Cat Point – 2007 Monitoring
CORPS Permit No. 200305450 (NW-JWS)

Project Location: The Apalachicola Bay breakwater and salt marsh restoration site is located along the southeastern shore of Cat Point in East Point, Florida (Figure 1) at approximately 29°43'N and 84°54'W in Section 31, Township 8S, Range 6W. The majority of the adjacent upland property is currently under ownership by the State of Florida (55 acres with 4000 feet of shoreline) and is managed by the Apalachicola National Estuarine Research Reserve (ANERR) and the Apalachicola Buffer Preserve. The State recently acquired a 3-acre parcel in the middle of the area that is to be developed as a public education and recreation site. The nearshore area is shallow with extensive sand shoaling visible (Figure 2). Transects taken perpendicular to the shoreline indicate depths of less than two feet extending up to 150 feet offshore. Overall, the site has experienced noticeable erosion in recent years, as evidenced by the numerous tree stumps extending below the water along a portion of the shoreline. Prior to acquisition of the site, concrete construction material and other debris was dumped near the edge of the water along approximately 500 feet of the shoreline in an effort to prevent erosion.

Project Description: The objective of this project is to mitigate for a 0.3-acre impact to seagrass beds in Apalachicola Bay associated with the replacement and realignment of the St. George Island Bridge (SR 300 – Bryant Patton Bridge). The approved mitigation plan included the restoration of approximately 0.8 acre of degraded shoreline. This involved removing old debris from 0.5 acres of shoreline, establishing a minimum marsh/breakwater area of 0.3 acre within the debris removal area, and restoring 0.3 acres of upland native habitat and vegetation on a strip landward of the created marsh. The marsh habitat includes the breakwater footprint, gaps in the breakwater, and areas of planted emergent vegetation. Planted marsh vegetation will enhance the amount of habitat along this section of shoreline. Gaps in the breakwater will allow flushing and ingress/egress of aquatic organisms utilizing the marsh area. The breakwater itself will provide valuable hard substrate for various forms of estuarine epifauna. This project is being carried out in accordance with U.S. Army Corps of Engineers Nationwide Permit 27, #200305450 (NW-JWS), issued June 6, 2003.

The project was built, based on use of proven design for the area (ANERR demonstration project), a prime location, and dedicated plans for long-term maintenance and monitoring. Successful completion of this project has general relevance to Florida Gulf ecosystems in several ways. First, it restores an area of eroding coastline within one of the most productive bays along the Gulf coast. Second, it demonstrates an environmentally sound method of protecting coastal shoreline properties. Third, it provides evidence that estuarine salt marsh habitat can be restored, enhanced and protected without requiring the loss of upland property. In addition, the site will be used to educate local and state regulators, developers, and the general public concerning alternatives to current shoreline hardening techniques that result in loss of aquatic and upland habitat.

Project Design and Implementation: The general project design was based on the specifications of a demonstration project implemented by ANERR in 1994. A breakwater of 2-3 foot diameter rock was placed approximately 10-25 feet offshore, roughly parallel to the shore with a 1:1 slope (6-foot base and 3 feet high) (Figure 3). The base of the breakwater was located

such that at Mean Low Water (MLW) it will be covered with several inches of water and at Mean High Water (MHW) approximately 0.5 to 1 foot of the breakwater will remain above the water surface. This placement was based on a 2-foot tidal range typical of Apalachicola Bay. Six-foot wide breaks were located every 75 feet along the breakwater.

The project was initiated in the fall of 2003 with the development of the scope of work, call for bids and awarding of the contract; work commenced in the winter of 2004. The project was divided into two phases: site cleanup, breakwater construction, and shoreline contouring were included in phase one, with phase two involving the marsh and upland vegetation planting. Carter's Contracting Services, Inc. of Andalusia, Alabama was selected for the construction phase; ANERR cooperated with vegetation plantings and will undertake future monitoring of the site.

