov 96
Construction Finish Date	Jul 96

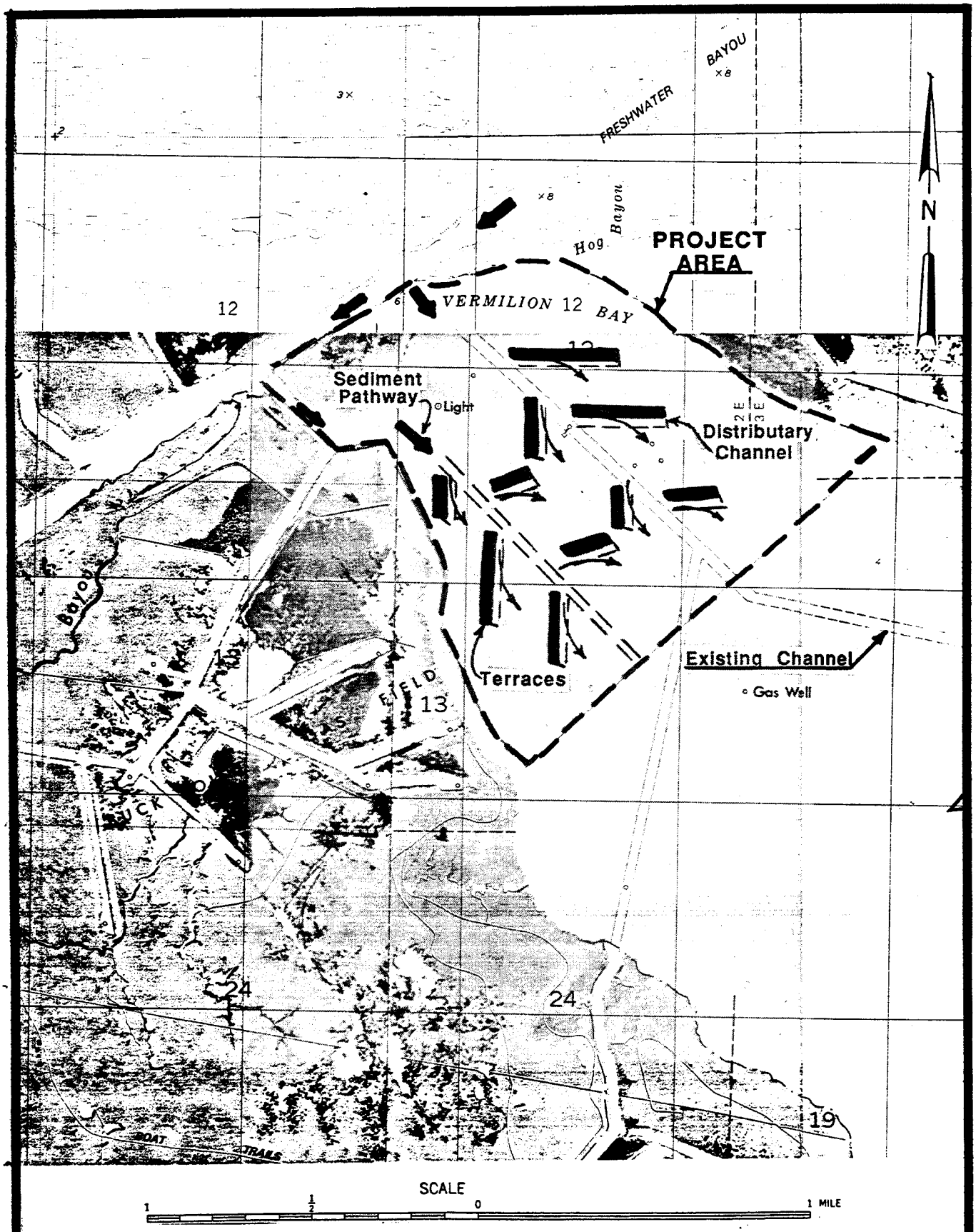
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.



PTV-19 LITTLE VERMILION BAY SEDIMENT TRAPPING

Little Vermilion Bay Sediment Trapping (PTV-19)

Proposed by: U.S. Department of Commerce, National Marine Fisheries Service

PROJECT DESCRIPTION

Location

The project is located in Little Vermilion Bay, a shallow western arm of Vermilion Bay. At two locations, Little Vermilion Bay is connected to Freshwater Bayou. The project is centered approximately at latitude 29° 43′ and longitude 92° 11′. The project area consists of 964 acres of fresh/intermediate marsh (67 acres marsh and 897 acres shallow open water).

Justification

Prior to 1839, marshes fringing Little Vermilion Bay were brackish to saline. After this date fresh water from the Atchafalaya River started to reach Atchafalaya Bay and consequently reduced 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 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 Gulf Intracoastal Waterway (GIWW) and Freshwater Bayou Canal. These channels are conduits 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 study site. Sediment availability is of fundamental importance to the project.

Objectives

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

Project Features

The project consists of 897 acres of shallow bay bottom and 3 acres of vegetated spoil mounds. A 200-foot strip of shoreline is included, comprising 67 acres of emergent marsh.

Presently, two man-made channels, 6 to 8 feet deep and 100 to 200 feet wide, cross the project site from the Freshwater Bayou Canal 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 the Freshwater Bayou Canal to the open bay. The project calls for the dredging of a distributary channel system that will facilitate spreading of the sediment load over a wide area. Given that the sedimentation rate presently exceeds subsidence, the spreading of sediments could cause large parts of the bay to become subaerial within a few years.

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. For this reason, 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. Additionally, terraces will contribute to shoreline protection.

Dredged distributaries will be 100 feet wide and 6 feet deep. A total of 15,000 linear feet of distributary channel will produce 340,000 cubic yards of material. Assuming a 3:2 cut-to-fill ratio, 44 acres of terrace, 100 feet wide with an elevation of + 2 feet above the local mean sea level, will be created (after some compaction).

Gallon containers of smooth cordgrass will be planted at the base of those terraces facing the greatest fetch. Sprigs of smooth cordgrass, as well as bullwhip, will be planted along the shoreline and at the base of the remaining terraces.

ANTICIPATED BENEFITS

Marsh Benefits

Without the project, the area will lose 51 acres of shoreline marsh. The project will directly create 44 acres of marsh. At the end of 20 years, a total of 360 acres of emergent marsh will have accreted in the bay, and the 51 acres of marsh along the shoreline will not have been lost. Thus, the project will create or protect a total of 441 acres of marsh over 20 years.

