Apalachicola Bay Breakwater and Salt Marsh Restoration Annual Monitoring Report (2008)
Nationwide Permit – 200305450 (NW-JWS) issued 6/6/2003

Impact: SR 300 Bryant Patton Bridge in Franklin County, 0.3 acre of seagrass in Apalachicola Bay

Mitigation: Cat Point/Apalachicola Bay breakwater and salt marsh
Monitoring Date: 11/25/08

Mitigation Site

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.

Scope

Replacement and realignment of the St. George Island Bridge (SR 300 Bryant Patton Bridge) in Franklin County will impact 0.3 acre of seagrass (FLUCCS 911 according to the FDOT Environmental Impact Inventory) in Apalachicola Bay. Shoal grass, *Halodule wrightii*, is present in the impact area but is sparse and very patchy in distribution. Potential direct construction impacts are estimated to be less than 0.003 acre with secondary impacts on about 0.3 acre due to shading and scour. To plan for sufficient mitigation, it was assumed that impacts would occur over the maximum area.

Proposed Mitigation

To mitigate for the potential 0.3-acre loss of seagrass beds in Apalachicola Bay, a restoration site of approximately 0.8 acre of degraded shoreline was selected. The approved mitigation plan included 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.

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.

Restoration Activities

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.

Construction was completed in March 2004 and the site was allowed to stabilize for about three months during which time the terrestrial portion of the shoreline began to revegetate (Figure 4). 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 from local marshes on the north side of Little St. George Island, transported intact to the site, 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.

The success of our marsh plantings was affected significantly by the occurrence of numerous tropical storm events over the next few years. During the late summer and early fall 2004 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 2004 (Figure 5). 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 (Figure 6); 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 and upland areas. A series of new plantings was completed in August 2006 with over 3000 new *Spartina* tublings interspersed among the remaining shoots. Mortality was high on these tublings and replanting of approximately 1500 plants took place in January 2007.

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 7 and 8); an additional 500 *Spartina* were planted at this time to supplement the existing marsh zone. The first annual monitoring report was issued 21 December 2007 describing conditions at the end of year with all plantings completed.

The second annual site monitoring was carried out on 25 November 2008. A late fall monitoring was chosen to assess the net result of propagation during the growing season coupled with any detrimental effects of tropical storm activity. Significant erosion and scouring occurred from multiple storms during the summer including Fay, Gustav and Ike, despite the fact that none made landfall in the immediate area (Figures 9-11). Survival of smooth cordgrass ranged from 65-90% depending on the section of shoreline planted (Figure 12); overall rate was about 75-80%. Upland buffer vegetation survival was poor with rates generally less than 5-10%; saltmarsh cordgrass (*Spartina patens*) and sea purslane (*Sesuvium portulacastrum*) had higher rates of survival (Figure 13). Upland buffer replanting will occur during spring 2009.

Work Schedule

- Project initiated (conceptual design, permitting, contracting): completed Fall 2003
- Breakwater construction: commenced 12/31/03, construction completed 3//30/04
- Vegetation planting: *Spartina alterniflora* planting - 6/04, 7/6-7/04, 8/06, 1/07, 9/07
  upland buffer planting – 9/17-18/07
- Annual monitoring: 12/21/07 and 11/25/08

Success Criteria

- Minimum survival of planted smooth cordgrass is 80% for three years: annual monitoring indicated a survival of about 75-80% for the planted smooth cordgrass.