The first phase of the project involved a cleanup of the debris that was placed originally on site in an effort to eliminate shoreline erosion. The debris included a considerable number of old concrete slabs and rubble (Figures 4 and 5), numerous old automobile tires (Figure 6) and other assorted trash. Much of this debris was located above mean high water, but a portion was found in the subtidal nearshore zone. After removal of the concrete and other assorted material, breakwater construction began from the northeast end and proceeded generally in a southwesterly direction. Figure 7 shows an early stage of breakwater construction with piles of old debris remaining onsite. Each 75-foot section of breakwater was added until the entire 500 linear-foot distance was complete (Figure 8). A gap of approximately six feet was left between each breakwater section (Figure 9) to allow water to circulate more easily behind the structure. This also allows free access and movement of organisms into the nearshore area. Shoreline cleanup and contouring was then accomplished as seen in Figure 10. A gentle slope similar to that noted in the adjacent uplands was continued throughout the immediate project area.

After construction was completed (March 2004), the site was allowed to stabilize for about three months during which time the terrestrial portion of the shoreline began to revegetate (Figure 11). Marsh planting was initiated in early summer 2004 with plantings occurring on June 4 and July 6-7. Clumps of smooth cord grass (*Spartina alterniflora*) were collected with post-hole diggers from local marshes on the north side of Little St. George Island, transported intact in large coolers, and planted on 2-foot centers in the nearshore area. Initial plantings were accomplished in three to five rows just above and below the MHW line (Figure 12). A minimum survival rate of 80% for 3 years is required by permit for *Spartina* plantings.

The success of our marsh plantings was affected significantly by the occurrence of several tropical storm events. During the late summer and early fall the shoreline along this section of coast was severely disturbed as three hurricanes passed through the Gulf, the most intense damage coming from Hurricane Ivan in late September (Figure 13). Although the breakwater itself was undamaged, wave action was significant, overtopping the rock structure by several feet at the height of the storm. Significant erosion occurred with landward movement of the demarcation line between beach slope and terrestrial upland occurred, as was noted by the newly formed erosion escarpment (Figure 14). Unfortunately, a substantial portion of the planted cord grass along with significant amounts of upland vegetation was scoured.

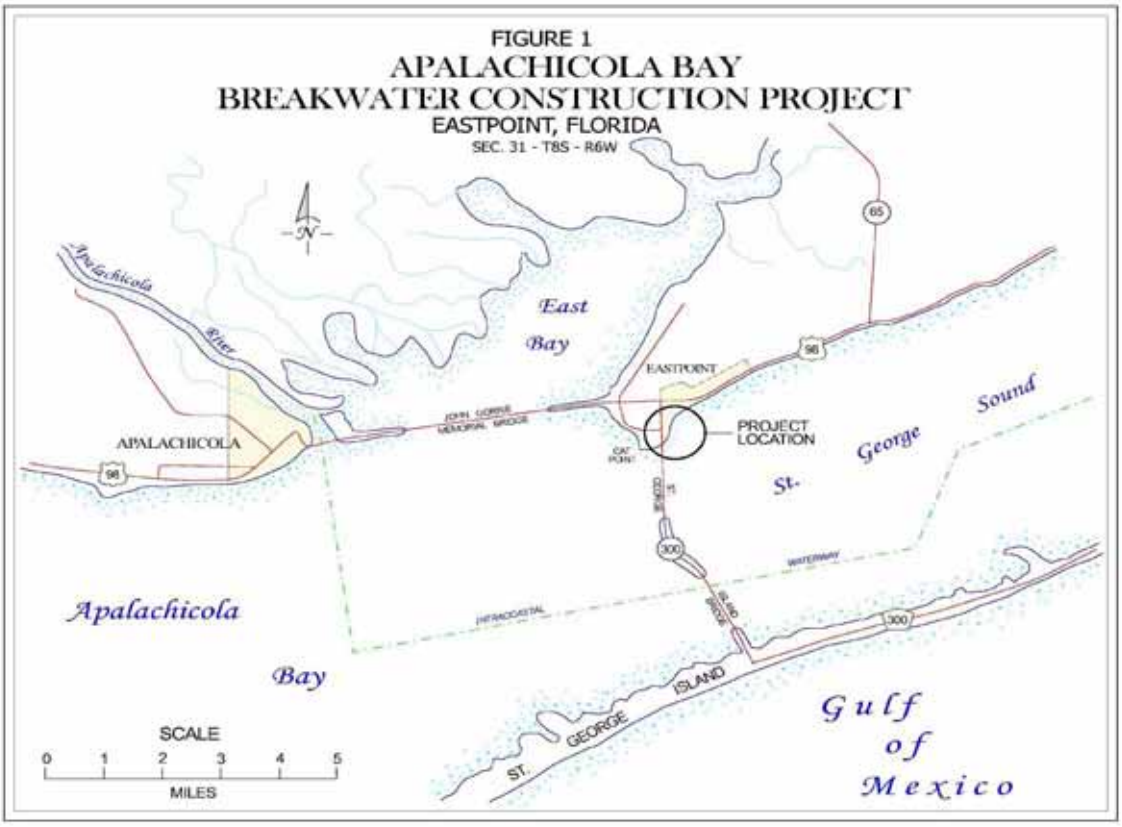
An active tropical storm season precluded additional replanting in 2005. Hurricane Dennis, although landfall occurred near Pensacola in July 2005, resulted in an extreme storm surge in the Apalachicola area and again damaged the marsh. A series of new plantings was completed in August 2006 with over 3000 new *Spartina* tublings interspersed among the remaining shoots (Figure 15). Mortality was high on these tublings and replanting of approximately 1500 plants took place in January 2007 (Figure 16). In September 2007, 6000 upland plants of seven species (including saltmeadow cordgrass, railroad vine, Muhly grass, sea purslane, dune elder, salt bush and beach panic grass) were planted in the transition zone between the beach and the upland at the site (Figures 17 and 18); an additional 500 *Spartina* were planted at this time to supplement the existing marsh zone. Both marsh and transition zone vegetation will be monitored in the spring of 2008 for survival success (minimum of 80% survival).

