7/9/92

Woodward-Clyde Consultants

RE-ESTABLISHMENT OF NATURAL SEDIMENT DELIVERY SYSTEMS, ATCHAFALAYA DELTA, ATCHAFALAYA BASIN PAT-2

Candidate Project
for the
Priority Project List
of the
Coastal Wetlands, Planning, Protection and Restoration Act

Proposed By:

U. S. Department of Commerce
National Marine Fisheries Service

Point of Contact: Ms. Peggy Jones
Phone: 504/389-0508

PROJECT DESCRIPTION

Location

The proposed project area is in Atchafalaya Bay, in the lower southeast corner of St. Mary Parish. The area's center is approximately at latitude 29°27'00" and longitude 91°16'30". The project area is the eastern half of the Atchafalaya Delta and comprises,

marsh Fresh water marsh (some willows) - 174 acres – marsh
OW { Submerged aquatic vegetation - 46 acres OW or SAV
Tidal flats - 1,622 acres OW
Open water bodies (includes distributary channels) - 4,000 acres – OW

Project area = 5,842 ac
OW = 5668 ac
marsh = 174 ac
5842 ac

The project area is referred to in the scientific literature as the "Eastern half of Atchafalaya Delta" or "Eastern Atchafalaya Delta."

Subaerial expression of this portion of the Atchafalaya Delta occurred after the 1973 flood. Since then, this subdelta has grown to cover 6,800 acres of former bay bottom.

Justification

Closure of a distributary channel, known as Natal Channel, in the eastern half of the Atchafalaya delta, principally as a consequence of man's dredging activities, has cut off sediment supply to approximately 1,000 acres of wetlands and 1,000 acres of shallow delta platform. As a result, delta progradation in this area has been dramatically reduced and wetland loss is starting to occur. Disruption of the sediment delivery network has resulted in sediment delivery during floods not being in balance with winter erosion events and subsidence, and net land (wetland) growth has become net land loss, in this portion of the delta.

Natal channel's cross-section has been monitored since early 1977. In 1983 it was 60m wide and had a mean depth of 1.5m (Van Heerden, 1983). In 1989 Natal Channel sealed at its upstream end due to subaqueous levee development mostly as a

consequence of sediment that had migrated down East Pass from an upstream dredge dump site.

Similar closure mechanisms have reduced flow down Radcliffe Pass, south of Natal Channel. Acreage, on a par with the Natal Channel situation, has been adversely impacted around Radcliffe Pass.

