7/9/92

Woodward-Clyde
Consultants

MARSH CREATION
BIG ISLAND MINING, ATCHAFALAYA DELTA
ATCHAFALAYA BASIN
XAT-7

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 is in Atchafalaya Bay, in the lower southeast corner of St. Mary Parish. The project area is in the western half of Atchafalaya Delta and is centered approximately at latitude 29°27'00" N and longitude 91°21'00".

The project area consists of a high, tree covered dredge spoil pile and adjacent waters.

Open water - 2,500 acres
High lands - 790 acres
Wetlands (fringe) - 300 acres

Dredge material, from maintenance of the upper sections of the Lower Atchafalaya Bay navigation channel was deposited from the early 1970s until the mid-1980s to form Big Island.

The area falls within the Atchafalaya Delta Wildlife Management Area and is managed by the Louisiana Department of Wildlife and Fisheries.

Justification

If there had never been dredging for navigation in Atchafalaya Delta, the surface area of the delta would be 2.5 times what is at present. Thus, to mine some sediment from Big Island and to use it to create wetlands would help diminish the effects of maintaining navigation. Secondly, very little if any sedimentation is occurring within the downstream "shadow" area of Big Island. The proposed project would ensure that sediments would now be available for wetland creation and maintenance in this shadow area.

Objectives

The project objective is to create 1,800 acres of new wetlands (delta lobes) with an associated distributary channel network and subaqueous delta platform. Material would be mined from Big Island for this purpose. Mining would be such that a distributary channel is cut through Big Island.

Project Features

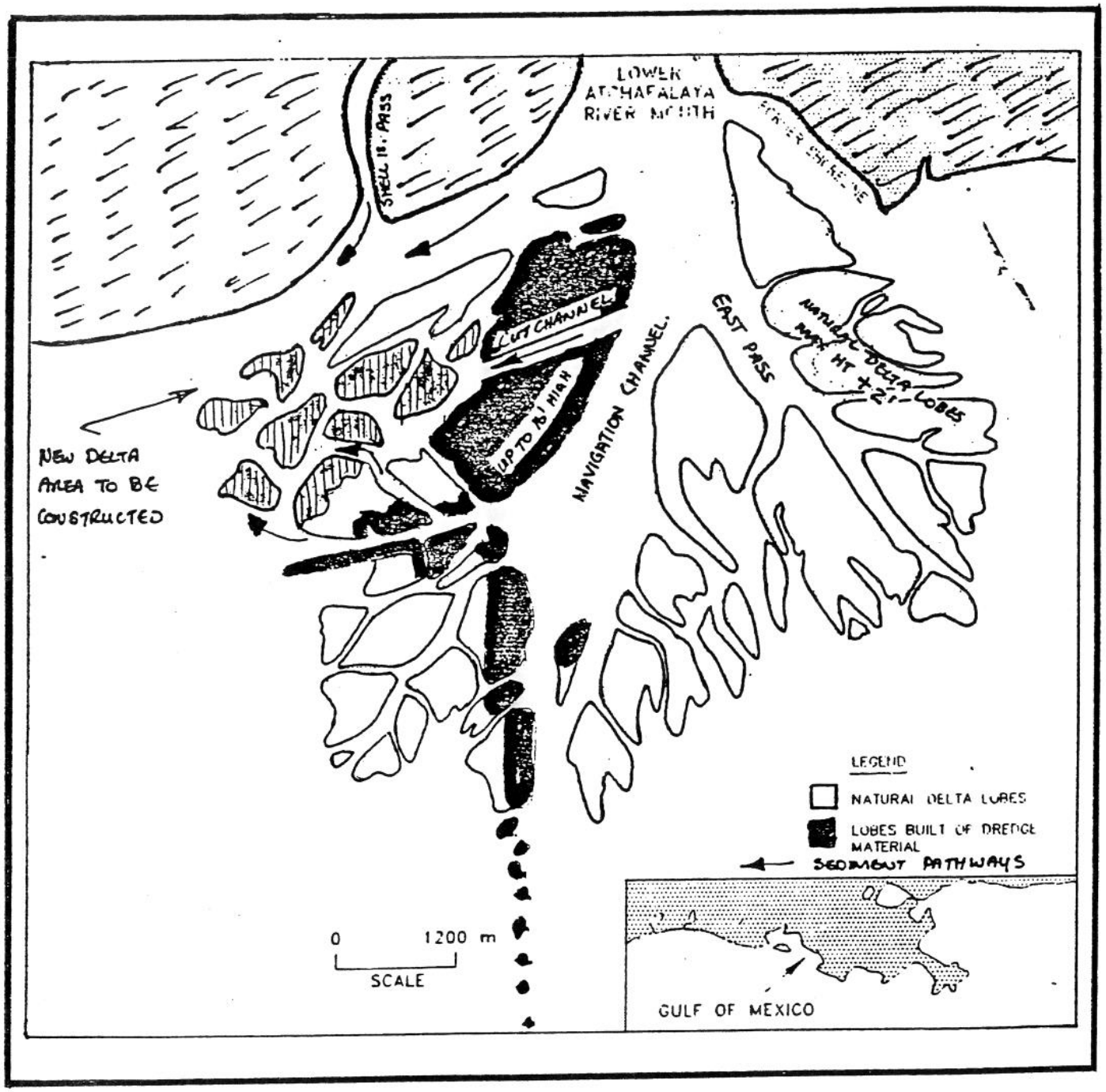
A distributary channel, with a bottom width of 650 feet and minimum depth of 6 feet, could be cut at a 45 degree angle through Big Island. Dredging would commence from the western side of the island. Dredge material would be placed in the form of delta lobes, that is crescentic shapes, with maximum elevations at the upstream, midsection of the crescent and elevations decreasing to the tips. The lobes will be spaced on a pattern similar to that of natural delta lobes so that distributary channels will become active between the lobes.