FIGURE 1

APALACHICOLA BAY
BREAKWATER CONSTRUCTION PROJECT

EASTPOINT, FLORIDA

SEC. 31 - T8S - R6W



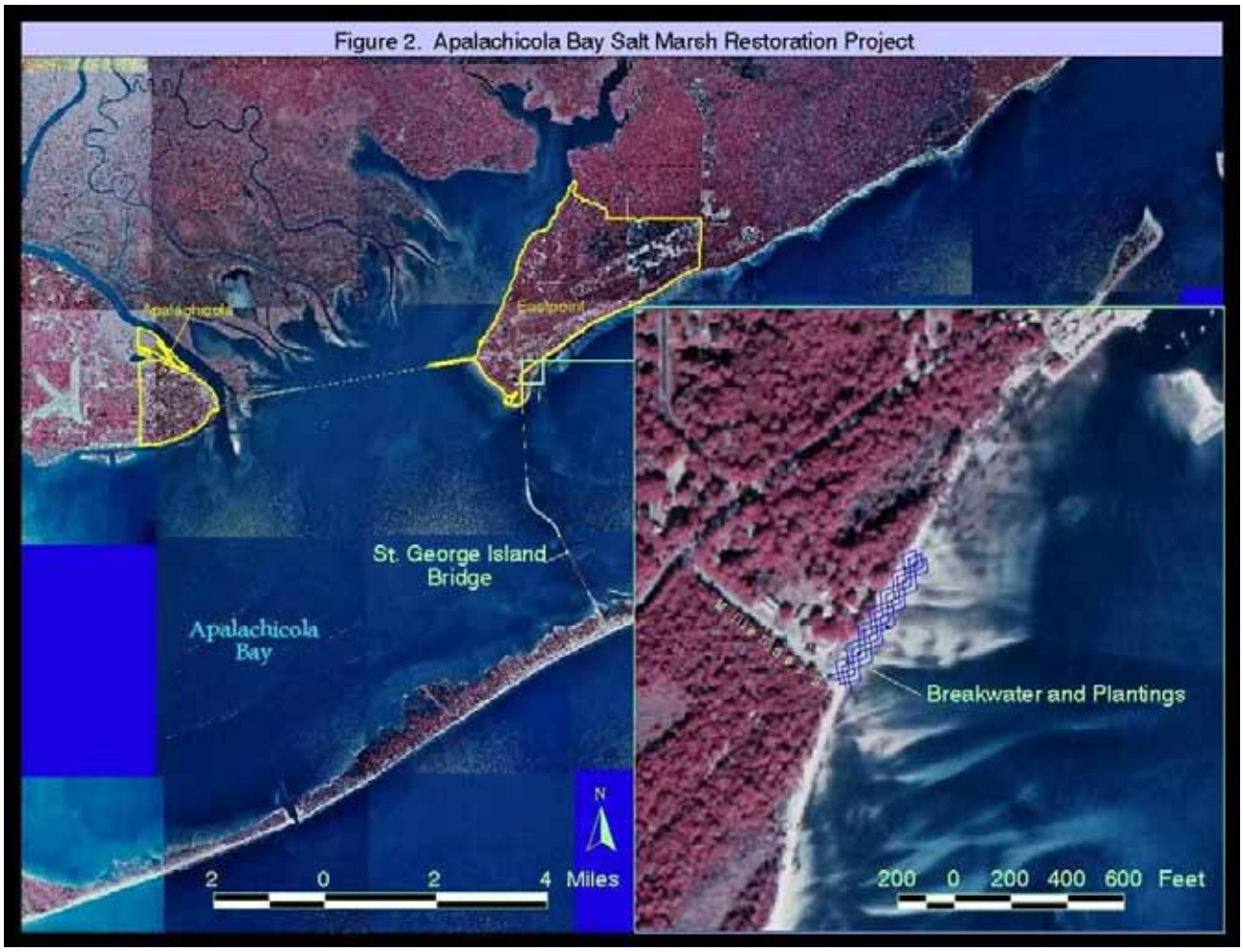


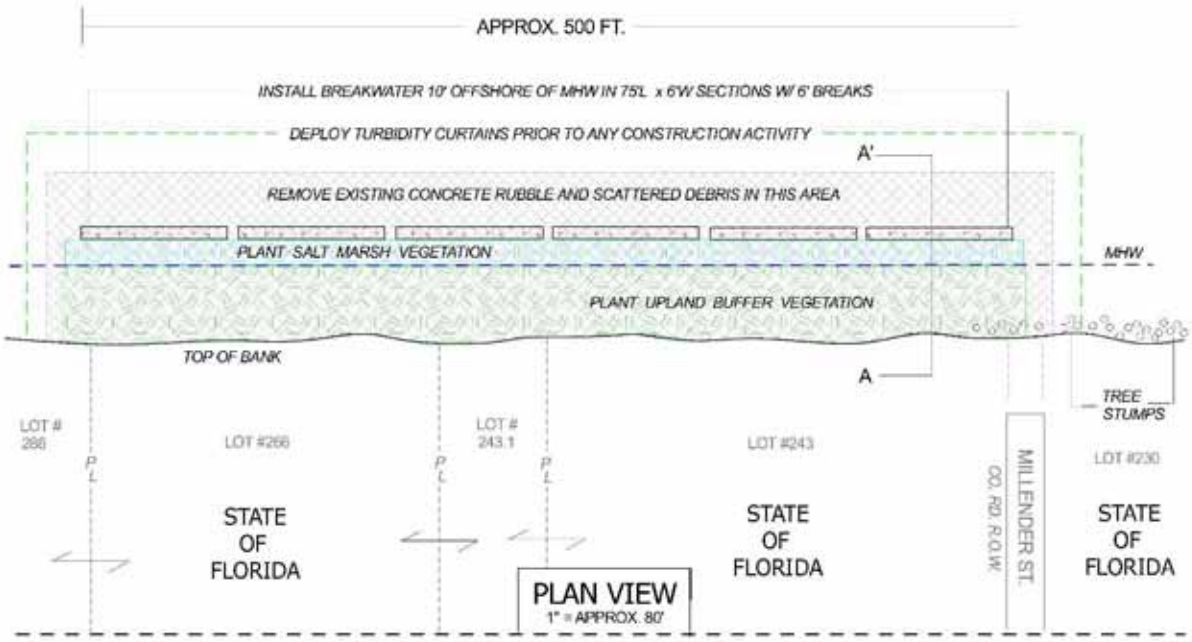
Figure 2. Apalachicola Bay Salt Marsh Restoration Project
Apalachicola
Eastpoint
St. George Island
Bridge
Apalachicola
Bay
N
2 0 2 4 Miles
Breakwater and Plantings
200 0 200 400 600 Feet

