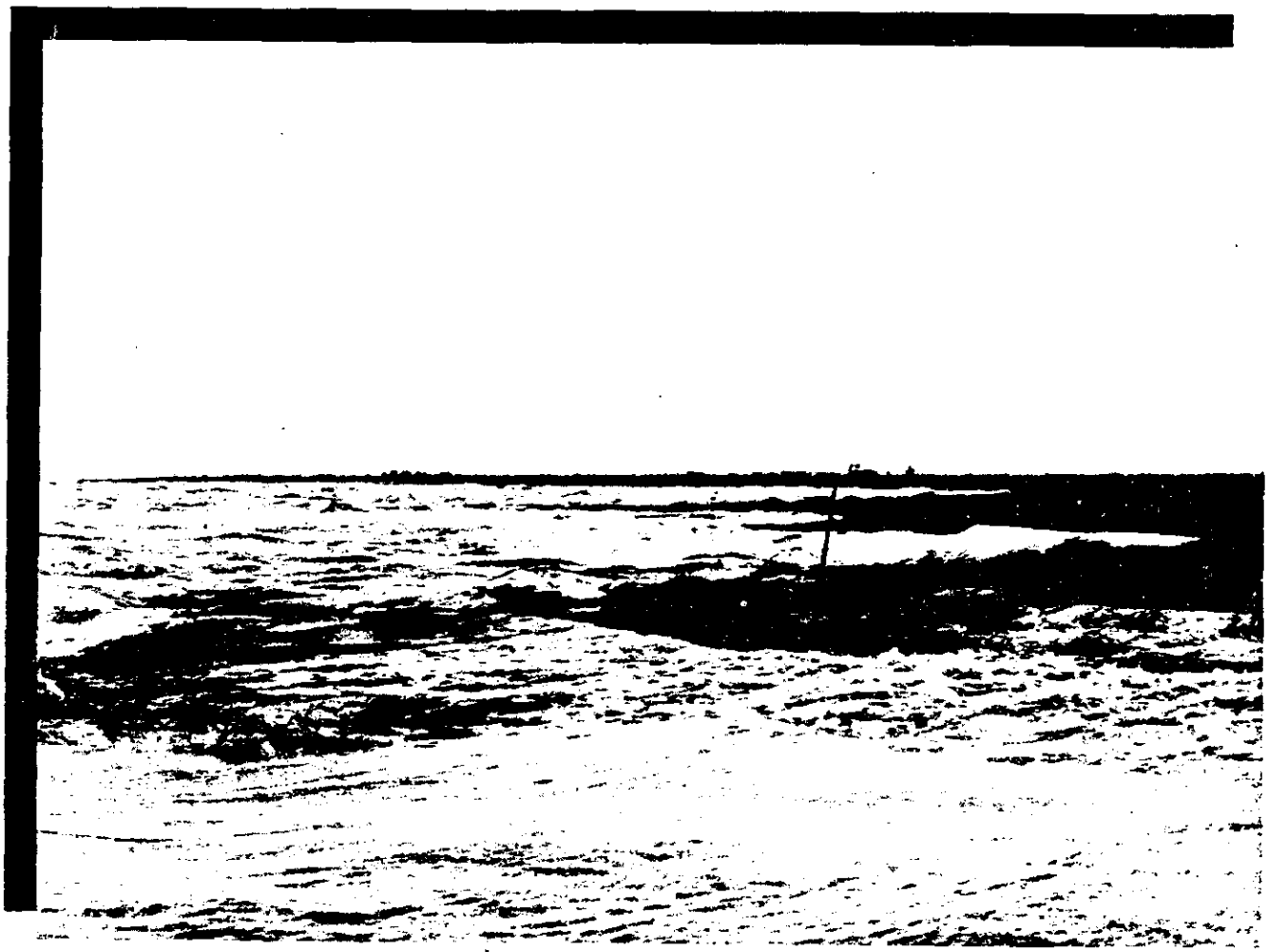
COASTAL WETLANDS CONSERVATION AND RESTORATION PLAN

(Fiscal Year 1990-91)



Resubmitted to the
House and Senate Committees
on
Natural Resources

April 1990

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PREFACE

The Wetland Conservation and Restoration Task Force is pleased to submit to the House and Senate Natural Resource Committees for their approval during the 1990 session of the Louisiana Legislature the first plan developed pursuant to R.S. 49:213.6 for conserving and restoring the state's coastal vegetated wetlands, consistent with legislative intent and with the policy developed by the Coastal Restoration Authority.

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ACKNOWLEDGEMENTS

The current plan incorporates a large number of recommendations from Federal, state, and local government; representatives of various interest groups; and other individuals knowledgeable about Louisiana's coastal wetlands. These recommendations include those offered by the House and Senate Natural Resources Committee during March 28 and March 30, 1990, hearings respectively held to review the original draft plan submitted to them by the Wetland Conservation and Restoration Task Force. The report also draws upon results of past and ongoing wetland investigations by universities and consultants. Furthermore, acknowledged are the constructive review comments provided by state agencies, and the participation in the planning process of each of the coastal parishes.

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INTRODUCTION

Act 6 of the Second Extraordinary Session of the 1989 Louisiana Legislature created the Wetlands Conservation and Restoration Authority (Authority) within the Office of the Governor, and the Office of Coastal Restoration and Management (OCRM) within the Department of Natural Resources (DNR). In addition, it created the statutorily dedicated Wetlands Conservation and Restoration Fund (Wetlands Fund).

The Authority consists of the governor's executive assistant for coastal activities and the Wetlands Conservation and Restoration Task Force (Task Force). The Task Force is composed of the following members:

(1) Executive Assistant for Coastal Activities
(2) Secretary of Department of Natural Resources (DNR)
(3) Secretary of Department of Wildlife and Fisheries (DWF)
(4) Secretary of Department of Environmental Quality (DEQ)
(5) Secretary of Department of Transportation and Development (DOTD)
(6) Assistant Chief of Staff (for Environment)
(7) Commissioner of Administration
(8) Director of the State Soil and Water Conservation Committee

The executive assistant serves as chairman of the Task Force and is responsible for developing procedures for its operation.

The legislature placed responsibility for the direction and development of the state's coastal vegetated-wetlands conservation and restoration plan within the Office of the Governor. Act 6 provided for the new Office of Coastal Restoration and Management in DNR to perform the functions of the state relative to conservation, development, restoration, and enhancement of the state's coastal wetlands resources, and to serve as the primary state agency for implementation of the state's coastal vegetated wetlands conservation and restoration plan. Within the Office, the Coastal Management Division was given the responsibility for implementing the coastal zone management program, and the Coastal Restoration Division was directed to perform the functions of the state relating to conservation, restoration, creation, and enhancement of coastal wetlands in Louisiana.

The Authority was directed to develop a comprehensive policy (Policy) addressing the conservation and restoration of coastal wetlands resources, and to develop the Coastal Wetlands Conservation and Restoration Plan (Plan). The Plan and Policy will serve as the state's overall strategy for conserving, enhancing, restoring, and creating coastal wetlands.

Act 6 requires that the plan address coastal wetland loss problems from both short- and long-range perspectives; incorporate structural, management, and institutional components; and include the following:

(1) A list of projects and programs required for the conservation and restoration of coastal wetlands.

(2) A schedule for the implementation of each project or program included in the plan.

(3) Where feasible, the rationale for incorporation of each project or program and, in particular, a description of how each project or program advances the plan objectives with respect to the management, conservation, or enhancement of vegetated wetland areas.

The plan must be submitted to the House and Senate Natural Resources Committees of the Legislature on or before March 15 of each year beginning in 1990 for their approval. If approved, the plan is then submitted to the full legislature for approval by resolution adopted by a majority vote of the members of each house provided that such resolution is adopted on or before June 1 of each calendar year. Upon approval, the Coastal Restoration Division shall implement the plan in conformity with the order of priority contained in the plan.

COASTAL WETLANDS CONSERVATION AND RESTORATION POLICY

The following policy statements are not rules or regulations, but rather are intended to generally guide the state's future coastal wetland conservation and restoration efforts, including structural, management, and institutional programs.

(1) Coastal vegetated wetlands--by virtue of their value as the basis for present and future fish and wildlife productivity, and related economic and recreational benefits; as natural protection for coastal towns and cities against the effects of storm damages; and for other reasons pertaining to the public health and welfare--are deemed to be uniquely important to this state and deserving of special safeguards and efforts related to their conservation, enhancement, restoration, and creation. Accordingly, it is the policy of the state to elevate coastal vegetated wetland conservation, enhancement, restoration, and creation to a level of importance equal to flood control, navigation, or other development activities so that a proper balance is achieved.

(2) It is the policy of the state to aggressively identify and implement projects and programs to offset coastal vegetated wetland losses that have resulted from past human activities and ongoing natural processes. It would be inappropriate, then, to allow future permitted developments that adversely impact coastal vegetated wetlands to go unmitigated. Accordingly, this state shall initiate the development of rules (via the Administrative Procedure Act process) and/or legislation, that would define and establish procedures needed to achieve, at a minimum, compensation for coastal wetland functional values lost due to future permitted activities. Overall functional coastal wetland value losses, which result from future permitted activities, would be offset by concurrent measures required in a permit (pursuant to R.S. 49: 213.4) to restore these values to the state. In this manner, public trust values (e.g., fish and wildlife values) lost as a result of permitted activities would be offset. Certain activities, as a result of their current exemption from the coastal use permitting process, would not be affected by these rules or legislation. These activities include: (1) agricultural, forestry and aquacultural activities on lands consistently used in the past for such activities, (2) normal maintenance or repair of existing structures, (3) construction of a residence or camp, (4) activities which do not have a direct and significant impact on coastal waters, (5) activities occurring entirely on lands 5 ft or more above mean sea level or within fastlands, unless discharges or changes in existing water flow from such activities cause a direct and significant impact on coastal waters, and (6) activities that occur outside of the state's designated coastal zone as defined in R.S. 49:213.4, unless such activities cause a direct and significant impact on coastal waters.

(3) Expenditures from the state's Wetlands Conservation and Restoration Fund shall be made in accordance with priorities established primarily on the basis of the effectiveness of each expenditure in conserving, enhancing, restoring, and creating coastal vegetated wetlands. Projects that introduce freshwater and sediments into wetlands shall have a high priority. These projects will be coordinated with DEQ and DHHR to assure that introduced water is of acceptable quality.

(4) The State of Louisiana recognizes the economic significance and importance of coastal activities such as navigation, including ports and waterways; seafood and wildlife-related industries; oil and gas exploration and production; chemical production; and agriculture, aquaculture, and silviculture. Accordingly, it is the policy of the state to consider the impacts of coastal wetland conservation and restoration programs and projects as they relate to these activities in our state's coastal area.

PLAN OBJECTIVES

(1) To plan, design, and complete in the near-term, projects and programs designed to conserve, enhance, restore, and create vegetated wetlands.

(2) To plan and evaluate alternative long-range projects (with complex socioeconomic interactions) designed to provide widespread and continuing long-term benefits to vegetated wetlands (e.g., large-scale freshwater and sediment diversions).

(3) To make projects and programs within hydrologic basins mutually compatible and to make them collectively serve the coastal wetland resource base.

(4) Through appropriate legislative or rulemaking processes, develop policies and procedures that would provide, at a minimum, for replacement of functional coastal wetland values lost due to future activities for which a coastal use permit is issued (see Table 5.A.1. and 2. for specific recommended measures).

(5) Take steps necessary to:

   (a) improve predictability and efficiency of the Coastal Use Permitting process; and

   (b) make operation and implementation of Federal water resources projects consistent with the policy of the state to elevate coastal vegetated wetland conservation, enhancement, restoration, and creation to a level of importance equal to flood control, navigation, or other development activities.

PLAN DEVELOPMENT AND CONTENTS

The current plan was developed through a process that involved the integration of a large number of recommendations from Federal, state, and local governmental entities; representatives of various interest groups; and other individuals knowledgeable about Louisiana's coastal processes and resources. An initial step in this process was the

Vegetated Wetlands in Coastal Louisiana" as part of the Policy Statement of the Governor's Coastal Restoration Policy Committee in August of 1988. That report presented in outline form measures and programs for the conservation and restoration of coastal wetlands in each of the nine hydrologic basins that make up coastal Louisiana.

Recommendations of the Policy Committee were subsequently built upon under DNR's Coastal Restoration Program through the identification and evaluation of those projects that could be implemented without significant adverse social impacts and in a short time-frame. These are projects that have local support, especially those in the planning and permitting stage; generally do not require Federal authorization and funding; would likely involve less than two years of planning and design; and have a comparatively moderate price tag. Under the current effort, project identification was further advanced through coordination between the Governor's Office of Coastal Activities and local governments. Meetings were held with representatives of each of the coastal parishes to determine whether support existed for projects recommended by the state and to solicit input concerning possible additional projects resulting from local recommendations. Similar contact with a representative of the coastal landowners was made because many of the projects required to conserve and enhance the vegetated wetland resource base cannot be accomplished without their cooperation.

The current document was coordinated among state agencies directly through review by the Secretaries serving on the Governor's Task Force, as well as through incorporation of the recommendations developed jointly in 1988 by representatives of Louisiana's DNR, DEQ, DWF, and DOTD who served on the Governor's Coastal Restoration Technical Committee.

Projects and Programs

Projects recommended for funding from the Wetland Funds during Fiscal Year 1990-91 are generally of four types:

- Introduction of freshwater, mineral sediments, and nutrients to conserve, enhance, restore, and create vegetated wetlands
- Management of surface water to protect vegetated wetlands from saltwater intrusion and erosion by tidal currents
- Marsh restoration, sedimentation, and low-cost shore protection to maintain and enhance physical integrity of vegetated wetlands
- Gulf shore protection along critical areas of the Chenier Plain

The projects have been grouped in three ways to facilitate review (Tables 1, 2, and 3). Each project is always identified by a letter/number combination, the letters representing the basin name (e.g. PO-1). Table 1 presents the projects grouped by hydrologic basin (e.g. Pontchartrain Basin) from east to west. Table 2 combines the projects by parish. In Table 3 the projects are grouped into three categories according to the nature of the work planned for 1990/91. These categories are: (1) operation, maintenance, and rehabilitation (OMR), (2) construction and implementation (CI), and (3) feasibility analysis, planning, permitting, and design (FPD). These notations also follow each project name in Tables 1 and 2.

The projects in the first category (OMR) are those that can become operational immediately by providing funds for operation, maintenance, or rehabilitation of existing features.

The second category (CI) combines those projects for which construction and implementation could be initiated during the 1990/91 Fiscal Year. In some cases feasibility analysis, planning, permitting, and design (FPD) have been completed, and only CI remains. In other cases one or more of the FPD elements needs to be completed before CI can commence as indicated by the FPD/CI notation. This may be for a number of reasons, including requirements for further coordination with local interests, questions concerning operation, pending permits, or other factors. In those cases where feasibility analysis has not been completed, construction and implementation, though indicated, could be delayed or possibly deactivated because of currently unanticipated social, economic, or technical constraints.

The third implementation category (FPD) includes those projects that cannot be brought to construction during the current fiscal year because they have not advanced beyond the conceptual stage and project characteristics do not allow completion of all FPD elements in less than one year.

In Tables 1 and 2 the sequence in which projects are listed within basins and parishes, respectively, is determined by how close the project is to becoming operational, CI projects being listed before FPD projects. When a number of projects occur within the same category, an alphabetical order is followed using the parish or basin name. In Table 3 the order within each category reflects the priority recommended by the Authority within the particular category. The basis for this priority is explained in the following document section entitled "Priorities and Implementation."

An illustrated description of each project is provided in the last part of this report. A map of coastal Louisiana with project locations precedes that section of the report (Figures 1 and 2). Individual project descriptions are grouped according to Table 1. In each case a basin map showing the location and estimated area of benefit for each project precedes the project descriptions.

In addition to the projects identified above, a number of programs are recommended for funding from the Wetland Fund during Fiscal Year 1990-91. These programs include both long- and short-range programs, and are listed in Table 4 with a short description of their objective. Additionally, it is recommended that a number of institutional and structural measures be advanced for state and Federal action for the purpose of conservation, restoration, and creation of wetlands. These are identified in Table 5 with funding requested for (1) matching federal or local monies for various dredged material disposal programs to create or protect marsh, (2) assisting local governments in rerouting runoff waters through wetlands, (3) cost-sharing in the restoration of back-barrier wetlands (such as at Wine Island) by the Corps of Engineers during navigation channel dredging, and (4) operation of various structures, if needed, to offset saltwater intrusion, retain freshwater, or to remove excess water from marsh areas.

Priorities and Implementation

The number of proposed projects and available funding made it necessary to establish a priority among the projects in order to guide project-related activities and expenditures. This has proven to be a most difficult task during this first year of implementation of Act 6 because time has been insufficient for development of: (1) cost estimates for projects that were proposed in recent weeks in response to coordination

between the Authority and local government, (2) an acceptable formula for determining cost-effectiveness of each project, and (3) a method to differentiate among projects that have a similar cost-effectiveness. Nevertheless, using a number of parameters, priorities were established among projects within the categories OMR, CI, and FPD, respectively (Table 3). Within each group, project priority was generally established on the basis of the following primary considerations:

- Area of anticipated benefit to conservation, restoration, enhancement, and creation of vegetated wetlands
- Cost
- Introduction and utilization of freshwater
- Introduction of sediments

Using these four factors, each project was assigned a value. These values are presented in Table 3. Specific criteria for the assignment of values are given below. In general, values of 1, 2, 3 and 4 were used as relative expressions of the area of benefit and of the project cost. A value of 1 was assigned for the smallest area as well as for the highest cost. Values of 0 and 1 were assigned for the water and sediment factors in accordance with presence or absence. In producing a single number for project ranking, it was believed that greater weight should be given to the area of benefit to emphasize cost-effectiveness relative to vegetated wetlands. A relative weight of 3 was given to the area value while the other factors were all given a weight of 1. Addition of these values then produced the final ranking value and the order presented in Table 3. Projects receiving the highest numbers are those where large areas of wetland are benefitted at low cost through the introduction or greater utilization of freshwater and sediments.

Within each of the project categories (OMR, CI, and FPD) in Table 3, a grouping of priorities (Priority 1, Priority 2, etc.) was largely suggested by the distribution of the ranking numbers, and in part arrived at through consideration of project types. Within priority groupings no attempt has been made to rank projects having the same rating; they are listed alphabetically according to hydrologic basin.

The following criteria were used in the assignment of values to each project and in determining project rank:

Area of Benefit	Value (V1)	Cost	Value (V2)
< 1,000 ac	1	< $ 1,000,000	4
1,000 - 10,000 ac	2	$ 1,000,000 - 5,000,000	3
10,000 - 50,000 ac	3	$ 5,000,000 - 10,000,000	2
> 50,000 ac	4	$ > $ 10,000,000	1

Freshwater introduction or utilization	Value (V3)	Sediment introduction	Value (V4)
no	0	no	0
yes	1	yes	1

Project rank is obtained from: $Rank = 3 \cdot V1 + V2 + V3 + V4$.

Secondary criteria could be used to further evaluate project merit in the event that funds within a given category are insufficient to implement all projects. These include:

- Location and value of the project wetlands relative to water quality, storm-buffer, recreation, fish and wildlife, and other functions
- Local support/cost sharing
- Time required for implementation
- Apparent need

Because several projects in the CI category still require completion of some FPD task, it is necessary to have two sub-categories within the FPD category (3a and 3b in Table 3). The first sub-category includes those projects for which completion of the FPD elements is necessary to advance the project to the CI category this year. Accordingly, priority in this group parallels that of the CI category. The second sub-category comprises those projects for which only FPD elements are proposed this year.

All phases of project development, implementation, and operation will be coordinated with all appropriate government agencies and landowners. This is a requirement not only because of governmental mandates, and state and private land ownership, but also because a number of projects were identified for which costs are shared by state, local, or federal government. Although some parishes have indicated a willingness to share in the cost of design and construction of several projects, a formal policy dealing with cost-sharing remains to be developed and must be included as a parameter in future plan development.

OMR = Operation / Maintenance / Rehabilitation; CI = Construction / Implementation; FPD = Feasibility Analysis, Planning, Permitting, Design.

FUNDING

Because of uncertainties about feasibility, permitting, and other project elements, it is proposed that state funding be provided for project implementation on a category (OMR, CI, FPD) basis rather than a project basis. Under this funding provision, project implementation within each group would occur according to the established and legislatively approved priority unless problems arise that delay implementation of a given project. In that case, work will begin on the project with the next highest priority.

Line item funding is requested for each of the project categories detailed in Tables 3, 4 and 5 as follows:

1.	Operation / Maintenance / Rehabilitation	$ 775,000
2.	Construction / Implementation	$ 18,500,000
3.	Feasibility Analysis / Planning and Permitting / Design	$ 2,000,000
4.	Long and Short-Range Programs	$ 4,000,000
5.	Policy and Structural Measures	$ 1,000,000
	Total	$ 26,275,000

Approval is also requested to transfer up to 20 % of allocated funds from any one category to other categories as needed to prevent undesirable delays in project planning and implementation.

Table 1. Projects Listed by Hydrologic Basin

	Project	Category	Parish
1.	Pontchartrain Basin		
PO-1	Violet Siphon Diversion		StBd
	a) Achieve operation of existing structure	OMR	
	b) Enlargement of diversion capacity	FPD/CI	
	c) Outfall management	FPD	
PO-2	Sediment trapping/vegetation planting/shore protection		
	a) Christmas tree pilot project	FPD/CI	all
	b) Alligator Point Wetland - protection	FPD/CI	Orls
	c) Bayou Chevee Wetland - protection	FPD	Orls
PO-3	La Branche Wetland - protection and enhancement		StCs
	a) Completion of management plan	FPD/CI	
	b) Stabilize critical reaches of shoreline	FPD	
PO-4	Bonnet Carré Freshwater Diversion - partial cost-sharing for portion of project to benefit wetlands	FPD	StCs
PO-5	Southeast Lake Maurepas Wetland		StJn
	a) Reduce ponding of water	FPD	
	b) Small diversion of Mississippi River water into swamps	FPD	
PO-6	Fritchie Wetland - marsh restoration	FPD	StTm
PO-7	North Shore Wetland - marsh restoration	FPD	StTm
PO-8	Central Wetlands Pump Outfall - enhancement	CI	StBd
2.	Breton Sound Basin		
BS-1	Bohemia Diversion Structure		Plqs
	a) Achieve operation of existing structure	OMR	
	b) Outfall management	FPD	
BS-2	Sediment trapping/vegetation planting		
	a) Christmas tree pilot project	FPD/CI	all
BS-3	Caernarvon Diversion Outfall - outfall management	FPD	Plqs/StBd
BS-4	White's Ditch Diversion Siphon		Plqs
	a) outfall management	FPD/CI	
	b) enlargement	FPD	
BS-5	Bayou LaMoque Diversion - outfall management	FPD	Plqs
3.	Mississippi River Delta		
MR-1	Small Sediment Diversions		Plqs
	a) Pass A Loutre Wildlife Management Area	FPD/CI	
	b) Delta Wildlife Refuge *	FPD/CI	

(Table 1 continued)

4. Barataria Basin			
BA-1	Davis Pond Freshwater Diversion *	FPD/CI	StCs
BA-2	GIWW to Clovelly Wetland - protection and enhancement	*FPD/CI	Lafr
BA-3	Naomi (LaReussite) Diversion Siphon		Plqs/Jefn
	a) Siphon construction	CI	
	b) Enlargement of diversion capacity	FPD/CI	
	c) Outfall management	FPD	
BA-4	West Point a la Hache Diversion Siphon		Plqs
	a) Siphon construction	CI	
	b) Enlargement of diversion capacity	FPD/CI	
	c) Outfall management	FPD	
BA-5	Sediment trapping/vegetation planting/shoreline protection		
	a) Christmas tree pilot project	FPD/CI	all
	b) Queen Bess Island - habitat restoration	FPD/CI	Jefn
	c) Baie de Chactas - protection	FPD	StCs
BA-6	Highway 90 to GIWW Wetland - protection	FPD	Lafr
BA-7	Couba Island - restore canal closure	FPD	StCs
5. Terrebonne Basin			
TE-1	Montegut Wetland - protection and enhancement	OMR/FPD	Terb
TE-2	Falgout Canal Wetland - protection and enhancement	FPD/CI	Terb
TE-3	Bayou la Cache Wetland - protection and enhancement	FPD/CI	Terb
TE-4	Sediment trapping/vegetation planting		
	a) Christmas tree pilot project	FPD/CI	all
	b) Barrier Islands - sediment retention	FPD/CI	Terb
TE-5	Grand Bayou Wetland - protection	FPD	Lafr
TE-6	Pointe au Chien Wetland - protection and enhancement	FPD	Terb
TE-7	Lake Boudreaux Wetland - protection		Terb
	a) Upper Petit Caillou management area	FPD	
	b) Lower Petit Caillou management area	FPD	
	c) Bayou Grand Caillou management area	FPD	
TE-8	Bayou Pelton Wetland - protection	FPD	Terb
6. Atchafalaya Basin			
AT-1	Sediment trapping/vegetation planting		
	a) Christmas tree pilot project	FPD/CI	all
	b) Atchafalaya River Delta	FPD/CI	StMy
7. Teche/Vermilion Basin			
T/V-1	Shark Island /Weeks Bay - protection	FPD/CI	Ibra
T/V-2	Cote Blanche Wetlands - protection		
	(a) Hammock Lake - protection/restoration	FPD/CI	StMy
	(b)Yellow Bayou Wetland - protection	FPD/CI	StMy
T/V-3	Vermilion River Cutoff - restoration	FPD/CI	Vrml
T/V-4	Sediment trapping/vegetation planting/shore protection		
	(a) Christmas tree pilot project	FPD/CI	all

(Table 1 concluded)

8. Mermentau Basin			
ME-1	Pecan Island Freshwater Introduction		Vrml
	a) Pecan Island Structure	FPD/CI	
	b) Outfall management	FPD	
ME-2	Hog Bayou Wetland - restoration and enhancement	FPD/CI	Camr
ME-3	Sediment trapping/vegetation planting		
	a) Christmas tree pilot project	FPD/CI	all
ME-4	Freshwater Bayou Wetland - diminish ponding of water	FPD	Vrml
9. Calcasieu/Sabine Basin			
C/S-1	Calcasieu-Sabine Wetland - Gulf shore protection from		Camr
	a) Peveto Beach to Holly Beach	FPD/CI	
	b) Holly Beach to Calcasieu	FPD	
	c) Constance Beach to Ocean View	FPD	
C/S-2	Rycade Canal - closure to Black Lake	FPD/CI	Camr
C/S-3	Sediment trapping/vegetation planting		
	a) Christmas tree pilot project	FPD/CI	all
C/S-4	Cameron-Creole Watershed		Camr
	a) Operation of control structures	OMR	
	b) Freshwater introduction - from GIWW	FPD	
C/S-5	Sabine Freshwater Introduction - freshwater diversion from the Sabine River	FPD	Camr

* Federal and state cost sharing

Categories:
OMR = Operation/Maintenance/Rehabilitation
CI = Construction/Implementation
FPD = Feasibility Analysis/Planning/Permitting/Design

Basins:

All	=	all basins	ME	=	Mermentau
AT	=	Atchafalaya	MR	=	Mississippi River Delta
BA	=	Barataria	PO	=	Pontchartrain
BS	=	Breton Sound	TE	=	Terrebonne
C/S	=	Calcasieu/Sabine	T/V	=	Teche/Vermilion

Parishes:

all	=	all parishes	Livn	=	Livingston	StMn	=	St. Martin
Assn	=	Assumption	Orls	=	Orleans	StMy	=	St. Mary
Calc	=	Calcasieu	Plqs	=	Plaquemines	StTm	=	St.Tammany
Camr	=	Cameron	StBd	=	St. Bernard	Tang	=	Tangipahoa
Ibra	=	Iberia	StCs	=	St. Charles	Terb	=	Terrebonne
Jefn	=	Jefferson	StJm	=	St. James	Vrml	=	Vermilion
Lafr	=	Lafourche	StJn	=	St. John the Baptist			

Table 2. Projects Listed by Parish

	Project	Category
1.	Assumption Parish	
TE-4	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
2.	Calcasieu Parish	
C/S-3	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
3.	Cameron Parish	
C/S-1	Calcasieu-Sabine Wetland - Gulf shore protection from:	
	a) Peveto Beach to Holly Beach	FPD/CI
	b) Holly Beach to Calcasieu	FPD
	c) Constance Beach to Ocean View	FPD
C/S-2	Rycade Canal - water control to Black Lake	FPD/CI
ME-2	Hog Bayou Wetland - restoration and enhancement	FPD/CI
C/S-3	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
C/S-4	Cameron-Creole Watershed	
	a) Operation of control structures	OMR
	b) Freshwater introduction - from GIWW	FPD
C/S-5	Sabine Freshwater Introduction - freshwater diversion from the Sabine River	FPD
4.	Iberia Parish	
T/V-1	Sediment trapping/vegetation planting/shore protection	
	a) Christmas tree pilot project	FPD/CI
	b) Shark Island/Weeks Bay - protection	FPD/CI
5.	Jefferson Parish	
BA-3	Naomi (LaReussite) Diversion Siphon	
	a) Siphon construction	CI
	b) Enlargement of diversion capacity	FPD/CI
	c) Outfall management	FPD
BA-5	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
	b) Queen Bess Island - habitat restoration	FPD/CI

(Table 2 continued)

6. Lafourche Parish		
BA-2	GIWW to Clovelly Wetland - protection and enhancement *	FPD/CI
BA-5	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
BA-6	Highway 90 to GIWW Wetland - protection	FPD
TE-5	Grand Bayou Wetland - protection	FPD
7. Livingston Parish		
PO-2a	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
8. Orleans Parish		
PO-2	Sediment trapping/vegetation planting/shore protection	
	a) Christmas tree pilot project	FPD/CI
	b) Alligator Point Wetland - protection	FPD/CI
	c) Bayou Chevee Wetland - protection	FPD
9. Plaquemines Parish		
BS-1	Bohemia Diversion Structure	
	a) Achieve operation of existing structure	OMR
	b) Outfall management	FPD
MR-1	Small Sediment Diversions	
	a) Pass A Loutre Wildlife Management Area	FPD/CI
	b) Delta Wildlife Refuge *	FPD/CI
BA-3	Naomi (LaReussite) Diversion Siphon	
	a) Siphon construction	CI
	b) Enlargement of diversion capacity	FPD/CI
	c) Outfall management	FPD
BA-4	West Point a la Hache Diversion Siphon	
	a) Siphon construction	CI
	b) Enlargement of diversion capacity	FPD/CI
	c) Outfall management	FPD
BA-5	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
BS-3	Caernarvon Diversion Outfall - outfall management	FPD
BS-4	White's Ditch Diversion Siphon	
	a) outfall management	FPD/CI
	b) enlargement	FPD
BS-5	Bayou LaMoque Diversion - outfall management	FPD
10. St. Bernard Parish		
PO-1	Violet Siphon Diversion	
	a) Achieve operation of existing structure	OMR
	b) Enlargement of diversion capacity	FPD/CI
	c) Outfall management	FPD

(Table 2 continued)

PO-2	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
PO-8	Central Wetlands Pump Outfall	CI
BS-3	Caernarvon Diversion Outfall - outfall management	FPD
11.	St. Charles Parish	
PO-3	La Branche Wetland - protection and enhancement	
	a) Complete implementation of management plan	FPD/CI
	b) Stabilize critical reaches of shoreline	FPD
BA-1	Davis Pond Freshwater Diversion *	FPD/CI
BA-5	Sediment trapping/vegetation planting/shore protection	
	a) Christmas tree pilot project	FPD/CI
	c) Baie de Chactas	FPD
PO-4	Bonnet Carré Freshwater Diversion - partial cost-sharing for portion of project to benefit wetlands	FPD
BA-7	Couba Island - protection/restoration	FPD
12.	St. James Parish	
PO-2	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
13.	St. John the Baptist Parish	
PO-2	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
PO-5	Southeast Lake Maurepas Wetland	
	a) Reduce ponding of water	FPD
	b) Small diversion of Mississippi River water into swamps	FPD
14.	St. Martin Parish	
AT-1	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
15.	St. Mary Parish	
AT-1	Sediment trapping/vegetation planting	
	b) Atchafalaya River Delta - sediment fences	FPD/CI
T/V-1	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
T/V-2	Cote Blanche Wetlands - protection/restoration	
	a) Hammock Lake - marsh restoration	FPD/CI
	b) Yellow Bayou Wetland - protection	FPD/CI

Table 2 concluded)

16. St. Tammany Parish		
PO-2	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
PO-6	Fritchie Wetland - marsh restoration	FPD
PO-7	North Shore Wetland - marsh restoration	FPD
17. Tangipahoa Parish		
PO-2	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
18. Terrebonne Parish		
TE-1	Montegut Wetland - protection and enhancement	FPD/OMR
TE-2	Falgout Canal Wetland - protection and enhancement	FPD/CI
TE-3	Bayou LaCache Wetland - protection and enhancement	FPD/CI
TE-4	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
	b) Barrier Islands - sand retention	FPD/CI
TE-6	Pointe au Chien Wetland - protection and enhancement	FPD
TE-7	Lake Boudreaux Wetland - protection	
	a) Upper Petit Caillou management area	FPD
	b) Lower Petit Caillou management area	FPD
	c) Bayou Grand Caillou management area	FPD
TE-8	Bayou Pelton Wetland - protection	FPD
19. Vermilion Parish		
ME-1	Pecan Island Freshwater Introduction	
	a) Pecan Island Structure	FPD/CI
	b) Outfall management	FPD
ME-3	Sediment trapping/vegetation planting	
	a) Christmas tree pilot project	FPD/CI
T/V-3	Vermilion River Cutoff - restoration	FPD/CI
ME-4	Freshwater Bayou Wetland - diminish ponding of water	FPD

* Federal and state cost sharing

For abbreviations see Table 1.

Table 3. Projects Grouped by Category (OMR, CI, FPD) and Order of Priority[1]

1. Operation/Maintenance/Rehabilitation (OMR)

Priority 1

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BS-1	Bohemia Diversion Structure	Plqs					
	a) Achieve operation of present structure		12	2	4	1	1
PO-1	Violet Siphon Diversion	StBd					
	a) Achieve operation of present structure		12	2	4	1	1
C/S-4	Cameron/Creole Watershed	Camr					
	a) Operation of control structures		10	2	4	0	0
TE-1	Montegut Wetland - protection	Terb	10	2	4	0	0

2. Construction/Implementation (CI)

Priority 1

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BA-1	Davis Pond Freshwater Diversion *	StCs	16	4	2	1	1
BS-3	Caemarvon Freshwater Diversion *						
	c) Diversion structure	Plqs	16	4	2	1	1
BA-2	GIWW to Clovelly Wetland *	Lafr	14	4	2	0	0
BA-3	Naomi (LaReussite) Diversion Siphon	Plqs	13	3	2	1	1
	a) Siphon construction						
	b) Enlargement diversion capacity						
BA-4	West Point a la Hache Diversion Siphon	Plqs	13	3	2	1	1
	a) Siphon construction						
	b) Enlargement diversion capacity						
ALL-1	Sedimentation and Vegetation Planting						
	a) Christmas tree project	All	-	-	-	-	-

Priority 2

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BS-4	White's Ditch Diversion Siphon	Plqs					
	a) outfall management		12	2	4	1	1
C/S-1	Calcasieu-Sabine Wetland - protection from:	Camr					
	a) Peveto Beach to Holly Beach		12	3	3	0	0
MR-1	Small Sediment Diversions	Plqs					
	a) Pass A Loutre Wildlife Management Area		12	2	4	1	1
	b) Delta Wildlife Refuge *		12	2	4	1	1
ME-1	Pecan Island Freshwater Introduction	Vrml					
	a) Pecan Island Structure		11	2	4	0	1
PO-1	Violet Siphon Diversion	StBd					
	b) Enlargement of diversion capacity		11	2	3	1	1
TE-2	Falgout Canal Wetland - protection	Terb	11	2	4	0	1
TE-3	Bayou la Cache Wetland - protection	Terb	11	2	4	0	1

(Table 3 continued)

Priority 3

	Project	Parish	Rank	Acres	Cost	Sed	Fw
C/S-2	Rycade Canal - water control to Black Lake	Camr	10	2	4	0	0
PO-3	La Branche Wetland	StCs					
	a) Completion of management plan		10	2	4	0	0
PO-4	Bonnet Carré Freshwater Diversion	StCs	9	2	1	1	1

Priority 4

	Project	Parish	Rank	Acres	Cost	Sed	Fw
ME-2	Hog Bayou Wetland - enhancement	Camr	8	1	4	0	1
PO-8	Central Wetlands Pump Outfall	StBd	8	1	4	0	1
AT-1	Sediment trapping/vegetation planting	StMy					
	a) Atchafalaya River Delta		7	1	4	0	0
PO-2	Sediment / vegetation / shore protection	Orls					
	b) Alligator Point Wetland - protection		7	1	4	0	0
BA-5	Sediment trapping/vegetation planting						
	c) Queen Bess Island - restoration	Jefn	7	1	4	0	0
T/V-2	Cote Blanche Wetlands - protection	StMy					
	a) Hammock Lake - restoration		7	1	4	0	0
	b) Yellow Bayou Wetland - protection		7	1	4	0	0
T/V-3	Vermilion River Cutoff - restoration	Vrml	7	1	4	0	0
TE-4	Sediment trapping/vegetation planting	Terb					
	b) Barrier Islands - sediment retention		7	1	4	0	0
T/V-1	Shark Island/Weeks Bay Wetland - protection	Ibra	6	1	3	0	0

3. Feasibility/Planning/Design (FPD)

a. FPD-Projects for which CI is intended during 1990/91

Priority 1

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BA-1	Davis Pond Freshwater Diversion *	StCs	16	4	2	1	1
BA-2	GIWW to Clovelly Wetland *	Lafr	14	4	2	0	0
BA-3	Naomi (LaReussite) Diversion Siphon	Plqs	13	3	2	1	1
	a) Siphon construction						
	b) Enlargement diversion capacity						
BA-4	West Point a la Hache Diversion Siphon	Plqs	13	3	2	1	1
	a) Siphon construction						
	b) Enlargement diversion capacity						

Priority 2

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BS-4	White's Ditch Diversion Siphon	Plqs					
	a) outfall management		12	2	4	1	1

(Table 3 continued)

C/S-1	Calcasieu-Sabine Wetland - protection from:	Camr					
	a) Peveto Beach to Holly Beach		12	3	3	0	0
MR-1	Small Sediment Diversions	Plqs					
	a) Pass A Loutre Wildlife Management Area		12	2	4	1	1
	b) Delta Wildlife Refuge *		12	2	4	1	1
ME-1	Pecan Island Freshwater Introduction	Vrml					
	a) Pecan Island Structure		11	2	4	0	1
PO-1	Violet Siphon Diversion	StBd					
	b) Enlargement of diversion capacity		11	2	3	1	1
TE-2	Falgout Canal Wetland - protection	Terb	11	2	4	0	1
TE-3	Bayou la Cache Wetland - protection	Terb	11	2	4	0	1

Priority 3

	Project	Parish	Rank	Acres	Cost	Sed	Fw
C/S-2	Rycade Canal - water control to Black Lake	Camr	10	2	4	0	0
PO-3	La Branche Wetland	StCs					
	a) Completion of management plan		10	2	4	0	0
PO-4	Bonnet Carré Freshwater Diversion	StCs	9	2	1	1	1

Priority 4

	Project	Parish	Rank	Acres	Cost	Sed	Fw
ME-2	*Hog Bayou Wetland*	Camr	8	1	4	0	1
PO-8	Central Wetlands Pump Outfall	StBd	8	1	4	0	1
AT-1	Sediment trapping/vegetation planting	StMy					
	a) Atchafalaya River Delta		7	1	4	0	0
BA-5	Sediment trapping/vegetation planting						
	c) Queen Bess Island - restoration	Jefn	7	1	4	0	0
PO-2	Sediment / vegetation / shore protection	Orls					
	b) Alligator Point Wetland - protection		7	1	4	0	0
T/V-2	Cote Blanche Wetlands - protection	StMy					
	a) Hammock Lake - protection		7	1	4	0	0
	b) Yellow Bayou Wetland - protection		7	1	4	0	0
T/V-3	Vermilion River Cutoff - restoration	Vrml	7	1	4	0	0
TE-4	Sediment trapping/vegetation planting	Terb					
	b) Barrier Islands - sediment retention		7	1	4	0	0
T/V-1	Shark Island/Weeks Bay Wetland	Ibra	6	1	3	0	0

b. FPD-Projects for which CI is not yet scheduled

Priority 1

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BS-3	Caernarvon Diversion Outfall	Plqs	14	3	3	1	1
BA-6	*Highway 90 TO GIWW Wetland*	Lafr	13	3	3	0	1

(Table 3 continued)

Priority 2

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BS-5	Bayou LaMoque Diversion - outfall	Plqs	12	2	4	1	1
TE-5	Grand Bayou Wetland - protection	Lafr	12	3	3	0	0
BA-3	Naomi (LaReussite) Diversion Siphon	Plqs/Jefn					
	c) Outfall management		11	2	3	1	1
BA-4	West Point a la Hache Diversion Siphon	Plqs					
	c) Outfall management		11	2	3	1	1
BS-1	Bohemia Diversion Structure	Plqs					
	b) Outfall management		11	2	3	1	1
BS-4	White's Ditch Diversion Siphon	Plqs					
	b) Enlargement		11	2	3	1	1
C/S-4	Cameron/Creole Watershed	Camr					
	b) Freshwater introduction - from GIWW		11	2	4	0	1
PO-1	Violet Siphon Diversion						
	c) Outfall management	StBd	11	2	3	1	1

Priority 3

	Project	Parish	Rank	Acres	Cost	Sed	Fw
BA-5	Sediment/vegetation/shore protection	StCs					
	d) Baie de Chactas - protection		10	2	4	0	0
BA-7	Couba Island - protection/restoration	StCs	10	2	4	0	0
C/S-1	Calcasieu-Sabine Wetland - protection from:	Camr					
	b) Holly Beach to Calcasieu		10	3	1	0	0
C/S-5	Sabine Freshwater Introduction	Camr	10	2	3	0	1
ME-1	Pecan Island Freshwater Introduction						
	b) Outfall management	Vrml	10	2	3	0	1
ME-4	Freshwater Bayou Wetland - ponding	Vrml	10	2	4	0	0
PO-3	La Branche Wetland	StCs					
	b) Stabilize critical reaches of shoreline		10	2	4	0	0
PO-5	Southeast Lake Maurepas Wetland	StJn					
	a) Reduce ponding of water		10	2	4	0	0
	b) Small diversion of Mississippi River water		10	2	2	1	1
PO-7	North Shore Wetland - restoration	StTm	10	2	4	0	0
TE-6	Pointe au Chien Wetland - protection	Terb	10	2	4	0	0
TE-7	Lake Boudreaux Wetland - protection	Terb	10	3	1	0	
TE-8	Bayou Pelton Wetland - protection	Terb	10	2	4	0	0
PO-6	Fritchie Wetland - restoration	StTm	9	2	3	0	0

Priority 4

	Project	Parish	Rank	Acres	Cost	Sed	Fw
PO-2	Sediment/vegetation/shore protection	Orls					
	c) Bayou Chevee - protection		7	1	4	0	0
C/S-1	Calcasieu-Sabine Wetland - protection from:	Camr					
	c) Constance Beach to Ocean View		5	1	2	0	0

(Table 3 concluded)

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1) Relative values used in project ranking (see pages 4 and 5 for further explanation):

Rank = composite number used for ranking each project.
Acres = relative value for estimated range of acres benefitted (1 to 4).
Cost = relative value for estimated range of implementation cost (4 to 1).
Sed = absence or presence of sediment introduction (0 or 1).
Fw = absence or presence of freshwater introduction and utilization (0 or 1).

