

December 12, 2012

The Richard Stockton College of NJ Coastal Research Center (CRC) has initiated a post storm survey and as

erosion the only avenue open. No sand arrives from the south. The best evidence for this was the limited success for the 2009 maintenance project focused on the West End site that declined by over 50% between 2009 and 2011. The Morris Avenue location 5,000 feet north benefited within 6 months however.

Another issue with the Long Branch to Sea Bright segment of the Army project was the failure to include a significant dune system in the original plan. The presence of the 28 foot high Sea Bright seawall and a 20+ foot high natural bluff in Long Branch armored with rock and steel allowed the dune to become more or less an after thought to the project's effectiveness. Initially, two lines of sand fence were erected in Sea Bright with grass planted between them. No initial ridge of sand was designed or built, so the dune system evolved naturally as naturally was

Century. Maintenance work was done on Phase I beaches in places, but none has been performed on the southern segment (Phase I) between Asbury Park and Manasquan Inlet. Based on the performance of the fill project, clearly the dune system's design needs to be evaluated and a new approach implemented along this pair of Monmouth County beaches as the post storm data is processed and analyzed.

* Below is a map showing the location of each profile.

Roosevelt Ave. Deal

404 Ocean Ave. Long Branch

Pullman Ave. Elberon

Beach Club Monmouth Beach

805 Ocean Ave. Long Branch

Cottage Ave. Monmouth Beach

West End Ave. Long Branch



Figure 1. NJBP Profile Locations between Roosevelt Avenue, Deal and Sandy Hook National Seashore, Monmouth County, New Jersey

The Roosevelt Avenue site is located north of the Deal sewage pumping station built in 1906 at the base of the sedimentary bluff. It is essentially a three-story building with just the top story presented at the end of Roosevelt Avenue. South of this street is a series of private homes built on the bluff with a decent sand beach seaward of the dune mantled bluff edge. Phillips Avenue is the location of a public bathing complex that was totally destroyed by the loss of the Phillips Avenue fishing pier built decades ago over the rock groin at the end of Phillips Avenue. North of Roosevelt Avenue there is essentially no dry beach between closely spaced groins. Site #170 has a 26-year history of a wet beach against the rocks. Occasional offshore bars have migrated to the shoreline yielding a temporary dry beach less than 25 feet in width. Sandy's waves overtopped the rock wall and scoured deeply into the soil, fill debris (bricks etc.) and bluff sediments. Water poured landward flooding both Roosevelt and Ocean Avenues to 3-foot depths as seen in debris lines on nearby properties. The tile roof was torn off the seaward side of the sewer plant pumping station and all three floors of the facility were filled with seawater. Deal's \$650,000 investment in rehabilitation of the facility last year was in ruins.

This single cross-section located in Elberon at Pullman Avenue demonstrated the susceptibility of even the high bluff located here (28 feet NAVD88) to major erosion from the storm surge and waves generated by Hurricane Sandy. Homes built at the bluff edge were destroyed by waves with about a third of each lot's width inland gone.

inland

remnant of grass east of the southbound roadway.

transport to the staging area. The beach was much lower and narrower because only 53% of the initial sand volume was still present from the Federal project. In addition, no dune had been designed into the project, but irregular sand dunes had appeared over time by natural growth processes.

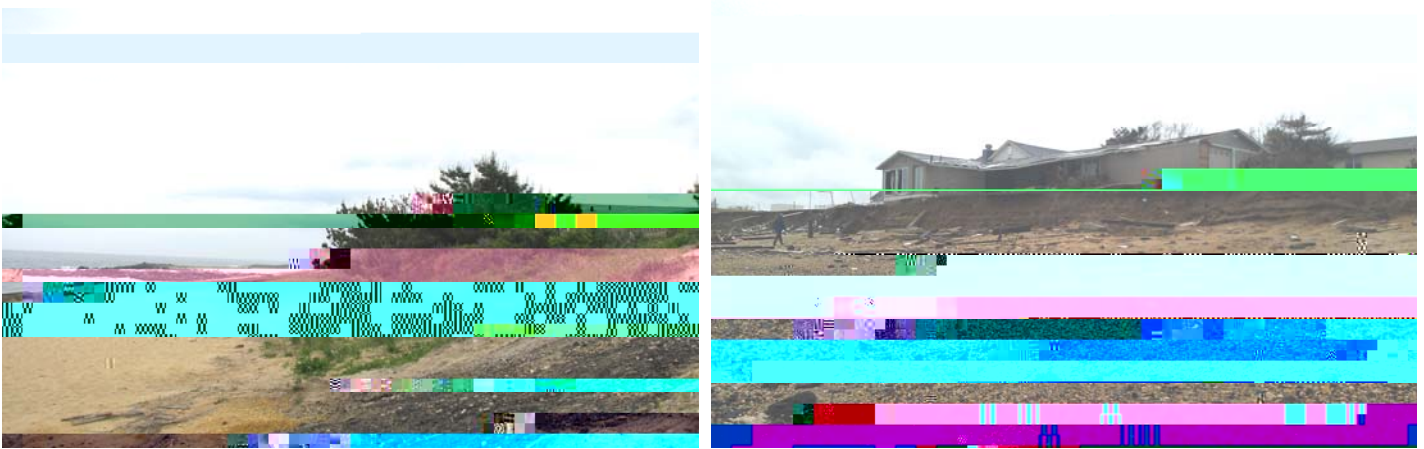
This site was the only northern Monmouth County site along Phase I Federal project that had exceeded the initial sand volume placed on the beach (116%). Even so, the storm waves broke over the Sea Bright seawall as they ramped up the sand against the rocks allowing waves to run up to crest the 28 foot wall. The beach profile was reduced in elevation and width.

