

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

The Rivers and Harbors Act of 25 June 1910 authorized the USACE, New Orleans District (CEMVN) to construct and maintain the Atchafalaya River, Morgan City to the Gulf of Mexico, Louisiana, project which provided a navigation 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 navigation 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 navigation channel in Atchafalaya Bay and Bar to 400 feet. Construction of the channel in the bay and Gulf of Mexico was initiated in April 1974 and was complete in December of the same year.

**BAY CHANNEL DISPOSAL HISTORY**

Dredged material disposal history prior to construction of the enlarged channel in 1974 is limited. 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 navigation channel.

Dredged material removed during new work dredging associated with construction of the 400 foot navigation channel in 1974 was placed in open water and on sub-aerial levees of existing delta lobes on the west side of the navigation 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 (1975-1984); dredged material was used to construct a campground at the Louisiana Department of Wildlife and Fisheries (LWDF) camp; dredged material was used to construct islands for colonial nesting seabirds; and some wetlands were created on the western side of Big Island.

In 1987, at the request of the LDWF and the US Fish and Wildlife Service (FWS), the CEMVN began placement of dredged material on the east side of the navigation 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 sub-aerial levees of existing delta lobes and on the heads of islands at existing channel bifurcations. The maximum initial placement height of the dredged material mounds was about +5.0 feet NGVD (+5.72 feet MLG). The mounds of dredged material would refurbish the sub-aerial 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 MLG) and/or submerged aquatic vegetation. The refurbished levees also would protect the developing wetlands from wave-induced erosion.

During upper bay maintenance events in 1987, 1988, and 1989, in accordance with this plan, dredged material was placed on the eroded sub-aerial levees of Roger Brown Island, Poule Deaux Island, and Roseate Island and on the heads of God's Island and Long Island. In the lower bay, dredged material was used to maintain and construct islands for colonial nesting seabirds (terns, gulls, and black skimmers) on the west side of the navigation channel. The maximum initial placement height of the dredged material for bird island creation was about +6.0 feet MLG (+5.28 feet NGVD).

### **Fiscal Year 2000**

No maintenance was required in the Atchafalaya Bay channel during 2000.

### **Fiscal Year 2001**

During the 2001 maintenance event (12 December 2000 – 25 January 2001), working under contract 01-C-0012, the cutterhead dredge TOM JAMES placed a total of 2,044,474 cubic yards of dredged material at two sites in the Atchafalaya Bay.

Prior to the FY 2000 maintenance of the navigation channel in Atchafalaya Bay, the LDWF and other state and Federal natural resources/regulatory agencies requested that the peninsulas be constructed with 200-foot wide gaps cut to -2.0 feet NGVD at 1000-foot intervals. Construction of all the gaps in the Long Island peninsula as specified in the contract was impossible due to the nature of the substrate and the weight of the dredged material. One of the four planned gaps was constructed to a width of 100 feet over a bottom depth of -2.0 feet NGVD while the remaining gaps were constructed to a width of 100 feet over a bottom depth of 0.0 feet NGVD. Dredged material removed during gap construction was stacked on either side of the gaps to a height of about +6.22 feet MLG (+7.0 feet NGVD). Following the FY 2001 maintenance event, CEMVN determined that peninsula gaps would be constructed at 100 feet wide at 1000-foot intervals to an elevation of 0.0 feet NGVD.

1. Approximately 1,387,571 cubic yards of dredged material were placed on **Long Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Approximately 139 acres of land were created by this placement effort.
2. Approximately 656,903 cubic yards of dredged material were placed on **T-Pat Island** to a maximum initial elevation of about +6.0 feet MLG (+5.22 NGVD). Approximately 45 acres of land were created by this placement effort.



Atchafalaya Bay – Long Island – April 2001

### **Fiscal Year 2002**

During the 2002 maintenance event (19 February 2002 – 8 June 2002), working under contract 02-C-0029, the cutterhead dredge TOM JAMES placed approximately 753,266 cubic yards of dredged material on **Gary Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Approximately 129 acres of land were created by this placement effort.

Discharge of dredged material at the **Gary Island** site was performed from 2 April to 6 May 2002. Following completion of discharge operations at **Gary Island**, the contractor was to excavate three gaps across the width of the island to permit water exchange from one side of the island to the other side.

During an interagency site visit to **Gary Island** on 4 June 2002, during gap construction efforts, it was discovered that least terns and black skimmers had nested on the site in the vicinity of on-going construction work. Nesting least terns were found in the vicinity of the middle gap, and nesting black skimmers were found at the island's southern tip. USFWS recommended that the areas of nesting birds be avoided by all Contractor personnel and equipment until the end of the nesting season (15 September 2002). The close proximity of nesting activities to construction activities on **Gary Island** meant that all work was to cease until the end of the nesting season.

However, having the contractor wait to complete gap construction work until this date would have exceeded the contract's specified work duration. Since the contractor had other work commitments, he would not have been able to return to the **Gary Island** site until the following year. This resulted in the decision to abandon completion of gap construction efforts at **Gary Island**.



Gary Island (4 June 2002)



Least Tern chick on Gary Island (4 June 2002)



Atchafalaya Bay - 2002

**Fiscal Year 2003**

No maintenance was required in the Atchafalaya Bay channel during 2003.

**Fiscal Year 2004**

During the 2004 maintenance event (10 November 2003 – 7 March 2004), working under contract 04-C-0006, the cutterhead dredges TOM JAMES and GEORGE D. WILLIAMS placed approximately 869,118 cubic yards of dredged material on **Long Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Two gaps were constructed across the width of the island. Approximately 95 acres of land were created by this placement effort.



Gap construction at Long Island (15 March 2004)



Atchafalaya Bay – 26 December 2004

## **Fiscal Year 2005**

No maintenance was required in the Atchafalaya Bay channel during 2005.

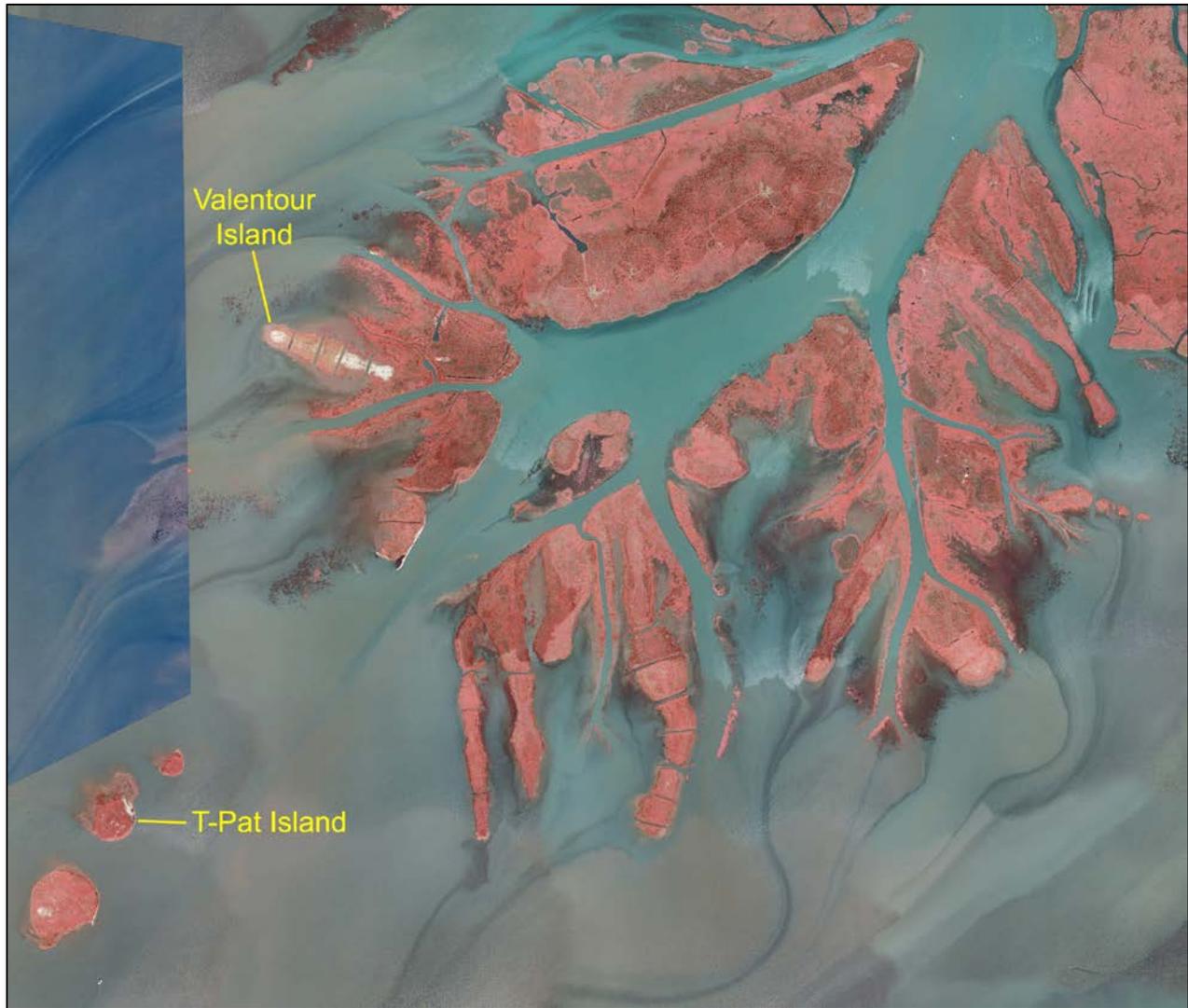
## **Fiscal Year 2006**

During the 2006 maintenance event (8 March 2006 – 30 April 2006), working under contract 06-C-0098, the cutterhead dredge GEORGE D. WILLIAMS placed a total of 1,222,705 cubic yards of dredged material on two sites in the Atchafalaya Bay.

1. Approximately 1,006,480 cubic yards of dredged material were placed on **Valentour Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Approximately 122 acres of land were created by this placement effort.
2. Approximately 216,225 cubic yards of dredged material were placed on **T-Pat Island** to a maximum initial elevation of about +6.0 feet MLG. Approximately 76 acres of land were created by this placement effort.



Valentour Island Placement of Dredged Material (9 April 2006)

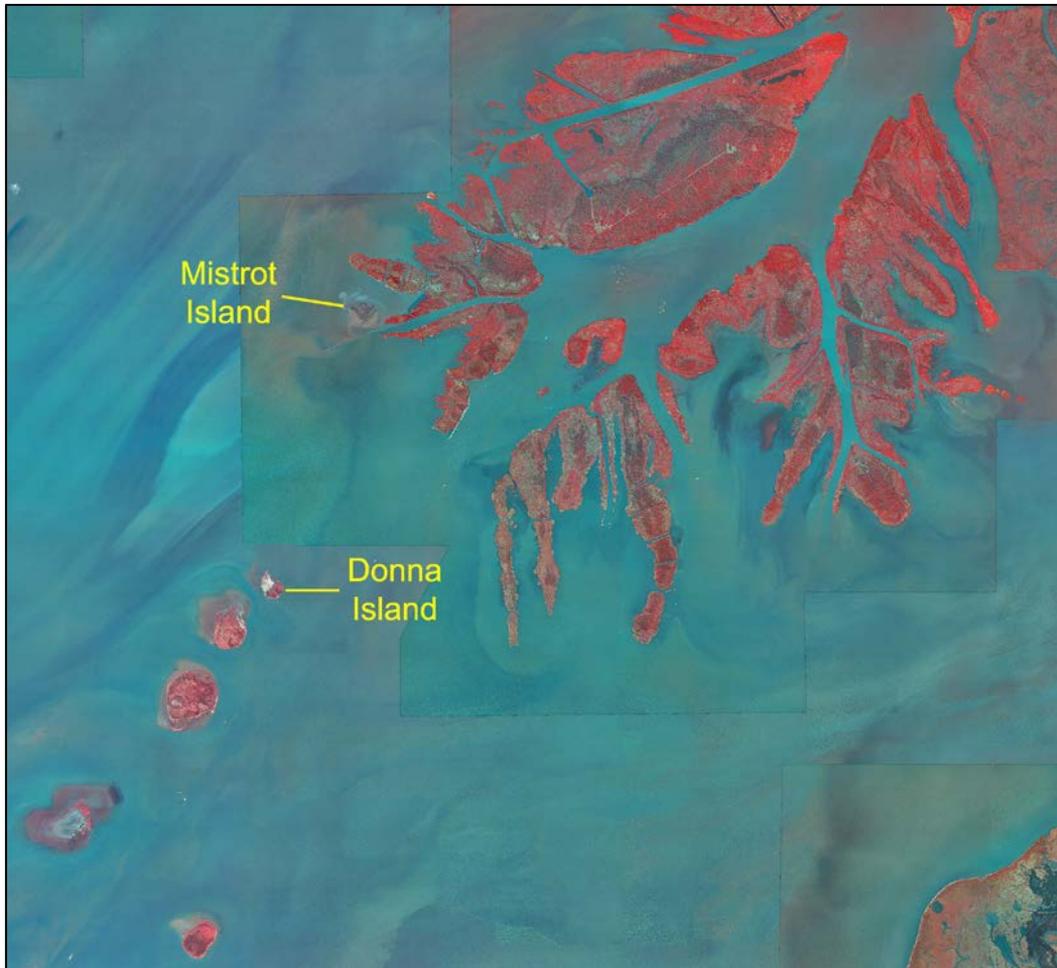


Atchafalaya Bay - December 2006

### **Fiscal Year 2007**

During the 2007 maintenance event (20 July 2007 – 10 December 2007), working under contract 07-C-0081, the cutterhead dredge R.S. WEEKS placed a total of 741,778 cubic yards of dredged material at two sites in the Atchafalaya Bay.

1. Approximately 503,356 cubic yards of dredged material were placed on **Mistrot Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Approximately 24 acres of land were created by this placement effort.
2. Approximately 238,422 cubic yards of dredged material were placed on **Donna Island** to a maximum initial elevation of about +6.0 feet MLG. Approximately 11 acres of land were created by this placement effort.



Atchafalaya Bay – December 2007

### **Fiscal Year 2008**

During the 2008 maintenance event (14 August 2008 – 9 September 2008), working under contract 08-C-0075, the cutterhead dredge G.D. WILLIAMS placed approximately 277,512 cubic yards of dredged material on **Mathies Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Approximately 42 acres of land were created by this placement effort.

Approximately 14,206 cubic yards of material were excavated during flotation access dredging to allow equipment and pipeline to reach Mathies Island from the Atchafalaya River bay channel. This material was placed in shallow open water at a single placement site located adjacent to the flotation access channel to a maximum initial elevation of about +4.78 feet MLG. Approximately 1 acre of land was created by this placement effort.



