



**Coastal Protection and Restoration
Authority of Louisiana**

**Office of Coastal Protection and
Restoration**

**2008 Biennial Inspection
Report**

for

**ATCHAFALAYA SEDIMENT
DELIVERY**

State Project Number AT-02
Priority Project List 2

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St. Mary Parish

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I. Introduction

The Atchafalaya delta and the Wax Lake delta formed in the shallow Atchafalaya Bay between the mouth of the Atchafalaya River navigation channel and the Point au Fer shell reef (Curole, 2003). The Atchafalaya River has been a tributary of the Mississippi River since the 1500's and is typical of diversion or capture of mainstream flow by tributary (van Heerden and Roberts, 1980). In 1960, the Old River control structure was completed by the U.S. Corps of Engineers (USACE) and has since maintained the flow of the Atchafalaya River at the historic rate of 30% of the combined flow of the Mississippi and Red Rivers (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993). A sub-aqueous delta began to form at the mouth of the Atchafalaya River between 1952 and 1962 with the introduction of silts and fine sands to the bay. Prior to 1952 the lakes and bays within the Atchafalaya Basin floodway system, north of the Atchafalaya Delta, filled with sediment. Only pro-delta clay deposition was occurring in the Atchafalaya Bay due to contact with higher salinity waters (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993). From 1962 to 1972, coarser materials began to be deposited into the bay and a period of distal bar and sub-aqueous bar accretion occurred (van Heerden and Roberts, 1980). The spring flood of 1973 produced the first sub-aerial growth of the Atchafalaya Delta on both sides of the navigation channel (van Heerden et. al., 1991).

The Atchafalaya Delta is bisected by the Lower Atchafalaya River navigation channel, which is maintained by the USACE for navigational purposes. Dredge material on the channel banks and increased channel depth have created unnatural conditions forming an efficient conduit for river sediment transportation to the Gulf of Mexico, depriving the adjacent delta environments of sediments critical to the delta-building process. Also, tributary channels in the eastern portion of the Atchafalaya delta have undergone large reductions in cross-sectional area and flow efficiency, further reducing sediment to the delta lobes (van Heerden and Roberts, 1980).

The Atchafalaya Sediment Delivery Project (AT-02) is a tributary channel maintenance and delta lobe creation project consisting of approximately 2,182 acres of freshwater wetlands and shallow open water. The project is located in the northeastern region of the Atchafalaya Delta within the Louisiana Department of Wildlife and Fisheries Atchafalaya Delta Wildlife Management Area in the southeast corner of St. Mary Parish, Louisiana. The project is bounded on the north by Mile Island, the west by East Pass, and to the east and south by the Atchafalaya Bay (Monitoring Plan, 2003). The Atchafalaya Sediment tributary features include two tertiary channels (Natal Channel and Castille Pass) located on the east side of East Pass, the secondary tributary channel on the eastern side of the Atchafalaya delta. A map of the project boundary and features are shown in Appendix A. The objective and specific goals of the project according to the Monitoring Plan prepared by the Louisiana Department of Natural Resources (LDNR) are outlined below:

Project Objectives:

1. Restore Natal Channel and Castille Pass to functioning tertiary distributary channels thereby enhancing the system's natural delta-building potential.
2. Utilizing dredge material from the dredging of Natal Channel and Castille Pass to create delta lobe islands suitable for establishment of emergent marsh.

Specific goals:

1. To increase the distributary potential of Natal Channel and Castille Pass by increasing their cross-sectional area and length.
2. Create approximately 230 acres of delta lobe islands through the beneficial use of dredge material at elevations suitable for emergent marsh vegetation.
3. Increase the rate of subaerial delta growth in the project area to that measured from historical photographs since 1956.
4. Increase frequency of occurrence of submerged aquatic vegetation.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Atchafalaya Sediment Delivery Project (AT-02) is to evaluate the constructed project features, identify any deficiencies and prepare a report detailing the condition of such features and to recommend corrective actions needed, if any. Should it be determined that corrective actions are needed, LDNR shall provide, in report form, a detailed cost estimate for engineering, design, supervision, inspection, construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects undertaken since the constructed features were completed and an estimated project budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C. A summary of past operation and maintenance projects undertaken since the completion of the Atchafalaya Sediment Delivery Project (AT-02) are outlined in Appendix IV.

