

**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

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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.

<b>BUMP Study Site</b>	<b>BUMP Created (Acres)</b>	<b>BUMP Created (Hectares)</b>	<b>Figure Number</b>
Atchafalaya- Avoca Island	1,066	432	1
Atchafalaya- Delta	2,924	1,184	2
Atchafalaya- 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
<b>Total</b>	<b>17,367</b>	<b>7,034</b>	

**BENEFICIAL USE OF DREDGED MATERIAL DISPOSAL HISTORY  
ATCHAFALAYA RIVER AND BAYOUS CHENE, BOEUF AND BLACK, LA  
ATCHAFALAYA BAY AND BAR**

Through FY 2000

The Rivers and Harbors Act of 25 June 1910 authorized the USACE-NOD to construct and maintain the Atchafalaya River, Morgan City to the Gulf of Mexico, Louisiana, project which provided a navigational channel 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. It incorporated the existing project and provided an increase in channel width of the navigational channel in Atchafalaya Bay and Bar to 400 feet. Construction of the channel in the bay and Gulf was initiated in April, 1974 and was complete in December of the same year.

Dredged material disposal history prior to construction of the enlarged channel in 1974 is sketchy. Dredging records dating back to 1957 indicate that maintenance of *discontinuous* reaches of the bay and/or bar channels occurred on an annual basis from 1957 until 1974 except for 1958. It is likely that dredged material was placed unconfined in open water on either side of the navigational channel.

Dredged material removed during new work dredging associated with construction of the 400 foot navigational channel in 1974 was placed in open water and on subaerial levees of existing delta lobes on the west side of the navigational channel. During maintenance events beginning in 1979 and continuing on an annual basis through 1985, this practice continued. During this period, Big Island was created; dredged material was used to construct a campground at the Louisiana Department of Wildlife and Fisheries Camp; dredged material was used to construct islands for colonial nesting seabirds; and some wetlands were created on the western side of Big Island (Figure 3).

In 1987, at the request of the Louisiana Department of Wildlife and Fisheries (LDWF) and the U.S. Fish and Wildlife Service (FWS), the New Orleans District began placement of dredged material on the east side of the navigational channel in an effort to stimulate growth of the east side of the delta. Disposal plans developed in coordination with the LDWF, FWS, and other state and Federal natural resources agencies, were designed to direct sediment-laden water through existing natural channels, i.e., God's Pass, East Pass, Ratcliffe Pass, to the east side of the delta. In general, dredged material was to be placed as a series of mounds on the eroding subaerial levees of existing delta lobes and on the heads of islands at existing channel bifurcations. The maximum initial height of the dredged material mounds was +5.0 feet Mean Low Gulf (+4.2 Mean Sea Level). The mounds of dredged material would refurbish the subaerial levees which would direct flows into the desired

locations within the developing delta. During high flow events, the re-furbished levees would be over-topped and sediment-laden waters would drop sediment behind them at elevations suitable for the establishment of fresh marsh (+2.3 feet Mean Low Gulf) and/or submerged aquatic vegetation. The refurbished levees also would protect the developing wetlands from wave-induced erosion.

In accordance with the plan during maintenance events in 1987, 1988, 1989, and 1990, in the upper bay/delta, dredged material was placed on the eroded subaerial levees of Roger Brown Island, Paule Deaux Island, and Roseate Island and on the heads of God's Island and Long Island. In the lower bay/delta, dredged material was used to maintain and construct islands for colonial nesting seabirds on the west side of the navigational channel. The initial height of the dredged material for bird island creation was +6.0 feet Mean Low Gulf (+5.2 Mean Sea Level).

By 1991 it became obvious that the refurbished levees were not being over-topped during high flow events. At the request of the LDWF, the maximum initial height of the dredged material was changed to +3.78 feet Mean Low Gulf (+3.0 Feet Mean Sea Level). Dredged material from the 1991 maintenance event was placed along the banks of the navigational channel on the east side of Big Island, on both sides of God's Island and Heron Island and on the banks of East Pass and Ratcliffe Pass. Dredged material also was placed behind previously refurbished levees on Paule Deaux and Roger Brown Islands, Long Island, and Roseate Island at an initial elevation of +2.78 feet Mean Low Gulf (+2.0 feet Mean Sea Level). Islands for colonial nesting seabirds were constructed and/or maintained with dredged material from the lower bay/delta.