This northern location lies just south of the bridge to Atlantic Highlands across the entrance into the Shrewsbury and Navesink Estuaries. The beach was at 74% of the initial Federal project placement sand volume and waves ran up and over the wall, but in a lower magnitude based on the sand found landward of the wall. Also, there was a much smaller ramp leading to the top of the wall on the seaside. Located close to the fetch limit produced by Long Island, perhaps the waves were simply smaller.

Each location was surveyed following Hurricane Sandy between November 12 and 26, 2012. The profile lines were surveyed using RTK GPS with data points on the dune, beach and shallow offshore regions or using a total station electronic transit at sites where the fall 2012 surveys were not completed prior to Sandy (Sites #177 to 183). Because not all sites were surveyed to closure depth following Sandy, all sand loss figures apply to the dune/beach system only and do not account for a percentage of sand dragged offshore by Sandy's waves, to return later in time. This recovery process was clearly already underway at all locations as of November 12th.

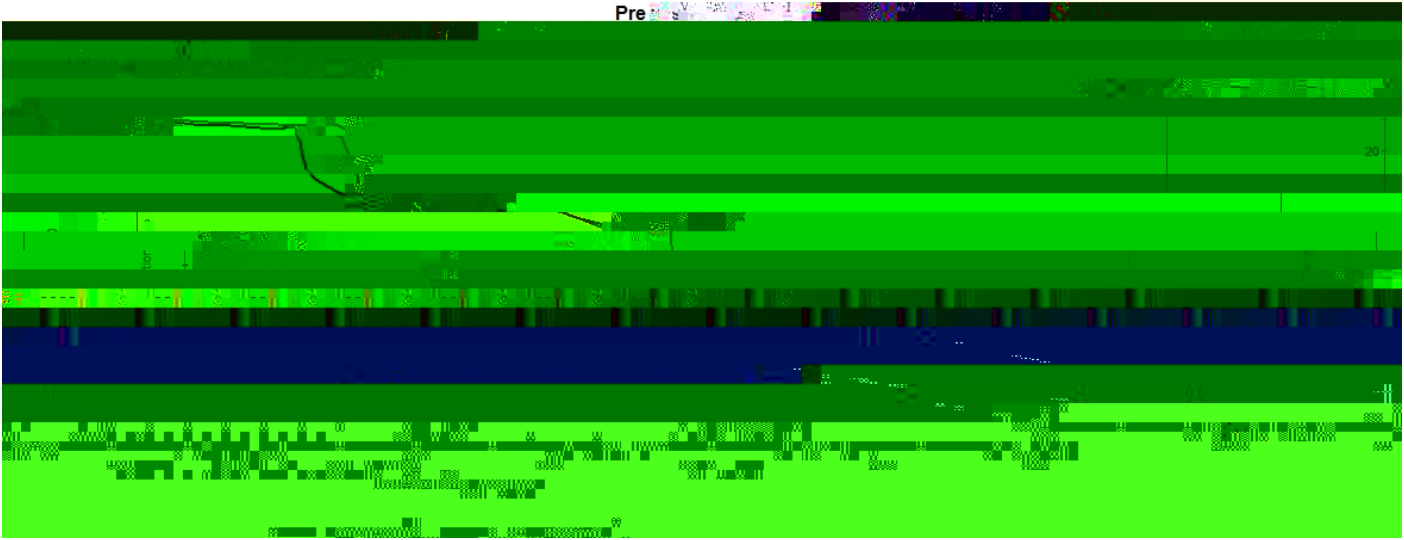


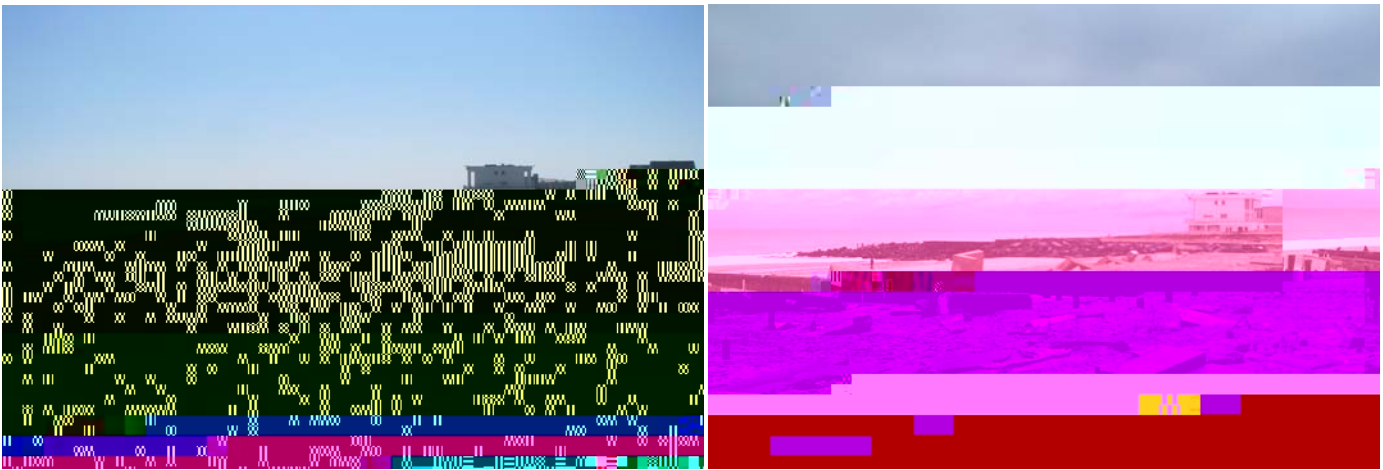
The photographs above were taken on May 13, 2012 (left) and November



The photographs above were taken on May 13, 2012 (left) and November 13, 2012 (right).

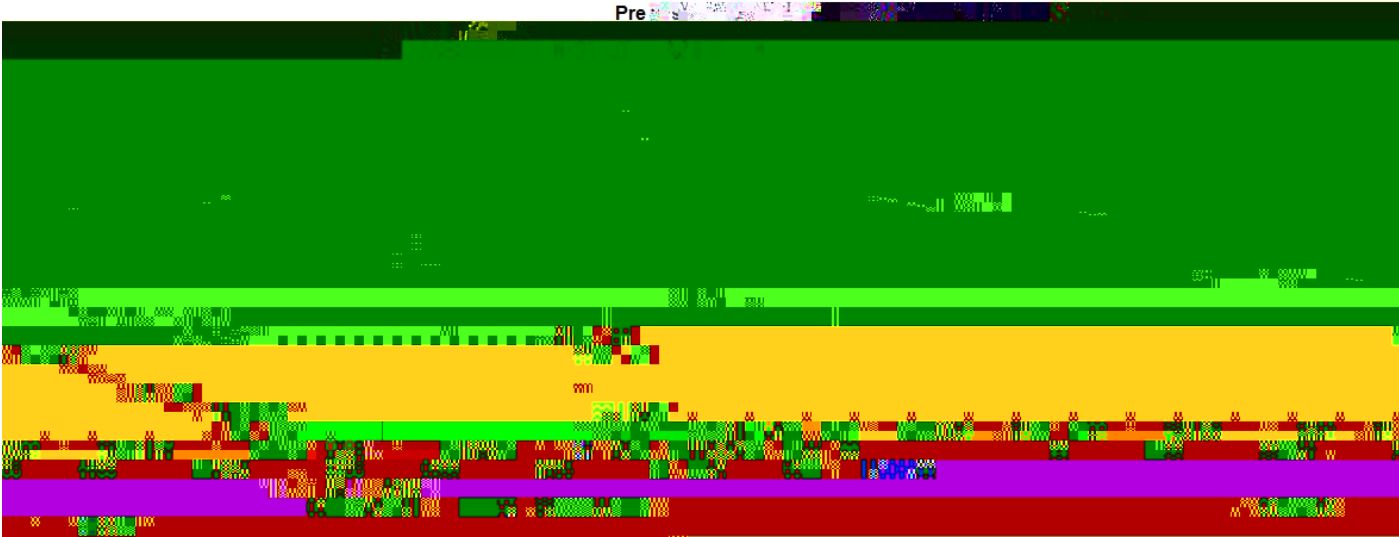
Figure 3. This site is located on the highest point along the bluff shoreline and in the past, has had very little sub aerial beach as this community was not included in the Federal beach nourishment projects. Prior to Hurricane Sandy the private properties were separated from the shoreline by a bulkhead and rock revetment which rises 12 feet in elevation and was un damaged. However, waves apparently broke over the rock revetment, attacked upper un armored bluff sediments and pushed the edge back 40 feet. The waves reached both homes either side of the street destroying both and removing a third of the building lot in the process. A small wedge of sand was observed in the corner created between the revetment and the south groin in this cell. The beach in front of the profile was virtually unchanged.

