# BENEFICIAL USE OF DREDGED MATERIAL DISPOSAL HISTORY ALONG SELECT NAVIGATIONAL CHANNELS IN LOUISIANA

Prepared for
The U.S. Army Corps of Engineers
New Orleans District

Prepared by
University of New Orleans
Contract DACW29-98-D-0008
May 2001

## INTRODUCTION

Beginning in the late 1970's, the U.S. Army Corps of Engineers (USACE) began placing dredged material in an effort to create and restore coastal habitats. In 1994, the Beneficial Use Monitoring Program (BUMP) was instituted to quantify the amount of new habitat created and to improve dredge disposal placement in order to maximize the beneficial use. As part of BUMP, the University of New Orleans- Coastal Research Laboratory (UNO-CRL) performed a cumulative landscape history of the BUMP monitored sites between 1985 and 2000 to determine the net amount of sub-aerial land created by the USACE. The study will be continued on a yearly basis to determine the net land created between the current year and base year of 1985.

## DATA

The base year color infrared (CIR) photography used in the study was flown in December 1985 by the NASA- Ames Research Center. The photography was captured using a Wild RC10 camera at an altitude of 65,000 feet (1:65,000 scale).

For comparison, the current fiscal year (FY) CIR photography was used. The FY 2000 photography was flown by Aerial View Point in December of 2000 and January 2001. The photography was captured with a Wild RC30 camera at an altitude of 12,000 feet (1:24,000 scale).

## METHODS

The CIR photography was first scanned at a resolution of 600 dpi, and then imported into Erdas Imagine file format. The photography was then geo-referenced and a CIR photo-mosaic was created. For the land water classification, an ISODATA algorithm was performed on the CIR photo-mosaic to separate the imagery into 85 unique spectral classes. These 85 classes were then examined for spectral homogeneity and assigned either a final class of land or water. The image was then recoded to produce a land-water image. This procedure was followed for both the 1985 and FY 2000 CIR mosaics.

Once a land-water image was finalized for a study site, a change detection matrix was computed and a change detection image created. From this image, the areas of direct land created due to dredged material disposal was delineated using information from the disposal history of each study site.

## RESULTS

The goal of the study was to determine the amount of sub-aerial land created by the USACE. Since this study was a comparison of two time periods, the polygon delineations and acreage of BUMP created land represents a net change in the landscape based on current conditions. However, it was beyond the scope of the study to determine the amount of new land created by "BUMP assistance." The natural processes of re-working sediment placed into a system are numerous; making the determination of

BUMP assisted land creation difficult. Table 1 summarizes the results of the study and is followed by figures presenting the cumulative landscape change for each study site.

**Table 1** Summary of BUMP created land by study site.

| BUMP Study Site | BUMP Created (Acres) | BUMP Created (Hectares) | Figure Number |
|---|---|---|---|
| Atchafalaya- Avoca Island | 1,066 | 432 | 1 |
| Atchfalaya- Delta | 2,924 | 1,184 | 2 |
| Atchfalaya- Horseshoe Bend | 1,256 | 508 | 3 |
| Baptiste Collette | 6,239 | 2,527 | 4 |
| Barataria- Inland | 141 | 57 | 5 |
| Barataria- Bay | 60 | 24 | 6 |
| Barataria- Grand Terre | 121 | 49 | 7 |
| Calcasieu- Brown Lake | 195 | 79 | 8 |
| Calcasieu- Sabine | 745 | 302 | 9 |
| Freshwater Bayou | 21 | 8 | 10 |
| Houma- Navigation Canal | 13 | 5 | 11 |
| Houma- Wine Inland | 48 | 19 | 12 |
| Mermentau River | 63 | 25 | 13 |
| MRGO- Inland | 289 | 117 | 14 |
| MRGO- Jetties | 319 | 129 | 15 |
| MRGO- Breton Island | 29 | 12 | 16 |
| South Pass | 396 | 161 | 17 |
| Southwest Pass | 3,096 | 1,254 | 18 |
| Tiger Pass | 347 | 140 | 19 |
| **Total** | **17,367** | **7,034** | |