Submerged Aquatic Vegetation Benefits

There are very few submerged aquatics in the bay at the present time. With the project, the shallow protected waters should allow 25 percent of the area to become vegetated with submerged aquatic vegetation.

Average Annual Habitat Units

This project will produce 149 average annual habitat units.

Other Significant Benefits

The created intermediate marsh will increase the amount of marsh edge, thus making the area more valuable as a fisheries nursery.

ANTICIPATED ADVERSE EFFECTS

No other coastal wetlands or wetland habitats will be adversely affected. The proposed project will not conflict with other wetland creation or protection projects or programs in Louisiana.

COSTS

Item	Amount ($)
Construction Cost	711,000
Contingencies	142,000
Subtotal Construction	853,000
Engineering and Design	75,000
Supervision and Administration	19,000
Supervision and Inspection	71,000
Real Estate	5,000
Oyster Seed Ground Mitigation	70,000
Total	1,093,000
Annual Charges	
Operation and Maintenance	0
Project Monitoring	4,325

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Mar 95
Engineering and Design Finish Date	Dec 95
Construction Start Date	Apr 96
Construction Finish Date	Aug 96

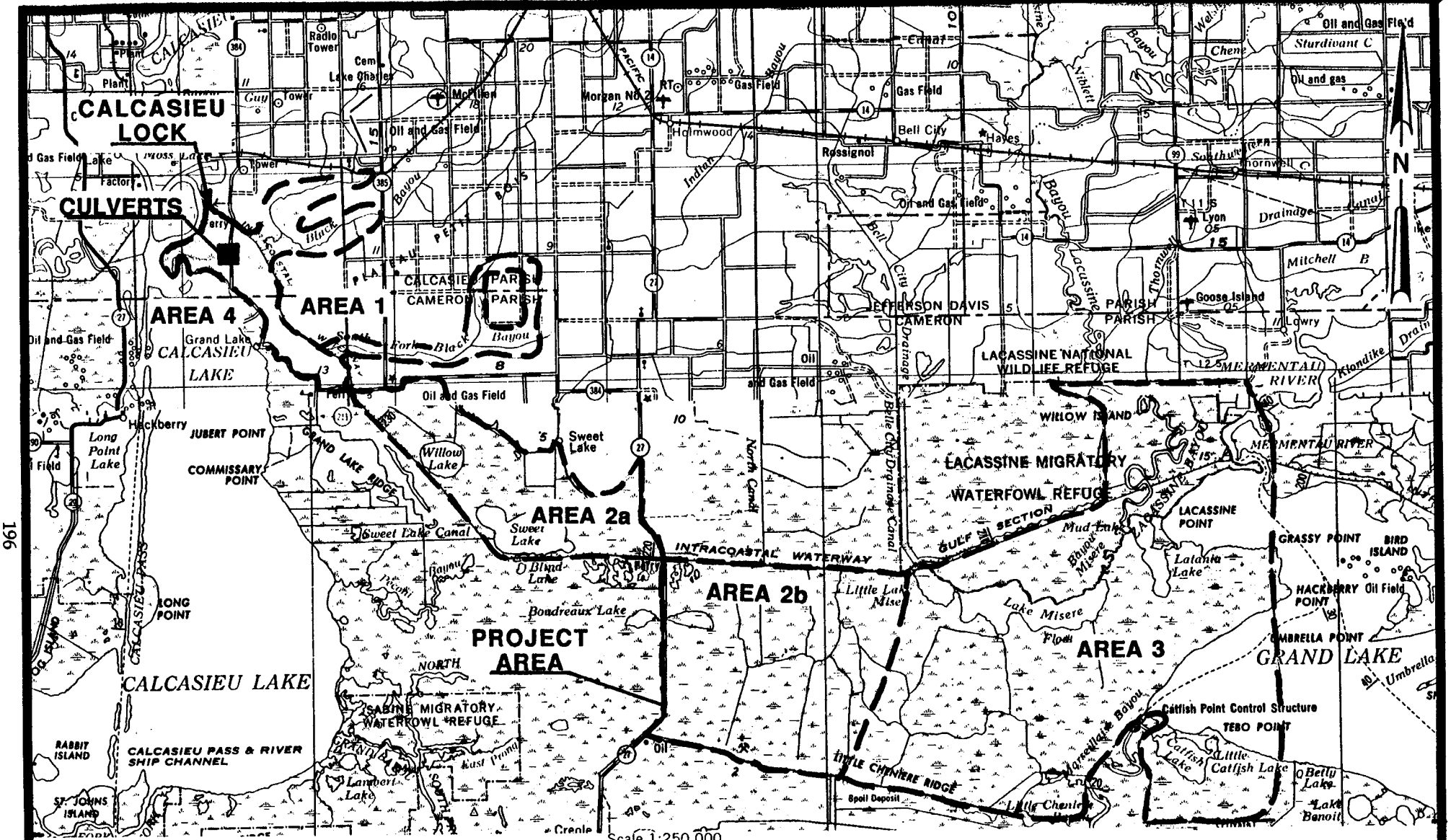
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.



CS-16 BLACK BAYOU CULVERTS HYDROLOGIC RESTORATION

Black Bayou Culverts Hydrologic Restoration (CS-16)

PROJECT DESCRIPTION

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. The marsh loss is caused by high water levels 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-foot 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 the Calcasieu Lock and Schooner Bayou and Catfish Point control structures.

ANTICIPATED BENEFITS

Marsh Benefits

In Area 1, the 4,000 acres of wetlands between Black Bayou and Willow Lake, water levels will be reduced by 3 inches and the land loss rate will be reduced by 20 percent, so a net of 82 acres of fresh marsh will be preserved over 20 years.

In Area 2a, the fresh marshes around Sweet and Willow Lakes, water levels will be reduced by 2 inches and loss rates would be reduced by 15 percent, so a net of 107 acres will be preserved over 20 years.

In Area 2b, the fresh marshes in the western Big Burn, no land loss is expected to occur without this project because the water control structure at the Welfare Bridge controls water levels in the area. However, with additional draw down

capacity, about 5 percent (approximately 327 acres) of the open water in the area will become emergent.

In Area 3a, the marshes in the eastern Big Burn and the interior marshes south of Lake Misere and west of Grand Lake, the Welfare Bridge structure is expected to prevent land loss. The one inch reduction in water levels caused by the Black Bayou Culverts should allow 3 percent of the open water to revegetate. An additional 187 acres will be present at the end of 20 years.