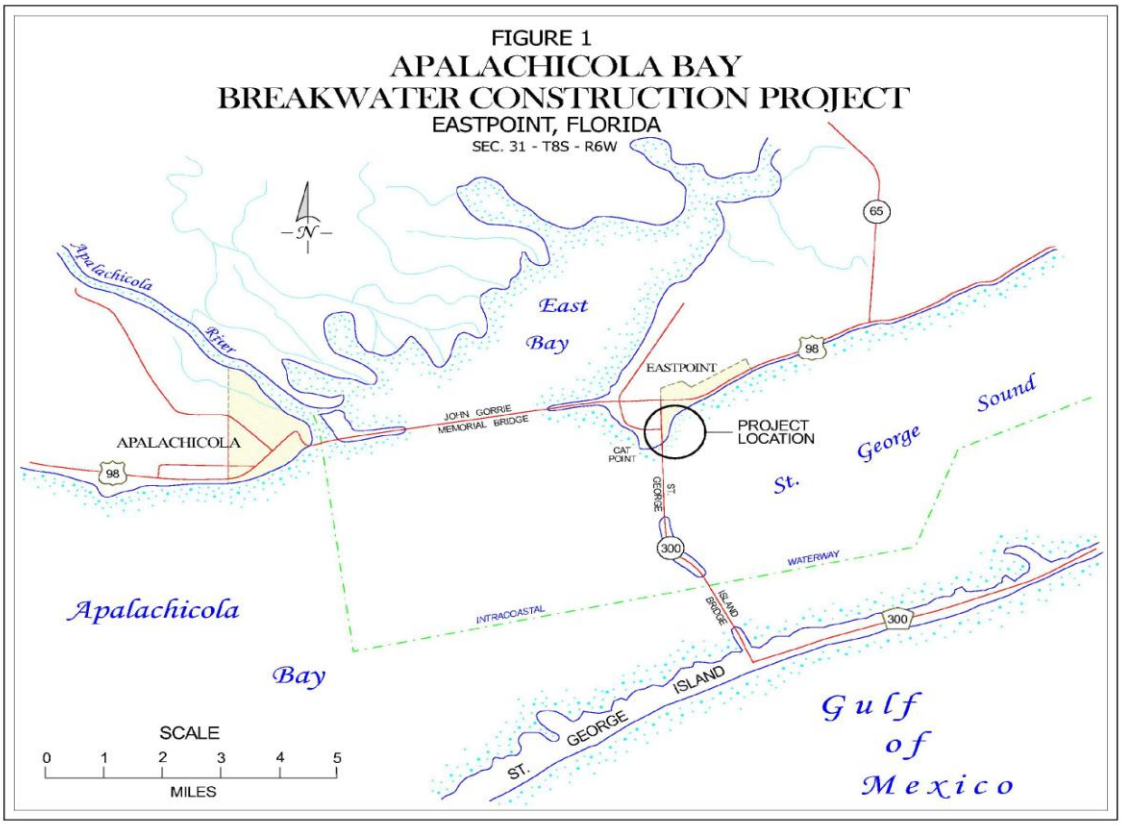
FIGURE 1
APALACHICOLA BAY
BREAKWATER CONSTRUCTION PROJECT
EASTPOINT, FLORIDA
SEC. 31 - T8S - R6W
N
Apalachicola
River
East
Bay
65
98
EASTPOINT
JOHN GORRIE
MEMORIAL BRIDGE
APALACHICOLA
98
PROJECT
LOCATION
CAT
POINT
George
Sound
St.
GEORGE
ST
300
WATERWAY
INTRACOASTAL
ISLAND
BRIDGE
Apalachicola
Bay
300
ISLAND
GEORGE
ST.
Gulf
of
Mexico
SCALE
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MILES