**BENEFICIAL USE OF DREDGED MATERIAL DISPOSAL HISTORY**
**ATCHAFALAYA RIVER AND BAYOUS CHENE, BOEUF AND BLACK, LA**
**LOWER ATCHAFALAYA RIVER - HORSESHOE REACH**
Through FY 2000

The Rivers and Harbors Act of 25 June 1910 authorized the USACE-NOD to construct and maintain a navigational channel through the Atchafalaya River from Morgan City to the Gulf of Mexico with project dimensions 20 feet deep, 200 feet wide and 15.75 miles long from the 20 foot contour in the Atchafalaya Bay, approximately 4 miles beyond the mouth of the Atchafalaya River, to the 20 foot contour in the Gulf of Mexico. Traffic sufficient to warrant maintenance of the authorized navigational channel to full project dimensions did not immediately develop. The channel was progressively enlarged during maintenance events from 10 by 100-feet in 1939 to 20 by 200-feet in 1974.

The Rivers and Harbors Act of 1968 authorized construction and maintenance of the Atchafalaya River and Bayous Chene, Boeuf, and Black, Louisiana project which provided an increase in channel width to 400 feet of the navigational channel in the Lower Atchafalaya River - Horseshoe from the junction of Avoca Island Cutoff Bayou channel to the Atchafalaya Bay. Construction of the channel in the bay and Gulf was initiated in April, 1974 and was completed in December of the same year. Maintenance in Lower Atchafalaya River-Horseshoe was not required prior to FY 1990 because channel depth historically was in excess of authorized channel dimensions. Dredging records dating back to 1989 indicate discontinuous segments of this reach of the channel or a minor segment of the intersection of Bayou Chene and the Lower Atchafalaya River, have been maintained annually with disposal of dredged material taking place in the Lower Atchafalaya River since FY 1990. Since maintenance of the Lower Atchafalaya River began, dredged material has been deposited unconfined in open water and unconfined in open water adjacent to the existing river banks for wetlands development. No dredged material has been placed on the existing shoreline.

Figure 3 illustrates the dredged material disposal history and USACE-NOD disposal areas for the Lower Atchafalaya River - Horseshoe channel. During FY 1990, material dredged from the Lower Atchafalaya River-Horseshoe was deposited into open water at a depth in excess of -50 feet National Geodetic Vertical Datum (NGVD) and material dredged from Bayou Chene was deposited into a wetland development site located adjacent to the east bank of the Atchafalaya River. Material was placed in the wetland development site to an elevation of no greater than +5 feet Mean Low Gulf (MLG).

During FY 1991 and FY 1992, material dredged from the Lower Atchafalaya River - Horseshoe was placed into the wetland development site located adjacent to the east bank of the Atchafalaya River, at the intersection of the Lower Atchafalaya River and Bayou Chene, to an elevation of no greater than +5 feet MLG.

During FY 1993, material dredged from the Lower Atchafalaya River - Horseshoe was placed into a wetland development site (Site C) located adjacent to the west bank of the Atchafalaya River. Material was deposited to an elevation of +5 feet MLG.

During FY 1994 (May 27, 1994 - October 16, 1994), material dredged from the Lower Atchafalaya River-Horseshoe was placed in four wetland development sites (Sites A, C, D and the site at intersection of the Lower Atchafalaya River and Bayou Chene) located adjacent to the east and west banks of the Lower Atchafalaya River- Horseshoe. Material was deposited to an elevation not to exceed +5 feet MLG.

In FY 1995, approximately 1,273,256 cubic yards of dredged material were placed in three wetland development sites (Sites B, D, and E) located adjacent to the east and west banks of the Lower Atchafalaya River-Horseshoe. Material was deposited to an elevation no higher than +5 feet MLG.

During FY 1996 (April 18, 1996 - May 16, 1996, and August 23, 1996 - October 25, 1996), four wetland development sites (Sites A, B, D, and E) located adjacent to the east and west banks of the Lower Atchafalaya River-Horseshoe were utilized for dredged material placement. Material was deposited to an elevation of no higher than +5 feet MLG.