In Area 3b the shorelines of Grand Lake and Lakes Misere and Lantana will continue to erode at 10 feet per year for the next 20 years, causing a loss of 2,349 acres. The reduction in duration in flooding provided by the culverts should cause a 10 percent reduction in this erosion, preserving 113 acres over 20 years.

In Area 4, west of Black Bayou in the outfall area of the culverts, without the project the marshes will slowly subside and erode over the next 20 years. The fresh water added to the brackish area will reduce the current loss rate by 35 percent for a net preservation of 11 acres over the 20-year project life.

The net total of marsh preserved by this project is 837 acres.

Submerged Aquatic Vegetation Benefits

In Area 1, about 10 percent of the water bottoms are presently covered with submerged aquatic vegetation. The reduction in water levels will allow about 17 percent of the water bottoms to contain submerged aquatics.

In Areas 2a and 2b, 72 percent of the water bottoms have submerged aquatics. The removal of 2 inches of water will allow submerged aquatic vegetation to cover 80 percent of the water bottoms.

In Area 3, submerged aquatics are not expected to change due to the project.

In Area 4, the increase in fresh water, nutrients, and sediments will allow the area to increase from the total lack of aquatics that presently exists to having 5 percent of the waters containing aquatics.

Average Annual Habitat Units

This project will produce 592 average annual habitat units.

Other Significant Benefits

Over the 20-year project life, reduction of water levels caused by the culverts will increase the amount of marsh edge and interspersion in the area, which will make the area more valuable as a fisheries nursery.

ANTICIPATED ADVERSE EFFECTS

No other coastal wetlands or wetland habitats will be adversely affected. The proposed project will not conflict with other wetland creation or protection projects or programs in Louisiana.

COST

Item	Amount ($)
Construction Cost	4,200,000
Contingencies	1,050,000
Subtotal Construction	5,250,000
Engineering and Design	
Engineering Division	650,000
Cultural Resources	20,000
HTRW Investigation	10,000
Subtotal E&D	690,000
Supervision and Administration	75,000
Supervision and Inspection (Construction Contract)	630,000
Real Estate	60,000
Total	6,705,000
Operation and Maintenance @ year 10	75,000
Annual Charges	
Operation and Maintenance	12,000
Project Monitoring	25,875

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	Feb 97
Construction Start Date	May 97
Construction Finish Date	May 99

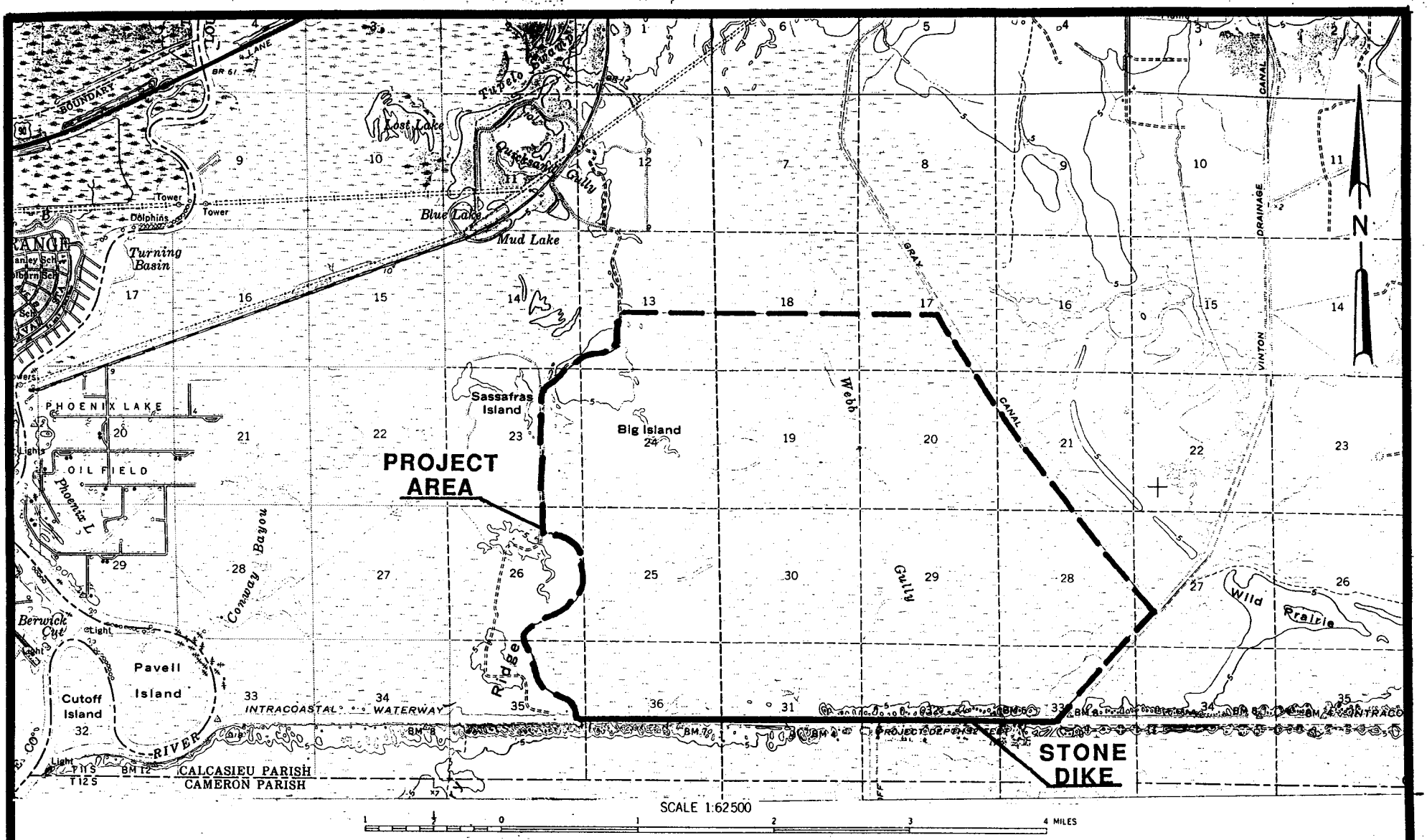
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are not available for this project.



PCS-26 PERRY RIDGE BANK PROTECTION

Perry Ridge Bank Protection (PCS-26)

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

Location

The project is located in Calcasieu Parish north of the GIWW and consists of 5,945 acres of fresh/intermediate marsh. It is bounded by the GIWW on the south, Vinton Drainage Ditch and Gray Canal on the east, and Perry Ridge and other higher elevations to the west and north. The location of the center of the project is approximately latitude 30° 04′ and longitude 93° 39′.