Atchafalaya Bay – December 2008



Mathies Island – 15 July 2009

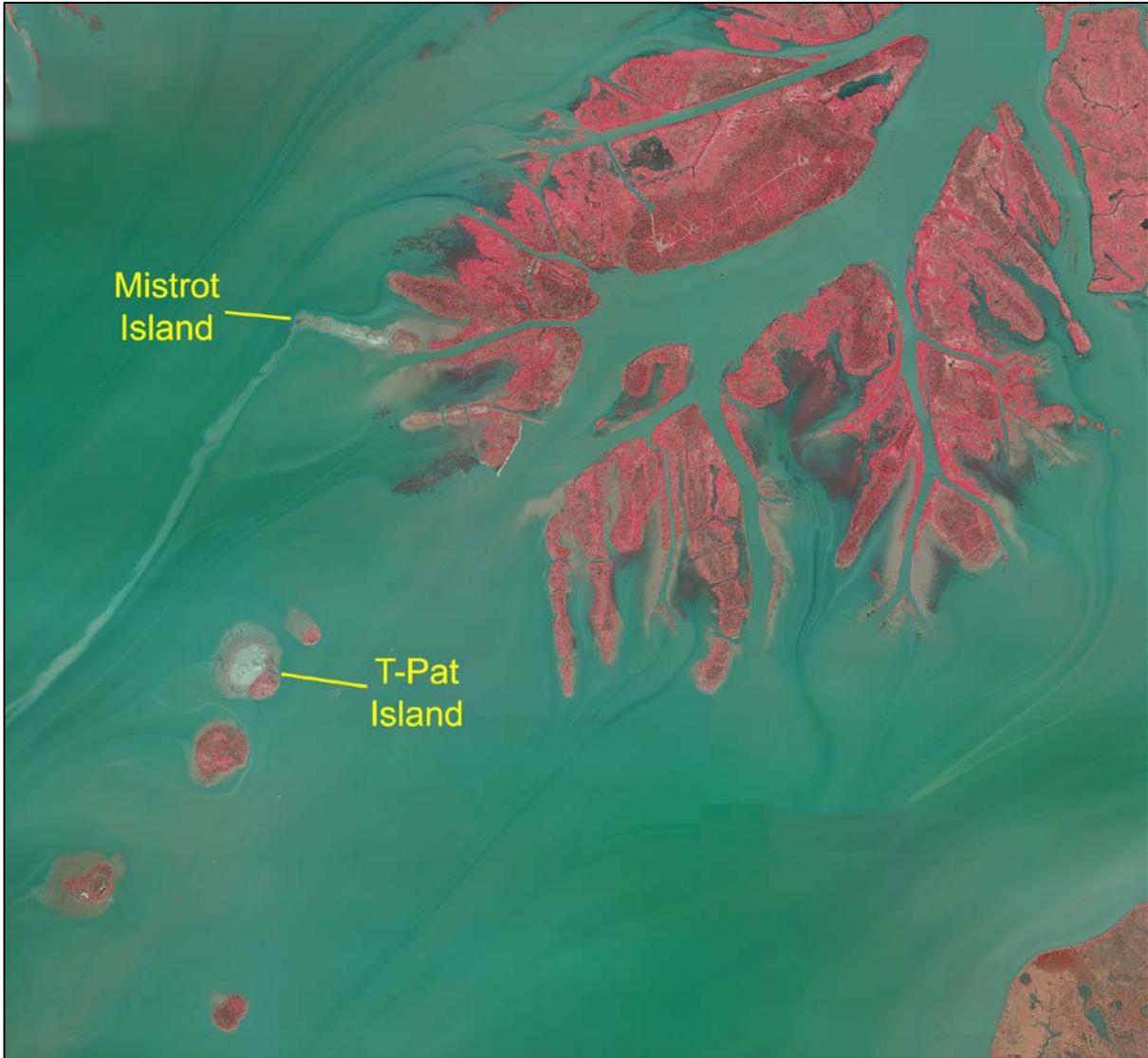


Mistrot Island (15 July 2009)

### **Fiscal Year 2009-2010**

During the 2009-2010 maintenance event (15 August 2009 – 22 November 2009), working under contract 09-C-0086, the cutterhead dredge VENTURE placed a total of 1,801,945 cubic yards of dredged material at two sites in the Atchafalaya Bay.

1. Approximately 754,604 cubic yards of dredged material were placed on **Mistrot Island** to a maximum initial elevation of about +4.78 feet MLG (+4.0 feet NGVD). Approximately 81 acres of land were created by this placement effort.
2. Approximately 1,047,341 cubic yards of dredged material also were placed on **T-Pat Island** to a maximum initial elevation of about +6.0 feet MLG. Approximately 158 acres of land were created by this placement effort.



Atchafalaya Bay – December 2009

## **BAR CHANNEL DISPOSAL HISTORY**

Between 1974 and 1991, all of the dredged material removed from the Atchafalaya River bar channel during routine maintenance was placed in an interim designated ocean dredged material disposal site located on the east side of the navigation channel (ODMDS East). Upper bar channel material tended to be characterized by higher concentrations of sand than the remainder of the bar channel. Because of this sand presence, upper bar channel material placed in the upper portion of the ODMDS East did not easily disperse following placement at the disposal site and a number of small subaerial mounds were periodically formed, only to become submerged again following wave erosion effects characteristic of this area. Beginning with the 1991 maintenance event, dredged material suitable for stacking from the upper reach of the bar channel has been placed into the upper portion of the ODMDS East (labeled Bird Island East) in a manner conducive to seabird nesting island construction and material not suitable for stacking has been placed into the ODMDS East. The maximum initial placement height of the dredged material for bird island creation was about +6.0 feet MLG (+5.28 feet NGVD). Terns, gulls, and black skimmers have typically utilized the Bird Island East site for breeding purposes.

### **Fiscal Year 2000**

During the 2000 maintenance event, two separate contracts were awarded to perform dredging in the Atchafalaya River bar channel.

1. During the 2000 maintenance event (25 June 2000 – 18 August 2000), working under contract 00-C-0068, the cutterhead dredge TOM JAMES placed approximately 10,749,971 cubic yards of dredged material in the **ODMDS East**.
2. During the 2000 maintenance event (26 August 2000 – 16 September 2000), working under contract 00-C-0083, the cutterhead dredge TOM JAMES placed approximately 2,237,039 cubic yards of dredged material at **Bird Island East**. Approximately 24 acres of land were created by this placement effort.

### **Fiscal Year 2001**

During the 2001 maintenance event, two separate contracts were awarded to perform dredging in the Atchafalaya River bar channel.

1. During the 2001 maintenance event (27 February 2001 – 30 April 2001), working under contract 01-C-0024, the cutterhead dredge TOM JAMES placed approximately 9,554,971 cubic yards of dredged material in the **ODMDS East**.
2. During the 2001 maintenance event (30 April 2001 – 18 June 2001), working under contract 01-C-0041, the cutterhead dredge TOM JAMES removed a total of 2,800,511 cubic yards of shoal material from the Atchafalaya river bar channel.
  - a. Approximately 1,269,887 cubic yards of dredged material were placed in the **ODMDS East**.

- b. Approximately 1,530,624 cubic yards of dredged material were placed at **Bird Island East**. Approximately 20 acres of land were created by this placement effort.

### **Fiscal Year 2002**

During the 2002 maintenance event, three separate contracts were awarded to perform dredging in the Atchafalaya River bar channel. A second ODMDS (ODMDS West) was designated for use on the western side of the bar channel in an effort to decrease the shoaling rate observed in the bar channel. The northernmost portion of the ODMDS West was designated as a colonial nesting seabird island construction site (Bird Island West). Similar to the Bird Island East site, shoal material removed from the upper bar channel dredging reach would be placed at this site to construct a series of bird nesting islands with placement of dredged material limited to a maximum initial elevation of +6.0 feet MLG.

1. During the 2002 maintenance event (22 September 2001 – 13 April 2002), working under contract 01-C-0065, the cutterhead dredges MISSOURI H and E. STROUD removed a total of 10,345,137 cubic yards of shoal material from the Atchafalaya River bar channel.

- a. Approximately 9,168,753 cubic yards of dredged material were placed in the **ODMDS East**.

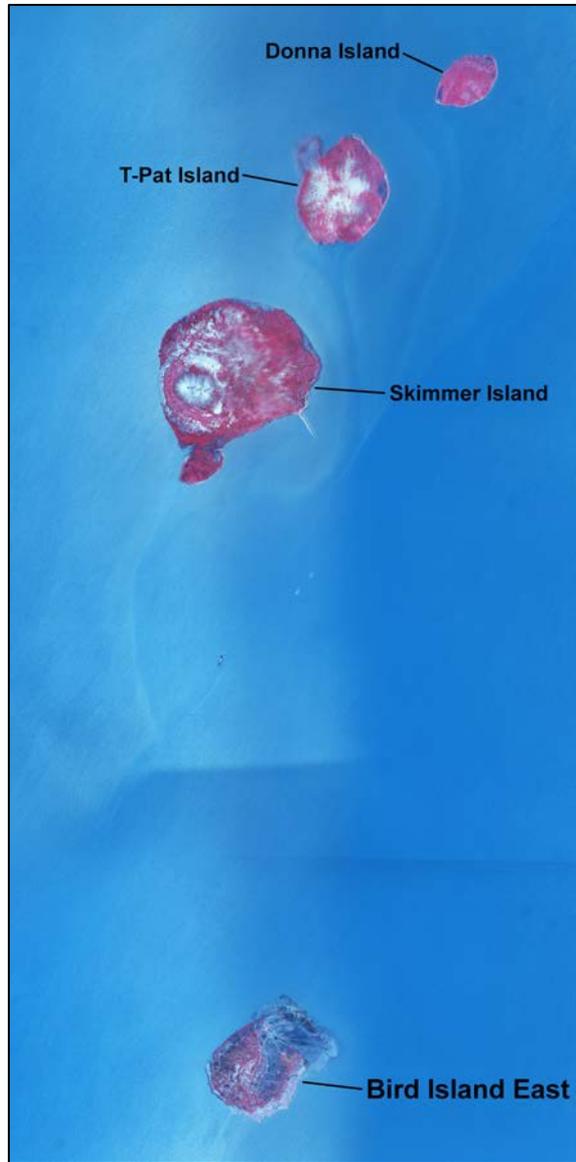
- b. Approximately 1,176,384 cubic yards of dredged material were placed at **Bird Island East**. Approximately 10 acres of land were created by this placement effort.

2. During the 2002 maintenance event (21 August 2002 – 17 November 2002), working under contract 02-C-0038, the cutterhead dredge GEORGE D. WILLIAMS removed a total of 9,382,250 cubic yards of shoal material from the Atchafalaya River bar channel and placed all of this material on the western side of the bar channel in the new ODMDS and bird nesting island site.

- a. Approximately 6,797,817 cubic yards of dredged material were placed in the **ODMDS West**.

- b. Approximately 2,584,433 cubic yards of dredged material were placed at **Bird Island West**. Approximately 74 acres of land were created by this placement effort.

3. Working under contract 02-C-0010 (30 January 2002 – 9 February 2002), the hopper dredge NEWPORT removed approximately 937,440 cubic yards from the bar channel by working in the agitation dredging mode. This work was performed as a demonstration project to evaluate the effectiveness of maintaining the Atchafalaya River bar channel by using a hopper dredge working in the agitation dredging mode versus using a cutterhead dredge with a discharge pipeline as is typically done for this channel. The results of this demonstration project showed that a hopper dredge working in agitation mode was not a more effective dredging method for maintaining the Atchafalaya River bar channel than a cutterhead dredge.



Atchafalaya Bar – May 2002

### **Fiscal Year 2003**

During the 2003 maintenance event (22 November 2002 – 12 February 2003), working under contract 03-C-0005, the cutterhead dredge GEORGE D. WILLIAMS placed approximately 9,125,381 cubic yards of dredged material in the **ODMDS West**.

### **Fiscal Year 2004**

During the 2004 maintenance event, two separate contracts were awarded to perform dredging in the Atchafalaya River bar channel.

1. During the 2004 maintenance event (10 November 2003 – 7 March 2004), working under contract 04-C-0006, the cutterhead dredges TOM JAMES and GEORGE D. WILLIAMS

removed a total of 10,637,239 cubic yards of shoal material from the Atchafalaya River bar channel.

- a. Approximately 9,099,924 cubic yards of dredged material were placed in the **ODMDS West**.
- b. Approximately 1,537,315 cubic yards of dredged material were placed at **Bird Island West**. Approximately 21 acres of land were created by this placement effort.

2. During the 2004 maintenance event (9 April 2004 – 21 May 2004), working under contract 04-C-0029, the cutterhead dredge MERIDIAN removed a total of 6,101,979 cubic yards of shoal material from the Atchafalaya River bar channel.

- a. Approximately 5,720,499 cubic yards of dredged material were placed in the **ODMDS West**.
- b. Approximately 381,480 cubic yards of dredged material were placed at **Bird Island West**. Approximately 7 acres of land were created by this placement effort.



Atchafalaya Bar – 30 December 2003



Atchafalaya Bar – 26 December 2004

### **Fiscal Year 2005**

During the 2005 maintenance event, two separate contracts were awarded to perform dredging in the Atchafalaya River bar channel. One contract covered the typical annual maintenance dredging needs while the other contract provided for the performance of a demonstration project utilizing a dustpan dredge instead of a cutterhead dredge for maintenance of this channel.

1. During the 2005 maintenance event (8 January 2005 – 24 May 2005), working under contract 05-C-0012, the cutterhead dredge GEORGE D. WILLIAMS removed a total of 15,087,940 cubic yards of shoal material from the Atchafalaya River bar channel.
  - a. Approximately 12,917,556 cubic yards of dredged material were placed in the **ODMDS West**.

- b. Approximately 2,170,384 cubic yards of dredged material were placed at **Bird Island West**. Approximately 114 acres of land were created by this placement effort.

2. A dredging demonstration project performed under contract 05-C-0053 (17 October 2005 – 11 November 2005), evaluated the ability of a dustpan dredge to remove “fluff” shoal material from the Atchafalaya River bar channel. Typical Atchafalaya River bar channel shoal material is composed of a very fine-grained, low density material, often referred to as either fluff or fluid mud. Fluff is made up of silts and clays. Generally, fluff is formed by the rapid deposition of fine-grained silt and clay flocs from suspension and can be maintained by periodic agitation (such as by waves, currents, or vessel navigation). If undisturbed, the fluff material settles, loses volume and becomes fluid mud, eventually forming a fully settled bed.

Approximately 550,238 cubic yards of shoal material were removed from the bar channel by the dustpan dredge BEACHBUILDER and placed into the **ODMDS West**. This study reached the conclusion that use of a dustpan dredge is not a cost-effective method for maintaining the Atchafalaya River bar channel. It is approximately 5 times as expensive as a cutterhead dredge to use for maintenance of this navigation channel.



Atchafalaya Bar – 18 January 2006

## **Fiscal Year 2006**

During the 2006 maintenance event, two separate contracts were awarded to perform dredging in the Atchafalaya River bar channel.

1. During the 2006 maintenance event (3 May 2006 – 5 July 2006), working under contract 06-C-0126, the cutterhead dredge GEORGE D. WILLIAMS placed approximately 8,168,569 cubic yards of dredged material in the **ODMDS West**.
2. During the 2006 maintenance event (21 March 2006 – 7 April 2006), working under contract 06-C-0098, the cutterhead dredge GEORGE D. WILLIAMS placed approximately 1,360,348 cubic yards of dredged material at **Bird Island West** to a maximum initial elevation of about +5.0 feet MLG. Approximately 57 acres of land were created by this placement effort.

## **Fiscal Year 2007**

During the 2007 maintenance event (4 February 2007 – 27 April 2007), working under contract 06-C-0203, the cutterhead dredge ALASKA removed a total of 9,863,684 cubic yards of shoal material from the Atchafalaya River bar channel.