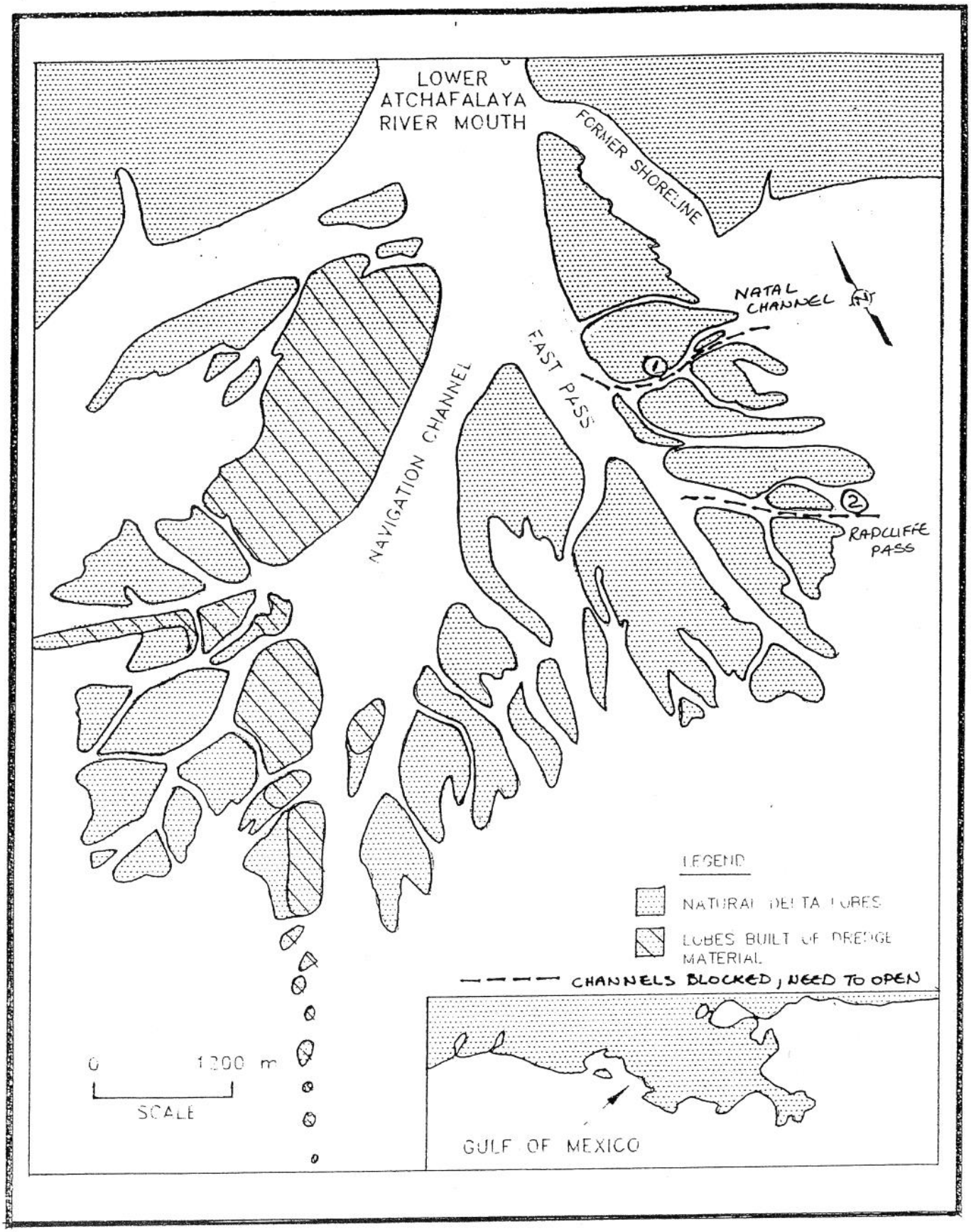
Objectives

The objective of this project is to re-establish the natural sediment delivery system in this portion of the Atchafalaya Delta and to enhance the system's natural delta building potential. This is to be accomplished by dredging open Natal Channel and Radcliffe Pass.

Project Features

Approximately 125,000 cubic yards of material is to be dredged from Natal Channel. If conventional dredge methods are employed, it will mean creating dredge mounds or high strips which will most likely become willow thickets rather than remaining marsh. Additionally, if the dredge material is placed adjacent to the dredge site, one may create problems for the channels immediately downstream. The solution lies in spray dredging. This disposal technique leads to a thin veneer of dredge material being spread over a large area and as a consequence elevation changes are minimal. The spray dredging technique that will be employed will consist of a hydraulic cutter/suction dredge connected to a barge fitted with a spray nozzle by a section of hose part of which will be flexible. The barge can thus be moved independently of the dredge ensuring that the spray dredging leads to minimal buildup.

A similar amount of material will be dredged from Radcliffe Pass and dispersed in the same manner.


LOWER
ATCHAFALAYA
RIVER MOUTH
FORMER SHORELINE
NATAL
CHANNEL
FAST PASS
NAVIGATION CHANNEL
1
2
RADCLIFFE
PASS
LEGEND
NATURAL DELTA LOBES
LOBES BUILT OF DREDGE
MATERIAL
CHANNELS BLOCKED, NEED TO OPEN
0
1200 m
SCALE
GULF OF MEXICO

ANTICIPATED BENEFITS

Types and Acres Enhanced

The proposed project will restore the natural freshwater and associated suspended sediment distribution to 2,000 acres of delta environments including 174 acres of prime freshwater marsh in the eastern half of Atchafalaya Delta. Over the next 20 years 2,000 acres of bay bottom will be converted to subaqueous and subaerial delta environments.

Types and Acres Created

Three hundred acres of new marsh will result directly from the spray dredge material disposal. An additional 1900 acres of new marsh will accrete over the next 20 years as a consequence of natural delta building associated with the two distributary channels.

Types and Acres Restored

Approximately 15 acres of marshes that have been lost in the last few years will be restored to an elevation that will allow revegetation by marsh plants.