* Federal and state cost sharing

Categories:
OMR = Operation/Maintenance/Rehabilitation
CI = Construction/Implementation
FPD = Feasibility Analysis/Planning/Permitting/Design

Basins:

All	=	all basins	ME	=	Mermentau
AT	=	Atchafalaya	MR	=	Mississippi River Delta
BA	=	Barataria	PO	=	Pontchartrain
BS	=	Breton Sound	TE	=	Terrebonne
C/S	=	Calcasieu/Sabine	T/V	=	Teche/Vermilion

Parishes:

all	=	all parishes	Livn	=	Livingston	StMn	=	St. Martin
Assn	=	Assumption	Orls	=	Orleans	StMy	=	St. Mary
Calc	=	Calcasieu	Plqs	=	Plaquemines	StTm	=	St.Tammany
Camr	=	Cameron	StBd	=	St. Bernard	Tang	=	Tangipahoa
Ibra	=	Iberia	StCs	=	St. Charles	Terb	=	Terrebonne
Jefn	=	Jefferson	StJm	=	St. James	Vrml	=	Vermilion
Lafr	=	Lafourche	StJn	=	St. John the Baptist			

Table 4. Long and Short-Range Programs to be Funded

Objective: Investigate potential, large-scale measures requiring further evaluation as part of a comprehensive, long-term planning effort to maximize the use of available water and sediment resources to restore and enhance coastal vegetated wetlands.

1. Louisiana Comprehensive Coastal Wetlands Study (Corps/State)*

   Objective: To develop a comprehensive plan that addresses large-scale and long-term requirements for the conservation, restoration, and enhancement of Louisiana's coastal wetlands with Federal participation.
   Status: Letter of agreement to be formulated.

   (a) Develop and implement a plan to allocate water and sediments of the Atchafalaya and Mississippi Rivers, considering the proposed measures listed below, in order to maximize maintenance, restoration, enhancement, and creation of vegetated wetlands.

   * Major diversion into Lake Verret watershed from the Atchafalaya River
   * Diversion from the Atchafalaya River through the Avoca Island levee south of Morgan City
   * An alternate Mississippi River navigation channel
   * Major intermittent diversion near Des Allemands
   * Major intermittent diversion north of Bonnet Carré Spillway
   * Major diversion below Caernarvon
   * Major diversion below Port Sulphur
   * Major diversion into West Bay

   (b) Develop and implement a water management plan for the marshes between Calcasieu and Sabine Lakes.

   (c) Isolate Houma Navigation Canal via construction of a floodgate in the canal and stabilize canal banks.

   (d) Construct a water control structure at Black Bayou, Cameron Parish.

   (e) Rebuild and protect back-barrier marsh platform of barrier islands through dredged material placement, structural measures, or combinations as appropriate.

   (1) East Timbalier to Cat Island Pass
   (2) Cat Island Pass to Whiskey Pass
   (3) Whiskey Pass to Raccoon Point
   (4) Sandy Point to Belle Pass

(Table 4 concluded)

(f) Develop and implement a plan for freshwater and sediment diversions into wetlands in the vicinity of the Bonnet Carré Spillway.

2. Land Loss and Marsh Creation Study (Corps/State)*

Objective: Identify, evaluate, and implement measures to create marsh using diversion of sediment from the Mississippi River and dredged material.
Status: Draft report concerning Plaquemines, St. Bernard, and Jefferson Parishes submitted for review.

3. Project Operation/Maintenance/Rehabilitation/Monitoring

Objective: To provide for (1) operation, maintenance, and monitoring of, and (2) emergency repairs, for vegetated wetland projects that have been implemented under the authorized Plan.

4. National Estuary Program (EPA/State)*

Objective: To develop and implement plans to protect the integrity of nationally significant estuaries threatened by pollution, development, or over-use.
Status: Application for inclusion of Barataria and Terrebonne Basins submitted.

5. Watershed Program (SCS/State under PL-566)*

Objective: To plan and implement projects for the management of small watersheds for marsh conservation and enhancement purposes and to provide technical and planning assistance for implementation of marsh management programs to private landowners.
Status: Ongoing throughout the coastal area.

6. Vegetation and Sedimentation Program (CRD-DNR)

Objective: To plan and implement marsh restoration and conservation using vegetation planting, sediment trapping, and low-cost shore protection.

(a) Sediment Trapping and Outfall Management in the Mississippi River and Atchafalaya Deltas.

(b) Sediment trapping, vegetation planting, and other low-cost protection along shorelines of coastal bays and lakes.

7. Basin Level Hydrologic Evaluation Program (CRD-DNR)

Objective: To assure mutual compatibility of proposed projects with regard to hydrology of each coastal basin.

8. Office of Coastal Activities (Governor's Office)

Objective: To execute powers and duties as provided by Act 6.

* Federal and state cost-sharing

Table 5. Measures Recommended for State and Federal Action

A. For State Action

1. Develop legislation or rules and regulations to provide, at a minimum, for replacement of the loss of functional coastal wetland values which result from permitted activities in the coastal zone.

2. Revise State Coastal Use Guidelines through appropriated rulemaking procedures to provide, at a minimum, for replacement of the loss of functional coastal wetland values due to permitted coastal activities.

3. Institute state mineral board advertisement of environmental conditions prior to mineral lease sale on state water bottoms.

4. Investigate alternatives to Avoca Island Levee Extension, and if none are feasible, require full mitigation of environmental impacts resulting from the existing levee and proposed extensions.

5. Route non-point-source discharges and, where appropriate, point-source discharges through wetlands to offset saltwater intrusion, enhance vegetation growth, and improve water quality.

B. For Federal Action

1. Increase flows into the Atchafalaya River through the Old River Control Structure for marsh building in the Atchafalaya Delta, in a manner that will produce no additional flooding of Morgan City and other coastal communities.

2. Maintain at least 30% of total Atchafalaya River flow through Wax Lake Outlet during normal flows.

3. Implement a management plan for maximizing growth of the Atchafalaya Delta.

4. Operate Bonnet Carré Floodway for freshwater diversion.

5. Operate Freshwater Bayou Structure to remove excess water from marshes in eastern Vermilion Parish.

6. Operate Algiers Lock for freshwater diversion.

7. Operate Violet Floodgate for freshwater retention and water-level control.

8. Reduce Mean Water Levels in the Grand-White Lakes impoundment.

(Table 5 concluded)

9.	Assure continued operation of the Cameron Creole Watershed Project.
10.	Achieve full design capacity of the Teche-Vermilion Diversion Project.
11.	Stabilize and maintain banks of the Mississippi River Gulf Outlet, and place dredged material along the northern bank.
12.	Stabilize and maintain banks of Freshwater Bayou Channel.
13.	Stabilize banks of the Barataria Waterway at Dupré Cut and place dredged material along the eastern bank.
14.	Stabilize and maintain banks of the Gulf Intracoastal Waterway and reject plans for enlargement.
15.	Create marsh and nourish beaches with dredged materials from Corps-maintained channels.
16.	Route non-point-source discharges and, where appropriate, point-source discharges through wetlands to offset saltwater intrusion, enhance vegetation growth, and improve water quality.

APPENDIX A

PROJECT DESCRIPTIONS

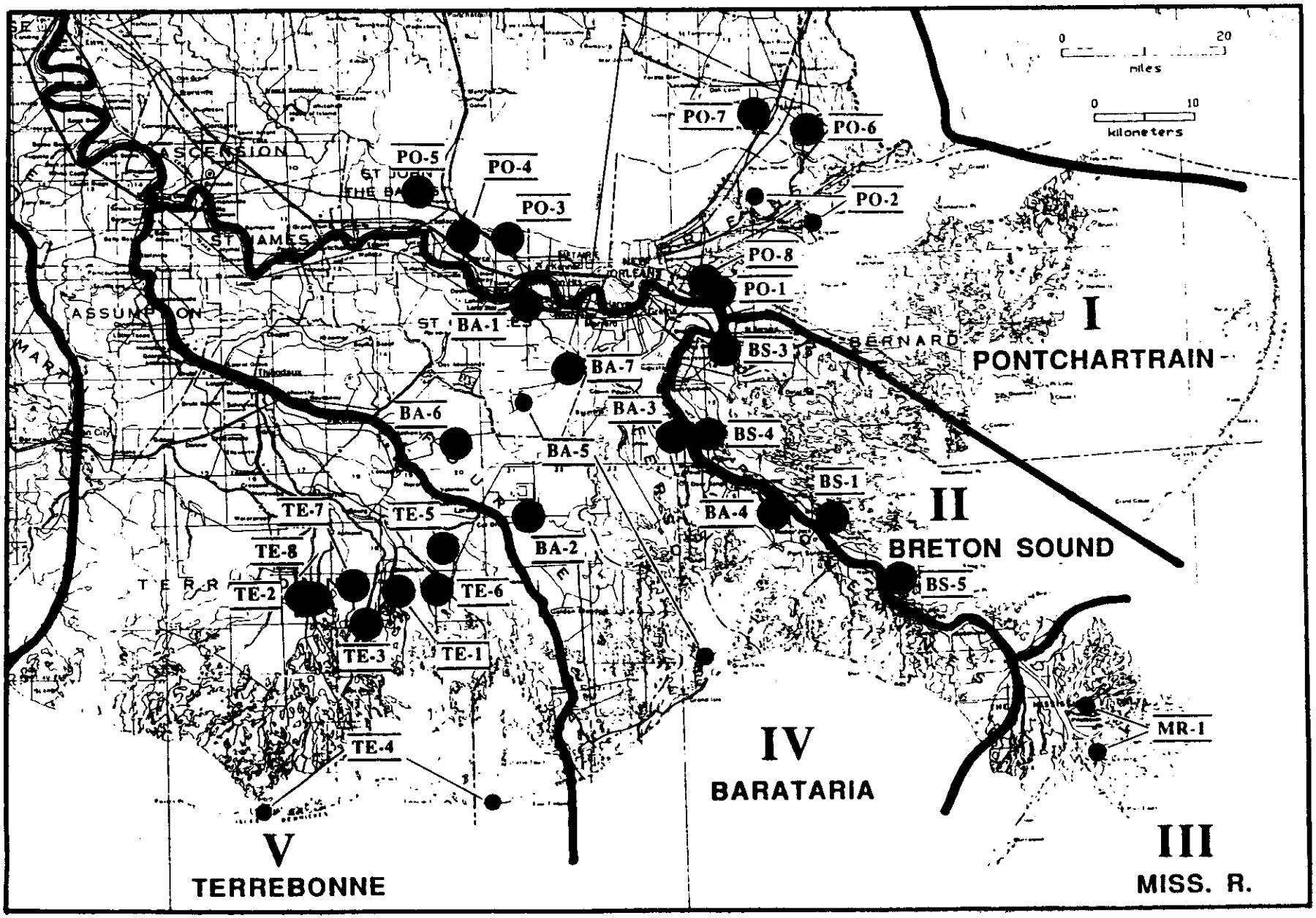


Figure 1. Location of proposed projects in eastern Louisiana.

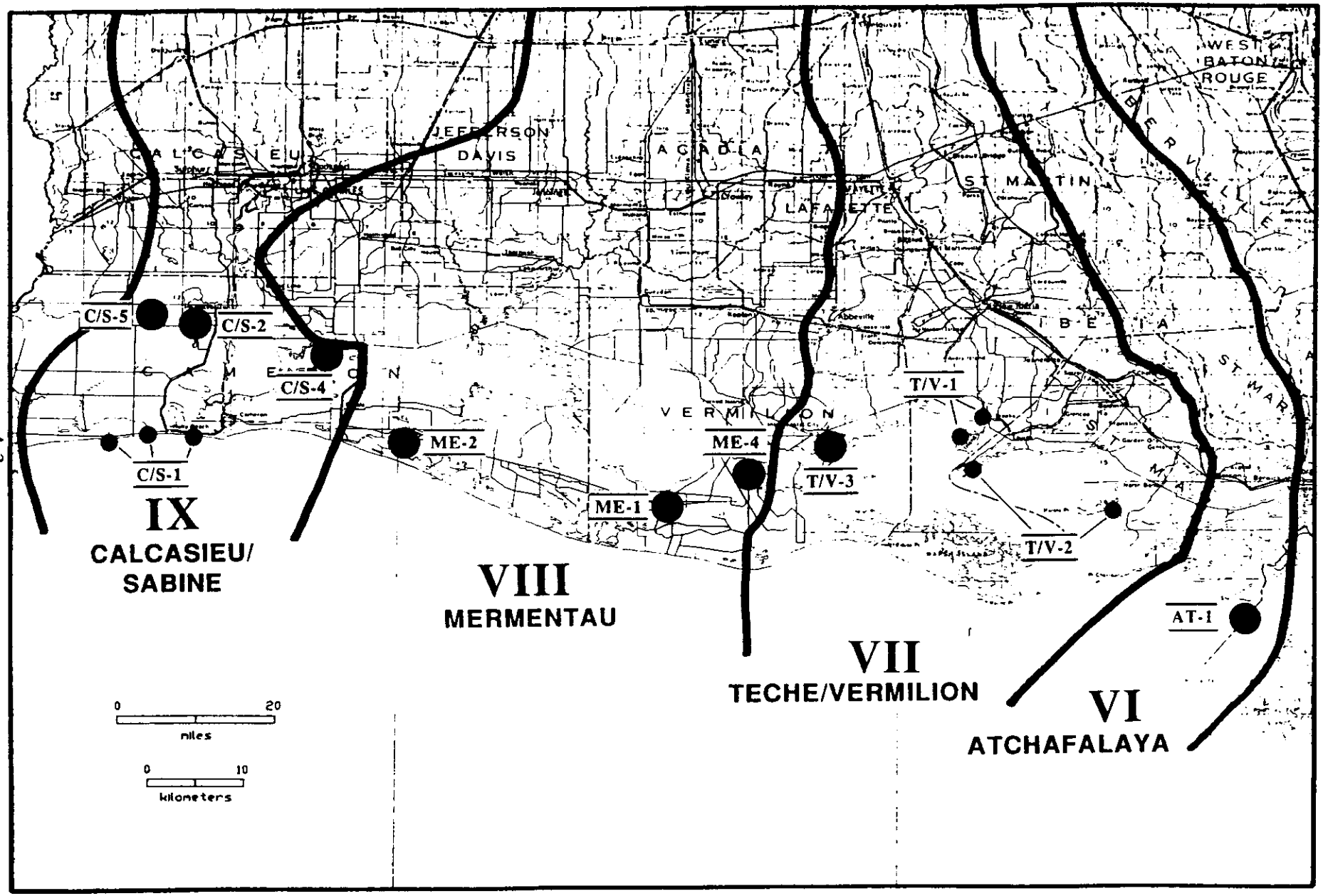


Figure 2. Location of proposed projects in western Louisiana.

PONTCHARTRAIN BASIN

PONTCHARTRAIN BASIN

PO-1. Violet Siphon Diversion

PO-2b/2c. Alligator Point / Bayou Chevee Wetland

PO-3a. La Branche Wetland

PO-3c. La Branche Shoreline

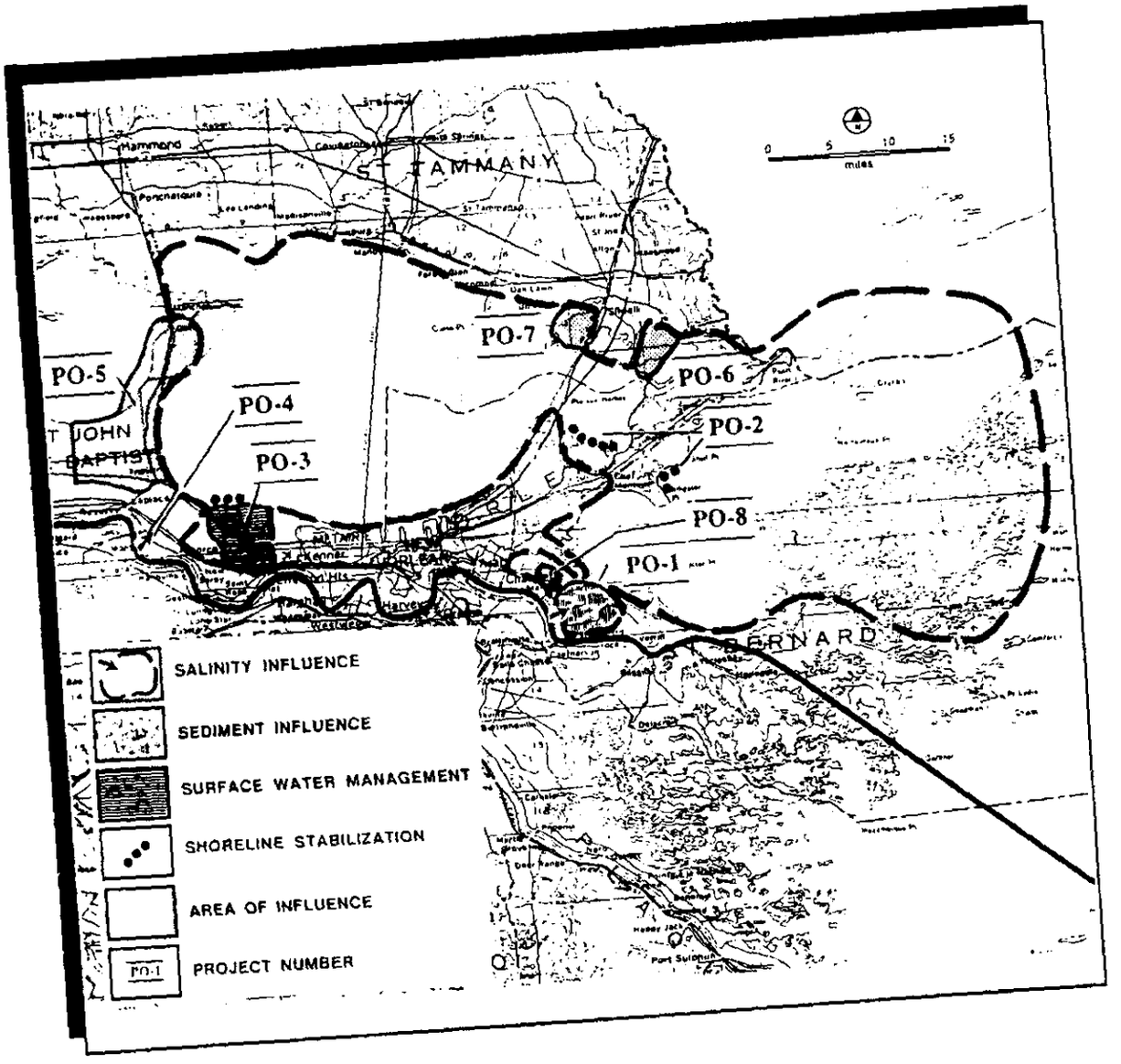
PO-4. Bonnet Carré Freshwater Diversion

PO-5a/5b. Southeast Lake Maurepas Wetland

PO-6/7. Fritchie Wetland / North Shore Wetland

PO-8. Central Wetlands Pump Outfall

Figure PO-0. Location and estimated area of benefit for projects proposed in the Pontchartrain Basin.


PO-5
PO-4
PO-3
PO-7
PO-6
PO-2
PO-8
PO-1
ST TAMMANY
ST JOHN
BAPTIST
BERNARD
0 5 10 15
miles
SALINITY INFLUENCE
SEDIMENT INFLUENCE
SURFACE WATER MANAGEMENT
SHORELINE STABILIZATION
AREA OF INFLUENCE
PO-1
PROJECT NUMBER

PO-1. VIOLET SIPHON DIVERSION

Location and Size

The Violet Siphon is situated at the head of the Violet (Lake Borgne) Canal /Bayou Dupré channel. The benefitted area includes 7,000 ac of marshland located between the spoil disposal area of the Mississippi River Gulf Outlet (MRGO) and the Back Protection Levee (Figures PO-0, PO-1).

Objectives

The primary objectives of the diversion are to offset marsh subsidence, ameliorate saltwater intrusion from the MRGO, and enhance habitat value through the introduction of freshwater and sediments. These objectives are to be achieved through the rehabilitation of an existing siphon system and enlargement thereof to the extent feasible. Outfall management would increase benefits by improving the distribution of fresh, sediment-laden siphon water from the Violet Canal into adjacent marshland.

The siphon proper is operable but operation has been seriously hampered by the deposition of siphon-introduced sediments in the outfall canal and a lack of funds for maintenance dredging. Priority is therefore given to making the system operational. The enlargement and outfall management are to be addressed as subsequent elements.

Project Features

The Violet Siphon was constructed in 1979 at a cost of about $2.5 million. The structure consists of two 50-in diameter steel pipes that run from the Mississippi River, over the levee, and into a silt containment box in the Violet Canal. River stages required for the siphon to operate are generally reached during the higher water months of February through July. The current maximum discharge is 500 cfs.

To achieve operation of the siphon, the siltation problem and its adverse impact on local canal usage must be resolved. Two general options for dealing with this problem are (1) modification and frequent maintenance dredging of the silt containment box, and (2) removal of the box and periodic dredging of the Violet Canal to maintain navigation depth.

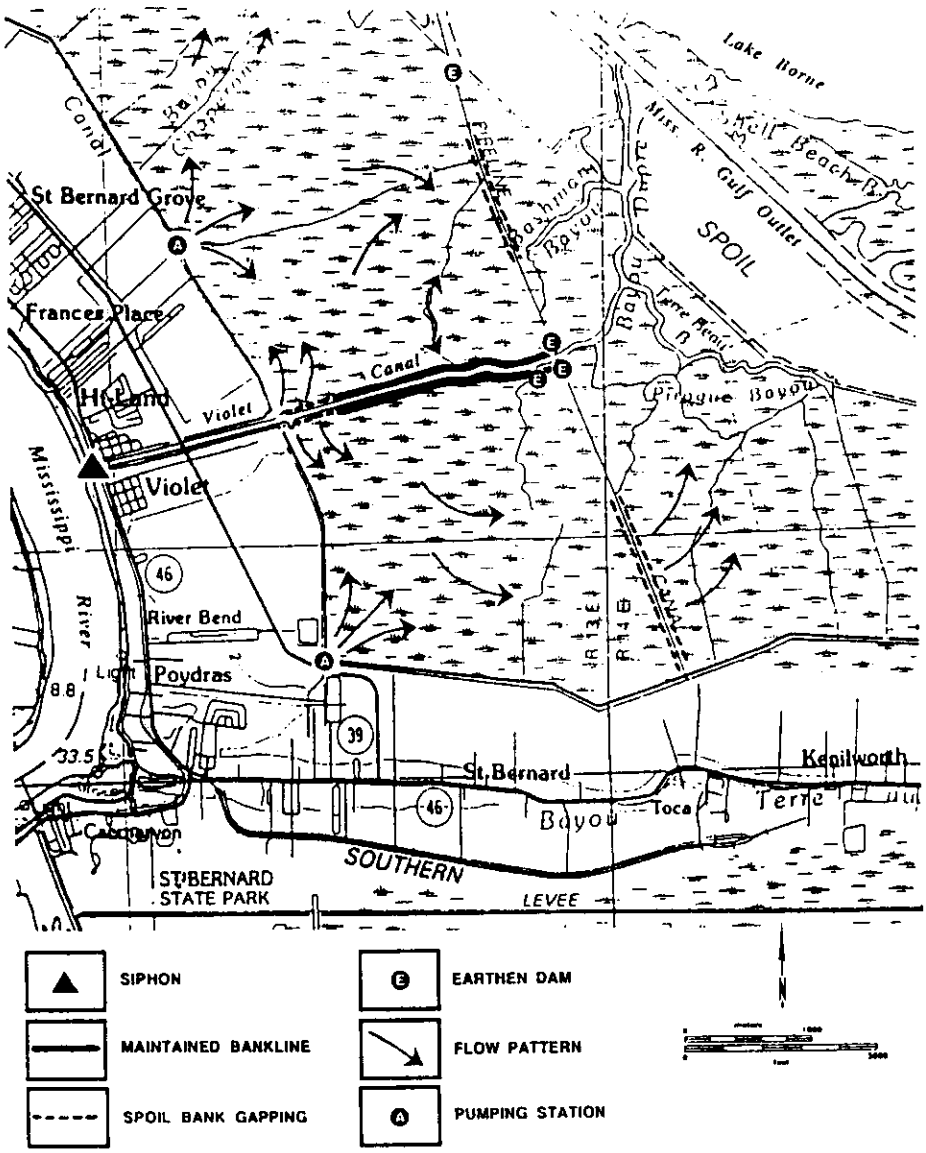
Enlargement of the siphon also requires further evaluation. A modest increase in discharge could be obtained by lowering the crest of the silt containment box, thus lowering the water level at the siphon discharge point. Alternatively, or in addition, the capacity of the diversion could be increased through additional pipes.

A prelimary plan for management and greater utilization of the siphon outfall has been developed (Figure PO-1). The direct loss of siphon water through the Violet Canal to the MRGO could be reduced by lowering existing spoil banks at the upper end of the Violet Canal. This procedure would provide for overflow from the Violet Canal into the marsh. Water would be routed through the marsh by limiting return flow into the lower part of the Violet Canal and by facilitating drainage northeastward across an existing pipeline canal. These actions could also improve the residence time of runoff from two pumping stations.

Status and Schedule

The siphon proper is presently operable. All other elements require feasibility analysis, planning, design, and construction or implementation.

Project Elements	90/91	91/92	92/93
Operation of existing structure	OMR	OMR	OMR
Enlargement of diversion capacity	FPD/CI	CI	
Outfall management	FPD	CI	OMR



PO-1. VIOLET SIPHON DIVERSION

Hydrologic Basin: Pontchartrain
Parish: St. Bernard
Acreage Benefitted: 7,000

Purpose and Need: To place the siphon back in operation; to enlarge the size of this diversion so that more sediment and freshwater are available to offset subsidence and saltwater intrusion; and to manage outfall for greater utilization of the sediment and water.

Project Description: The following is planned in the project: maintenance dredging in canal and maintenance, modification, or removal of the silt containment box; evaluation of feasibility of diversion enlargement; provision for the routing of outfall through the marsh by gapping spoil banks and by changing outflow locations of marsh drainage.

PO-2b/2c. ALLIGATOR POINT / BAYOU CHEVEE WETLAND

Location and Size

The project area includes shoreline segments in two areas of the eastern Orleans Parish wetlands. The Bayou Chevee project is located near the Chef Menteur north of U.S. 90 and the Alligator Point project is just east of the Chef Menteur bordering Lake Borgne (Figure PO-0). Approximately 1,200 ac will be protected by the project.

Objectives

The main objective of the project is to stabilize the eroding shoreline and protect the marsh in two areas that are important in maintaining the physical integrity of the barrier between Lake Borgne and Lake Pontchartrain. In the Alligator Point area, shoreline retreat has nearly intercepted Bayou Platte and is likely to result in a direct connection between Lake Borgne and Lake Pontchartrain through the Gulf Intracoastal Waterway (GIWW) and Lake St. Catherine. At Bayou Chevee, erosion is progressing into an exposed lens of peat in one area and into a shallow marsh pond in another.

Project Features

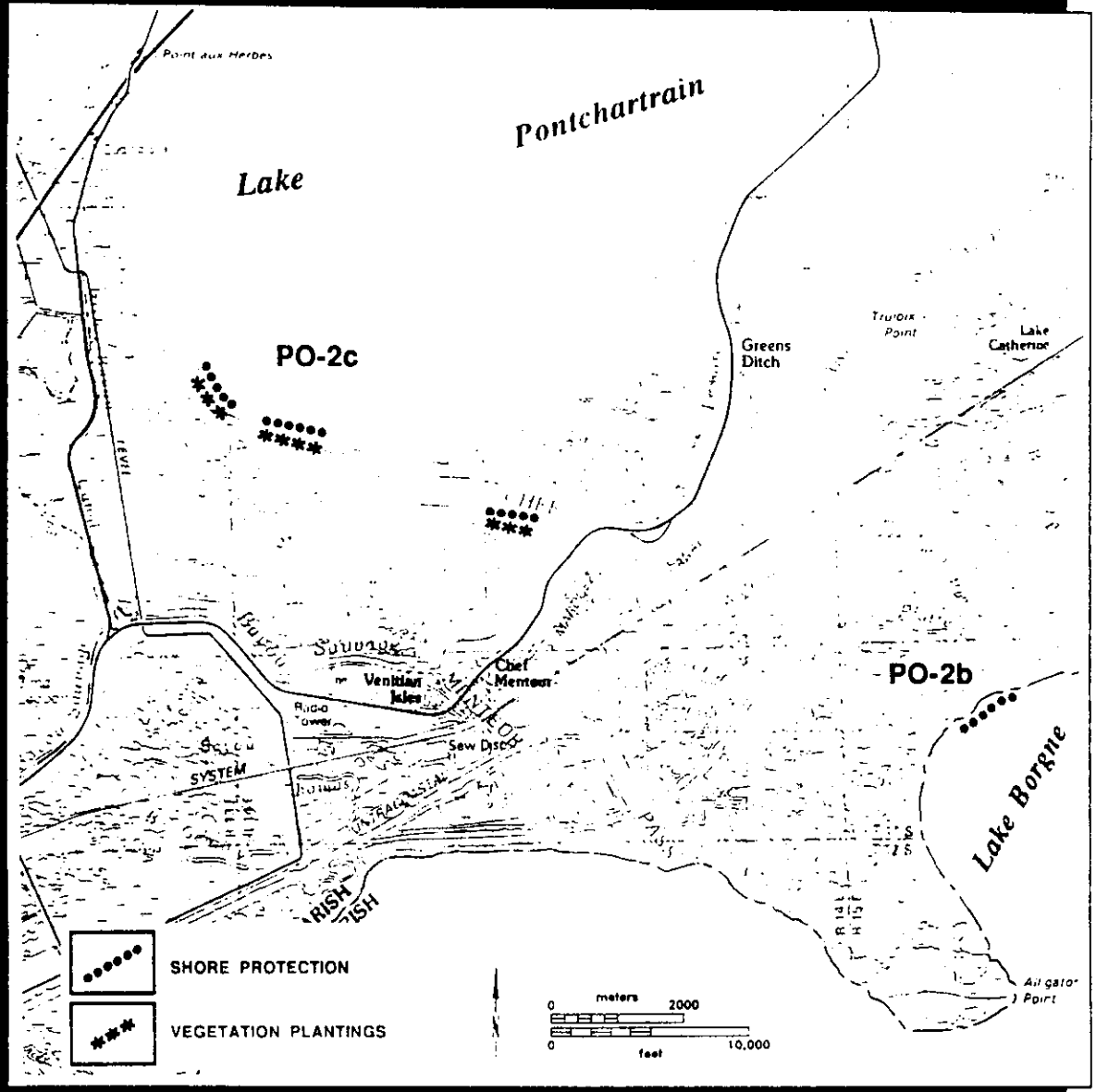
In the Alligator Point area (Figure PO-2b/2c), the project proposes to prevent breaching of Lake Borgne into Bayou Platte by providing some measure of shore protection. This procedure would most likely involve the addition of coarse material to the shoreline; there are natural sources of coarse material in the area. Sand occurs as a buried Pleistocene barrier and is deposited at various depths. No specific investigation has been made to identify the precise location and extent of these material sources. The feasibility of utilizing local materials or alternative "soft" methods of shore protection remains to be determined.

In the Bayou Chevee Unit, shore protection using sediment trapping and vegetation planting are proposed at three locations along Lake Pontchartrain and the Chef Menteur Pass where shoreline erosion is penetrating shallow ponds (Figure PO-2b/2c). The centrally located site at the mouth of Bayou Chevee is an area of exposed peat with a very high erosion rate, which has been made worse in recent years by animal "eat-outs." Wave-dampening and sediment-trapping devices are needed at this site.

Status and Schedule

Local government has undertaken plan development. The project requires further coordination with local interests, as well as with Federal agencies, should the Bayou Sauvage refuge be realized. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Alligator Point protection	FPD/CI	OMR	OMR
Bayou Chevee restoration	FPD	C/I	OMR



PO-2b/2c. ALLIGATOR POINT/BAYOU CHEVEE

Hydrologic Basin: Pontchartrain
Parish: Orleans
Acreage Benefitted: 1,200

Purpose and Need: To stabilize segments of rapidly eroding shoreline where necessary to protect the physical integrity of the wetland barrier between Lake Borgne and Lake Pontchartrain.

Project Description: The project focuses on the addition of coarse material to the shoreline along a critical segment of Lake Borgne. The feasibility of using local coarse material sources need to be determined. In less exposed areas of Lake Pontchartrain and Chef Menteur Pass, where breaching into pond systems is imminent, sediment trapping and vegetative planting will be utilized to retard erosion and restore marsh.

PO-3a. LA BRANCHE WETLAND

Location and Size

The La Branche Wetland consists of 16,200 ac of marshland located south of Lake Pontchartrain, between U.S. 90 and the Bonnet Carré Spillway, within St. Charles Parish (Figure PO-0).

Objectives

The primary objectives are to protect and enhance remaining marshes and their associated values for water quality, and fish and wildlife. Threats to the existing marsh include saltwater intrusion and erosion by waves and currents. Accordingly, it is proposed that marsh protection consist of moderating rates of water movement, conserving freshwater, and managing water levels. Marsh revegetation in the open water bodies between the lake and the railroad is being proposed to dampen wave energy.

Project Features

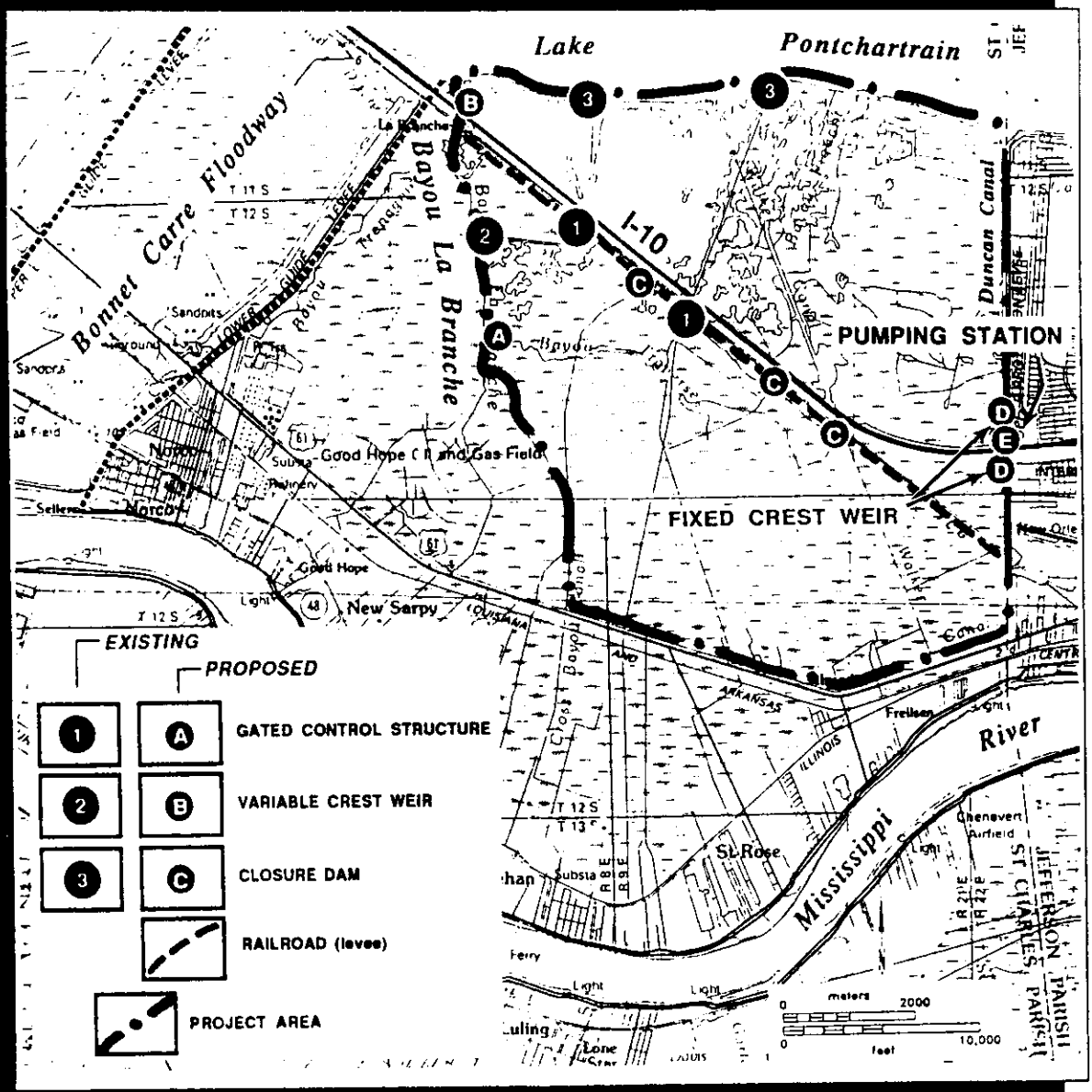
Management aspects include protection of the Lake Pontchartrain shoreline and structures controlling water exchange (Figure PO-3a). Primary water exchange between the lake and the wetland will take place through the structure at Bayou La Branche and I-10. A second structure, at Bayou Traverse, will provide for water inflow from Bayou La Branche during high discharge conditions resulting from pump outfall from developed areas to the south. Water exchange between the northern and southern parts of the area will be controlled through a number of closures and control structures along the railroad. On the east side, water exchange with the Duncan Canal will be controlled by fixed crest weirs to be constructed by DOTD when work on the I-410 interchange is completed. Ingress and egress of the estuarine fishery resource will be accommodated by opening control structures during critical times of the annual migratory cycle. Water exchange with Lake Pontchartrain during normal conditions will be limited to Bayou La Branche, a gated structure connecting Bayou La Branche with the wetlands to the west, and the weirs on the Duncan Canal. Existing structures include two closure dams, one variable crest weir, and two, gated control structures. Funds are needed for three additional closure dams, one gated control structure, and one large variable crest weir.

Additionally, the project proposes to evaluate the feasibility of routing drainage pump outfall from the developed area to the west through the wetlands. The pump discharges directly into the Duncan Canal and hence into Lake Pontchartrain.

Status and Schedule

The entire management project has been permitted at this time. Several structures, as well as protection of the lakeshore, have been completed. In addition, a number of structures will be funded as mitigation for the construction of I-310. Remaining for design and funding are the main structure at Bayou La Branche and I-10, rehabilitation of the structure at Bayou Traverse, and closure of three uncontrolled openings under the railroad embankment. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Completion of management plan	FPD/CI	OMR	OMR
Reroute pump outfall	FPD	FPD/CI	CI



PO-3a. LA BRANCHE WETLAND

Hydrologic Basin: Pontchartrain
Parish: St. Charles
Acreage Benefitted: 16,200

Purpose and Need: To complete an existing and largely implemented management plan for protecting and enhancing the remaining marshland. Threats to the existing marsh result from saltwater intrusion and erosion.

Project Description: Primary features that remain to be completed are the water control structure at I-10, closures along the railroad embankment, rehabilitation of a structure on Bayou Traverse, and fixed crest weirs on the west side of the Duncan Canal. Measures for delivering supplemental freshwater from a pump station will be evaluated.

PO-3b. LA BRANCHE SHORELINE

Location and Size

The project proposes the implementation of 9,700 ft of shoreline protection measures along the western half of the La Branche Wetland Management Area adjacent to Lake Pontchartrain (Figure PO-0). The benefitted area encompasses the 4,000-ac wetland complex between the railroad and Lake Pontchartrain.

Objectives

Continued viability of the La Branche wetland management is dependent on a hydrologic boundary between Lake Pontchartrain and the wetland complex being managed. The primary objective of the project is to protect the shoreline in this area and to prevent a breakthrough into the shallow pond areas immediately behind the shoreline. Such an opening would rapidly enlarge, as it would provide the only point of water exchange throughout the wetland complex.

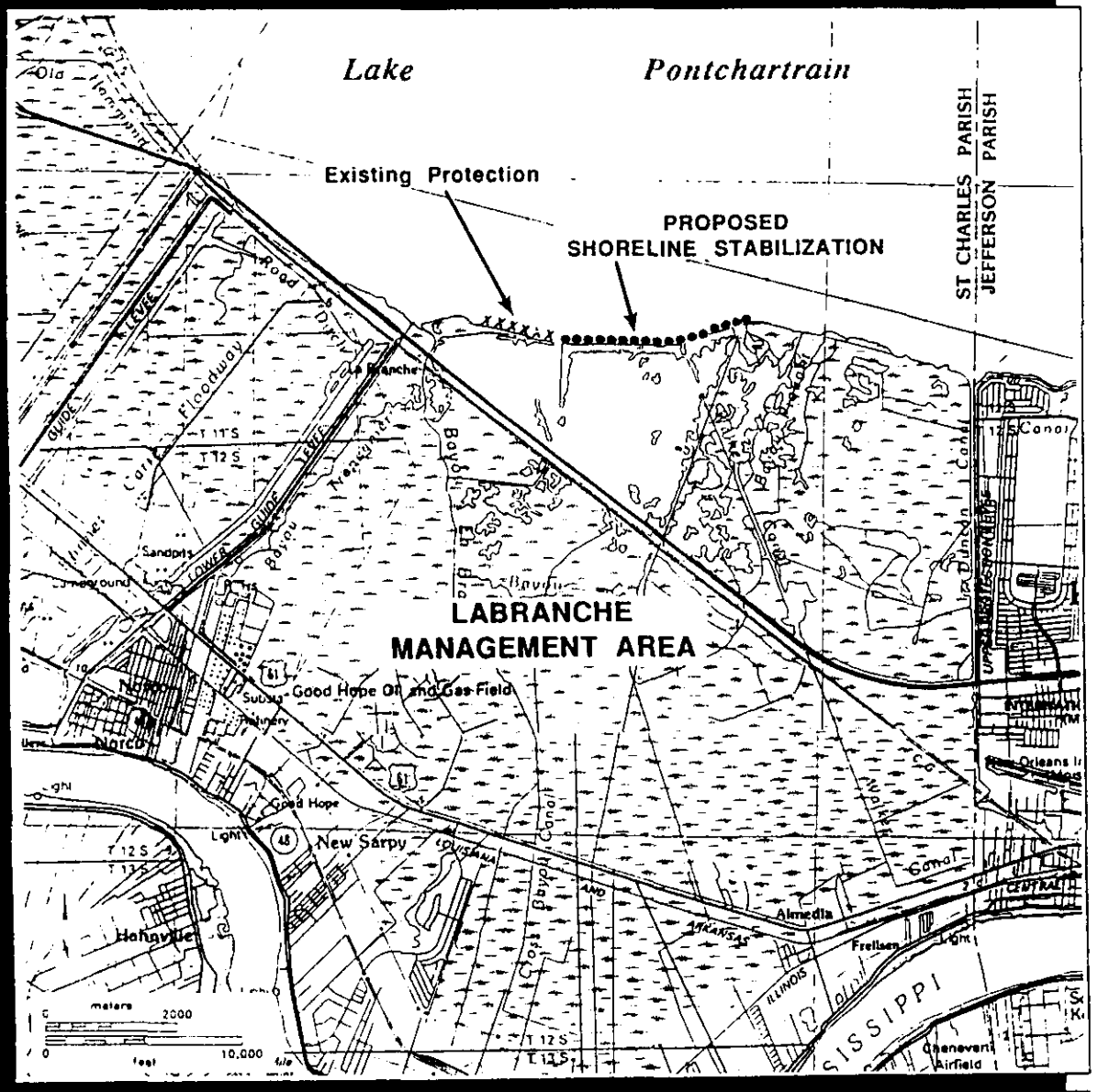
Project Features

The project is at a conceptual stage and no specific measures have been decided upon. Levels of wave energy during north winds accompanying frontal passage are likely to dictate either armoring of the shoreline or a repetitive beach construction and maintenance project. Alternatively, the riprap type protection used on the adjacent shoreline could be extended, consisting of rocks placed on geotextile fabric (Figure PO-3b).

Status and Schedule

At this time the project is in the conceptual stage. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Shoreline protection measures	FPD	CI	OMR



PO-3b. LA BRANCHE SHORELINE

Hydrologic Basin: Pontchartrain
Parish: St. Charles
Acreage Benefitted: 4,000

Purpose and Need: Continued viability of the La Branche Wetland Project in its present form is dependent on a hydrologic boundary between Lake Pontchartrain and the wetland complex being managed. Breaching of this shoreline as a result of erosion is likely to occur in the near future.

Project Description: A feasibility analysis will be undertaken. Wave energy will dictate what type of shoreline protection is required. No specific measures have been decided upon. Measures could range from broadening the remaining marsh band with dredged material to structural elements such as rocks used in the adjacent area.

PO-4. BONNET CARRÉ FRESHWATER DIVERSION

Location and Size

The Bonnet Carré Floodway, located on the east bank of the Mississippi River at Norco, Louisiana, is the proposed site of a major freshwater introduction into the Pontchartrain Basin. The project was developed under the New Orleans District, Army Corps of Engineers "Mississippi and Louisiana Estuarine Areas Study." Benefits of freshwater and nutrient introduction to the fisheries industry are expected to extend into Lake Pontchartrain and Lake Borgne, and into Mississippi Sound (Figure PO-0). The benefits to wetland preservation are, however, limited.