Justification

Construction of the GIWW and a lack of adequate spoil along the banks has greatly increased tidal exchange. This section of the GIWW allows use of double-wide barges, thereby exacerbating the problem. This has resulted in interior marsh loss through increased energies and tidal scour of the fragile organic soils, especially when salinities are able to intrude into these fresh areas.

Objective

The object of the project is to reduce tidal scour, wave action from boats, and other excessive energy impacts on interior marshes and the possibility of saltwater intrusion by repairing the northern spoil bank of the GIWW.

Project Features

The project involves the placement of rip-rap along low areas of the northern bank of the GIWW from Perry Ridge to Vinton Drainage Canal. The material will be placed similarly to that done along the GIWW adjacent to Blind Lake. This will allow overbank flow over the rip-rap and deposition of sediments between rip-rap and marsh. Two inlets will be armored. The rip-rap will be placed below the mean low water elevation and connected to the existing bank to allow migration of aquatic organisms, while not sacrificing the objective of wetland protection.

ANTICIPATED BENEFITS

Marsh Benefits

Over the next 20 years, the shoreline along the GIWW is expected to breach in two or three places, allowing high salinity events to bring salt water into the interior of the intermediate marsh. Without the project, 1,189 acres of marsh will be lost over the next 20 years due to salt scald in the interior and wave erosion along the bank. The bank protection will prevent the estimated loss, and approximately 14 acres of emergent wetlands will accrete behind the rock dike. Thus, at the end of 20 years there will be 1,203 more acres of intermediate marsh as the result of project implementation.

Submerged Aquatic Vegetation Benefits

Breaches in the bank causing high saline waters to reach the interior intermediate marshes will reduce the the submerged aquatic vegetations population from 55 percent to 25 percent. With the project, the reduction in tidal flows should allow 60 percent of the project area waters to contain aquatic vegetation at year 20.

Average Annual Habitat Units

The project will produce 624 average annual habitat units.

Other Significant Benefits

Without the project, water depths in the marsh would increase and the amount of marsh edge and interspersion will be less. The project will preserve these attributes as they are now, thus keeping the area valuable as a fisheries nursery. Without the project, salinity will increase, reducing wildlife usage.

ANTICIPATED ADVERSE EFFECTS

No other coastal wetlands or wetland habitats will be adversely affected. The proposed project will not conflict with other wetland creation or protection projects or programs in Louisiana.

COSTS

Item	Amount ($)
Construction	1,237,000
Contingencies	309,000
Subtotal Construction	1,546,000
Engineering and Design	103,000
Supervision and Administration	104,000
Supervision and Inspection	80,000
Real Estate	50,000
Total	1,883,000
Operation and Maintenance (at years 5, 10, and, 15)	15,000
Annual Charges	
Project Monitoring	2,150

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Nov 96
Engineering and Design Finish Date	Jul 97
Construction Start Date	Nov 97
Construction Finish Date	Sep 98

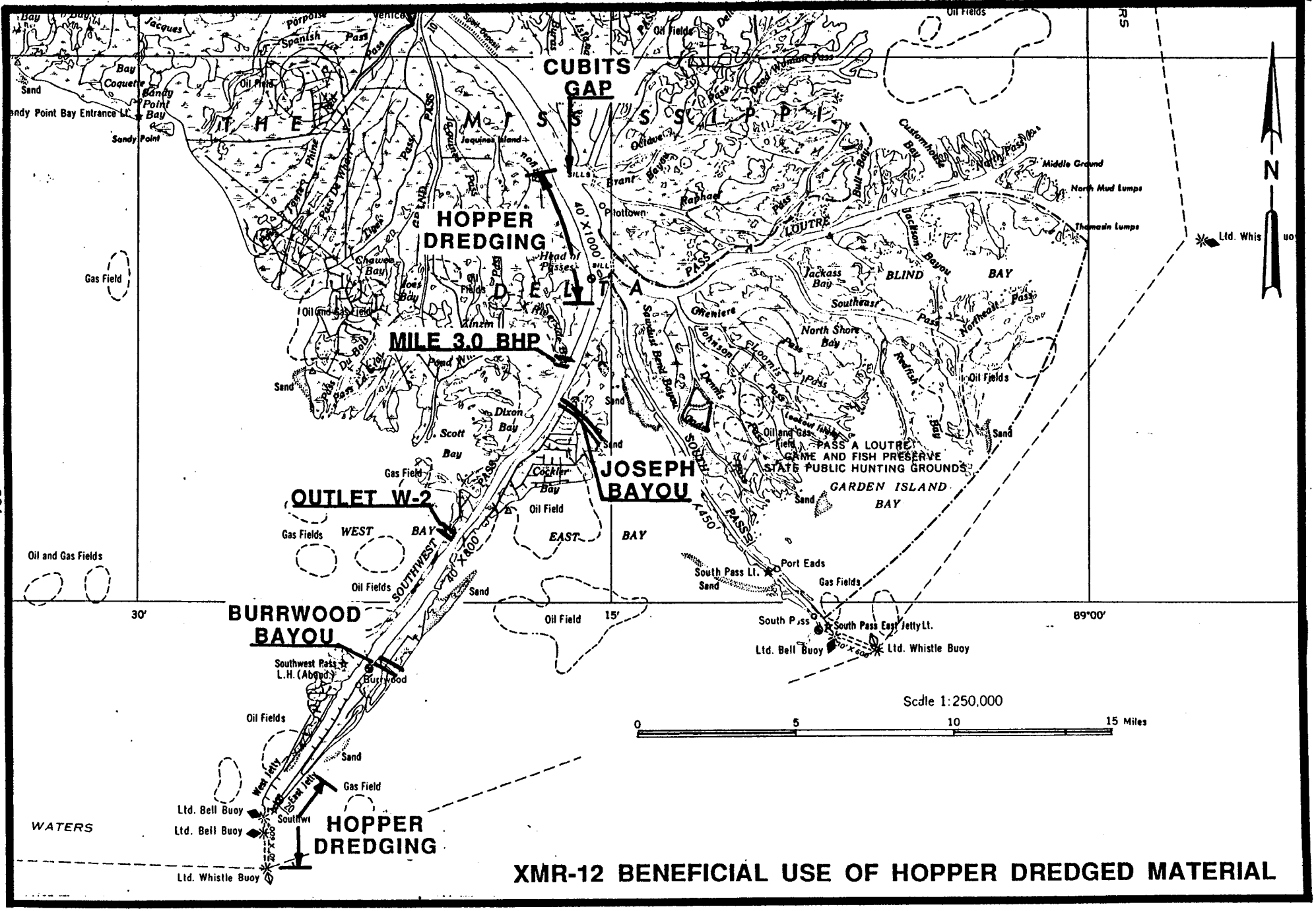
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.