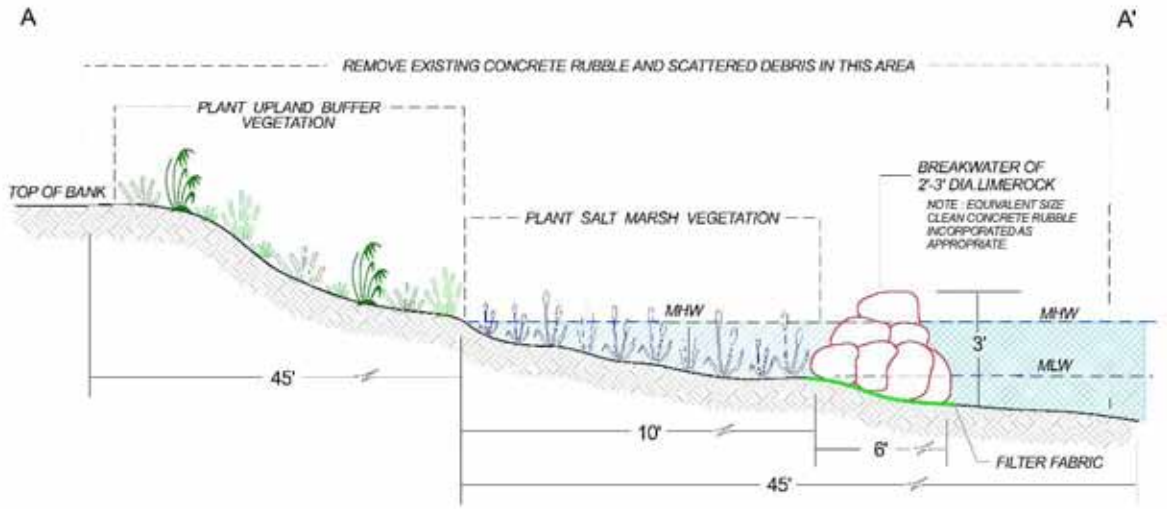
FIGURE 3

APALACHICOLA BAY
BREAKWATER CONSTRUCTION PROJECT

EASTPOINT, FLORIDA

SEC. 31 - T8S - R6W





CROSS-SECTION A-A' DETAIL
NOT TO SCALE

Figure 4. Preconstruction view of concrete construction material previously placed on site to control erosion of shoreline.

Figure 5. Preconstruction view of concrete construction material previously placed on site to control erosion of shoreline.

Figure 6. Preconstruction view at low tide showing concrete rubble and numerous old automobile tires scattered in the nearshore subtidal area at the project site.

Figure 7. Cleanup of debris underway with old tires piled in foreground (later removed) and stone for breakwater just behind. The first section of breakwater is shown under construction in center right.

Figure 8. Construction of breakwater nearing completion with piles of old tires shown at center left (later removed from site).

Figure 9. Close-up view of gap in breakwater (shown in center) to allow movement of water and organisms. Contoured shoreline with rubble removed seen in background.

Figure 10. Construction of breakwater complete along with rubble removed and shoreline sloped to match adjacent beach profile.

Figure 11. Post-construction view of breakwater showing rubble removed, shoreline contoured and initial recovery of beach vegetation.

Figure 12. Initial planting of *Spartina alterniflora* sprigs along shoreline (summer 2004).

Figure 13. View of breakwater and adjacent eroded shoreline after Hurricane Ivan. Beach erosion was significant, extending at least 50 feet landward of previous beach/upland demarcation line.

Figure 14. Close-up view of eroded shoreline after Hurricane Ivan. Erosion extended landward to newly formed escarpment, seen at center left in photo.

Figure 15. Revegetation of *Spartina alterniflora* after hurricane damage in 2004 and 2005. Approximately 3000 *Spartina* tublings were planted in the nearshore zone interspersed among existing shoots in August 2006.

Figure 16. Supplemental planting of marsh during January 2007. Approximately 1500 plants were added after relatively high mortality was experienced.

Figure 17. Vegetation planted in the transition zone between the beach and uplands (fall 2007). See text for list of planted species.

Figure 18. Vegetation planted in the transition zone between the beach and uplands (fall 2007). See text for list of planted species.