COASTAL PROTECTION TASK FORCE REPORT

TO

GOVERNOR DAVID C. TREEN

AND TO THE

JOINT HOUSE AND SENATE COMMITTEE ON NATURAL RESOURCES

AND TO THE

LEGISLATIVE BUDGET COMMITTEE

May, 1982

DEPARTMENT OF NATURAL RESOURCES

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1982

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Pursuant to R.S. 30:313 C (Act 41) of the 1981 special session, the Administrator of the Coastal Management Section recommended projects to the Secretary of the Department of Natural Resources (see Appendix A). With the assistance of the Secretary of the Department of Wildlife and Fisheries and the Assistant Secretary for the Office of Public Works, the Secretary of the Department of Natural Resources recommended these projects to you and to the joint House and Senate subcommittee on Natural Resources. In addition, the Secretary suggested the formation of a task force representing appropriate state agencies and the Louisiana Coastal Commission to direct this effort (see Appendix B). On January 21, 1982 the joint House and Senate Subcommittee on Natural Resources reviewed and unanimously approved the project recommendations (see Appendix C), as well as endorsing the establishment of the task force.

The task force, designated as the Coastal Protection Task Force, consists of four members, Gerald Bordelon, chairman of the Louisiana Coastal Commission; Frank Simoneaux, Secretary of Natural Resources, Jesse Guidry, Secretary of Wildlife and Fisheries; and I. F. "Jiff" Hingle, Assistant Secretary, Office of Public Works.

The task force has had four meetings to date. One of the first actions taken by the task force was to establish a technical work committee consisting of personnel of the appropriate state agencies. (See Appendix D - organizational chart.) Through meetings of this committee and the task force a contract strategy and schedule have been devised.

Representatives of the task force have met with the U.S. Army Corps of Engineers and other federal agencies regarding the recommended projects. Similarly, discussions with leaders of major environmental groups have been held, and presentations to local police juries have been scheduled for a number of coastal parishes.

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The task force and its technical work committee have finished this Coastal Protection Task Force Report and are presently in a position to draw up scopes of services. We anticipate being able to let the first contracts during the month of July.

This report involves two joint state-federal projects, The Caernarvon Freshwater Diversion and the Teche-Vermilion Freshwater Project, three demonstration/pilot projects funded entirely by the state, and one study. (Figure 1 shows pilot project locations, Table 1 contains a summary budget, and Table 2 outlines the anticipated contract time schedule.) One pilot project involves barrier island restoration at two locations, one involves beach nourishment, and three involve diversion of freshwater. The single study is designed to project coastal conditions that will establish a baseline upon which we can guide and measure the success of coastal restoration and erosion reduction projects in the future.

The state funded pilot projects are small-scale barrier island and beach stabilizations and water/sediment diversions designed to demonstrate techniques, test levels of effectiveness, and provide cost/benefit information that will lead to informed decisions in related future projects. The pilot projects recommended in this report are also contained in the Senate and House Committees on Natural Resources report entitled "Report on Special Projects for Coastal Louisiana" and Act 41 of the 1981 Special Legislative Session, though funding limitations have reduced the project sizes. A more detailed discussion and budget for each of the six projects follows this introduction.

Since timing of the projects to demonstrate results in 24-44 months is important, a number of activities must be carried on simultaneously upon project initiation (See Table 2). Early project monitoring, environmental assessment, economic feasibility, and detailed project planning are essential for successful completion within the allotted time frame. Project timing is

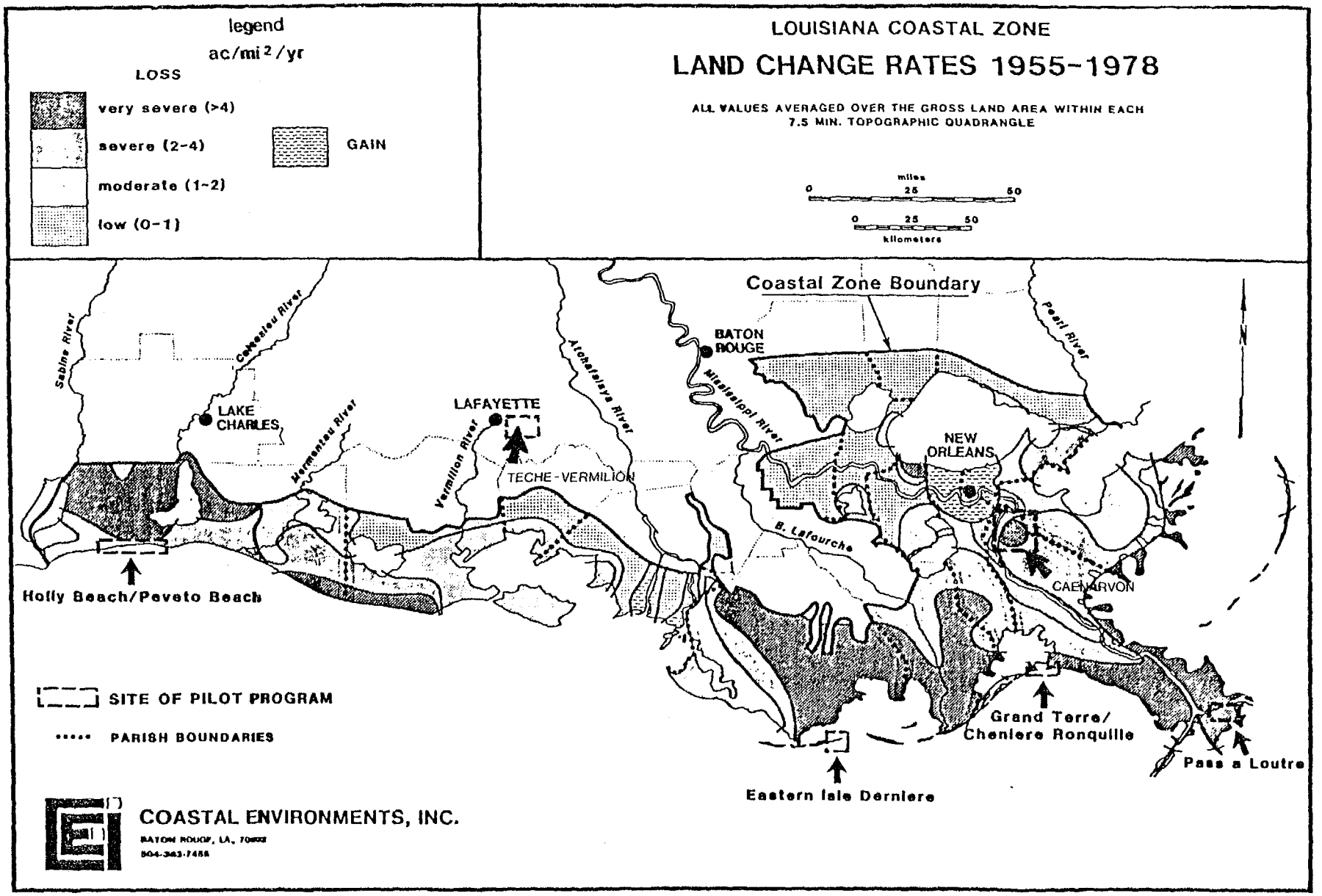

legend
ac/mi²/yr
LOSS
very severe (>4)
severe (2-4)
moderate (1-2)
low (0-1)
GAIN
LOUISIANA COASTAL ZONE
LAND CHANGE RATES 1955-1978
ALL VALUES AVERAGED OVER THE GROSS LAND AREA WITHIN EACH 7.5 MIN. TOPOGRAPHIC QUADRANGLE
miles
0 25 50
0 25 50
kilometers
Coastal Zone Boundary
Sabine River
Calcasieu River
LAKE CHARLES
Mermentau River
LAFAYETTE
Vermillion River
TECHE-VERMILION
Atchafalaya River
BATON ROUGE
Mississippi River
Pearl River
NEW ORLEANS
B. Lafourche
CAILLARVON
Holly Beach/Peveto Beach
SITE OF PILOT PROGRAM
PARISH BOUNDARIES
Grand Terre/
Chenière Ronquille
Pass a Loutre
Eastern Isle Dernière
COASTAL ENVIRONMENTS, INC.
BATON ROUGE, LA. 70802
504-383-7455

Figure 1.

Table 1. Summary Budget of Coastal Protection Projects

PROJECT NO.	PROJECT NAME
(1)	Holly Beach-Peveto Beach Protection
(2)[a]	Barrier Island Stabilization - (2)A is reduced version, (2)B is as originally proposed
(3)	Pass-a-Loutre Marsh Building
(4)	Projecting Future Coastal Conditions

A. Pilot Projects and Study	COSTS			
Project Number	(1)	(2)A	(2)B	(3)
Detailed Study & Design	70,000	100,000	225,000	83,000
Environmental Assessment	25,000	50,000	60,000	25,000
Seismic Sand Survey	70,000	140,000	140,000	-0-
Monitoring	25,000	50,000	50,000	60,000
Engineering	50,000	100,000	200,000	70,000
Economic Analysis	30,000	60,000	60,000	30,000
Construction	750,000	3,822,000	4,876,000	560,000
Revegetation	-0-	330,000	858,000	-0-
Total	1,020,000	4,652,000	6,469,000	828,000

(4)Projecting Future Coastal Conditions	
Task	
1 - Project Scoping	10,000
2 - Projecting Land Loss and Habitat Change	190,000
3 - Projecting Shape & Position of Barrier Island & Shoreline	150,000
4 - Rates of Subsidence & Effect on Ridgelands & Flooding	150,000
Task Total	500,000

	With (2)A	With (2)B
TOTAL for Projects (1-4)	$7,000,000	$8,817,000

B. State-Federal Matching Projects	State Contribution
(5) Caenarvon Freshwater Diversion Project	$200,000
(6) Teche-Vermilion Freshwater Project	$500,000