During FY 1997 (May 24, 1997 - July 25, 1997 and October 9, 1997 - November 7, 1997), two wetland development sites, Site D located adjacent to the west bank of the Lower Atchafalaya River - Horseshoe and Site B located adjacent to the east were used for dredged material placement. Approximately 1,117,411 cubic yards of dredged material were placed into wetland development Site D and approximately 944,300 cubic yards of material were placed at Site B. The material was deposited to an elevation no higher than +5.0 feet MLG.

Dredged material from both the Avoca Island Cutoff - Bayou Chene reach and the Lower Atchafalaya River - Horseshoe reach were placed into disposal sites within the Lower Atchafalaya River during the FY 1998 maintenance event (May 22, 1998 - October 12, 1998 and September 22, 1998 - December 29, 1998). Approximately 3,291,390 cubic yards of material from the Avoca Island Cutoff - Bayou Chene reach were placed into wetland development Sites G1 and G2 and approximately 748,000 cubic yards of material from the Lower Atchafalaya River - Horseshoe reach were placed into wetland development Site F. The dredged material was placed unconfined to an initial elevation no higher than +5.0 feet MLG.

During the FY 1999 maintenance event (August 30, 1999 - October 23, 1999), approximately 528,769 cubic yards of dredged material were removed form the Lower Atchafalaya River - Horseshoe reach. Approximately 319,069 cubic yards of material were placed into the abandoned shell borrow pit, Site H, and approximately 209,700 cubic yards of material were placed into Site B. At both sites, the dredged material was placed to an initial elevation no higher than +5.0 feet MLG.

There was no maintenance dredging in the Lower Atchafalaya River - Horseshoe reach during FY 2000.

Figure 2 illustrates the dredged material disposal history for the study area through FY 2000.

