Cat Point Breakwater (Apalachicola Bay Breakwater and Salt Marsh Restoration) Fourth Annual Monitoring Report (2011)

Nationwide Permit – 200305450 (NW-JWS) issued 6/6/2003; Impact: SR 300 St. George Island Bridge, Franklin County; Impact: 0.3 acre of seagrass in Apalachicola Bay

Monitoring Date: January 1, 2011

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 has acquired a 3-acre parcel in the middle of the area that is to be developed as a public education and recreation site. The near-shore 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 placed 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 with very patchy 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 acre of shoreline, establishing a minimum marsh/breakwater area of 0.3 acre within the debris removal area, and restoring 0.3 acre 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 is intended to enhance the amount of habitat along this section of shoreline. Gaps in the breakwater allow flushing and ingress/egress of aquatic organisms utilizing the marsh area. The breakwater itself provides 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 at 75-foot intervals along the breakwater.

The project was initiated in Fall 2003 with the development of the scope of work, call for bids, and awarding of the contract; work commenced in Winter 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 re-vegetate (Figure 4). Marsh planting was initiated in Spring/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 alterniflora* tublings interspersed among the remaining shoots. Mortality was high on these tublings and replanting of approximately 1,500 plants took place in January 2007.

In September 2007, 6000 upland plants of seven species, including saltmeadow cordgrass (*Spartina patens*), railroad vine (*Ipomoea pes-caprae* subsp. *brasiliensis*), Muhly grass (*Muhlenbergia capillaris*), shoreline seapurslane (*Sesuvium portulacastrum*), seacoast marshelder (*Iva imbricata*),

salt bush (*Atriplex pentandra*), and beach panic grass (*Panicum amarum*), were planted in the transition zone between the beach and the upland at the site (Figures 7 and 8); an additional 500 *Spartina alterniflora* 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. Prior to the 2008 monitoring event, 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 (Figure 9). The 2010 monitoring event documented 80% survival of salt marsh planted materials.

The third annual monitoring event was conducted January 11, 2011. The monitoring event was conducted during low tide. The breakwater is intact and supports flora and fauna such as sea lettuce (*Ulva lactuca*), barnacles (*Balanus* sp.), and bivalves (aff. *Brachidontes exustus*). The presence of these fouling organisms indicates good water quality, an increase in appropriate species diversity, and an increase in organisms that provide food and water filtration services. The lower beach/marsh restoration area exhibited 50-60% overall cover of planted *Spartina alterniflora* which is manifested in dense patches along the shoreline (Figure 10). In comparison to the previous monitoring photo points all *Spartina alterniflora* appears to have survived since the last monitoring event, meeting the 80% survival success criteria required for permit compliance. Areas dominated by this species also showed sexual and vegetative reproduction which indicates that the planted populations are healthy and expanding (Figure 11). Species planted or naturally recruited on the upper beach comprised approximately 60-70 % overall cover. The *Spartina patens* planting from January 2010 shows over 80% planted material survival and, like *Spartina alterniflora*, exhibits both vegetative and sexual reproduction (Figures 12 and 13). Most of the other native beach species that were planted at the site in 2007 are still present; however these species are not present in large numbers indicating a lack of planted material survival, probably due to past hurricane/storm events. Many of the planted and naturalized plant species were reproductive at the time of the survey, which indicates a trend toward greater species cover and an increase in the desired species composition. No nuisance or invasive exotic species were seen within the restoration area.

WORK SCHEDULE

- Project initiated (conceptual design, permitting, contracting): **completed Fall 2003**
- Breakwater construction: **commenced 12/31/03 and 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 and 01/10**
- Annual monitoring: **12/21/07; 11/25/08; 12/25/10; and 01/11/11**