Types and Acres Protected

The development of new delta lobes associated with the reopened distributary channels will protect older marshes from the erosive effects of winter cold air outbreaks and their associated high wind-wave activity.

Duration of Coastal Wetland Benefit

The duration of the benefit should continue for at least 20 years. (Typically, distributary channels in the eastern Atchafalaya Delta have a 20 to 25 year life span.)

Benefits to Coastal Wetland Dependent Fish and Wildlife Populations

The Atchafalaya Delta is one of Louisiana's prime waterfowl wintering areas. Additionally, it has a large indigenous duck breeding population as well as numerous ibis and heron breeding colonies. Development of new delta lobes will greatly increase the habitat on which these birds are dependent.

The shallow delta lobe interiors, channel flanks and mud flats are utilized by numerous species of fish. Increasing the area of these environments will greatly enhance fisheries habitat and productivity.

Other Significant Benefits

Increasing discharge down the eastern side of Atchafalaya Delta will enhance sediment introduction to marshes surrounding the eastern side of Atchafalaya Bay, including Point au Fer island.

Dredging the channels will improve recreational access to the area.

ANTICIPATED ADVERSE EFFECTS

Types and Acres Adversely Affected

None.

Conflict With Other Programs

None.

COSTS

Site Survey, Engineering Design	$ 15,000
Supervision of Construction	$ 30,000
Project Construction (±253,000 cu yds @ $1.8/cy)	$ 455,000
Cost of Monitoring (20 years @ $3,000/yr)	$ 60,000
The total cost of the project over 20 years will be approximately	$ 560,000
Cost per acre (new wetland)	$ 280
Cost per acre of new wetland only amortized over 20 years	$ 14

STATUS OF ENVIRONMENTAL COMPLIANCES

NEPA

No specific environmental evaluation of the project has taken place at this time and no applications for permits have been undertaken.

Sections 10/404

No specific environmental evaluation of the project has taken place at this time and no applications for permits have been made.

Louisiana Coastal Management Program

The project is located within the Louisiana Coastal Zone and will require a Coastal Use Permit.

Louisiana Water Quality Certification

No application has been made for this permit.

Endangered Species Act

The project is not believed to adversely affect endangered or threatened species.

PROJECT IMPLEMENTATION SCHEDULE

The following schedule expresses anticipated time periods in terms of months after initiation of the project.

Authorization	0
Planning and survey starting date	2
Planning and detailed feasibility analysis finishing date	4
Submittal of permit application	4
Completion of permit process	7
Construction start date	7
Construction finish date	10

POTENTIAL FUNDING SOURCES

Federal Funding Sources

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

Non-Federal Funding Sources

State funding is available to share in the project cost if the project were to be submitted and approved under the State's 1992-1993 Coastal Wetland Restoration and Protection Plan.

PAT-2
7/9/92

Woodward-Clyde Consultants

COASTAL WETLANDS PLANNING, PROTECTION, AND RESTORATION ACT

Proposed Project Information Sheet

Project Name:	Re-Establishment of Natural Sediment Delivery Systems Atchafalaya Delta, Atchafalaya Basin
Project Area Size:	4248 acres
Submitted By:	U.S. Department of Commerce

Marsh Type: Fresh Acres: 4248

PRESENT CONDITIONS

1. Acres of vegetated marsh and listing of most common plant species present.

   One hundred and seventy four acres of vegetated fresh marsh are currently present, composed of Sagittaria latifolia, Sagittaria platyphylla, Scirpus americanus, Scirpus validus, Typha domingenis, Zizaniopsis miliacea, Justicia ovata, mixed fresh marsh (as presented by Robertson et al., 1987; Aster. spp, Bacopa sp., Colocasia sp., Cyperus spp., Echinochloa spp., Leersia sp, Aeschynomene indica and others), Salix nigra and submerged aquatic vegetation (46 acres consisting of numerous small patches).

2. Acres of open water.

   Four thousand (4000).

3. Percentage of open water listed in Item 2 dominated by aquatic plants.

   1.5 percent.

4. Historical information on marsh loss trends.

Reduction of discharge down Natal Channel and Radcliffe Pass, since the mid to late 1980s, predominately reflects the activities of man. As a consequence 2000 acres of delta lobes and 2000 acres of subaqueous delta platform have had their sediment supply dramatically cut. In the past few years 15 acres of wetlands have been lost and the rate is expected to accelerate. Marsh loss rate at present is 2.6 percent p.a.