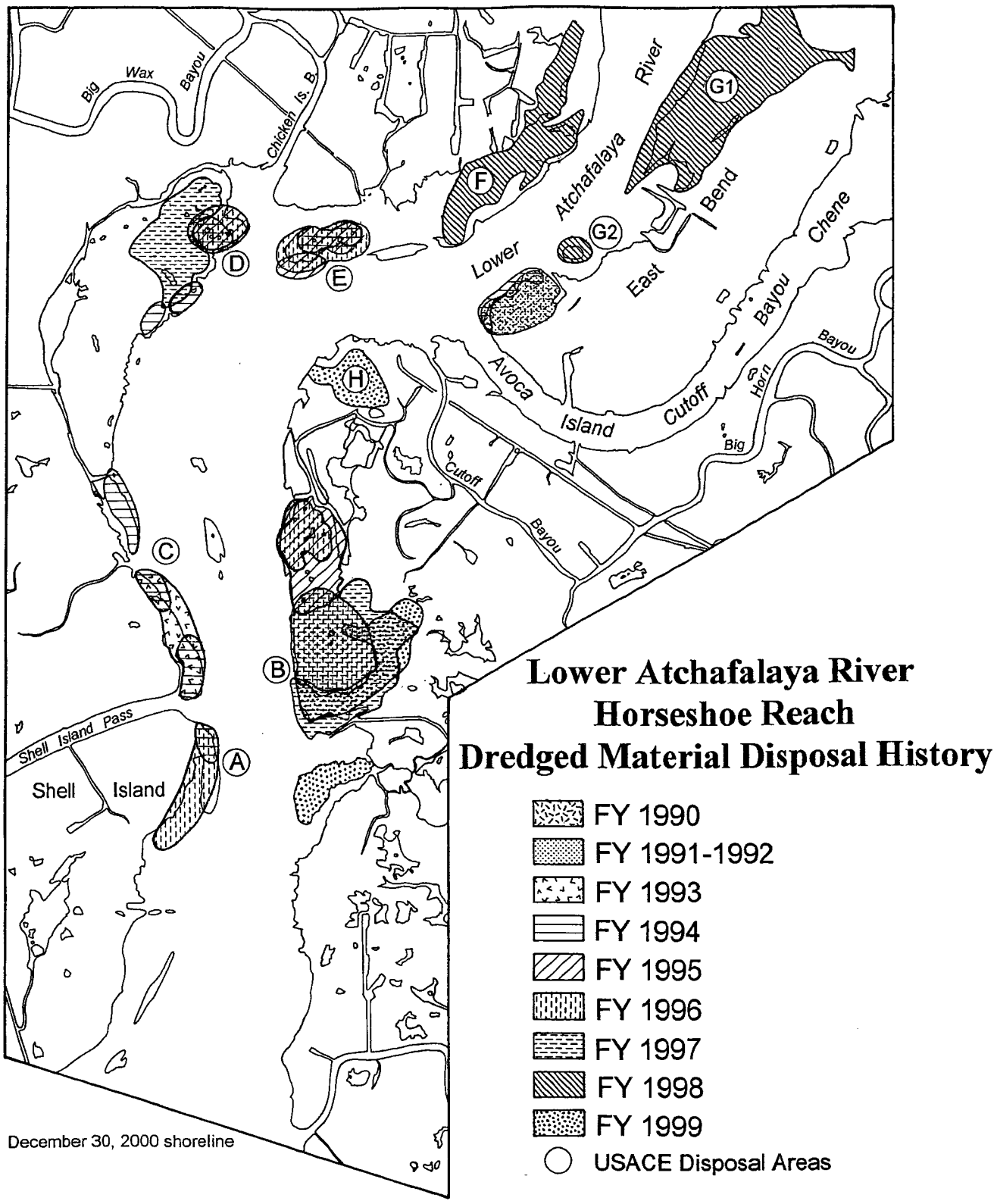
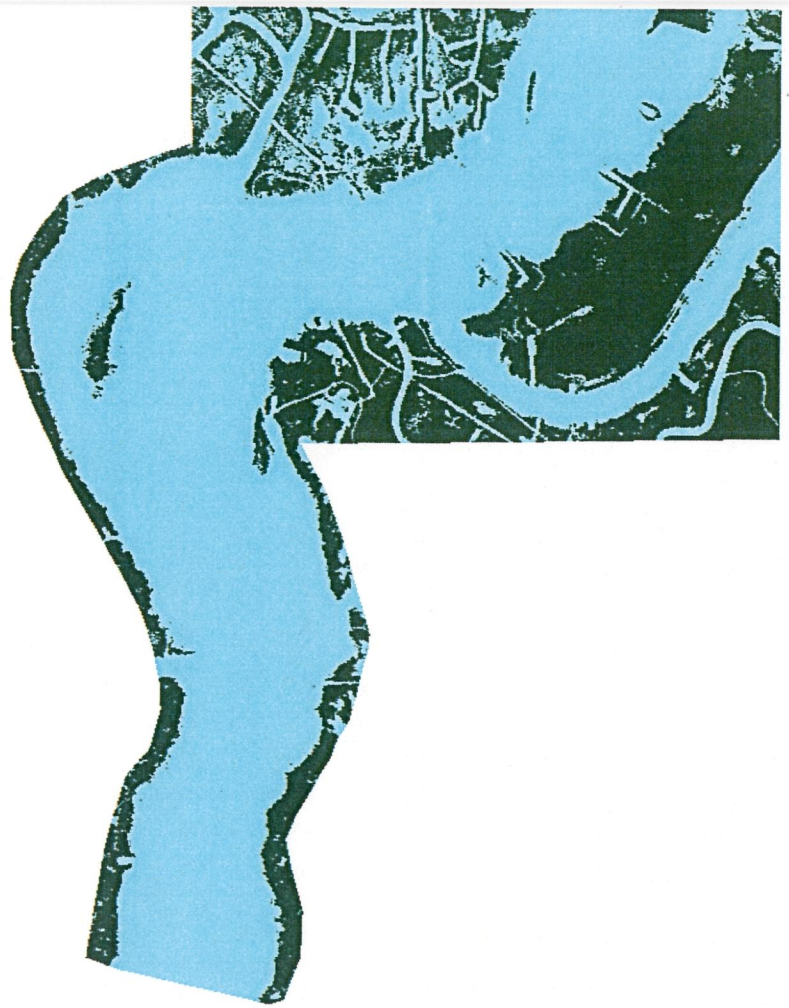