SUCCESS CRITERIA

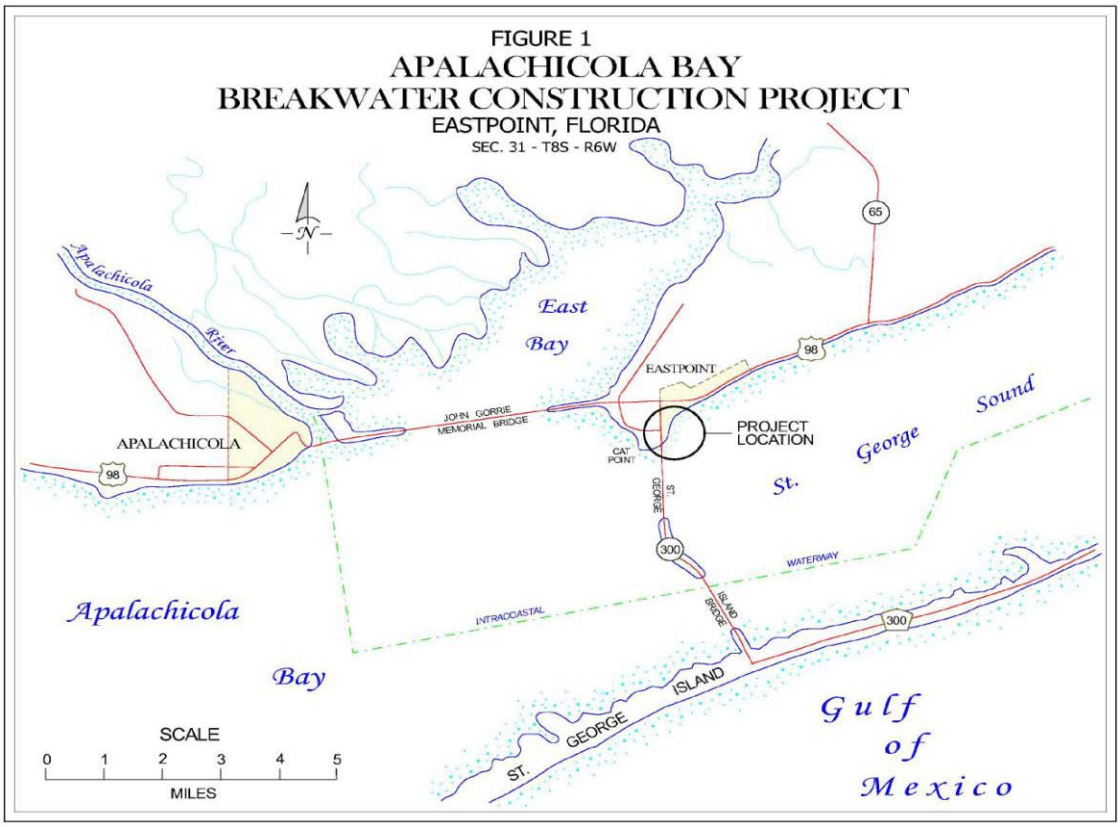
- Minimum survival of planted smooth cordgrass is 80% for three years: **The third annual monitoring event indicated a survival of 75-80% for the planted smooth cordgrass (*Spartina alterniflora*) and the planted saltmeadow cordgrass (*Spartina patens*). This result is in compliance with the success criteria of the permit.**

2011 Cat Point Species List

Species	Walk paths	% Cover	Condition	Dominant Species	Natural Recruitment	Flowering/Fruiting
Aster sp.	UB	<1	Good	N		Y
Atriplex pentandra	UB	1-5	Good	N		N
Baccharis glomeruliflora	UB	1-5	Good	N		N

Species	Walk paths	% Cover	Condition	Dominant Species	Natural Recruitment	Flowering/Fruiting
Cakile lanceolata	UB	1-5	Good	N		N
Cenchrus spinifex	UB	1-5	Good	N		Y
Cyperus sp.	UB	1-5	Good	N		Y
Dichanthelium sp.	UB	1-5	Good	N		N
Eupatorium compositifolium	UB	1-5	Good	N		N
Fimbristylis spadicea	UB	1-5	Good	N		Y
Heterotheca subaxillaris	UB	1-5	Good	N		Y
Hydrocotyle bonarensis	UB	1-5	Good	N		N
Iva imbricata	UB	1-5	Good	N		Y
Juncus roemerianus	UB	1-5	Good	N		N
Juncus sp.	UB	1-5	Good	N		Y
Panicum amarum	UB	1-5	Good	N		Y
Paspalum sp.	UB	1-5	Good	N		Y
Phytolacca americana	UB	<1	Good	N		N
Pinus elliottii	UB	1-5	Good	N		N
Schizachyrium maritimum	UB	1-5	Good	N		Y
Serenoa repens	UB	<1	Good	N		N
Sesuvium portulacastrum	UB	1-5	Good	N		Y
Smilax bona-nox	UB	1-5	Good	N		N
Spartina alterniflora	LB	70-80	Good	Y	Y	Y
Spartina patens	UB	50-60	Good	Y	Y	Y
Sporobolus virginicus	UB	10-20	Good	N		Y