	With (2)A	With (2)B
GRAND TOTAL (6 projects)	$7,700,000	$9,517,000

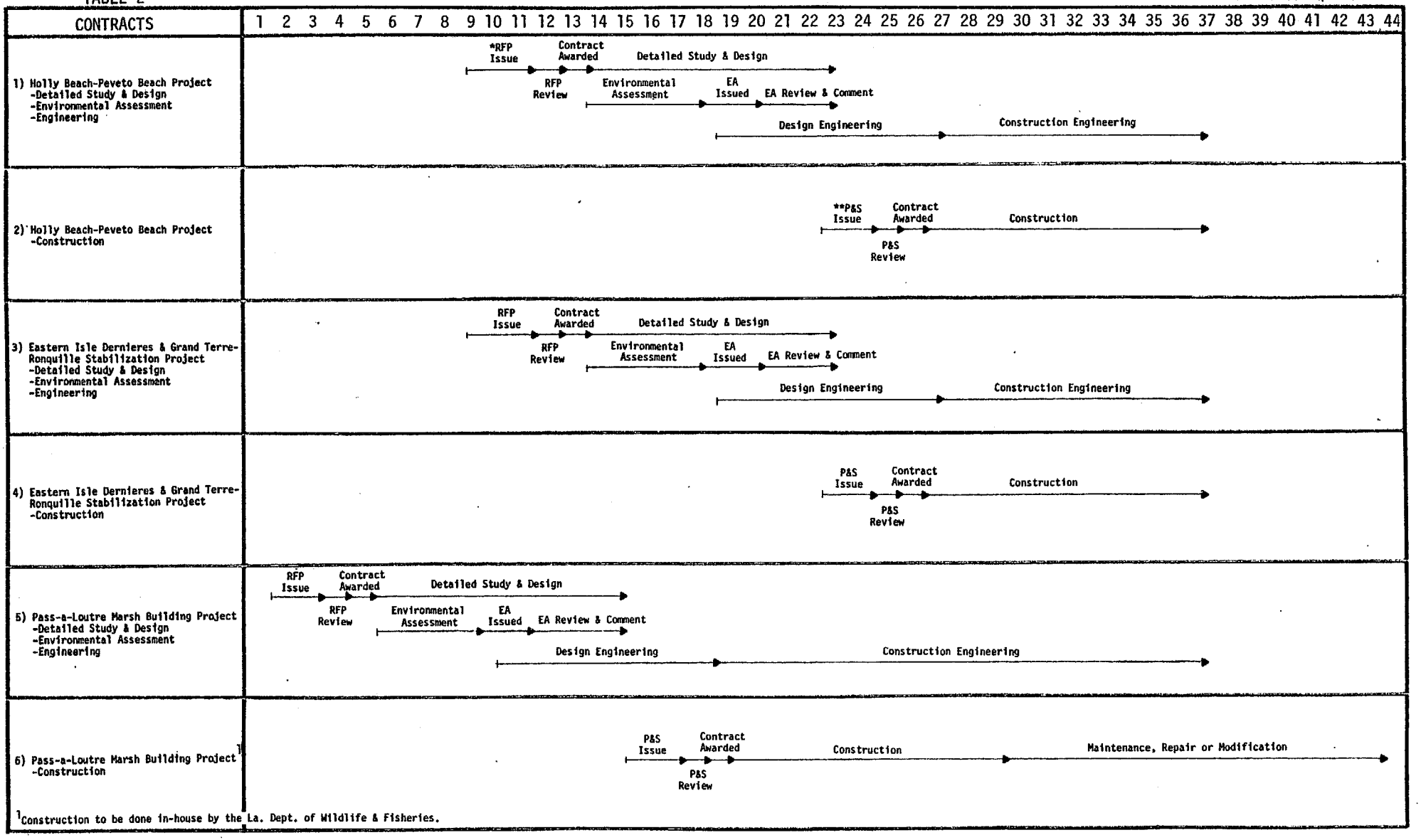
[a]The Office of Public Works has an additional $1,000,000 (OPW Project No. 5035507) for stabilization of Isle Dernieres.

TABLE 2

CONTRACT SCHEDULE

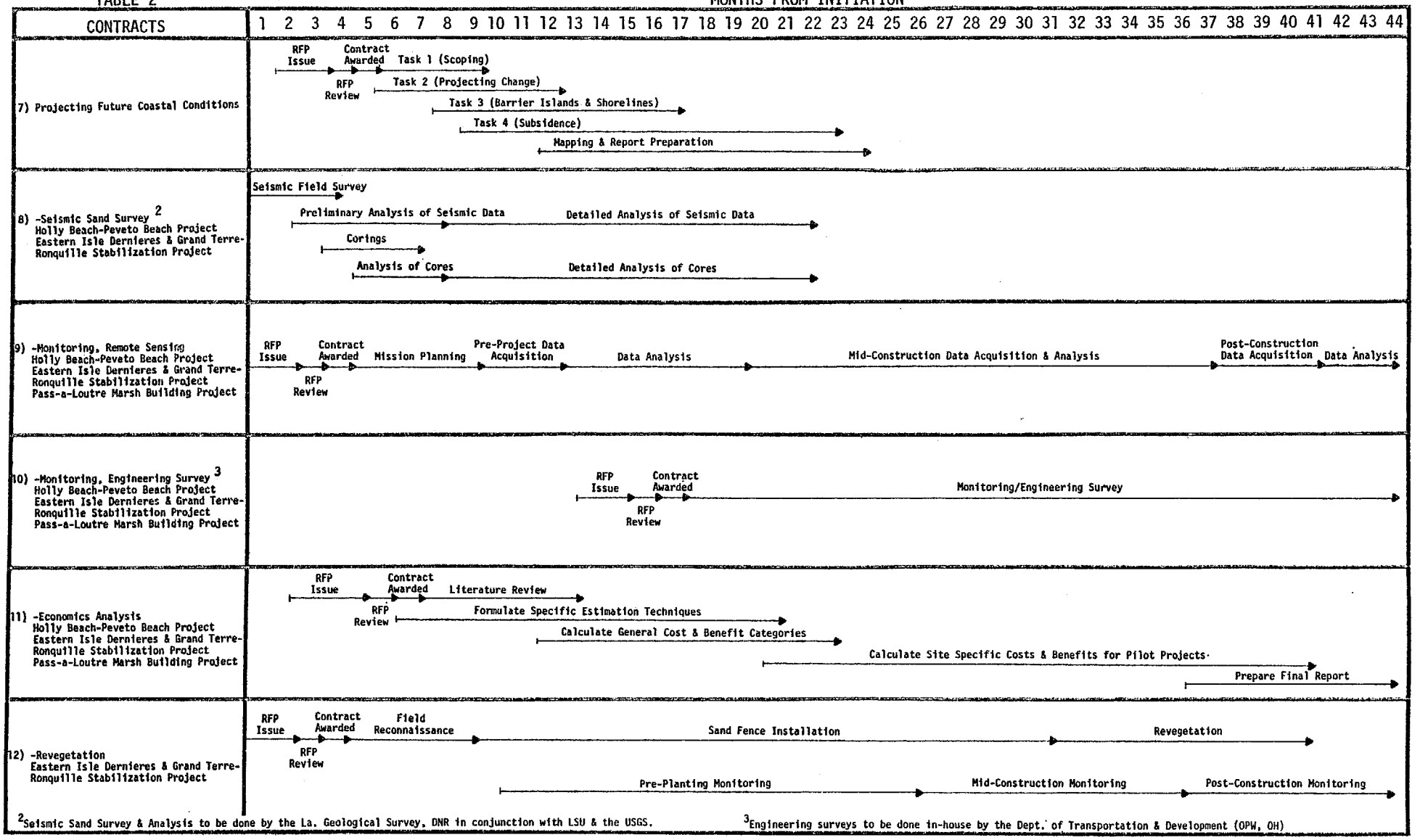
MONTHS FROM INITIATION

*RFP = Request for Proposal
**P&S = Plans & Specifications



[1]Construction to be done in-house by the La. Dept. of Wildlife & Fisheries.

TABLE 2 CONTRACT SCHEDULE



[2] Seismic Sand Survey & Analysis to be done by the La. Geological Survey, DNR in conjunction with LSU & the USGS.

[3] Engineering surveys to be done in-house by the Dept. of Transportation & Development (OPW, OH)

phased to allow cost savings due to economies of scale. For instance, all sand dredging for the barrier island project can be built into a single contract and done sequentially. This will lower the cost per yard of sand moved.

Each of the pilot projects will require monitoring that will detail conditions before, during, and after the project. Information gained in the monitoring program will be essential in judging the success of the project. The monitoring program will rely heavily on the use of the Department of Natural Resources remote sensing aircraft to increase cost effectiveness. On the ground surveys will be required to determine quantitative changes.

The economic analysis portion of the pilot projects is important in establishing cost effectiveness of each project approach. Since many of the benefits accrue to the state's natural resources, a resource economics approach is necessary to quantify benefits. On each pilot project the cost/benefit study will detail and document the benefits.

Two of the projects involve the use of dredged material for beach and barrier island nourishment. These two projects are located in the Holly Beach/ Peveto Beach area, and at E. Isle Dernieres and Grande Terre/Cheniere Ronquille. In order to locate subsurface sand bodies, a survey of existing seismic data coupled with additional fieldwork and coring of selected sand bodies will be undertaken.

The Barrier Islands Project (E. Isle Dernieres and Grande Terre/Cheniere Ronquille) will utilize vegetation to hold the dredged sand or sediment in place. Vegetation has been found to play a key role in reducing erosion, and accumulating and binding sediments.

This report brings together past and ongoing research, and agency, university, and consultant expertise in a state-of-the-art package of feasible projects that can provide prototypes in the fight to save Louisiana's coastal zone.

CAERNARVON FRESHWATER DIVERSION PROJECT

The Caernarvon freshwater diversion project (Big Mar) has been recommended for construction by the Corps of Engineers and the U.S. Fish and Wildlife Service. It has already been authorized by the Congress and is ready for design and construction, pending state assurances and funding. It was also recommended for implementation by the Joint Natural Resources Committee in their recent "Report on Special Projects for Coastal La." Funding will be provided on a 75/25 federal/state matching basis.

The original size and funding requirements have been scaled down from some $20 million to approximately $13 million. The structure is proposed to have a maximum flow of 6,600 cubic feet per second (cfs) and to be similar in size to the existing Bayou La Moque structure. Freshwater from the Mississippi River will be introduced into an intermediate/brackish marsh to reduce salinities to approximate those occurring during years of high rainfall. A large area will benefit from the salinity reduction, including the Louisiana Department of Wildlife and Fisheries main oyster seed grounds east of the Mississippi River where the salinities should be maintained below 15 parts per thousand to retard the predatory oyster drill. Habitat for many commercial species will also be improved.

It is hereby recommended that Louisiana provide the match and assurances required to implement the project. The 16% ($5.6 million) set aside for matching Federal funds, or a portion thereof, described and allocated in Act 41 (Louisiana R.S. 30:313 C) of the 1981 Special Legislative Session should be used to provide the state's share of implementation for the Caernarvon project.

It is further recommended that a surface water management plan be developed and implemented in the impacted outfall area so as to maximize the benefits of the project's freshwater inflow. The water management plan should be designed to control the water flow to optimize salinity reductions over the largest area feasible and to maximize habitat enhancement.

The matching funds provided by the state can be used in a number of ways to expedite and insure maximum benefit from the project. Using the state's match to develop a surface water management plan, including the building of small structures, would insure maximum benefits from the introduced freshwater. This part of the match could be considered as an in-kind contribution.

Since the Corps funding has been delayed, it is recommended that the state forward a sum of $200,000.00 to the Corps (New Orleans District) as a portion of the state's match to begin their General Design Memo studies. This would reduce the lead time by some twelve months.