5. Brief summary of significant historical hydrologic changes.

If a delta's sediment delivery network is disrupted, a situation could develop where sediment delivery during floods will not balance with that eroded during winter frontal passages and lost due to subsidence. Therefore, net land growth will become net land loss. Until the late 1980s navigation channel dredged material was never placed in the eastern (natural) half of the Atchafalaya Delta. Starting in 1987 the Corps of Engineers was advised to place dredge material at the heads of lobes in the eastern half of the delta as it was felt that this would "stabilize" the islands and channel locations. Unfortunately, due to natural channel sediment transport mechanisms and the redistribution erosional processes associated with cold fronts, some of the material migrated down the channel and effectively sealed Natal Channel by late 1988. Radcliffe Pass is now also starting to seal.

As a consequence of reduced sediment input the delta lobes adjacent to Natal Channel and Radcliffe Pass are losing elevation. Marsh loss, in this delta, is now occurring.

6. Shoreline erosion rate.

In portions of the project area erosion rates in subaerial portions of the delta have exceeded 100 feet per annum. In general, they average 3 feet per annum for emergent land.

7. Percent of open water area in the following categories (4000 acres):

Fresh Marsh

Less than 0.5 feet	= 20 percent
Between 0.5 feet and 1.5 feet	= 30 percent
Between 1.5 feet and 4 feet	= 25 percent
Greater than 4 feet	= 25 percent

8. Available historical salinity data.

The project area is nearly always fresh due to the proximity of the Atchafalaya River. During the fall with low river flows and high Gulf of Mexico waters, salinities may reach 5 ppt (van Heerden, 1983).

9. Location, type and operation schedule of existing permitting and unpermitted structures.

Not applicable.

10. Is there an existing permitted management plan for the area?

No.

11. Location of structures, culverts, breaks in spoil banks, etc. that serve as hydrologic connections and are not identified above or are not easily seen by examination of aerial photography.

All channels are readily seen on high altitude aerial photography.

12. Estimated subsidence rate

1.3 cm/yr (van Heerden, 1983)

FUTURE CONDITIONS

1. Locations, type, and operation of proposed structures and water control system, including plugs.

   No structures planned.

2. Proposed hydrologic changes due to the project.

   Both Natal Channel and Radcliffe Pass will be dredged such that discharges from East Pass will now flow down these channels out into the bay.

3. Project Benefits.

   a. Acres of emergent marsh predicted to be lost without the project.

      The vegetated marsh loss rate for existing marsh is 2.6 ~~acres~~ % per annum. Thus over 20 years it is estimated that 32 acres will be lost. The fact that under normal conditions, i.e., open distributary channels, an average 95 acres of new marsh would be created per year due natural processes, means that the annual loss rate is actually 96.6 acres/annum. Thus total loss without project is 1932 acres.

      Acres of emergent marsh predicted to be gained with project.

      Three hundred acres of marsh will be constructed as a consequence of dredge material dispersal. Thereafter new marsh could accrete at a rate of 95 acres per annum. Total new emergent marsh over 20 years could equal 2200 acres.

      One hundred and seventy-four acres of existing marsh will be enhanced by the project as will about 2000 acres of delta environments.

b. Acres of open water aquatic vegetation predicted to be lost without project.

Due to subsidence the existing 46 acres of aquatic vegetation would be lost.

Acres of open water aquatic vegetation predicted to be gained with project.

At least 460 acres of aquatic vegetation would develop as a result of this project.

4. Predicted plant species composition of marsh in the future, with and without the project.

Without the project the area Sagittaria latifloria, Sagittaria platyphylla, Scirpus americanus, Scirpus validus and Zizanicpris miliacea will decrease.

With the project there will be a dramatic increase in Sagittaria latifolia, Sagittaria platyphylla, Scirpus americanus, Scirpus validus, Zizaniopsis miliacea and mixed fresh marsh.

5. Estimates of open water area in depth categories, future with and without project:

Current estimates of depths of open water with an area of 4,000 acres

Fresh Marsh

Less than 0.5 feet	= 20 percent
Between 0.5 feet and 1.5 feet	= 30 percent

Between 1.5 feet and 4 feet	= 25 percent
Greater than 4 feet	= 25 percent

With Project (at 20-year "project life), open water would be 1,800 acres.