1. Approximately 8,676,338 cubic yards of dredged material were placed in the **ODMDS West**.
2. Approximately 1,187,346 cubic yards of dredged material were placed at **Bird Island West**. Approximately 56 acres of land were created by this placement effort.



Atchafalaya Bar – December 2007



Bird Island West – 11 June 2008



Bird Island West – 11 June 2008

**Fiscal Year 2008**

During the 2008 maintenance event (17 June 2008 – 26 September 2008), working under contract 08-C-0055, the cutterhead dredge E.W. ELLEFSEN removed a total of 11,337,087 cubic yards of shoal material from the Atchafalaya River bar channel.

1. Approximately 9,545,797 cubic yards of dredged material were placed in the **ODMDS West**.
2. Approximately 1,791,290 cubic yards of dredged material were placed at **Bird Island West**. Approximately 25 acres of land were created by this placement effort.



Atchafalaya Bar – December 2008

**Fiscal Year 2009**

During the 2009 maintenance event (26 August 2009 – 28 September 2009), working under contract 09-C-0103, the cutterhead dredge VENTURE placed approximately 751,787 cubic yards of dredged material in the **ODMDS West**.



Atchafalaya Bar – December 2009

**Fiscal Year 2009-2010**

During the 2009-2010 maintenance event (26 August 2009 – 15 June 2010), working under contract 09-C-0103, the cutterhead dredges VENTURE, BORENQUEN, and G.D. MORGAN removed a total of 12,694,741 cubic yards of shoal material from the Atchafalaya River bar channel.

1. Approximately 10,494,316 cubic yards of dredged material were placed in the **ODMDS West**.
2. Approximately 2,200,425 cubic yards of dredged material were placed at **Bird Island West**. Approximately 128 acres of land were created by this placement effort.



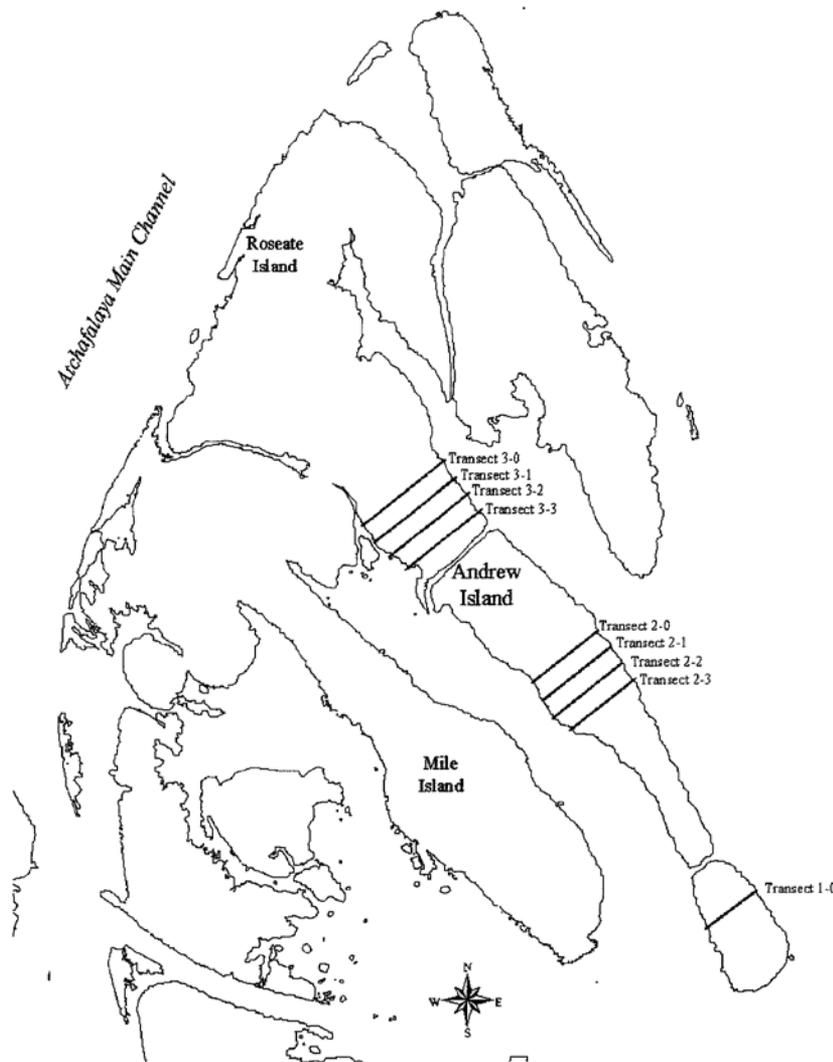
Atchafalaya Bar – December 2010

## 2001 Elevation and Vegetation Survey Effort

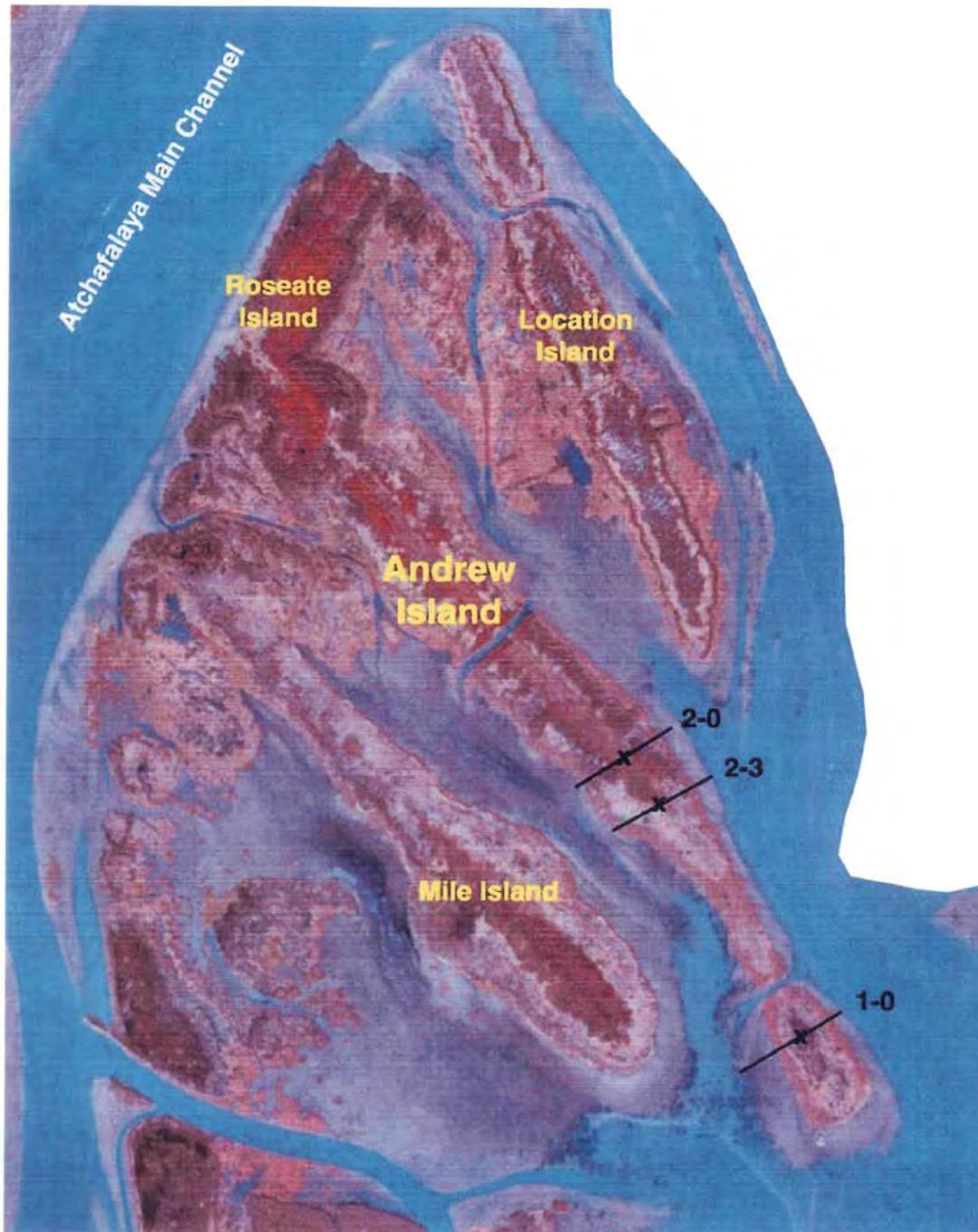
During 2001, field monitoring for elevation, vegetative species composition and habitat verification was performed at Andrew Island, Horseshoe Island, Ibis Island and Long Island. Field monitoring had previously been performed during 1995-1996 for Andrew Island, Horseshoe Island, and Ibis Island.

### Andrew Island

The southern tip of **Andrew Island** (transect 1-0) was characterized by an average elevation of +1.8 feet MLG with a maximum elevation of +3.0 feet MLG. Transect 2-3 across the central crest was characterized by an average elevation of +3.4 feet MLG with a maximum elevation of +5.1 feet MLG. Transect 2-0 also across the central crest just northwest of transect 2-3 was characterized by an average elevation of +4.0 feet MLG with a maximum elevation of +4.5 feet MLG.



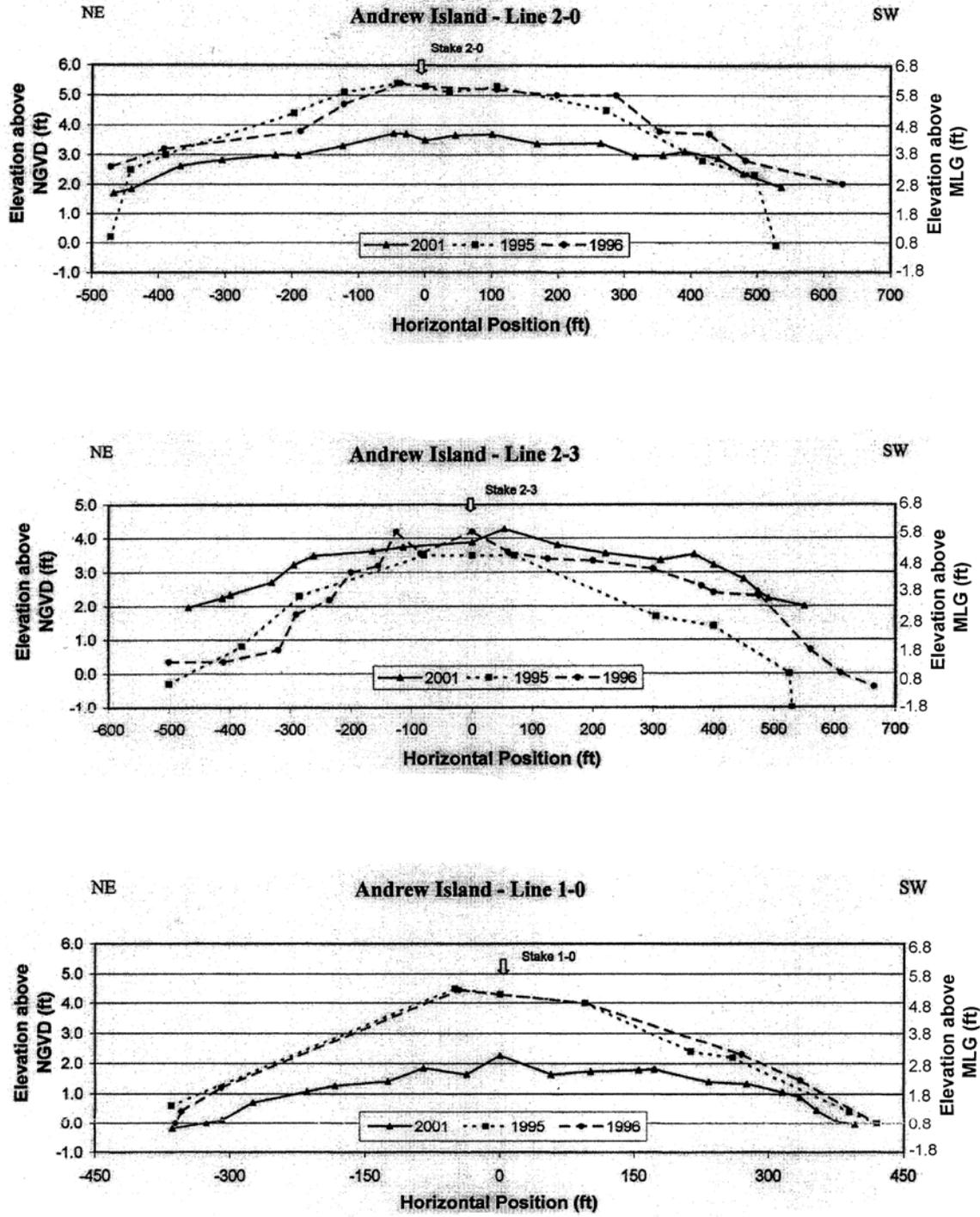
Schematic diagram of the original configuration of profile transects established on Andrew Island in 1995 at the Lower Atchafalaya River Bay and Bar BUMP study site.



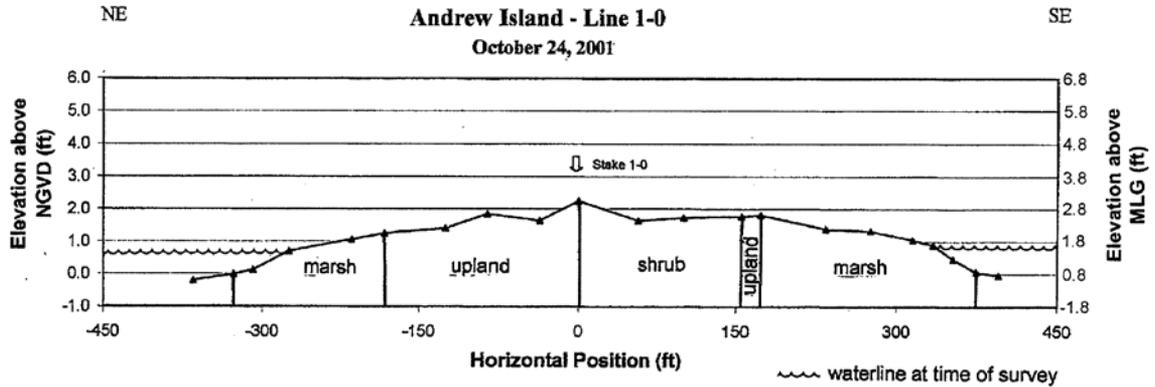
Infrared vertical aerial photography taken on January 4, 2001 of the Andrew Island area at the Lower Atchafalaya Bay and Bar study site showing the approximate location of the transects revisited in 2001.