Objectives

The primary objective of the project has been to maintain a desired position of the 15-ppt isohaline to benefit fisheries resources, particularly oysters. The maintenance of wetlands through lowered salinities and increased nutrients has remained a secondary objective. More recently, the focus of coastal projects has changed to favor direct enhancement and maintenance of coastal wetlands as the primary objective of freshwater diversion, with fish and wildlife being indirect beneficiaries. Freshwater and sediment benefits to the wetlands will be limited because discharges are directed into Lake Pontchartrain. Salinity changes are not expected to alter vegetative species composition, and little increase in sedimentation rates are expected in the area's wetlands.

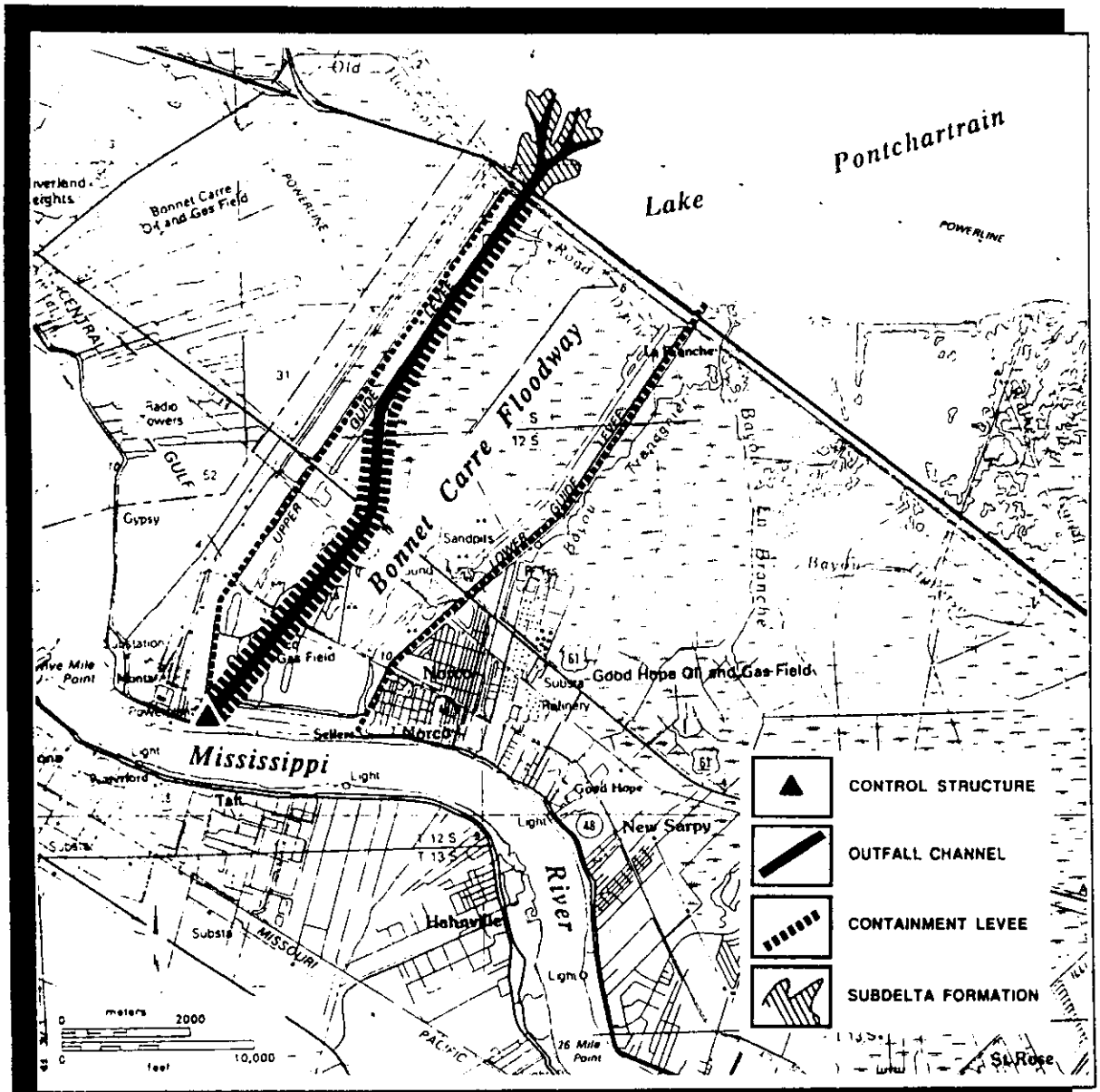
Project Features

The presently proposed plan is to divert Mississippi River water through a control structure into the Bonnet Carré Floodway, and subsequently route water to Lake Pontchartrain through construction of an outfall channel and containment dike along the northwest guide levee (Figure PO-4). Maximum capacity of the diversion structure will be 30,000 cfs. The beneficial effects of the proposed project on Louisiana coastal wetlands is limited to 10,500 ac.

Status and Schedule

A local cost-sharing agreement with the state is being requested by the Corps of Engineers to be completed in July 1990. The project is a Federal project that requires Louisiana cost-sharing for $15 million. Total construction cost is presently estimated to be $76 million. The state's present position is that cost-sharing will be limited to the degree that the project benefits the wetlands. This has been estimated to be 10% of the benefits. The Lake Pontchartrain Basin Foundation has recommended that the project be reevaluated with regard to the diversion location or routing, with the hope of increasing benefits to the basin's wetlands and improving quality of diverted water. The diversion project is awaiting funding to begin construction. If the project advances as currently designed, the schedule would be as follows:

Project Elements	90/91	91/92	92/93
Diversion of freshwater from the Mississippi River	FPD/CI	CI	CI



PO-4. BONNET CARRÉ FRESHWATER DIVERSION

Hydrologic Basin: Pontchartrain
Parish: St. Charles
Acreage Benefitted: 10,500

Purpose and Need: The reduction of salinities in Breton Sound and Mississippi Sound for oyster production.

Project Description: A structure would divert up to 30,000 cfs of Mississippi River water through the Bonnet Carré Spillway into Lake Pontchartrain. Suspended sediment, in combination with outfall management could result in the development of a small subdelta in the lake at the end of the outfall channel. Cost sharing from the Trust Fund is proposed to the extent that the diversion will benefit marshes.

PO-5a/5b. SOUTHEAST LAKE MAUREPAS WETLAND

Location and Size

Diminished ponding of water, reduced water levels, and introduction of Mississippi River water and sediment could benefit 5,000 ac of coastal wetlands in the area to the southeast of Lake Maurepas in St. John the Baptist Parish (Figure PO-0).

Objectives

It has been established that continuously high water levels prevail southeast of Lake Maurepas. The objective of the project is to provide for forest regeneration or a transition to marsh rather than open water, if feasible, by implementing hydrologic restoration measures that would reduce ponding of water and reintroduce mineral sediments and nutrients with Mississippi River water.

Project Features

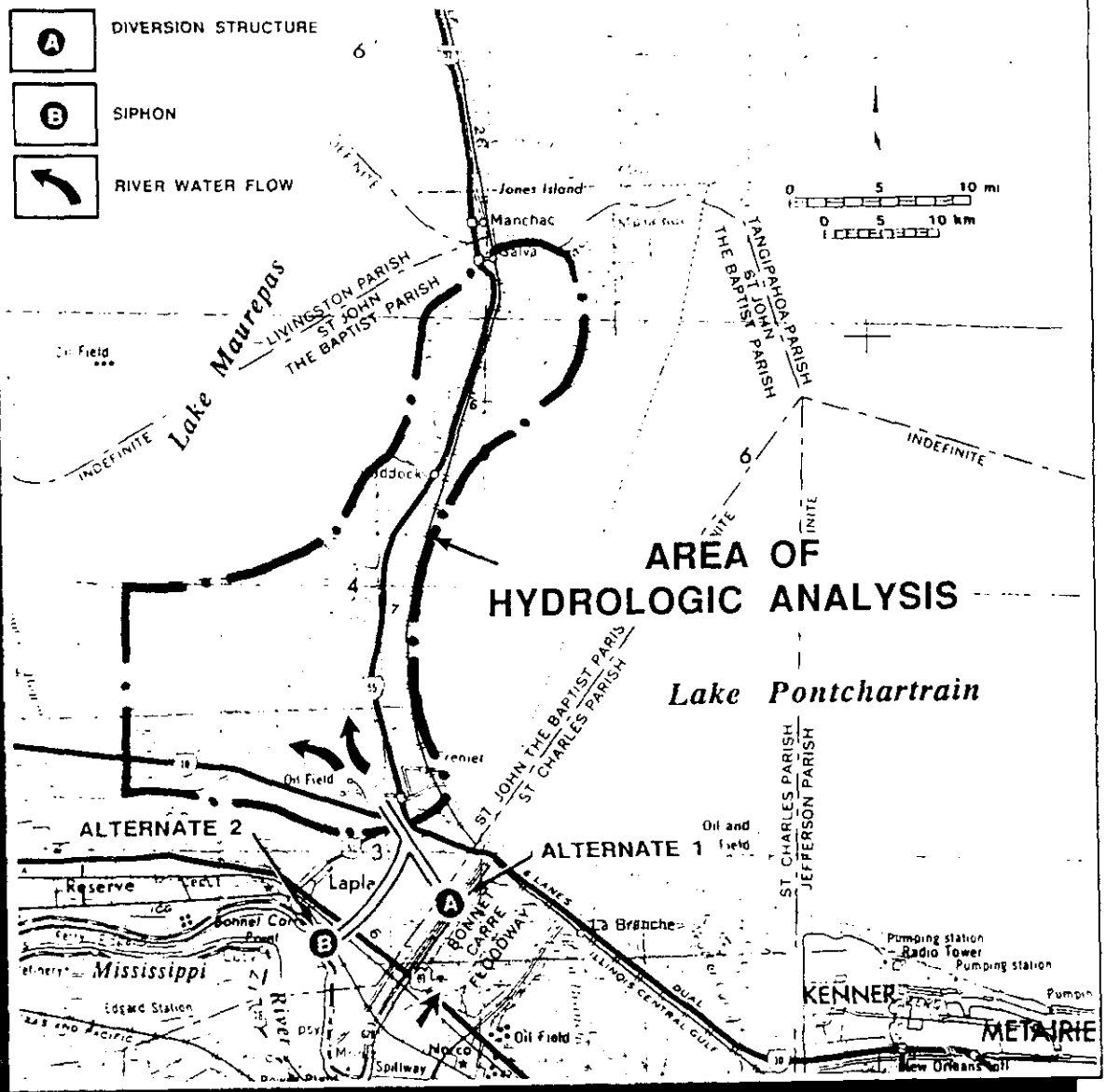
The feasibility of addressing the increasingly adverse wetland conditions in this area depend primarily on the extent to which ponding results from regional subsidence or from hydrologic modifications. The latter could involve impeded drainage resulting from transportation features, including the LA 51 embankment, spoil placement associated with the I-55 construction canal, or railroad embankments (Figure PO-5a/5b). It will be necessary to evaluate and determine the extent to which these, as well as other factors, contribute to the observed increase in the normal swamp water level. Where appropriate, recommendations for dealing with the problem should be developed.

Findings of this investigation will be useful in developing a long-term strategy to manage the wooded swamps of the Pontchartrain Basin because the observed ponding in the Maurepas sub-basin swamps is not limited to this particular project area. Solutions may require the diversion of water from the Mississippi River into the swamps to provide mineral sediments and counter subsidence. Under the proposed state project, the feasibility of a small diversion will be evaluated for two alternatives. A diversion from the Bonnet Carré Spillway (Figure PO-5a/5b) will be evaluated as Alternative 1. The feasibility of delivering sediments and nutrients to the swamp by using a siphon at the Mississippi River will be evaluated as Alternative 2.

Status and Schedule

No elements of this project have been undertaken. The anticipated schedule, pending the outcome of analysis results, is as follows:

Project Elements	90/91	91/92	92/93
Hydrologic investigation	FPD	FPD	FPD/CI



PO-5a/5b. SOUTHEAST LAKE MAUREPAS WETLAND

Hydrologic Basin: Pontchartrain
Parish: St. John the Baptist
Acreage Benefitted: 5,000

Purpose and Need: Provide for forest regeneration or a transition to marsh rather than open water, by implementing hydrologic restoration measures.

Project Description: Evaluate hydrological factors that are contributing to the decreasing productivity of the swamps south of Lake Maurepas and, if feasible, implement measures to ameliorate present, adverse hydrologic conditions. Determine the feasibility of water diversion from the Bonnet Carre Floodway or a siphon from the Mississippi River to input sediment and nutrients.

PO-6/7. FRITCHIE WETLAND/NORTH SHORE WETLAND

Location and Size

The North Shore and Fritchie marshes are located just southwest and southeast of Slidell, respectively (Figure PO-0). The North Shore marsh comprises approximately 3.100 ac, and the Fritchie Marsh, 5,900 ac in St.Tammany Parish.

Objectives

The primary objective of the project is to achieve remediation of the causes of wetland loss in this area and achieve restoration.

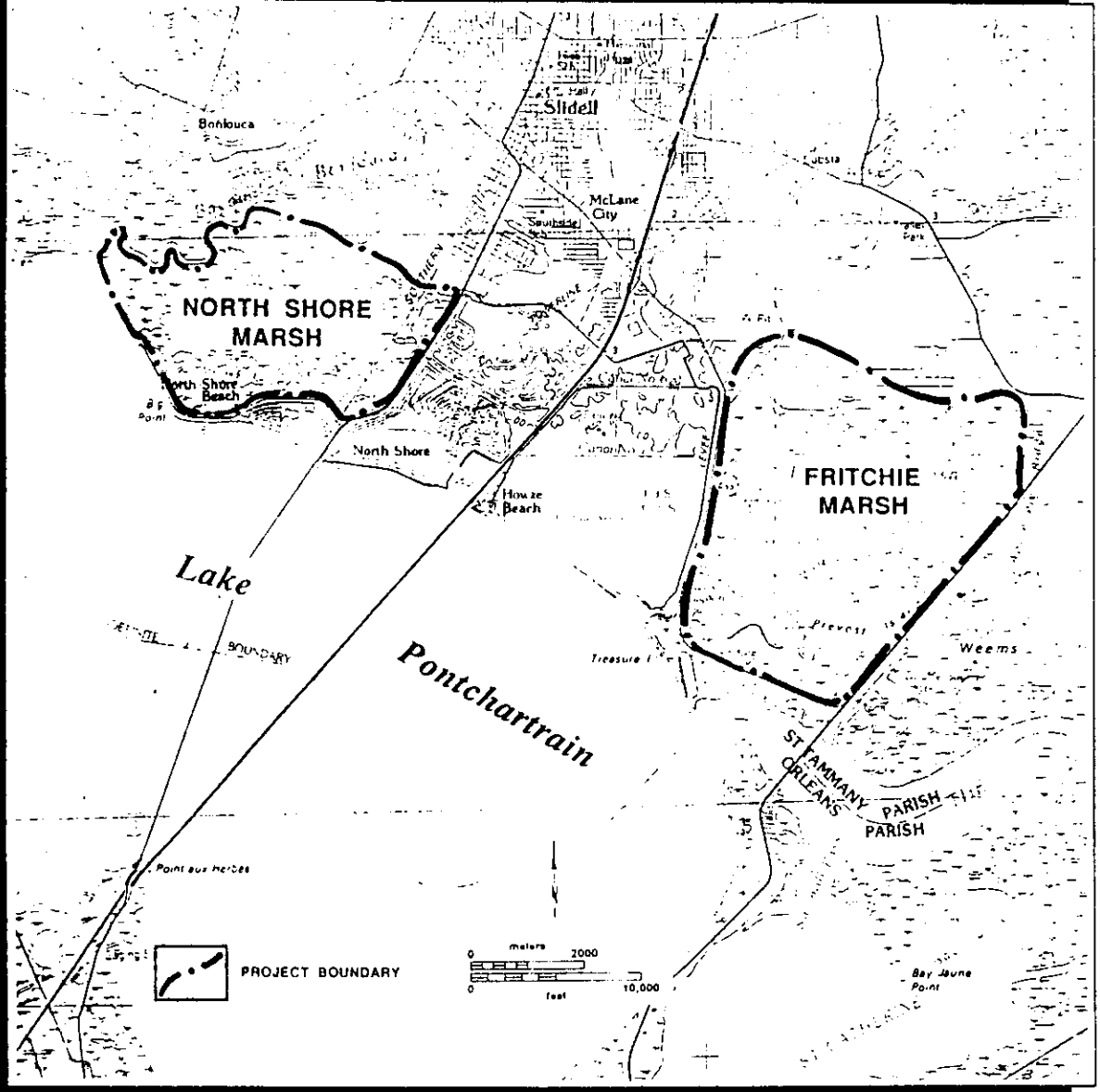
Project Features

Wetland loss in this setting is most often the result of salinity increases, subsidence, or impoundment--both natural and man-induced, and either singularly or in combination. The project proposes to determine the primary causes and the feasibility of remediation and restoration. Major elements of this project will be developed after characterization of wetland hydrology (Figure PO-6/7).

Status and Schedule

No elements of the project have been undertaken. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Feasibility analysis	FPD	FPD/CI	CI



PO-6/7. FRITCHIE WETLANDS/NORTH SHORE WETLANDS

Hydrologic Basin: Pontchartrain
Parish: St. Tammany
Acreage Benefitted: 9,000

Purpose and Need: Much of the interior wetlands of these two marsh areas has been lost to open water. The causes for this loss are not understood. Location of these marshes gives importance particularly to water-quality-related aspects of Lake Pontchartrain.

Project Description: The project will determine the feasibility of marsh restoration.

PO-8. CENTRAL WETLANDS

Location and Size

The general project area comprises 6,000 ac of brackish and saline marsh (Figure PO-0) between the MRGO spoil bank and the back protection levee near Violet, St. Bernard Parish. Outfall from a planned pumping station will lower the salinity of the area and reestablish 300 ac of intermediate marsh.

Objectives

The primary objective of the project is to conserve wetlands through the use of freshwater, nutrients, and sediments provided by the outfall of a drainage-pump station. The discharge of storm waters into the marsh benefits both the marshes and the water quality of the surrounding area.

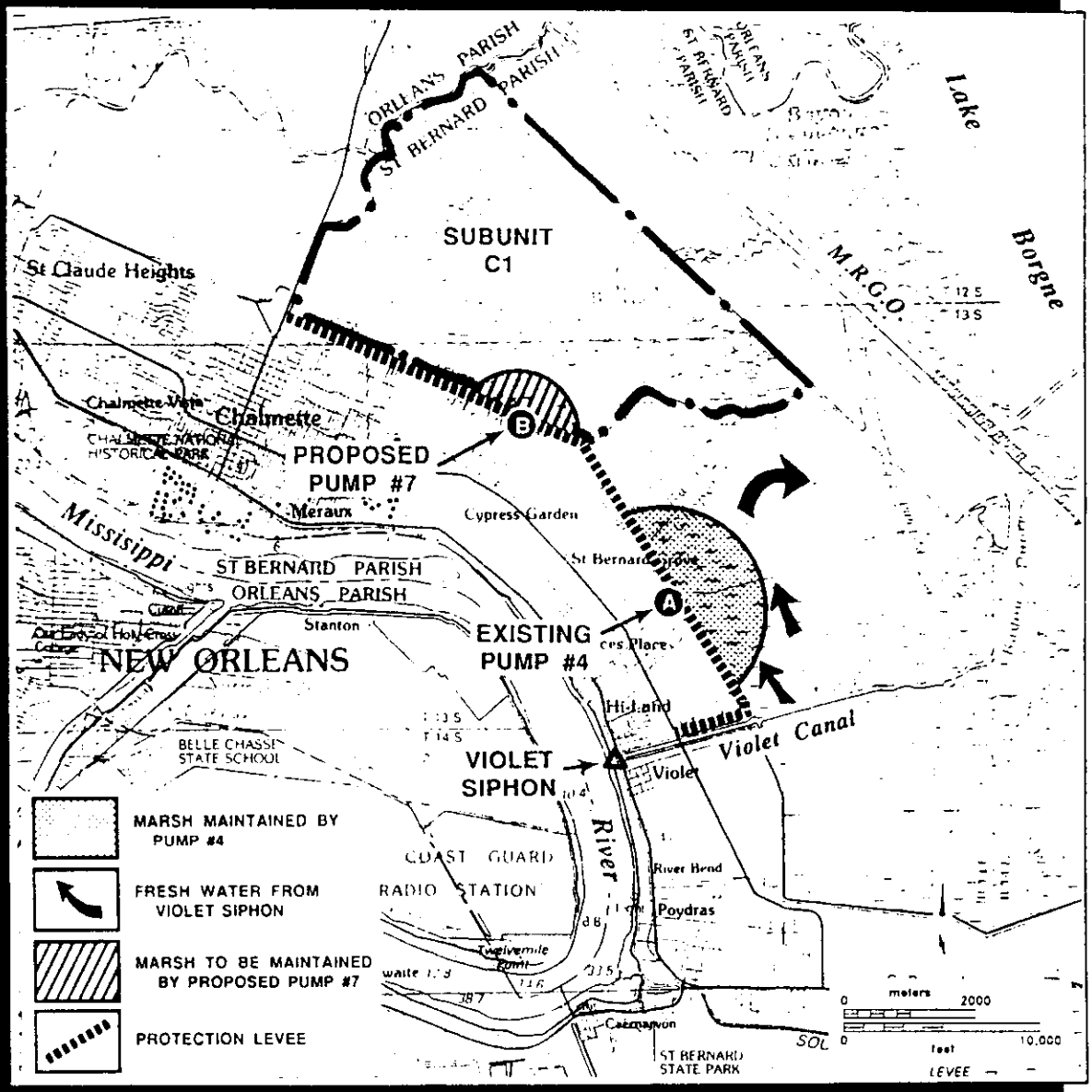
Project Features

The project proposes cost-sharing by the state in construction of a pumping station. A new pumping station #7 (Figure PO-8) will be constructed by local interests to supplement the older station #4. The 450,000-gallon-per-minute (GPM) outfall of station #4 has been responsible for maintaining 600 ac of intermediate marsh despite the drastic increases in salinity brought about by construction of the MRGO. This is because the discharge flowed directly into a semi-enclosed wetland area instead of a canal. The proposed station #7 will reduce the outfall of station #4. However, that loss would be more than offset by the inflow from a refurbished Violet Siphon (see PO-1). The proposed station #7 would help conserve and enhance 300 ac of intermediate marsh in Subunit C-1, which are likely to receive only limited benefits from the proposed siphon project because of distance to the siphon and hydrology of the area.

Status and Schedule

Pump construction has not yet commenced. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Cost-share in pump construction	CI		



PO-8. CENTRAL WETLANDS

Hydrologic Basin: Pontchartrain
Parish: St. Bernard
Acreage benefitted: 300

Purpose and Need: To conserve and enhance wetlands by using drainage-pump outfall in an area between Paris Road and the Violet Canal.

Project Description: The project proposes cost-sharing by the state in construction of pumping station #7. The proposed station #7 will provide freshwater, nurtrients and suspended sediment associated with storm-water runoff to an area of marsh that is unlikely to significantly benefit from the proposed siphon project (PO-1).

BRETON SOUND BASIN

BRETON SOUND BASIN

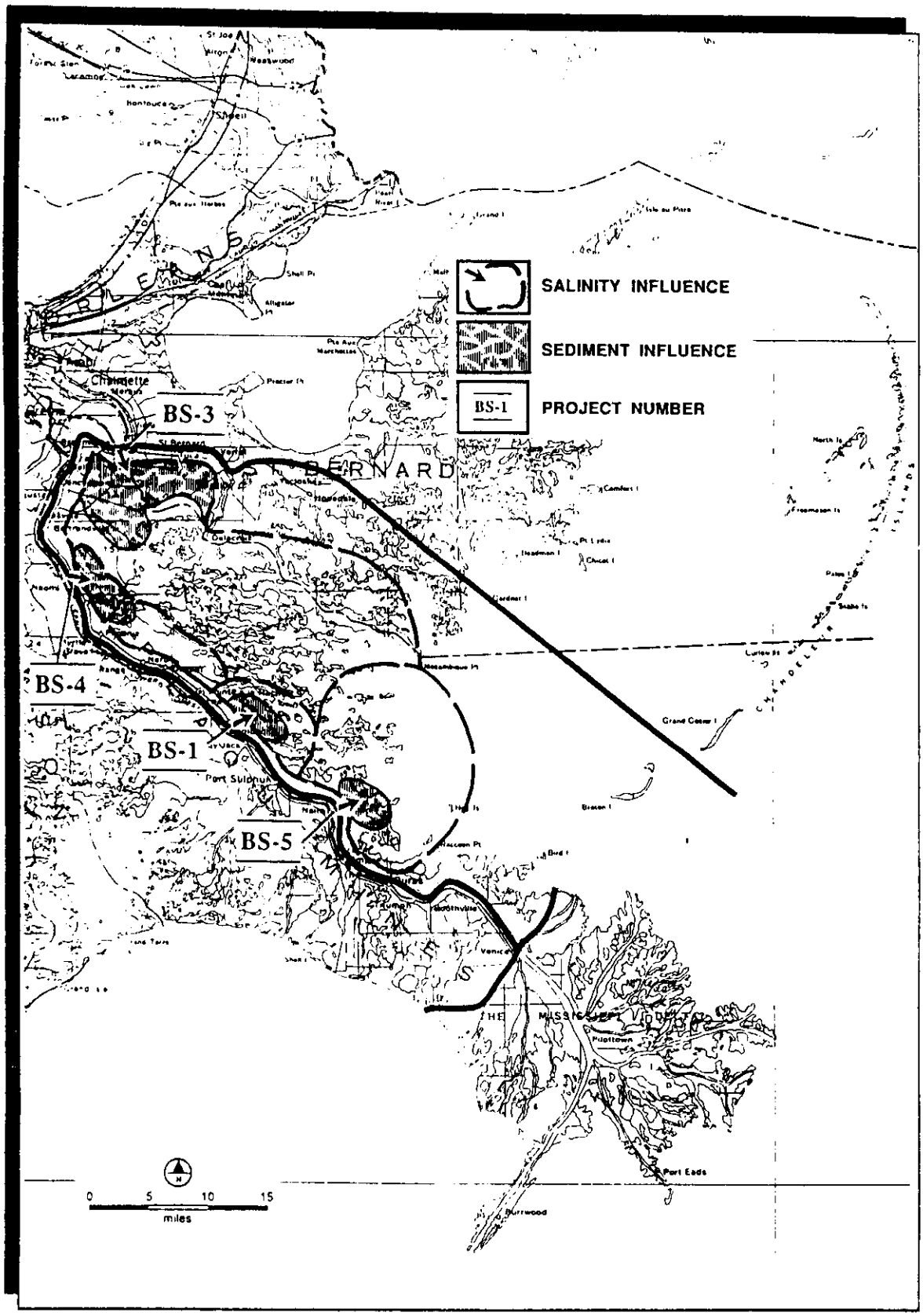
BS-1. Bohemia Diversion Structure

BS-3. Caernarvon Diversion Outfall

BS-4. White's Ditch Diversion Siphon

BS-5. Bayou LaMoque Diversion Outfall

Figure BS-0. Location and estimated area of benefit for projects proposed in the Breton Sound Basin.


SALINITY INFLUENCE
SEDIMENT INFLUENCE
BS-1
PROJECT NUMBER
BS-3
BS-4
BS-1
BS-5
BERNARD
0 5 10 15
miles

BS-1. BOHEMIA DIVERSION STRUCTURE

Location and Size

Bohemia freshwater diversion structure is located on the east bank of the Mississippi River approximately 3.5 mi south of Pointe a la Hache. The structure is presently inoperable because of sedimentation and lack of maintenance. With proper outfall management, renovation of this structure can benefit as many as 1,400 ac (Figure BS-0).

Objectives

The main objective is to enhance marsh by renovating the existing freshwater diversion structure and making it operational in a cost- and time-effective manner. The second objective is to design an outfall management plan that will provide maximum benefits to the marsh.

Project Features

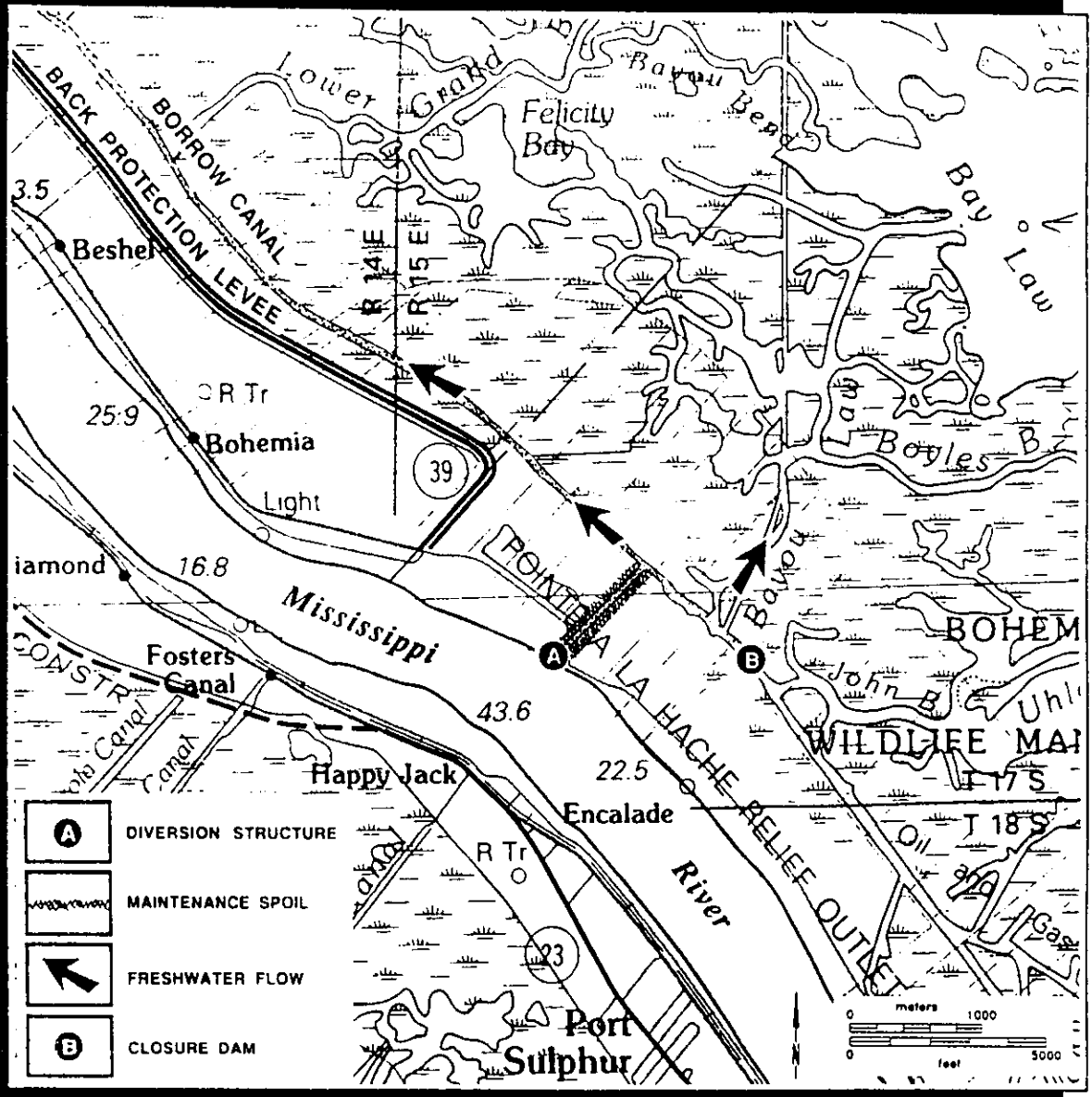
The existing diversion structure consists of four 60-in-diameter, gated culverts and inflow and outfall channels designed to deliver about 1,000 cfs during normal high river stages. The structure was connected to the leveed land to the northwest by an elevated roadway (Figure BS-1). At present, portions of the roadway near the structure have been undermined, and the inflow channel has silted in. According to a preliminary feasibility analysis, the structure foundation and gate works are in good condition. The inflow and outfall siltation and erosion problems can be solved with dredging and installation of rock and concrete revetments.

Effective outfall management and distribution of sediment-laden water through the marsh can be accomplished by closing the borrow canal just east of the outfall channel. Without this closure, outfall from the structure will be routed directly into open water, resulting in a loss of sediment for marsh maintenance and restoration, as well as reducing water quality in oyster-growing areas.

Status and Schedule

A preliminary feasibility analysis is the only element that has been undertaken at this time. The project requires coordination among DNR as the implementing agency, DWF, and the Department of Health and Human Resources (DHHR) concerning water quality and oyster production, and local government and oyster lease holders. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Control structure	OMR	OMR	OMR
Outfall management	FPD	CI	OMR



BS-1. BOHEMIA DIVERSION STRUCTURE

Hydrologic Basin: Breton Sound
Parish: Plaquemines
Acreage Benefitted: 1,400

Purpose and Need: To maintain and enhance wetlands by introducing freshwater and sediment from the Mississippi River through rehabilitation of the existing diversion structure and through outfall management.

Project Description: Place the existing diversion structure back in operation. The structure foundation and gate works are in good condition. The inflow and outflow siltation and erosion problems can be solved with dredging and installation of revetments. Effective outfall management and distribution of sediment can be accomplished by closing the borrow canal.

BS-3. CAERNARVON DIVERSION OUTFALL

Location and Size

The proposed state project provides for management of outfall from the Caernarvon diversion structure over an area of 25,400 ac in Plaquemines Parish, and possibly an additional 20,400 ac in St. Bernard Parish. The diversion structure, located near the community of Braithwaite, Plaquemines Parish (Figure BS-0), will be completed in 1990 and divert up to 8,000 cfs of Mississippi River water into the Breton Sound estuary.

Objectives

The primary objective of this project is to enhance marshland by increasing the utilization of freshwater, nutrients, and sediments that will be provided by the Caernarvon freshwater diversion. Management of the outfall would route the freshwater through the marshes rather than allow rapid loss through channels, and provide greater deposition of sediments in the marsh to offset subsidence, greater utilization of nutrients by vegetation, and a more gradual release of freshwater to the benefit of wildlife, fish, and shellfish.

Project Features

When operational in 1990, the Caernarvon diversion sructure will consist of five, gated box culverts connecting the river with an outfall canal (Figure BS-3a) that discharges into Big Mar (an 1,800-ac water body). A containment levee is to be constructed on the east side of Big Mar adjacent to the Caernarvon Canal to help maintain navigation in the Caernarvon Canal. The design capacity of the structure is 8,000 cfs. Under average conditions the design flow can be obtained from January through June.

The proposed state project focuses on management of the diverted water in Plaquemines (Figure BS-3a) and St. Bernard Parishes (Figure BS-3b). Outfall management in Plaquemines Parish would include lengthening the containment levee, constructing earthen dams, and removing elevated spoil banks to direct diversion discharge away from major channels and into the marsh and shallow pond areas to the south of Big Mar. Using the anticipated discharge scenario, the diversion structure will deliver at least 343,000 cu yds of sediment/year to the Big Mar and adjacent wetlands. The Big Mar would be totally infilled in approximately 14 years. At that time, with regular maintenance and channel training of the diversion distributaries, the sediment input of the structure is estimated to maintain over 25,400 ac of marsh.

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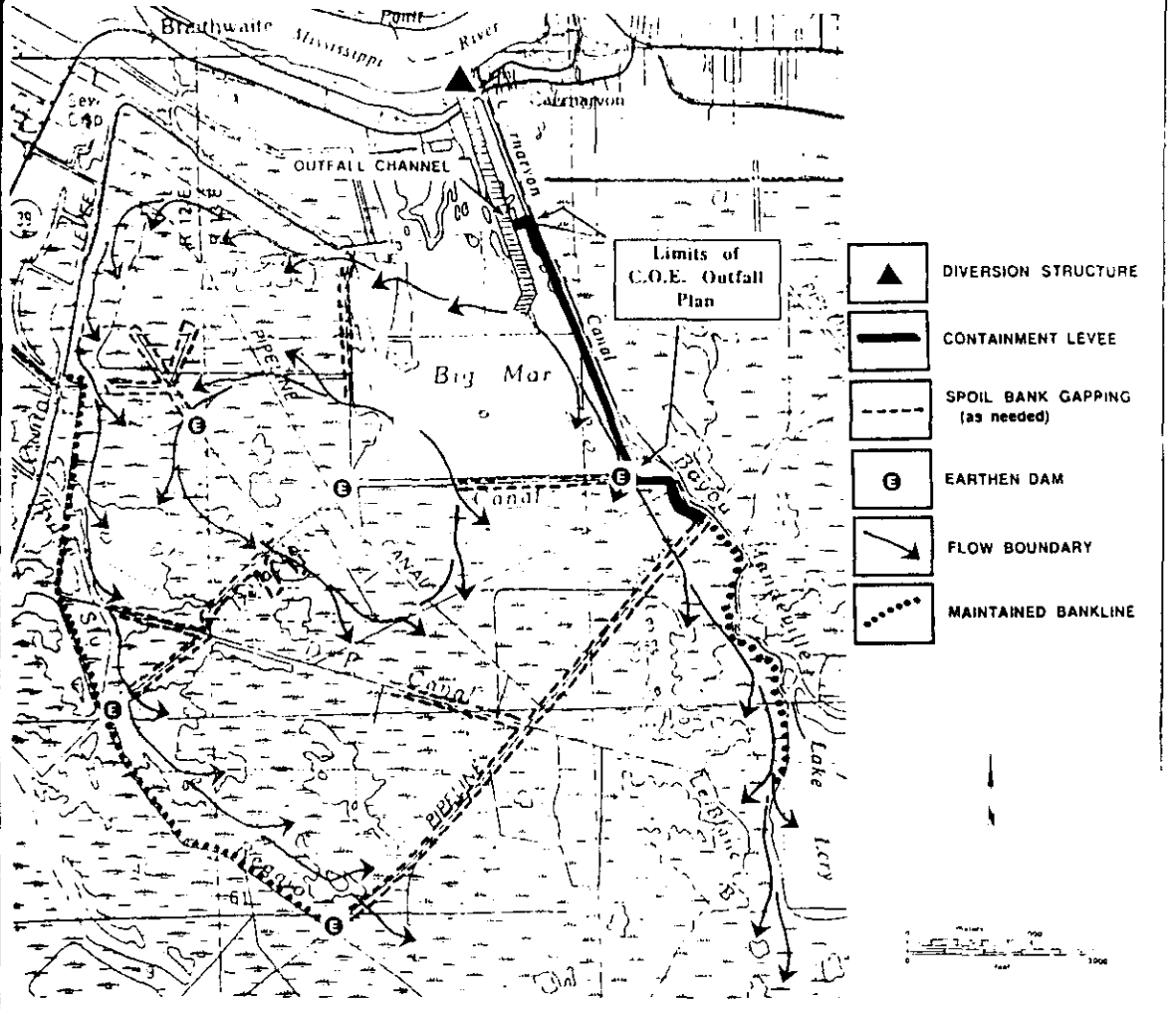


BS-3a. CAERNARVON DIVERSION OUTFALL

Hydrologic Basin: Breton Sound
Parish : Plaquemines
Acreage Benefitted: 25,400

Purpose and Need: The outfall management project is needed to achieve the highest possible retention of the sediment/nutrient resources in the wetland area. The project will direct the flow of water, nutrients, and sediment into the marshes in order to halt and reverse deterioration.

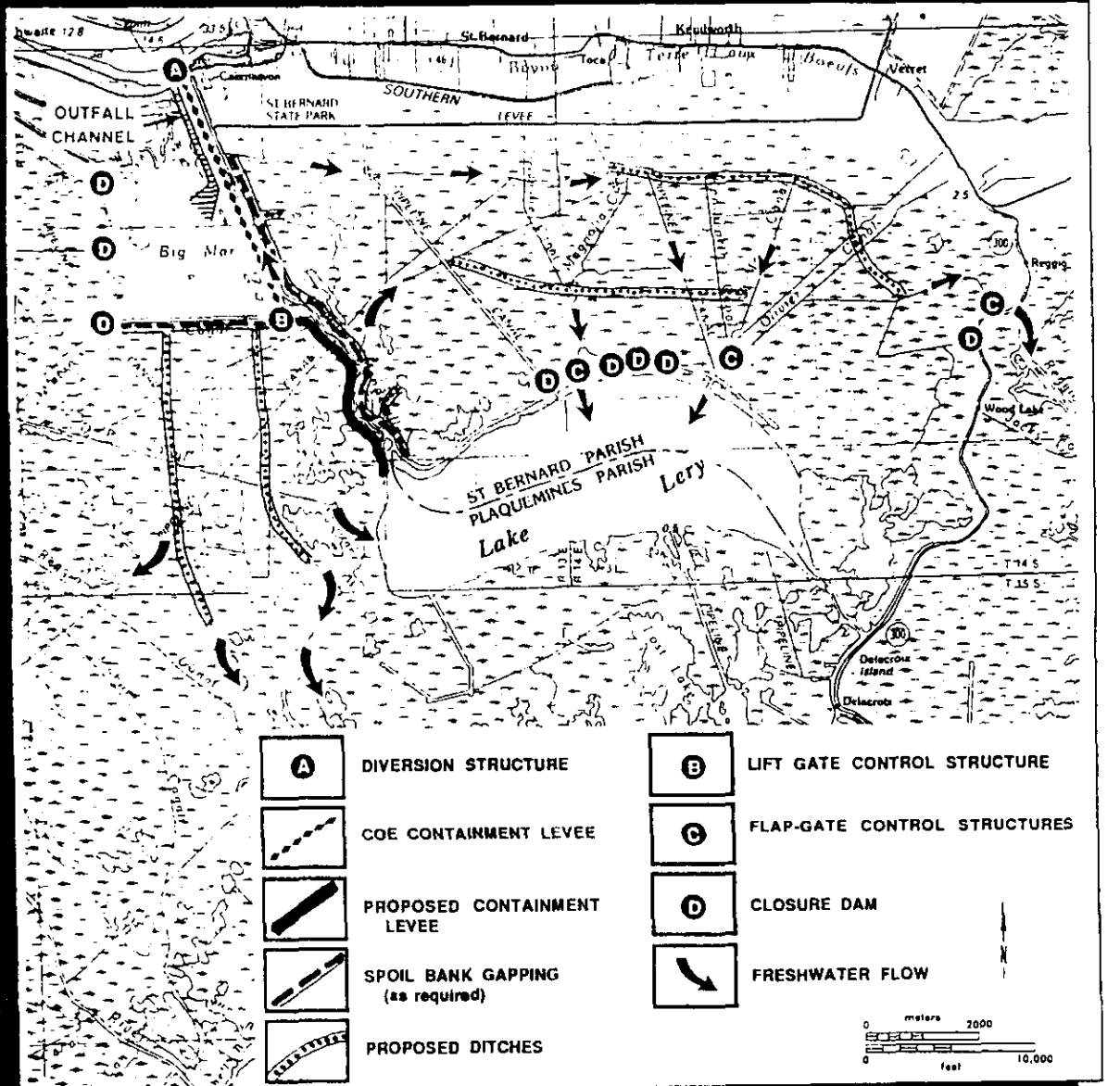
Project Description: This project includes lengthening the outfall containment levee, constructing earthen dams, and removing elevated spoil banks to direct diversion discharge away from major channels and into the marsh/shallow pond areas.

Depending on the extent to which Mississippi River water will flow through Lake Lery, the retention of sediments in the marshes north of Lake Lery in St. Bernard Parish could be enhanced by active water management. Such management is envisioned to reduce the rate of outflow from the marsh following the flooding of the marsh during high tide by sediment-laden waters from Lake Lery. The management in St. Bernard Parish would benefit 20,400 ac. A preliminary plan proposes the installation of gated water-control structures on major pipeline canals (Figure BS-3b).

Status and Schedule

The Caernarvon diversion structure will be completed in 1990 with most water discharging directly into Lake Lery. Preliminary outfall management plans have been developed for both areas but require detailed design. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Outfall management	FPD	CI	OMR



BS-3b. CAERNARVON DIVERSION OUTFALL

Hydrologic Basin: Breton Sound
Parish : St. Bernard
Acreage Benefitted: 24,000

Purpose and Need: The outfall management project is needed to achieve the highest possible retention of the sediment/nutrient resources in the wetland area. The project will enhance the movement of fresh, sediment-laden water into the marsh north of Lake Lery in order to halt and reverse the process of deterioration.