An inspection of the Atchafalaya Sediment Delivery Project (AT-02) was held on June 17, 2008 under partly cloudy skies and warm temperatures. In attendance were Brian Babin, Shane Triche and Glen Curole of the LDNR, Dr. John Foret of the National Marine Fisheries Service (NMFS) and Cassidy Lefeune, Edmond Mouton, Wayne Desota and Paul Cook with the Louisiana Department of Wildlife and Fisheries (LDWF). The attendees met at the Berwick Public Boat Launch in St. Mary Parish. The inspection began at approximately 9:30 a.m. and ended at 1:30 p.m.

The field trip included a visual inspection and limited soundings of Natal and Castille Pass channels. No attempt was made to measure the geometry of the channels other than periodic depth measurements recorded using a hand-held fathometer. However, LDNR contracted Morris P. Hebert in the spring of 2008 to perform complete topographic and bathymetric surveys of all distributary and tertiary channels and disposal areas constructed under the

Atchafalaya Sediment Delivery (AT-02) project. The original centerline profile was established and survey transects were taken every 500 feet extending from one shoreline to the opposite shoreline with transect points collected every 50 feet and at any significant change in grade. The final deliverable included a survey report, methodology report, field notebook records, survey data and drawings of all survey profiles and transects. The survey transects were then superimposed over the project as-built drawings to determine the extent of shoaling and deposition of sediments in both channels (Natal and Castille Pass). The 2008 survey was the primary source of information and data used in analyzing project deficiencies and determining the need for maintenance or corrective actions.

III. Project Description and History

The Atchafalaya Delta is bisected by the Lower Atchafalaya River which is maintained by the U.S. Corps of Engineers to an elevation of -20.0 ft. NGVD with a 400 foot bottom width for navigation purposes. The continued dredging and placement of spoil material along the banks of the river has caused sediment deprivation in adjacent delta environments.

The projects were constructed as a Coastal Wetlands, Planning, Protection, and Restoration Project (CWPPRA) with the Louisiana Department of Natural Resources as the local state sponsor and the National Marine Fisheries Service of the Department of Commerce as the federal sponsor. The general contractor performing the construction of the Atchafalaya Sediment and Big Island projects, which was accomplished under one contract by the State of Louisiana Division of Administration, and administered by the Louisiana Department of Natural Resources (LDNR) was River Road Construction Co. of Mandeville, LA. The Atchafalaya Sediment Delivery Project (AT-02) and the Big Island Mining Project (AT-03) were constructed during the period of January 28, 1998 and October 27, 1998. Final cost of the construction contract for both projects was \$7,238,449.36. The design, engineering, and construction oversight for this project was performed by Brown, Cunningham, and Gannuch Engineers under an engineering services contract with LDNR.

The principle project features of the Atchafalaya Sediment Delivery (AT-02) project include:

- Natal Channel – 5,100 linear ft. dredged channel with a 200 ft. bottom width and a smaller 1,500 linear ft. branch channel oriented to the northeast from Station 74+00. The bottom width of this branch channel was 150 ft.
- Castille Pass – 2,000 linear ft. dredged channel with a 125 ft. bottom width.
- Marsh Creation – approximately 668,683 cubic yards of dredge material from Natal Channel placed at four (4) different sites creating approximately 257 acres of wetlands.
- Marsh Creation – approximately 32,242 cubic yards of dredge material from Castille Pass placed at a location southeast of the pass creating approximately 20.5 acres of wetlands.

IV. Summary of Past Operation and Maintenance Projects

Since the completion of the Atchafalaya Sediment Delivery (AT-02) Project in March 1998, no maintenance dredging or marsh creation efforts have been proposed or undertaken. As recommended in the 2005 Annual Inspection Report, a complete survey of all dredged channels and marsh fill areas were completed in the spring of 2008 by Morris P. Hebert, survey consultant contracted by the Louisiana Department of Natural Resources. The inspection results in this report were based primarily on the 2008 surveys and visual observation in the field.