Benefits of the project to Louisiana's natural resources, including fish and game, will be enormous and lasting. Preproject and long term monitoring is imperative to document these benefits. The project is a forerunner of the type that shows great promise in alleviating Louisiana's coastal salinity intrusion problems.

THE TECHE-VERMILION FRESHWATER PROJECT

In 1965, the U.S. Army Corps of Engineers completed a study of the need for supplemental surface water in the Teche-Vermilion Basins of Louisiana. The area studied is located in south central Louisiana adjacent to and west of the Atchafalaya Basin Floodway. It is contained within the six parishes of St. Landry, St. Martin, Lafayette, Vermilion, Iberia, and St. Mary.

Ruth Canal, located two miles south of the city of Breaux Bridge, is a controlled interconnection between the Vermilion River and Bayou Teche. This canal was constructed in the early 1920's by a private company to furnish additional water along the lower Vermilion River for rice irrigation. During the formation of the Teche-Vermilion Project, the Corps of Engineers anticipated that the canal and regulating structure would be available as an integral segment of the supplemental water supply system. Recently, however, the Evangeline Canal Company, owners of the canal and structure, discontinued its use and that firm is now disposing of all its properties and other assets. In April, 1981 the Corps of Engineers became aware of this situation and immediately notified the Fresh Water District that it was obligated to acquire control over the canal and structure.

The Fresh Water District and Office of Public Work's studies of the Ruth Canal and structures have revealed that the system is in fair condition except for minor details such as the need for removal of trees, repair of bank erosion, and removal of siltation at various locations in the channel; all at a cost of approximately $100,000. Appraisal of the market value of the land and structure is $520,000. The Fresh Water District obtained on January 11, 1982, a 90-day option to purchase the Ruth Canal, land and structure for a total price of $500,000. The cost of the minor repairs to place the canal in first class condition will be assumed by the District.

It is the responsibility of the District to operate and maintain the entire Fresh Water Project. Anticipated revenues from the maintenance tax imposed by the District are not sufficient to purchase the Ruth Canal and meet its obligations to operate and maintain the Fresh Water Project. The entire project is one which improves the coastal environment, 95% funded by the Federal Government, 5% funded by the District (a multi-parish government agency), and is due to be completed

August 1, 1982. Since a need exists for acquisition of the Ruth Canal, the Coastal Protection Task Force recommends that the purchase be made using monies from the Coastal Environment Protection Trust Fund.

HOLLY BEACH - PEVETO BEACH PROTECTION

Area Description

Along the shore west of Calcasieu Pass in Cameron Parish is the second most extensive coastal recreational development in the State of Louisiana. Over 700 structures are found in the beachfront communities of Holly Beach, Constance Beach, Chaisson Subdivision and Ocean View Beach. Louisiana Highway 82, the Gulf Coastal Highway, hugs the shoreline between Holly Beach and the former beach community of Peveto Beach. The beach is primarily sand between Calcasieu Pass and a point southwest of Johnsons Bayou, and the beach ridges are over 8 feet above mean sea level (msl) west of Peveto Beach and near Calcasieu Pass and less than 5 feet msl between those two zones. The shoreline from Holly Beach to Ocean View Beach has been subject to erosion for at least the past 150 years, as seen by the 1833 survey sections displayed on the 15-minute USGS topographic quadrangles. Between Holly Beach and Peveto Beach, the highway, which serves as an important hurricane evacuation route, has been inundated and relocated inland several times since the 1930s. The highway was very severely damaged by Hurricane Audrey in 1957, which also destroyed all recreational development in the area. In 1971, a gobi-block revetment was installed by the Office of Highways along Louisiana Highway 82 at Peveto Beach to buffer wave attack and protect the highway.

Project Description

Recent events along the Holly Beach-Ocean View Beach stretch have prompted renewed concern for the highway and recreational settlements. The gobi-block

revetment protecting 3 miles of highway has exhibited some success, but with unacceptable maintenance costs. Consequently, $3 million has been appropriated to the Office of Highways for construction of a more solid revetment coupled with a series of T-groins (breakwaters 200 feet offshore and connected to shore by 1.5 foot msl causeways).

Over 170 recreational structures are found in this zone today and erosional problems are in evidence at Constance Beach and Chaisson Subdivision (Figure 2). Recent data indicate that the erosion rate at Constance Beach (averaging over 16 feet per year during the 1955-78 period) has increased since 1970.

Evidently, a more comprehensive erosion plan is required to protect both the highway and the recreational facilities. A $1 million dollar sand nourishment program is recommended to augment the proposed revetment and T-groin construction. Such sand nourishment will not only prevent scouring at the foot of the planned revetment, but will also compensate for an expected increase in shoreline erosion in the Ocean View Beach-Constance Beach Zone.

Sand sources for nourishment of the southwest Louisiana beaches include inland cheniers, dredge material excavated from the Calcasieu Ship Channel and the outer bar at Calcasieu Pass, and offshore areas. Although a detailed study and offshore survey is needed prior to implementation, the latter two sources appear promising. Sediment dredged from the mouth of the Calcasieu channel (maintained by dredging to almost 40 feet below msl) contains a considerable amount of sand. The offshore area is characterized by numerous exposures of Pleistocene surface and sand-filled Pleistocene channels. Seismic analyses will be conducted to determine optimum dredging locations and sand will be pumped or barged to designated areas. A more long-range plan (which is mandatory for the greatest long-term benefits) might include the construction of a groin field over the whole length of the study area. This means of trapping sand could be installed groin by groin, beginning at the westernmost (most downdrift) area.

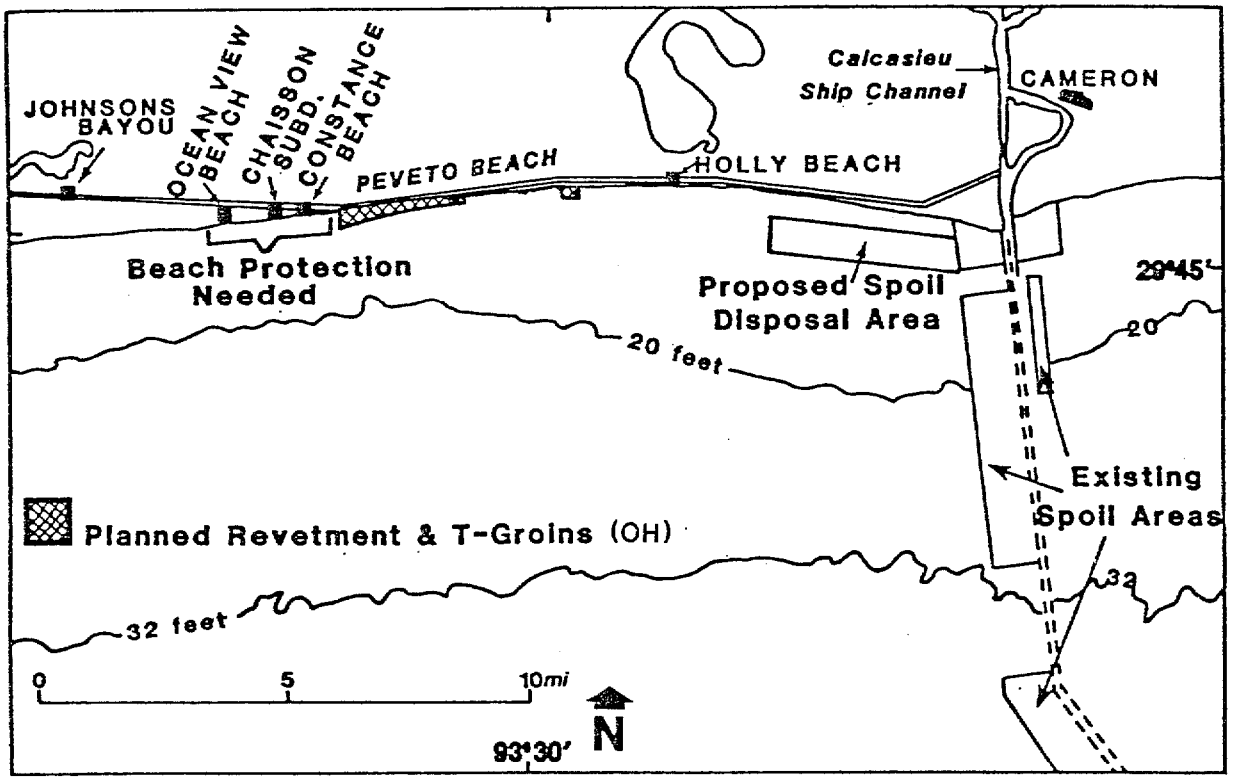

JOHNSONS BAYOU
OCEAN VIEW BEACH
CHAISSON SUBD.
CONSTANCE BEACH
PEVETO BEACH
HOLLY BEACH
Calcasieu Ship Channel
CAMERON
Beach Protection Needed
Proposed Spoil Disposal Area
29°45'
20
20 feet
Existing Spoil Areas
Planned Revetment & T-Groins (OH)
32
32 feet
0
5
10mi
N
93°30'

Figure 2.

Benefits

If no action is taken to prevent erosion between Holly Beach and Ocean View Beach, wave action will continue to undermine Louisiana Hwy. 82 and recreational camps at Constance Beach. If the highway revetment and T-groins are constructed as planned, and no additional protection is provided to the downdrift recreational communities, erosion at Constance Beach could threaten many camps. Increased scouring is expected at the foot of the revetment, and periodic maintenance of the highway may be required. The sand will also improve the quality of the beach for recreational uses; therefore, a well-planned beach nourishment program is considered cost-effective.

STABILIZATION OF EASTERN ISLES DERNIERES AND GRAND TERRE/CHENIERE RONQUILLE

Description of the Eastern Isle Dernieres Area

The Isles Dernieres, located offshore from the central Louisiana coast in Terrebonne Parish, serve to protect the important marshy mainland and provide a protected haven from storms for vessels and oil development in the bay behind the island. In addition, the islands serve to establish a baseline from which the state's three (3) mile mineral rich tidelands territory is measured.

The entire Isles Dernieres barrier island chain is exposed to high rates of shoreline erosion and island fragmentation. The effectiveness of the island as a buffer for severe hurricanes is being seriously undermined. Remedial measures are necessary to prevent further deterioration and potential loss of the islands altogether.

Project Description

This part of the barrier island project will use several restoration techniques on the eastern portion of Isles Dernieres (Figure 3). This island was breached in the mid-1970s following Hurricane Carmen, and the inlet has remained open. Within the project area two major washovers are evident, and several narrow segments of the island could be breached at any time.

Location A

A high-priority area for restoration is the breach that opened several years ago. Left alone, this breach will develop into a wider and deeper inlet. This will not only act as a trap for longshore-migrating sands (thus removing valuable sand from the system), but increased tidal exchange will lead to accelerated erosion of adjacent land areas.