Project Description: This project includes enhancement of flow from the Caernarvon Canal into the marsh and the installation of water-control structures to increase residence time of sediment-laden water into the marsh following overflow during high tides. Certain spoil banks will be gapped and water movement through the marsh improved.

BS-4. WHITE'S DITCH DIVERSION SIPHON

Location and Size

The White's Ditch diversion siphon is located on the east side of the Mississippi River between the Belair and Bellevue Drainage Districts, where there is no back protection levee (Figures BS-0). The siphon discharges through the Belair Canal into River aux Chenes. Enlargement of the siphon and management of the outfall could maintain 6,500 ac of marsh within an area bounded by the Mississippi River levee and the River aux Chenes natural levee ridge.

Objectives

The objectives of this project are to increase the diversion of Mississippi River water into the River aux Chenes area and, through outfall management, improve the distribution of fresh, sediment-laden siphon water from the Belair Canal into adjacent marshes. Because of the River aux Chenes levee ridges, benefits to this area from the Caernarvon diversion will be limited and need to be supplemented. The diverted mineral sediments, nutrients, and dissolved minerals will aid in the maintenance of existing marsh and are a significant deterrent to land loss. It can be 20 times more expensive to create marsh in shallow water than to maintain existing marsh with freshwater diversion.

Project Features

The siphon was constructed by Plaquemines Parish in 1963 for the specific purpose of increasing the population of muskrats for commercial trapping. The two 50-in-diameter, 800-ft pipes were constructed at a cost of about $100,000. It is proposed that the present average outflow of 250 cfs be expanded with an additional 1,000 cfs by installing four new 6-ft-diameter siphons at the site. The Belair Canal cross-sectional area is sufficient to carry the additional flow, but increased maintenance dredging of the canal will be required along the upper 3,000 ft.

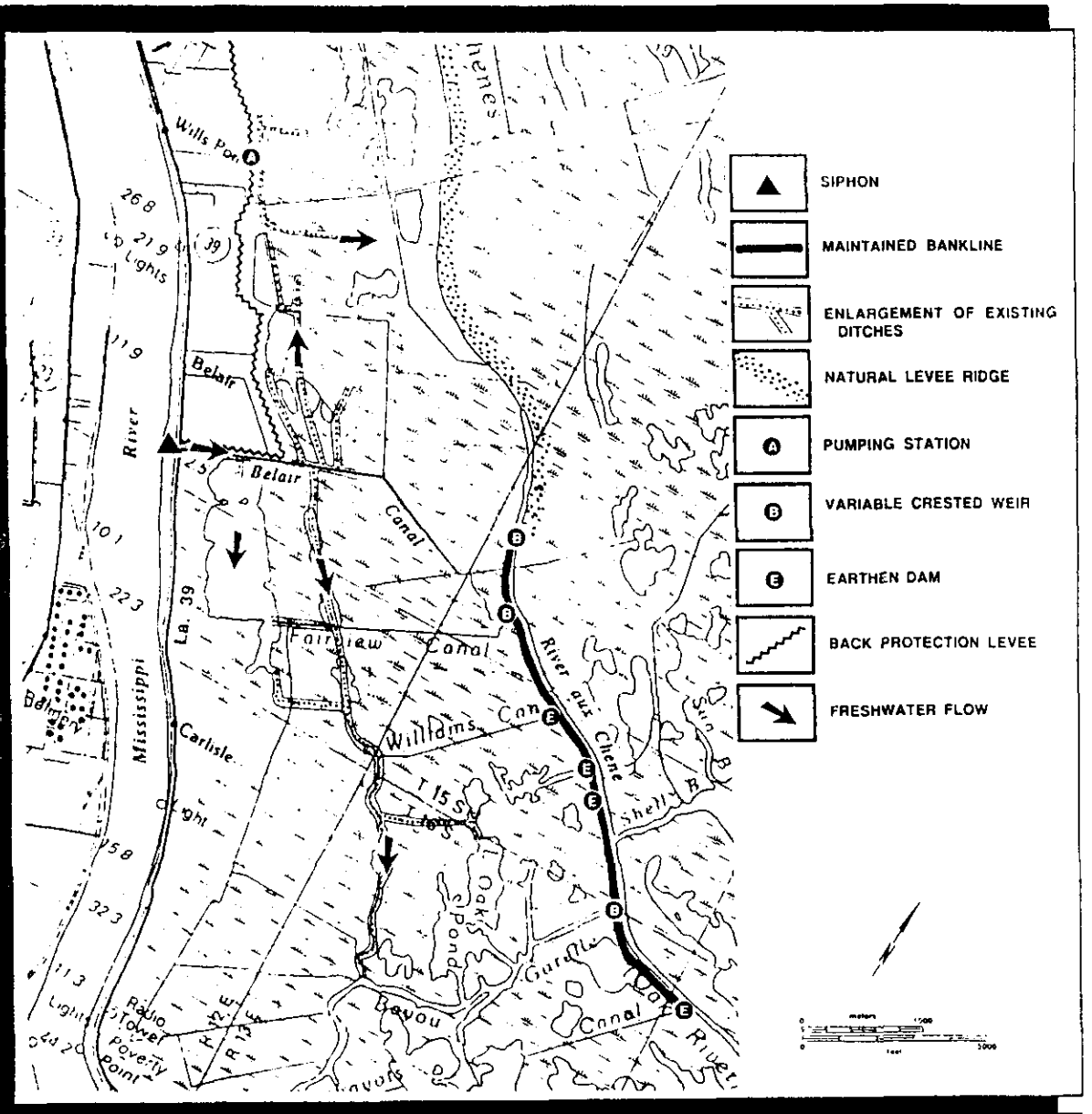
An outfall management plan shown in Figure BS-4 focuses on limiting direct losses of freshwater to River aux Chenes through a series of closures and variable crested weirs. Together with improvement of internal circulation, this will expand the area of benefit northward and force the outfall discharge through the marsh. A more gradual release of the freshwater, and the increased sedimentation and nutrient uptake will all help maintain the marsh as well as enhance the habitat for fish and wildlife. The average volume of fine sediments that will be available to the marsh is estimated at 88,000 cu yds per year.

The combination of siphon enlargement and outfall management would increase maintenance capability from 1,300 ac at present to 6,500 ac of marsh.

Status and Schedule

The present siphon is being operated annually to the greatest extent. The anticipated schedule for required project elements is as follows:

Project Elements	90/91	91/92	92/93
Enlargement of diversion capacity	FPD	CI	OMR
Outfall management	FPD/CI	CI	OMR



BS-4. WHITE'S DITCH DIVERSION SIPHON

Hydrologic Basin: Pontchartrain
Parish : Plaquemines
Acreage Benefitted: 6,500

Purpose and Need: The enlargement and outfall management project is designed to direct the flow of diverted Mississippi River water, nutrients, and sediment into deteriorating wetlands that are unlikely to benefit from the Caernarvon Diversion.

Project Description: The present outfall canal allows expansion of the siphon structure with four 6-ft-diameter pipes. Outfall will be managed with a system of water control structures that will provide for greatest use of diverted materials by routing water through the marshes. The average volume of fine sediments that will be available for marsh enhancement is 88,000 cu yds per year.

BS-5. BAYOU LAMOQUE DIVERSION

Location and Size

Two diversion structures are presently in operation at Bayou Lamoque on the east bank of the Mississippi River across from Empire, Louisiana. Outfall from these structures maintains favorable hydrological conditions for oysters throughout California Bay (Figure BS-0).

Objectives

The main objectives are to offset subsidence and build new marsh, to the extent feasible, by conserving sediment within the marshland. Marshes are presently being bypassed by the diverted water. Potential sediment-trapping for marsh creation at the diversion outlets will also be evaluated.

Project Features

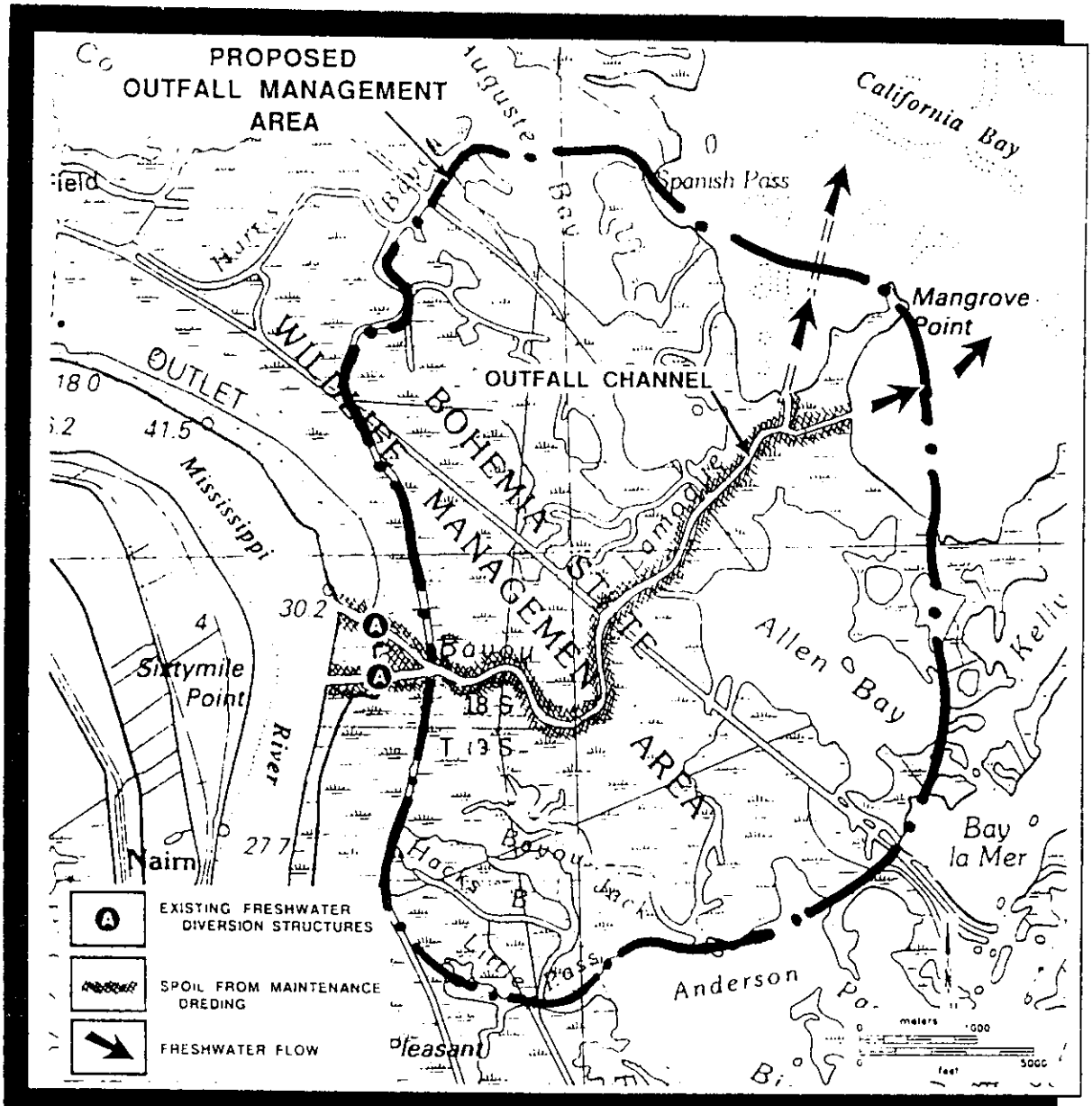
The existing diversion structures deliver a combined total of about 10,800 cfs at the normal annual peak flows of the Mississippi River. The older structure, built in the 1950s, consists of four 10 x 10 ft gates. The newer structure consists of four 12 x 12 ft gates. Outflows from these structures converge into Bayou Lamoque, which carries the water to California Bay (Figure BS-5). During operation, substantial amounts of fine sand and silt components of the suspended sediment load tend to be deposited in the bayou, causing a shoaling problem. Shoaling eventually causes a decrease in the water flow from the structures. In the past this has been remedied by dredging the bayou and placing the spoil in a continuous fashion along both banks.

The present project proposes to determine the feasibility of diverting water from Bayou Lamoque through adjacent marshes and trapping sediment where channelized diversion enters open water, benefitting close to 2,400 ac of wetlands.

Status and Schedule

No elements of the project have been undertaken. The project requires coordination among DNR as the implementing agency; DWF, which operates the diversion structures; local government; and oyster-lease holders. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Hydrologic investigation	FPD	CI	OMR



BS-5. BAYOU LAMOQUE DIVERSION

Hydrologic Basin: Breton Sound
Parish: Plaquemines
Acreage Benefitted: 2,400

Purpose and Need: To offset subsidence and build new marsh by conserving sediment within the marshland.

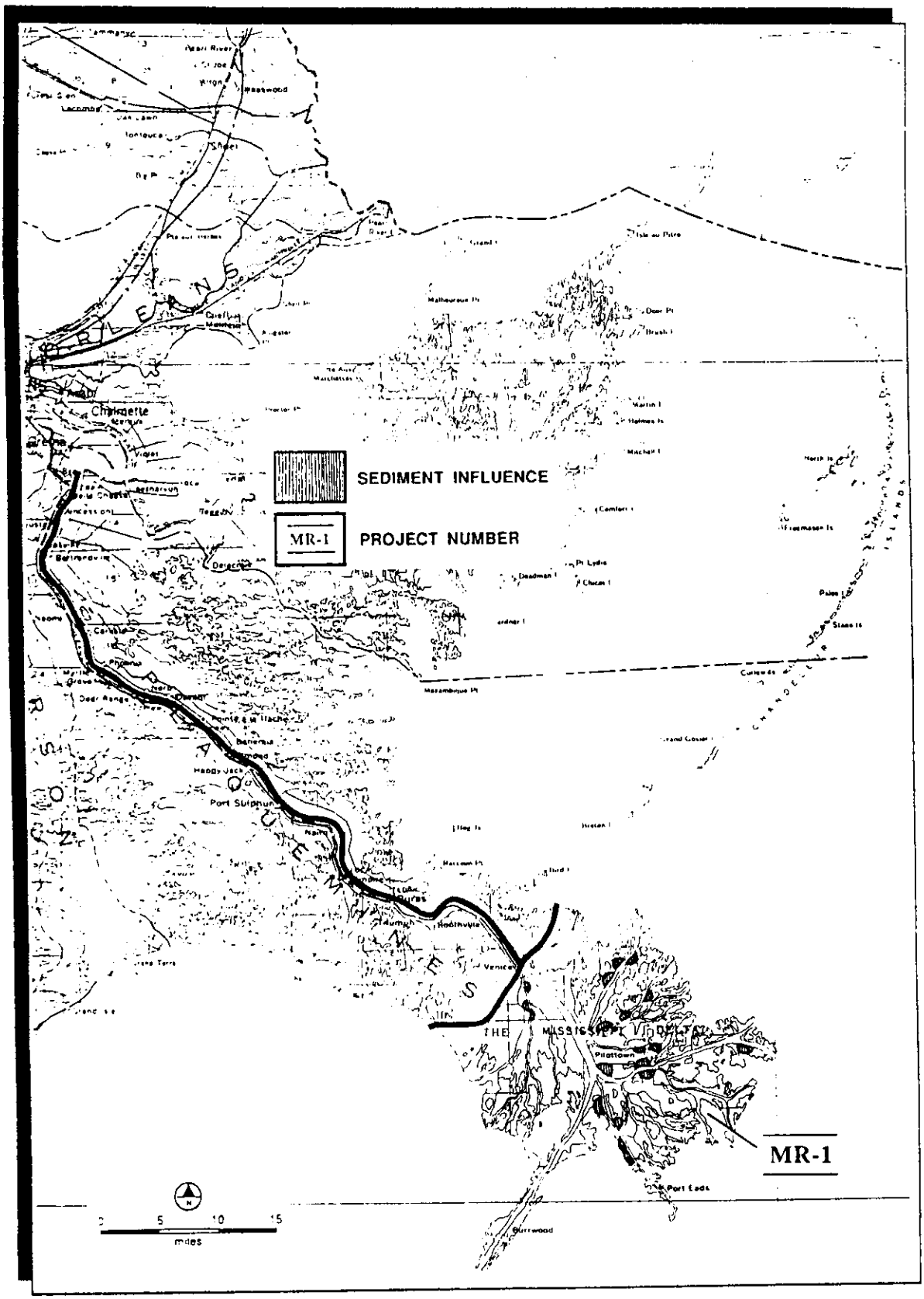
Project Description: The present diversion structure delivers sediment-laden water from the Mississippi River to the estuary. However, the suspended load remains largely unutilized for marsh benefits. This project will determine the feasibility of trapping sediment by diverting water through the adjacent marshes.

MISSISSIPPI RIVER DELTA

MISSISSIPPI RIVER DELTA

MR-1. Small Sediment Diversions

Figure MR-0. Location and estimated area of benefit for projects proposed in the Mississippi River Delta.


SEDIMENT INFLUENCE
MR-1
PROJECT NUMBER
MR-1
0 5 10 15
miles

MR-1. SMALL SEDIMENT DIVERSIONS

Location and Size

The project area is in the Mississippi River Delta below Venice in Plaquemines Parish (Figure MR-0). Massive land loss has occurred in the active delta because of a very high rate of subsidence. However, the resulting shallow waters are sites where small sediment diversions can produce fresh marsh. The proposed project will create approximately 5,600 ac.

Objectives

The primary objective of the project is to create and manage cuts (crevasses) through the natural levee ridges of major distributary channels so that more and coarser sediment is delivered to the shallow basins between the distributaries. This will allow crevasse splays to emerge and vegetation to establish itself.

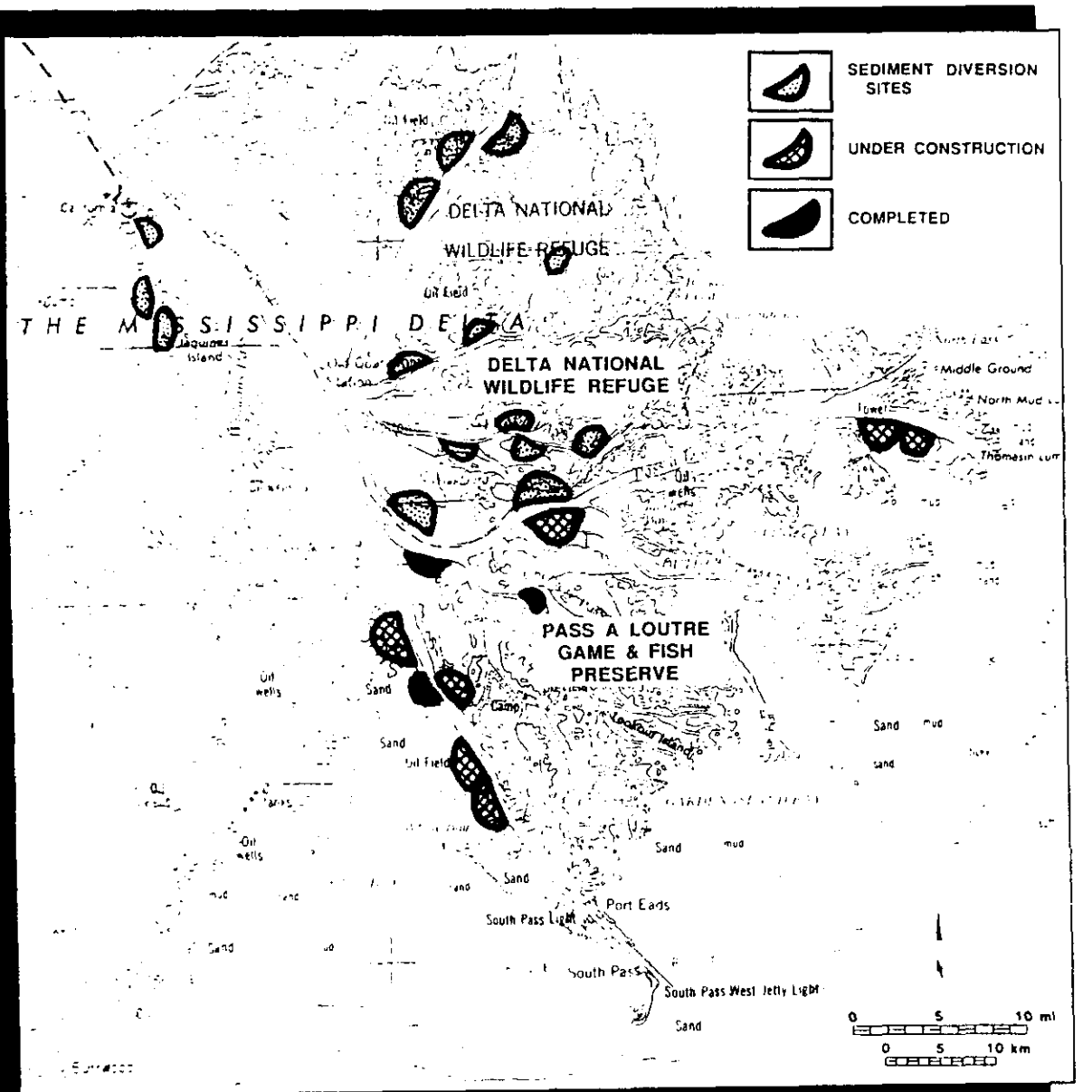
Project Features

Sites with high potential are chosen based on conditions of the distributary channel and depth, size, and hydrology of the adjacent shallow water receiving area. Twenty-one potential sites have been identified (Figure MR-1). A project is initiated by creating a channel of a certain size from the distributary into the receiving interdistributary basin. If the location is properly selected, the crevasse channel tends to maintain itself until the receiving area fills with sediment, marsh becomes established, and the channel extension results in a reduction of the gradient to where sediment transport is impeded.

Status and Schedule

Three artificial crevasses have been operational since 1986, and an additional six are being implemented cooperatively by DNR and DWF within the Pass a Loutre Game and Fish Preserve. Crevasses in the Delta National Wildlife Refuge will be coordinated with the U.S. Fish and Wildlife Service. All permitted sites would be implemented in short order while additional sites would be identified in coordination with the Corps of Engineers.

Project Elements	90/91	91/92	92/93
Implementation of sediment diversion sites	CI/FPD	FPD/CI	CI



MR-1. SMALL SEDIMENT DIVERSION

Hydrologic Basin: Mississippi River
Parish: Plaquemines
Acreage Benefitted: 5,600

Purpose and Need: Land loss has occurred in the active delta because of a high rate of subsidence. Small diversions will distribute coarse sediment to shallow basins allowing crevasse splays to emerge and vegetation to establish itself.

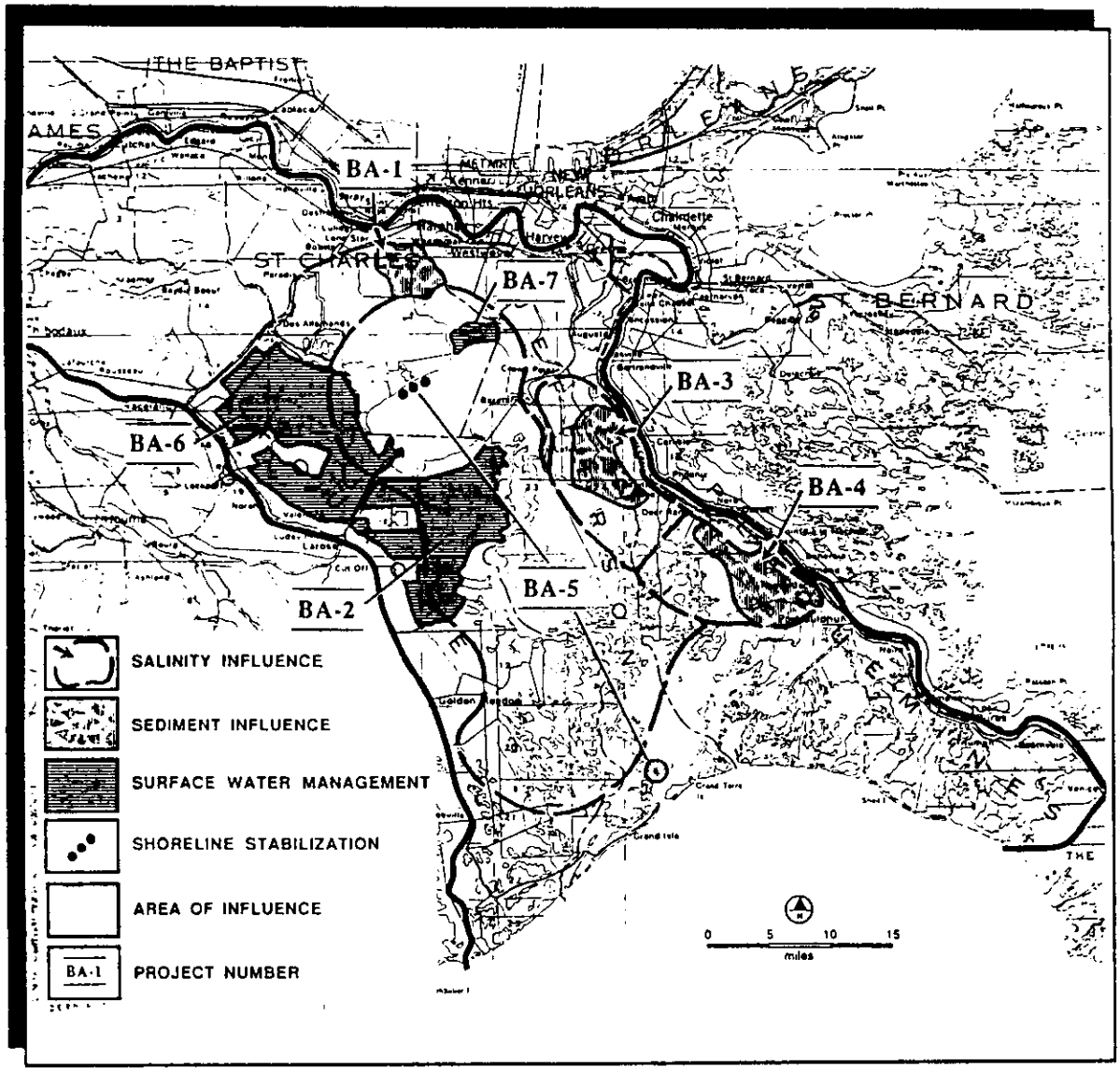
Project Description: Twenty-one potential sites for marsh restoration have been selected based on water depth, size, and hydrology of the area. A project is initiated by creating a channel from a distributary into an interdistributary basin.

BARATARIA BASIN

BARATARIA BASIN

BA-1. Davis Pond Freshwater Diversion
BA-2. GIWW to Clovelly Wetland
BA-3. Naomi (LaReussite) Diversion Siphon
BA-4. West Point a la Hache Diversion Siphon
BA-5. Queen Bess Island / Baie de Chactas
BA-6. U.S. 90 to GIWW Wetland
BA-7. Couba Island

Figure BA-0. Location and estimated area of benefit for projects proposed in the Barataria Basin.


THE BAPTIST
AMES
BA-1
NEW ORLEANS
ST CHARLES
BA-7
BERNARD
BA-3
BA-6
BA-4
BA-5
BA-2
SALINITY INFLUENCE
SEDIMENT INFLUENCE
SURFACE WATER MANAGEMENT
SHORELINE STABILIZATION
AREA OF INFLUENCE
BA-1
PROJECT NUMBER
0 5 10 15
miles

BA-1. DAVIS POND FRESHWATER DIVERSION

Location and Size

The Davis Pond freshwater diversion structure has been planned and authorized for construction through the "Louisiana Coastal Areas Study" at a site near Luling, Louisiana. The project will divert Mississippi River water and sediment into the Barataria Basin. This diversion will indirectly benefit approximately 65% of the basin (Figure BA-0). Approximately 83,000 ac of marsh are expected to be preserved by the diversion.

Objectives

The project will optimize salinity conditions for fish and wildlife, particularly furbearers, waterfowl, and oysters, and will maintain and enhance the existing ecological framework of the basin by providing nutrients and sediments to help offset subsidence in the vegetated wetlands.

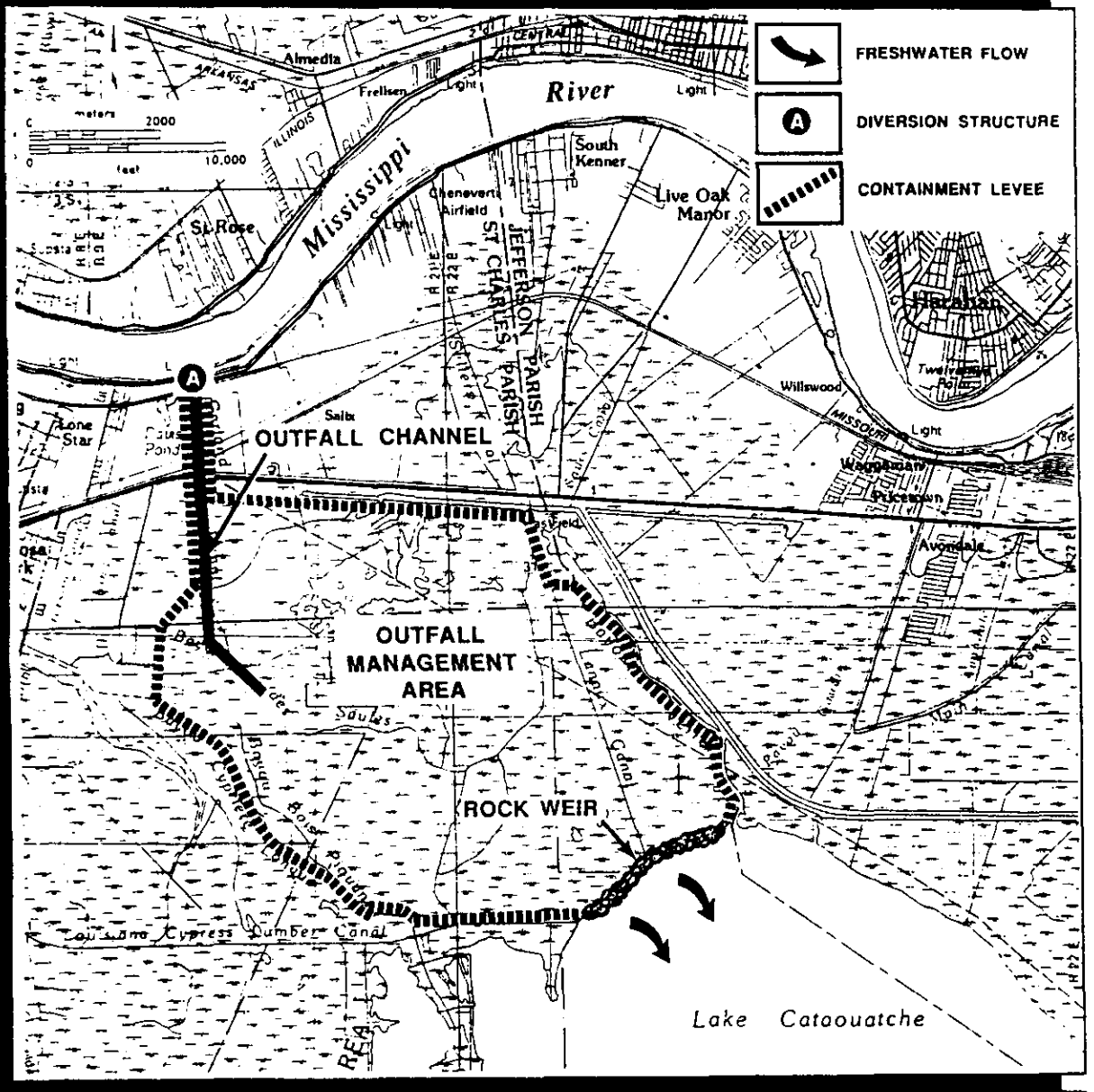
Project Features

The Davis Pond diversion is designed to deliver approximately 10,500 cfs at normal high water stages in the river. The water will be discharged through an outfall channel into a 10,000-ac marsh area (Figure BA-1) where much of the sediment load is expected to be retained. From the marsh, the water will flow across a series of low weirs into Lake Cataouatche and subsequently into Lake Salvador. Reduced salinity is expected to result in greater organic production of the marshes, which will help lessen relative subsidence. Similar benefits may result from increased suspended sediment concentrations during overflow of the marshes surrounding Lake Cataouatche, including those of the Salvador State Wildlife Management Area.

Status and Schedule

The project is an authorized Federal project. A local cost sharing agreement with the State for 25% of the project is being requested by the Corps of Engineers. Total construction cost is presently estimated to be $40 million, which would place the state's share at $ 10 million. Planning of the project is nearly complete and operation could be realized by 1995. Finalization of the design memorandum and commencement of engineering design are pending but require final coordination and agreement between Federal, state, and local government and private landowners. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Planning, engineering and design	FPD/CI	FPD/CI	C/I



BA-1. DAVIS POND FRESHWATER DIVERSION

Hydrologic Basin: Barataria
Parish: St. Charles
Acreage Benefitted: 83,000

Purpose and Need: Maintaining and enhancing the existing ecological framework of the basin by providing freshwater, nutrients and sediment to counter saltwater intrusion and help offset subsidence.

Project Description: The proposed project will divert Mississippi River water through the Davis Pond Diversion Structure into a wetland outfall area and into Lake Cataouatche.

BA-2. GIWW TO CLOVELLY WETLAND

Location and Size

This wetland protection and enhancement project encompasses the marshes of Lafourche Parish southeast of the GIWW, east of Bayou Lafourche, and north of the Superior Canal. The area encompasses approximately 60,000 ac of primarily fresh and low-salinity wetlands and is one of the last contiguous marsh tracts within the Barataria estuary (Figures BA-0, BA-2).

Objectives

The objectives of this project are to protect and maintain approximately 60,000 ac of primarily fresh and low-salinity wetlands through the restoration of hydrologic conditions. These wetlands are of great importance not only for the biological future of the Barataria estuary but also for the protection of the developed areas along Bayou Lafourche. The maintenance and protection of the GIWW to Clovelly wetland is best served by maintaining or reestablishing natural hydrologic conditions that promote: (1) greater freshwater retention and utilization to prevent rapid salinity increases, and (2) water exchange through sheet flow as opposed to an expanding network of tidal channels. These are the hydrologic conditions that prevailed historically in the area. Most of the marshes in the project area are of the flotant type and are susceptible to rapid breakup. The process of marsh breakup has been progressive from south to north and has already become noticeable in the southern part of the project area. This is most alarming in view of the limited possibilities for freshwater and sediment introduction into the area from the Mississippi River. Restoration is less feasible and almost always more expensive once losses have occurred.

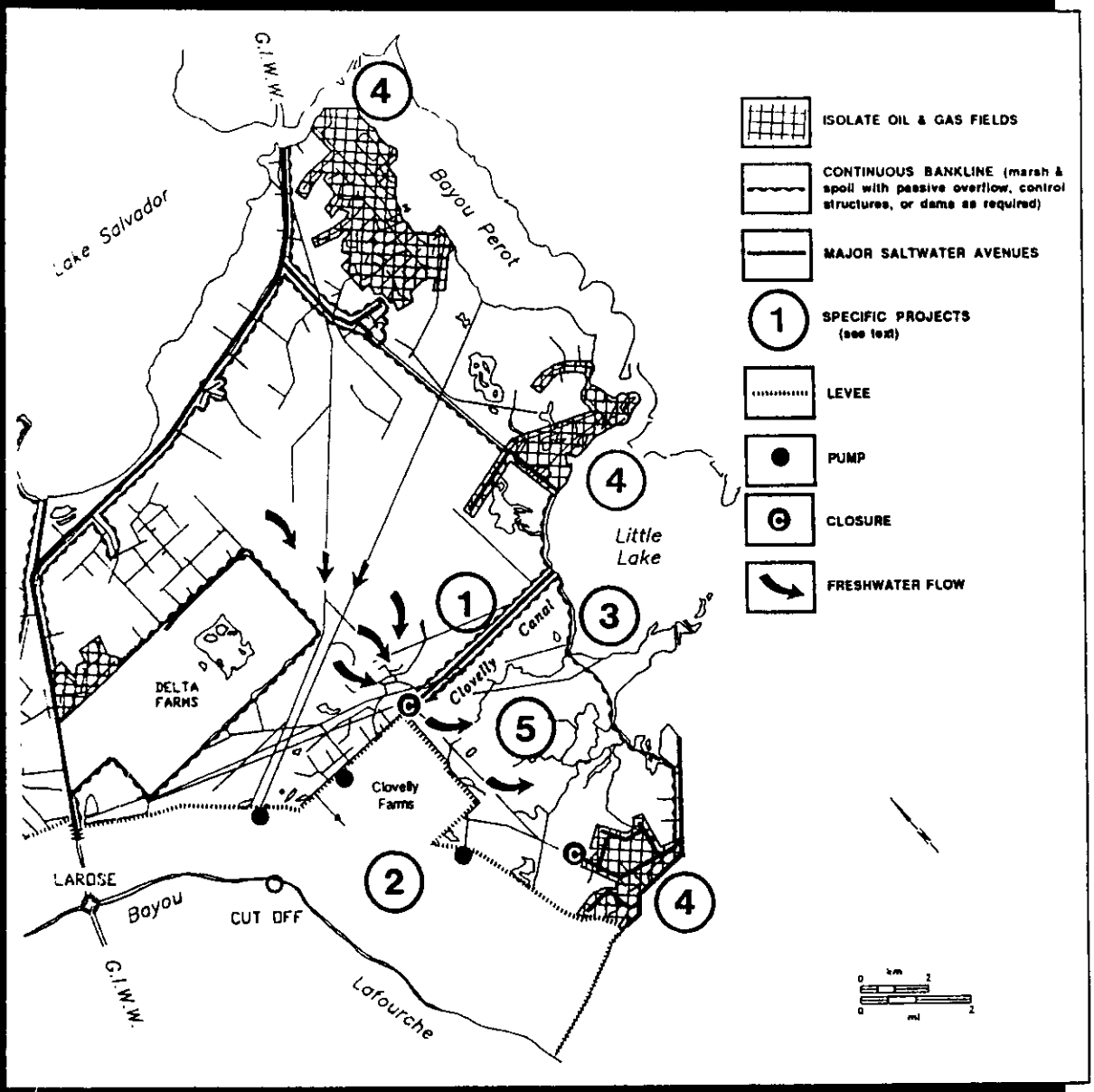
Project Features

The GIWW to Clovelly wetland enhancement and protection project has five major features. Implementation of these features will partly restore the more favorable hydrologic conditions by restoring the supply of freshwater runoff to the marshes and restoring historically lesser rates of tidal water exchange between the marshes and adjacent open water bodies. Greater utilization of the available freshwater will reduce the rate of saltwater intrusion and the associated wetland loss. The enhancement of overbank sheet flow will further help in freshwater conservation without impeding access for marine organisms. The major elements of the proposed plan include: (1) isolating the Clovelly Canal, (2) conserving freshwater from three pumping stations, (3) maintaining a continuous marsh bankline along major water bodies, (4) isolating major oil and gas fields, and (5) placing constraints on the further expansion of major tidal channels (Figure BA-2).

Status and Schedule

The proposed plan has been endorsed by local government and the principal landowners. Because the area is coincident with part of the West Fork Bayou l'Ours small watershed project, the U.S. Soil Conservation Service (SCS) is evaluating an expressed interest by local sponsors to cost-share in implementation. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Wetland protection and enhancement	FPD/CI	FPD/CI	OMR



BA-2. GIWW TO CLOVELLY WETLAND

Hydrologic Basin: Barataria
Parish: Lafourche
Acreage Benefitted: 60,000

Purpose and Need: To prevent imminent loss of wetlands by retaining and utilizing available freshwater. These wetlands are of great importance to the biological future of the Barataria estuary and to the protection of the levees that surround the developed areas.

Project Description: Greater utilization of freshwater and a reduction of tidal water exchange through enhancement of sheet-flow will restore a more favorable hydrological regime. Both elements can be accomplished and will reduce the rate of saltwater intrusion and associated wetland loss, while maintaining access to the marsh for marine organisms

BA-3. NAOMI (LAREUSSITE) DIVERSION SIPHON

Location and Size

The site of the proposed freshwater diversion siphons is near the community of Naomi in Plaquemines Parish (Figure BA-0). Freshwater and nutrient benefits are expected to extend over 65,000 ac. Sedimentation benefits are expected to extend over about 8,200 ac in Plaquemines Parish and Jefferson Parish combined (Figure BA-3).

Objectives

The objective of the siphon project is to maintain and restore marsh by providing supplemental freshwater, nutrients, and mineral sediments from the Mississippi River. Marshes in the area have become increasingly subject to deterioration, and many shallow ponds have developed.

Project Features and Benefits

As proposed, the Naomi Siphon project is composed of three elements: (1) siphon construction proper, (2) enlargement of the diversion capacity, and (3) outfall management. At present, eight 6-ft-diameter pipes are to be constructed from the river, over the river levee, under the roadways, and through a back protection levee to the marsh, a distance of about 2,750 ft. This battery of siphons will deliver a discharge of about 2,400 cfs during spring-flood flow of the Mississippi River. Under average conditions the siphons will deliver nearly 200,000 cu yds of river sediment annually. Depending on retention of the clay-size sediments and the extent of sediment dispersion through the area, it is estimated that subsidence could be offset by enhanced sediment deposition over an area of 8,200 ac from implementation of the siphon and management of the outfall.

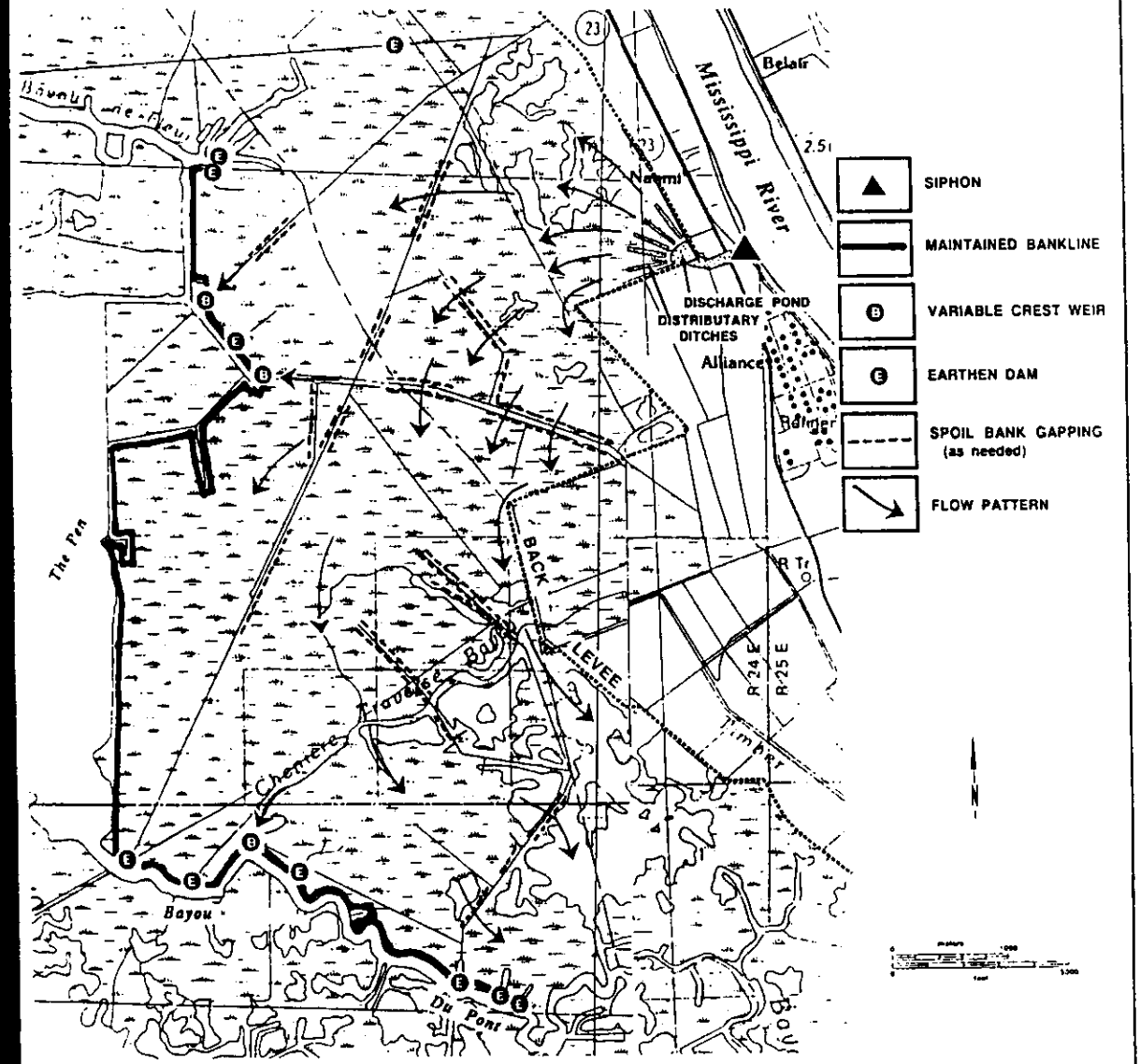
Because benefits would increase accordingly, and because the area is largely separated from future benefits of the proposed Davis Pond Diversion by the Bayou Barataria ridge, it is proposed that the siphon capacity be enlarged through additional pipes to the extent possible. Earlier analysis had established a need of about 6,000 cfs.