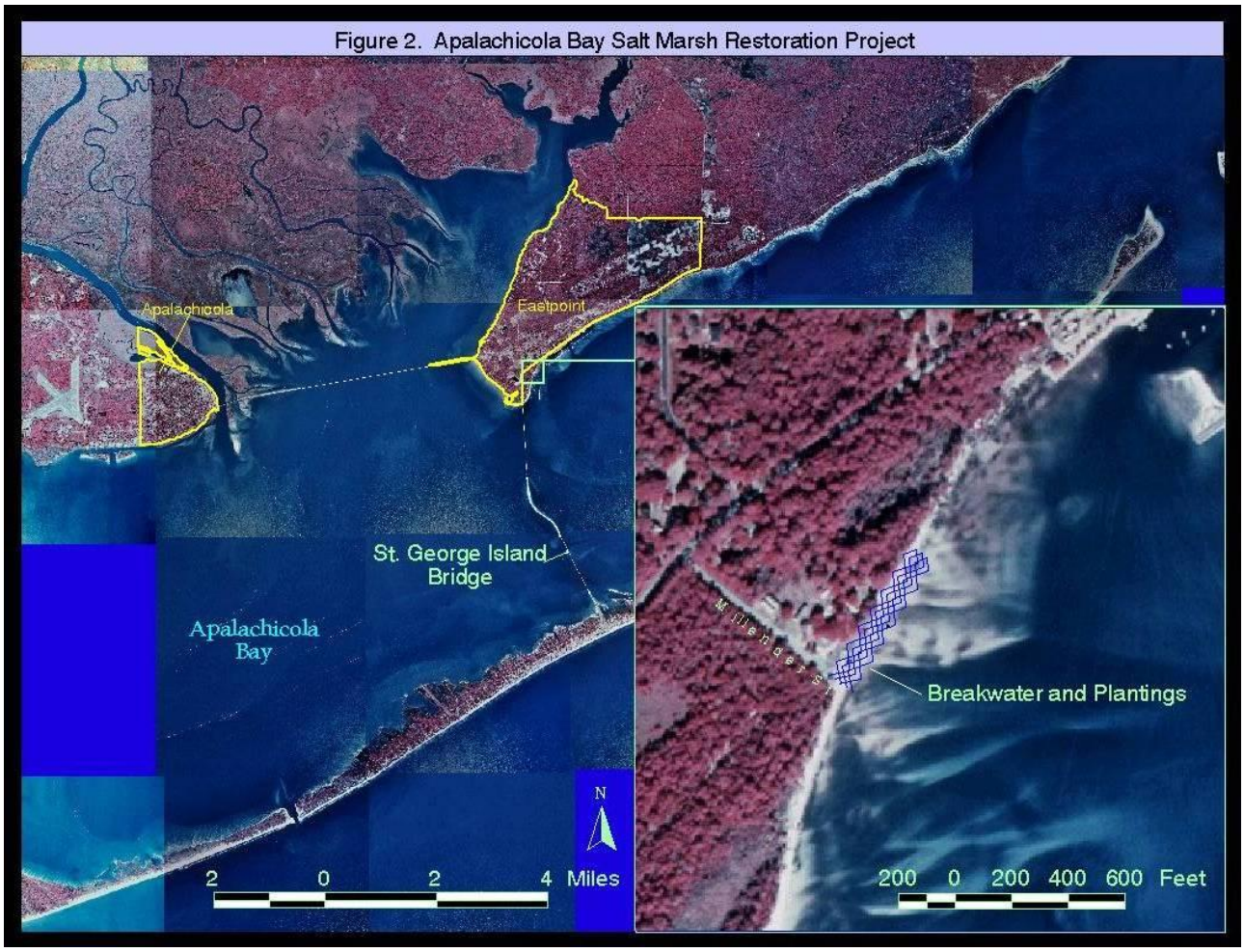


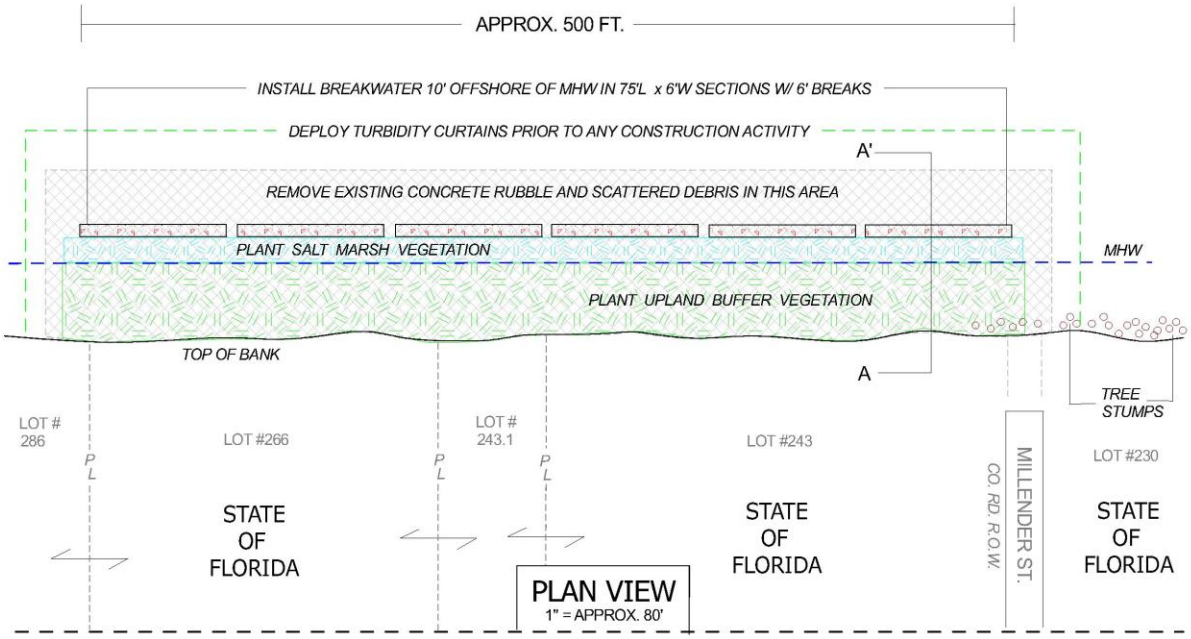
Figure 2. Apalachicola Bay Salt Marsh Restoration Project
Apalachicola
Eastpoint
St. George Island
Bridge
Apalachicola
Bay
N
2 0 2 4 Miles
Breakwater and Plantings
200 0 200 400 600 Feet