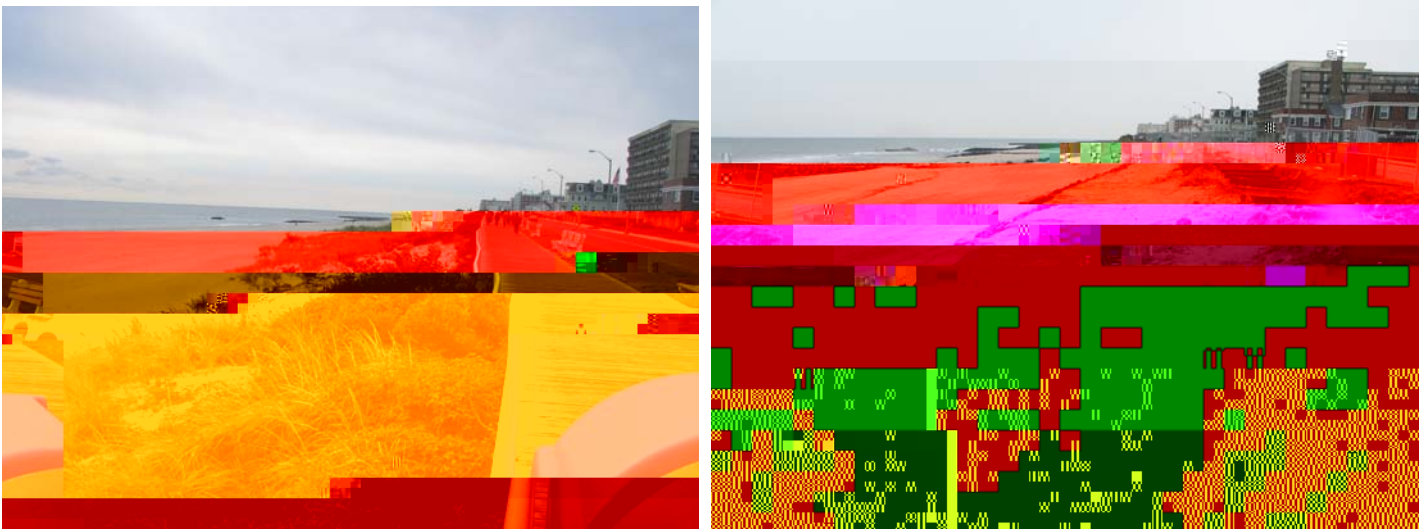




The photographs above were taken on October 5, 2012 (left) and November 13, 2012 (right).

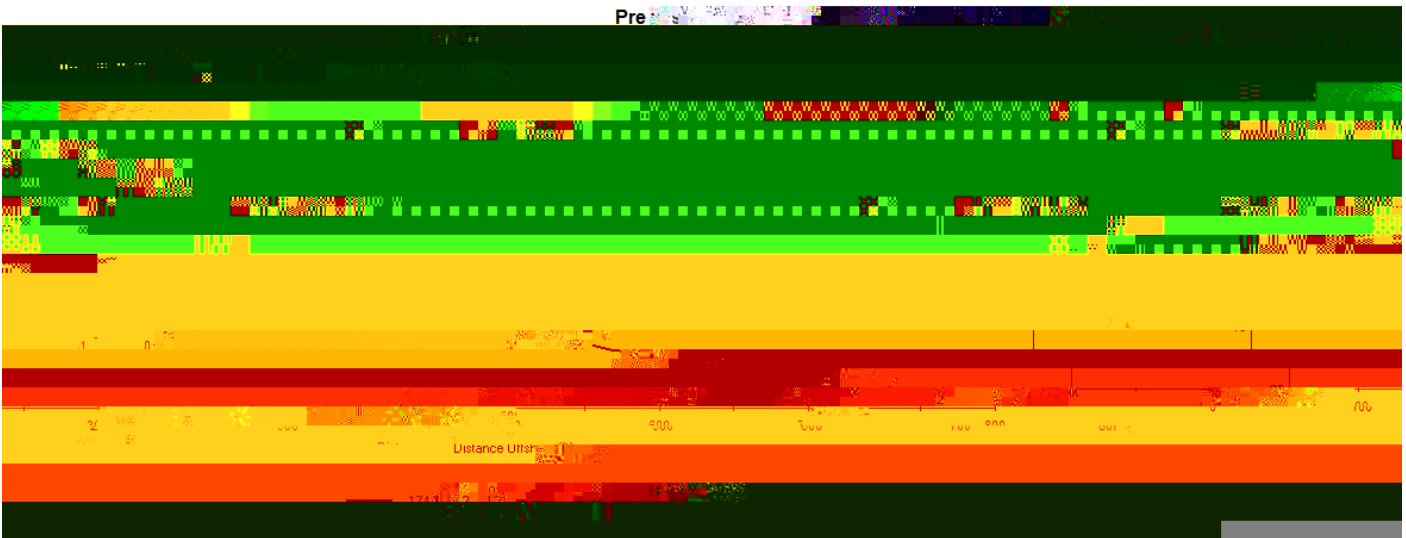
Figure 4. This site was established in 2010 and has gained in sand volume over the past two years. Unfortunately, Hurricane Sandy stripped sand from the beach and pushed the berm landward. All structures landward of the original dune crest were erased and reduced to rubble. Sand was pushed landward or washed back out to sea.

