



Coastal Protection and Restoration Authority of Louisiana

Office of Coastal Protection and Restoration

2008 Biennial Inspection Report

for

BIG ISLAND MINING PROJECT

State Project Number AT-03
Priority Project List 2

July 31, 2008
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 distributary of the Mississippi River since the 1500's and is typical of diversion or capture of mainstream flow by distributary (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 the Mississippi and Red Rivers (Louisiana Coastal Wetlands Conservation and Restoration Task Force, 1993). A subaqueous 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 prodelta 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 subaqueous bar accretion occurred (van Heerden and Roberts, 1980). The spring flood of 1973 produced the first subareal growth of the Atchafalaya Delta on both sides of the navigation channel (Curole, 2003).

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 depths have created unnatural conditions forming an efficient conduit for river sediment to the Gulf of Mexico, depriving the adjacent delta environments of sediment critical to the delta building process (Curole, 2003). Spoil material deposited along the western portion of the navigation channel formed Big Island. This island effectively limits westward flow of sediment rich Atchafalaya River water (van Heerden, 1983). A comparison can be made between the Atchafalaya delta and the Wax Lake delta to the west. Dredging ceased on the Wax Lake Outlet in 1980 and this delta has flourished, building land naturally since that time (Curole, 2003).

The Big Island Mining (AT-03) project is a distributary channel maintenance and delta lobe creation project located in the northwestern region of the of the Atchafalaya delta within the Atchafalaya Delta Wildlife Management Area, in the southwest corner of St. Mary Parish, La. The project is bounded by Shell Island and Shell Island Pass to the north and west, Ameranda Pass to the south, and the Atchafalaya Bay Channel to the east and southeast (Monitoring Plan, 2003). 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. Establish a sediment delivery system in the western portion of the Atchafalaya delta, thereby enhancing the system's natural delta-building potential.

2. Utilizing dredged material from the creation of the distributary channels to create delta lobe islands suitable for establishment of emergent marsh.

Specific Goals:

1. To increase the project areas delta-building potential through the establishment of effective distributary channels.
2. Create approximately 850 ac. of delta lobe islands through the beneficial use of dredge material at elevations suitable for emergent marsh vegetation.
3. Increase the rate of subaerial growth in the project area to that measured from historical photography since 1956 with the project area.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Big Island Mining Project (AT-03) 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, the Office of Coastal Protection and Restoration (OCPR) 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 the 2003 bi-annual inspection and past operation and maintenance projects undertaken since the completion of the Big Island Mining Project (AT-03) are outlined in Section IV.

An inspection of the Big Island Mining Project (AT-03) 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 Breaux's Pass (Channel "A") and Channels "D", "B", "E" and "F". 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 channels and disposal areas constructed under the Big Island Mining project. The original centerline profile was established and survey transects were taken every 500 ft. extending from bank to bank with transect points collected every 50 ft. 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 of all channels were superimposed over the project as-built drawings to determine the extent of shoaling and deposition of sediments in the channels. The 2008 survey was the primary source of information and data 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 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 Big Island Mining (AT-03) and Atchafalaya Sediment Delivery (AT-02) 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 that constructed both 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 the projects was performed under an engineering services contract with LDNR by Brown, Cunningham, and Gannuch Engineers.

The principle project features of the Big Island Mining (AT-03) project include:

- Channel A – 20,600 linear ft. of dredged channel from the Atchafalaya River starting with an 800 ft. bottom width at an elevation of -20 ft. NGVD contour of the Atchafalaya River to a 400 ft. bottom width at an elevation of -10.0 ft. NGVD. The remainder of Channel A was dredged to -10.0' NGVD. Bottom width of the channel was 400 ft. to Sta. 145+00, thence 375 ft. between Stations 145+00 to 180+00, thence 250 ft. wide between Stations 180+00 and 200+00, thence 200 ft. wide between Stations 200+00 and 206+00.
- Channel B – 5,500 linear ft. of dredged channel with a bottom width of 160 ft.
- Channel C – 2,400 linear ft. of dredged channel with a bottom width of 125 ft.
- Channel D – 4,000 linear ft. of dredged channel with a bottom width of 160 ft.
- Channel E – 4,150 linear ft. of dredged channel with a bottom width of 125 ft.