Less than 0.5 feet	= 40 percent
Between 0.9 feet and 1.5 feet	= 40 percent
Between 1.5 feet and 4 feet	= 20 percent
Greater than 4 feet	= 0 percent

Without Project (at 20-year "project life), open water would be 4,100 acres.

Less than 0.5 feet	= 5 percent
Between 0.9 feet and 1.5 feet	= 25 percent
Between 1.5 feet and 4 feet	= 40 percent
Greater than 4 feet	= 30 percent

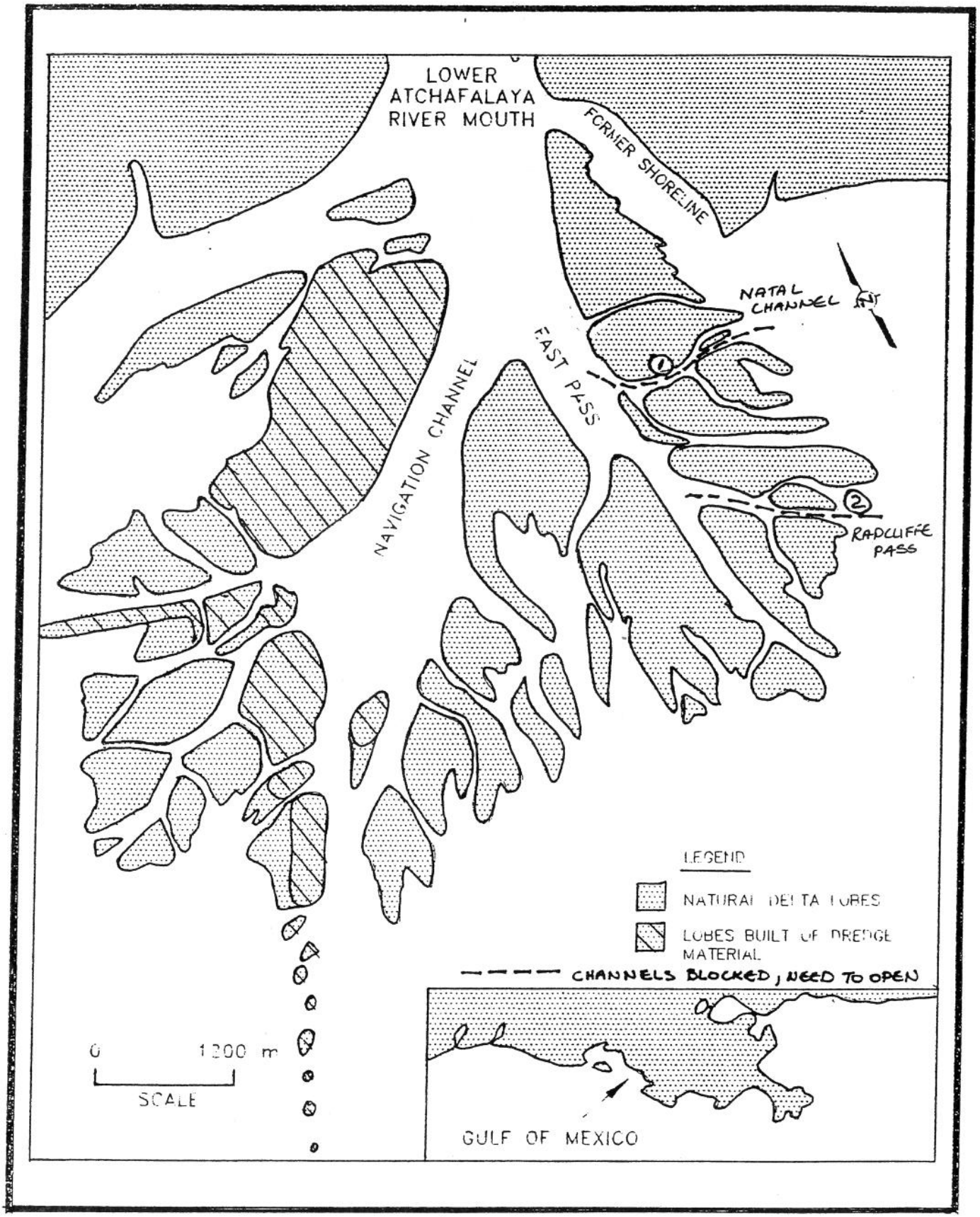
6. The project will reduce the salinities in this part of the bay due to the freshwater moving down the distributary channels.