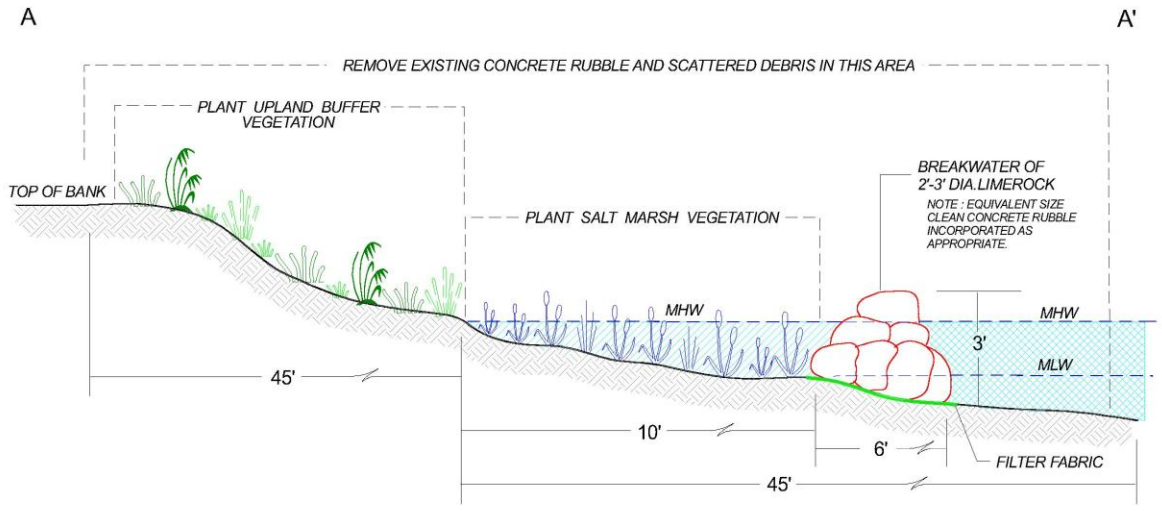
FIGURE 3

APALACHICOLA BAY
BREAKWATER CONSTRUCTION PROJECT

EASTPOINT, FLORIDA

SEC. 31 - T8S - R6W





CROSS-SECTION A-A' DETAIL
NOT TO SCALE

Figure 4. Post-construction view of breakwater showing rubble removed, shoreline contoured and initial recovery of beach vegetation (June 2004).

Figure 5. View of breakwater and adjacent eroded shoreline after Hurricane Ivan (September 2004). Beach erosion was significant, extending at least 50 feet landward of previous beach/upland demarcation line.

Figure 6. Close-up view of eroded shoreline after Hurricane Ivan (fall 2004). Erosion extended landward to newly formed escarpment, seen at center left in photo.

Figure 7. Vegetation planted in the transition zone between the beach and uplands (fall 2007). See text for list of planted species. Compare with above photo (Figure 6).

Figure 8. Vegetation planted in the transition zone between the beach and uplands (fall 2007). See text for list of planted species.

Figure 9. Overall condition of site after the storm activity in summer 2008 as noted during annual monitoring. The salt marsh has expanded despite significant erosion and loss of upland buffer vegetation.

Figure 10. Erosion and scour in the nearshore/intertidal area noted during annual monitoring 2008; exposure of peat deposits that were covered prior to storm activity.

Figure 11. Erosion and scour in upland buffer zone in middle of site. Annual monitoring photo shows an additional loss of 15-20 feet of upland that occurred during the 2008 storm season.

Figure 12. Spartina marsh has expanded into three large patches, the largest of which is shown in the foreground (noted in annual monitoring 2008).

Figure 13. Significant erosion and scour of upland resulting from high storm surge. Surviving saltmarsh cordgrass and sea purslane in southern portion of upland buffer (noted in annual monitoring 2008).