A comparison of the elevation data collected in 1995-1996 and 2001 revealed an interesting pattern of compaction, aeolian transport, sediment accretion and overwash processes for **Andrew Island** in cross section. The transect profiles showed an overall decrease in elevation and area of the island, with overwash and general migration to the southwest. Transect 2-3 showed an

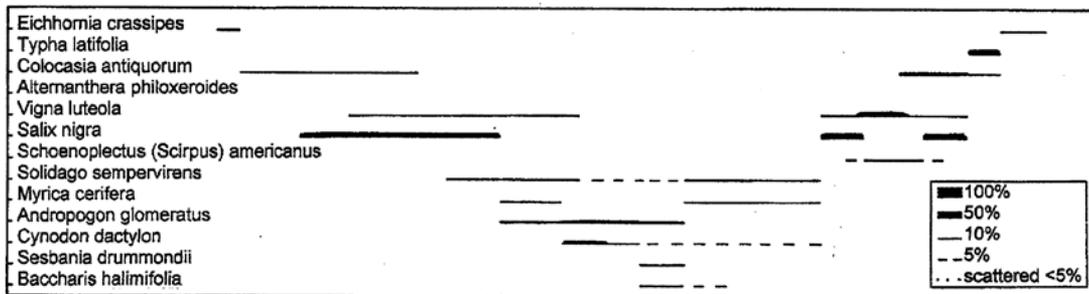
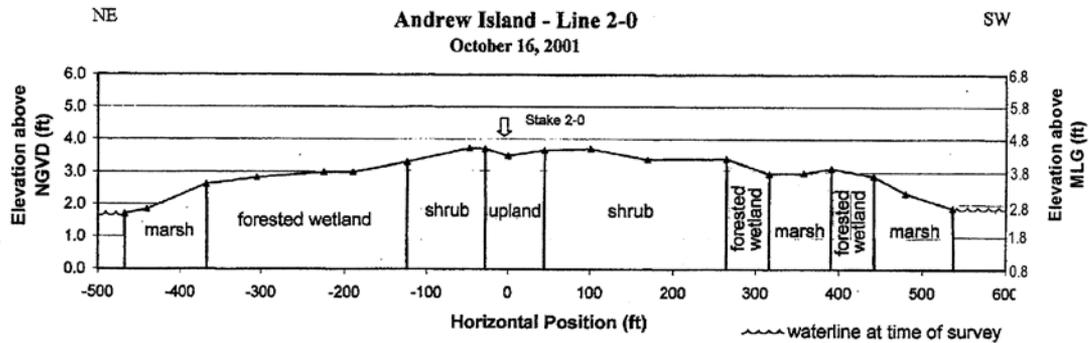
elevation increase due to sediment accumulation with accompanying marsh growth on the intertidal flanks. Additionally, in 1996 **Andrew Island** was sparsely vegetated with the densest vegetation occurring on the shoulder of the island. This provided a trap for Aeolian transported material to accumulate. The 1996 transect profiles had a lateral length range of 790-1450 feet. By 2001 the lateral length range had been reduced to 760-1019 feet (a 3.8-29.7% reduction).



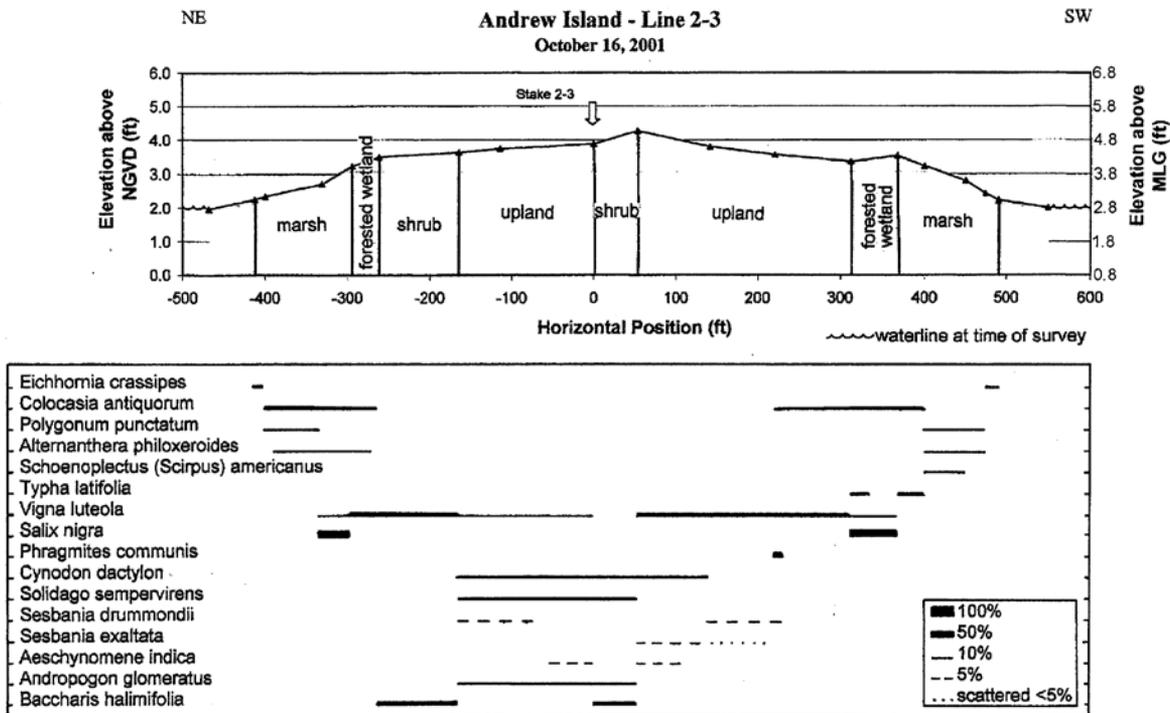
A comparison of 1995, 1996, and 2001 elevation data at Andrew Island in the Atchafalaya River delta. A) Profile at stake 2-0. B) Profile at stake 2-3. C) Profile at stake 1-0.



Elevation profile for transect 1-0 at Andrew Island - Lower Atchafalaya BUMP study site with vegetation data illustrated.



Elevation profile for transect 2-0 at Andrew Island - Lower Atchafalaya BUMP study site with vegetation data illustrated.



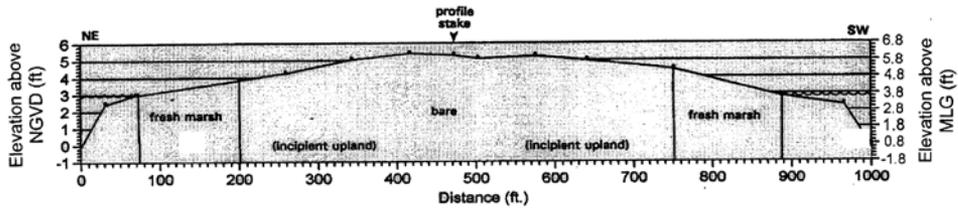
Elevation profile for transect 2-3 at Andrew Island - Lower Atchafalaya BUMP study site with vegetation data illustrated.

The profiles were typically more densely vegetated at the either end where the substrate was either intertidal or very wet, with a dramatic drop in density and vegetative height toward the center axis of the island that corresponded to an increase in substrate elevation and decrease of soil moisture. The landscape was dominated by fresh marsh, willow swamp, shrub thicket, grassland meadow, and wetland border species. The fresh marsh was mostly cattail, elephant ears } scirpus, or grasses, with a thick raft of water hyacinth at the water line. Trees observed in the area were willow (*Salix nigra*), and the shrubs were predominately groundsel bush (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), or *Sesbania* spp. The higher elevations were occupied by extensive, goldenrod (*Solidago sempervirens*) and broomsedge (*Andropogon* spp.) grassland/meadows, sometimes covered thickly by a dense tangle of vines.

A comparison of the vegetation data collected in 1995-1996 and 2001 illustrates the changes that took place in the general distribution of habitats. Changes were observed in vegetative cover as annuals and opportunistic species changed between profile periods, and plant competition and succession processes progressed. Vegetative succession for a 6-year period was pronounced, illustrated dramatically by the size of the willow trees that were seedlings in 1995. Some bare areas had been colonized, and habitats became more established or shifted as the elevation varied over time. The island crest that was described in 1995 as of "bar aeolian type sand features (ripples and dunes)", was an upland grassland/meadow in 2001, and the 1995 marsh fringe was a dense willow swamp/marsh in 2001.

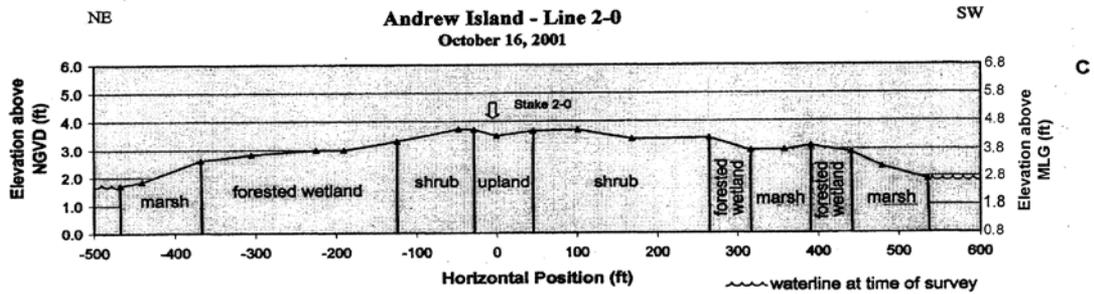
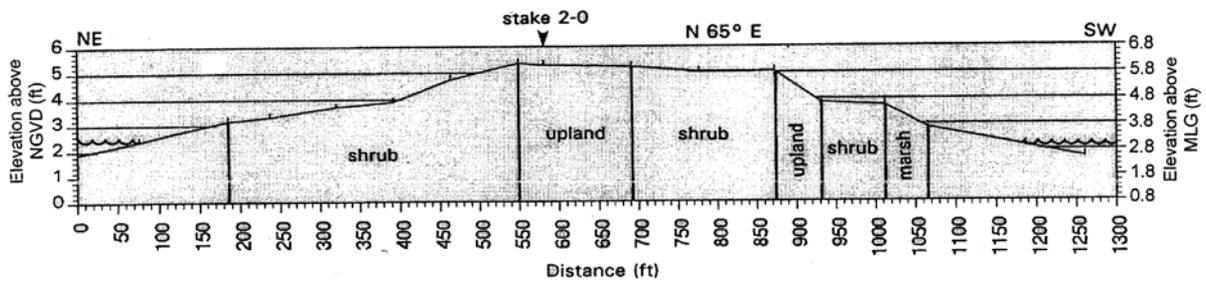
ATCHAFAYLAYA DELTA, LOUISIANA  
 USACE Andrew Island (ANI 2-0)  
 April 26, 1995

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ATCHAFAYLAYA DELTA, LOUISIANA  
 USACE Site, Andrew Island (AHI-2-0)  
 October 31, 1996

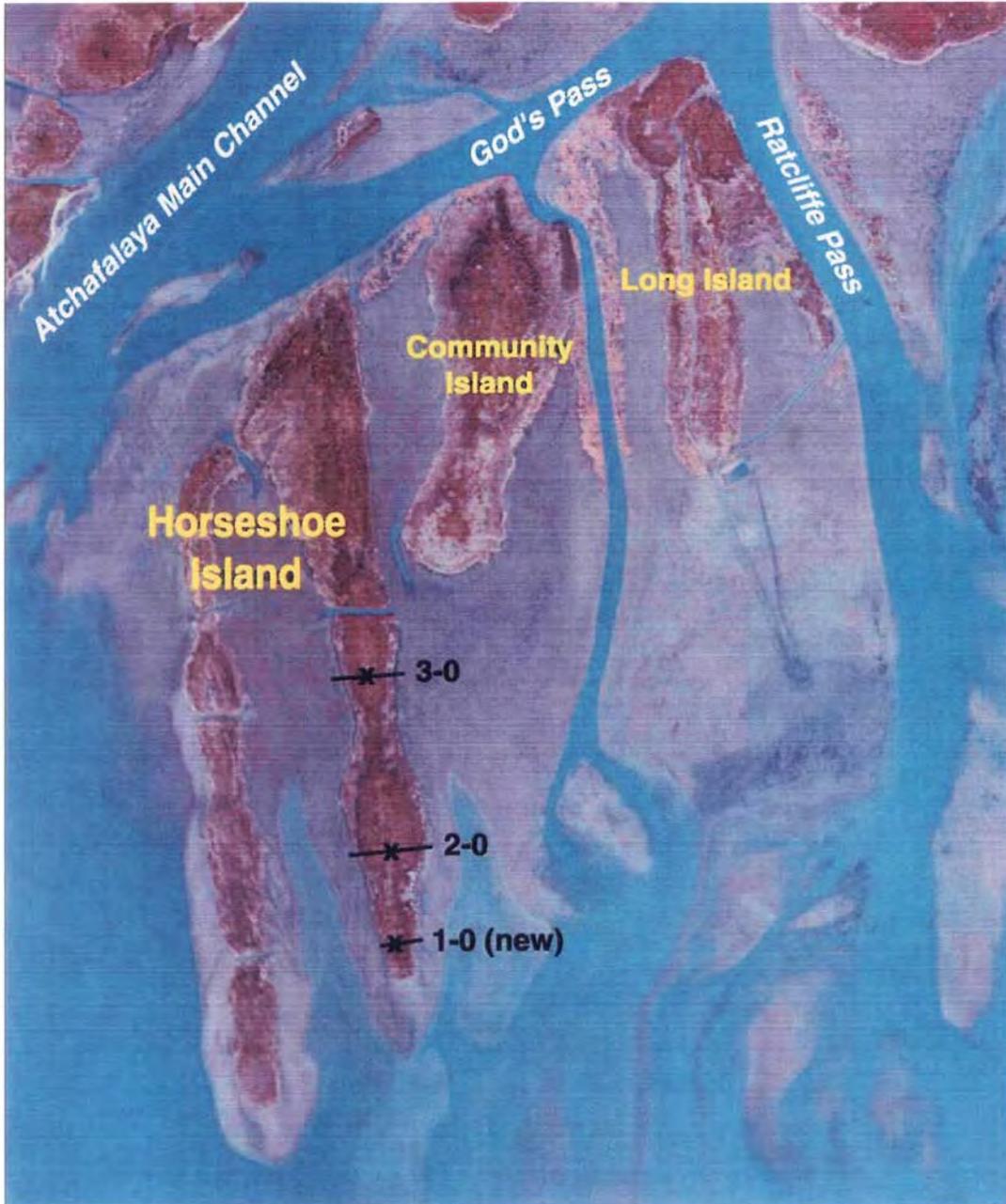
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Elevation profile 2-0 from Andrew Island in the Atchafalaya River Delta showing habitat distribution changes. A) 1995 data. B) 1996 data. C) 2001 data.