LB – Lower Beach
UB – Upper Beach



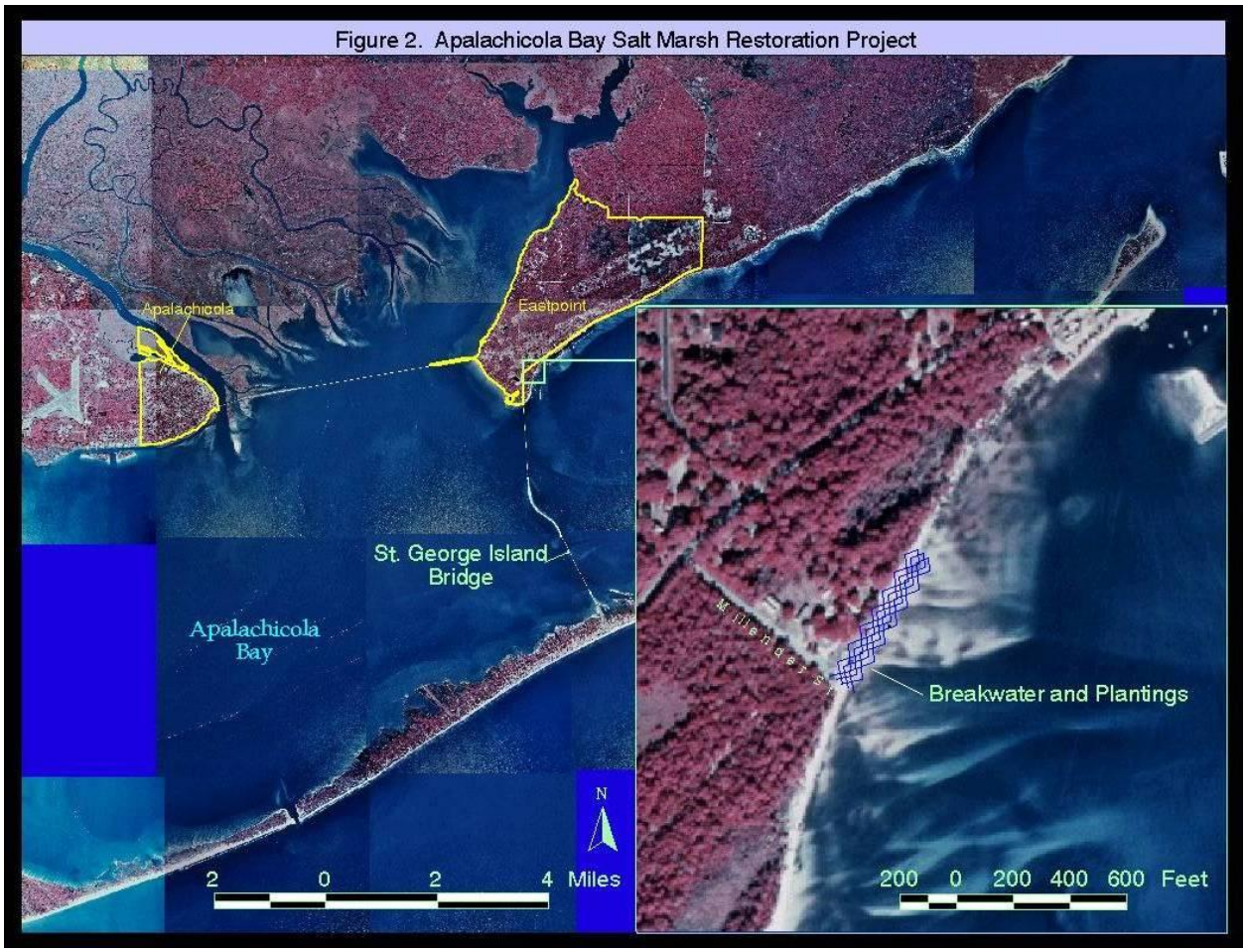


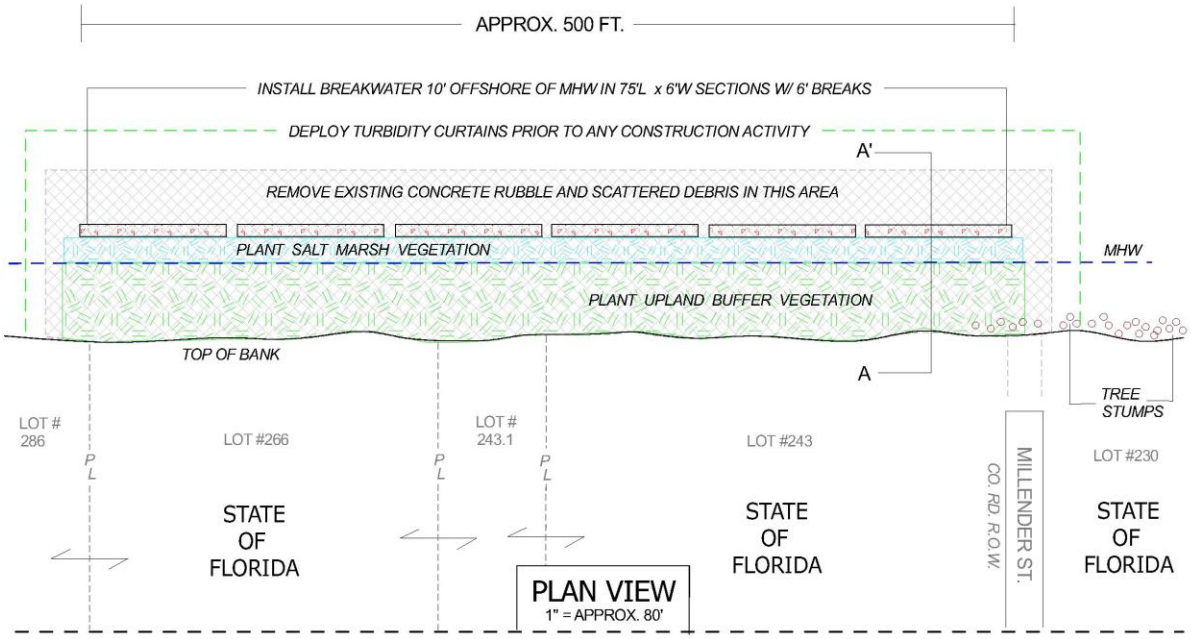
Figure 2. Apalachicola Bay Salt Marsh Restoration Project
Apalachicola
Eastpoint
St. George Island
Bridge
Apalachicola
Bay
N
2 0 2 4 Miles
Breakwater and Plantings
200 0 200 400 600 Feet