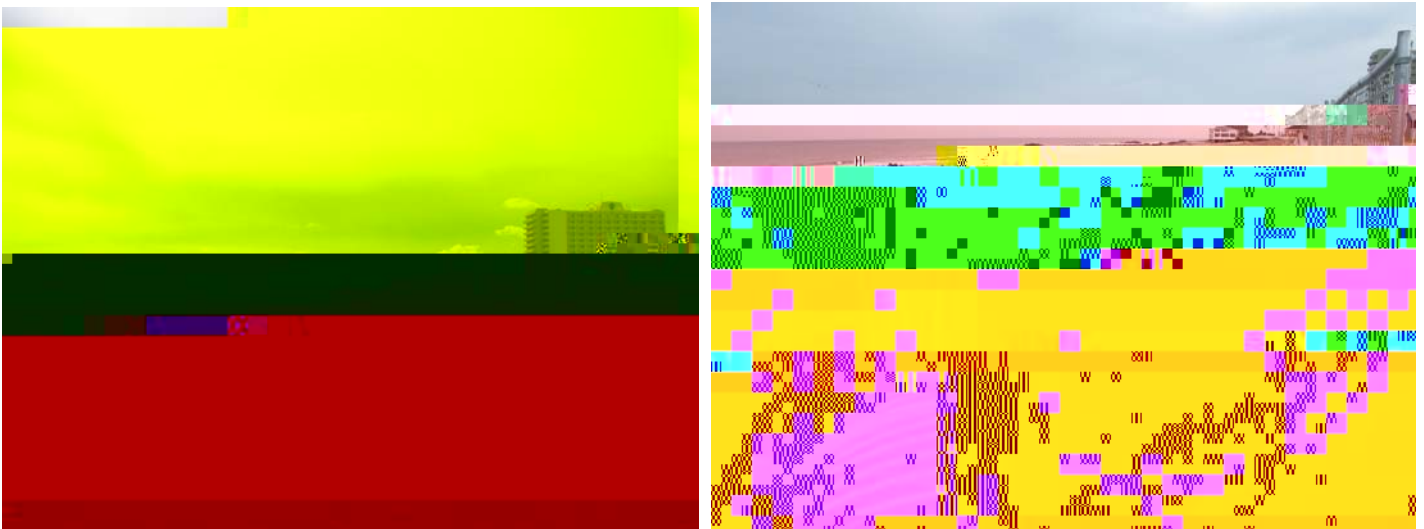




The photographs above were taken on October 8, 2012 (left) and November 13, 2012 (right).