A preliminary plan for management and greater utilization of the siphon outfall has been proposed (Figure BA-3). Management would reduce the direct loss of siphon water through a number of canals to the Barataria Waterway. The management plan calls for maintenance of a continuous bankline along the Pen and Bayou Dupont to force discharges southward where wetland deterioration is most severe, and the gapping of spoil banks to facilitate dispersion and movement of the diverted water through the marsh. These actions will increase the residence time of the introduced water and optimize sediment retention.

Status and Schedule

Eight siphon pipes have been permitted and are currently under design. Right-of-way agreements have been reached with landowners. Design of the siphons is ongoing and is to be completed in the spring of 1990. The schedule for the remaining elements is as follows:

Project Elements	90/91	91/92	92/93
Construction of the permitted siphon	CI	OMR	OMR
Enlargement of diversion capacity	FPD/CI	CI	
Outfall management	FPD	CI	OMR



BA-3. NAOMI (LAREUSSITE) DIVERSION SIPHON

Hydrologic Basin: Barataria
Parishes : Plaquemines and Jefferson
Acreage Benefitted: 8,200

Purpose and Need: To divert water and associated nutrients and sediments from the Mississippi River into an area of marsh that is rapidly deteriorating as a result of saltwater intrusion and subsidence.

Project Description: The project involves: (1) the construction of six parallel siphons, presently under design, that have a maximum discharge capacity of 2,400 cfs and will deliver nearly 200,000 cu yds of river sediment annually; (2) construction of additional siphons if feasible; and (3) management of the siphon outfall to maximize the use of diverted materials by routing water through the marshes.

BA-4. WEST POINTE A LA HACHE DIVERSION SIPHON

Location and Size

The site of the freshwater diversion siphon is immediately upstream from the ferry landing at West Pointe a la Hache, Plaquemines Parish (Figures BA-0). This project is estimated to maintain at least 9,200 ac of deteriorating marshland west of the Mississippi River in an area bounded by the Bayou Grande Cheniere natural levee ridge. Freshwater and nutrient benefits are expected to extend beyond the ridge.

Objectives

The objective of the siphon project is to maintain and restore marsh by providing supplemental freshwater, nutrients, and mineral sediments from the Mississippi River. Marshes in the area are deteriorating rapidly at present as a result of subsidence, saltwater intrusion, and wave and current forces.

Project Features

The project is composed of three elements: (1) siphon construction proper, (2) enlargement of the diversion capacity, and (3) outfall management. At present, eight 6-ft-diameter siphons are proposed from an intake structure in the river, over the river levee, under the highway, and through a back protection levee to the marsh, a distance of 1,725 ft (Figure BA-4). These siphons will deliver a discharge of about 2,000 cfs during annual flood conditions. Under average conditions, the structure will enhance at least 9,200 ac of marshland when combined with management of the outfall.

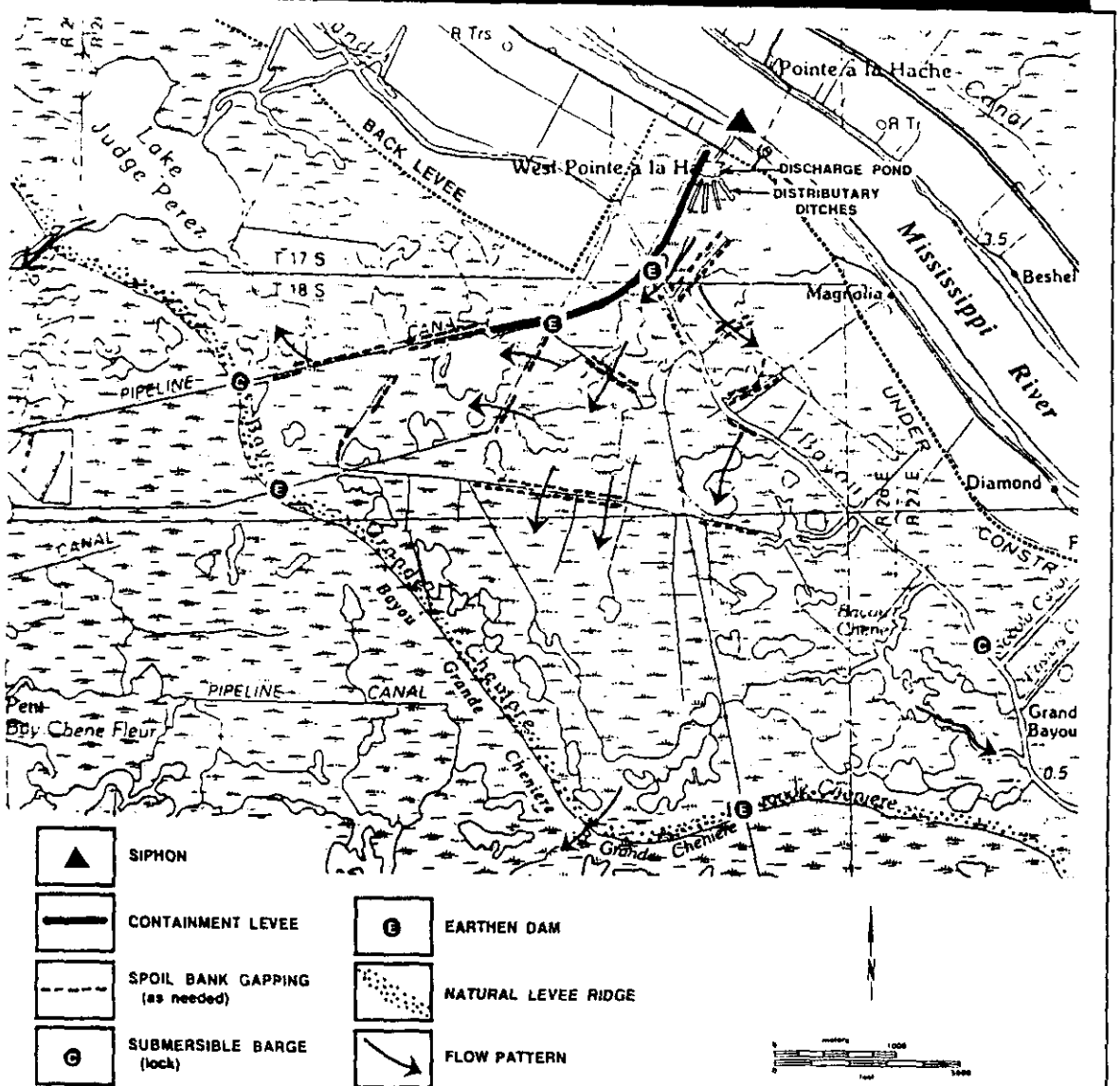
Because benefits would increase accordingly, and because the area is too far removed and sheltered from the Davis Pond Diversion to receive sedimentation benefits, it is proposed that the siphon capacity be enlarged through additional pipes to the extent possible. Earlier analysis had established a need of about 6,000 cfs. Enlargement of the siphon requires further evaluation and design. Increased capacity would be accomplished by the addition of pipes to the system.

A preliminary plan for management and greater utilization of the siphon outfall has been proposed (Figure BA-4). Management would reduce the direct loss of siphon water through a number of pipeline canals across the Bayou Grande Cheniere ridge system. The management plan calls for controlling normal water exchange across the Bayou Grande Cheniere ridge and the gapping of spoil banks to facilitate dispersion and movement of the diverted water through the marsh. These actions will increase the residence time of the introduced water in the marsh/pond system and optimize sediment retention. Outfall management in this area is necessary but difficult. Small boat access needs to be maintained through Lake Hermitage and special provisions are necessary for mineral industry access.

Status and Schedule

Eight siphon pipes have been permitted and are currently under design. Right-of-way agreements have been reached with landowners. Design of the siphons is ongoing and is to be completed in the spring of 1990. The schedule for the remaining elements is as follows:

Project Elements	90/91	91/92	92/93
Construction of the permitted siphon	CI	OMR	OMR
Enlargement of diversion capacity	FPD/CI	CI	
Outfall management	FPD	CI	OMR



BA-4. WEST POINTE A LA HACHE DIVERSION SIPHON

Hydrologic Basin: Barataria
Parish : Plaquemines
Acreage Benefitted: 9,200

Purpose and Need: To divert water and associated nutrients and sediments from the Mississippi River for the maintenance and enhancement of marsh in areas where its presence is most beneficial.

Project Description: The project involves: (1) the construction of six parallel siphons, presently under design, that have a maximum discharge capacity of about 2,000 cfs and will deliver nearly 150,000 cu yds of river sediment annually; (2) construction of additional siphons if feasible; and (3) management of the siphon outfall to maximize the use of diverted materials by routing water through the marshes.

BA-5. QUEEN BESS ISLAND/BAIE DE CHACTAS

Location and Size

Two projects are proposed in the Barataria Basin to protect and restore wetlands and critical habitat through sediment trapping, vegetation planting, and low-cost shore protection. The major one is located along the northwest shore of Lake Salvador at Baie de Chactas and Baie de Cabanage in St. Charles Parish (Figure BA-0). A smaller project is located at Queen Bess Island just north of the island of Grand Terre, in Jefferson Parish. The Baie de Chactas project seeks to restore the physical integrity of shore segments that total about 2 mi and protect nearly 5,000 ac of wetland/pond habitats (Figure BA-5).

Objectives

The objective of the Baie de Chactas project is to restore the physical integrity of the shore segments that provide a hydrologic barrier and limit the rate of water exchange between Lake Salvador and the pond complexes of Baie de Chactas and Baie de Cabanage, respectively. This integrity is threatened by shoreline erosion and increasing water exchange through newly-developed connections between Lake Salvador and interior marshes. The project will help freshwater retention and protect the marshes from increasing salinity and erosion by waves and currents. The Queen Bess project seeks to restore deteriorating wetland rookery habitat for the endangered brown pelicans.

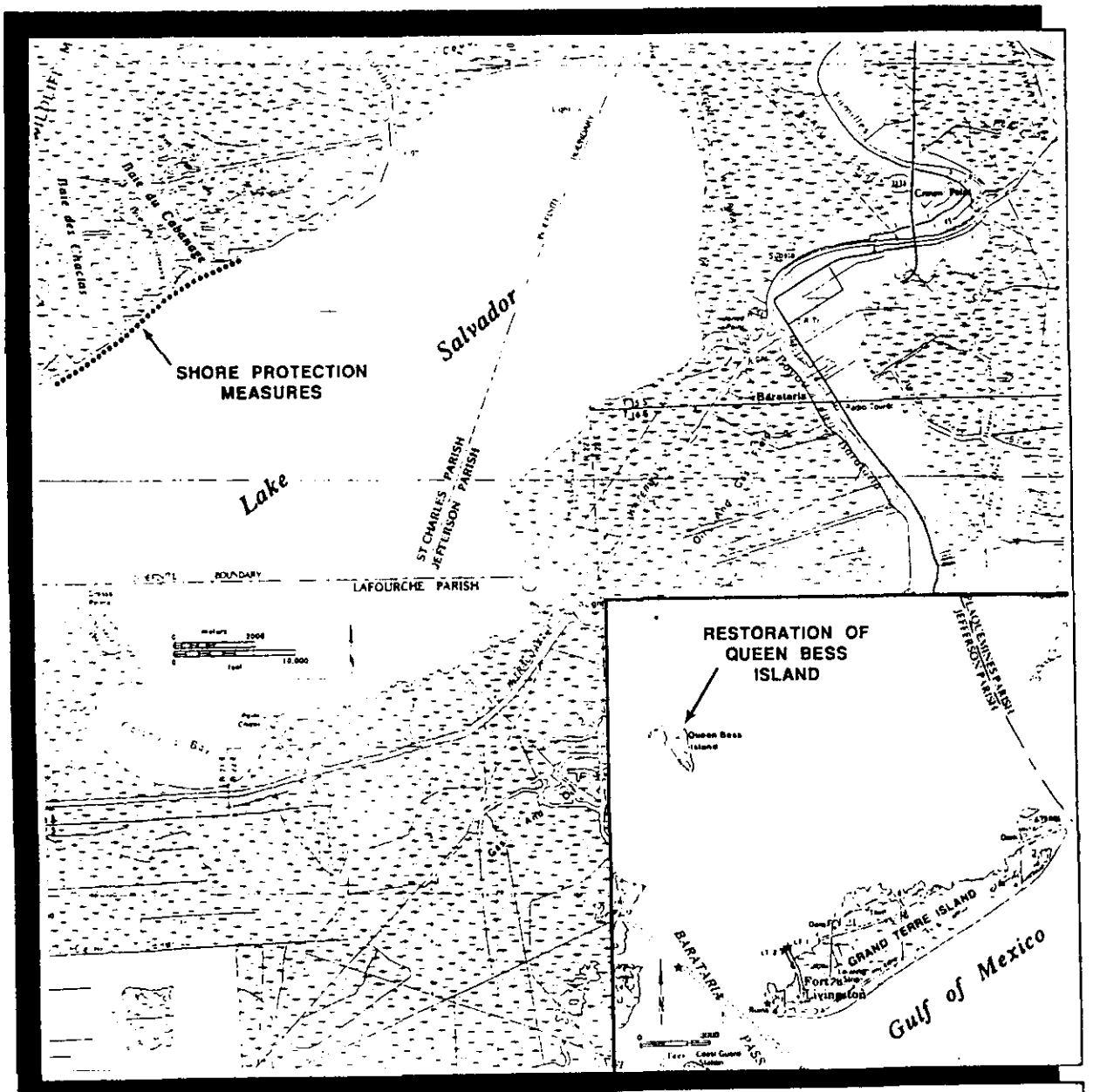
Project Features

The project would attempt to restore the physical integrity of the marsh shore separating Lake Salvador and Baies de Chactas and Cabanage through sediment trapping and revegetation and the use of low-cost shore protection materials. No specific design can be presented until site-specific information is available and a feasibility analysis has been undertaken. The feasibility of restoring pelican rookery habitat at Queen Bess Island will also be evaluated in conjunction with the COE and the DWF.

Status and Schedule

No steps have been taken toward implementation of this project beyond the initial concepts. The project requires further coordination with local interests and a feasibility analysis of shoreline protection and restoration. The Queen Bess project may be cost-shared with the Corps of Engineers.

Project Elements	90/91	91/92	92/93
Baie de Chactas shore protection and restoration	FPD/CI	CI	OMR
Queen Bess wetland restoration	FPD/CI		



BA-5b/5c. QUEEN BESS ISLAND/BAIE DE CHACTAS

Hydrologic Basin: Barataria
Parish: St. Charles and Jefferson
Acreage Benefitted: 9,000

Purpose and Need: To maintain and restore marsh and protect the physical integrity of those shore segments that provide a hydrologic barrier and limit the rate of water exchange between Lake Salvador and adjacent marsh/pond systems.

Project Description: Low-cost shore protection materials, sediment trapping devices, and revegetation may be used to halt erosion. Site specific information is needed before the plans can be finalized. The Queen Bess Island project would restore rookery habitat for brown pelicans.

BA-6. U.S. 90 TO GIWW WETLAND

Location and Size

This project protects approximately 60,000 ac of fresh and intermediate marshland in Lafourche Parish southeast of U.S. 90, east of Bayou Lafourche, and north of the GIWW (Figures BA-0, BA-6).

Objectives

These marshes are essential for the biological future of the Barataria estuary as well as for the protection of developed areas along Bayou Lafourche. The objective of the project is to prevent imminent loss of vegetated wetlands. Most of the marshes in the project area are of the flotant type and are susceptible to rapid breakup. The process of marsh breakup has been progressive from south to north. In view of the limited possibilities for freshwater diversion and sediment introduction from the Mississippi River, restoration is less feasible and almost always more expensive.

Project Features

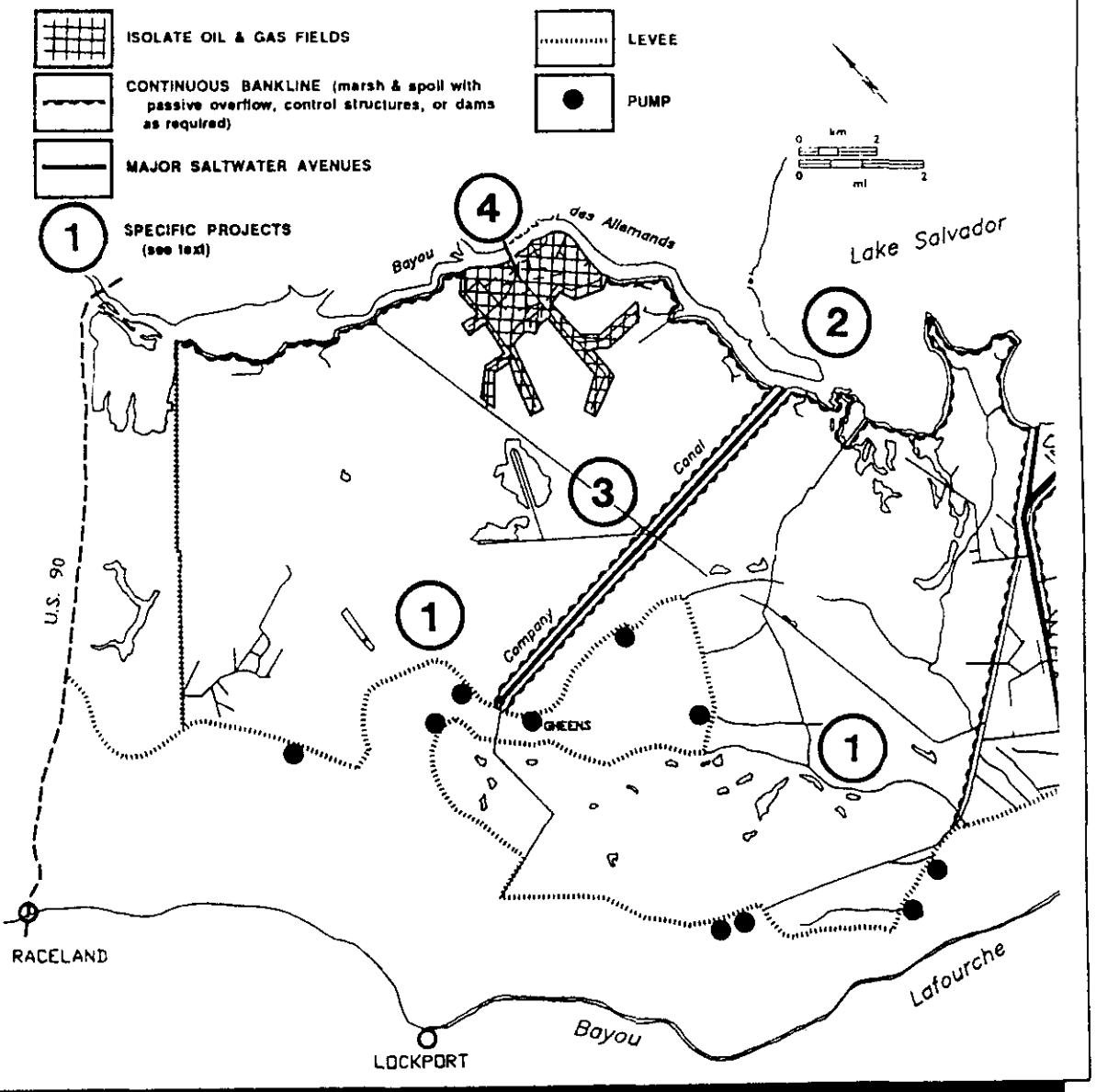
The protection of the U.S. 90 to GIWW wetland community is best served by reestablishing and maintaining hydrologic conditions that promote: (1) greater freshwater retention and utilization to prevent rapid salinity increases, and (2) water exchange through sheet flow as opposed to tidal channels.

The U.S. 90 to GIWW wetland protection project has five major features. Implementation of these features will partly restore the more favorable hydrologic conditions by restoring the supply of freshwater runoff to the marshes and reducing the rates of tidal water exchange between the wetlands and adjacent open water bodies. Greater utilization of the available freshwater will reduce the rate of saltwater intrusion and associated wetland loss, while maintaining access to the marsh for marine organisms. Major features of the project, as presented in Figure BA-6, are: (1) utilization of freshwater from 10 pumping stations through dispersion into the marsh, (2) maintenance of a continuous, natural marsh-bankline along Lake Salvador, (3) isolation of the Company Canal, (4) isolation of the major oil and gas fields, and (5) prevention of development of major tidal channels.

Status and Schedule

The plan is supported by the Lafourche Parish government and the primary landowners. It is in a preliminary planning phase. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Wetland protection and enhancement	FPD	FPD/CI	OMR



BA-6. HIGHWAY 90 TO GIWW WETLAND

Hydrologic Basin: Barataria
Parish: Lafourche
Acreage Benefitted: 60,000

Purpose and Need: To prevent future loss of wetlands by retaining and utilizing available freshwater. These wetlands are of great importance to the biological future of the Barataria estuary and to the protection of the levees that surround the developed areas.

Project Description: Greater utilization of available freshwater and a reduction of tidal water exchange will maintain a favorable hydrological regime. Measures include the use of pump outfall, the isolation of major avenues of saltwater intrusion, and maintenance of the physical integrity of the marsh boundary along major water bodies.

BA-7. COUBA ISLAND

Location and Size

Couba Island, in St. Charles Parish, is a 2,700-ac marsh island that separates Lake Cataouatche and Lake Salvador. Bayou Couba and Bayou Bardeaux separate the island from the contiguous marshes on the west and east, respectively (Figure BA-0). The island is a critical landform to the hydrology of the basin.

Objectives

The primary objective of the project is to maintain the physical integrity of the island as a hydrologic barrier between Lake Salvador and Lake Cataouatche. This integrity is threatened by shoreline erosion, increased salinities, and increased water exchange through newly-developed connections between Lake Salvador and interior marshes, partly as a result of an eroded access-canal dam. The project will focus on reducing the rate of shoreline erosion and channel development to restore and maintain the hydrologic functions of these wetlands.

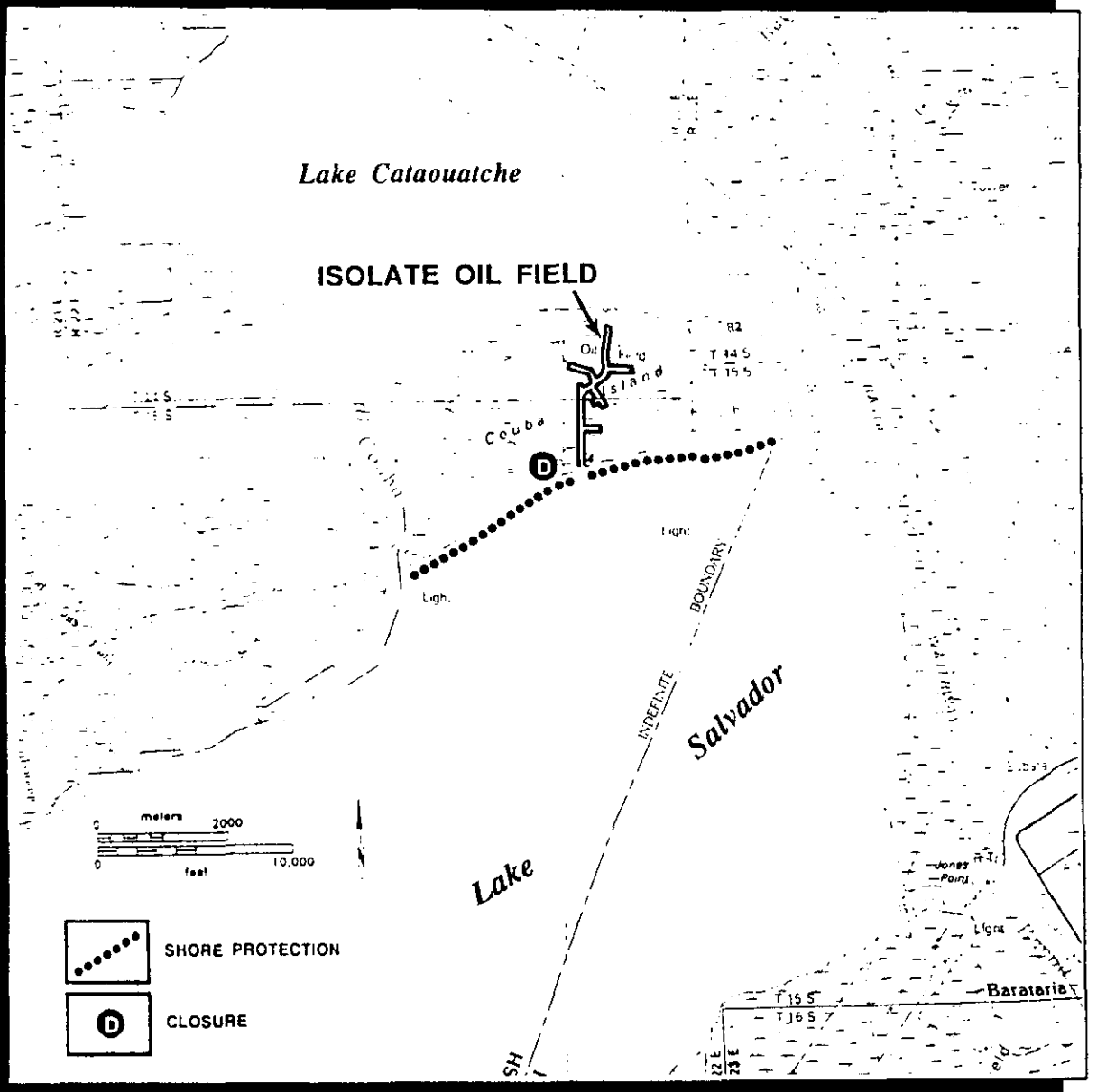
Project Features

The project will evaluate the feasibility of restoring the eroded closure of the canal leading westward from the center of Couba Island, insuring shore protection measures such as coarse material deposits and vegetation planting, and isolating the presently utilized access canal from the marshes (Figure BA-7). Plans were developed by the SCS in 1985. Those plans called for considerable reworking of canal spoil banks and installation of water control structures. In several places, only a narrow strip of marsh separated shallow marsh pond networks and the lake.

Status and Schedule

No steps have been taken toward implementation of this project beyond the initial planning effort by the SCS. The project requires further coordination with local interests and feasibility analysis of shoreline protection.

Project Elements	90/91	91/92	92/93
Shore protection and hydrologic restoration	FPD	CI	OMR



BA-7. COUBA ISLAND

Hydrologic Basin: Barataria
Parish: St. Charles
Acreage Benefitted: 2,700

Purpose and Need: To maintain the physical integrity of the island through shoreline protection and restoration of hydrology. Couba Island is important as a hydrologic barrier between Lake Salvador and Lake Cataouatche.

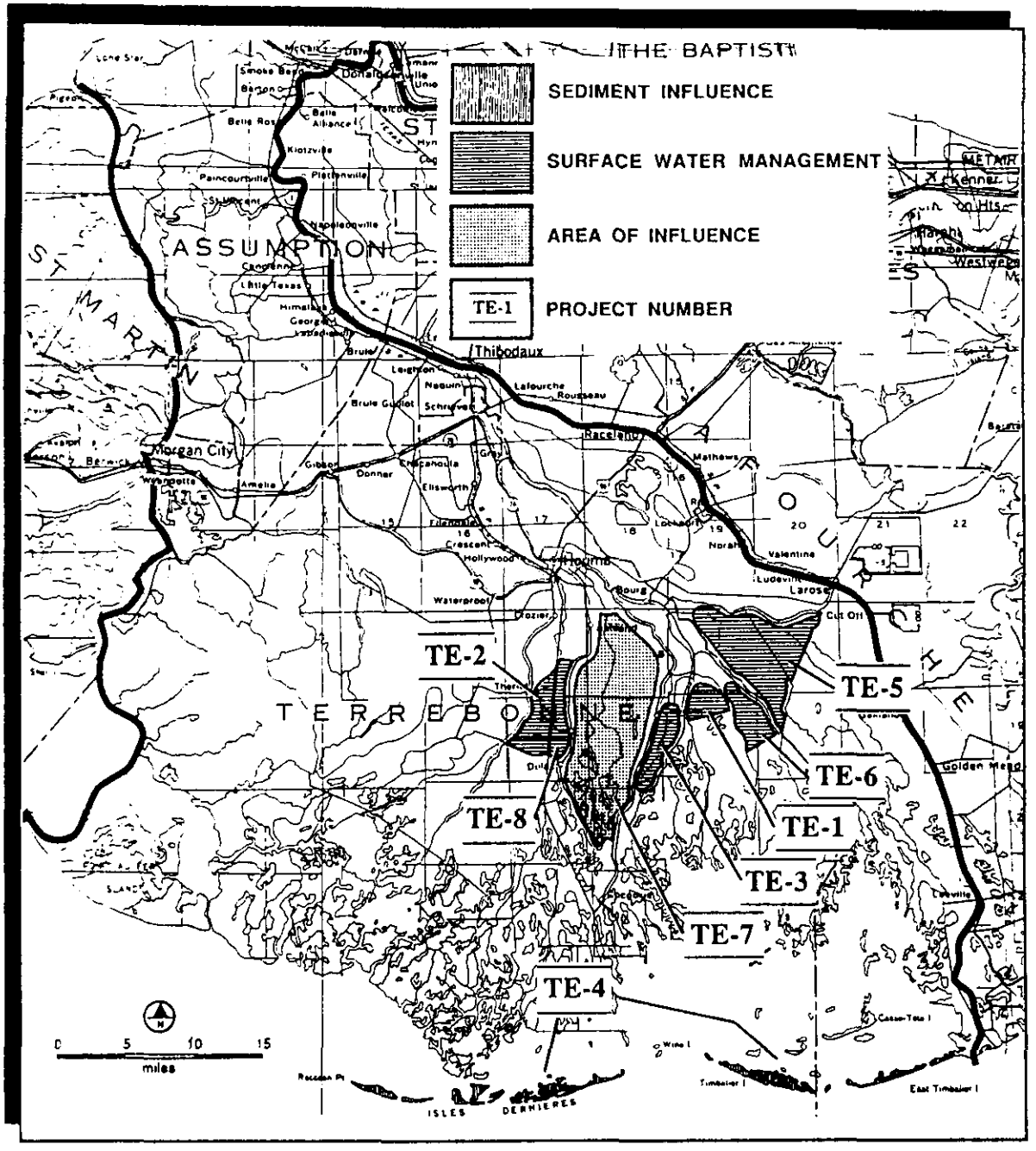
Project Description: The objectives of this project are to determine feasibility, and implement where possible, measures to halt shoreline erosion and the development of new connections between Lake Salvador and interior marshes. Measures are likely to include the restoration of an access canal closure, sediment trapping, planting vegetation, and isolating other access canals.

TERREBONNE BASIN

TERREBONNE BASIN

TE-1.	Montegut Wetland
TE-2.	Falgout Canal Wetland
TE-3.	Bayou la Cache Wetland
TE-4	Barrier Island Sand Retention
TE-5.	Grand Bayou Wetland
TE-6.	Pointe au Chien Wetland
TE-7.	Lake Boudreaux Wetland
TE-8.	Bayou Pelton Wetland

Figure TE-0. Location and estimated area of benefit for projects proposed in the Terrebonne Basin.


ST JOHN THE BAPTIST
SEDIMENT INFLUENCE
SURFACE WATER MANAGEMENT
AREA OF influence
TE-1
PROJECT NUMBER
ASSUMPTION
ST MARTIN
Thibodaux
Morgan City
TERREBONNE
LAFOURCHE
TE-2
TE-5
TE-6
TE-8
TE-1
TE-3
TE-7
TE-4
0 5 10 15
miles
ISLES DERNIERES

TE-1. MONTEGUT WETLAND

Location and Size

The Montegut wetland area includes 4,200 ac of intermediate to brackish marshland, located within Pointe au Chien Wildlife Management Area, southeast of the community of Montegut. The southern boundary follows a series of oil access canals (Figure TE-0).

Objectives

The primary objective of this project is to protect, maintain, and, to the extent feasible, restore wetland vegetation through maintenance and possibly enhancement of existing management provisions that improve freshwater retention, reduce maximum salinity, and moderate water flux and tidal energy in the deteriorated wetland community.

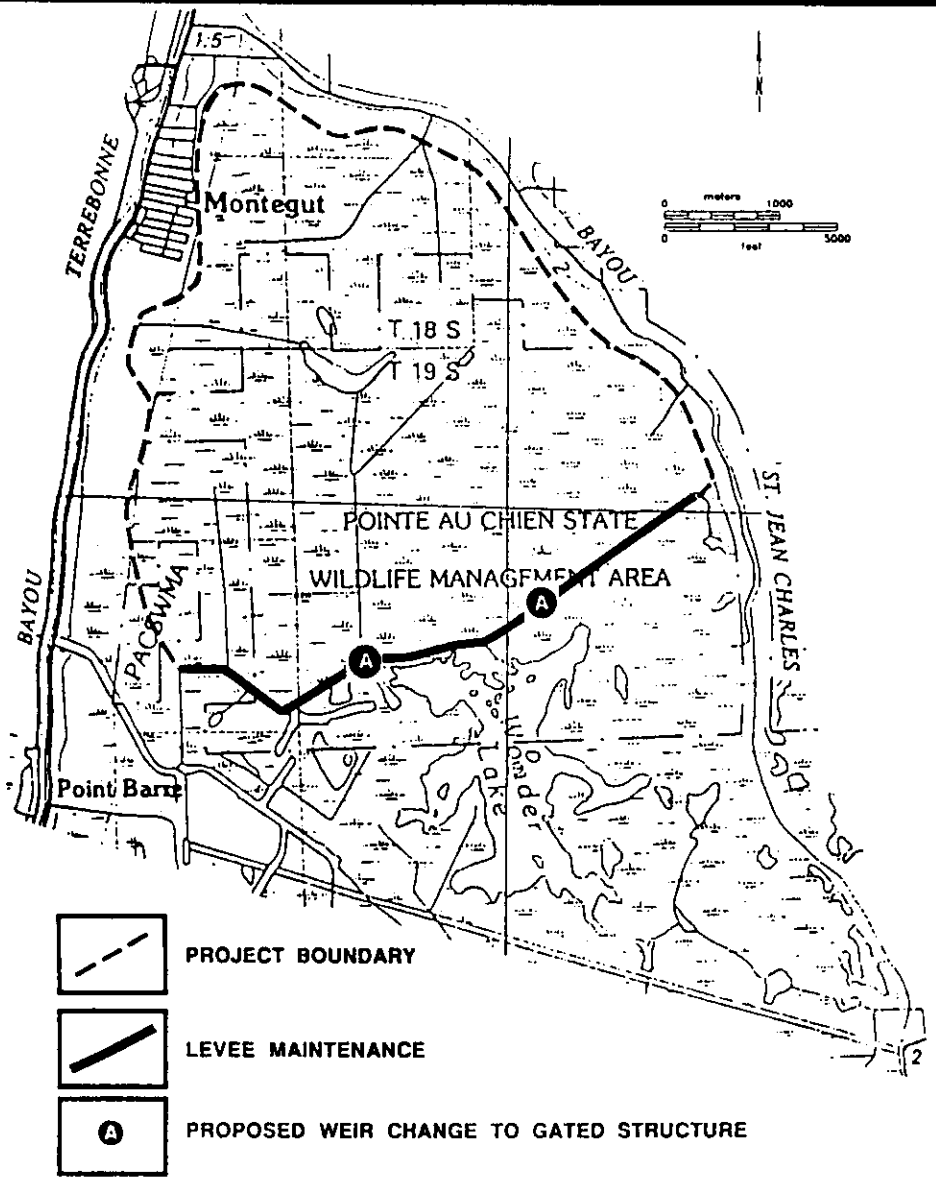
Project Features

In 1989, water management of the Montegut Wetland was provided for through the construction of a continuous embankment along a series of mineral industry access canals, and the installation of two fixed-crest weirs (Figure TE-1). The embankment has received a single lift of materials and has maintained a crest elevation of 3 to 4 ft + Mean Sea Level (MSL) over all but 5,000 ft. Along the western part of the levee, poor soil conditions have resulted in subsidence and a second lift of materials is required. Additionally, the project will evaluate the feasibility and advisability of replacing the present fixed crest weirs with variable control structures for greater flexibility in water-level management.

Status and Schedule

Wetland protection is presently operational. The area is managed under a cooperative agreement with local interests, as part of the Point au Chien Refuge, by the DWF. The anticipated schedule for project features is as follows:

Project Elements	90/91	91/92	92/93
Levee maintenance	OMR	OMR	OMR
Water control structures	FPD	CI	OMR



TE-1. MONTEGUT WETLAND

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage Involved: 4,200

Purpose and Need: The primary objective of this project is to maintain freshwater retention capability and control over saltwater intrusion in order to protect this deteriorating wetland community. Compaction and subsidence have resulted in a decrease in height of about 5,000 ft of the existing management levee.

Project Description: The project will provide for maintenance of a segment of the existing management levee. The need to replace existing fixed-crest weirs with variable control structures will be evaluated. Greater utilization of freshwater will restore a more favorable hydrological regime.

TE-2. FALGOUT CANAL WETLAND

Location and Size

The Falgout Canal wetland consists of 4,000 ac of marshland south of Houma. The area extends northward from the Falgout Canal between the west bank of the Houma Navigation Canal and the eastern natural levee ridge of Bayou du Large (Figure TE-0).

Objectives

The primary objective is to curtail marsh loss. Currently, intermediate and brackish marsh comprise most of the Falgout Canal wetland. The area continues to experience a significant loss of wetlands. In 1978, most of the area consisted of fresh marsh and cypress swamp. Since then, salinities have increased, cypress has died, fresh marsh has become intermediate, and intermediate marsh has become open water or brackish marsh. A second objective is to limit the area that is hydrologically connected to the Houma Navigation Canal, thereby lessening saltwater intrusion and rapid loss of freshwater. The loss of wetlands diminishes freshwater retention within the area and increases water exchange between the project area and surrounding water bodies. Both cause further increases in the rate of erosion.

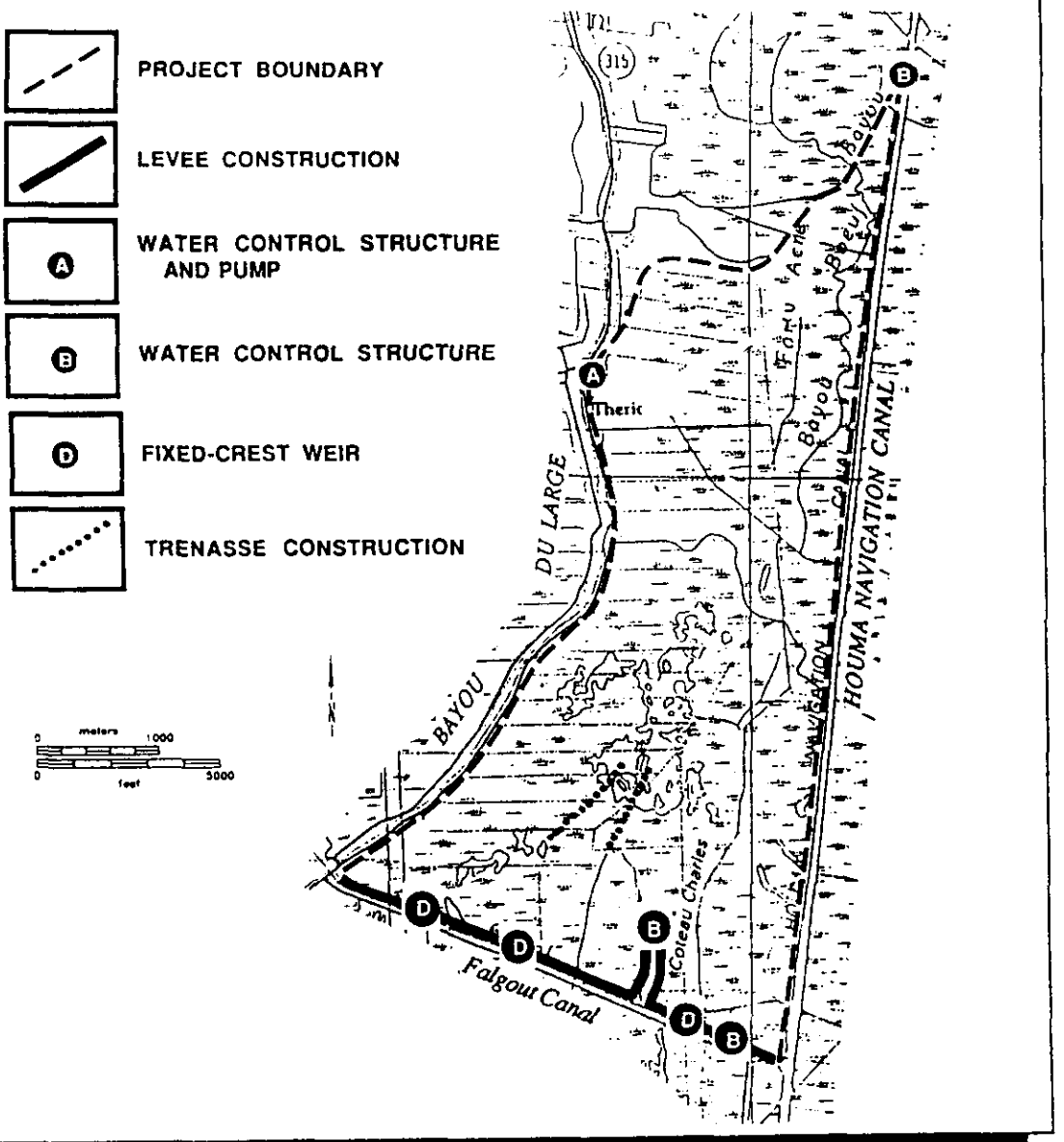
Project Features

Proposed project features are shown in Figure TE-2. The project provides for structural control over water exchange with surrounding water bodies, including the Houma navigation Canal and Bayou du Large. Water management is achieved through maintenance of the existing spoil bank along the Houma Navigation Channel, construction of a levee along the Falgout Canal, and the installation of water-control structures for the removal of water along the southern boundary and for the introduction of water, from the Houma Navigation Canal and Bayou du Large during low salinity conditions. The project establishes increased retention of freshwater derived from local runoff, control of saltwater inflow from the Gulf, and control of water levels. In this manner, the project is expected to prolong the existence of the remaining wetlands, enhance existing wetlands, and restore wetlands through revegetation.

Status and Schedule

All required Federal and state permits for implementation of the proposed project features have been obtained by Terrebonne Parish. Currently, the spoil banks along the Houma Navigation Canal and the mineral access canal on the south side have been implemented.

Project Elements	90/91	91/92	92/93
Wetland protection and enhancement	PFD/CI	OMR	OMR



TE-2. FALGOUT CANAL WETLAND

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage Benefitted: 4,000

Purpose and Need: This area experiences a significant loss of wetlands and an increase in salinities. The primary objectives of this project are to improve freshwater retention and restore vegetation by moderating water flux and tidal energy in the deteriorating wetland community.

Project Description: Greater utilization of freshwater will restore a more favorable hydrological regime. The use of levees and control structures will allow reduction of the rate of saltwater intrusion and the associated wetland loss.

TE-3. BAYOU LACACHE WETLAND

Location and Size

The Bayou LaCache wetland comprises approximately 4,250 ac of marsh located between Bayou Petit Caillou and Bayou Terrebonne in Terrebonne Parish (Figure TE-0). The unit is bordered on the south by a levee along Bush Canal and on the north by a pipeline canal spoil bank (Figure TE-3).