V. Inspection Results

Inspection of the Atchafalaya Sediment Project (AT-02) began at the head of Natal Channel near East Pass (Station 15+00). Reports from previous inspections indicated that a large shallow “sand bar” had developed at the head of East Pass near Natal Channel. From survey data collected in the spring 2008, we found that the “bar” begins near Station 15+00 on the left bank of Natal Channel and encompasses the entire section of the original constructed dredge channel. As the existing channel filled in, a smaller channel along the right descending bank of Natal Channel developed. The smaller channel is approximately 100’ wide with depths ranging between -7.0’ to -10.0’ NAVD. Traveling downstream, the 100’ wide smaller channel proceeds along the right descending bank of Natal Channel to Station 45+00 near the bend around Ivor Island. As the channel traverses around the bend of Ivor Island near Station 50+00, the channel begins to transition towards the left descending bank between Stations 50+00 to 65+00. The bottom width of the channel in this area is smaller (approximately 25’ bottom width) and the bottom elevations average -10.0’ NAVD. The south leg of remaining channel past the “fork” between Stations 70+00 and 88+00 is completely shoaled in with average elevations around 0.0’ NAVD. Oddly enough, the 2003 inspection revealed that water depths in this reach of Natal Channel were between -6.0’ to -6.5’ for quite a distance below the fork on the left indicating that the water flow in the channel was adequate enough to scour pass the location where the initial dredging had ended. If this is the case, over the last five (5) years, the entire channel has shoaled in diverting the majority of flow and sediments through the left “fork”, a smaller 1,500 foot section of Natal Channel along the southern boundary of Teal Island. The channel depths along the left fork, south of Teal Island, ranged between -8.0 at Station 0+00 and -10.0 at Station 15+00. Based on the 2008 surveys and observation in the field, we concluded that the primary water flow from East Pass through Natal Channel is limited to the left “fork” to a small developing deltaic lobes south of Teal Island.

VI. Conclusions and Recommendations

Overall, the Acthafalaya Sediment Delivery (AT-02) project was is fair to poor condition with substantial shoaling evident throughout the distributary and tertiary channels of the project. The most severe sediment accumulation was found at the head of East Pass and along Natal Channel from the beginning of the right “fork” to Tiger Pass (Sta. 75+00 to Sta. 88+00). Although shoaling is an obvious problem, there are small visual benefits with delta lobe