CUBITS GAP
HOPPER DREDGING
MILE 3.0 BHP
JOSEPH BAYOU
OUTLET W-2
BURRWOOD BAYOU
HOPPER DREDGING
PASS A LOUTRE GAME AND FISH PRESERVE STATE PUBLIC HUNTING GROUNDS
GARDEN ISLAND BAY
WEST BAY
EAST BAY
BLIND BAY
Scale 1:250,000
0 5 10 15 Miles
XMR-12 BENEFICIAL USE OF HOPPER DREDGED MATERIAL

Beneficial Use of Hopper Dredged Material (XMR-12)

Proposed by: U.S. Department of the Army, U.S. Army Corps of Engineers

PROJECT DESCRIPTION

Location

The project is located in the Mississippi River bird's foot delta, in Plaquemines Parish, Louisiana.

Justification

Data from the 1994 dredging cycle show that 11,800,000 cubic yards of material were removed from the area between Cubits Gap and Head of Passes. Hopper dredges remove this material and place it in the entrance to Pass-a-Loutre and South Pass. Placing this material in the pass slightly increases the sediment load and potentially serves to enhance natural wetland development.

Currently, ocean dumping is the method used to maintain the lower jetty and bar channel of the Mississippi River. Without constant and continual maintenance, shoaling quickly would result in the loss of project depths, which would, in turn, adversely affect the shipping industry. During the dredging season, hopper dredges must maintain high production to maintain project depths. To facilitate this production, the agitation method of dredging is used when conditions permit, and the ocean disposal site is used when conditions do not permit agitation dredging. In 1994, 11,900,000 cubic yards of material was dredged in the jetty and bar channels. This material was either placed in ocean disposal sites or removed through agitation.

Objective

The objective of the demonstration project is to evaluate alternative methods of directly creating wetlands using material dredged by hopper dredges for maintenance of the navigation channel.

Project Description

The Pass-a-Loutre Sediment Mining (PMR-8) project will mine 800,000 cubic yards of material from Pass-a Loutre and directly create approximately 35 acres of emergent wetland above elevation 1.5 MLG and 80 acres of subaerial wetland. The total area of benefit, including minor deposition, is 380 acres. Additionally, increased flows through Pass-a-Loutre will help carry sediment to crevasses and sediment fences constructed in the Wildlife Refuge areas. In effect, the Pass-a-Loutre Sediment Mining project redredges material dredged and dumped by the hoppers. In lieu of using a cutter head dredge to redredge the material, directly pumping the material out of the hopper to create wetlands will be investigated. Issues still to be resolved will be the availability of a suitable location outside the navigation channel and the high cost of pump-out operations.

Another alternative to be considered will be to dump the hopper load in the crevasse or near the crevasse mouth, allowing the material to be pulled through the crevasse and into the adjacent wetlands. Hydrographic surveys indicate that the

crevasse with the greatest depth at the mouth is Outlet W-2; however, Joseph Bayou appears to have a greater width, which will be important for the dredge to actually be able to get into the crevasse.

COSTS

The Task Force approved funds not to exceed $300,000 for this demonstration project.

PROJECT IMPLEMENTATION SCHEDULE

The project will be implemented in the FY 96 dredging cycle.

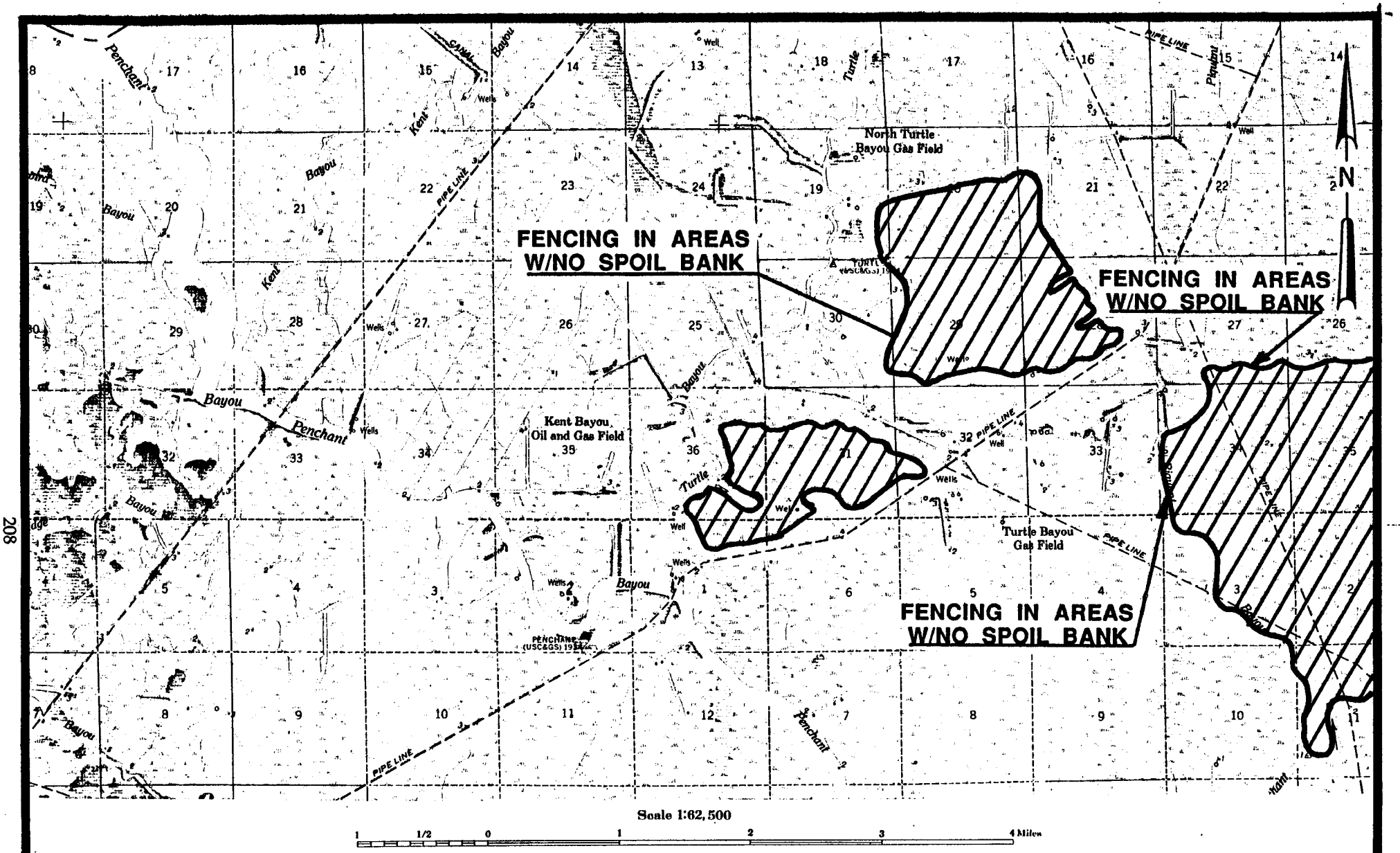
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.