Objectives

The primary objective of the proposed state project is to increase retention of freshwater derived from local runoff and establish control over saltwater inflow. Wetland benefits include prolonging the existence of the remaining wetlands, restoring wetlands through revegetation, and enhancing existing habitats by maintaining less saline conditions and allowing for a more gradual transition toward brackish conditions.

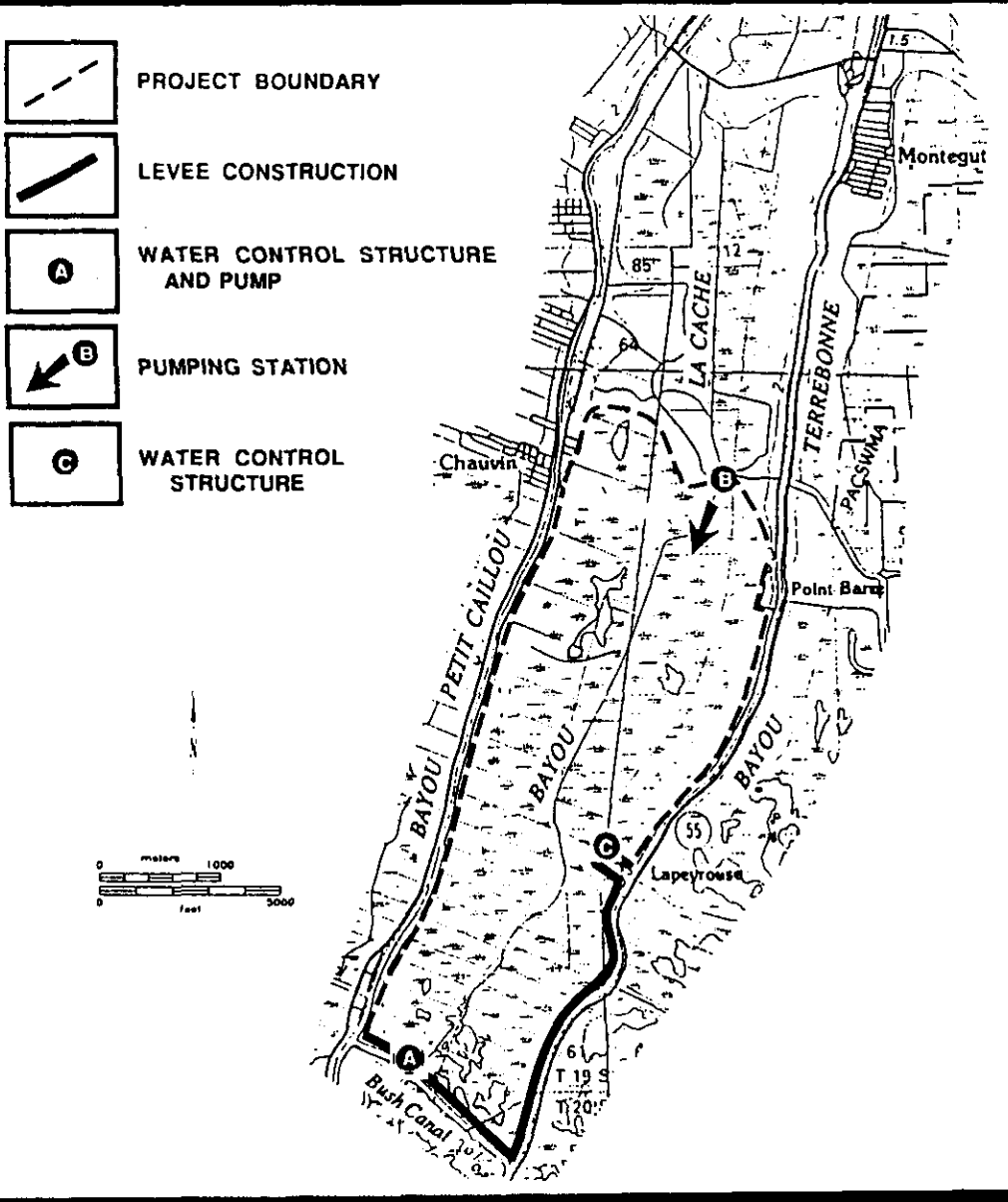
Project Features

Marshes will be protected and enhanced by surface-water management using levees and water control structures (Figure TE-3). Operation of the main control structure at Bush Canal will follow a scenario allowing ingress and egress of estuarine organisms to the extent possible without allowing excessive water levels in the area. Bank stabilization and a control structure along Bayou Terrebonne are proposed. Pump outfall from forced drainage could restore freshwater input to the marshes if properly routed. To prevent impoundment when the main control structure is closed, a pump has been proposed as an addition to the Bush Canal structure.

Status and Schedule

A considerable portion of the project has already been constructed, or will be completed in short order, including the levee and control structure along Bush canal. The bank stabilization and control structure on Bayou Terrebonne, the freshwater diversion pump, and the water level control pump are in the planning and permitting stages. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Water management feature	FPD/CI	CI/OMR	OMR



TE-3. BAYOU LACACHE WETLAND

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage Benefitted: 4,250

Purpose and Need: This area has and continues to experience a significant loss of wetlands and an increase in salinities. The primary objectives of this project are to improve freshwater retention and restore vegetation by moderating water flux and tidal energy in the deteriorating wetland community.

Project Description: Greater utilization of freshwater will restore a more favorable hydrological regime. The use of levees and control structures will allow reduction of the rate of saltwater intrusion and the associated wetland loss.

TE-4b. BARRIER ISLAND SAND RETENTION

Location and Size

The project area encompasses the Timbalier Islands and the Isles Dernieres of Terrebonne Parish (Figures TE-0, TE-4). The area of direct benefit are the 1,000 or more ac of marsh that fringe the barrier islands on the bay side.

Objectives

The primary objective of the project is to maximize conservation of remaining sand and to prolong existence of the islands and associated vegetated wetlands.

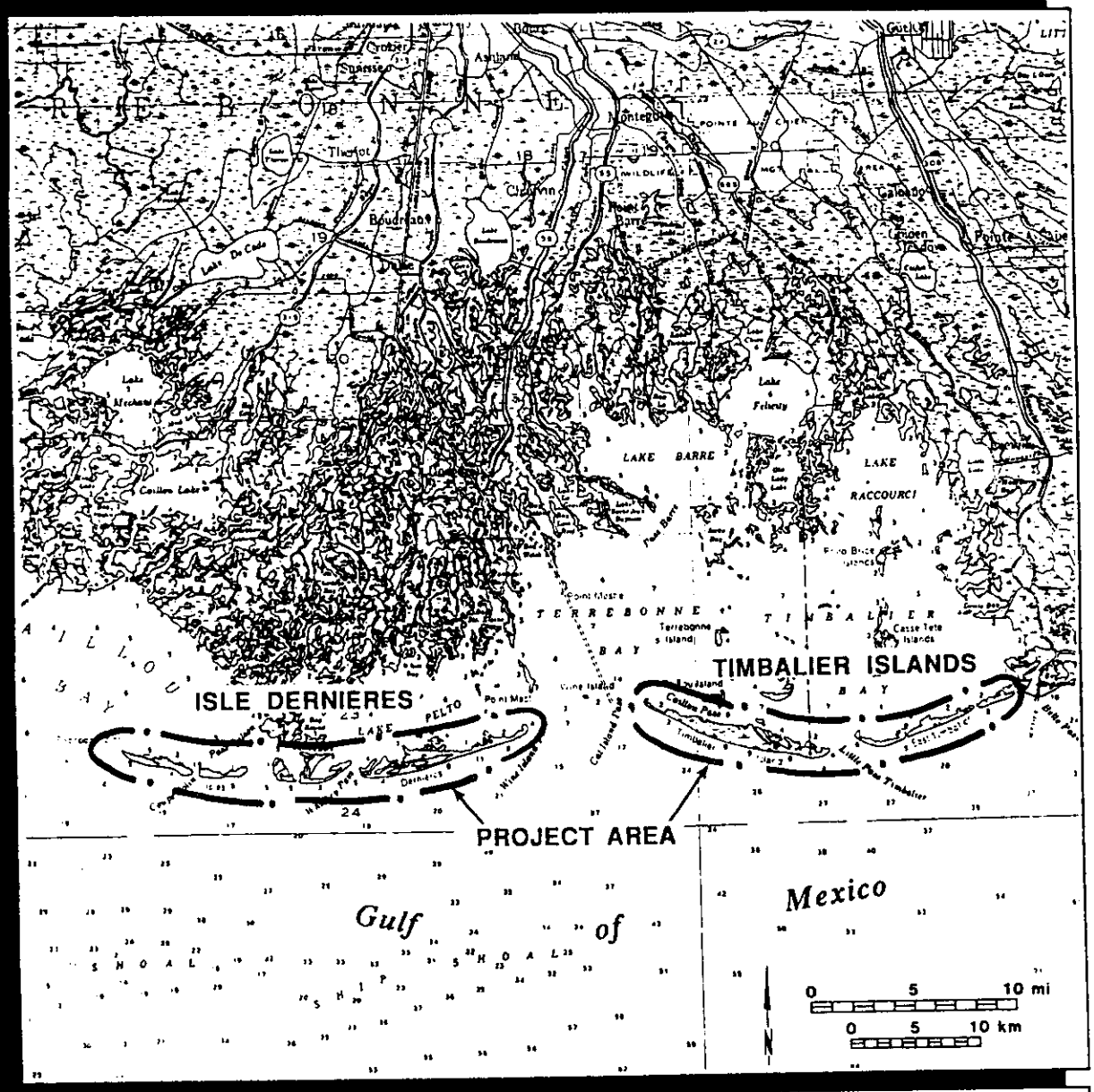
Project Features

The project proposes to construct sand fences and plant vegetation in order to enhance retention of sand and promote development of small dunes. These measures will retard the rate at which sand is being lost from the islands as a result of washover, and help reduce breaching during lesser storm events. Site selection will be governed by available sand supply, island width, and similar parameters.

Status and Schedule

Construction of fences and planting of vegetation have previously been undertaken by local interests, and site selection will be coordinated. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Sand fences and vegetation planting	FPD/CI	FPD/CI	FPD/CI



TE-4b. BARRIER ISLAND SAND RETENTION

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage benefitted: 1,000

Purpose and Need: To enhance conservation of the limited sand supply of the islands. Breaching and washover of the islands adversely affect the physical integrity of the islands and associated marshes.

Project Description: The project proposes to construct sand fences and plant vegetation to enhance sediment retention and development of low dunes.

TE-5. GRAND BAYOU WETLAND

Location and Size

The proposed project area comprises 26,000 ac between the natural levee ridges of Bayou Blue and Bayou Pointe au Chien. It includes the whole spectrum of wetland habitats, including bottomland hardwoods, wooded swamp, and fresh, intermediate, and brackish marshes. About 4,600 ac of the southern section is included within the Pointe au Chien State Wildlife Management Area and was selected in 1982 by the Corps of Engineers (COE) as a site to mitigate the impacts resulting from the Larose to Golden Meadow Hurricane Protection project. The present proposal introduces an expansion of the proposed structural measures to manage the entire 26,000-ac watershed (Figure TE-0).

Objectives

The overall objective of the proposed plan is to protect the mostly fresh and intermediate wetland habitats from encroaching saltwater and to maintain the diversity of wetlands by modifying the original wetland mitigation project. Continued loss of marshes to the south is resulting in a landward movement of marine conditions. In addition, the watershed is bounded on the southeast by Grand Bayou Canal, which is a major navigation route and saltwater avenue from the upper bay system of the Terrebonne Basin to the Bully Camp Oil and Gas Field. Tidal processes have led to considerable marsh loss in the southern end of the project area. Since there are no reliable, external sources of freshwater input to the area, these habitats must depend upon conservation of rainfall within the watershed.

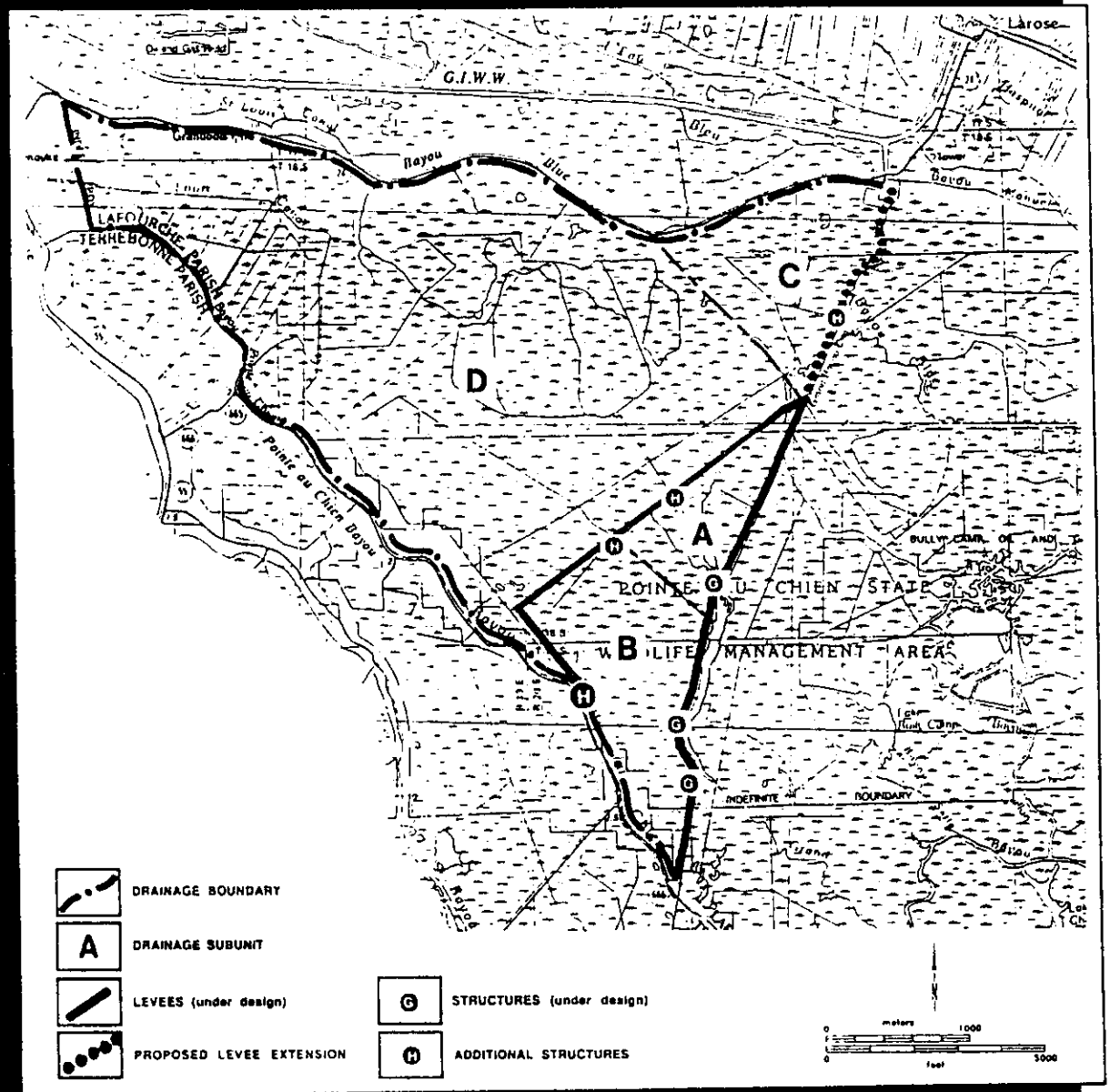
Project Features

The project plan is presented in Figure TE-5. It consists of the mitigation part, as agreed to by the COE in 1982 and presently under design (Area A in Figure TE-5), and additional features required to extend marsh protection to the entire project area. The mitigation part comprises a management levee and variable water-control structures along the Grand Bayou Canal, and rehabilitation of existing spoil banks along the northwest boundary of Area A. Newly proposed features are the extension of the management levee along Grand Bayou Canal from the United Gas Pipeline Canal to the Bayou Blue ridge, and the installation of a major structure in the southwest corner of the area to control water exchange with Bayou Point au Chien. The proposed levees and control structures will permit gradual release of freshwater and permit management for a gradual transition to more brackish conditions in the future. Two additional structures along the boundary between areas A and D would allow for transfer of freshwater from A to C.

Status and Schedule

The proposed plan requires further coordination among the DWF, local government, and landowners. Levee work along Grand Bayou Canal is in engineering design at this time. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Wetland protection and maintenance	FPD	FPD/CI	OMR



TE-5. GRAND BAYOU WETLAND

Hydrologic Basin: Terrebonne
Parish: Lafourche
Acreage Involved: 26,000

Purpose and Need: The overall objective of the proposed plan is to maintain the diversity of wetland habitats in the watershed and deter wetland loss. The proposed addition to the original COE mitigation plan will protect more wetlands by retaining and utilizing available freshwater.

Project Description: Greater utilization of freshwater will restore a more favorable hydrological regime. The use of levees and control structures will allow reduction of saltwater intrusion and associated wetland loss. A levee along Grand Bayou and associated water-control structures may eventually be implemented by the COE under current mitigation requirements. Feasibility of enlargement of the current project will be determined.

TE-6. POINTE AU CHIEN WETLAND

Location and Size

The project is located near Montegut in Terrebonne Parish and extends southward between the natural levee ridges of Bayou St. Jean Charles and Bayou Pointe au Chien. The southern boundary of the unit is formed by the embankment of a road traversing the marsh from east to west. The benefitted area encompasses 4,700 ac (Figures TE-0).

Objectives

The primary objective of this project is to protect, maintain and, to the extent feasible, restore wetland vegetation by improving freshwater retention, reducing maximum salinity, and moderating water flux and tidal energy in the deteriorating wetland community. Marine tidal invasion, wave action, and subsidence have caused removal of the organic substrate and resulted in a conversion to open water. The remaining marshes are not able to revert rapidly enough to more saline tidal conditions and maintain a living root mat, resulting in further erosion.

The project intends to prolong the integrity of the remaining wetlands, restore emergent vegetation, and enhance the quality of existing habitats by maintaining less saline conditions and allowing for a more gradual transition toward brackish conditions where necessary.

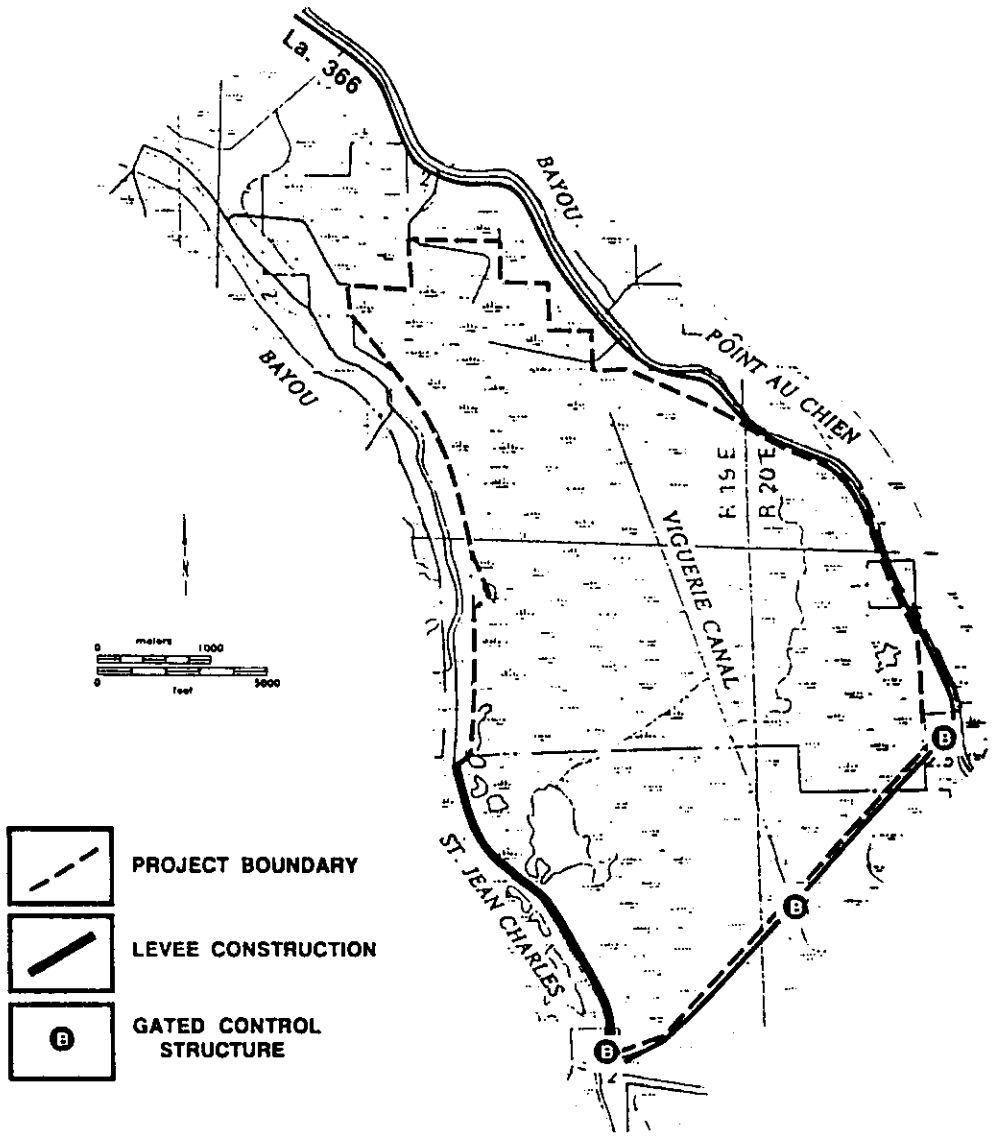
Project Features

Negotiations are presently being conducted for a cooperative agreement between landowners and the DWF to integrate management of the area into that of the Pointe au Chien Wildlife Refuge. The project is intended to prolong the integrity of the remaining wetlands by maintaining less saline conditions and allowing for a more gradual transition toward brackish conditions where possible through structural controls (Figure TE-6). These include: (1) a continuous embankment along the southern boundary, (2) maintenance of 10,800 ft of the lower part of the Bayou du Large natural levee ridge, and (3) the installation of three water control structures. To provide additional freshwater and nutrients, it is proposed that outfall from the forced drainage area to the north be routed through the management unit.

Status and Schedule

The embankment along the southern boundary is presently in place. Federal and state permits for implementation of the proposed project features have been obtained. No agreement has been reached on the proposed rerouting of discharge from the pumping station.

Project Elements	90/91	91/92	92/93
Wetland protection and enhancement	FPD	FPD/CI	OMR



TE-6. POINTE AU CHIEN WETLAND

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage Involved: 4,700

Purpose and Need: Marshes in this area are rapidly eroding as a result of subsidence, increasing water exchange, and saltwater intrusion. This project intends to facilitate conservation of freshwater derived from local runoff and control saltwater inflow to obtain a more favorable hydrologic regime.

Project Description: Water management would be achieved through use of an existing highway embankment and three water control structures. The need for further definition of hydrologic boundaries for management purposes requires evaluation.

TE-7. LAKE BOUDREAUX WETLAND

Location and Size

The project includes 46,000 ac of marshland in a hydrologic sub-basin located north of LA 57 between the Bayou Grand Caillou and Bayou Petit Caillou natural levee ridges

Objectives

The objective of this project is to provide wetland protection and enhancement through water management on a basin-wide scale by possibly incorporating individually proposed management areas, including the Upper Petit Caillou area, Lower Petit Caillou area and the Grand Caillou area (Figure TE-7). A second objective is to limit the area that is hydrologically connected to the Houma Navigation Canal, thereby lessening saltwater intrusion and rapid loss of freshwater.

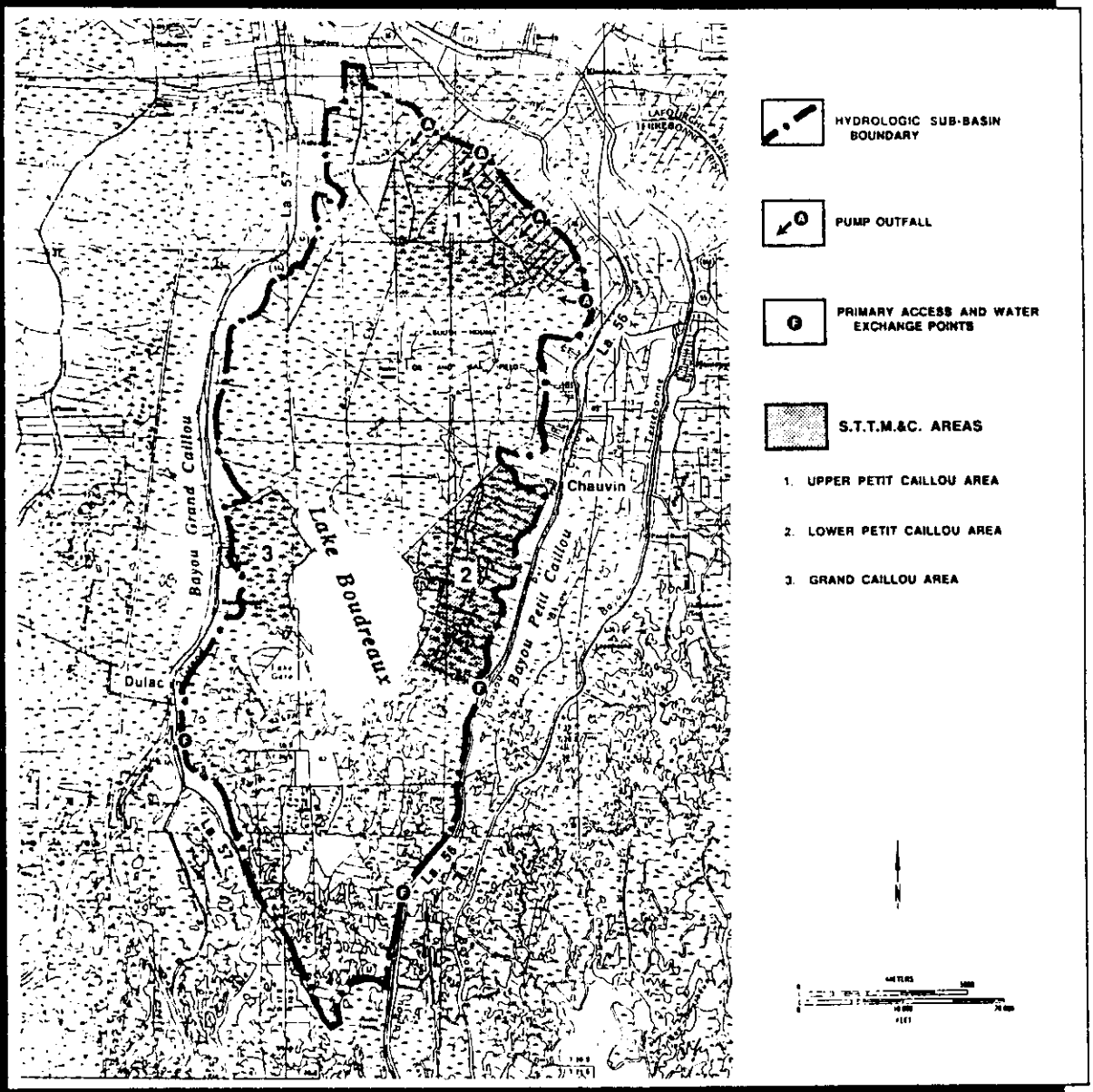
Project Features

The project focuses on the water management of the entire sub-basin In order to formulate this management plan, the following must be considered: reduction of saltwater exchange with the Houma Navigation Canal through Bayou Grand Caillou and Bayou Dulac, and conservative use of freshwater provided through local rainfall and outfall from a number of pumping stations (Figure TE-7). Major inflow and outflow of the area occurs at three locations. Bayou Dulac at Dulac, the Boudreaux Canal at LA 56, and the Robinson Canal at LA 56. Water-control structures to be proposed will depend on water management as well as navigation needs.

Status and Schedule

No elements of the project have been undertaken. The project requires extensive feasibility analysis and further coordination between DNR as the implementing agency and local government. The area has been identified in the Lafourche-Terrebonne Basin study as a potential watershed project area. Federal cost-sharing may be available for implementing this project. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Water management	FPD	FPD/CI	FPD/CI



TE-7. LAKE BOUDREAUX WETLAND

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage Benefitted: 46,000

Purpose and Need: Wetland protection and enhancement through water management on a sub-basin scale to counter saltwater intrusion and erosive tidal forces.

Project Description: The project focuses on the water management of an entire sub-basin. Major water exchange in the area occurs at three locations. Navigational access, fishery migration, and water control feasibility are to be evaluated. The project would combine and incorporate areas presently considered for management by local interests.

TE-8. BAYOU PELTON WETLAND

Location and Size

The project area consists of a 2,400-ac strip of wetland lying between the Houma Navigation Canal and Bayou Grand Caillou from Bayou Pelton to Dulac (Figure TE-0).

Objectives

The main objective of this surface-water-management project is to halt wetland loss caused by saltwater inflow from and rapid loss of freshwater to the Houma Navigation Canal. A second objective is to limit the area that is hydrologically connected to the Houma Navigation Canal, thereby lessening saltwater intrusion and rapid loss of freshwater.

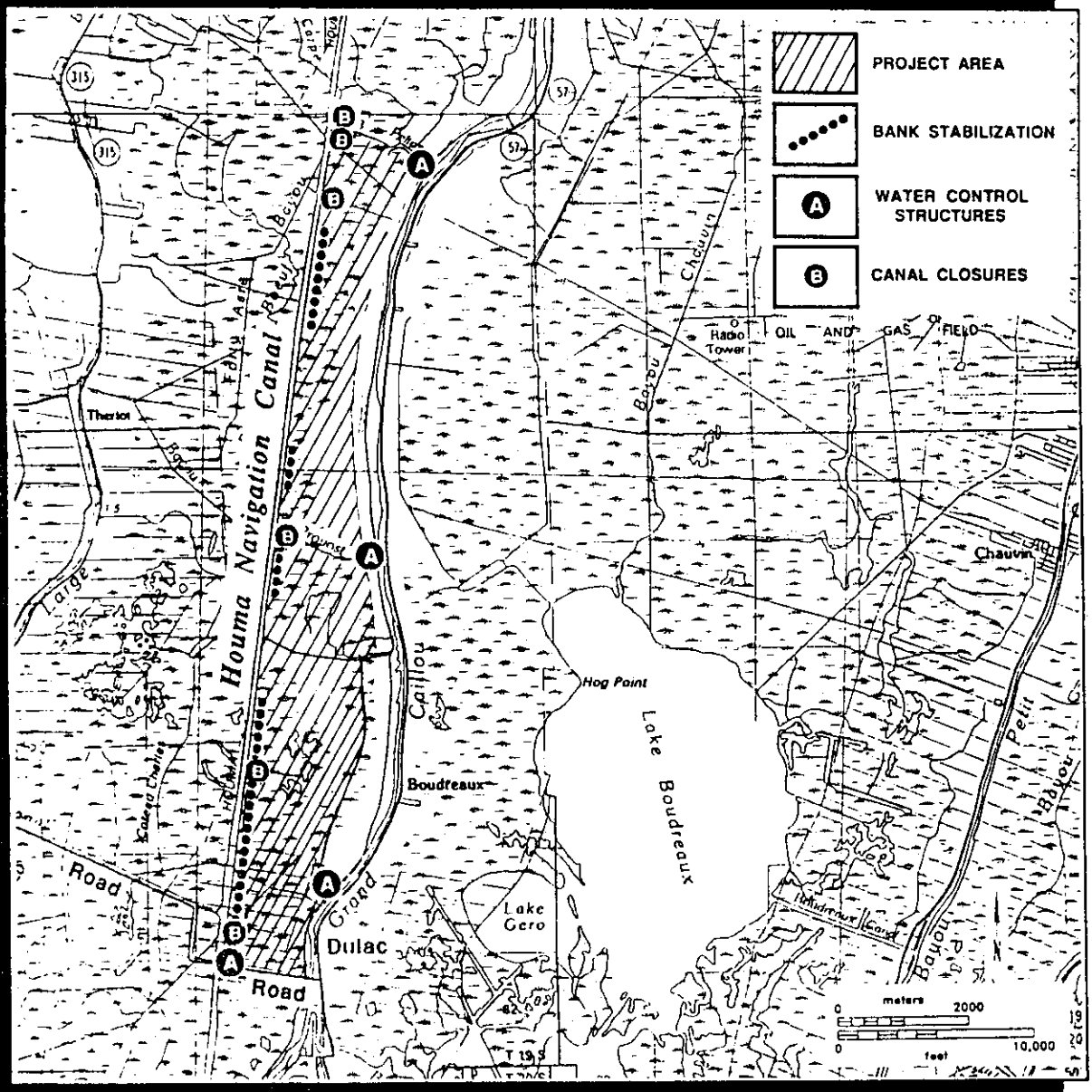
Project Features

Proposed project features include closure of tidal connections at seven locations and 5,000 ft of bank stabilization along the Houma Navigation Canal. Water-control structures have been proposed for the Falgout Canal, Bayou Provost, and Bayou Pelton to provide for freshwater conservation and water exchange with Bayou Grand Caillou. A structure for drainage and flow-through purposes is proposed in the southwest corner of the project area along the Houma Navigation Canal (Figure TE-8).

Status and Schedule

No elements of the project have been undertaken. The project requires coordination among DNR as the implementing agency, local government, and landowners. Pending outcome of a feasibility analysis, the anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Water management measures	FPD	FPD/CI	OMR



TE-8. BAYOU PELTON WETLAND

Hydrologic Basin: Terrebonne
Parish: Terrebonne
Acreage Benefitted: 2,400

Purpose and Need: To halt wetland loss caused by saltwater inflow from and rapid loss of freshwater to the Houma Navigational Canal.

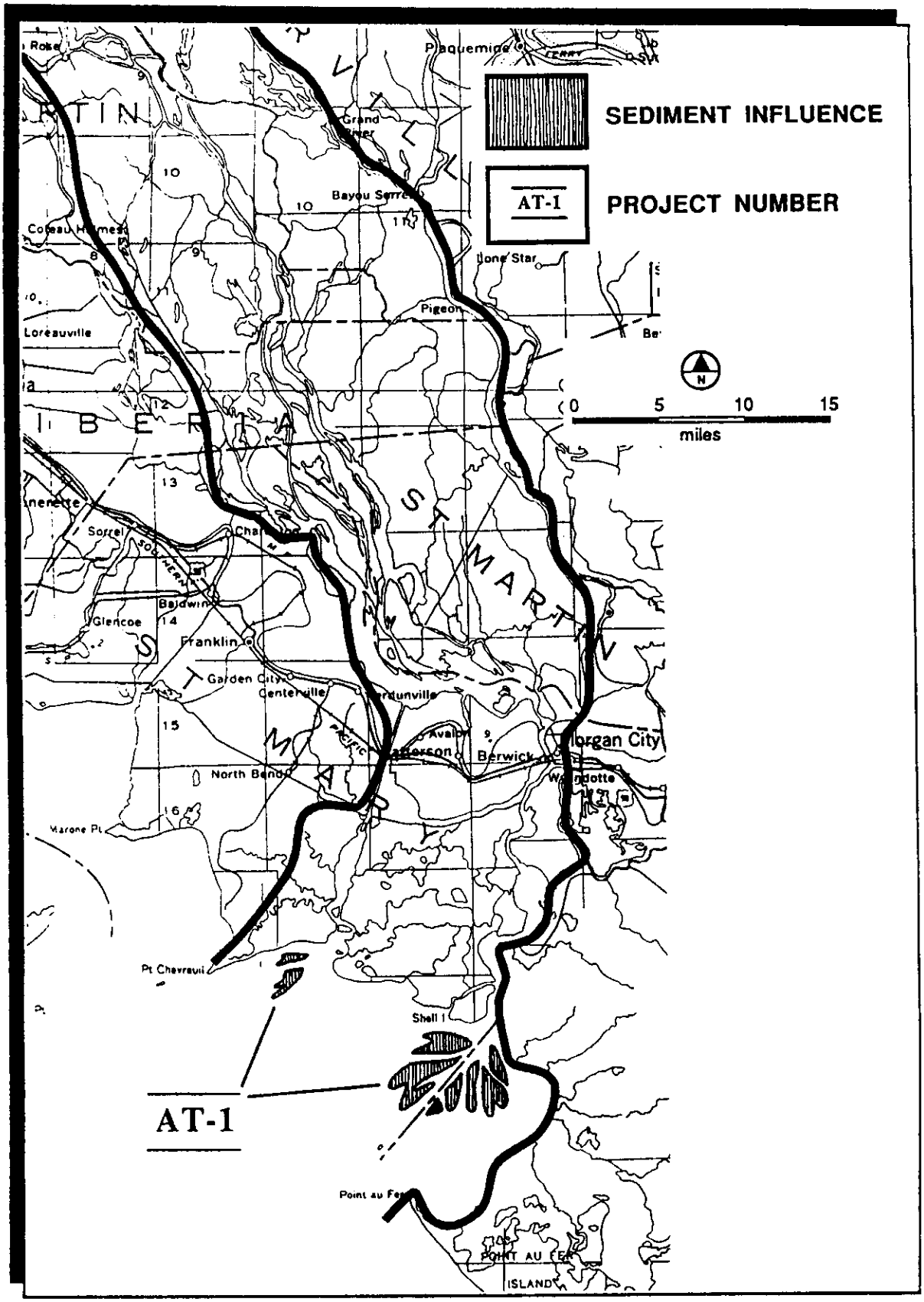
Project Description: Water exchange between this and surrounding areas will be controlled and reoriented toward Bayou Grand Caillou for wetland protection and enhancement. Requirements are for a number of closures and some bank stabilization along the Houma Navigation Canal, and water-control structures along Bayou Grand Caillou.

ATCHAFALAYA BASIN

ATCHAFALAYA BASIN

AT-1. Atchafalaya River Delta

Figure PO-0. Location and estimated area of benefit for projects proposed in the Atchafalaya Basin.


SEDIMENT INFLUENCE
AT-1
PROJECT NUMBER
0 5 10 15
miles
N
Plaquemine
Grand River
Bayou Sorrel
Lone Star
Pigeon
Loreauville
Sorrel
Baldwin
Glencoe
Franklin
Garden City
Centerville
Berwick
Morgan City
North Bend
Pt Chevreuil
Shell I
Point au Fer
POINT AU FER ISLAND
AT-1

AT-1b. ATCHAFALAYA DELTA

Location and Size

The project is located south of Morgan City, St. Mary Parish, at the mouth of the Atchafalaya River. The emerging delta of the river occupies over 20,000 ac in Atchafalaya Bay (Figure AT-0).

Objectives

The primary objective of the project is to accelerate the rate of marsh building using sediment-trapping devices and vegetation planting.

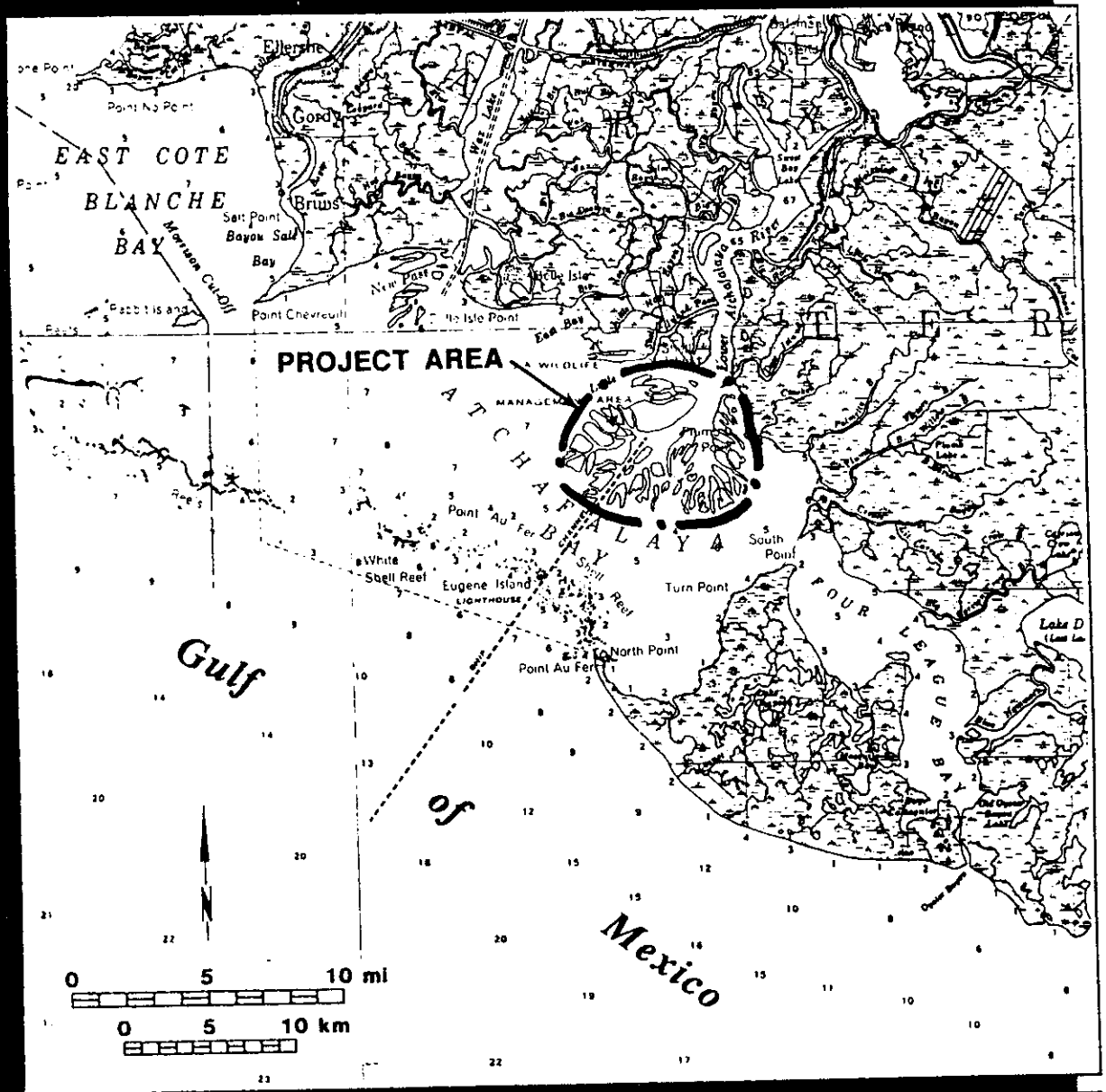
Project Features

Although the acreage of shoals and submerged towhead islands in the Atchafalaya Delta is substantial, the actual area of emergent marsh is relatively small. Land is formed mostly during major floods when water levels are high and sediment can build to the point where islands are exposed when the water level recedes again. Once vegetation becomes established, island growth accelerates. This project will use sediment-trapping techniques in conjunction with vegetation plantings to accelerate the buildup of sediment on existing shoals. Several pilot projects will be constructed and monitored to determine the most feasible and cost-effective technique for large-scale application (Figure AT-1b.).

Status and Schedule

The project is an outgrowth of similar projects undertaken by the DWF in the Mississippi River Delta and under development in the Atchafalaya Delta Wildlife Management Area. The development and implementation of the project will be in cooperation with the DWF.

Project Elements	90/91	91/92	92/93
Fence construction and planting	FPD/CI	FPD/CI	FPD/CI



AT-1b. ATCHAFALAYA DELTA

Hydrologic Basin: Atchafalaya
Parish: St. Mary
Acreage benefitted: Not determined

Purpose and Need: The objective of the project is to increase the rate of marsh building by the use of sediment-trapping devices and vegetation planting.

Project Description: This project will use sediment-trapping techniques in conjunction with vegetation plantings to accelerate the buildup of sediment on and the emergence of existing shoals. Several pilot projects will be constructed and monitored to determine the most feasible and cost-effective technique for large-scale application.