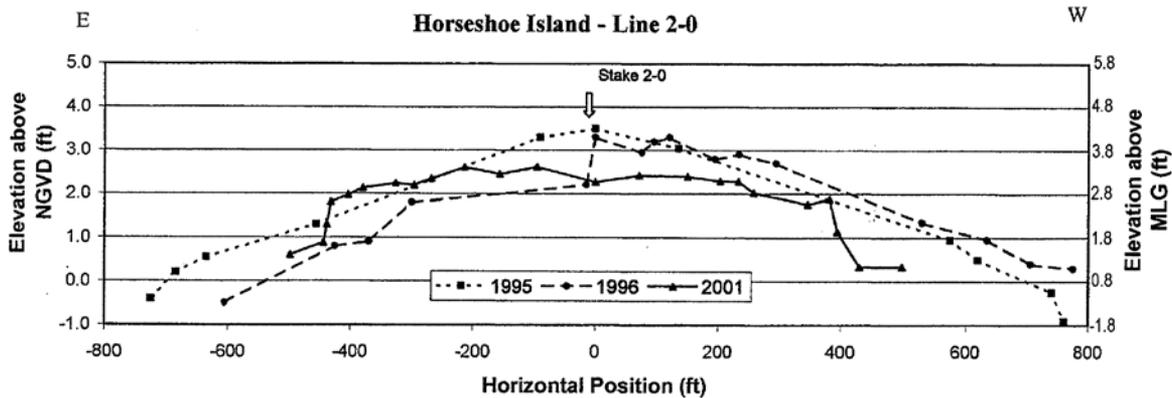
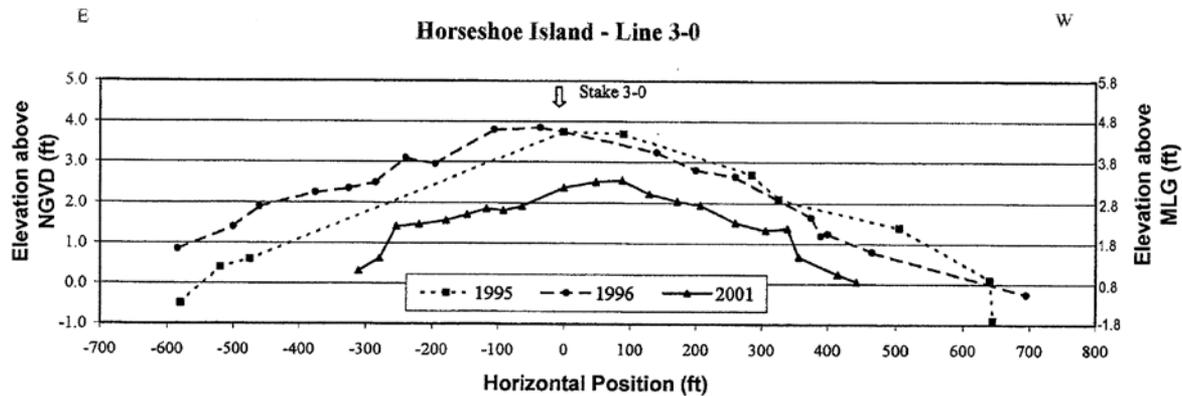
## Horseshoe Island

The southern tip of **Horseshoe Island** (transect 1-0) was characterized by an average elevation of +3.5 feet MLG and a maximum elevation of +1.0 feet MLG. Transect 2-0 (E-E') along the central crest was characterized by an average elevation of +2.6 feet MLG and a maximum elevation of +3.4 feet MLG. Transect 3-0 (A-A') along the crest of the north end of the section was characterized by an average elevation of +2.3 feet MLG and a maximum elevation of +3.3 feet MLG.



Infrared vertical aerial photography taken on January 4, 2001 of the Horseshoe Island area at the Lower Atchafalaya Bay and Bar study site showing the approximate location of the transects revisited in 2001.

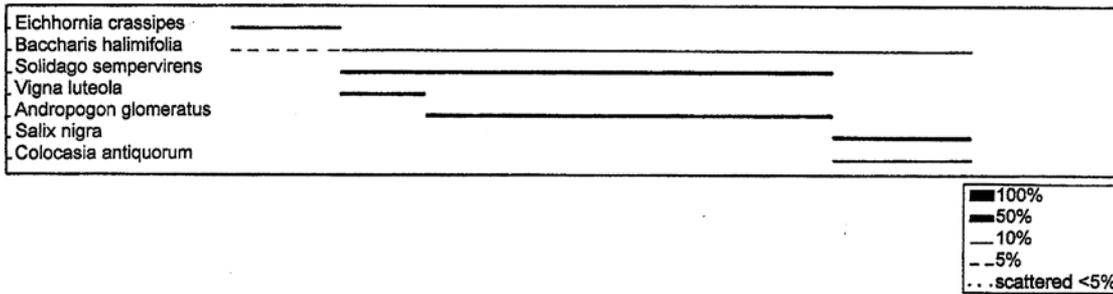
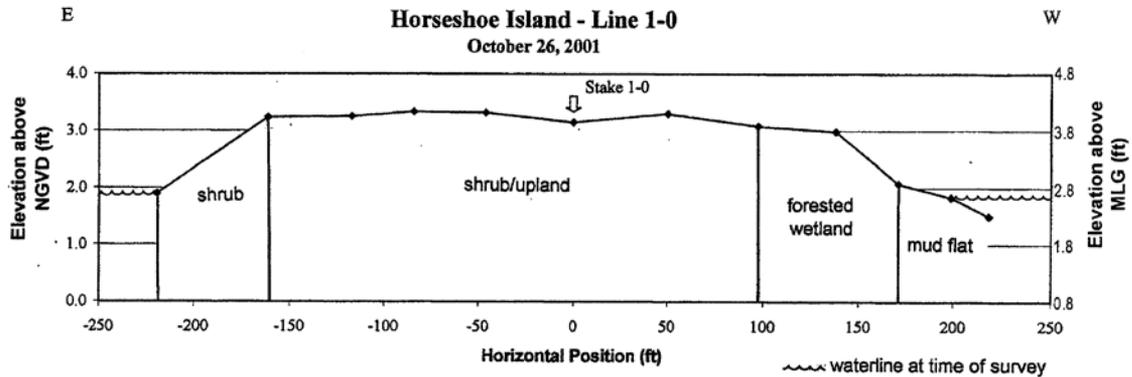
A comparison of the elevation data collected in 1995, 1996, and 2001 reveals a pattern of compaction, aeolian transport, sediment accretion and overwash processes for **Horseshoe Island** in cross section. The profiles in 1996 had a lateral length range of 1,045-1,445 feet with the range in 2001 reduced to 437-996 feet, which is a -58.2% to -31.1% reduction in length for this site. The profiles show an overall decrease in elevation, and a general migration to the east.



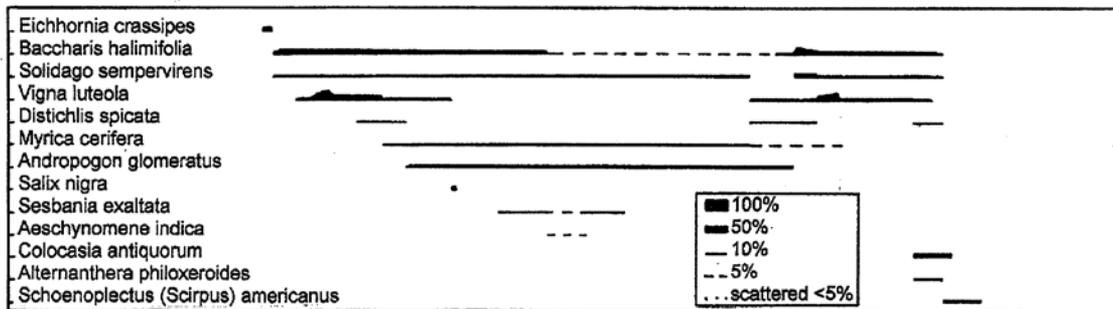
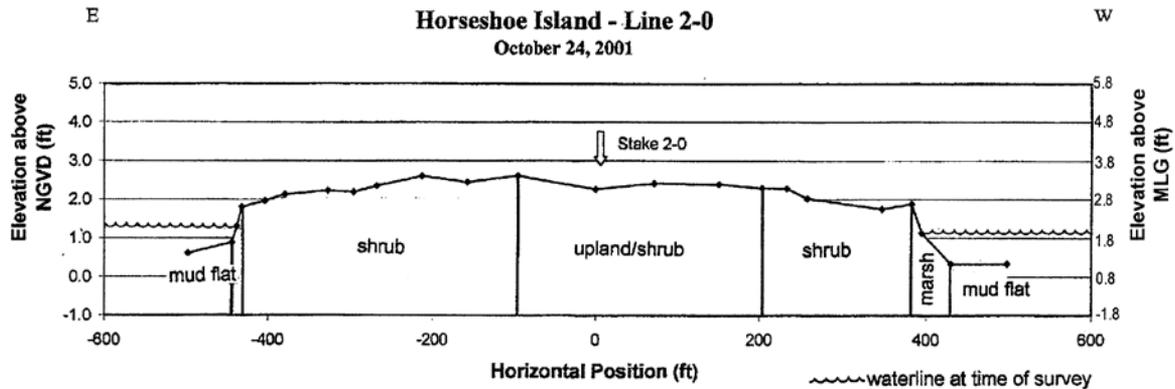
A comparison of 1995, 1996, and 2001 elevation data at Horseshoe Island in the Atchafalaya River delta. A) Profile at stake 3-0. B) Profile at stake 2-0.

The cross-island profiles were typically more vegetated at either end where the substrate was either intertidal or very wet, and generally decreased in density and vegetative height toward the center of the island that corresponded with an increase in elevation and decrease of soil moisture. This island is less sheltered than the others in the study area, and more affected by erosional forces and environmental stress. Although well vegetated, **Horseshoe Island** did not support the extensive willow thickets found elsewhere. Fresh marsh, shrubs, and goldenrod meadows/vine terraces, that are considered upland for this report, dominated the landscape. The fresh marsh was mostly cattail, elephant ears, scirpus, or grasses, with a thick raft of water hyacinth at the water line. Trees observed in the area were willow (*Salix nigra*) and the shrubs were groundsel bush (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), and *Sesbania* spp. The higher elevations were occupied by extensive, grass, goldenrod (*Solidago sempervirens*) and broomsedge (*Andropogon spp.*) meadows, sometimes covered by a thick tangle of vines (*Vigna luteola*).

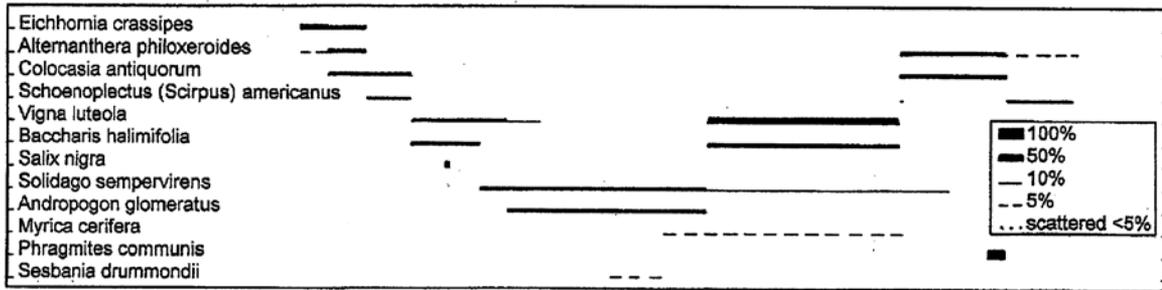
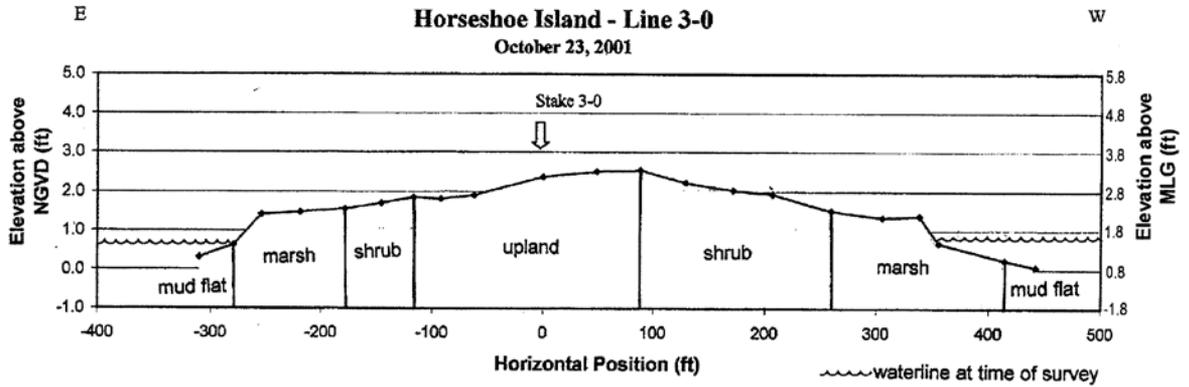
A comparison of the vegetation data collected in 1995, 1996 and 2001 at transect 3-0 illustrates the changes that took place in the general distribution of habitats. Changes were observed in vegetative cover as annuals and opportunistic species changed between profile periods, and plant competition and succession processes progressed. Some bare areas had been colonized, and habitats have become more established or shifted as the elevation varied over time.



Elevation profile 1-0 from Horseshoe Island at the Lower Atchafalaya River Bay and Bar BUMP study area with vegetation data illustrated.



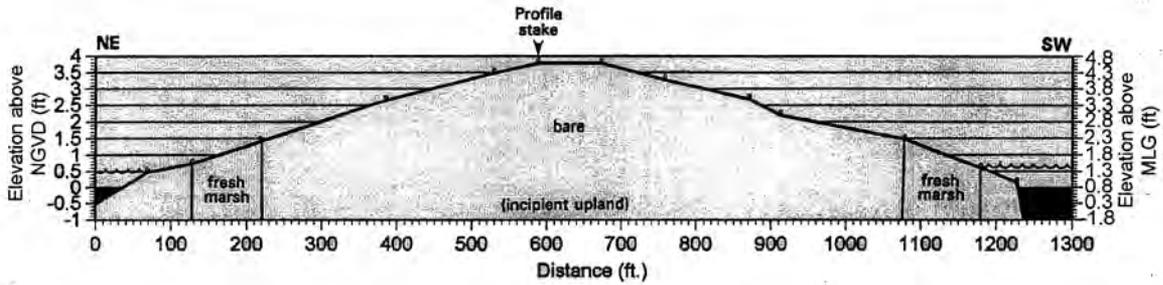
Elevation profile 2-0 from Horseshoe Island at the Lower Atchafalaya River Bay and Bar BUMP study area with vegetation data illustrated.



Elevation profile 3-0 from Horseshoe Island at the Lower Atchafalaya River Bay and Bar BUMP study area with vegetation data illustrated.