XTE-54b FLOTANT MARSH FENCING DEMONSTRATION

Flotant Marsh Fencing Demonstration (XTE-54b)

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

Location and Size

The project is located twenty miles west of Houma, Louisiana, in Terrebonne Parish. The project area comprises two units totaling 1,256 acres of fresh marsh.

Justification

Breaches in canal spoil banks have exposed the fragile flotant marshes in the project area to the unnatural water exchange of deep-water canals. This process has caused severe erosion and subsequent fragmentation of the emergent marsh. The organic nature of the soils often prohibits the installation of water control structures or overflow banks to provide protective measures for erosion control.

Objectives

The primary objective of this project is to determine the effectiveness of different fencing techniques to conserve and restore floating marshes as an alternative to depositing fill material for repairing banks or installing water control structures.

Project Features

The units selected for this project will have two or three sides enclosed by spoil banks and the remaining side enclosed by different types of fencing. The fencing will be tied to existing spoil banks with the remaining openings closed by fencing. A control area will be identified and monitored to verify results. Approximately 10,000 feet of fencing will be constructed.

ANTICIPATED BENEFITS

Types and acres of coastal wetlands enhanced, and the degree and nature of the enhancement

This will directly enhance approximately 400 acres of fresh flotant marsh because the fencing will hold the floats in place, allowing them to expand.

Types and acres of coastal wetlands protected

The total 1,256 acres of fresh flotant marsh will be protected by maintaining the integrity of the boundaries, thus preventing deterioration by scouring.

ANTICIPATED ADVERSE EFFECTS

Types and acres of coastal wetlands and other habitats adversely affected by the project

No adverse impacts are anticipated.

Conflicts with other projects and programs

No conflicts with other programs are anticipated at this time.

COSTS

Item	Amount ($)
Construction	175,000
Contingencies	44,000
Subtotal	219,000
Engineering and Design	33,000
Supervision and Administration	26,000
Supervision and Inspection	15,000
Real Estate	10,000
Total	303,000
Operation and Maintenance (for 3 years)	6,000
Project Monitoring (for 3 years)	6,000

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Jan 96
Engineering and Design Finish Date	Feb 97
Construction Start Date	Jun 97
Construction Finish Date	Dec 97

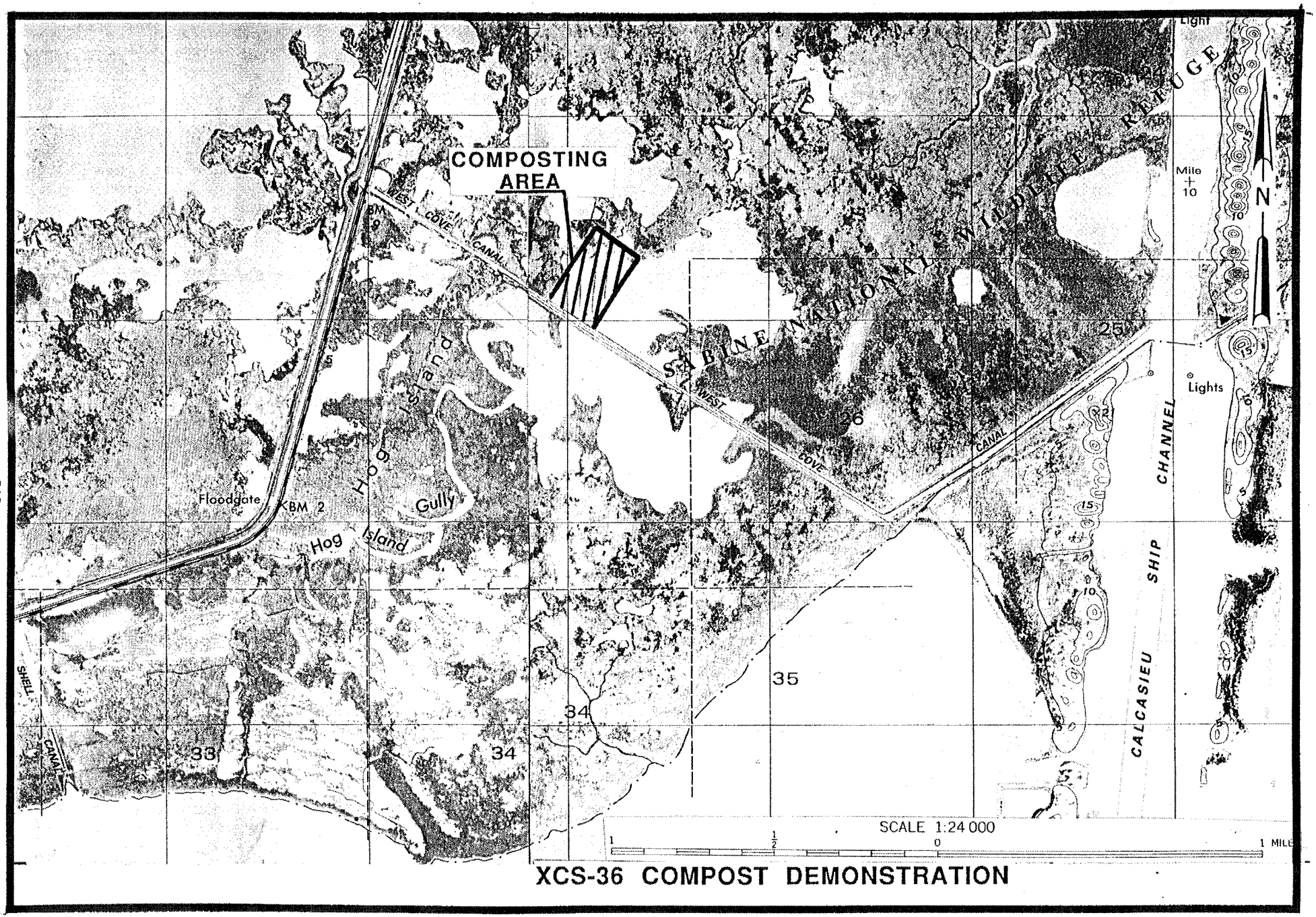
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.