FIGURE 3

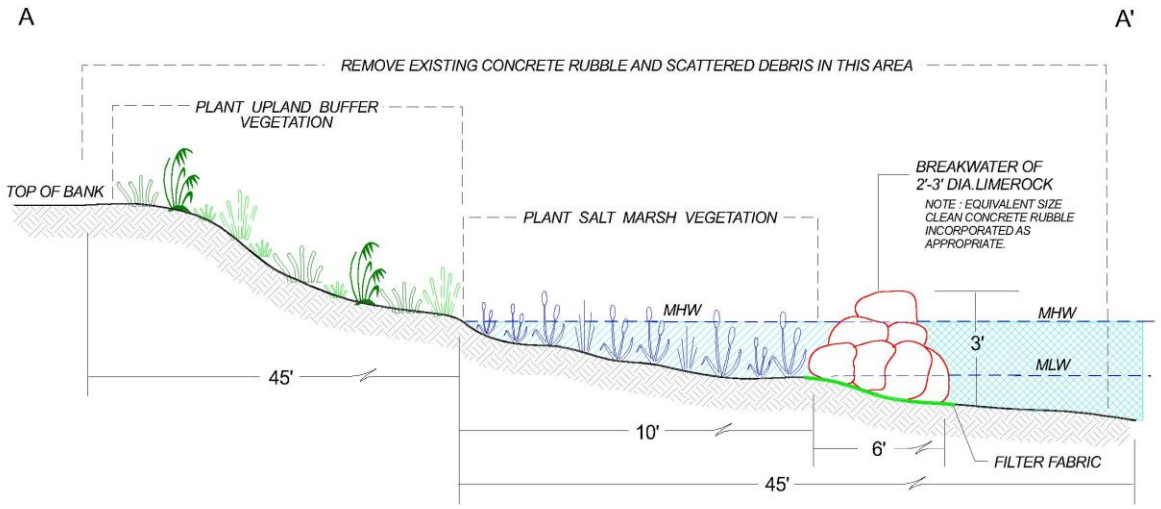
APALACHICOLA BAY
BREAKWATER CONSTRUCTION PROJECT

EASTPOINT, FLORIDA

SEC. 31 - T8S - R6W



PLAN VIEW
1" = APPROX. 80'



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 that is 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 Figure 6.