The new delta lobes should be self-maintaining, i.e., sedimentation should balance subsidence due to the new distributary channel system and its direct connection with the Atchafalaya River.

ANTICIPATED BENEFITS

Types and Acres Enhanced

Three hundred acres of marsh along the western fringe of Big Island will be enhanced by this project. An additional 300 acres of wetland along the north shore of Atchafalaya Bay will be enhanced as a consequence of increased back flooding of sediment rich waters from the new channel. After 20 years, in addition to delta lobe growth, at least 600 acres of bay bottom would be converted to shallow subaqueous delta platform.


LOWER
ATCHAFALAYA
RIVER MOUTH
SHELL IS. PASS
CUT CHANNEL
UP TO 10' HIGH
NAVIGATION CHANNEL
EAST PASS
NATURAL DELTA LOBES
MAX HT +21'
NEW DELTA
AREA TO BE
CONSTRUCTED
LEGEND
NATURAL DELTA LOBES
LOBES BUILT OF DREDGE
MATERIAL
SEDIMENT PATHWAYS
0
1200 m
SCALE
GULF OF MEXICO

The new channel will increase freshwater and sediment input into western Atchafalaya Bay. The positive consequences (e.g., sediment-laden waters) of this will be felt as far a field as Vermilion Bay and Marsh Island.

Types and Acres Created

Five hundred and twenty acres of new wetland in the form of delta lobes will be created during construction. Associated with this will be 500 acres of shallow water with submerged aquatic vegetation and 500 acres of mud banks, channel flanks and distributary channels. As the delta lobes will be served by a distributary network, the initial 520 acres should accrete to in excess of 1,800 acres over a 20-year period.

Types and Acres Restored

Increased sediment and fresh water in western Atchafalaya Bay will benefit fringe wetlands in numerous areas. It is difficult to speculated on areas and acres directly restored by the cutting of the new distributary channel.

Types and Acres Protected

The new subdelta of the Atchafalaya created by this project will offer storm-induced erosion protection to approximately 500 acres of existing wetlands.

Duration of Coastal Wetland Benefit

The duration of the benefit would continue for at least 20 years.

Benefits to Coastal Wetland Dependent Fish and Wildlife Populations

The Atchafalaya Delta winters some 400,000 water fowl. This project will immediately increase the marsh area by four percent with associated benefits to the water fowl. Additionally, ducks, ibises, herons and skimmers, and other birds have breeding colonies in Atchafalaya Delta. The new delta lobes will provide suitable habitat for additional breeding colonies.

Fish populations will benefit from the shallow protected environments associated with delta lobe creation. These areas will provide forage and nursery habitats and an additional source of plant detritus. Detrital material will contribute to increased inshore and nearshore fishery productivity.

Other Significant Benefits

The new distributary channel will enhance recreational access. Additionally, new fishing and hunting grounds will be established.

ANTICIPATED ADVERSE AFFECTS

Types and Acres Adversely Affected

None.

Conflict With Other Programs

None.

COSTS

Site Survey, feasibility analysis, conceptual design, permitting	$	35,000.00
Engineering Design	$	20,000.00
Project Construction	$	4,000,000.00
Construction Supervision of Inspection	$	20,000.00
Project Monitoring (20 years @ $3,000 p.a.)	$	60,000.00
The Total Cost of the Project Over 20 Years Will Be Approximately	$	4,135,000.00
Cost Per Acre (New Wetland Only)	$	2,297.00
Cost Per Acre New Wetland Amortized Over 20 Years	$	114.86

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, detailed feasibility analysis and permitting starting date	1
Planning, detailed feasibility analysis and permitting finishing date	4

Engineering and design start date	4
Engineering and design end date	6
Construction start date	7
Construction finish date	19

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.