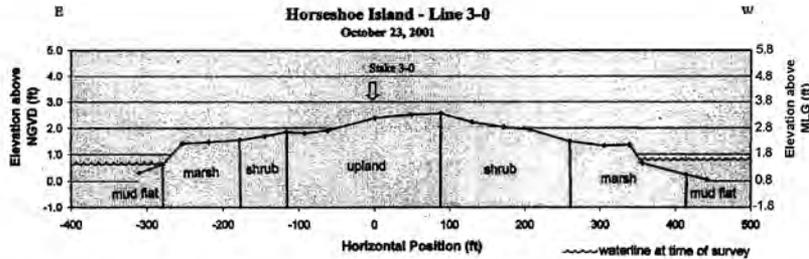
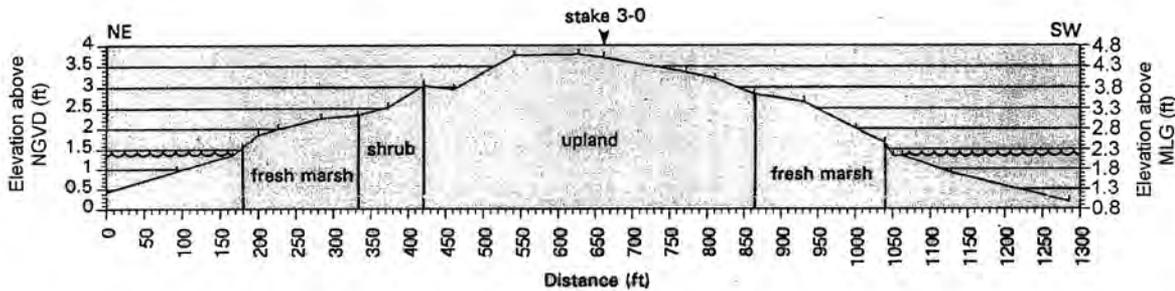
**ATCHAFALAYA DELTA, LOUISIANA**  
**USACE Eastern Horseshoe Island (EHI 3-0)**  
 April 27, 1995

A



**ATCHAFALAYA DELTA, LOUISIANA**  
**USACE Site, Eastern Horseshoe Island (EHI-3-0)**  
 July 3, 1996

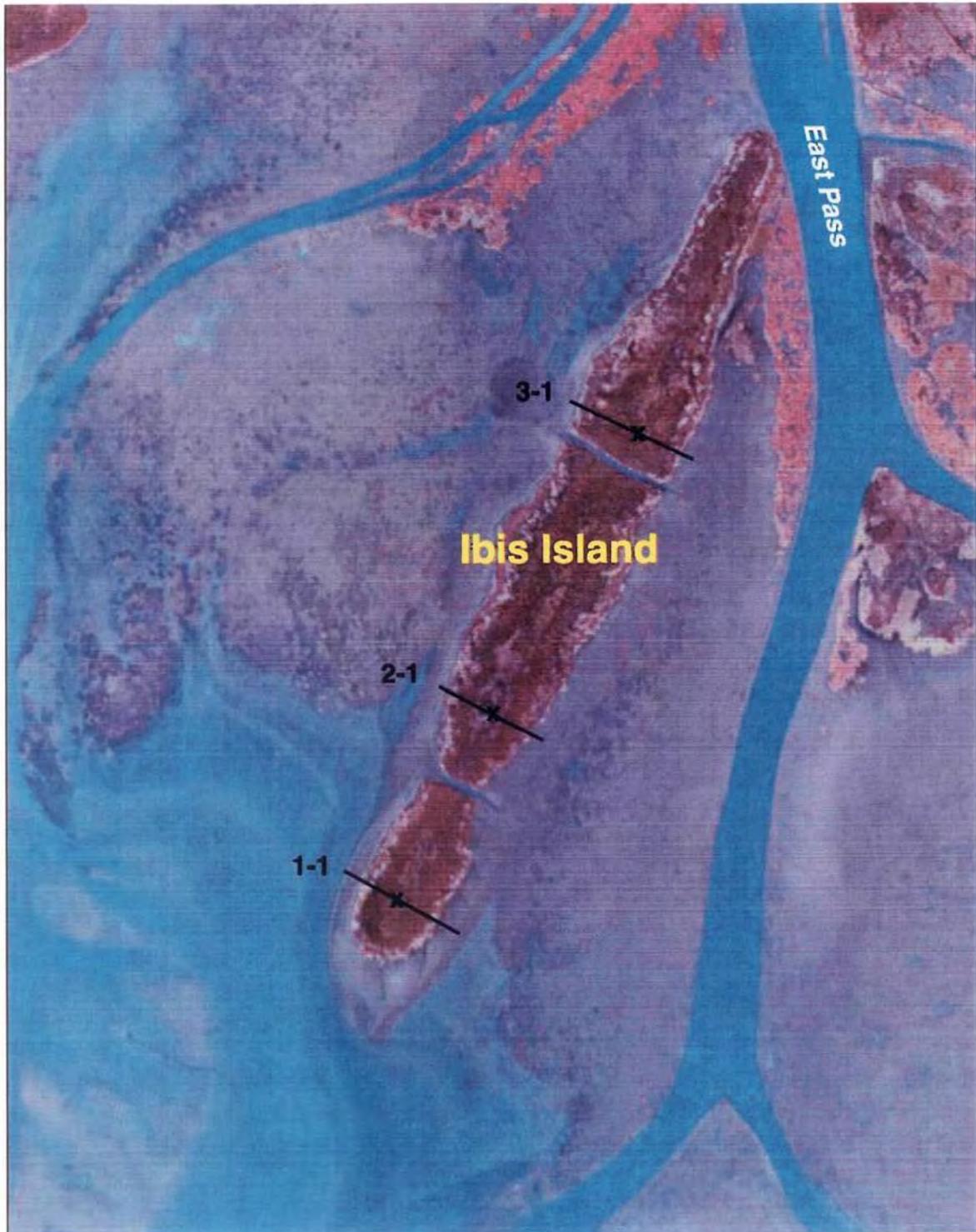
B



Elevation profile 3-0 from Horseshoe Island in the Atchafalaya River delta showing habitat distribution changes. A) 1995 data. B) 1996 data. C) 2001 data.

**Ibis Island**

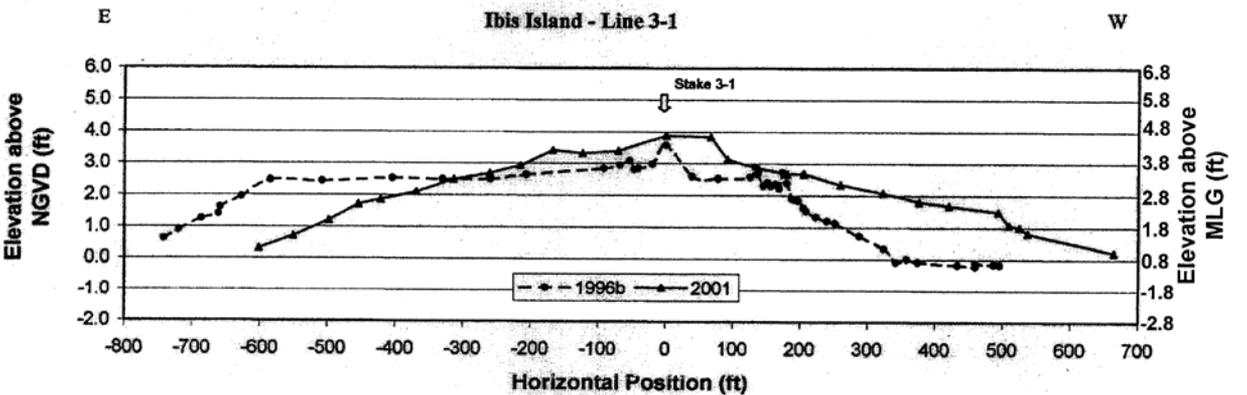
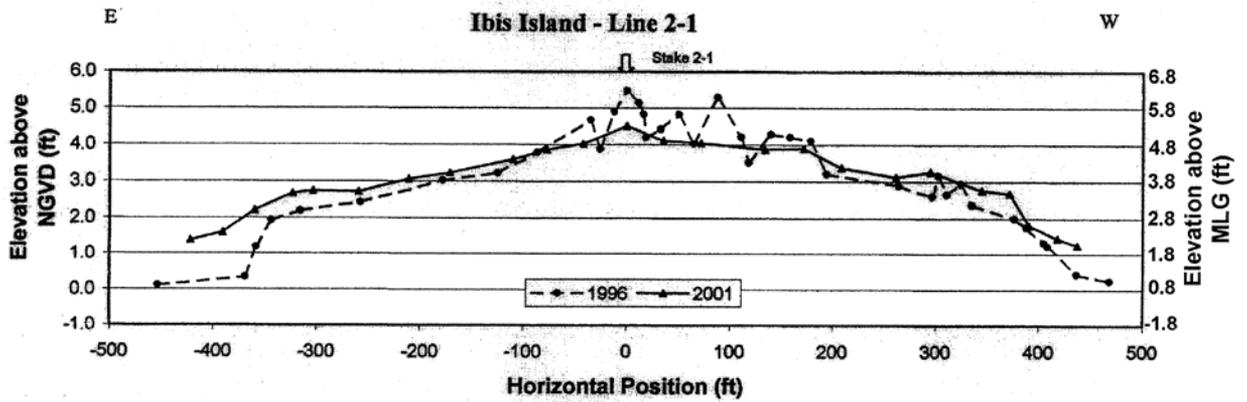
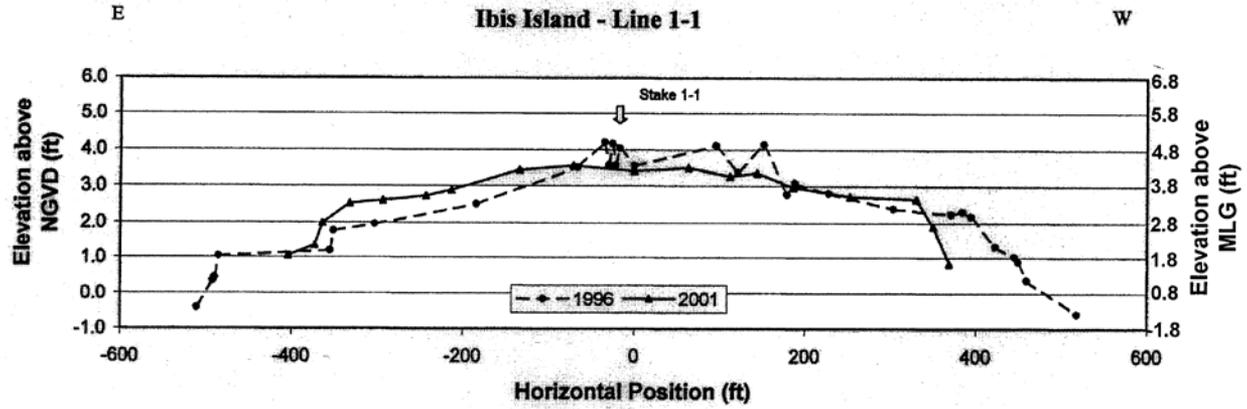
The southern tip of eastern **Ibis Island** (transect 1-1) was characterized by an average elevation of +3.4 feet MLG and a maximum elevation of +4.4 feet MLG. Transect 2-1 along the central portion of the island was characterized by an average elevation of +3.8 feet MLG and a maximum elevation of +5.3 feet MLG. Transect 3-1 on the portion of the island near East Pass was characterized by an average elevation of +2.9 feet MLG and a maximum elevation of +4.7 feet MLG.



Infrared vertical aerial photography taken on January 4, 2001 of the Ibis Island area at the Lower Atchafalaya Bay and Bar study site showing the approximate location of the transects revisited in 2001.

A comparison of the elevation data collected in 1996 and 2001 reveals an interesting pattern of compaction, aeolian transport, sediment accretion and overwash processes for **Ibis Island**

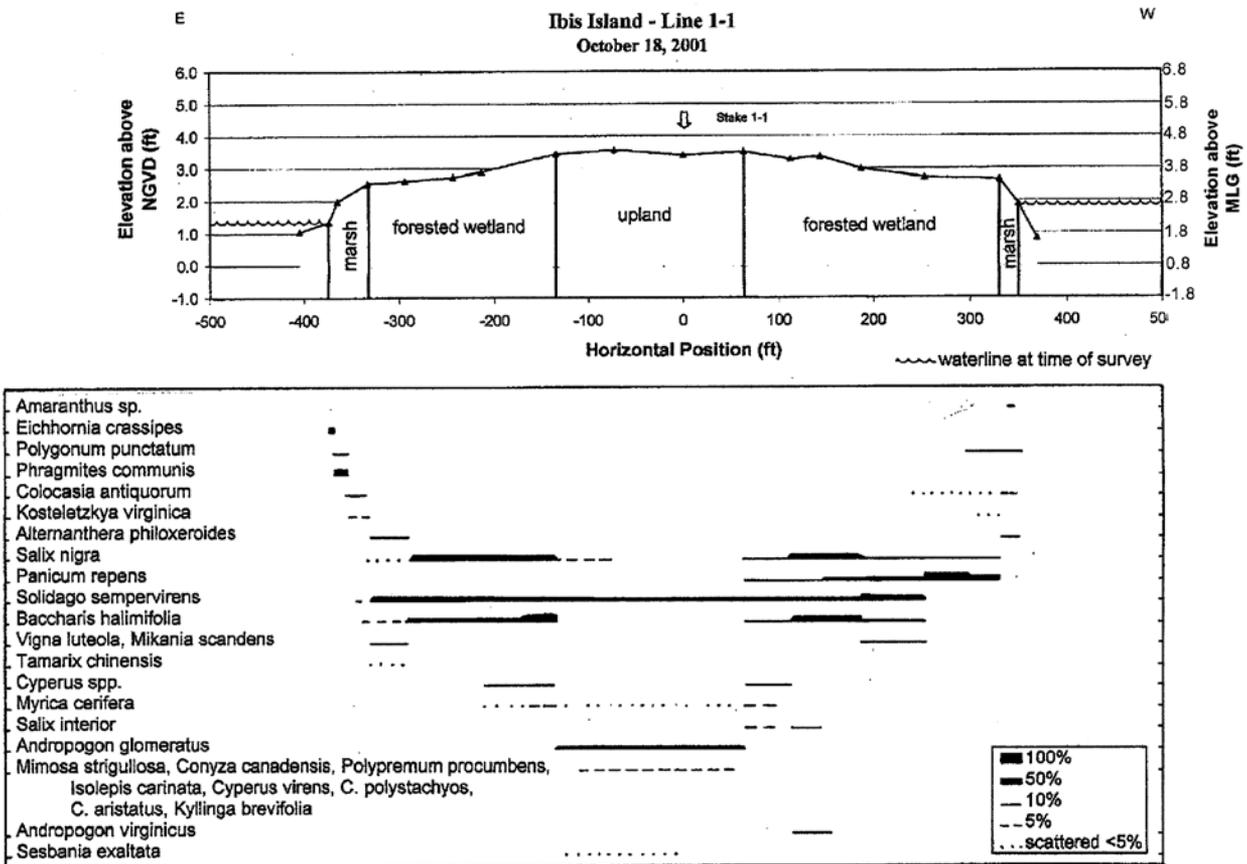
in cross section. The profiles show a relatively stable elevation and area of the island. The profiles in 1996 had a lateral length range of 921 to 1,237 feet, with the range in 2001 reduced to 773 to 1,265 feet, which corresponds to a range of -16.1% loss in length to a +2.3% increase.