Figure 8. Vegetation planted in the transition zone between the beach and uplands (Fall 2007).

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. 2011 *Spartina alterniflora* and *Spartina patens* survival in restoration area. Beach erosion from previous hurricanes is evident. Facing NE from center of site.

Figure 11. *Spartina alterniflora* vegetative and sexual (not pictured) reproduction indicating the health of the planted material and a trend toward increasing cover.

Figure 12. 2010 Spring *Spartina patens* planting survival.

Figure 13. *Spartina patens* vegetative and sexual (not pictured) reproduction indicating the health of the planted material and a trend toward increasing cover.

Site Inspection Field Form	
Project: Cat Point Breakwater	Date: Jan 11 2011
Name(s) of Data Collectors: Caitlin Elam	Weather: 35 degrees F, overcast
Environmental Description: Shoreline to breakwater in Apalachicola Bay	
GPS Location: 29°43'54.63"N 84°53'1.61"W	Time: 3pm

On at least a yearly basis, the site will be inspected as follows:

A: Perimeter for signs of trespassing, fencing and signage integrity and infestation by exotic or nuisance vegetation;

The sign at the entrance is intact, the site is accessible to the public and is adjacent to a public park so trespassing is not an issue, and no exotic invasive species were seen along the perimeter.

B: Internal Roads (Both public and maintenance) for signs of dumping or trespassing, erosion, bridges and road integrity, and exotic or nuisance species infestations;

N/A

C: All construction areas for stabilization and re-vegetation, structure, operation, and integrity;

The breakwater is intact and stable.

D: Representative polygons for each UMAM community for fuel load, exotic or nuisance species, planted material survival, groundcover, and shrub condition.

The fuel load is low throughout the mitigation/restoration area. The species composition is appropriate for a beach community along the Apalachicola Bay, cover will increase with time.

The lower beach is dominated by approximately 60-80% overall cover of planted *Spartina alterniflora* which is surviving well and exhibiting both vegetative and sexual reproduction.

The upper beach is dominated by typical coastal species and 50-60% cover of planted *Spartina patens* which is surviving well and is exhibiting both vegetative and sexual reproduction.

Vegetation Assessment Field Form Qualitative Assessment	
Project: Cat Point Breakwater	Date: Jan 11 2011
Name(s) of Data Collectors: Caitlin Elam	Weather:35 degrees F, overcast
Environmental Description: Shoreline to breakwater in Apalachicola Bay.	Photo #'s
GPS Location: 29°43'54.63"N 84°53'1.61"W	Time: 3pm
Nuisance Species: None	Fuel Load: Low

Wildlife Observations: **Little Blue Heron, Killdeer, Sandpiper, many burrows, barnacles, clams, and sea lettuce living on breakwater.**

Water depth: **Low Tide**

Is the community observed along the walk path representative of the community being measured? **Yes**

To what degree is the restoration in this area trending towards success? **The restoration is trending towards success as exhibited by survival and vegetative and sexual reproduction of the planted species and the colonization of native beach vegetation.**

Potential Problems and solutions: **As previous storm events have shown a hurricane or storm could damage the planted vegetation on the beach.**

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Cenchrus spinifex	UB	1-5	Good	N		Y
Cyperus sp.	UB	1-5	Good	N		Y
Dichanthelium sp.	UB	1-5	Good	N		N
Eupatorium compositifolium	UB	1-5	Good	N		N
Fimbristylis spadicea	UB	1-5	Good	N		Y
Heterotheca subaxillaris	UB	1-5	Good	N		Y
Hydrocotyle bonarensis	UB	1-5	Good	N		N
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Paspalum sp.	UB	1-5	Good	N		Y
Phytolacca americana	UB	<1	Good	N		N
Pinus elliottii	UB	1-5	Good	N		N
Schizachyrium maritimum	UB	1-5	Good	N		Y
Serenoa repens	UB	<1	Good	N		N
Sesuvium portulacastrum	UB	1-5	Good	N		Y
Smilax bona-nox	UB	1-5	Good	N		N
Spartina alterniflora	LB	70-80	Good	Y	Y	Y
Spartina patens	UB	50-60	Good	Y	Y	Y
Sporobolus virginicus	UB	10-20	Good	N		Y

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