With project maximum	1 ppt
Without project maximum	5 ppt

REFERENCES

Robertson, M., E. Evers, G. Peterson, and C. Sasser. 1987. Atchafalaya Delta-Vegetation Map. Spec. Publ. Louisiana Sea Grant Program. L.S.U. Baton Rouge.

van Heerden, I. Ll. 1983. Deltaic Sedimentation in Eastern Atchafalaya Bay, Louisiana Spec. Publ. Louisiana Sea Grant Program. L.S.U. Baton Rouge. 117 p.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COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

Wetland Value Assessment Worksheet

(V)

Project: PAT-2 **Date:** 7/15/92

Condition: FWOP

Project Area = 4248ac
Fresh

TY	V_1	V_2	V_3	V_4	V_5	V_6	V_7
Ø	248ac 6%	1.5%	4	2	50%	1	1.0
1	246ac 6%	1.5%	4	2	50%	1	1.0
20	216ac 5%	1.5%	4	2	30%	2	1.0

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

Wetland Value Assessment Worksheet

Project: PAT - 2

Date: 7/15/92

Condition: FWP

Project Area = 4248 ac
Fresh

TY	V_1	V_2	V_3	V_4	V_5	V_6	V_7
Ø	248ac 6%	1.5%	4	2	50%	1	1.0
1	548ac 13%	1.6%	3	2	60	0.5	1.0
20	2448ac 58%	26%	3	2	80%	0.5	1.0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Fresh/Intermediate Marsh

Project.....Re–establish Natural Sediment Delivery (PAT–2) Marsh type acres:

Fresh..... 4248

Condition: Future Without Project

Intermediate..

Variable		TY 0		TY 1		TY 20	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	6	0.15	6	0.15	5	0.15
V2	% Aquatic	1.5	0.11	1.5	0.11	1.5	0.11
V3	Interspersion	%		%		%	
	Class 1		0.20		0.20		0.20
	Class 2						
	Class 3						
	Class 4	100		100		100	
	Class 5						
V4	Hydrology	%		%		%	
	Class 1		0.50		0.50		0.50
	Class 2	100		100		100	
	Class 3						
	Class 4						
V5	%OW <= 1.5ft	50	0.60	50	0.60	30	0.40
V6	Salinity (ppt)						
	fresh	1	1.00	1	1.00	2	1.00
	intermediate						
V7	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
		HSI =	0.28	HSI =	0.28	HSI =	0.26

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Fresh/Intermediate Marsh

Project.....Re–establish Natural Sediment Delivery (PAT–2) Marsh type acres:

Fresh..... 4248

Condition: Future With Project

Intermediate..

Variable		TY 0		TY 1		TY 20	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	6	0.15	13	0.22	58	0.62
V2	% Aquatic	1.5	0.11	1.6	0.11	26	0.33
V3	Interspersion	%		%		%	
	Class 1		0.20		0.40		0.40
	Class 2						
	Class 3			100		100	
	Class 4	100					
	Class 5						
V4	Hydrology	%		%		%	
	Class 1		0.50		0.50		0.50
	Class 2	100		100		100	
	Class 3						
	Class 4						
V5	%OW <= 1.5ft	50	0.60	60	0.70	80	0.90
V6	Salinity (ppt)						
	fresh	1	1.00	0.5	1.00	0.5	1.00
	intermediate						
V7	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
		HSI =	0.28	HSI =	0.34	HSI =	0.59

AAHU CALCULATION

Project: Re–establish Natural Sediment Delivery (PAT–2)

Future With Project			Total	Cummulative
TY	Acres	x HSI	HU's	HU's
0	4248	0.28	1183.74	
1	4248	0.34	1430.28	1307.01
20	4248	0.59	2492.29	37264.37
			AAHU's =	1928.57

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HU's	HU's
0	4248	0.28	1183.74	
1	4248	0.28	1183.74	1183.74
20	4248	0.26	1116.35	21850.81
			AAHU's	1151.73

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHU's =	1928.57
B. Future Without Project AAHU's =	1151.73
Net Change (FWP – FWOP) =	**776.84**