Beginning with the 1992 maintenance event and in coordination with LDWF, FWS and other natural resources agencies, the dredged material disposal plan was modified to incorporate use of dredged material from the upper bay/delta to construct artificial delta lobes. The disposal plan developed was designed to direct flows between the lobes and to provide protected, shallow, open water areas within the lobes for the development of fresh marsh and submerged aquatic vegetation. During the 1992 maintenance event, the maximum initial height of the dredged material in that portion of the artificial delta lobes paralleling the channel was +4.0 feet Mean Sea Level/National Geodetic Vertical Datum (+4.78 feet Mean Low Gulf); the maximum initial height of the dredged material in that portion of the delta lobes perpendicular to the channel was +3.0 feet Mean Sea Level/National Geodetic Vertical Datum (+3.78 feet Mean Low Gulf). Both Mile Island and Community Island were constructed during the 1992 maintenance event. Islands for colonial nesting seabirds were constructed with dredged material from the lower bay/delta.

During the 1993 maintenance event, the maximum initial height of the dredged material for creation of the artificial delta lobes was +4.0 feet Mean Sea Level/National Geodetic Vertical Datum (+4.78 feet Mean Low Gulf) for all portions of the lobes. Construction of Andrew Island and Horseshoe Island commenced during the 1993 maintenance event and continued during the 1994 maintenance event. Dredged material also was placed at North Point and on God's Island during the 1993 maintenance event. Islands for colonial nesting seabirds were constructed with dredged material from the lower bay/delta during both 1993 and 1994, and were enlarged in 1995 and 1996. In 1995, a new delta lobe was created on the east side of the delta off of East Pass. Named Ibis Island, the bare, sandy formation was quickly claimed by nesting birds.

No maintenance dredging was necessary in the Atchafalaya Bay channel during 1996.

Dredged material was added to the artificial delta lobes at "A4" Island, Long Island, and Horseshoe Island during the 1997 maintenance event (September 4, 1997 - October 8, 1997). Skimmer Island also was used for dredged material placement during this maintenance event.

In 1998 (September 22, 1998 - December 29, 1998), dredged material from maintenance of the bay channel was placed on Poule Deaux Island, Long Island, and Skimmer Island.

During 1999 (November 26, 1999 - December 22, 1999), a new delta lobe, Natal Island, was created off of East Pass. Dredged material was added to Long Island during the 2000 maintenance event (December 12, 2000 - January 25, 2001).

Figure 3A illustrates the previous dredged material disposal history for the study area through FY 1995. Figure 3B details the recent dredged material disposal history for the study area through FY 2000.

In the bar channel between 1974 and 1991, all of the dredged material removed during routine maintenance was placed in an interim designated ocean dredged material disposal site (ODMDS) located on the east side of the navigational channel. Beginning with the 1991 maintenance event, dredged material suitable for stacking from the upper reach of the bar channel has been placed into an open water disposal area on the east side of the channel in a manner conducive to bird island construction and the material not suitable for stacking has been placed into the ODMDS.