To seal this breach, several steps are necessary. First, large rocks (riprap) will be placed across the opening up to water level to reduce tidal flows and provide a foundation for subsequent sand nourishment. Sand will be used to build up a dune (to a height of 4 feet), to fill in a 500-foot width in the back-bay area, and to build up the back-barrier-zone to 1 foot above mean sea level (msl).

Location B

An active washover is located here, and sands are washed into the bayou behind the washover. The bayou will be filled to prevent further loss of sand, a dune will be constructed, and stabilizing vegetation will be planted.

Location C

Here a former oil company holding pond, backed by retention levees, is being filled in by the landward-moving beach. The water surface of the

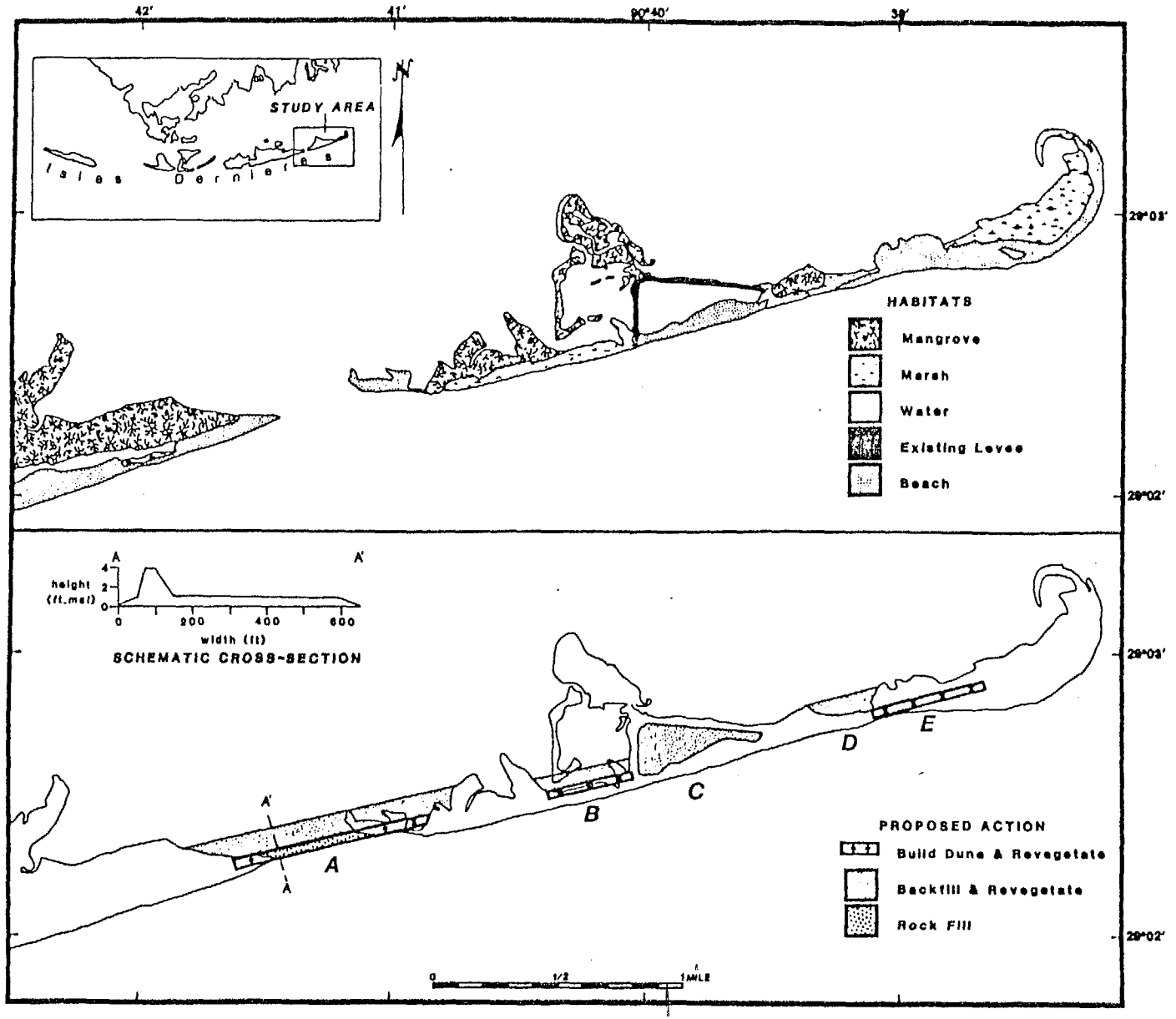

42'
41'
90°40'
39'
STUDY AREA
Isles Dernieres
29°03'
29°02'
HABITATS
Mangrove
Marsh
Water
Existing Levee
Beach
A
A'
height (ft.msl)
4
2
0
0
200
400
600
width (ft)
SCHEMATIC CROSS-SECTION
A
B
C
D
E
PROPOSED ACTION
Build Dune & Revegetate
Backfill & Revegetate
Rock Fill
0
1/2
1 MILE

Figure 3.

impounded area is over 30 acres and presumably quite shallow, and it will be relatively simple to pump sediments into the pond to re-establish a portion of the islands' former land mass. The convenience of existing backlevees makes this an optimum restoration site.

Location D

This short stretch of the island is very narrow and presents a potential breach zone. Therefore, sand will be pumped into an area of about 10 acres to widen the island and minimize the threat of breaching. A retaining wall will be constructed on the landward side of the island to help hold the sand in place.

Location E

On this active washover, a 4-foot dune will be constructed for a length of 3,100 feet. This artificial dune, which will extend to the marsh areas flanking the washover, will be stabilized subsequently by the planting of dune vegetation.

Sand Source and Nourishment Feasibility

Considerable sand is tied up in the outer bar, or ebb-tidal delta of Cat Island Pass. In addition, an average of 400,000 cubic yards of material - identified as 70% sand, 20% silt, and 5% shell - is dredged from the Houma Navigation Canal annually, approximately 5 miles to the east. It may be feasible to pump sediment directly onto the island by pipeline, in conjunction with moored, floating booster pumps. Alternate potential sand sources will be identified using results of the offshore seismic sand survey analyses.

Benefits

Benefits of the project include the demonstration of feasibility for

various techniques to restore Isles Dernieres. With no restoration, the Dernieres can be expected to continue to be breached causing increased erosion rates as the number of islands and length of shoreline exposed to wave action increase. In approximately fifty years, the Dernieres will be shifting shoals, gradually subsiding below sea level. As this occurs the marshlands on the mainland will be exposed to increased wave attack and accelerated erosion. The shoreline will rapidly retreat, and towns and other development on the ridgelands up to and including Houma, Louisiana, will be increasingly vulnerable to storm surge and flooding. As the shoreline (and Louisiana's legal tidelands baseline) rapidly recedes, the state's ownership of waterbottoms and minerals out to the present three mile tidelands boundary becomes questionable.

GRANDE TERRE/CHENIERE RONQUILLE STABILIZATION

Description of the Grand Terre /Ronquille Area

Nowhere along Barataria's Gulf shore have coastal retreat and wetland deterioration taken on more severe proportions than at Eastern Grand Terre Island and Cheniere Ronquille. This segment of the barrier system presently forms the weakest link in the protection of the Barataria estuary and adjacent wetlands. Shoreline retreat averages nearly 50 feet annually and is likely to accelerate in the near future as a result of eminent encounter with a series of pipeline canals paralleling the shoreline behind the present beach.

A major cause of the rapid deterioration of this section of the coast is the extremely limited sand supply; both in terms of sand contained within this barrier segment and sand supplied through wave induced transport primarily from the east. Amelioration of the present high rate of barrier disintegration thus becomes primarily dependent on minimizing loss of sand and, where possible, augmenting the available supply.

Project Description

Since maintenance of any given segment of the shoreline is dependent on balancing sand and loss within a segment, prevention and removal of updrift interruptions to the supply are critical insofar as losses in downdrift direction cannot be controlled. Breaching of the beach system under the prevailing conditions of a very limited beach deposit in many cases presents such an interruption. The resulting temporary storage of sand in seaward or bayward tidal deposits and the dispersal of sand cause a downdrift sand shortage that in turn induces accelerated erosion of the protective beach deposits and subsequently the rapid removal of remaining marsh lands.

A similar cause for accelerated disintegration can be identified relative to sand movement normal to the shore. When shoreline retreat is acompanied by washover of sand onto barrier vegetation, sand remains part of the protective "armor" fronting the Gulf. However, when transported landward into open water bodies, part of the protective function is lost due to temporary or permanent removal from the maintenance mechanism. In particular, this occurs when sand is deposited at greater depth, such as in canals or tidal channels.

To decelerate shoreline retreat and ameliorate the rapid disintegration of Eastern Grand Terre Island and Cheniere Ronquille, the following measures are proposed (Figure 4a and 4b):

1. CANAL FILL

   Fill all pipeline canals located within 2000 feet from the shoreline. Fill should be placed to an elevation of one foot above mean sea level and revegetated. This action will prevent future functioning of the canals as a sand sink when shoreline retreat places the canal location within the area of washover deposition.