Woodward-Clyde Consultants

COASTAL WETLANDS PLANNING, PROTECTION, AND RESTORATION ACT

Proposed Project Information Sheet

Project Name:	Marsh Creation, Big Island Mining, Atchafalaya Delta, Atchafalaya Basin
Project Area Size:	3600 acres
Submitted By:	Department of Commerce

Marsh Type: Fresh Acres: 3600

PRESENT CONDITIONS

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

   Three hundred acres of vegetated fresh marsh are currently present composed of Mixed Fresh Marsh (as presented by Robertson et al., 1987 and consisting of Aeschynomene indica, Aster spp., Bacopa sp., Colocasia sp., Cyperus spp., Echinochloa spp., J. ovata, Leersia sp., Panicum dichotomiflorum, Paspalum distichum, Polygonum sp., S. latifolia, S. nigra, S. platyphylla, S. americanus, S. validus, T. domingensis, Zizaniopsis miliacea and others), Sagittaria latifolia, Sagittaria platyphylla, Scirpus americanus and Scirpus validus.

   Additionally the site consists of 790 acres of vegetated spoil pile.

2. Acres of open water.

   2500 acres.

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

   7 acres = 0.3%

4. Historical information on marsh loss trends.

Spoil from dredging the Atchafalaya Bay navigation channel resulted in numerous large spoil piles. If this material had been deposited as delta lobes the area of the whole delta would have been two and one-half times its present extent of 8,650 acres. Locally the Big Island spoil pile caused the delta not to prograde. This in essence meant that 1,800 acres of wetlands that could have formed by mid-1991 did not, meaning an 1800-acre loss. This is an annual loss rate of 100 acres. During the period 1973 to 1991 overall land loss due to lack of progradation was 17.5 percent. no

5. Brief summary of significant historical hydrologic changes.

The Atchafalaya Delta attained subaerial expression following the 1973 flood. During the subsequent 12 years, spoil from dredging the upper reaches of the Atchafalaya Bay navigation channel resulted in the creation of Big Island with elevations now 16 feet. After the mid-1980s sediment was no longer deposited on Big Island. The presence of this large, high island has created a shadow area in its downstream wake where natural delta growth would have occurred. Thus, Big Island has significantly reduced wetland growth due to not only all the sediment tied up in the Island, but also because of the way it has shut off natural delta growth.

6. Shoreline erosion rate.

In portions of the project area erosion rates of non-vegetated subaerial loss can exceed 100 feet per winter, especially if river flows are low during the following spring. However, in general, shoreline erosion is repaired with the following spring floods.

7. Percent of open water area in the following categories (2500 acres):

   Fresh Marsh

Less than 0.5 feet	= 25 percent
Between 0.5 feet and 1.5 feet	= 30 percent
Between 1.5 feet and 4 feet	= 30 percent
Greater than 4 feet	= 15 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 water salinities may reach 5 ppt briefly (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 photography.

12. Estimated subsidence rate

    1.3 cm/yr (van Heerden, 1983)

FUTURE CONDITIONS

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

   No structures planned.

2. Proposed hydraulic changes due to the project.

   A channel with a bottom width of 650 feet and a depth of 6 feet is to be dredged at a 45 degree angle through Big Island. Water and sediment passing down this channel will flow around a series of delta lobes, created with the material obtained from dredging the channel. Discharges up to 15,000 cfs will occur in this new channel.

3. Project Benefits.

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

   The vegetated marsh loss rate for areas west of the Big Island is estimated to be 1.7 acres per annum. Thus over 20 years it is estimated that 34 acres will be lost. Additionally, if Big Island were not present, then delta growth would occur at about 100 acres per annum. Thus, total loss without project could be considered to be 2034 acres.

   Acres of emergent marsh predicted to be gained with project.

   Five hundred and twenty acres of wetland will be created during construction. As these wetlands (lobes) will be serviced by a distributary network, the initial 520 acres should accrete to in excess of 1800 acres over a 20-year period. Three hundred acres of marsh along the fringe of Big Island and 300 acres along the north shore of Atchafalaya Bay

will be enhanced. Approximately 500 acres of existing marshes will be protected from erosion effects during winter frontal passages.