XCS-36 COMPOST DEMONSTRATION

Compost Demonstration Project (XCS-36)

Proposed by: U.S. Environmental Protection Agency

PROJECT DESCRIPTION

Location

The project area is located on the Sabine National Wildlife Refuge in Calcasieu Parish, Louisiana, 1,500 feet east of Louisiana Highway 27 on the north side of Hog Island Gully.

Justification

Prior to the channelization of Louisiana's waterways and construction of the levee system, brush material flowed naturally during annual flood events into the wetlands and was deposited by the calmed waters. The Compost Demonstration project was conceived to demonstrate and develop the technologies to reintroduce compost material into the wetland system to nourish and enhance marshes. The demonstration will provide the basis to create the technology and scientific data base to develop the recipe for compost in wetlands for the various hydrologic basins in Louisiana. Earlier research provided by Louisiana State University Wetland Research Center indicates very positive results of compost under laboratory conditions

Objective

The objective of the project is to demonstrate under field conditions the degree of influence which compost has in establishing vegetation on newly deposited sediment and dredged material within a previously open water area. The project will initiate and document methods of transportation and placement of the compost material. The new technology will provide for new markets and alternatives for disposal of the compost material which now burdens landfills.

Project Features

The project will collect, process, transport, and place into a wetland area between 7,000 and 9,000 cubic yards of compost material. The design will require the construction of three sections with four cells per section. Each section will be 400 feet long, 25 feet wide, and completely enclosed by a brush fence. Each cell will be 20 feet wide and 100 feet long. The contents of each section will be as follows:

Cell 1	100 percent dredged material and 0 percent compost;
Cell 2	50 percent dredged material and 50 percent compost;
Cell 3	90 percent dredged material and 10 compost;
Cell 4	0 percent dredged material and 100 percent compost.

The project will require that the elevation of each section be raised to a 1.5foot height at mean tide. The water depth in the project area should be between 0.5 feet and 1.5 feet. Material in each cell will be layered in the following manner:

Layer 1	Small brush up to 1 inch diameter up to 6 inches deep;
Layer 2	Whole leaves approximately 12 inches deep to act as a filter medium;

Layer 3 Small brush up to 1 inch in diameter approximately 6 inches deep to anchor material in high water;

Layer 4 Ground leaves and brush at a depth of 6 to 9 inches deep.

COSTS

Item	Amount ($)
Construction Cost	210,000
Contingencies	53,000
Subtotal	263,000
Engineering and Design	26,000
Supervision and Administration	11,000
Supervision and Inspection	16,000
Real Estate	5,000
Total	321,000
Annual Charges	
Project Monitoring (for 3 years)	10,000

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Feb 95
Engineering and Design Finish Date	May 95
Construction Start Date	Sep 95
Construction Finish Date	Jan 96

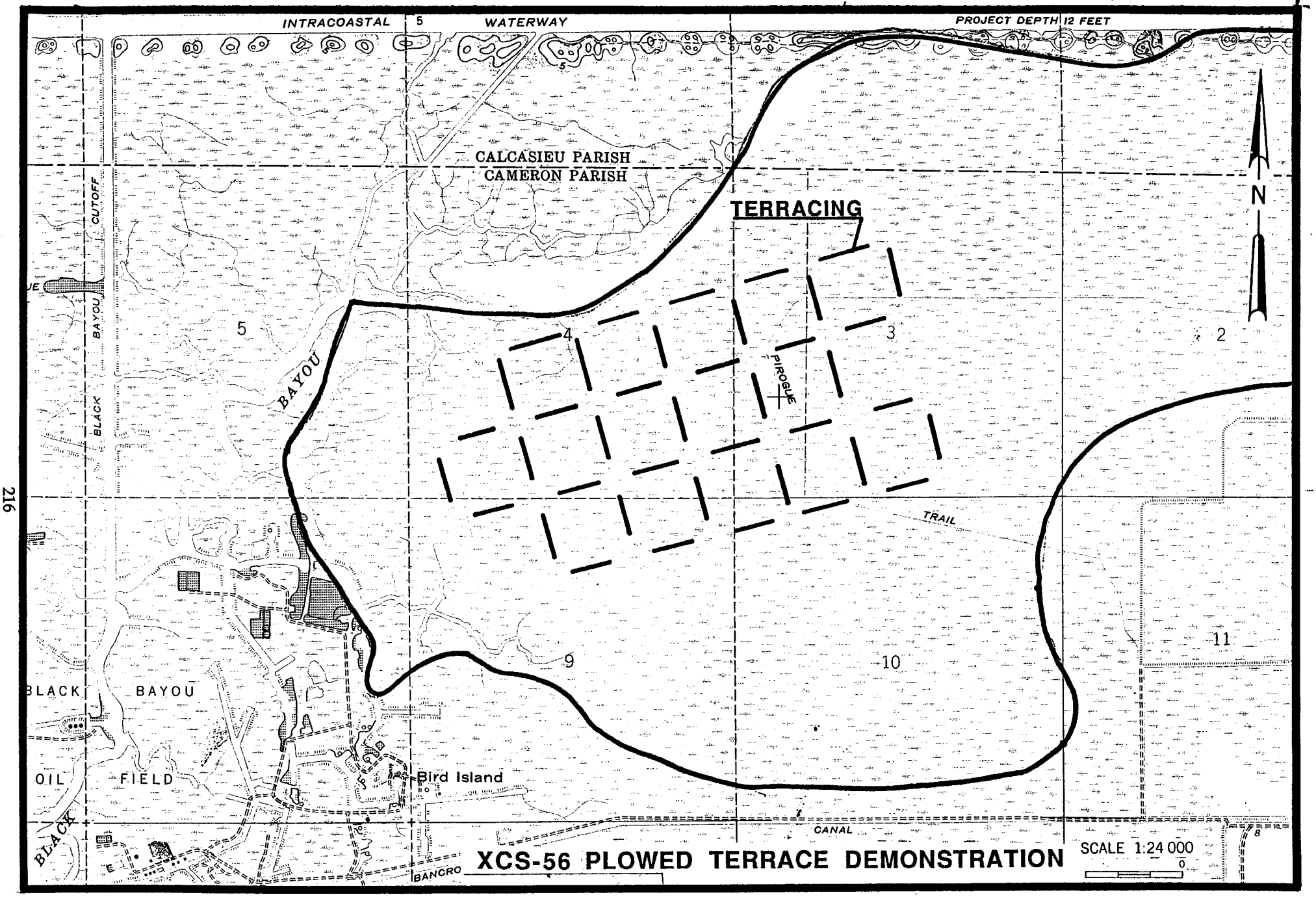
POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has indicated that funds established under Louisiana Act 6 are available for this project.