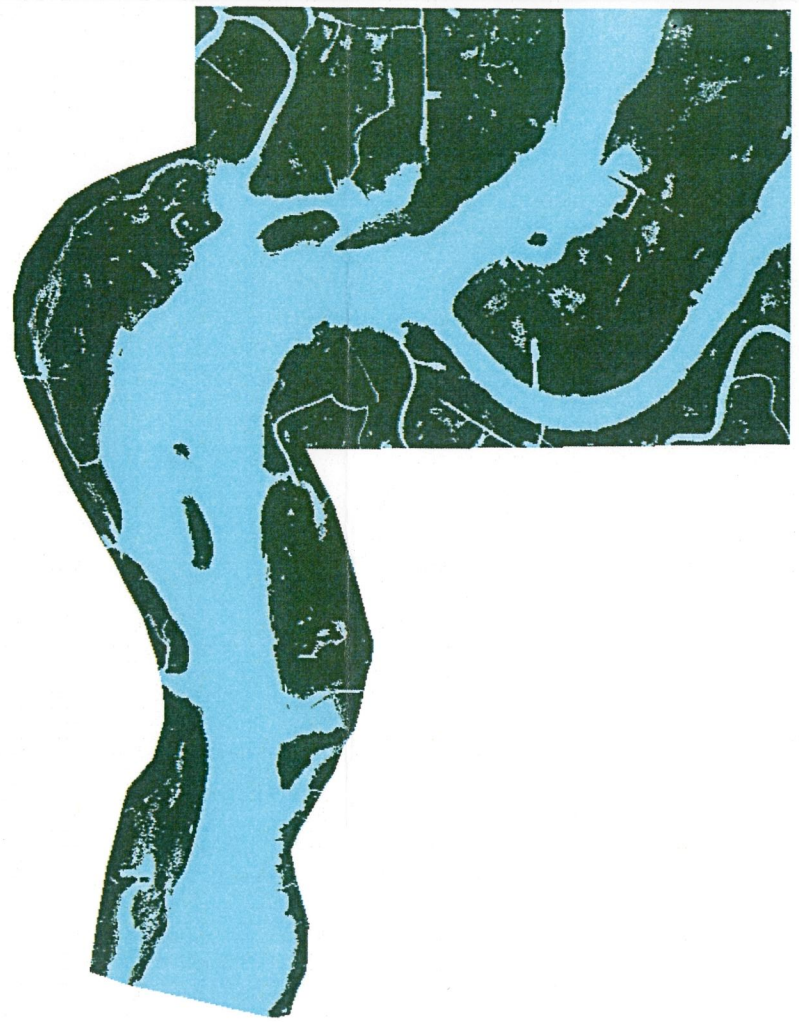

Figure 2. Dredged material disposal history and USACE-NOD disposal areas for the Lower Atchafalaya River Horseshoe reach through FY 2000. Data from USACE-NOD and aerial photography.

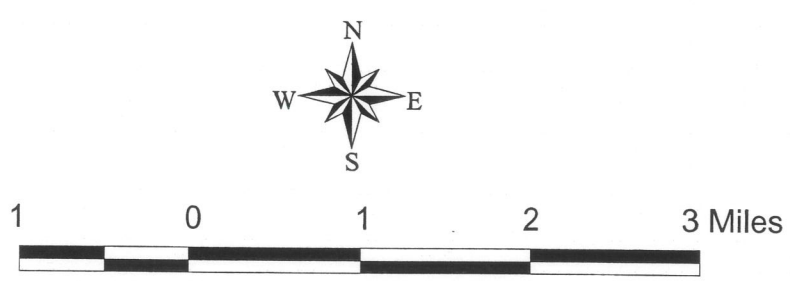
1985 Land-Water Classification

2000 Land-Water Classification

Change Detection: 1985-2000








LEGEND

BUMP Created Land

Other New Land

Unchanged Land

Land Loss

Water

Figure 3 Cumulative Landscape Change for Atchafalaya- Horseshoe Bend: 1,256 Acres