# Atchafalaya Bay and Bar Dredged Material Disposal History

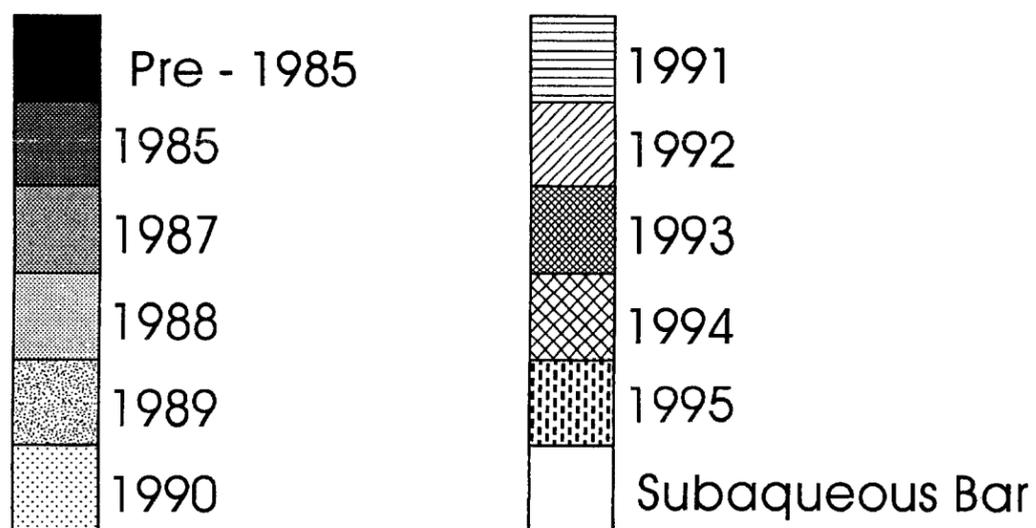
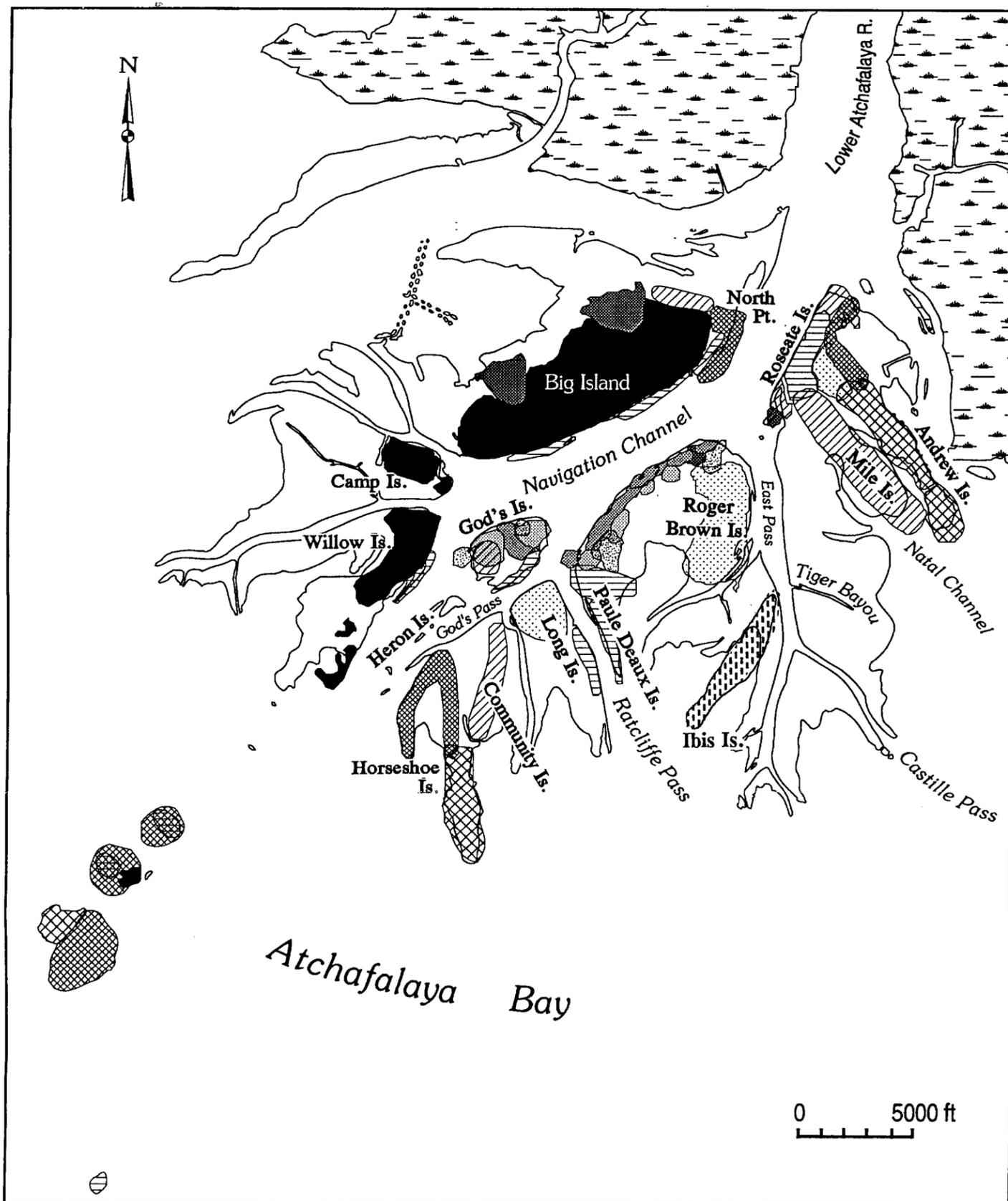


Figure 3A. Previous dredged material disposal history for the Lower Atchafalaya River Bay and Bar channel reaches through 1995. 1985 to 1990 data from Van Heerden, 1994; 1991 to 1995 data from USACE-NOD *as-builts*.