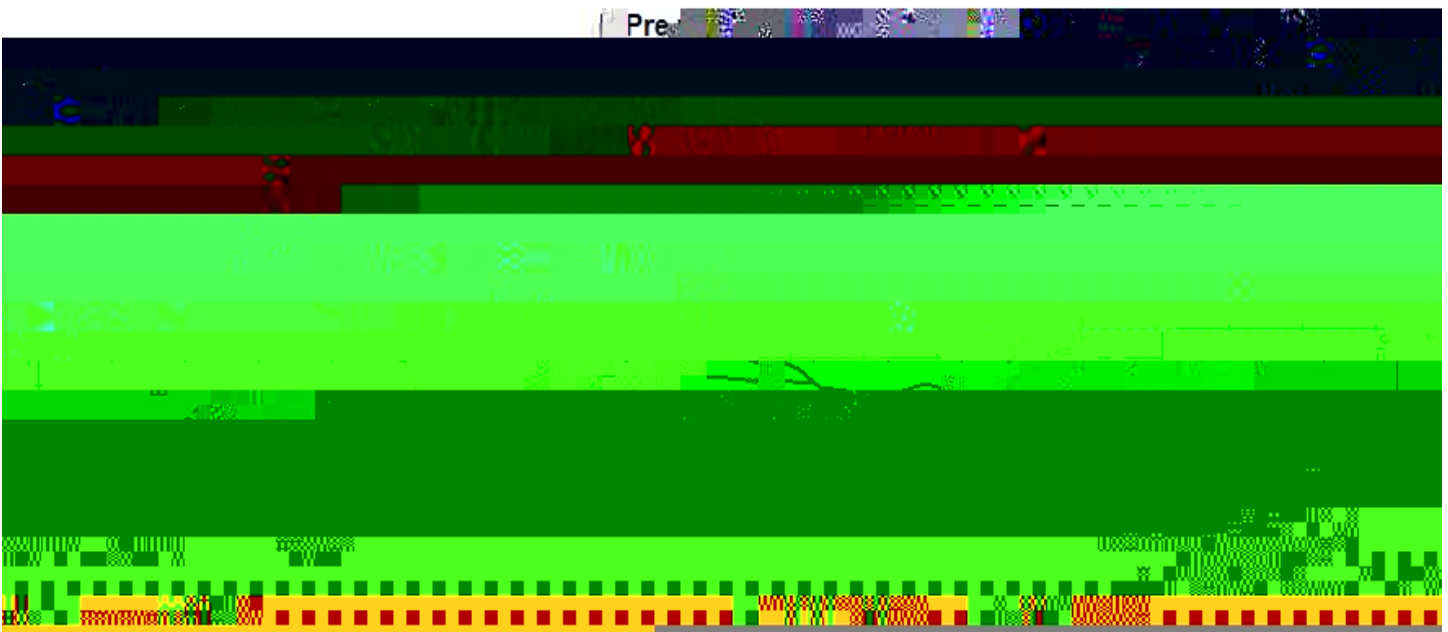
Figure 6. This site also was the recipient of the Federal beach nourishment project and was a direct beneficiary from the 2010 maintenance fill completed to the south. Strong northerly littoral sand transport moved abundant sand from that project into this segment. Hurricane Sandy removed the sand from on top of the seawall, eroded into the upper bluff sediments and destroyed the boardwalk. The beach was reduced in elevation and width with sand deposited offshore. The recovery berm and a small offshore bar are indicated on the survey from 11/13/2012.

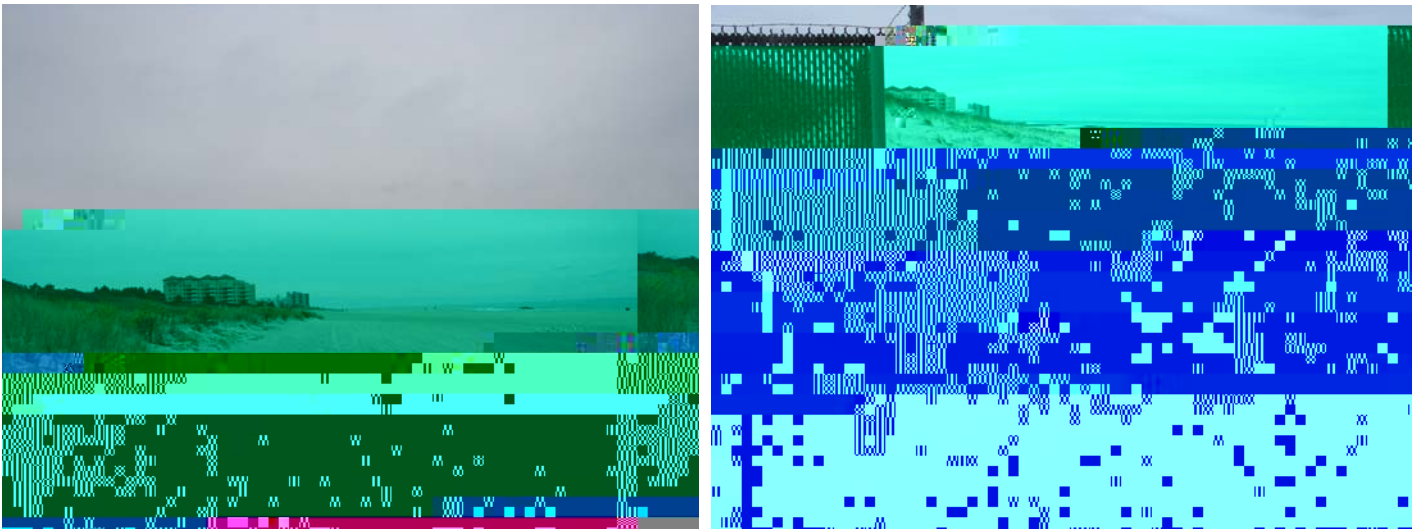




The photographs above were taken on October 8, 2012 (left) and November 13, 2012 (right).