IV. Summary of Past Operations and Maintenance Projects

Since completion of the Big Island Mining (AT-03) project in October 1998, no maintenance dredging or marsh creation efforts have been undertaken. As recommended in the 2005 Biennial Inspection Report, a complete survey of all dredged channels and marsh fill areas were completed in the spring of 2008 by Morris P. Hebert, contracted by the Louisiana Department of Natural Resources (LDNR). The inspection results in this report are based primarily on the 2008 surveys and visual observations in the field.

V. Inspection Results

Inspection of the Big Island Mining Project (AT-03) began at the head of Channel "A", known as Breaux's Pass", near the beginning reach at Sta. 20+00. As part of the scheduled monitoring program, a topographic and bathymetric survey was conducted by Morris P. Hebert of Houma, La. to determine the extent of shoaling in all channels and to evaluate settlement of the constructed disposal areas. The survey of Channel "A" began near Sta. -2+89.82 in the center of the Atchafalaya River southwest to the Atchafalaya Bay near Sta. 206+00. Depths from Sta. -2+89.82 to Sta. 10+00 ranged from -18' NAVD 88 to -10' NAVD 88. Signs of sediment deposits in the channel were not evident until Sta. 10+00 where the channel bottom sloped upwards from -5' NAVD 88. The channel section at this location was not clearly defined. The channel section became better defined beginning near Sta. 25+00 with a 100' bottom width to an elevation of -10.0' NAVD. The original section was approximately 600' wide to a -10.0' NAVD 88 elevation. Similar to Natal Channel on the Atchafalaya Sediment Project, a smaller channel section had developed on the south side of the original channel with the majority of sediment deposition on the north side. The smaller narrower channel was approximately 300' wide, 10' deep and stretched from Sta. 30+00 to 70+00, near the head of Channel "D". From Sta. 70+00 westward along Channel "A", the channel opened up to its originally constructed section of 500' with slightly shallower depths in the range of -5.0' to -7.0' NAVD 88. The channel width and depth remained constant to the end of the 500' section near Sta. 200+00, west of Channels "E" and "F". The remaining 300' wide section from Sta. 200+00 to Sta. 206+00 has completely filled in to an elevation of -1.0' NAVD. Although the 2008 survey indicates this section of the channel had shoaled completely, it is a possibility that smaller, narrower channels have developed between the newly deltaic lobes outside the survey limits. Further field investigations will be required to determine if this is the case.

Channel "D" extends northwest on the north side of the first "fork" in Breaux's Pass between Shell Island and dredge disposal area #5. In 2003, there was approximately 4 feet of water in the initial reach at the mouth of the channel. Thereafter, approximately 5.0' water depths were recorded as the inspection team moved downstream towards Shell Island Pass to the northwest (Juneau, 2003 Inspection Report). In 2005, the water depths in the initial reach had reduced to 2 to 3 feet with slightly deeper depths downstream. It was the inspection team's opinion that the configuration of this channel with Breaux's Pass to the southeast and Catfish Pass to the west had contributed the low velocities in

the channel causing silt material to settle out in the channel rather than being transported to the desired areas (Babin, 2005 Inspection Report). From the survey data collected in the spring of 2008, severe shoaling was apparent from Sta. 10+00, the head of Channel "D" to Sta. 25+00 where average bottom elevations were 0.0' NAVD 88. Traveling downstream from Sta. 25+00 to Sta. 50+89, the end of the channel, water depths averaged -4.0' to -5.0' NAVD 88. This data would suggest that the upper reach of Channel "D" had completely shoaled in and that very little flow was occurring in the lower reach of the channel. Based on current flow patterns of Breaux's Pass and Shell Island Pass, it is highly unlikely that maintenance dredging of Channel "D" would produce substantial benefits in that the channel would most likely continue to shoal shortly after the channel was dredged.

Channel "B" is approximately 5,500 linear feet in length and is the second distributary channel along the north bank of Breaux's Pass extending in a northwesterly direction towards Shell Island Pass. Soundings taken during the 2003 inspection revealed that the water depths in the upper reach of Channel "B" were 4.0' deep and 8.0' to 9.0' deep in the lower reach near Shell Island Pass (Juneau, 2003 Inspection Report). From survey data collected in 2008, the entire reach between Sta. 5+00 and 40+00 has completely shoaled in with channel bottom elevations between 0.0' and -1.0' NAVD 88. Downstream of Sta. 40+00 where Channel "B" gets closer to the Shell Island Pass Channel, depths begin to deepen to elevations of -2.0' to -5.0' NAVD 88. We suspect that the flow patterns affecting velocities in the Channel "D" are also prevalent in Channel "B", causing sediment to settle out in the channel rather than forming deltaic land formations at the end of the reach as designed. As in the case of Channel "D", it is unlikely that maintenance dredging of Channel "B" would produce long term project benefits.