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

Due to subsidence the existing 7 acres of aquatic vegetation would be lost.

would not be regained naturally elsewhere

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

At least 60 additional acres of aquatic vegetation would develop as a result of this project.

how is this assessed at

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

Without the project the area of mixed fresh marsh (Robertson et al., 1987) will be reduced with some converting to marsh dominated by Sagittaria spp. Overall, the areas of existing Sagittaria spp. will diminish in size. With the project, there would be a dramatic increase in stands of Sagittaria latifolia, Sagittaria platyphylla, Scirpus americanus, Scirpus validus, Typha domingensis, Zizaniopsis miliacea, Justicia ovata and mixed fresh marsh.

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

Current estimates of depths of open water of 2500 acres

Fresh Marsh

Less than 0.5 feet = 25 percent

Between 0.9 feet and 1.5 feet	= 30 percent
Between 1.5 feet and 4 feet	= 30 percent
Greater than 4 feet	= 15 percent

With Project (at 20-year "project life). Open water would be 700 acres.

Less than 0.5 feet	= 45 percent
Between 0.9 feet and 1.5 feet	= 40 percent
Between 1.5 feet and 4 feet	= 10 percent
Greater than 4 feet	= 5 percent

Without Project (at 20-year "project life). Open water would be 2800 acres.

Less than 0.5 feet	= 27 percent
Between 0.9 feet and 1.5 feet	= 33 percent
Between 1.5 feet and 4 feet	= 28 percent
Greater than 4 feet	= 12 percent

6. The project will reduce the salinities in this part of the bay due to the fresh water input down the new canal.

With project maximum	3 ppt
Without project maximum	7 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.

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

Wetland Value Assessment Worksheet

Increment Analysis - Increment 1 : channel width = 500 ft.

Project: Big Island Restoration (XAT-7) **Date:** 9/15/92

Condition: FWOP (same as baseline)

Area = 3400ac (fresh)

TY	V_1	V_2	V_3	V_4	V_5	V_6	V_7
Ø	900ac 26%	36%	All Class 4	All Class 2	55%	2 ppt	1.0
1	882ac 26%	36%	All Class 4	All Class 2	55%	2 ppt	1.0
20	540ac 16%	36%	All Class 4	All Class 2	45%	2 ppt	1.0

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

Wetland Value Assessment Worksheet

Increment Analysis - Increment 1: channel width = 500 ft.

Project: Big Island Restoration (VAT-7) **Date:** 9/15/92

Condition: FWP

Area = 3400 ac (fresh)

TY	V_1	V_2	V_3	V_4	V_5	V_6	V_7
Ø	900 ac 26%	36%	All Class 4	All Class 2	55%	2 ppt	1.0
1	1210 ac 36%	36%	All Class 3	All Class 2	60%	1 ppt	1.0
20	2100 ac 62%	40%	All Class 3	All Class 2	65%	1 ppt	1.0

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Fresh/Intermediate Marsh

Increment Analysis

Project..... Big Island Mining (XAT–7)
Increment 1
Condition: Future Without Project

Marsh type acres:
Fresh..... 3400
Intermediate..

Variable		TY 0		TY 1		TY 20	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	26	0.33	26	0.33	16	0.24
V2	% Aquatic	36	0.42	36	0.42	36	0.42
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	55	0.65	55	0.65	45	0.55
V6	Salinity (ppt)						
	fresh	2	1.00	2	1.00	2	1.00
	intermediate						
V7	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
		HSI =	0.46	HSI =	0.46	HSI =	0.41

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Fresh/Intermediate Marsh

Increment Analysis

Project..... Big Island Mining (XAT–7)
Increment 1
Condition: Future With Project

Marsh type acres:
Fresh..... 3400
Intermediate..

Variable		TY 0		TY 1		TY 20	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	26	0.33	36	0.42	62	0.66
V2	% Aquatic	36	0.42	36	0.42	40	0.46
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	55	0.65	60	0.70	65	0.75
V6	Salinity (ppt)						
	fresh	2	1.00	1	1.00	1	1.00
	intermediate						
V7	Access Value	1.00	1.00	1.00	1.00	1.00	1.00
		HSI =	0.46	HSI =	0.53	HSI =	0.62

Increment Analysis

AAHU CALCULATION

Project: Big Island Mining (XAT–7)
Increment 1

Future With Project			Total	Cummulative
TY	Acres	x HSI	HU's	HU's
0	3400	0.46	1568.08	
1	3400	0.53	1818.76	1693.42
20	3400	0.62	2123.77	37454.00
			AAHU's =	1957.37

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HU's	HU's
0	3400	0.46	1568.08	
1	3400	0.46	1568.08	1568.08
20	3400	0.41	1403.48	28229.76
			AAHU's	1489.89

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHU's =	1957.37
B. Future Without Project AAHU's =	1489.89
Net Change (FWP – FWOP) =	**467.48**