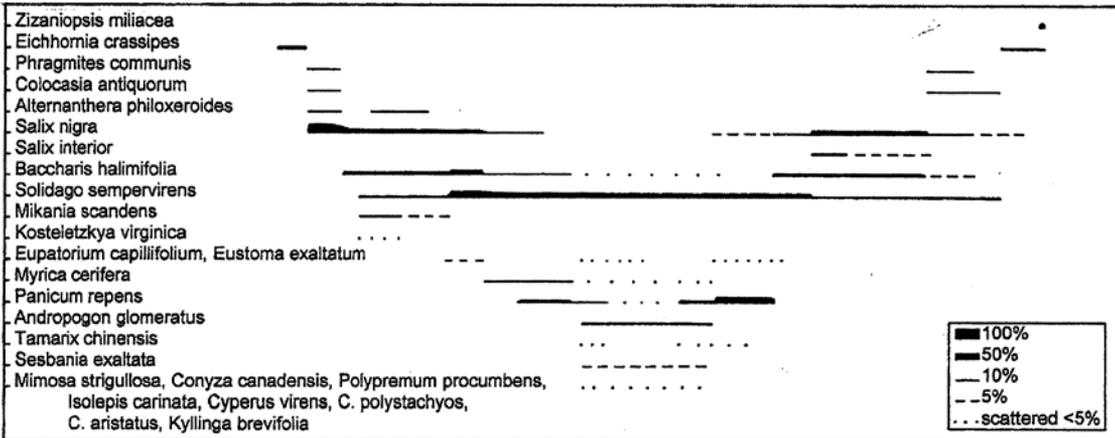
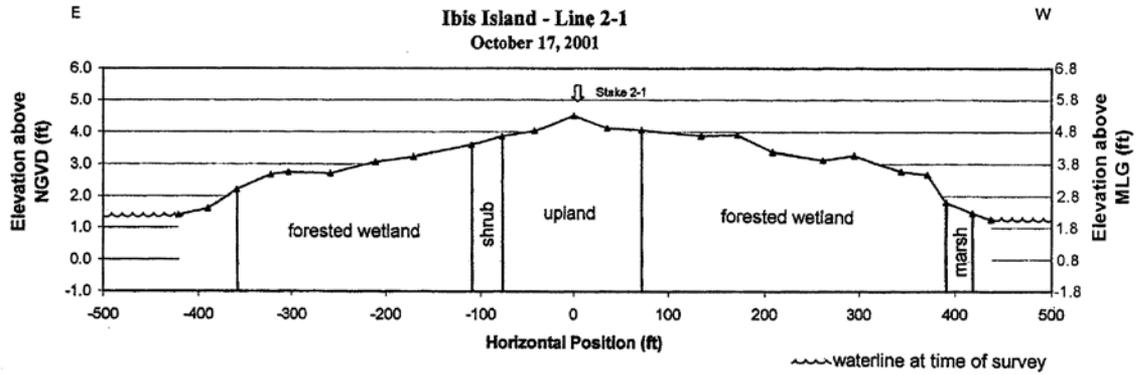
A comparison of 1996 and 2001 elevation data at Ibis Island in the Atchafalaya River delta.  
 A) Profile at stake 1-1. B) Profile at stake 2-1. C) Profile at stake 3-1.

The profiles were typically more densely vegetated at the either end where the substrate was either intertidal or very wet, with a decrease in density and vegetative height toward the center axis of the island that corresponds to an increase in elevation and decrease of soil

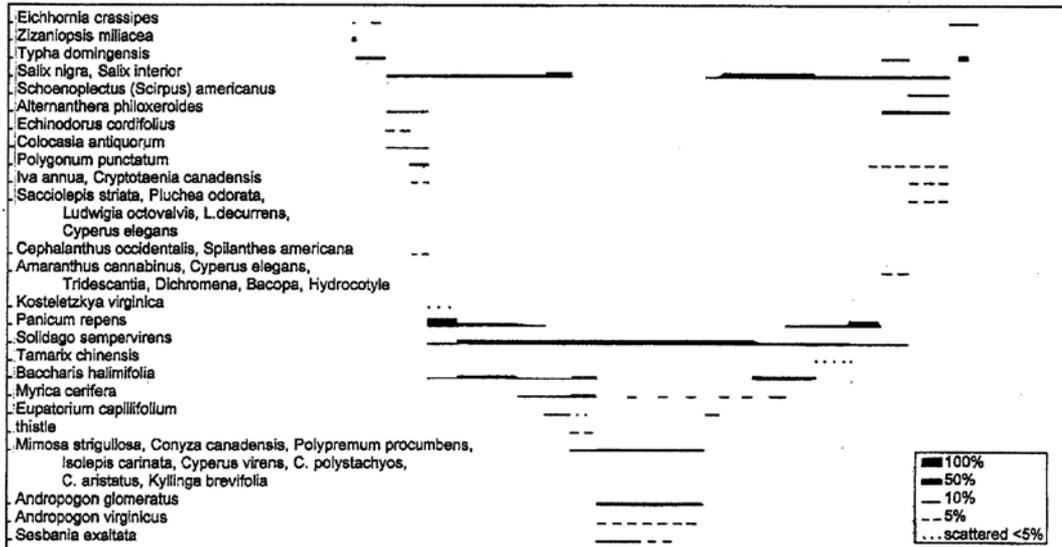
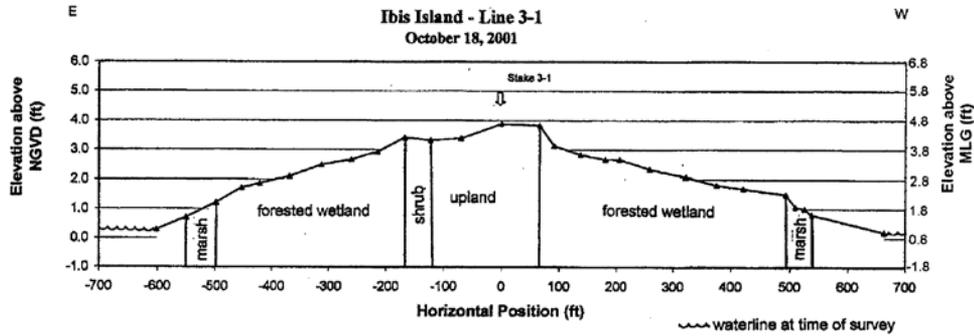
moisture. The landscape was dominated by a fresh marsh fringe at the waterline, extensive willow swamp along the saturated soil zone, shrub zone bordering drier ground, and goldenrod/ broomsedge meadow along the higher axis of the island. The fresh marsh was mostly elephant ear, cattail, wild rice, alligator weed or dogtooth grass. Trees observed in the area were predominantly willow (*Salix nigra* and *Salix interior*) with scattered cottonwood (*Populus heterophylla*) on "high" ground. Some of the trees were 6" in diameter and over 25-ft tall. The shrubs were typically groundsel bush (*Baccharis halimifolia*) and wax myrtle (*Myrica cerifera*) with an understory of various herbs and grasses. The higher elevations were occupied by extensive, goldenrod (*Solidago sempervirens*) and broomsedge (*Andropogon spp.*) meadows, sometimes covered by a tangle of vines (*Vigna luteola*).



Elevation profile 1-1 at the southern end of Ibis Island at the Lower Atchafalaya River Bay and Bar BUMP study area with vegetation data illustrated.



Elevation profile 2-1 across the central section of Ibis Island at the Lower Atchafalaya River Bay and Bar BUMP study area, with vegetation data illustrated.

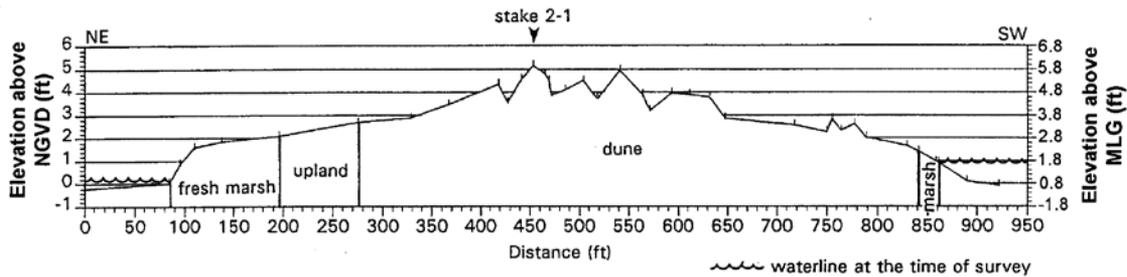


Elevation profile 3-1 on the section of Ibis Island closest to East Pass at the Lower Atchafalaya River Bay and Bar BUMP study area, with vegetation data illustrated.

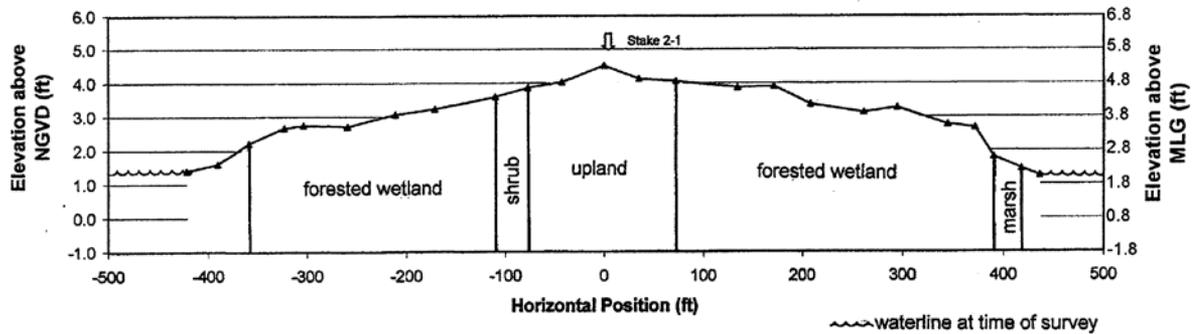
A comparison of the vegetation data collected in 1996 and 2001 illustrated changes in the general distribution of habitats. The island was created approximately one year before the initial elevation/vegetation survey in 1996. Vegetation colonization was well under way along the waterline at that time, but the island was basically bare, with extensive sand flats and aeolian dunes. The plant succession evident in the five years since last surveyed was extensive. Changes were observed in vegetative cover as annuals and opportunistic species changed between profile periods, and plant competition and succession processes progressed. Vegetative succession for the 5-year period was pronounced, illustrated dramatically by the size of the willow trees that were saplings in 1996. Some bare areas had been colonized, and habitats have become more established or shifted as the elevation varied over time. The island crest that was described in 1995 as of "bar aeolian type sand features (ripples and dunes)", was a thickly colonized meadow in 2001, and the sparse 1996 marsh fringe was a dense willow swamp/marsh in 2001.

ATCHAFALAYA DELTA, LOUISIANA  
 USACE Site, Ibis Island (IBS-2-1)  
 July 2, 1996

A



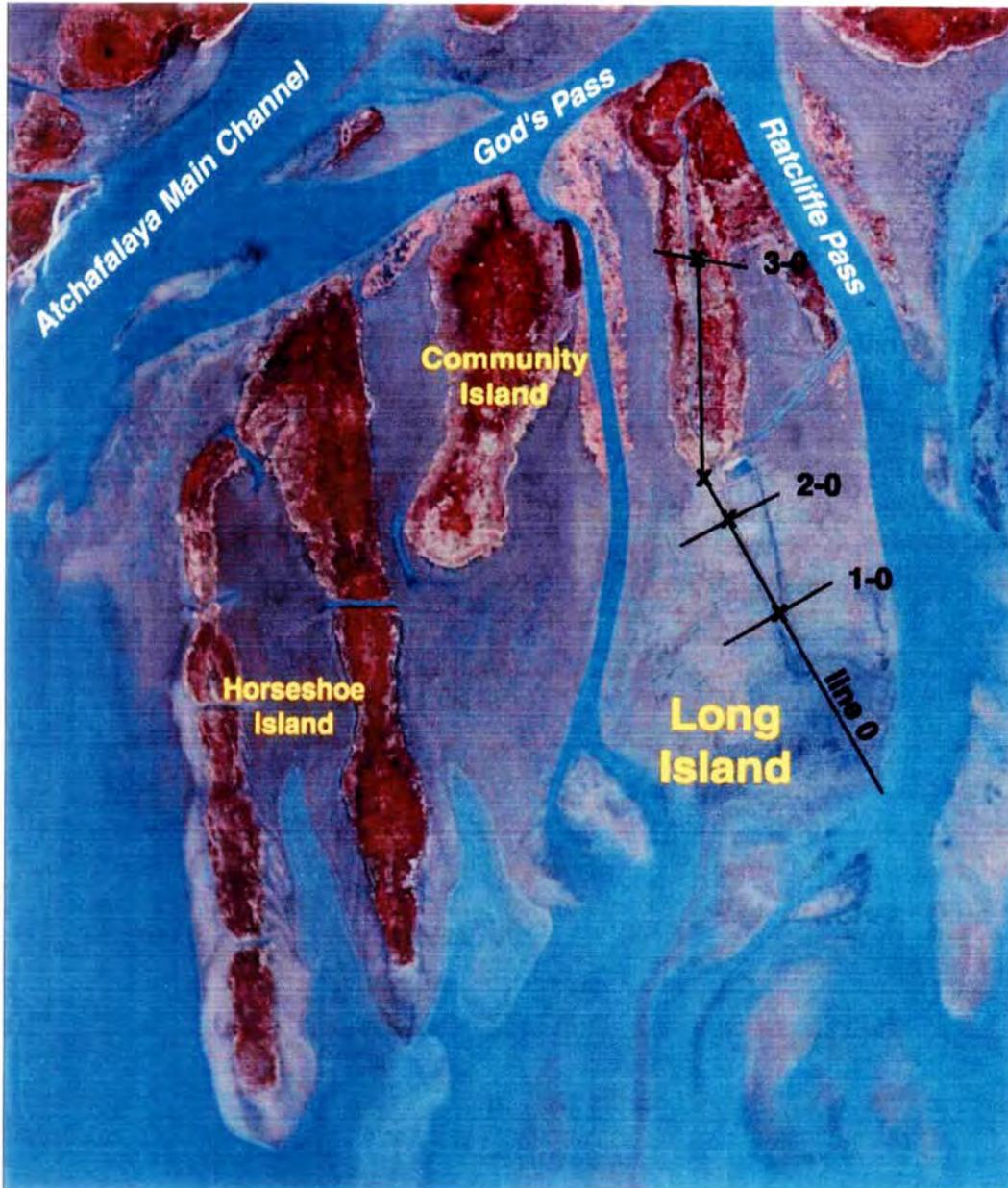
E Ibis Island - Line 2-1 W B  
 October 17, 2001



Elevation profile 2-1 from Ibis Island at the Lower Atchafalaya River Bay and Bar BUMP study area showing habitat distribution changes. A) 1996 data. B) 2001 data.

### Long Island

In 2001, an elevation/vegetation survey was conducted along four new transects across **Long Island**. One transect (3-1) was placed across a vegetated part of the island created in 1998, two were placed across the mostly unvegetated part created in 2000, and strike transect profile 0 connected the three transects. The southern portion of **Long Island** (transect 1-0 A-A') had a lateral length of 1,840 feet and was characterized by an average elevation of +2.9 feet MLG and a maximum elevation of +4.5 feet MLG. Transect 2-0 (B-B') across the more recently created portion of the island near the vegetated area had a lateral length of 1,664 feet and was characterized by an average elevation of +3.1 feet MLG and a maximum elevation of +4.0 feet MLG. Transect 3-0 (C-C') across the more vegetated, older part of the island had a lateral length of 1,011 feet and was characterized by an average elevation of +3.4 feet MLG and a maximum elevation of +4.7 feet MLG. The strike transect profile 0 connected all transects and gave an overall profile of the axis of the island. Transect profile 0 had a lateral length of 7,739 feet, and a maximum elevation of 7.9 feet MLG on the top of a ridge adjacent to a cut south of stake 1-0. This is the initial survey for this site so there is no comparison data.



Infrared, vertical aerial photography taken on January 4, 2001 of the Long Island area at the Lower Atchafalaya River Bay and Bar BUMP study site showing the approximate location of the transects established in 2001.

The end of the island was created approximately one year before the initial elevation/vegetation survey in 2001, and the habitats were very similar to those found on **Ibis Island** one year after creation. Vegetation colonization was under way along the waterline at that time, but half of the island was basically bare, with extensive sand flats and incipient, aeolian dunes. The landscape of the newer part was dominated by sparse grassland with composites, and fresh marsh. The older part found near transect 3-0 was dominated by fresh marsh, shrubs, and goldenrod/broomsedge meadows.