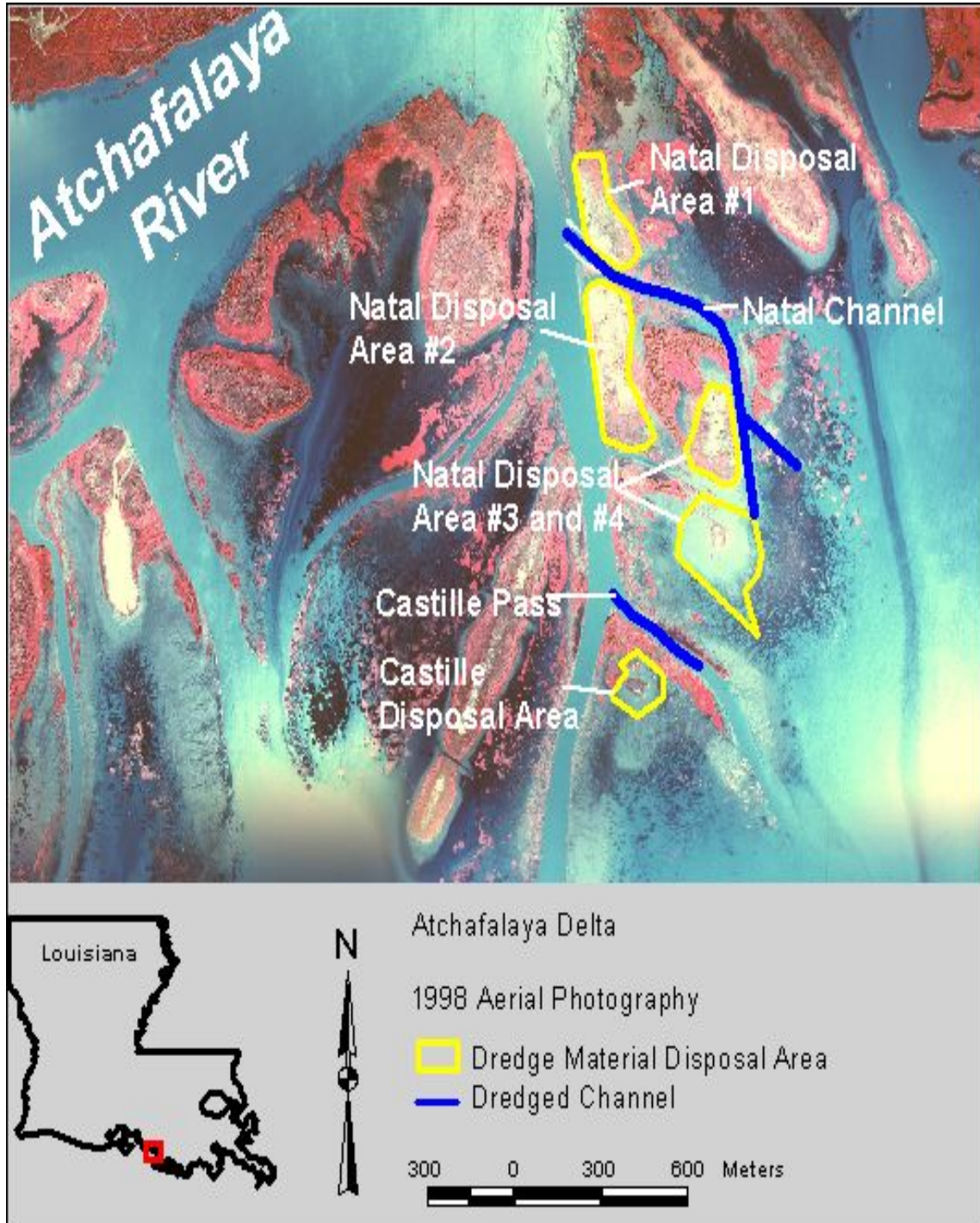
development near the end of Natal Channel south of Teal Island which indicates that sediment transport via Natal Channel is occurring. Based on the anticipated benefits in the Wetland Value Assessment (WVA), it was estimated that approximately 1,900 acres of new marsh would accrete over a 20 year period as a consequence of natural delta building associated with the construction of Natal Channel and Castille Pass (NMFS,1992). The consensus of the review committee for the adaptive management process completed in 2002 revealed that the expectations of creating 95 acres of marsh per year are somewhat questionable and likely will not be met (Raynie and Visser, 2002). In order to accurately assess the benefits of the project, current habitat mapping data should be analyzed to draw a conclusion to the performance of the project. The earliest habitat mapping data available was completed immediately following construction in 1998 to develop a marsh creation baseline. The next series of habitat mapping data to be collected of the Atchafalaya Delta is schedule to be completed in 2009. Once this data is collected, an evaluation of cost-to-benefit of the project can be assessed and an informed decision as to the benefits of re-dredging Natal Channel can be made. Therefore, we are not recommending maintenance of the Atchafalaya Sediment (AT-02) project until definitive benefits can be identified through the upcoming habitat mapping effort.

References:

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- R. Raynie., Dr. J. Visser 2002. CWPPRA Adaptive Management Review Final Report. Prepared for the CWPPRA Planning and Evaluation Subcommittee, Technical Committee, and Task Force. 50pp.
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- van Heerden, H. H. Roberts, S. Penland, and R. H. Cunningham 1991. Subaerial delta development, eastern Atchafalaya Bay, Louisiana. *Proceedings of GCS-SEP 12th Annual Meeting.* 13 pp.