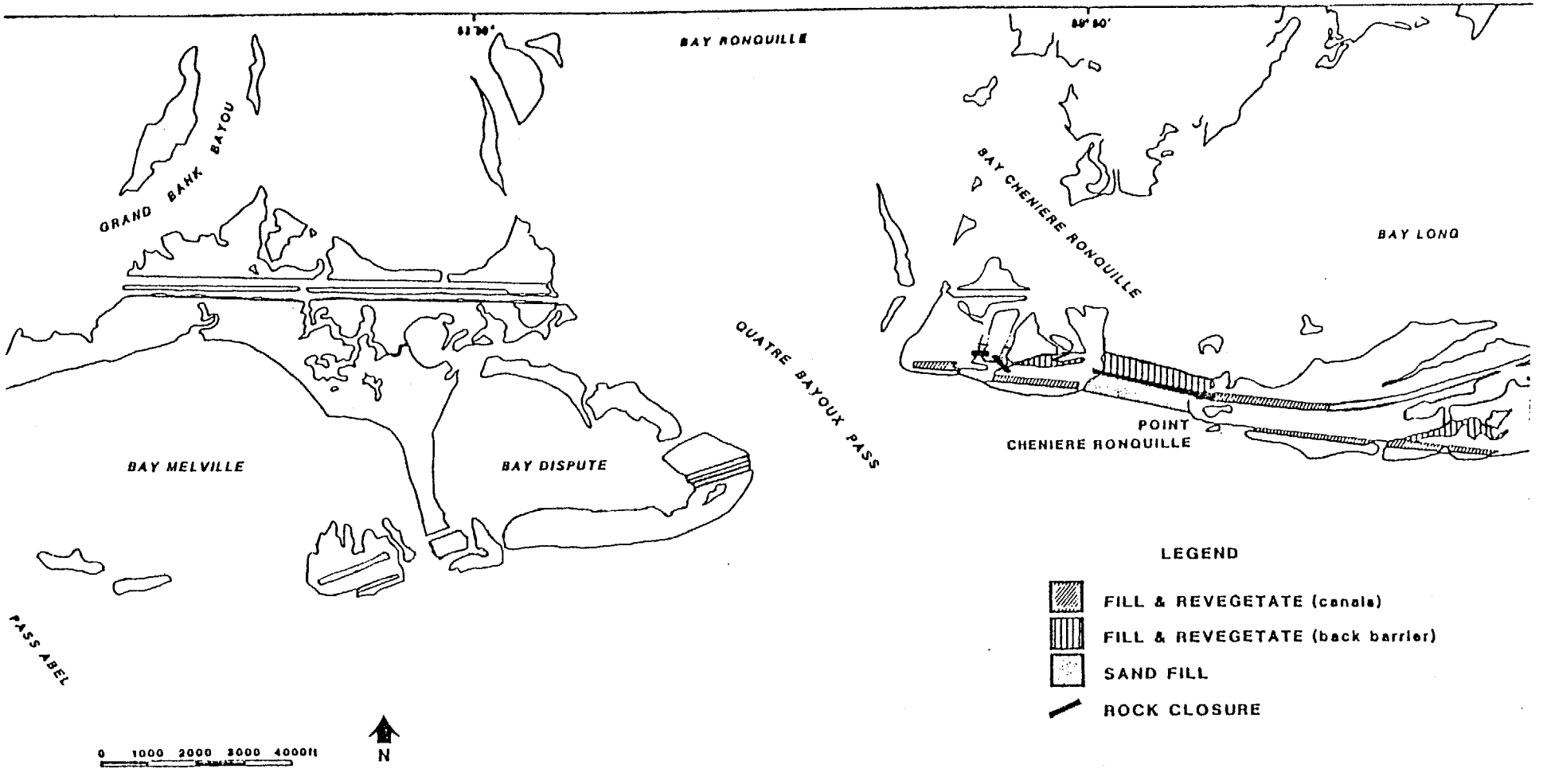


Figure 4(a) Alternative A

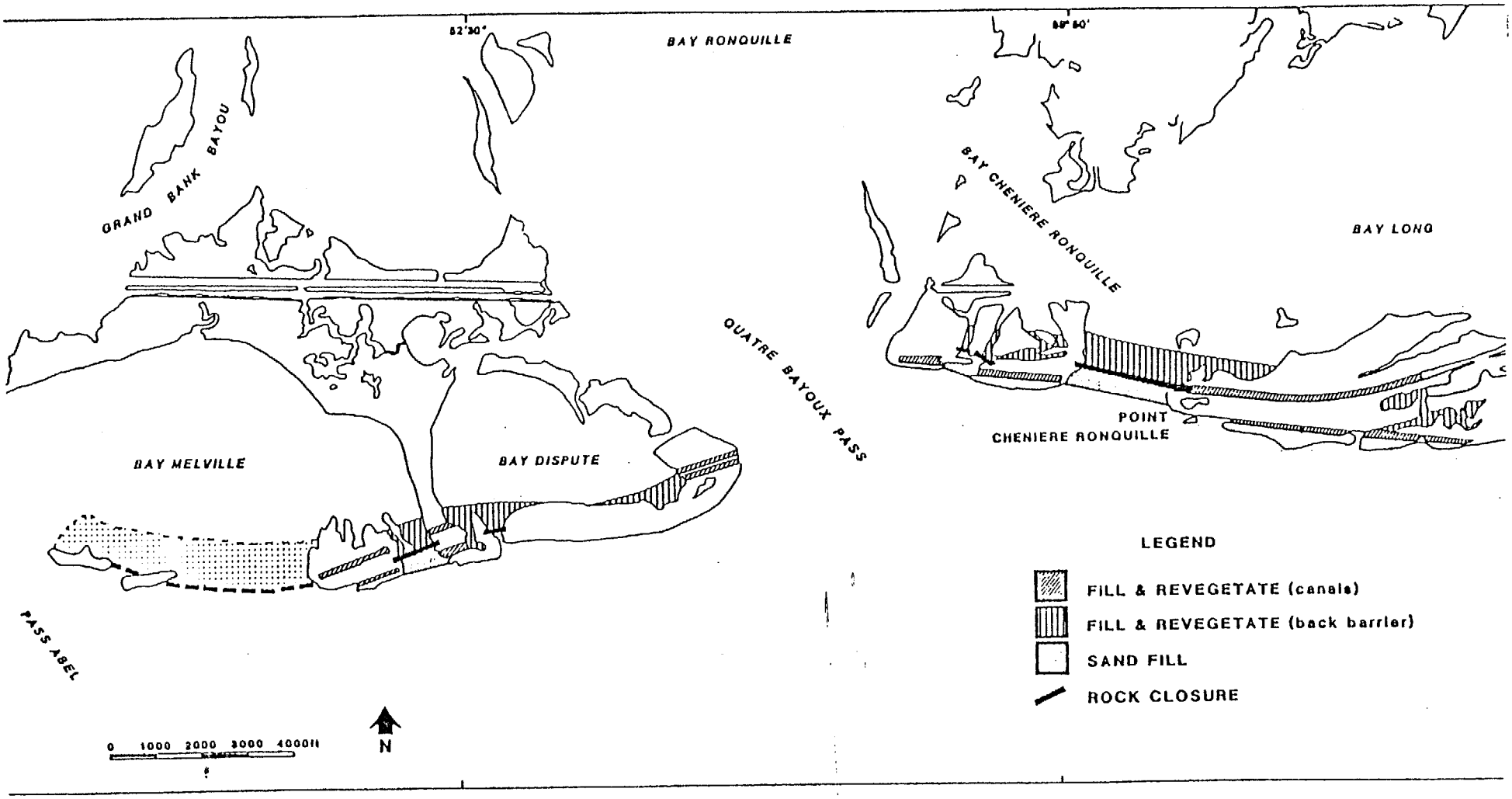


Figure 4(b) Alternative B

2. BACK BARRIER FILL

To reduce further breaching of the barrier and maintain available sand along the shoreline, waterbodies in the immediate proximity of the shoreline should be filled. It is recommended that fill be extended a minimum of 500 feet landward from the present shoreline, placed to an elevation of one foot above msl, and revegetated in order to reduce landward transport and dispersion of sand through washover processes.

3. SEAL EXISTING BREACHES

Existing breaches causing interruption of longshore transport and dispersal of sand in a seaward or bayward direction should be sealed. It is proposed that a rock dam be placed across these breaches to an elevation of 1 foot msl. Location of the dam should be set back from the shoreline to allow beach development along the seaward side. Fill should be placed on the land side to a distance of 500 to 1000 feet and at an elevation of 1 foot msl and revegetated. Sand should be placed on the seaward side--with a crest elevation of 3 feet msl.

4. MINERAL ACCRETION

To determine the feasibility of using mineral accretion for structural management of coastal processes, jetty and spoil containment structures are proposed to be constructed to test the utility of the mineral accretion process in both a low-energy bayside environment and a higher-energy tidal pass area. Approximate proposed locations for the structures are shown in Figures 5 and 6. Generalized schematics depicting the structures are shown in Figure 7.

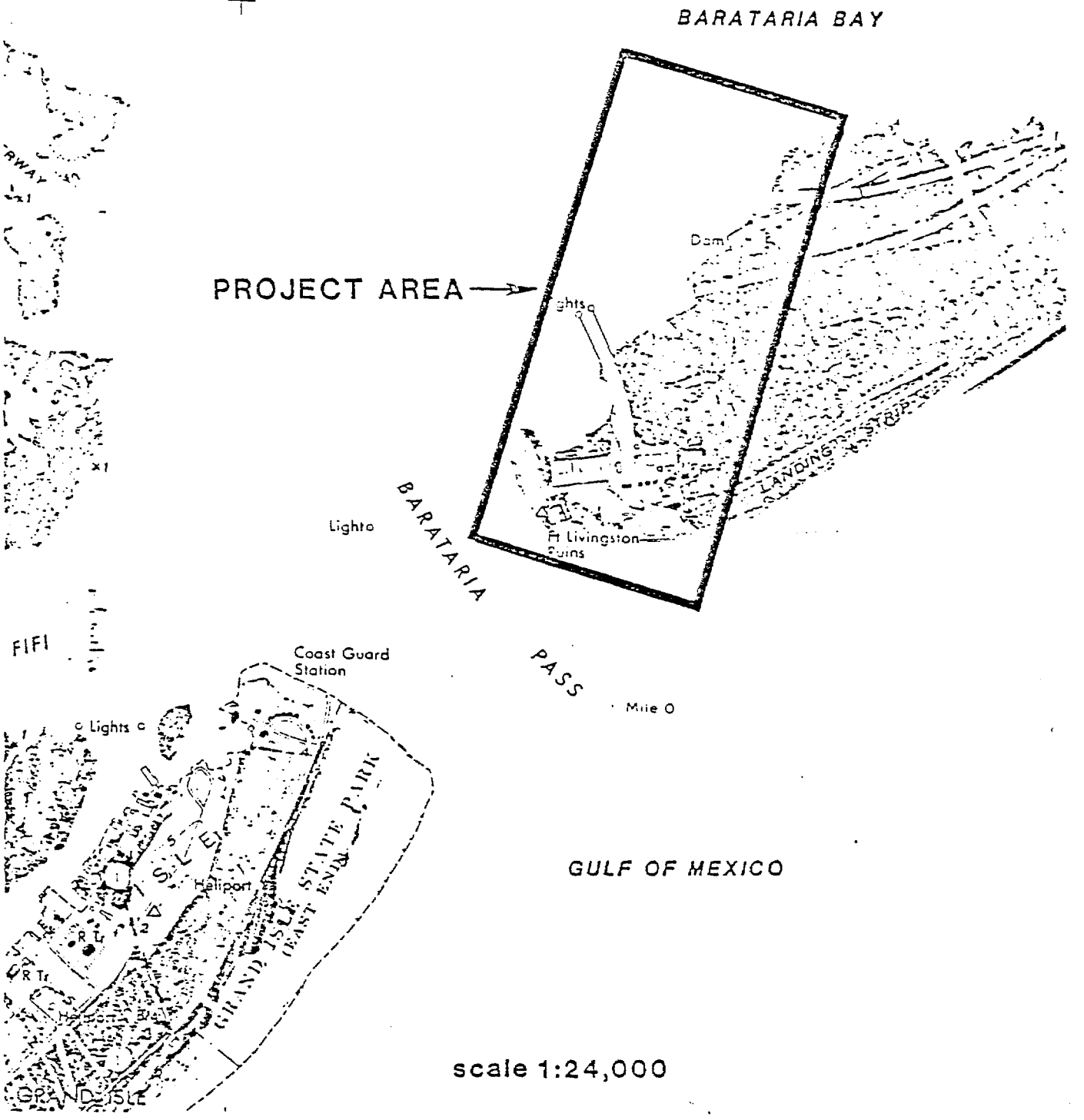


Figure 5. General location map of mineral accretion demonstration.