TECHE / VERMILION BASIN

TECHE/VERMILION BASIN

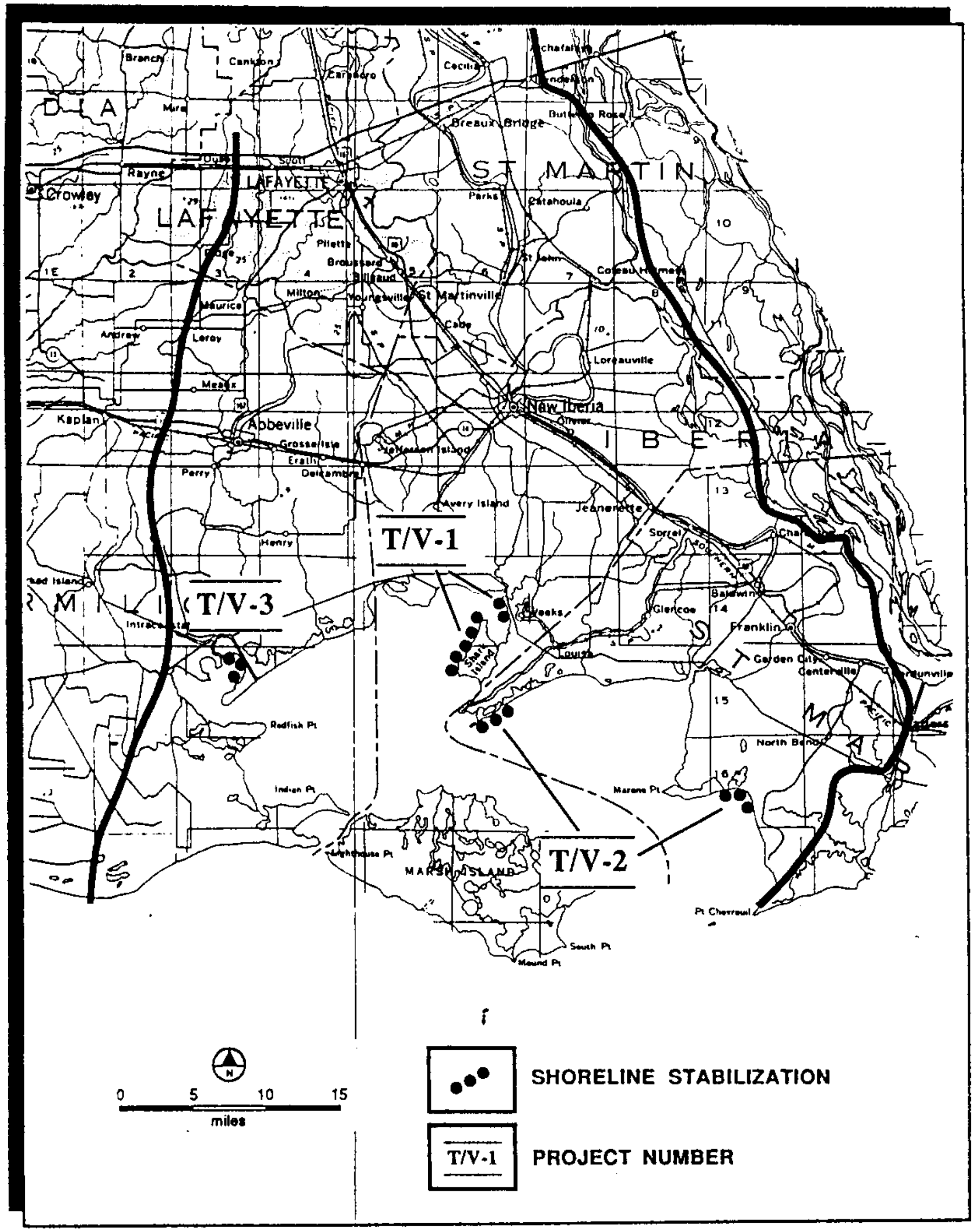
T/V-1. Shark Island / Weeks Bay

T/V-2a. Hammock Lake

T/V-2b. Yellow Bayou Wetland

T/V-3. Vermilion River Cutoff

Figure T/V-0. Location of projects proposed in the Teche/Vermilion Basin.



LAFAYETTE
ST MARTIN
Lafayette
Crowley
Rayne
Breaux Bridge
Abbeville
New Iberia
Kaplan
St Martinville
Loreauville
Jeanerette
Avery Island
Jefferson Island
Franklin
Baldwin
Glencoe
Weeks
Redfish Pt
Indian Pt
Marone Pt
North Bend
Pt Chevreuil
Lighthouse Pt
MARSH ISLAND
South Pt
Mound Pt
Garden City
Centerville
T/V-1
T/V-2
T/V-3
0 5 10 15
miles
N
SHORELINE STABILIZATION
T/V-1
PROJECT NUMBER

T/V-1. SHARK ISLAND/WEEKS BAY

Location and Size

The project has two elements. One is the western shore of Shark Island, the second is the eastern shore of Weeks Bay where erosion has breached the marsh between Weeks Bay and the GIWW. Both areas are located in Iberia Parish (Figures T/V-0, T/V-2). The Shark Island project is expected to preserve about 1,000 ac of marsh. The Weeks Bay project would help protect several thousand acres of fresh and imtermediate marsh from saltwater intrusion.

Objectives

The objectives of the proposed projects are to reduce the exceptionally high rate of shoreline erosion along Shark Island and to close several breaches that presently connect Weeks Bay and the GIWW, and that facilitate the exchange of water, including the loss of freshwater and the introduction of saltwater.

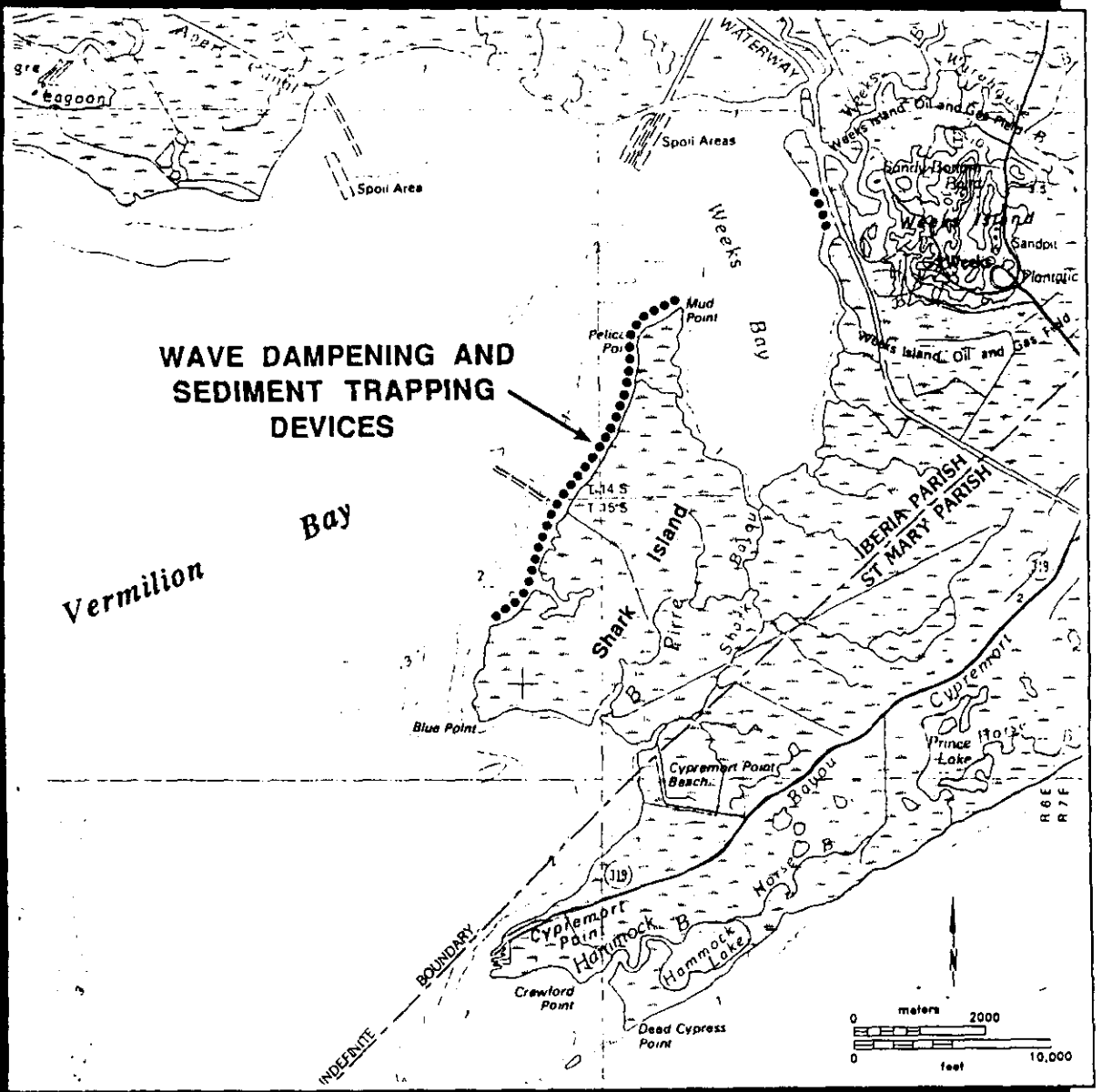
Project Features

These projects will be an integral part of DNR's sedimentation/vegetation/shore protection program in the Coastal Restoration Division. A site-specific feasibility analysis is necessary to establish the project design. Once established, specific materials to be used will be selected. Reversing the erosional trend may be possible in both areas through the construction of devices that will dampen wave action and enhance deposition of suspended sediments, particularly during high Atchafalaya River discharges. However, materials must be comparatively low in cost and could include dredged material, brush material, fencing material, synthetic fabrics, and vegetation seedlings.

Status and Schedule

No elements of the project have been undertaken. The project requires coordination among DNR as the implementing agency; local government; landowners; and, along the GIWW, the Corps of Engineers. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Shark Island	FPD/CI	CI	OMR
Weeks Bay/GIWW	FPD/CI	CI	OMR



T/V-1. SHARK ISLAND/WEEKS BAY

Hydrologic Basin: Teche-Vermilion
Parish: Iberia
Acreage Benefitted: 1,000 (20,000 ft Shoreline)

Purpose and Need: To reduce the exceptionally high rate of shoreline erosion and restore marsh through enhancement of sediment deposition and vegetation planting.

Project Description: Proposed project locations include the eastern shore of Weeks Bay and the western shore of Shark Island. The project will be an integral part of DNR's Sedimentation and Vegetation Program. A site-specific analysis is needed to establish the project design characteristics.

T/V-2a. HAMMOCK LAKE

Location and Size

The project area is located at Hammock Lake along the shoreline of West Cote Blanche Bay, just east of Cypremort Point in St. Mary Parish (Figure T/V-0). The project encompasses 4,000 ft of shoreline, and could restore up to 200 ac of wetlands.

Objectives

The primary objective is to prevent Hammock Lake from merging with West Cote Blanche Bay by the use of retaining fences and biodegradable sediment-trapping devices (Christmas trees). In addition, this project increases public awareness of the problems of coastal erosion by providing an opportunity for participation by the general public.

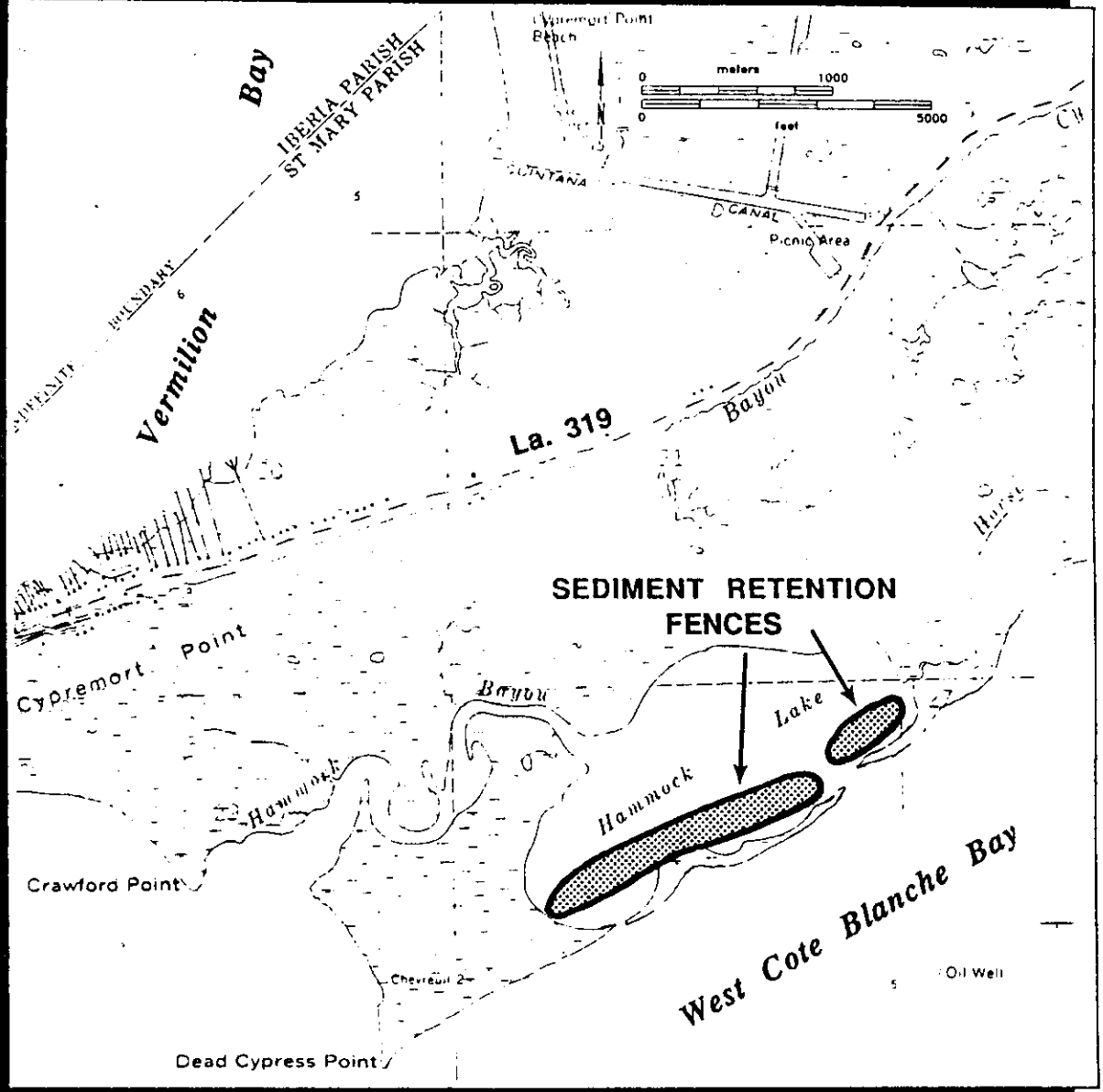
Project Features

Hammock Lake, situated south of Quintana State Park, is a popular spot for local sports fishermen. Breaching of the remaining lakeshore threatens to open the lake up to wave action. To protect the shoreline, fences will be constructed along critical areas (Figure T/V-1b) to serve as an anchor for sediment-trapping brush material (Christmas trees). The trees will serve to dampen wave energy and trap suspended sediments. When enough sediment has accumulated to reach above local water level, marsh plants will become established and continue to trap more sediment. Approximately 8,000 Christmas trees have been collected for use this year. Maintenance of the retaining fences, replacement of trees, and placement of additional trees would continue annually based on the degree of success. The area is highly suitable for sediment trapping because of the high suspended-sediment concentrations associated with Atchafalaya River discharges.

Status and Schedule

The project will be implemented in part during 1990 under the ongoing program of DNR's Coastal Restoration Division. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Fence and tree installation	FPD/CI	OMR	OMR



T/V-2a. HAMMOCK LAKE

Hydrologic Basin: Teche Vermilion
Parish: St. Mary
Acreage Benefitted: 200

Purpose and Need: To restore the breached marsh boundary between Hammock Lake and Cote Blanche Bay and prevent merging of the two water bodies. Located in the vicinity of the Quintana State Park, the lake is intensively used for recreation.

Project Description: To enhance sedimentation, fences will be constructed in critical areas to anchor sediment-trapping brush material (Christmas trees). The area is considered suitable for sediment trapping because of the high suspended-sediment concentrations in the area.

T/V-2b. YELLOW BAYOU WETLAND

Location and Size

The project is located along the north shore of East Cote Blanche Bay, just west of LA 317 near South Bend in St. Mary Parish (Figure T/V-0) and involves approximately 13,000 ft of eroding shoreline. About 2,000 ac of wetlands depend on the physical integrity of the shore for protection from wave erosion and saltwater.

Objectives

The objective of the proposed project is to stop shoreline erosion at this site and thereby prevent the development of channel connections between a shallow pond system and East Cote Blanche Bay. Breaching of the shoreline could result in accelerated wetland loss as a result of increased wave erosion and scouring.

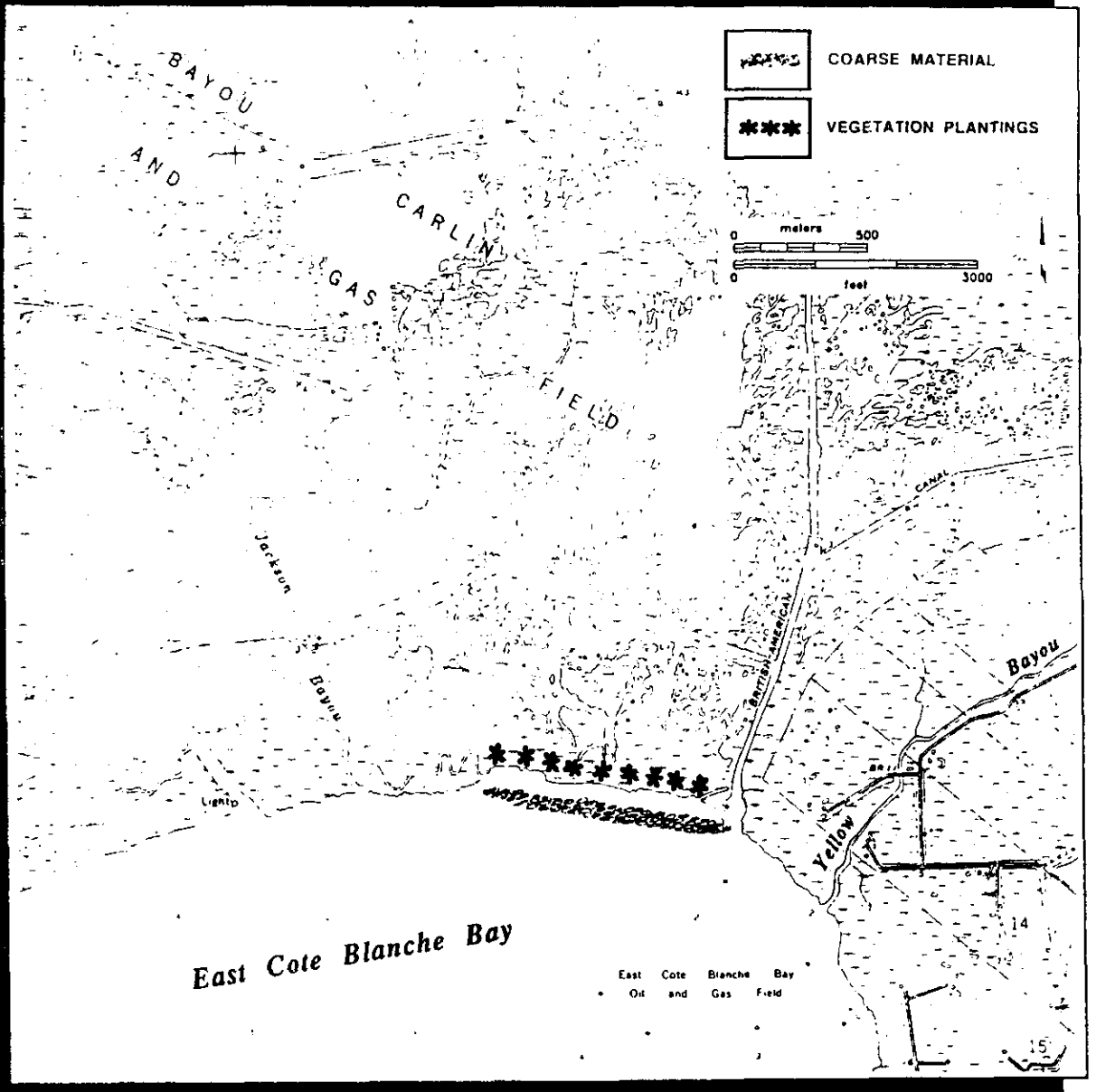
Project Features

The marsh presently protected by the eroding shoreline of the project site is in a deteriorated condition. Proposed plans call for the deposition of coarse material in the nearshore area approximately 20 to 50 ft from the shoreline (Figure T/V-1a). Wave action is expected to redistribute the material into a berm deposit and form a protective veneer along the marsh shore. Additionally, vegetation plantings will be made just behind the berm crest to capture overwash material.

Status and Schedule

The proposed project is at the planning, permitting, and design stage.

Project Elements	90/91	91/92	92/93
Shore protection measures	FPD/CI	OMR	OMR



T/V-2b. YELLOW BAYOU WETLAND

Hydrologic Basin: Teche-Vermilion
Parish: St. Mary
Acreage Benefitted: 2,000

Purpose and Need: Prevent breaching of a marsh boundary and merging of a pond system with East Cote Blanche Bay. Breaching would cause rapid wetland loss and deterioration as a result of increased wave erosion and scouring.

Project Description: Marsh presently protected by the shoreline is in a deteriorated condition. The proposed plan calls for coarse material deposition and vegetative plantings along 13,000 ft of shoreline.

T/V-3. VERMILION RIVER CUTOFF

Location and Size

The Vermilion River Cutoff (Four Mile Cutoff), near Intracoastal City in Vermilion Parish, connects the Vermilion River and the GIWW with Vermilion Bay for navigational purposes (Figure T/V-0). Sediment availability from natural sources and maintenance dredging appear to provide an opportunity for marsh restoration in at least a 225-ac area. The project would protect 300 ac of marsh from wave erosion.

Objectives

The objective of the project is to reestablish a section of marsh bank along the west side of the Vermilion River Cutoff through measures that induce settling of suspended sediment derived from natural sources such as the Atchafalaya River, as well as from future dredged material.

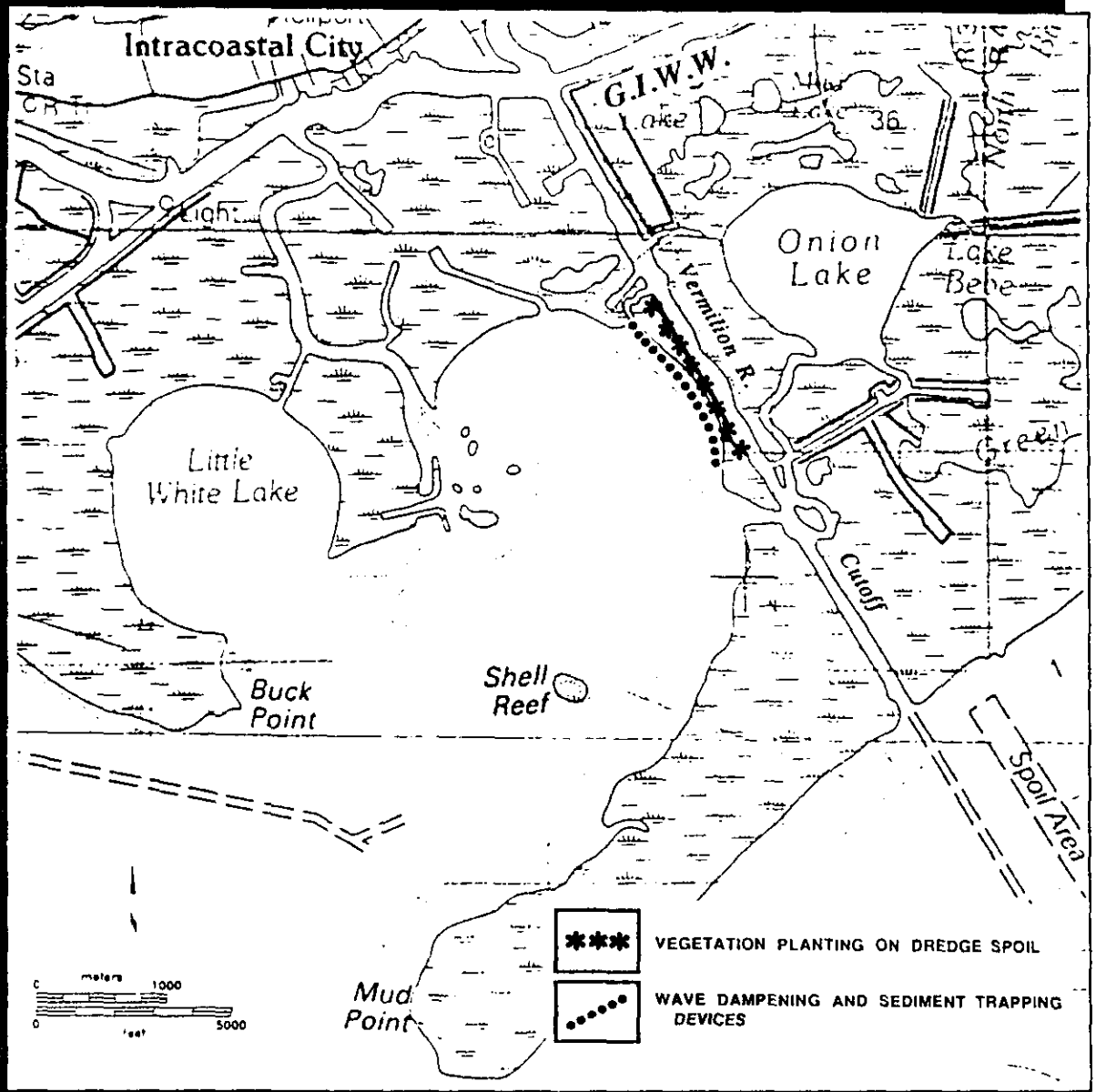
Project Features

A large section of the west bank of the Vermilion River Cutoff has eroded away as a result of boat wakes in the canal and wave erosion from the bay on the opposite side. A wide, shallow area through which flow is diverted from the navigation channel remains. The flow loss results in siltation of the channel and the need for limited maintenance dredging in the near future. It should be determined whether it is feasible to install sediment-trapping devices that will enhance deposition of suspended sediment moving through the gap into deeper water and that will limit loss of dredged material during disposal (Figure T/V-3).

Status and Schedule

Preliminary planning has been accomplished through efforts by local interests. Additional feasibility analysis and coordination with the Corps of Engineers and local government is required.

Project Elements	90/91	91/92	92/93
Marsh restoration	FPD/CI	CI	OMR



T/V-3. VERMILION RIVER CUTOFF

Hydrologic Basin: Teche-Vermilion
Parish: Vermilion
Acreage Benefitted: 25

Purpose and Need: Enhance deposition of sediments with a combination of dredged material and natural sources of suspended sediments to restore marshland.

Project Description: A large section of the west bank of the Vermilion River Cutoff has eroded away as a result of wave action. It is proposed that sediment-trapping devices be used to dampen wave energy and enhance sediment deposition, and that vegetation be planted to stabilize newly deposited sediments.

MERMENTAU BASIN

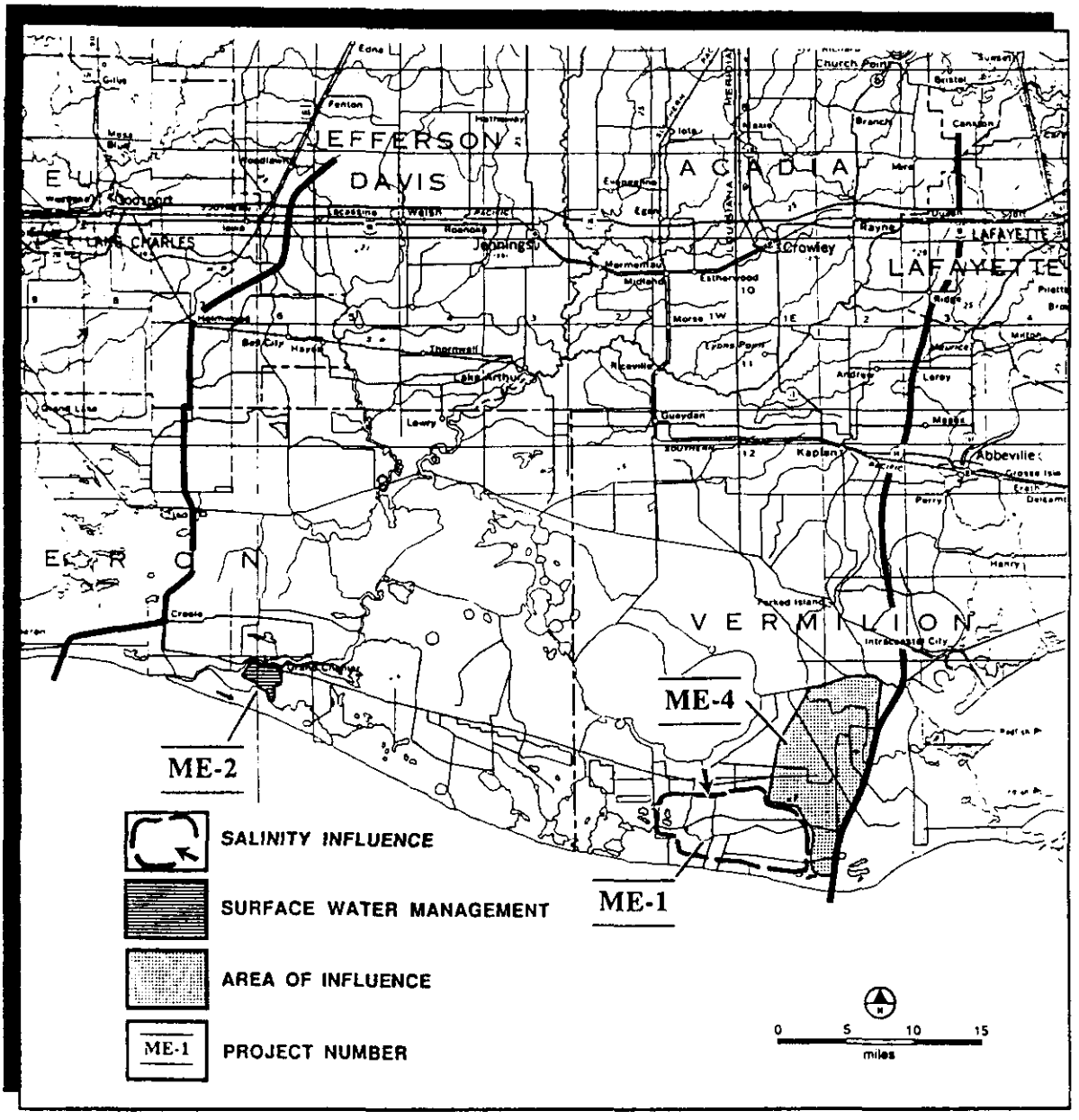
MERMENTAU BASIN

ME-1. Pecan Island Freshwater Introduction

ME-2. Hog Bayou Wetland

ME-4. Freshwater Bayou Wetland

Figure ME-0. Location and estimated area of benefit for projects proposed in the Mermentau Basin.


JEFFERSON DAVIS
ACADIA
LAFAYETTE
VERMILION
ME-2
ME-4
ME-1
SALINITY INFLUENCE
SURFACE WATER MANAGEMENT
AREA OF INFLUENCE
ME-1
PROJECT NUMBER
0 5 10 15
miles

ME-1. PECAN ISLAND FRESHWATER INTRODUCTION

Location and Size

The Pecan Island Canal in Vermilion Parish will be used to divert water from the Grand Lake-White Lake Basin into the marshes to the south of LA 82 (Figure ME-0). It is estimated that 38,700 ac of marshland will benefit from this introduction of freshwater.

Objectives

The primary objective is to reduce the rate of marsh loss by introducing freshwater from White Lake into the marshes to the south of LA 82. The proposed project will create a controlled input of freshwater from White Lake into the marsh to reduce saltwater intrusion. The freshwater diversion, whenever possible, would allow maintenance of a freshwater head in the wetland system to the south of LA 82 and thus reduce saltwater introduction from the Gulf.

A secondary benefit of the project would be to provide an additional drainage outlet for the Grand Lake/White Lake watershed. It has been generally recognized that the average water levels in this watershed are too high under normal meteorological conditions. The present Corps of Engineers structures are designed to conserve freshwater during low rainfall conditions for irrigation and navigation purposes. During normal or high rainfall, excess water is available. The proposed plan would utilize excess water to enhance marshland.

Project Features

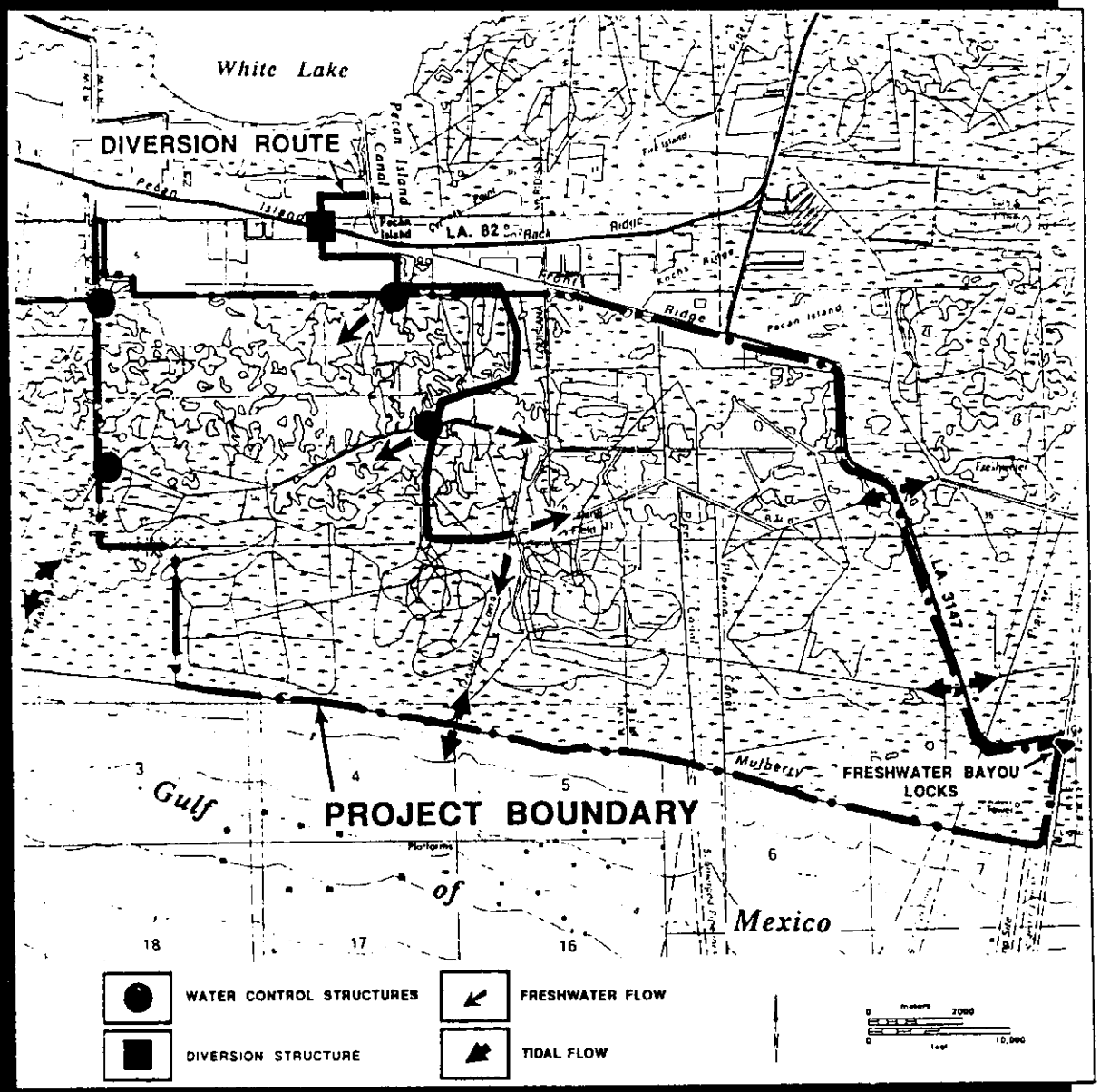
The Pecan Island wetland enhancement project has been divided into two sections: (1) Pecan Island structure, and (2) outfall management. It is proposed that the Pecan Island Canal be extended to intersect with LA 82. Dimensions of the canal extension require further engineering evaluation. For the crossing of LA 82, a conduit of about 100 sq ft cross section with operable gates needs to be designed and constructed. An outfall management scheme must also be designed to disperse water, nutrients, and sediment to the marsh. It is proposed that the access canal system of the Pecan Island Gas Field be utilized as a freshwater distribution system from which water can be withdrawn through water-control structures (Figure ME-1).

The diversion structure at LA 82 will be operated in the same manner as the other major structures controlling the surface waters of the Grand Lake/White Lake system. The plan has been coordinated with regard to an existing, permitted marsh management plan and access requirements of Vermilion Corporation. The diversion would aid in offsetting saltwater intrusion through Rollover Bayou and the Dewitt Canal when open.

Status and Schedule

At this time both the proposed structure and associated outfall management are in the formative stage. The first step will be to finalize the plan and coordinate with affected landowners, local government, and regulatory agencies.

Project Elements	90/91	91/92	92/93
Diversion structure	FPD/CI	CI	OMR
Outfall management	FPD	CI	OMR



ME-1. PECAN ISLAND FRESHWATER INTRODUCTION

Hydrologic Basin: Mermentau
Parish: Vermilion
Acreage Benefitted: 38,700

Purpose and Need: This area experiences a significant loss of wetlands and an increase in salinities. Freshwater diversion would allow maintenance of a freshwater head in the wetland system to the south and thus reduce saltwater introduction from the Gulf.

Project Description: The project will provide for diversion of water from White Lake through the Pecan Island Canal and a structure under LA 82. Existing oil and gas access canals will provide a distribution network from which freshwater can be diverted into the marshes and utilized through existing and proposed management features.

ME-2. HOG BAYOU WETLAND

Location and Size

This project is north of Lower Mud Lake and Hog Bayou, and south of LA 82, in Cameron Parish, and encompasses about 2,000 ac of saline marshland (Figure ME-0). The marsh experiences a high tidal range (1.5 ft), high suspended-sediment load, and a considerable range of salinity.

Objectives

The project area sustained considerable marsh loss from 1978 to 1985. The objective of the project is to restore brackish marsh habitats and improve the value of the area for wildlife while maintaining important fisheries functions. To achieve these objectives a number of measures have been proposed to regain freshwater retention capability, reduce salinities, and provide for draw-down to harden pond bottoms to promote growth of submerged aquatic plants for waterfowl food. Special measures will be included to provide for continued access of the marshland by marine organisms. Continued input of suspended sediments to offset subsidence can be provided with the control structures to allow for marsh enhancement and restoration.

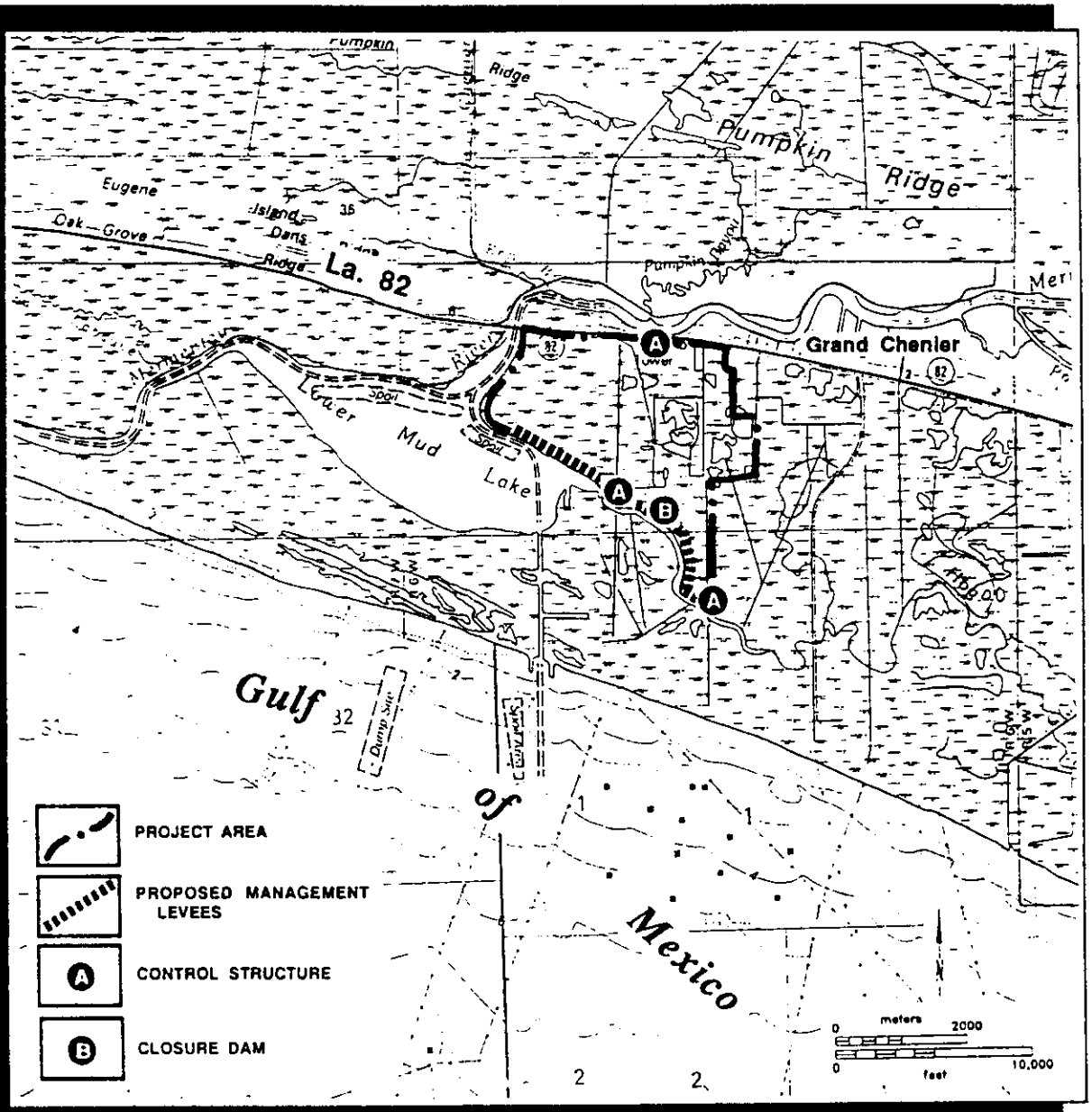
Project Features

The plans for the project as presently envisioned include restoration of 10,500 lin ft of levee, an earthen plug, and three sets of water control structures (total of eight structures) (Figure ME-2). One set of structures will be composed of five 48-in culverts with stop-log bays on the inside. On the outside, four of the culverts will have flap gates and one will be slotted to provide for fisheries ingress and egress. Existing culverts on the north end of the area under LA 82 will be fitted with flap gates on each end so that freshwater and sediments will enter from the Mermentau River on rising tides and be retained. Water levels will be lowered every fourth year to harden pond edges, thereby reducing turbidity and promoting production of widgeongrass for waterfowl food. The same structures could be operated to input and retain suspended sediments from Mud Lake and Hog Bayou during low salinity periods and allow for draw-down to reestablish marsh vegetation.

Status and Schedule

The project is being proposed through a joint effort of the Cameron Parish Drainage District #5 and all 23 owners of the wetlands within the project area. A state Coastal Use Permit has been obtained; Federal approval is pending. The project requires further coordination with local interests concerning management objectives.

Project Elements	90/91	91/92	92/93
Implement management features	FPD/CI	OMR	OMR



ME-2. HOG BAYOU WETLAND

Hydrologic Basin: Mermentau
Parish: Cameron
Acreage Benefitted: 2,000

Purpose and Need: To restore brackish marsh habitats and improve the value of the area for wildlife while maintaining important fisheries functions.

Project Description: The project area has sustained considerable marsh loss recently. Management plans include the restoration of a levee, an earthen plug, and three water control structures. The same structures can be used to input and retain suspended sediment or to draw water level down to reestablish marsh vegetation.

ME-4. FRESHWATER BAYOU WETLAND

Location and Size

The project area is located west of Freshwater Bayou Canal, east of LA 82, south of the Schooner Bayou Canal, and north of the Acadiana Canal. It encompasses 35,000 ac of marshland in southeastern Vermilion Parish (Figure ME-0).