Channel "E" is approximately 4,150' linear feet and is the first channel located along the south bank of Breaux's Pass extending to a cul-da-sac on the interior of Big Island. From soundings taken in 2003, controlling depths of 2 feet over a hump approximately 150 feet in length downstream from the mouth was reported. Thereafter, water depths increased to 5', gradually sloping down to -10', proceeding 1,500 feet down to the cul-da-sac location. (Juneau, 2003 Inspection Report). It was apparent from field observations and channel conditions in 2003 that Channel "E" was receiving significant deposits of sediment from Channel "A" which were falling out at the mouth of the channel due to the minimal hydraulic gradient and inadequate velocities required for transporting sediment (Juneau, 2003 Inspection Report). Channel "E" is frequently used by the Louisiana Department of Wildlife and Fisheries for access to public hunting grounds and biological data collection stations. The maintenance of this channel is primarily for access and provides little deltaic formation benefits. Survey data collected in 2008 reveals similar conditions reported in previous inspection reports.

Channel "C" is approximately 2,400 linear feet and is a small distributary channel at the end of Breaux's Pass extending in a southwesterly direction leading into Catfish Pass. In 2003, depth measurements indicated approximately 5' of water at the mouth near Channel "A" and 6' to 7' depths downstream towards Catfish Pass (Juneau, 2003 Inspection Report). In 2005 a visual inspection and limited soundings revealed a large build-up of sediment overgrown with vegetation in the center of the channel (Babin, 2005 Inspection

Report). The 2008 survey data confirms the observation of previous years of shoaling in the center of the channel. It appears that the shoaling is concentrated in the center of the channel along the left descending bank causing the channel to migrate to the right of the original dredge section. Elevations ranged between 0.0' and -2.0' NAVD 88 in the center where shoaling has developed and -6.0' NAVD 88 near the shifted channel section on the right side.

Channel "F" is approximately 2,400 linear feet and extends in a northwesterly direction towards Shell Island Pass. In 2003, approximately 4' of controlling water depth was evident at the mouth of Channel "F" near Breaux's Pass for several hundred feet. Further downstream, closer to the Shell Island Pass, a consistent bottom depth of 6' was found (Juneau, 2003 Inspection Report). In 2005, a visual inspection revealed no serious silting or shoaling in Channel "F" with estimated depths of 7' in the center of the channel (Babin, 2005 Inspection Report). The data results collected in 2008 indicated more serious shoaling than previously reported in 2005. Large portions of the original section has shoaled in, leaving a much smaller channel along the left descending bank which was approximately 50 wide with bottom elevations ranging from -7.0' NAVD 88 to -10.0 NAVD 88. As in the case of Channels "D" and "B", velocity through Channel "F" is influenced by Shell Island Pass causing sediments to collect in the channels rather than creating deltaic lobial features. However, Unlike Channels "D" and "B", Channel "F" has remained opened with remnants of a small channel that directs flow from Breaux's Pass towards the Atchafalaya Bay.

VI. Conclusions and Recommendations

Overall, The Big Island Mining (At-03) project was in fair to poor condition with substantial shoaling evident throughout the distributary and tertiary channels of the project. As noted in the inspection results, the influence of Shell Island Pass on the north side of the project is having a negative impact on the ability of the tertiary channels ("D", "B" and "F") to effectively transporting sediment to areas where deltaic land formations can be formed. The large volume of water and tidal flows from Shell Island Pass has caused a reduction in velocities in the tertiary channels on the north side of Breaux's Pass, resulting in severe shoaling in Channels "D", "B" and "F". Although shoaling is an obvious problem, there are small visual benefits with remnants of delta lobe development at the end of Breaux's Pass north of Catfish Pass.