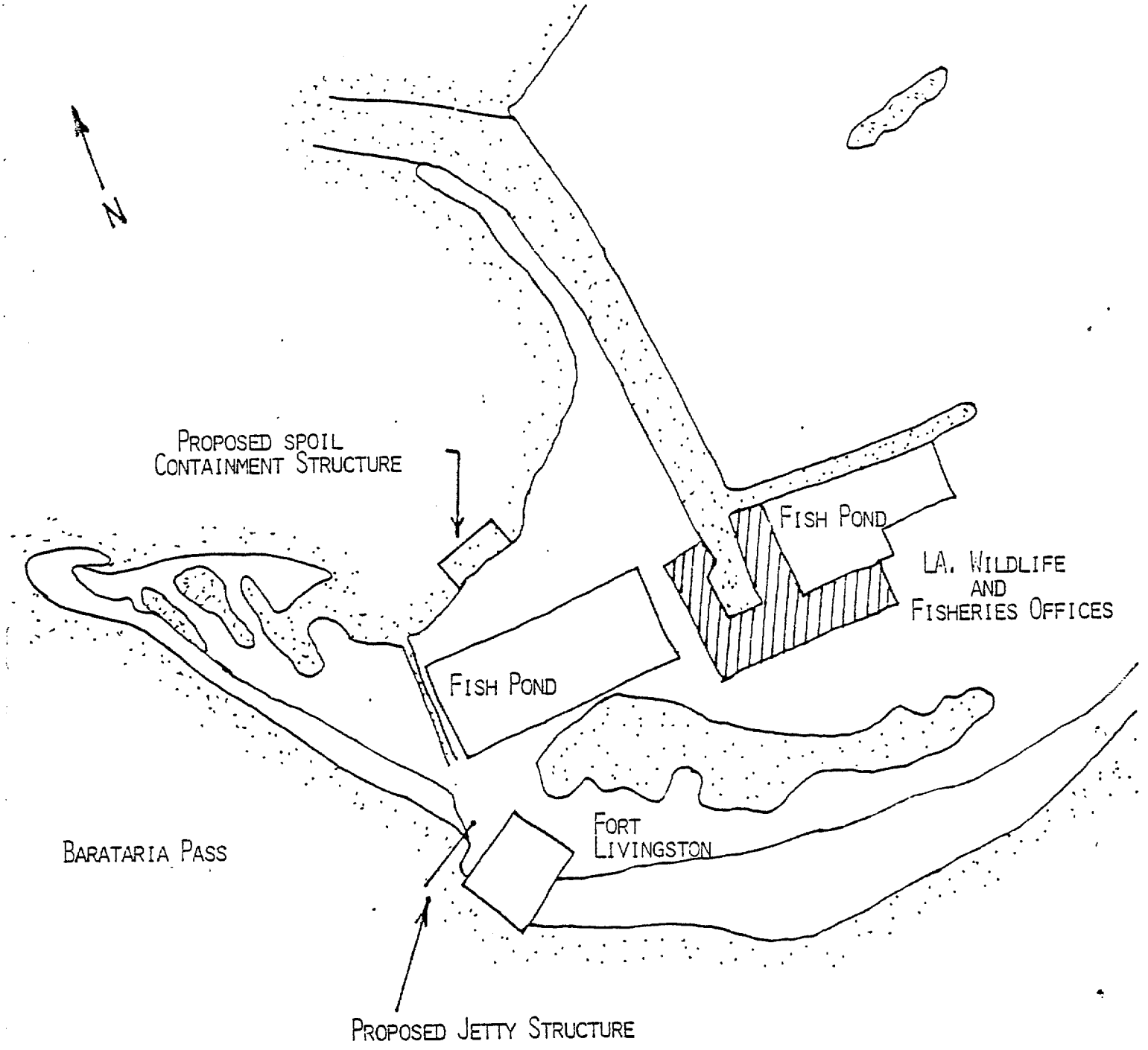
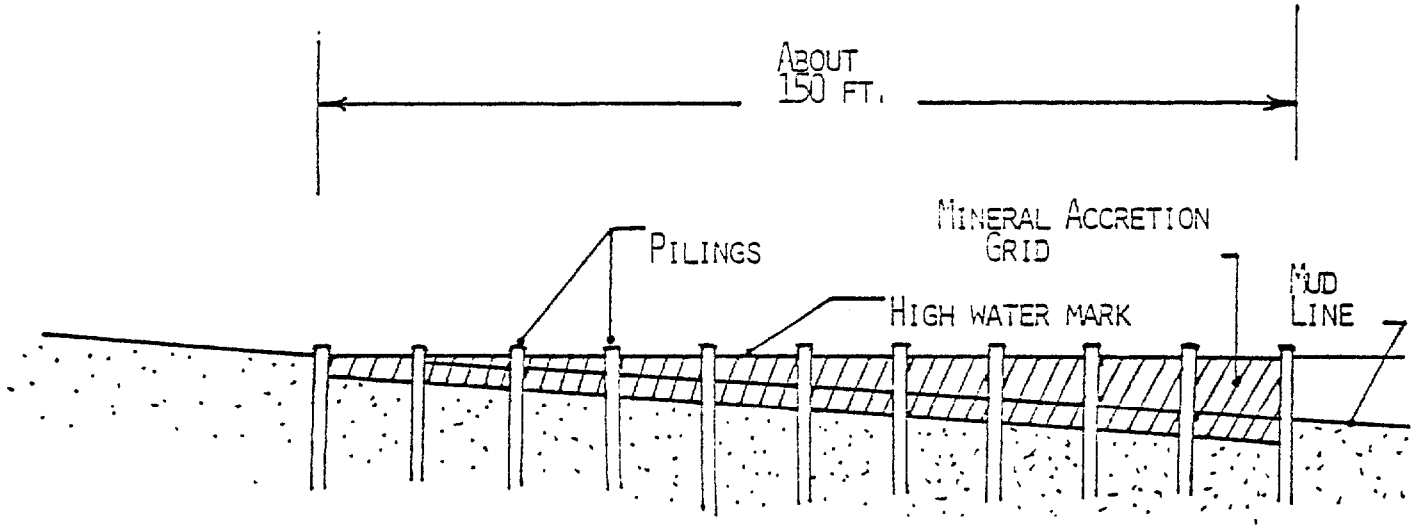
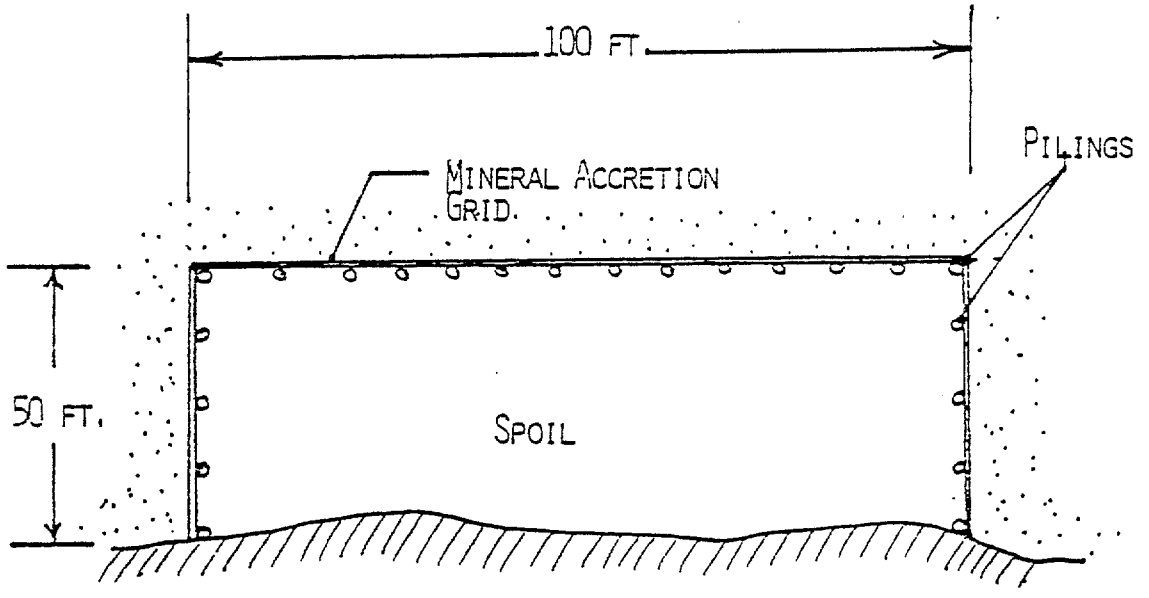


Figure 6. Grand Terre mineral accretion demonstration sites



SPOIL CONTAINMENT STRUCTURE

Schematic Plan, No Scale



JETTY STRUCTURE

Schematic Section, No Scale

FIGURE 7. SCHEMATICS OF PROPOSED MINERAL ACCRETION STRUCTURES.

Benefits

The primary benefits of the proposed project will be the reduction of shoreline retreat and disintegration of eastern Grand Terre Island and/or western Cheniere Ronquille. Without remedial action these two barrier segments will undergo accelerated disintegration and lose most of their protective function within the next 25 years. Increased wave action will result in further acceleration of marsh loss and subsequent salt intrusion within the eastern Barataria estuary.

To remain within the original budgetary limit of twenty percent of the Trust Fund (to be allocated for pilot or demonstration projects) a reduction in the originally proposed scope of work for the Grand Terre/Ronquille site has been required. Fig. 4(a) shows the extent of the work that can be done at this site while staying within approved budgetary limits (Alternative A). Fig. 4(b) shows the work as originally proposed (Alternative B). The latter alternative will raise the overall cost to an amount greater than that currently provided for by R.S. 30:313 B. Table 1 has two columns for the barrier island stabilization project, one incorporates only the amount needed for Alternative A, while the other includes the additional amount needed for Alternative B. Similarly, two grand totals have been tabulated reflecting the difference in cost between the two alternatives.

PASS A LOUTRE MARSH BUILDING

(Freshwater Diversion)

Description of the Area

The Pass a Loutre Wildlife Management Area, which is owned and operated by the Louisiana Department of Wildlife and Fisheries (LDWF), encompasses some 66,000 acres of the lower Mississippi delta in Plaquemines parish. The area is generally bounded on the north by Pass a Loutre and on the southwest by South Pass. Southeast Pass divides the management area into two distinctive

sectors. The northern sector is dominated by the shallow open waters of Blind Bay, while the southern sector is composed of ponds, broken marsh, and the minor passes of the deteriorating Garden Island Bay subdelta.