Objectives

The objective of the proposed project is to determine the cause(s) of ponding and excessively high water levels in the marshes of the project area, and to implement enhancement and protective measures that address these causes.

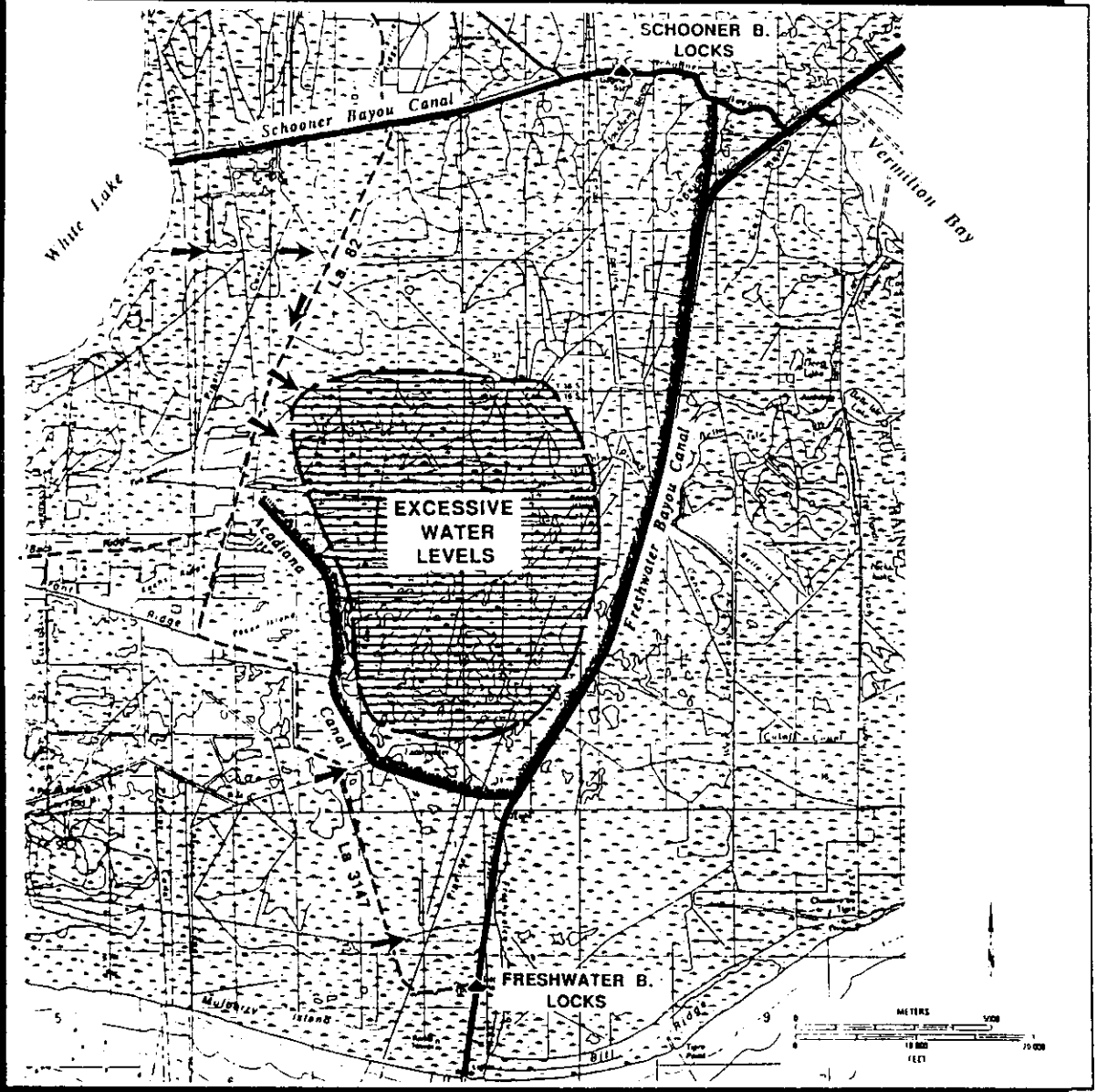
Project Features

High water levels maintained in White Lake may be transmitted into the study area through borrow canals and culverts beneath LA 82. Drainage from this area is impeded by spoil banks along both Freshwater Bayou and the Acadiana Canal. These conditions are aggravated during southeast winds when high stages in Vermilion Bay impede drainage from Freshwater Bayou. The Freshwater Bayou Locks are currently operated exclusively for navigation by the Corps of Engineers. Solutions to be evaluated include changes in the operation of Freshwater Bayou Locks during periods of excessive ponding, and installation of gated control structures along the Acadiana Canal (Figure ME-4).

Status and Schedule

No elements of the projects have yet been undertaken. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Hydrologic investigation	FPD	FPD/CI	OMR



ME-4. FRESHWATER BAYOU WETLANDS

Hydrologic Basin: Mermentau
Parish: Vermilion
Acreage Benefitted: 35,000

Purpose and Need: To determine the causes of excessively high water levels in the marshes and implement corrective measures where feasible.

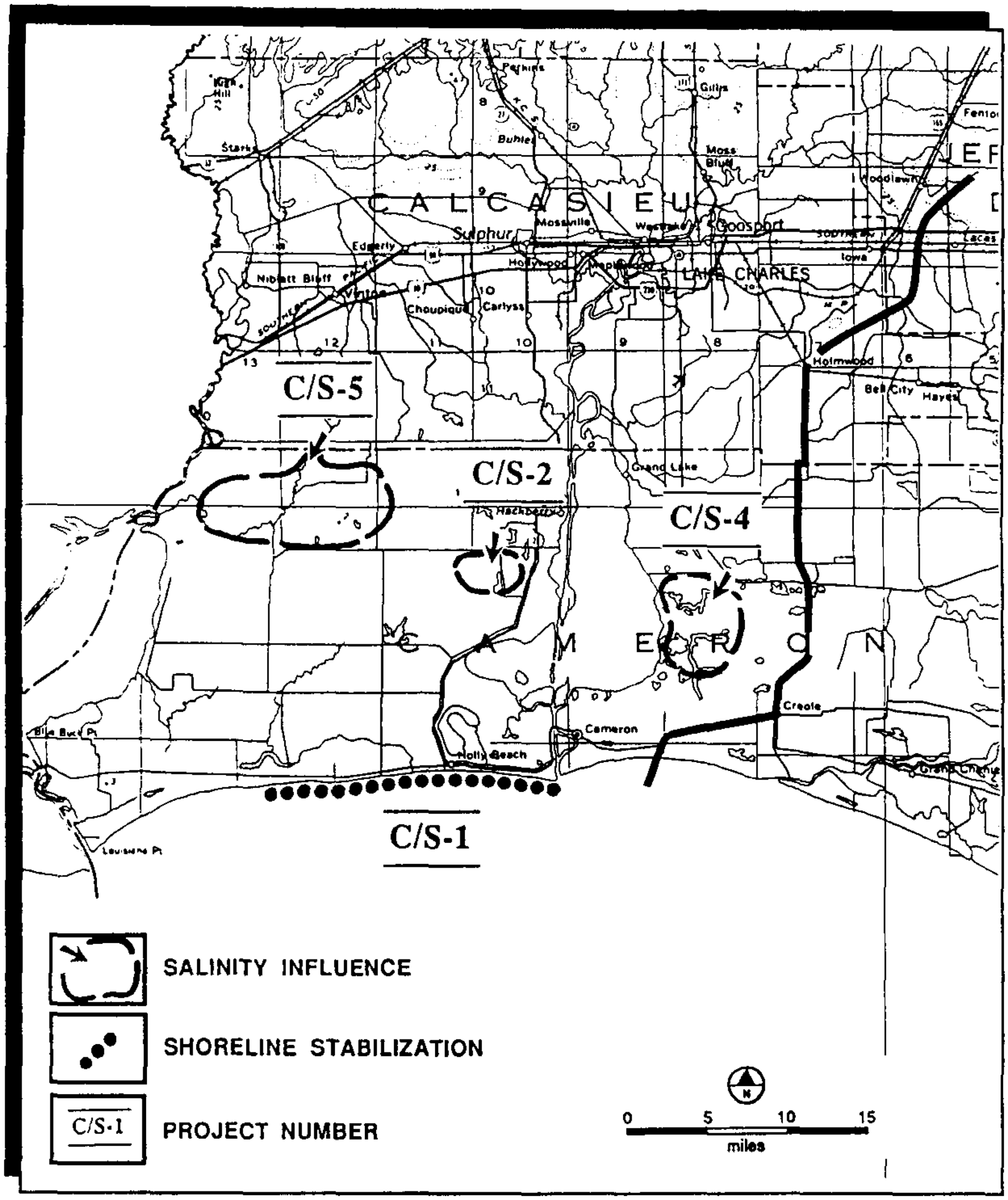
Project Description: Drainage of this wetland is impeded by spoil banks along both Freshwater Bayou and the Acadiana Canal. Solutions to be evaluated include changes in the operation of Freshwater Bayou Locks and installation of gated control structures along the Acadiana canal.

CALCASIEU / SABINE BASIN

CALCASIEU/SABINE BASIN

C/S-1a. Peveto Beach to Holly Beach
C/S-1b. Holly Beach to Calcasieu
C/S-1c. Constance Beach to Ocean View
C/S-2. Rycade Canal
C/S-4. Cameron Freshwater Introduction
C/S-5. Sabine Freshwater Introduction

Figure PO-0. Location and estimated area of benefit for projects proposed in the Calcasieu/Sabine Basin.


C A L C A S I E U
C A M E R O N
C/S-5
C/S-2
C/S-4
C/S-1
LAKE CHARLES
Sulphur
Goosport
Westlake
Mossville
Moss Bluff
Gillis
Perkins
Buhler
Starks
Edgerly
Niblett Bluff
Vinton
Choupique
Carlyss
Hollywood
Iowa
Holmwood
Bell City
Hayes
Grand Lake
Hackberry
Holly Beach
Cameron
Creole
SALINITY INFLUENCE
SHORELINE STABILIZATION
C/S-1
PROJECT NUMBER
0
5
10
15
miles

C/S-1a. PEVETO BEACH TO HOLLY BEACH

Location and Size

The project extends along 19,000 ft of Gulf of Mexico shoreline from Peveto Beach to Holly Beach along LA 82 in Cameron Parish (Figures C/S-0, C/S-1a). This elevated shore segment is part of the protection of 50,000 ac of wetlands between Calcasieu Lake and Sabine Lake.

Objectives

The objective of the proposed project is to expand shoreline erosion protection, which is presently being implemented between Constance Beach and Peveto Beach, eastward to Holly Beach for a total of 19,000 ft. This will help prevent breaching of the only remaining marsh protection currently provided by the highway embankment.

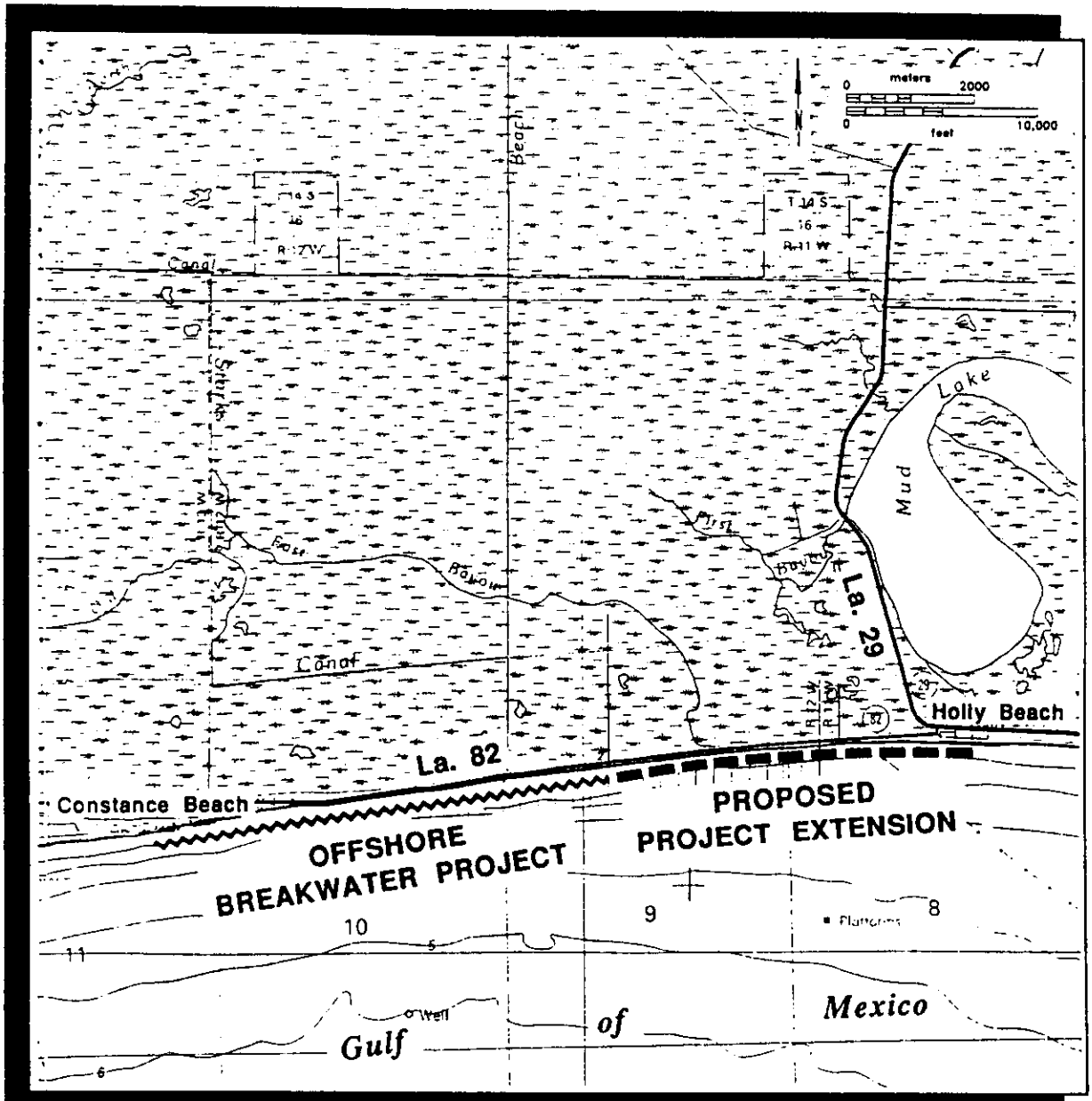
Project Features

The DOTD has installed and evaluated a variety of revetments and detached offshore breakwaters since 1963 to preserve LA 82. The most recently completed segment covers 24,000 ft of what has been historically the worst area (Figure C/S-1a). It is proposed that protection be extended eastward from Peveto Beach to Holly Beach. Offshore breakwaters of the alternate concrete block and rock designs presently being implemented will be considered if they prove to be successful. These breakwaters will be located from 200 to 300 ft from the shoreline in about 6-ft-deep water.

Status and Schedule

Planning and design for part of the project have been completed, with bid requests expected in the spring of 1990. The anticipated schedule for the project extension is as follows:

Project Elements	90/91	91/92	92/93
Extension of shore protection measures	CI	CI/OMR	OMR



C/S-1a. PEVETO BEACH TO HOLLY BEACH

Hydrologic Basin: Calcasieu/Sabine
Parish: Cameron
Acreage Benefitted: up to 50,000

Purpose and Need: To protect marsh north of the shoreline by expanding shoreline protection from Peveto Beach to Holly Beach.

Project Description: The DOTD has installed and evaluated a variety of shoreline protection measures. A line of breakwater structure, 200 to 300 ft from the shoreline, is considered the most successful method and is proposed for construction.

C/S-1b. HOLLY BEACH TO CALCASIEU PASS

Location and Size

The project area extends along 35,000 ft of Gulf of Mexico shoreline from Holly Beach eastward to the Calcasieu Ship Channel in Cameron Parish (Figures C/S-0, C/S-1b). This elevated shore segment is part of the protection of 50,000 ac of wetlands between Calcasieu Lake and Sabine Lake.

Objectives

The objective of the proposed project is to extend shoreline erosion protection from the segment to be implemented during 1990 eastward to Calcasieu Pass. This will help prevent breaching of the only remaining marsh protection that is currently provided by the highway embankment.

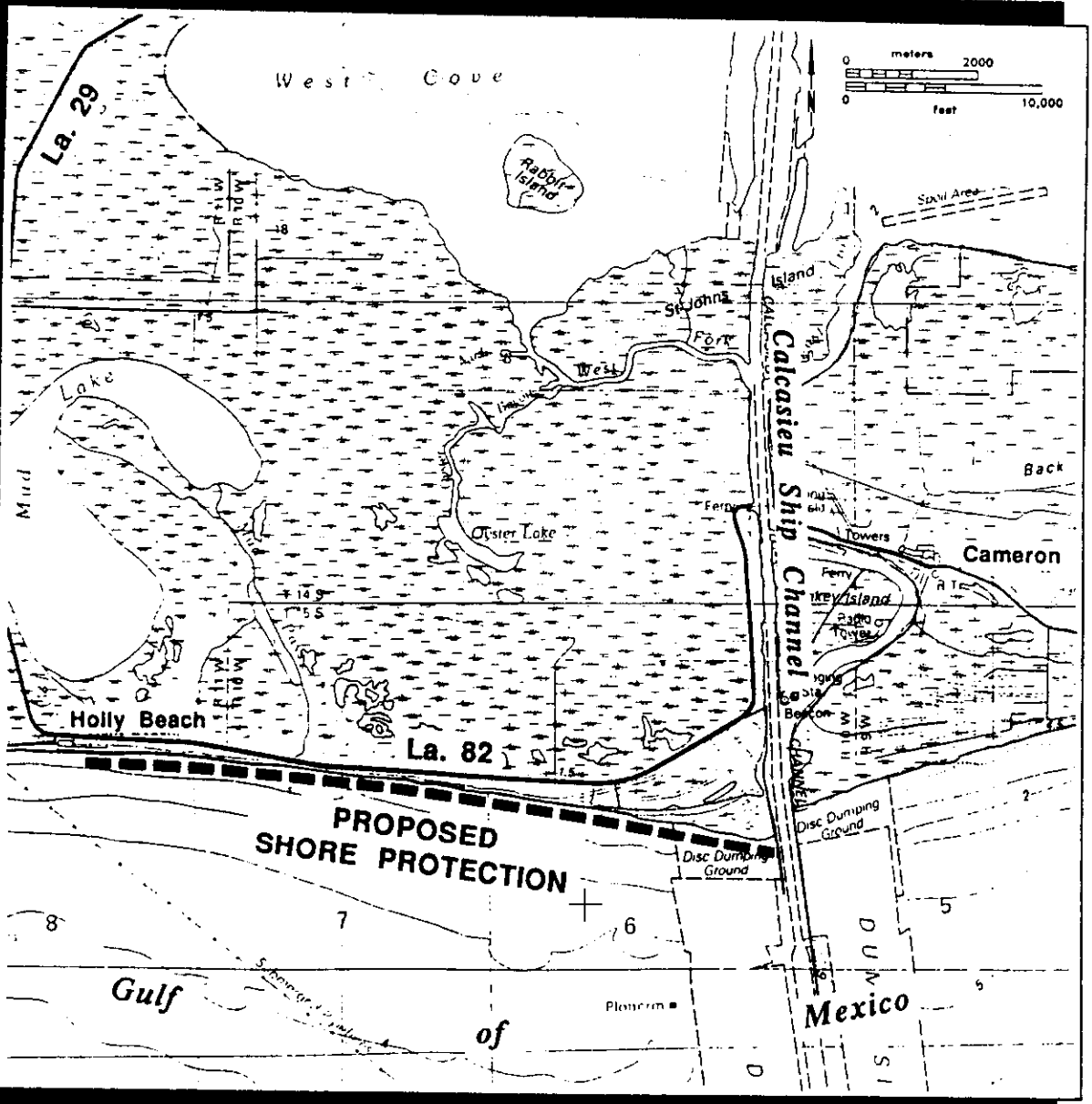
Project Features

The DOTD has installed and evaluated a variety of revetments and detached offshore breakwaters since 1963 to preserve LA 82. Several miles of offshore breakwater construction are expected to be completed in 1990 in the area between Constance Beach and Holly Beach. If these structures perform as anticipated, similar structures will be utilized along this segment of the coast. These measures could be supplemented with dredged material from Calcasieu Ship Channel maintenance dredging.

Status and Schedule

None of the project elements have been implemented at this time. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Extension of shore protection measures	FPD	FPD	CI



C/S-1b. HOLLY BEACH TO CALCASIEU PASS

Hydrologic Basin: Calcasieu/Sabine
Parish: Cameron
Acreage Benefitted: up to 50,000

Purpose and Need: To protect marsh north of the shoreline by expanding shoreline protection from Holly Beach to Calcasieu Pass.

Project Description: Breakwaters are being used in the area between Constance Beach and Holly Beach. If they prove to be successful, they will be used on this section of shoreline. These measures could be supplemented with dredged material from the Calcasieu Ship Channel.

C/S-1c. CONSTANCE BEACH TO OCEAN VIEW

Location and Size

The project area covers a 17,000-ft stretch of Gulf of Mexico shoreline from Constance Beach to Ocean View along LA 82 in Cameron Parish. This elevated shore segement protects directly about 600 ac of chenier ridges and associated marshlands seaward of LA 82 in the Ocean View area, and is part of the protection for more than 50,000 ac of wetlands between Calcasieu Lake and Sabine Lake.

Objectives

The objective of the proposed project is to extend shoreline erosion protection from the segment to be implemented during 1990 eastward to Ocean View. This will help retard shoreline retreat to the last remaining ridge along LA 82 and should help to preserve interior marshlands.

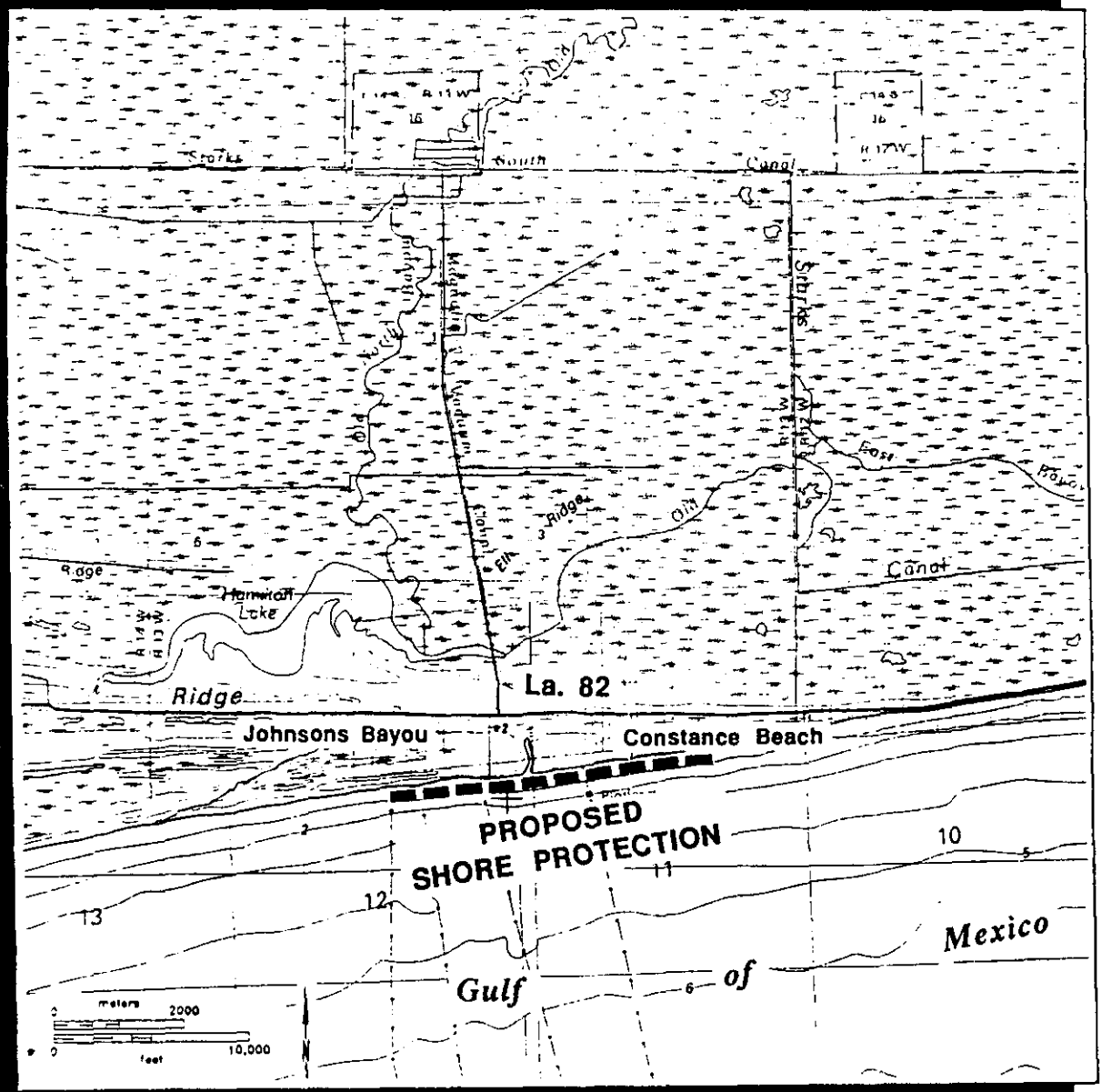
Project Features

The DOTD has installed and evaluated a variety of revetments and detached offshore breakwaters since 1963 to preserve LA 82. Several miles of offshore breakwater construction are expected to be completed in 1990 in the area between Constance Beach and Holly Beach. If these structures perform as anticipated, similar structures will be utilized along the Ocean View segment of the coast.

Status and Schedule

None of the project elements have been implemented at this time. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Extension of shore protection measures	FPD	FPD	CI



C/S-1c. CONSTANCE BEACH TO OCEAN VIEW

Hydrologic Basin: Calcasieu/Sabine
Parish: Cameron
Acreage Benefitted: up to 50,000

Purpose and Need: To protect marsh north of the shoreline by extending shoreline protection to the Ocean View Beach area.

Project Description: The DOTD has installed and evaluated a variety of shoreline protection measures. Breakwaters are being used in the area between Constance Beach and Holly Beach. If they prove to be successful, breakwaters will be used on this section of shoreline.

C/S-2. RYCADE CANAL

Location and Size

The project site is located on the Rycade Canal just west of the town of Hackberry, Louisiana. The Rycade Canal was initially constructed for mineral industry access to West Hackberry oil field and links Black Lake with marshes to the south in and adjacent to the Sabine National Wildlife Refuge. The project will benefit at least 10,000 ac of marsh (Figure C/S-0).

Objectives

The main objective of the proposed project is to enhance and protect low salinity marshland by eliminating uncontrolled input of saline water. In its current state, the Rycade Canal is an uncontrolled conduit for water exchange between Calcasieu Lake, through Black Bayou and Black Lake, and the upper watershed of the Sabine National Wildlife Refuge. This condition is particularly damaging because of the high salinities and rapid water-level changes that are transmitted up Calcasieu Lake by the Calcasieu Ship Channel and extend into Black Lake. Closure of the Rycade Canal will reduce the damaging extremes of salinity and water levels and restore a lower energy, fresher system on about 10,000 ac.

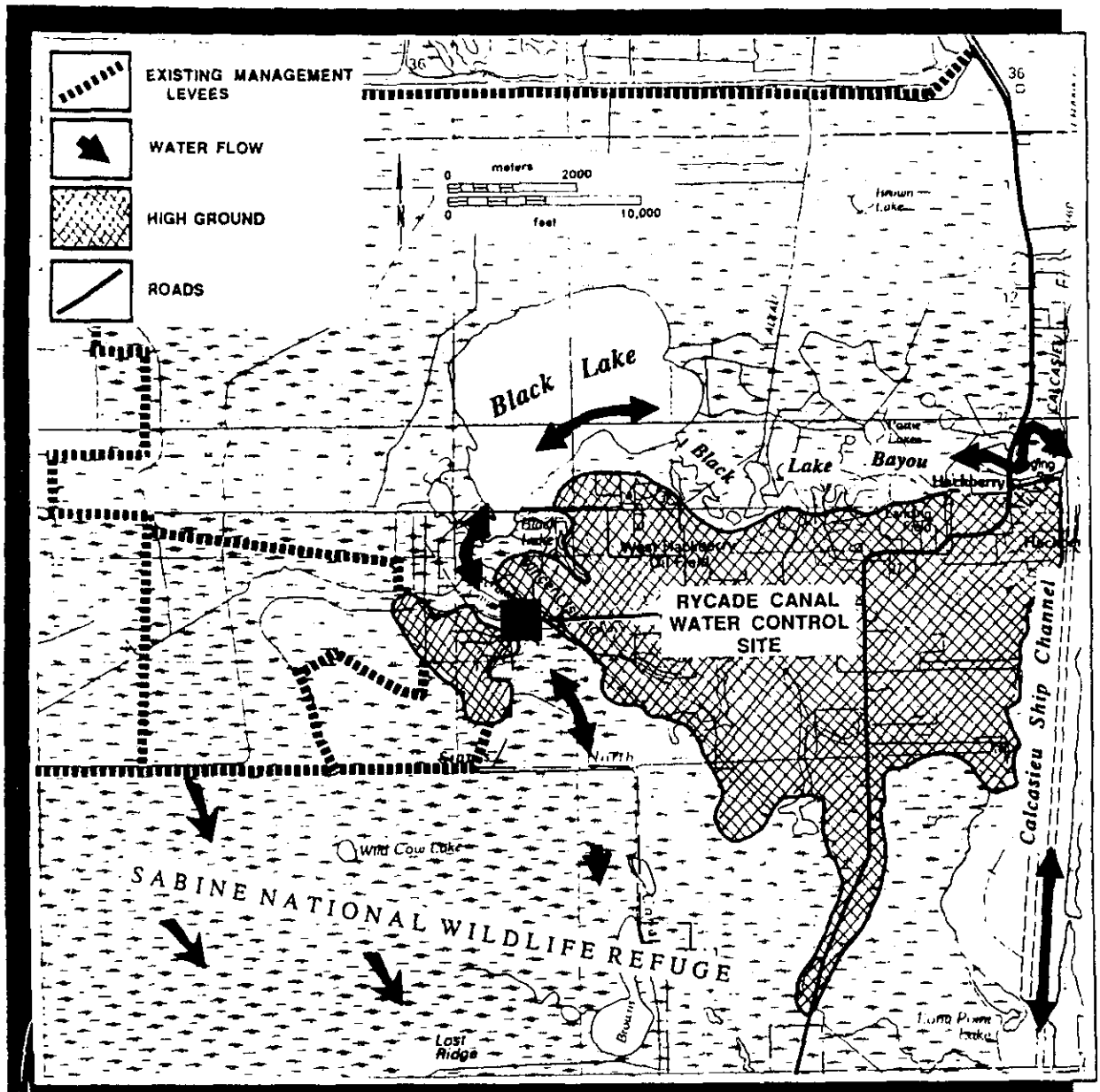
Project Features

The only project measure will be a water-control structure just north of the bridge crossing of the Rycade Canal (Figure C/S-2). An existing plug in this area has been circumvented by a breach and enlargement of a tidal network behind the south bank. The flow reenters the canal at the north side of the bridge. The structure could utilize interlocking steel sheetpile, tying into the road bed on each end of the bridge. The water control could be constructed from land with little or no dredging or direct wetland impact. The specific structure type and required variability will depend on hydrologic characteristics that have not yet been evaluated.

Status and Schedule

The proposed plan is supported by the Sabine National Wildlife Refuge. Coordination with local government, landowners, and regulatory agencies remains necessary. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Water control structures	FPD/CI	CI	OMR



C/S-2. RYCADE CANAL

Hydrologic Basin: Calcasieu
Parish: Cameron
Acreage Benefitted: 10,000

Purpose and Need: The project area continues to experience a significant loss of wetlands and an increase in salinities. Water control on the Rycade Canal would stop saltwater flow from Calcasieu Ship Channel through Black Lake into the wetland system to the south.

Project Description: The only project feature needed is a water-control structure just north of the bridge crossing the Rycade Canal. The structure would reduce the rate of saltwater intrusion and the associated wetland loss.

C/S-4. CAMERON-CREOLE WETLANDS

Location and Size

The proposed state project concerns the existing Cameron-Creole Watershed (CCW). Freshwater introduction is proposed at the northern boundary along the GIWW (Figure C/S-0) and would benefit a major portion of this 110,000-ac watershed composed of estuarine marshland. A second element of this project involves operation of existing water-control structures along Calcasieu Lake.

Objectives

The objectives of this project are to: (1) abate saltwater intrusion into the CCW when control structures are opened for fisheries purposes, (2) reduce the conflict between various management needs as related to divergent uses of the area, (3) somewhat restore the natural flow of freshwater through the system that is interrupted by the GIWW, (4) provide an additional source of freshwater for management, and (5) improve operation of the water-control structures along Calcasieu Lake to facilitate access for marine organisms.

Diversion of water from the GIWW could reduce the period during which structures need be closed in the summer and fall because of high salinity and allow greater access for marine organisms. The latter would also be aided through enhanced operation of the structures; however, lack of funding and manpower are an impediment.

Furthermore, freshwater introduction into the CCW would reduce salinities in the area adjacent to the diversion, allowing for a fresher and more varied plant community and enhancing organic production of both emergent and submergent plants. Second, the GIWW can be utilized as a source of water when water levels need to be elevated following a planned draw-down for plant regeneration.

Project Features

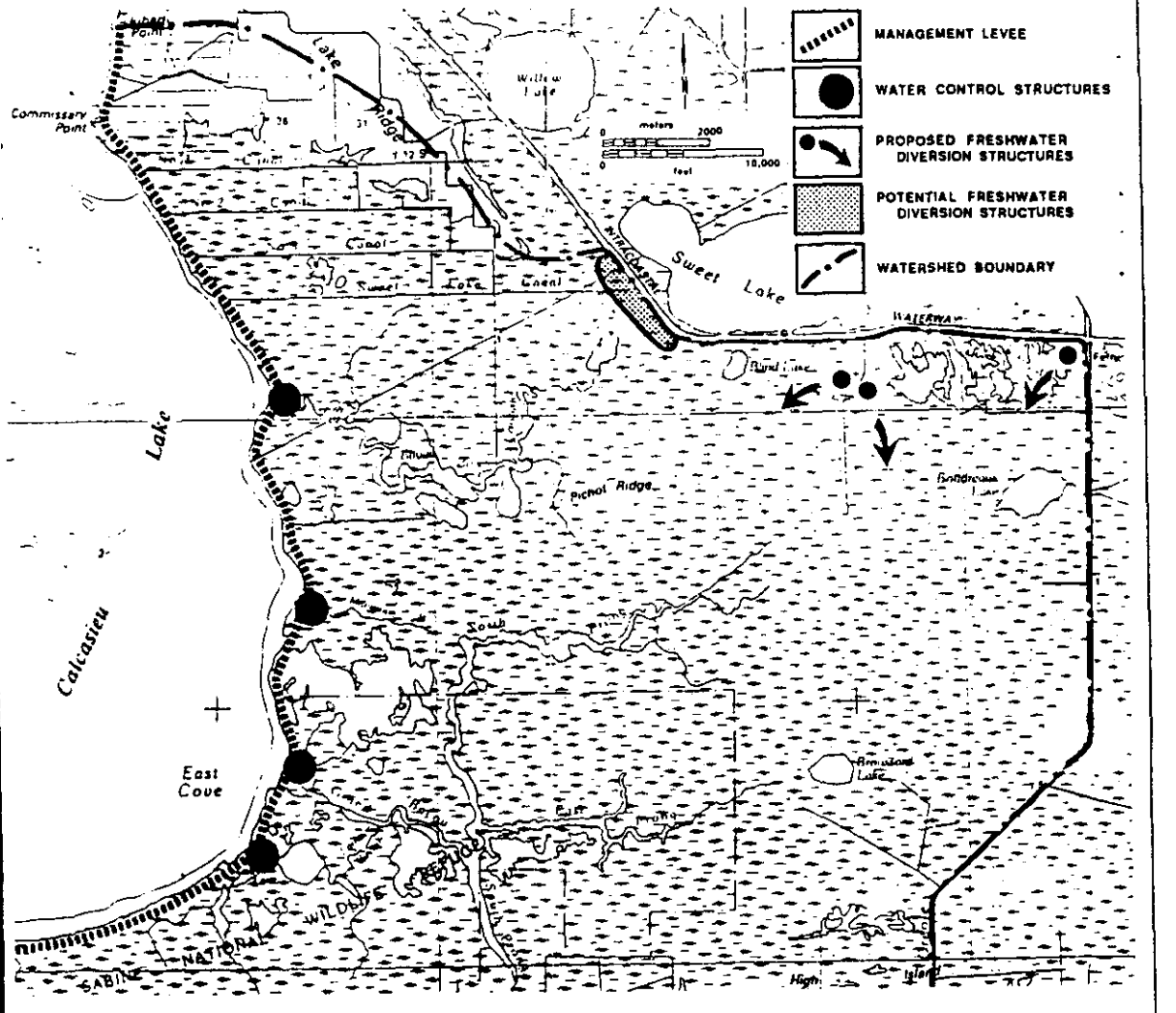
The CCW project was implemented by the SCS to prevent saltwater intrusion and marsh deterioration of the CCW wetlands following construction of the Calcasieu Ship Channel. Introduction of saline water from Calcasieu Lake is now controlled by a series of gated structures (Figure C/S-4). The state is presently requesting the USFWS to increase funding and manpower to enhance operation of the structures. In the event that this effort is not succesful, state funding would be considered.

Freshwater input from the GIWW is proposed along the upper boundary of the CCW (Figure C/S-4). The GIWW is presently isolated from the CCW by a spoil bank and is essentially a western branch of the Grand Lake/White Lake drainage basin where the regional freshwater runoff is conserved for agricultural uses. On the average, the water level in the GIWW is higher than that in the CCW. Water would be diverted through a series of gated structures. The feasibility of realizing the stated objectives must be further evaluated on the basis of hydrologic information concerning water levels, salinities, and tidal variation.

Status and Schedule

The proposed plan is presently in the conceptual stage. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
a) Structure operation	OMR	OMR	OMR
b) Diversion structures	FPD	CI	OMR



C/S-4. CAMERON - CREOLE WETLANDS

Hydrologic Basin: Calcasieu
Parish: Cameron
Acreage Benefitted: 110,000

Purpose and Need: Freshwater inflow into the CCW would allow for less stringent structure operation to control saltwater introduction from Calcasieu Lake and would enhance marsh restoration capabilities.

Project Description: The project would provide for diversion of water from the GIWW through a number of structures along the northern boundary of the CCW.

C/S-5. SABINE FRESHWATER INTRODUCTION

Location and Size

The project considers introduction of Sabine River water into the marshes south of the GIWW in the northwestern part of Cameron Parish. Coastal wetlands to potentially benefit from this project are likely to encompass from 5 to 10,000 ac.

Objectives

The objective of the proposed project is to determine feasibility of providing additional freshwater and nutrients to the wetlands of Cameron Parish within the Calcasieu-Sabine Basin. The project would restore some of the freshwater flow presently intercepted by the GIWW (Figure C/S-0).

Project Features

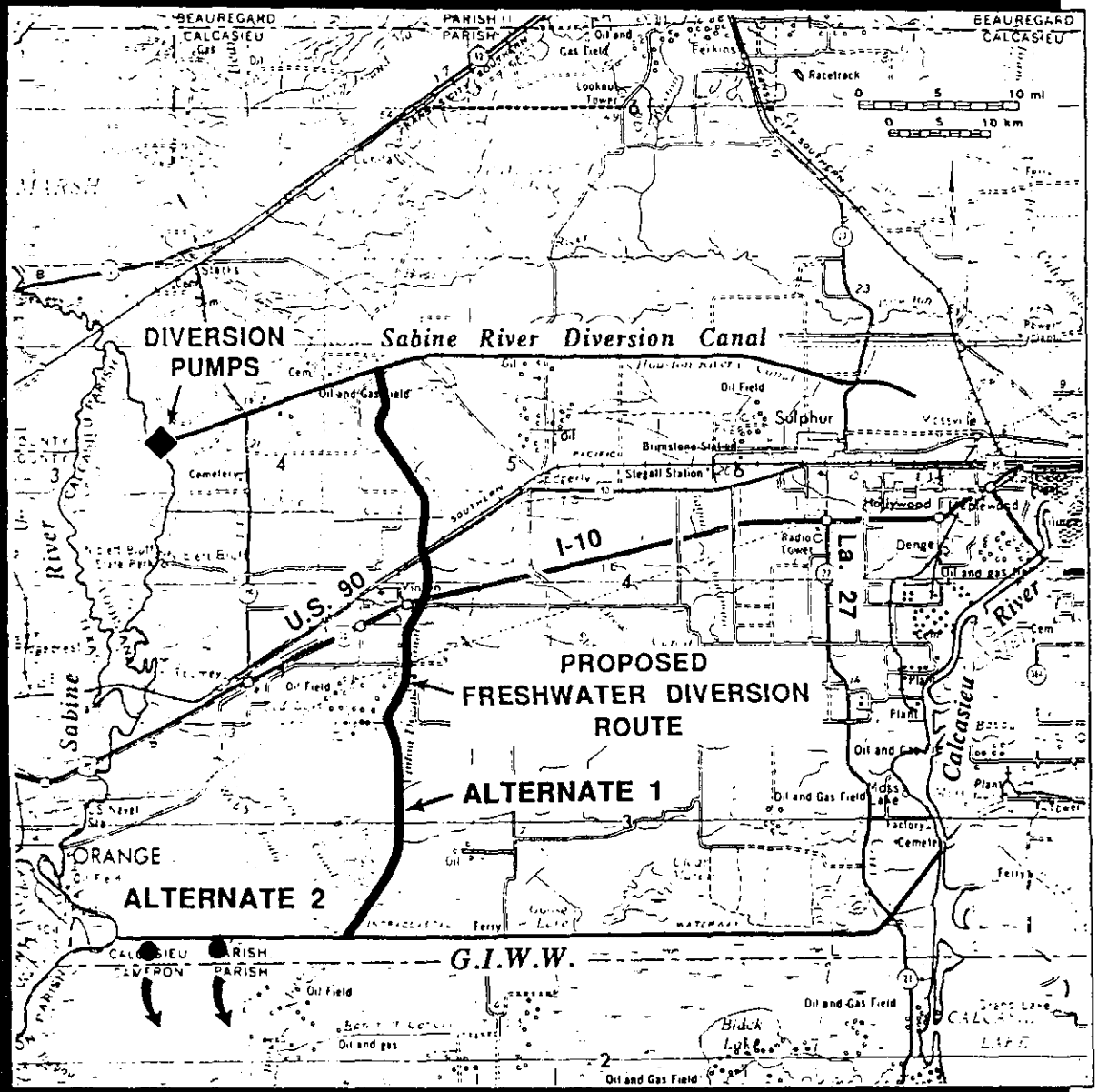
The project will evaluate the feasibility of two alternatives for freshwater introduction. Under one alternative water is diverted into the Sabine River Diversion Canal using excess capacity of an existing pump. The Sabine River Diversion Project has the capacity to pump 97 million gallons per day (150 cfs) of freshwater from the Sabine River to Sulphur for use (Figure C/S-5). Only about 7.5 MGD is needed. From the Sabine River Diversion Canal water would be routed south through the Vinton Drainage Canal or other routes if available. Aspects to be considered will include the cost of pumping, feasibility of moving water across the GIWW, and availability of water during high salinity periods.

A second alternative will evaluate the introduction of freshwater from the GIWW in the immediate vicinity of the Sabine River. It is assumed at this time that during high Sabine River discharges, some eastward movement of water occurs into the GIWW.

Status and Schedule

No elements of this project have been undertaken. The anticipated schedule is as follows:

Project Elements	90/91	91/92	92/93
Hydrologic investigation	FPD	FPD/CI	FPD/CI



C/S-5. SABINE FRESHWATER INTRODUCTION

Hydrologic Basin: Calcasieu
Parish: Cameron
Acreage Benefitted: N/A

Purpose and Need: Determine feasibility of combating saltwater intrusion in the Calcasieu-Sabine wetlands with freshwater from the Sabine River.

Project Description: The project will evaluate the feasibility of freshwater introduction into marshes south of the GIWW. Alternatives to be evaluated include diversion of Sabine River water through the Sabine River Diversion Canal and direct introduction from the GIWW.