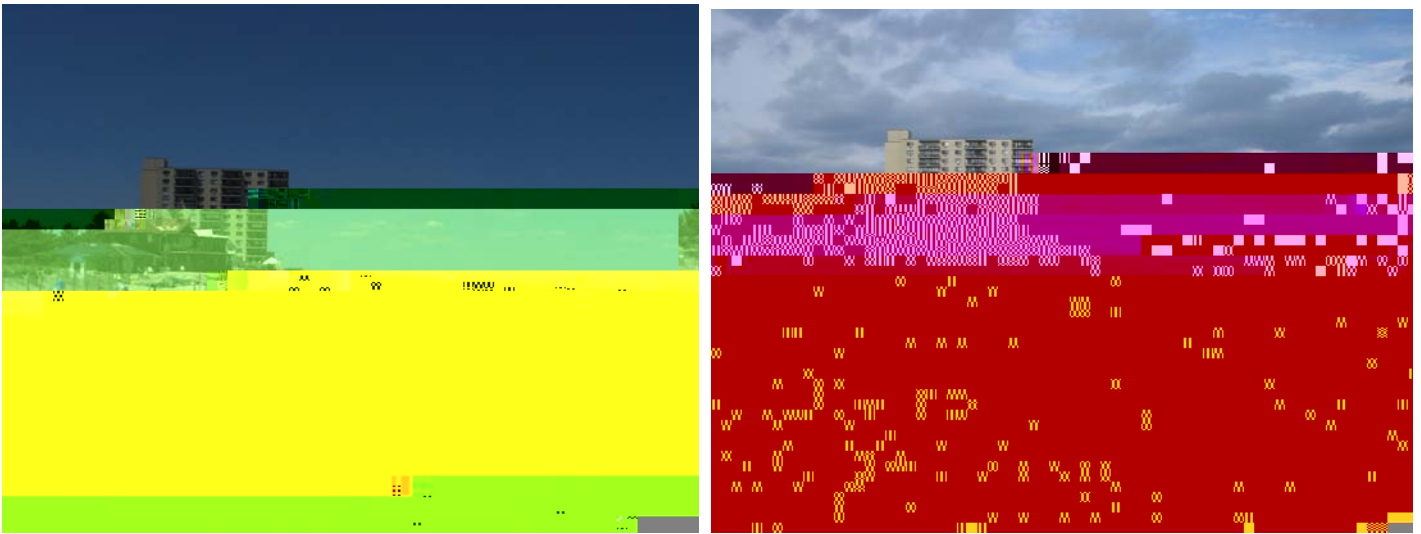
Figure 7. This site lost a huge amount of sand from the berm with some moved over the vertical steel wall, but the vast majority deposited offshore beyond the reach of the wading profile survey. The railing on the right photograph was bent landward by wave action 17 feet above the zero datum elevation.





The photographs above were taken on October 8, 2012 (left) and November 13, 2012 (right).

Figure 8. This site is a



The photographs above were taken on May 31, 2012 (left) and November 25, 2012 (right).

Figure 10. This profile was the recipient of the initial Federal beach nourishment project and since that time, shoreline and volume changes have been relatively stable. Hurricane Sandy removed significant amounts of sand from the berm, destroyed a moderate sized dune and utterly destroyed the buildings associated with the facility. Sand was not carried offshore because much of the loss was moved either landward or to the immediate



The photographs above were taken on May 31, 2012 (left) and November 21, 2012 (right).