Subdelta development has been responsible for 80% of the land accretion in the active delta within historic times. Around 1890, the vast majority of the area now making up the refuge was composed of the shallow waters of Garden Island Bay. In 1891, a crevasse occurred in the natural levee between South Pass and Southeast Pass, initiating a turbulent flow of river water and sediments into the bay. After an initial infilling of the bay, land began to appear at a rate of 480 acres/year. The rapidly accreting subdelta was recognized as state land by the 1921 Louisiana legislature who set the area aside as public shooting grounds, the genesis of the present management area. The subdelta reached a maximum extent of 19,200 acres around 1940 and has been in a natural phase of deterioration since then. Presently the management area is losing land at a rate of 190 acres/year. In 1978, only 22,000 acres of land remained in the 66,000 acre management area.

Description of the Proposed Project

Pass a Loutre carries about 31% of the discharge from the Mississippi River. This project proposes to divert some of the freshwater and sediment from Pass a Loutre into the adjacent state wildlife management area for the purpose of creating marshland. Sediment diversion for land building has been proposed in the past, but has met with opposition for the following reasons:

1. Problems with multiple land ownership.
2. Incompatiblity with existing resource uses.
3. Prohibitive expense of control structures.

The proposed project will not encounter these problems. First, the state is the sole owner of the land and all benefits will accrue to its residents. Second, sediment diversion is compatible with the primary LDWF goals of migratory waterfowl and fur management, as well as transportation and mineral extraction resource uses. Lastly, an expensive structural approach will not be sought in this project. The project will take 18 months to complete and will be divided into three phases:

Project planning phase - 6 months

Engineering planning phase - 6 months

Implementation phase - 6 months

Following the implementation phase, a 24 month monitoring and maintenance program for the project is planned.

Project Planning Phase

Project planning will focus on establishing the conditions which immediately preceded each of the 6 major subdelta events, especially the Garden Island Bay subdelta. Through examination of published studies, historic maps, charts, and an examination of the effects and benefits of the existing Bayou La Moque Diversion, the critical hydraulic parameters essential to the development of a subdelta will be calculated. Recent hydrographic data and bathymetric charts will then be used in conjunction with field reconnaissance to locate a site that most closely approximates the critical parameters. Personnel from the Refuge Division of LDWF will be closely involved in the site selection process to ensure that the project fulfills the expectations and goals for the management area.

Existing support facilities in the management area will be used as a base of operations during the field work. At present, the general area around Blind Bay is listed as a candidate for the site (Figure 5). However, a number of smaller bays and ponds also appear to have favorable conditions for diversions. One or more diversion sites will be selected. Coordination with oil companies operating in the area will insure that their activities are not disrupted.

Engineering Phase

When the most promising sites have been identified, the differences between the optimum hydraulic conditions and the existing hydraulic conditions at each site will be evaluated. A plan will then be formulated to optimize the existing conditions primarily through excavation and redeposition of sediments. The engineering plan will be designed so that once a flow is initiated, each diversion will maintain itself as a distributary of the river until it has built a sub-delta of the size desired. Upon reaching this size, the river will abandon these distributaries and will begin the natural deterioration phase (in about 30 years).

An Environmental Impact Assessment will be conducted in conjunction with the engineering planning to facilitate acquisition of the necessary permits and to ensure that a minimum of environmental impacts result from the project.

Implementation Phase

The implementation of the plan is expected to require one year. Supervisors from LDWF will monitor the progress of the work to make sure that project specifications and schedules are met. Construction work can be handled in-house using personnel and equipment of the LDWF.

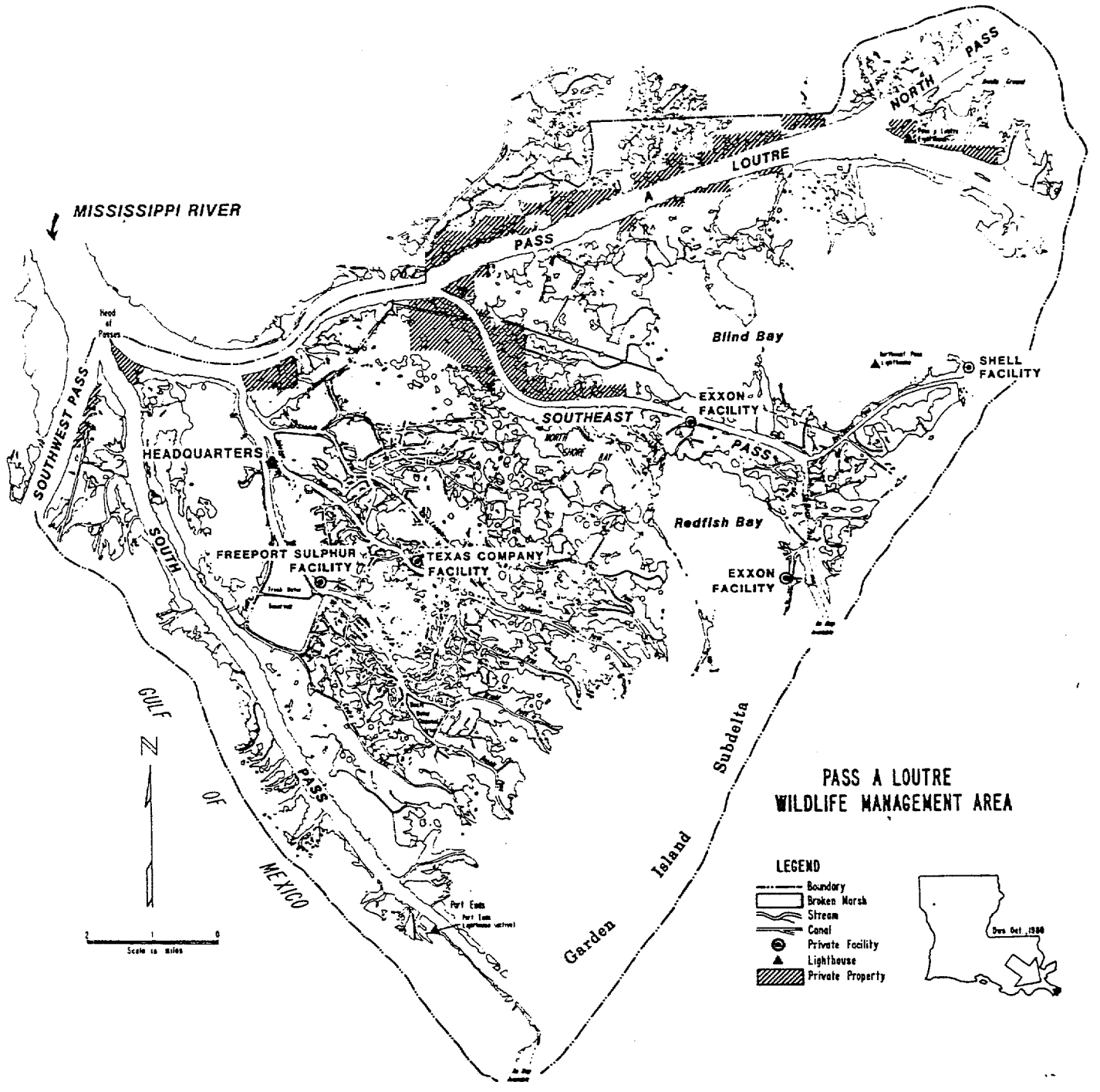


Figure 5. (After Refuge Division, Department of Wildlife and Fisheries 1980.)

Post-Project Monitoring

After initiation of the diversions, they will be closely monitored for twenty-four months to collect information on changes in the channel, accretion rates, and discharge. These data will be useful in judging the effectiveness of the plan as well as adding to the body of knowledge for future applications. LDWF personnel will set up a field monitoring program to be carried out from their support facilities in the management area. In addition, the Louisiana Geological Survey will monitor accretion rates and sediment distribution in the area.

Benefits of the Project

In the past, seasons with the highest waterfowl usage in the management area have been correlated with high river discharges which deposit mineral sediments in the ponds and shallow bays. These sediments are conducive to the growth of delta duck potato and other waterfowl foods. It has also been shown that waterfowl prefer fresh and intermediate marshes with small to large open water areas. Furbearer populations are also dependent on the acreage of marsh habitat. This project would therefore increase the productivity and effectiveness of the management area by introducing mineral sediments and increasing marsh acreage. These benefits would continue to occur annually throughout the natural subdelta cycle (60 to 70 years).

PROJECTING FUTURE COASTAL CONDITIONS

Description of the Area

Studies conducted during the past 10 years have demonstrated that coastal Louisiana is literally eroding away and sinking beneath the level of the sea at an alarming rate. Data resulting from these studies indicate that a crisis situation exists in Louisiana's coastal zone. Cities, highways, farms, oil and gas fields, ports, and all other activities of man in this heavily populated area will be increasingly threatened as major changes in the landscape unfold during the next 50 years. The state is faced with large expenditures in order to continue to protect life and property in endangered areas. In addition, the renewable resource values of the coastal zone, which include, but are not limited to, fish, wildlife and recreation, will undoubtedly decline at a rapid rate. Such predictions are not a matter of idle speculation, but are based upon sound scientific data. The most notable and visible evidence of these deteriorating conditions include land loss, erosion of barrier islands and the Gulf shore, wetlands change, salt water intrusion, and sinking of ridgelands upon which people live.

The State of Louisiana, through the Coastal Environment Protection Trust Fund, has taken initial steps to try and arrest and reverse some of these detrimental changes. Recognizing that available resources must be used wisely, and that because of the magnitude of the forces involved many of the changes are inevitable, it is important to understand where and at what rate changes are likely to occur. For this reason a project to predict future conditions in the coastal zone is proposed.

The project area comprises all of the Louisiana Coastal Zone extending from the offshore three-mile State-Federal demarcation line to the inland boundary, as established by Act 361 (as amended) of the 1978 Louisiana State Legislature.

Description of the Proposed Project

A series of maps will be developed that depict the future configuration and conditions of the Louisiana coastal zone. The maps will be shown for 25, 50 and 75 year projections of: 1) the position and configuration of the barrier islands and the Gulf shoreline; 2) the positions of the shorelines around major lakes and bays; 3) the ratio of land to water in all wetland areas; 4) the zonation of wetland vegetation; 5) maximum elevations and width of land above mean Gulf level along natural levee and relict beach ridgelands; and 6) elevations along the crests of major flood protection levees. Projections will be based upon the assumption that rates of change in landscape indicator parameters that have occurred since 1900 will continue. Projections will be based upon measurements of these indicator parameters through time.

Three groups of indicator parameters will be utilized as follows: 1) measurements of habitat change and land loss; 2) measurements of change in configuration and position of the Gulf shoreline and barrier islands; and 3) measurements of subsidence in coastal areas.

The work will utilize, and build upon, data from several previous projects. One of the most important of these was a project conducted for the U.S. Fish and Wildlife Service and the Bureau of Land Management (Contract FWS-OBS-79/07) in which habitats were interpreted and measured for 1955 and 1978 in the Mississippi River Deltaic Plain Region (hydrologic units II through VII). This mapping was continued in the Chenier Plain (hydrologic units VII and VIII) for the 1978 period under contract for the Office of Coastal Management, Department of Natural Resources. Other detailed habitat mapping studies that will be uti-

lized have been conducted in St. Bernard, Tangipahoa and Terrebonne Parishes. Thus, the proposed project will build upon previous work, and take advantage of data collected at the expense of thousands of man hours of effort and considerable monetary expense.