## Atchafalaya Bay and Bar Dredged Material Disposal History

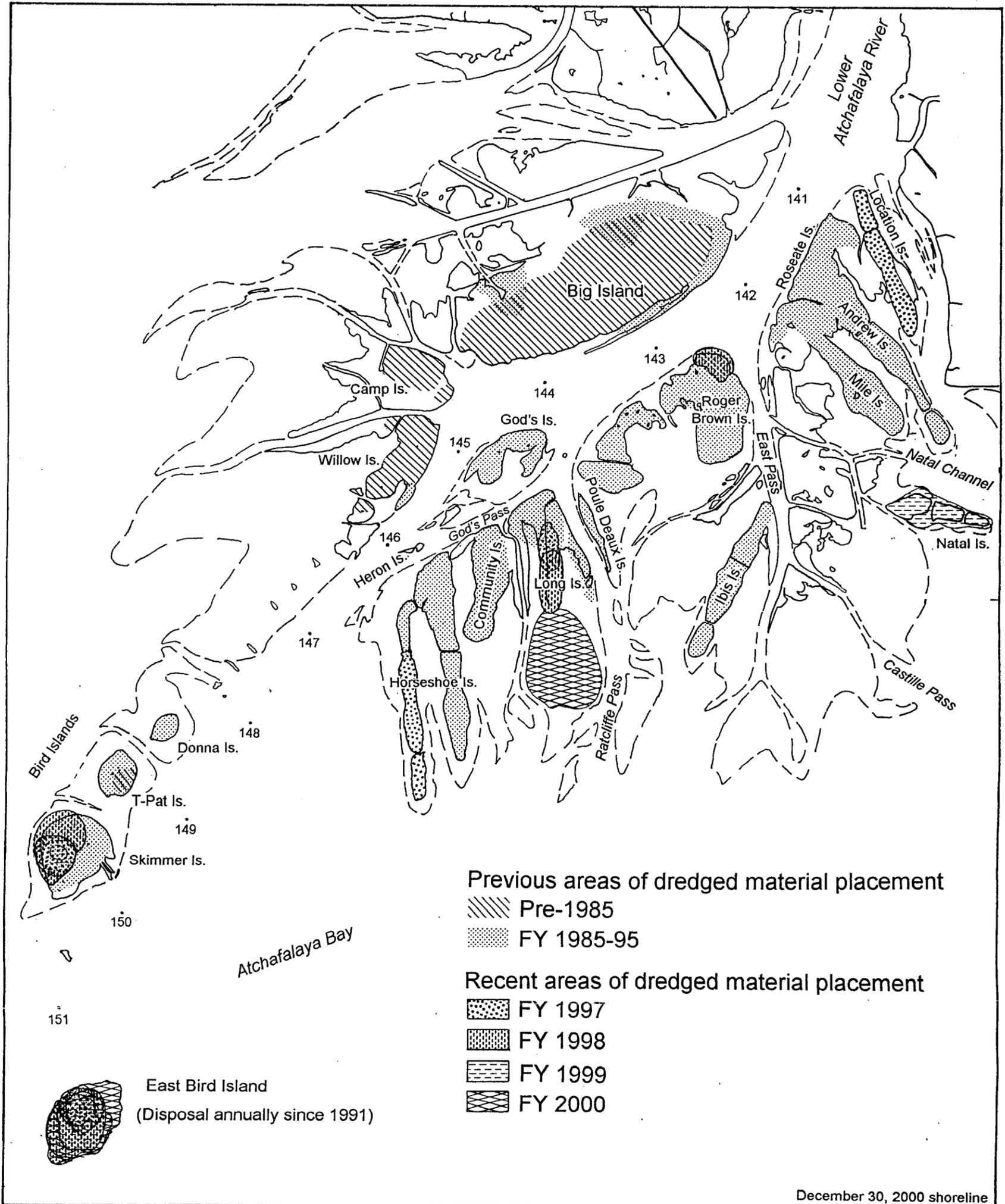


Figure 3B. Dredged material disposal history for the Lower Atchafalaya River Bay and Bar channel reaches with recent placement detailed FY 1996 through FY 2000. 1985 to 1990 data from Van Heerden, 1994; 1991 to 2000 data from USACE-NOD *as-built*s and aerial photography.

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 2 Cumulative Landscape Change for Atchafalaya- Delta: 2924.4 Acres

1985 Land-Water Classification

2000 Land-Water Classification

Change Detection: 1985-2000



Figure 17 Cumulative Landscape Change for South Pass: 396 Acres