Appendix A

PROJECT FEATURES MAP



Appendix B
PHOTOGRAPHS



Photo No.1 – (AT-02) – view of Natal Channel near East Pass looking southeast.



Photo No.2 – (AT-02) – view of Natal Channel near East Pass looking southeast.



Photo No.3 – (AT-02) – view of near the end of Natal Channel near Sta. 15+00 looking southeast.



Photo No.4 – (AT-02) – view of existing marsh at the end of Natal Channel near Sta. 10+00.



Photo No.5 – (AT-02) – view of the Castille Pass Channel from Sta. 10+00 looking southeast.

Appendix C

Three (3) Year Budget Projections

ATCHAFALAYA SEDIMENT DELIVERY PROJECT (AT-02)			
Three-Year Operations & Maintenance Budgets 07/01/2008 - 06/30/11			
Project Manager	O & M Manager	Federal Sponsor	Prepared By
	<i>Brian Babin</i>	<i>NMFS</i>	<i>Brian Babin</i>
	2008/2009	2009/2010	2010/2011
Maintenance Inspection	\$ 2,500.00	\$ -	\$ 2,652.00
Structure Operation	\$ -	\$ -	\$ -
Administration	\$ 3,000.00	\$ 1,000.00	\$ -
Maintenance/Rehabilitation			
08/09 Description: review of habitat mapping information			
<i>E&D</i>			
<i>Construction</i>	\$ -		
<i>Construction Oversight</i>	\$ -		
<i>Sub Total - Maint. And Rehab.</i>	\$ -		
09/10 Description: Secondary Monument Maintenance			
<i>E&D</i>		\$ -	
<i>Construction</i>		\$ 5,000.00	
<i>Construction Oversight</i>		\$ -	
<i>Sub Total - Maint. And Rehab.</i>		\$ 5,000.00	
10/11 Description:			
<i>E&D</i>			\$ -
<i>Construction</i>			\$ -
<i>Construction Oversight</i>			\$ -
		<i>Sub Total - Maint. And Rehab.</i>	\$ -
	2008/2009	2009/2010	2010/2011
Total O&M Budgets	\$ 5,500.00	\$ 6,000.00	\$ 2,652.00
Total O&M Budget 2008 through 2011			\$14,152
Unexpended O&M Budget			\$419,335
Remaining O&M Budget (Projected)			\$405,183

OPERATIONS & MAINTENANCE BUDGET WORKSHEET

Project: Atchafalaya Sediment Delivery Project (AT-02)

FY 08/09 –

Administration		\$	3,000
O&M Inspection & Report		\$	2,500
Operation:		\$	0
Maintenance:		\$	0
E&D:	\$		
Construction:	\$		
Construction Oversight:	\$		
General Maintenance:	\$		

Operation and Maintenance Assumptions:

The Atchafalaya Sediment Delivery project is inspected biennial (every two years). The last inspection was completed in 2007/2008. The inspection in 2008/2009 is included at the request of NMFS to re-evaluate the project after the habitat mapping data is completed in 2009. 2008/2009 includes \$3,000 for LDNR and NMFS review of habitat mapping information.

FY 09/10 –

Administration		\$	1,000
O&M Inspection & Report		\$	0
Operation:		\$	0
Maintenance:		\$	5,000
E&D:	\$ 5,000		
Construction:	\$		
Construction Oversight:	\$		

Operation and Maintenance Assumptions:

Assume maintenance/ adjustment of secondary monuments at a lump sum cost of \$5,000 and \$1,000 for LDNR administration.

FY 10/11 –

Administration		\$	0
O&M Inspection & Report		\$	2,652
Operation:		\$	0
Maintenance:		\$	0
E&D:	\$ 0		
Construction:	\$ 0		
Construction Oversight:	\$ 0		

Operation and Maintenance Assumptions:

Scheduled inspection for year 2010/2011.

2008-2011 Accounting

Unexpended funds from Lana Report:

\$ 436,767.32

FY08 Expenditures by LDNR:

\$ -17,432.43

Estimated Unexpended Funds:

\$ 419,334.89