Based on the anticipated benefits outlined in the Wetland Value Assessment (WVA), it was estimated that approximately 1,800 acres of new marsh would accrete over a 20 year period as a direct result of natural delta building associated with the construction of the Big Island Mining project. Without habitat mapping data to determine the actual acres of land created, it is difficult to conclude whether the project is performing as anticipated. In order to accurately assess the benefits from 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. The next series of habitat mapping data to be collected of the Atchafalaya Delta is scheduled to be completed in 2009. Once this data is finalized, an evaluation of the actual benefits can be made and informed decisions regarding maintenance dredging can be

determined. Therefore, we are not recommending maintenance of the Big Island Mining (AT-03) project until definitive benefits can be identified through the upcoming habitat mapping effort.

References:

Curole, 2003. Monitoring Plan, Atchafalaya Sediment Delivery (AT-02). State of Louisiana, Department of Natural Resources, Coastal Engineering Division. 14 pp.

H. Juneau, 2003. 2003 Biennial Inspection Report for the Big Island Mining (AT-03) project. State of Louisiana, Department of Natural Resources, Coastal Engineering Division.

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U.S. Department of Commerce, National Marine Fisheries Service 1992: Re-Establishment of Natural Sediment Delivery Systems, Atchafalaya Delta, Atchafalaya Basin PAT-2, Wetland Value Assessment (WVA).

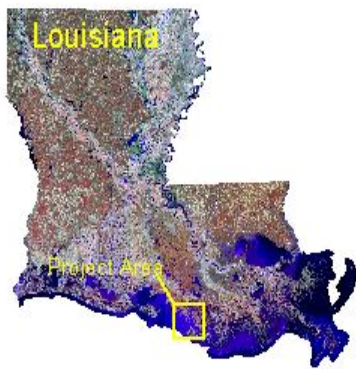
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Van Heerden, H. H. Roberts, S. Penland, and R. H. Cunningham 1991. Subaerial delta development, eastern Atchafalaya Bay, Louisiana. Proceedings of GCS-SEP 12th Annual Meeting. 13 pp.

Appendix A

PROJECT FEATURES MAP

Big Island Mining (AT-03) project Dredged channel and disposal areas



Data Source:

LA Dept. of Natural Resources
Coastal Restoration Division
Biological Monitoring Section
Thibodaux Field Office

1998 DOQQ's

Map ID: 2002-TFO-003
Date: January 30, 2002

3000 0 3000 6000 Feet



1000 0 1000 2000 Meters



Appendix B

PHOTOGRAPHS



Photo No.1 – (AT-03) – view of Channel “A” near Sta. 50+00 looking southwest downstream.



Photo No.2 – (AT-03) – view looking southwest along Channel “A” near the intersection of Channel “D”.



Photo No.3 – (AT-03) – view of Channel “D” looking northwest near the intersection of Channel “A”



Photo No.4 – (AT-03) – view of Channel “D” from Sta. 15+00 looking northwest.



Photo No.5 – (AT-03) – view of Channel “B” from Sta. 5+00 looking northwest.



Photo No.6 – (AT-03) – another view of channel “B” from Sta. 5+00 looking southwest.



Photo No.7 – (AT-03) – view of Channel “E” near the intersection of Channel “A” looking southeast.



Photo No.8 – (AT-03) – view of Channel “E” near Sta. 10+00 looking southeast.



Photo No.9 – (AT-03) – view of the cul-da-sac at the end of Channel “E” looking southeast.



Photo No.10 – (AT-03) – view of Channel “F” near Sta. 5+00 looking northwest.



Photo No. 11 – (AT-03) – view of aquatic vegetation on the southwest side of Channel "F".

Appendix C

Three (3) Year Budget Projections

BIG ISLAND MINING PROJECT (AT-03)			
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
<i>Maintenance Inspection</i>	\$ 2,500.00	\$ -	\$ 2,652.00
<i>Structure Operation</i>	\$ -	\$ -	\$ -
<i>Administration</i>	\$ 3,000.00	\$ 1,000.00	\$ -
<i>Maintenance/Rehabilitation</i>			
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
<i>Total O&M Budgets</i>	\$ 5,500.00	\$ 6,000.00	\$ 2,652.00
Total O&M Budget 2008 through 2011			\$14,152
Unexpended O&M Budget			\$374,059
Remaining O&M Budget (Projected)			\$359,907

OPERATIONS & MAINTENANCE BUDGET WORKSHEET

Project: Big Island Mining Project (AT-03)

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 Big Island Mining 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:

\$ 391,584.03

FY08 Expenditures by LDNR:

\$ -17,524.95

Estimated Unexpended Funds:

\$ 374,059.08