Figure 11. This site



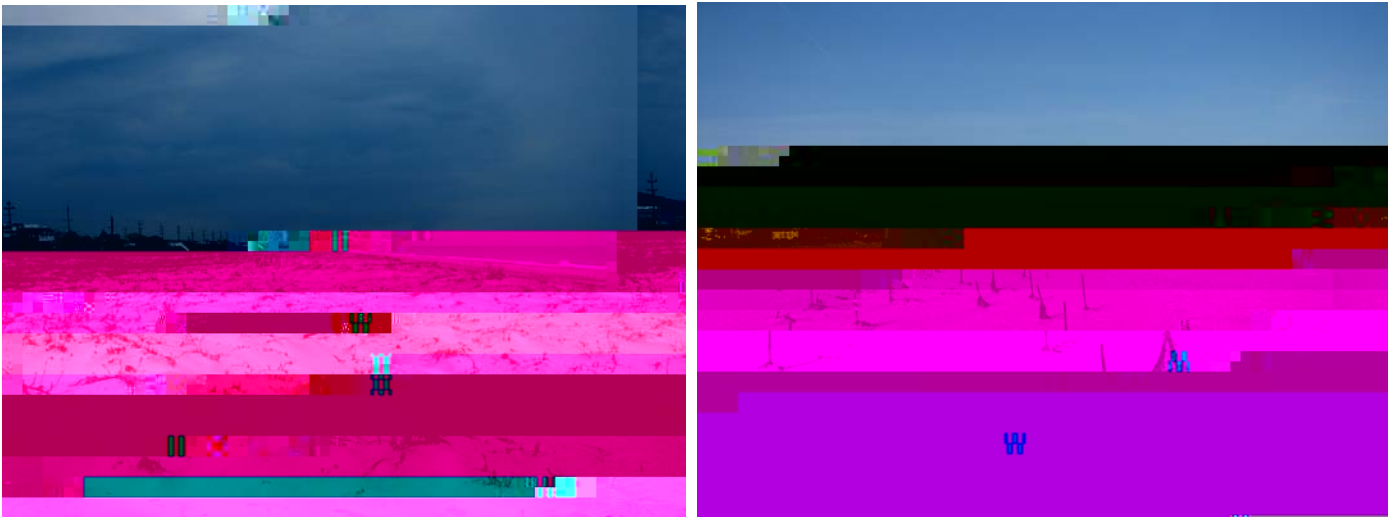
The photographs above were taken on May 30, 2012 (left) and November 21, 2012 (right).

Figure 13. This site was the most heavily damaged along the northern Monmouth County shoreline because there was a gap in the rock seawall at the municipal beach protected by dunes (but with large grade level pedestrian gaps) and an aging, low bulkhead separating the beach from the municipal services and ward. Sandy blasted through these defenses and wrecked the fire



The photographs above were taken on March 22, 2012 (left) and November 21, 2012 (right).

Figure 14. At this location, low, wide dunes established naturally following the initial Federal beach nourishment project did not stop the wave damage. Sand volumes have been relatively stable since that time. Hurricane Sandy's storm surge and waves relocated sand from the dune and berm both landward to the rocks, over the rocks sand to the nearshore. E.ely28l 8a 02n



The photographs above were taken on March 28, 2012 (left) and November 26, 2012 (right).

Figure 15. This site was included in the initial Federal beach nourishment project but did not include an engineered dune. A low, wide dune field was established surrounding a pair of fence rows built immediately following beach restoration and planted with grass between them. The left photograph shows the natural development of the dune system over the past 12 years. The site has gained in sand volume since the project (116% of



The photographs above

Summary& Conclusions

SiteLocationandNumber	SiteSandVolume Change(cuyds/ft)	DuneFailure(Y or N)	Dateof Recent BeachFill
Deal	170	NoDataYet	Never
Elberon	171	13.60	Never
LongBranch	272	r	



Figure 18. This is a graphical display of the sand volume lost at each site combined with an indication of the presence, absence or failure of the dune system along the Northern Monmouth County shoreline. The natural area north of Sea Bright

Elberon	171	no project	13.60	13.60	Bluff Retreat	Never	5527	75,172	141,379
Long Branch	272	no project	71.38	42.29	Failed	Never	1418	101,185	242,564
Long Branch	173	362	23.97	47.68	Bluff Retreat	1999	3283	78,695	321,259
Long Branch	174	216	40.72	32.35	Bluff Retreat	1999	4886	198,973	520,232
Long Branch	175	97	46.76	43.74	No Dune	1998	3353	156,767	676,999
Long Branch	176	83	62.07	54.42	No Dune	1998	2192	136,066	813,065
Long Branch	177	7	45.87	51.25	No Dune	1997	2096	96,130	909,194
Monmouth Beach	178	198	69.38	59.87	Failed	1994	2647	183,648	1,092,842
Monmouth Beach	179	309	48.83	61.92	No Dune	1994	2949	143,976	1,236,818
Sea Bright	180	124	22.60	25.48	Failed	1995	4559	103,044	1,339,863
Sea Bright	181	111	16.70	10.03	Failed	1995	5382	89,873	1,429,735
Sea Bright	182	106	31.20	8.47	Failed	1995	1937	60,437	1,490,172
Sea Bright	282	95	37.13	4.28	Partial	1996	4206	156,159	1,646,331
Sea Bright	183	86	34.10	1.93	Failed	1996	4742	161,702	1,808,032