The **Long Island** study sites in 2001 exhibited four basic zones of plant communities, indicating the predominant moisture regime. A central, elevated, drier grassland/meadow flanked by shrubs, then an extensive willow swamp thicket outlined by a fresh marsh fringe was the common arrangement of habitats. There was extensive overlap of plant communities across these zones. Marsh species within the study sites at occurred most commonly at an elevation below +2.8 feet MLG. The fresh marsh was represented by cattail (*Typha* spp), alligator weed (*Alternanthera philoxeroides*) and elephant ears (*Colocasia antiquorum*) most often, with occasional stands of wild rice (*Zizania aquatica*), or bulltongue (*Sagittaria* spp.). Water hyacinth (*Eichhornia crassipes*) was found along the shore, rafted against the windward side and stranded thickly by a previous high water. High marsh or marsh-margin species *Scirpus* spp., *Cyperus* sp., *Ranunculus sceleratus*, *Polygonum* spp., *Rorippa palustris*, and *Senecio glabellus*, were also locally abundant, though inland of the lower marsh. The low relief of the study sites allowed a complex mixing of various species types.

"Forested Wetland" indicated by willow trees (*Salix nigra* and *Salix interior*) seemed to dominate the landscape throughout the study area, making thickets with other shrubs, scattered in many areas of the marsh, along low energy beaches, or even within the grasslands. Fresh marsh formed the understory at the lower extent, and shrubs and grasses occurred at the upper extent. The willow "forested wetland" zone occurred most commonly at an elevation between +2.8 and +4.3 feet MLG.

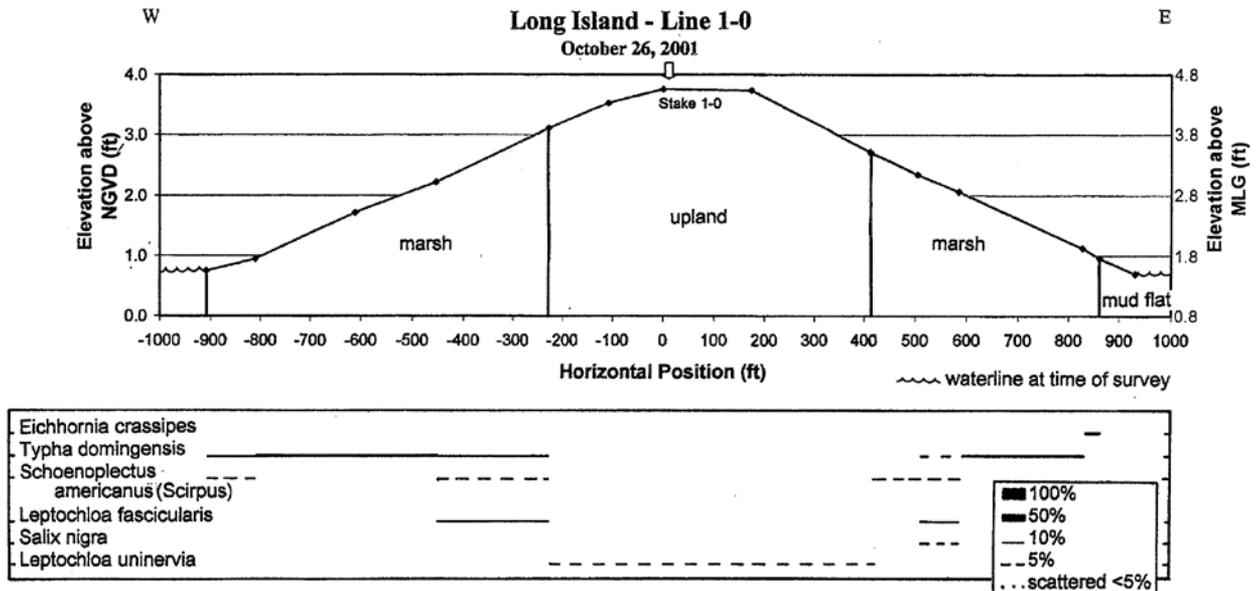
Shrub communities usually indicate older, more stable, elevated area. In the Atchafalaya area, this community overlaps greatly with the willow "forested wetland" zone, and the species present must be able to withstand periods of inundation. Young willows below 15 feet tall are also considered "shrubs". *Baccharis halimifolia* occurred throughout the profile, but it attained its most dense presence usually between +3.3 and +4.8 feet MLG of elevation. Wax myrtle (*Myrica cerifera*) seemed to prefer less soil moisture and occurred along the more elevated parts of the shrub zone, above +3.5 feet MLG, and scattered across the grassland areas. The understory toward lower elevations held bulltongue (*Sagittaria* sp), butterweed (*Senecio glabellus*), dog-tooth grass (*Panicum repens*), and goldenrod (*Solidago sempervirens*), and the upper elevations held goldenrod, broomsedge (*Andropogon glomeratus*), thoroughwort (*Eupatorium capillifolium*), and other grasses.

"Upland" areas along the profiles within the study sites were represented by grasslands/meadows, predominantly goldenrod (*Solidago sempervirens*) and broomsedges (*Andropogon glomeratus* and *A. virginicus*), sometimes completely covered by vines (*Vigna luteola* or *Mikania scandens*). The elevation of these areas varied, occurring in the central areas even when the maximum elevation never attained more than +3.8 feet MLG. Even though the dominant vegetation was considered marsh-margin, this area was designated "upland" because it supported some upland species and no wetland obligates. There was a complex understory of smaller species between the stalks of goldenrod and broomsedge, represented by *Mimosa strigosa*, several small *Cyperus* species, and several species which are not very common. Tall stands of the annual *Sesbania exaltata* were found in scattered groups. An occasional cottonwood tree (*Populus deltoides*) was discovered on the higher elevations of **Long Island**.

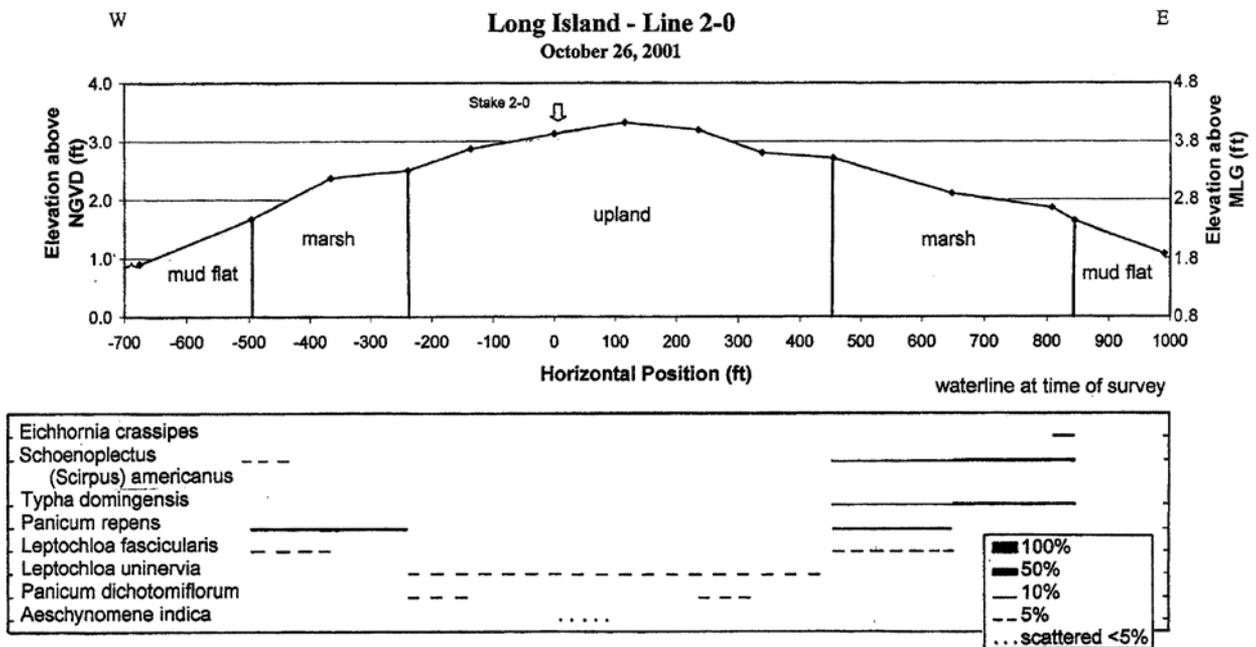
At **Long Island**, the newest site, grasses established quickly on well-drained, freshly deposited materials and formed grasslands that help to quickly stabilize the new material. This site was

very similar to **Ibis Island** in 1996. *Leptochloa uninervia*, *Panicum repens*, and *Cynodon dactylon* tend to be the most common grass species, with *Cyperus elegans*, *Acnida tamariscina*, *Conyza bonariensis* as common herbaceous plants. Older deposits support additional species and the beginnings of shrub habitats with an understory of grasses.

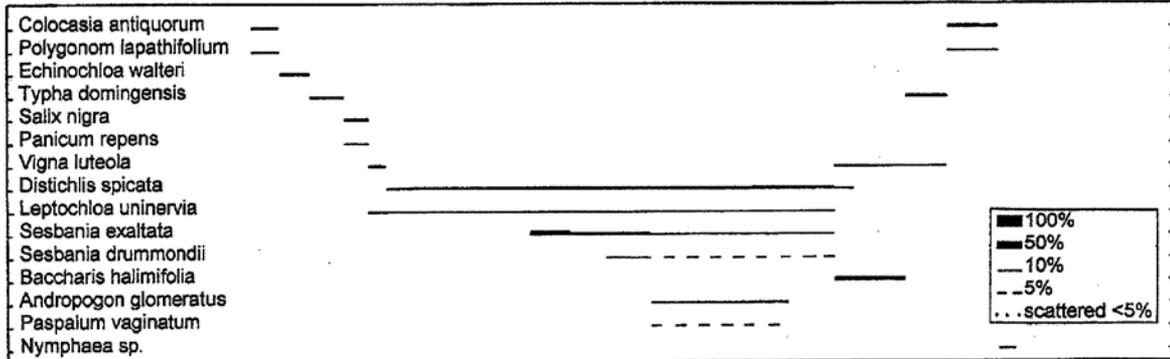
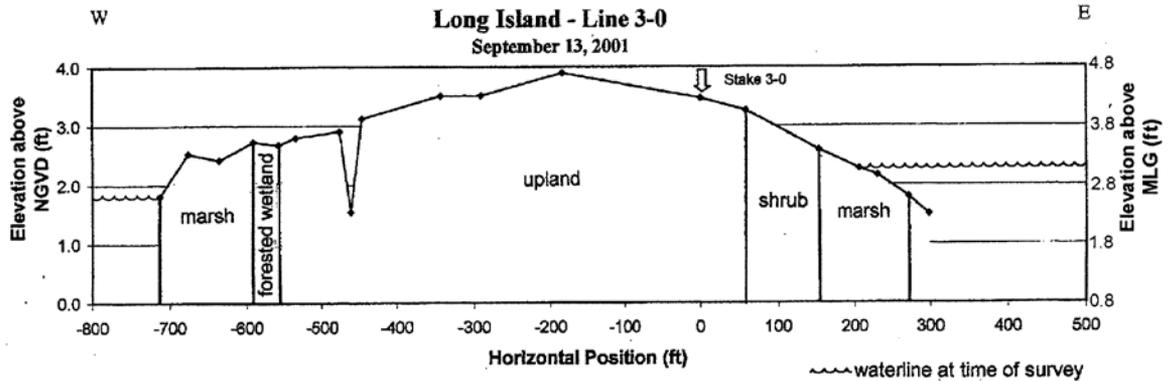
Low wet areas within the upland areas of the study sites were colonized by *Bacopa monnieri*, *Polygonum lapathifolium*, and tiny *Eleocharis parvula*.



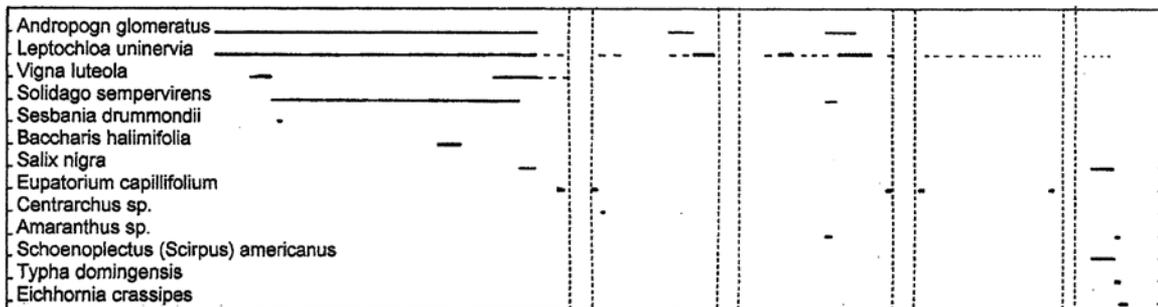
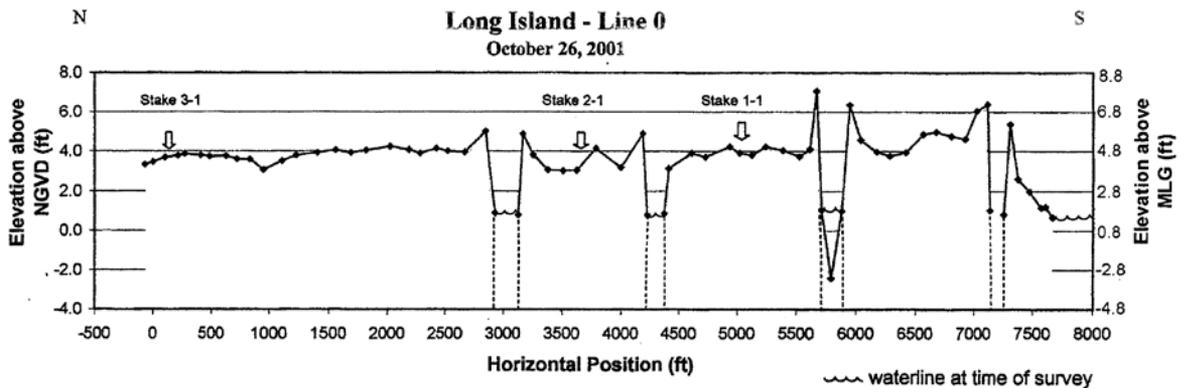
Elevation profile 1-0 on the southern end of Long Island at the Lower Atchafalaya River Bay and Bar BUMP study site with vegetation data illustrated.



Elevation profile 2-0 on Long Island at the Lower Atchafalaya River Bay and Bar BUMP study site with vegetation data illustrated.



Elevation profile 3-0 on the northern portion of Long Island at the Lower Atchafalaya River Bay and Bar BUMP study site with vegetation data illustrated.



Elevation "strike" profile 0 connecting the stakes along the axis of Long Island at the Lower Atchafalaya River Bay and Bar BUMP study site with vegetation data illustrated.

The 2001 field surveys provided information regarding dredged material stacking heights that would be optimal for establishing marsh habitat. The optimal target elevation for marsh creation appears to be less than +2.0 feet MLG. At the time of this 2001 survey, the average elevation of Andrew Island was +2.6 feet MLG, the average elevation of eastern Horseshoe Island was +2.2 feet MLG, the average elevation of Ibis Island was +2.8 feet MLG, and the average elevation of Long Island was +2.6 feet MLG.