Task 1. Project Scoping

Since the proposed project will have value to many agencies of government, and because of its complexity, a series of scoping meetings to design the product format are considered to be essential. Format for computerized data storage and retrieval, as well as map format, will be considered. The project design will also consider, to the greatest extent possible, compatability with other automated image interpretation, and data storage and retrieval being developed as tools for resource management.

Task 2. Projecting Land Loss and Habitat Change

Utilizing measurements from maps, aerial photographs and color infra-red imagery, projections will be made of the future configuration of the amounts of land and the types of habitats and surface use. Measurements will be made with an electronic digitizer from interpretative overlays from various time periods (1890-1981). Most of these overlays will be at a scale of 1:24,000, but other scales may also be utilized. These will provide the basis for projecting future conditions. A computer will be used for data integration, summary and projection. Programs will be developed for the various tasks. Contours of the land/water ratio (% land) will depict the continuity of the land surface, and map symbols will be used to show wetland vegetation zonation.

Task 3. Projecting Shape and Position of the Barrier Islands and Shorelines

Changes in the position and configuration of the Gulf shore, the shores of major lakes and bays, and the barrier islands will be determined by measuring maps, aerial photos, and color infra-red imagery from various times over the past 90 years and projecting changes into the future. These measurements will provide the basis for predicting where the shoreline will be in future years and what it will look like. For example, it is well known that barrier islands along the Louisiana coast not only retreat in a landward direction, but also migrate along the shore in response to longshore drift and may have a tendency to rotate and diminish in total area. Measurements of these changes made from historic maps and aerial photos make it possible to establish rates of change based on the various parameters and thus allow projection of future size, position, and shape of the barrier islands.

Accreting shorelines will also be projected. These include sand spits in the vicinity of stream outlets, as well as areas of delta growth, such as Atchafalaya Bay and distributary mouth areas in the active Mississippi Delta.

Task 4. Determine Rates of Subsidence and its Effect on Ridgelands and Flood Protection Levees.

Land sinking or subsidence is clearly a major factor in land loss, erosion, and wetlands deterioration in coastal Louisiana. Furthermore, it has major implications regarding flooding of developed ridgelands and areas impounded by levees. The components of subsidence which must be considered include those related to natural changes between the relative position of land and sea and those induced or accelerated by human activity. Rates of subsidence vary across

the coastal zone and may also vary through time.

Long term subsidence rates will be determined through study of radiocarbon dates of buried organic deposits, historical elevation profiles, and mapping of habitat and environmental changes. Over 200 radiocarbon dates have been published in geological reports and journals, and it is anticipated that additional ones can be located from archival sources. A contour map showing these long term rates will be compiled.

Subsidence during modern times can be determined from comparisons of repeated measurements of tide levels and land survey points. The data for these comparative studies will be obtained from the U.S. Geological Survey, the U.S. Department of Commerce, the Office of Public Works of the Louisiana Department of Transportation and Development, the Louisiana Geological Survey, and other appropriate government agencies. A contour map showing short term subsidence rates will be developed.

The above maps will provide the basis for estimating decrease in area of low-lying ridgelands within the coastal zone. These maps will also be used to evaluate future changes in elevation of major flood protection levees.

Benefits

Projections of future conditions in the coastal zone, derived from comparative map studies, will provide an invaluable basis for planning and evaluating the cost effectiveness of projects proposed under the Coastal Environment Protection Trust Fund. In addition to these projects it will have immediate application in many aspects of planning and design in the coastal zone including, but not limited to, flood protection and drainage, wetlands management, erosion control, highways, structures and pipelines related to the mineral extraction

industry, ports and navigation projects, industrial development, and legal boundary disputes. The maps developed as a result of this project should provide an important tool for management, planning and decision making for virtually all activities in the Louisiana coastal zone.

APPENDIX A

State of Louisiana

FRANK A. ASHBY, JR.
SECRETARY

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF STATE LANDS

STEPHEN ZERANGUE
DIRECTOR

January 6, 1982

MEMORANDUM

TO: Frank A. Ashby, Jr.
Secretary, DNR

FROM: Joel L. Lindsey
CMS/DNR Administrator

RE: Coastal Environment Protection Trust Fund

Pursuant to LA R.S. 30 Section 313c, the administrator of CMS/DNR is directed to make recommendations to you on projects to control coastal erosion and wetland loss, this report contains five projects for your consideration.

The following criteria were used to select these projects:

(1) Environmental soundness
(2) Cost effectiveness
(3) Timeliness (demonstrated results within 18-24 months)
(4) Technical feasibility
(5) Visibility in demonstrating results

The projects selected also reflect the work done by the joint Senate and House committees on Natural Resources entitled "Report on Special Projects for Coastal Louisiana".

The Coastal Management Section will provide technical assistance to you as we continue to refine these projects.

JLL/cb

POST OFFICE BOX 44396 . BATON ROUGE, LOUISIANA 70804-4124 . PHONE (504) 342-4577
NATURAL RESOURCES BUILDING

APPENDIX B

DAVID C. TREEN
GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

FRANK A. ASHBY, JR.
SECRETARY

January 20, 1982

The Honorable David C. Treen
Governor of The State of Louisiana
State Capitol Building
Post Office Box 44004
Baton Rouge, Louisiana 70804

Dear Governor Treen:

The legislature recently sent to you legislation addressing one of the very important issues dealt with in your call for the special 1981 session. Since your signing of that piece of legislation establishing the Coastal Environment Protection Trust Fund, we at the Department of Natural Resources have been busy, as directed by L.R.S. 30, Section 313c, conceiving a strategy to meet the requirements of the legislation. I am pleased to report that we have developed a proposal that responds particularly to the provisions of L.R.S. 30, Sections 313b and 313d.

Briefly, our proposal identifies five pilot projects selected for their environmental soundness, cost effectiveness, technical feasibility, timeliness and visibility in demonstrating results. Specifically included are small scale barrier island and beach stabilizations in the areas of Holly Beach-Peveto Beach, East Isles Dernieres and Grande Terre Ronquille and water/sediment diversion in the Pass-a-Loutre Game and Fish Preserve. Our proposal also addresses State participation with the U.S. Corps of Engineers in the major freshwater diversion effort at Caernarvon (Big Mar). The total dollar investment in all five pilot projects and the Caernarvon freshwater diversion is estimated to be nearly $14 million.

In developing these project proposals, we paid particular attention to the findings of the joint House and Senate Committees on Natural Resources published in a report to you entitled "Report on Special Projects for Coastal Louisiana" and consulted with representatives of both the Wildlife and Fisheries Department and the Department of Transportation and Development, Office of Public Works. As

we proceed now from proposal to project reality, I recommend strongly that such a procession be guided by the efforts of a formally constituted Task Force, composed of the Secretaries or their designees of the aforementioned agencies and the Department of Natural Resources. I suggest also that the Chairman of the Louisiana Coastal Commission be designated a member. I understand you have considered and tentatively approved such a Task Force in a meeting with Secretary Guidry, Kai Midboe, Victor Marvar and Dr. David Etzold. The expertise of the Department of Transportation, Office of Public Works will be particularly important where the engineering components of the projects are involved, and input from the Department of Wildlife and Fisheries is essential in that one of the proposed projects involves land under their management jurisdiction.

Each project will include elements of study and design, environmental assessment, engineering, contract negotiation and construction. The services of a Coastal Environment Protection Contract Coordinator will be secured to ensure that these major functions are accomplished in a timely and competent fashion, thereby guaranteeing the overall success of this effort. This person will also provide staff support to the Task Force.

I believe a consensus relative to project selections on the part of your office, the Task Force, and the Legislature must be achieved with all due speed. We would like to be in a position to begin negotiating for contracts when the funds become available in the Spring.

You can count on our cooperation and hard work in this effort. With kindest personal regards

Sincerely,

FRANK A. ASHBY, JR.
Secretary

FAAjr/SZ/cb

APPENDIX C

Projects aimed at fighting coastal erosion

By ALLAN PURSNELL
Capitol news bureau

Six pilot projects, representing an $8.5 million first step in a new program to fight erosion along Louisiana's coast, were unveiled Thursday before a legislative committee.

The Legislature last year, with the support of Gov. Treen, agreed to set aside $35 million from the state's mineral trust fund to stem erosion that gobbles up Louisiana's shores and marshes at an accelerating rate.

The six proposals were approved unanimously by the Joint Natural Resources Committee, but they must still go before the Budget Committee, Legislature and the governor, who has the final say.

The state is limited to spending a fifth of the $35 million on such pilot projects.

The projects include pumping sand along some shorelines and freshwater diversion to fight salt water intrusion into marshes. The projects also include a program to study and predict coastal conditions for the next 75 years at a cost of $500,000.

Joel Lindsey, administrator of the state's Coastal Management Section, called the proposals "a bold and creative approach to fighting the loss of our coastal wetlands."

There has been growing concern among state officials and the Legislature the past few years over the accelerating rate of coastal erosion of Louisiana's coast line. A Department of Wildlife and Fisheries documentary film, viewed by the committee, showed how 800,000 acres of marshlands have been lost since 1900. The department said the loss is approximately 30,000 acres a year.

Lindsey said one element in selecting the projects was time. He said projects which would show quick results — 18-24 months, were selected.

"We want demonstrated results," Lindsey told the panel.

He said other criteria included technical feasibility, environmental soundness and cost effectiveness.

The list of projects includes one that isn't new. That is construction of the Caernarvon Water Diversion Project in St. Bernard and Plaquemines Parish. The state has agreed to pay 25 percernt of the $18 million project. The money was provided in a separate appropriation last year, but the project is included in the state's overall anti-erosion program. The U.S. Army Corps of Engineers will cover the other 75 percent. The project will divert fresh Mississippi River water into marsh areas that have been receiving increasingly higher amounts of salt water from the Gulf of Mexico.

The projects were recommended through a study conducted by Sherwood M. Gagliano under contract to the Department of Natural Resources. The committee added a project suggested by Rep. Sam Theriot, D-Abbeville who complained his area wasn't included in the original list of recommendations. His proposal, at a projected cost of $650,000 would create a fresh water diversion project in Vermilion Parish.

The other projects include:

- Holly Beach - Peveto Beach protection project, costing $1 million.
- Eastern Isle Dernieres barrier island stabilization, $2.2 million.
- Grande Terre - Ronquille barrier island stabilization project, $3.4 million.
- Pass-a-Loutre marsh fresh water diversion project, $920,000.

APPENDIX D

ORGANIZATIONAL CHART

FOR IMPLEMENTATION OF THE COASTAL ENVIRONMENT PROTECTION TRUST FUND