INTRACOASTAL WATERWAY
PROJECT DEPTH 12 FEET
CALCASIEU PARISH
CAMERON PARISH
TERRACING
N
BLACK BAYOU CUTOFF
BAYOU
PIROGUE
TRAIL
BLACK BAYOU
OIL FIELD
Bird Island
CANAL
BANCRO
SCALE 1:24 000
XCS-56 PLOWED TERRACE DEMONSTRATION

Plowed Terrace Demonstration (XCS-56)

Proposed by: U.S. Department of Agriculture, Natural Resources Conservation Service

PROJECT DESCRIPTION

Location

The project is located in Cameron Parish approximately 24 miles southwest of Lake Charles. It will be installed within unit NO-13 of the Calcasieu-Sabine River Basin Study. The location of the center of the project is approximately latitude 30° 02′ and longitude 93° 35′.

Justification

Cameron Parish alone has over 60,000 acres of eroded wetlands that are now shallow, turbid, open water areas and have soil types suitable for plow-constructed earthen terraces. This practice could be perfected to be applied to many areas across the Louisiana coast.

Objective

The project is designed to develop and demonstrate a non-traditional procedure for constructing earthen terraces in shallow open water areas. The terraces will serve as wave-stilling, sediment-trapping structures and provide a medium base for the establishment of emergent vegetation. If successful, this technique will provide a less expensive method of constructing earthen terraces than the traditional method using excavation equipment and its consequent borrow channels.

Project Features

The project consists of constructing 38 earthen terraces using a specially fabricated plow pulled with a marsh buggy. The terraces will each be 500 feet in length for a total of 19,000 feet. Each terrace will be 2.5 feet in height, with a 3foot top width and a 9-foot bottom width. The terraces will be built in water varying from 6 inches to 24 inches in depth and have a settled height of marsh elevation. Immediately following construction, each terrace will be vegetated with smooth cordgrass (*Spartina alterniflora*).

ANTICIPATED BENEFITS

Types and acres of coastal wetlands enhanced, and the degree and nature of the enhancement

This will directly enhance approximately 90 acres where the terraces will be constructed.

Types and acres of coastal wetlands protected

Additional acreage will be protected by reduction of fetch, thereby damping the effect of wave action on shorelines.

Types and acres of coastal wetlands restored

The terraces will immediately create almost 2 acres, while plantings on the slopes will create an additional 3 acres.

ANTICIPATED ADVERSE EFFECTS

Types and acres of coastal wetlands and other habitats adversely affected by the project

No adverse impacts are anticipated.

Conflicts with other projects and programs

No conflicts with other programs are anticipated at this time.

COSTS

Item	Amount ($)
Construction Cost	141,000
Contingencies	35,000
Subtotal	176,000
Engineering and Design	22,000
Supervision and Administration	24,000
Supervision and Inspection	20,000
Real Estate	10,000
Total	252,000
Project Monitoring (per year for 3 years)	7,500

PROJECT IMPLEMENTATION SCHEDULE

Engineering and Design Start Date	Mar 96
Engineering and Design Finish Date	Sep 96
Construction Start Date	Feb 97
Construction Finish Date	May 97

POTENTIAL FUNDING SOURCES

Federal Funding Sources

No federal funding sources other than the Coastal Wetlands Planning, Protection and Restoration Act have been identified.

Non-Federal Funding Sources

The state, through the Louisiana Department of Natural Resources, has identified this project to be funded with funds established under Louisiana Act 6.

SUMMARY AND CONCLUSIONS

The 4th list consists of 17 projects, including four demonstration projects. The total fully funded cost of the 17 projects is $45,784,000. The total average annual cost of the recommended projects is $4,091,000, with average annual habitat units of 5,400 and 5,200 average annual acres of emergent wetlands. Implementation of these projects is expected to provide an additional 8,740 acres of coastal wetlands compared to the future without-project condition over the 20 year project life.

Because of a shortfall in anticipated state funds under Louisiana's Act 6, the Louisiana Department of Natural Resources anticipates the state can cost share only $20,000,000 ($15,000,000 Federal, $5,000,000 non-Federal). The Task Force approved 17 projects to provide an opportunity for the state to locate additional funding sources.

The Task Force believes the recommended projects represent the best strategy for addressing the immediate needs of Louisiana's coastal wetlands. The Task Force will conduct a final review of the plans and specifications for each project prior to the award of construction contracts by the lead Task Force agency and the allocation of construction funds by the Task Force chairman.

BIBLIOGRAPHY

Lambou, V.W., 1952. Food and habitat of gar fish in the tide water of southeastern Louisiana. M. Sc. Thesis, L.S.U. 54 pp.

Lee, D.M., and J. L. van Beek, 1994. Preliminary Evaluation of the Oak Harbour Tract Elevations and Recommendations for Estuarine Management. Unpublished Contract Report to NMFS.

O'Neil, T., 1949. The Muskrat in the Louisiana Coastal Marshes. Federal aid section -Fish and Game Division, Louisiana Department of Wildlife and Fisheries, New Orleans. 152 pp.

Suter, J.R, S. Penland, and K.E. Ramsey, 1991. Nearshore sand resources of the Mississippi River Delta Plain: Marsh Island to Sandy Point. LGS. Coastal Geology Technical Report #8., 129.

U. S. Fish and Wildlife Services. 1980. Habitat Evaluation Procedures (HEP). Division Ecol. Service ESM 102, U. S. Fish and Wildlife Service, Washington DC. 141 pp.

Van Heerden, I., G. P. Kemp and J.N. Suhayda, 1993. The Importance and Role of Barrier Islands to Coastal Wetlands in Terrebonne Parish. A contract report for Terrebonne Parish Consolidated Report, Houma, LA 70361, Natural Systems Management and Engineering Program, CCEER, LSU, Baton Rouge, LA 70803.