



New Jersey Beach Profile Network

Atlantic County

Little Egg Inlet
to Great Egg Harbor Inlet

NJBPN Profile #'s
134 - 126

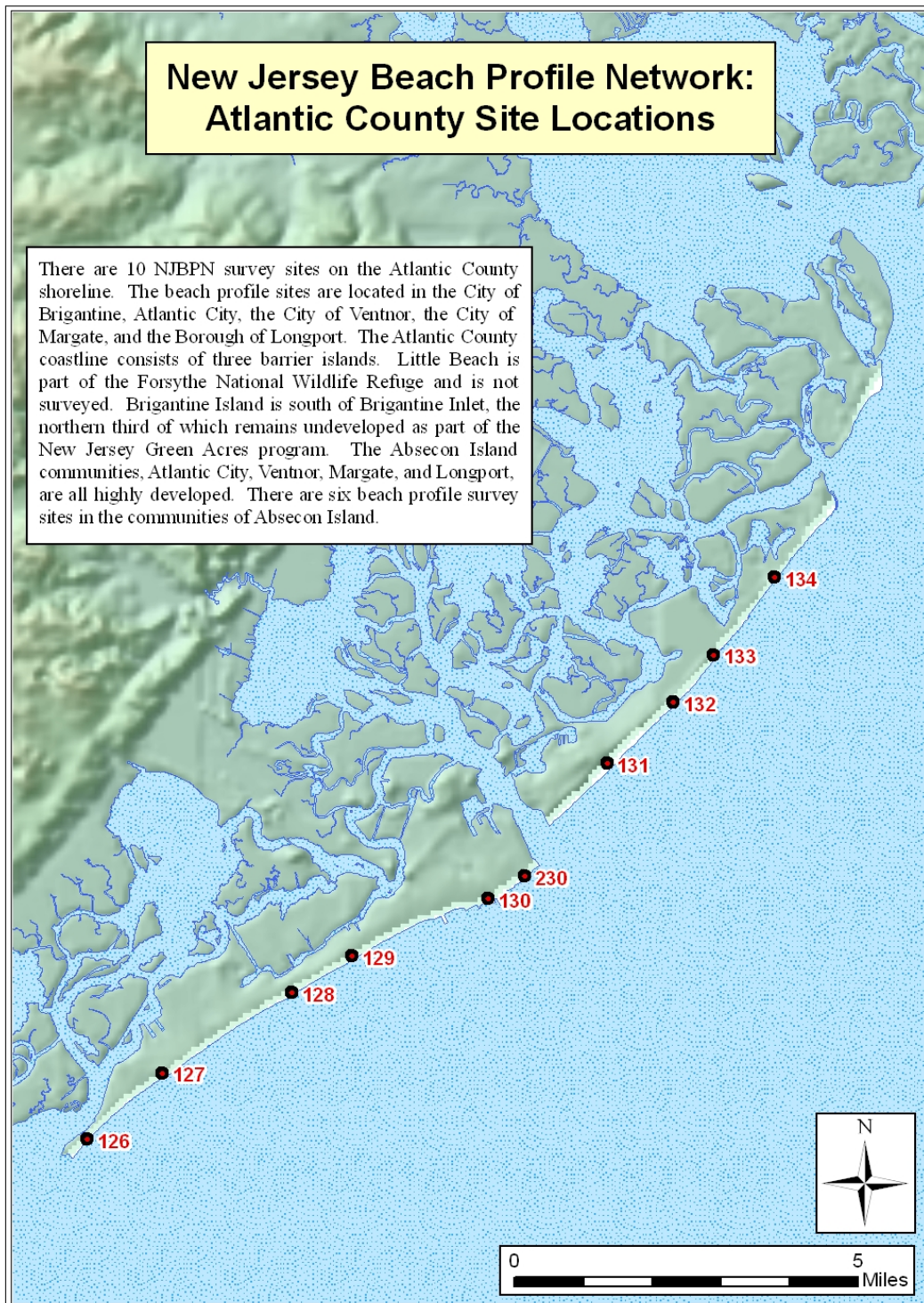


Figure 74. Location map for the 10 NJBPN profile sites in Atlantic County, NJ

Hurricane Sandy's Impact on the Atlantic County Ocean Shoreline;

In general terms, damage to beaches, dunes and public or private property was significantly worse on the north side of the storm's zone of coastal landfall in Atlantic County. Southern Cape May County fared best with limited overwash, dune scarping and loss of beach elevation. Damages increased towards the region of landfall with moderate dune breaches, especially in southern Ocean City area, and damages to southern Absecon Island's oceanfront properties. The wide beach in Brigantine combined with multi-ridged dune systems along half of the City's oceanfront precluded any wave damage. Backbay flooding was a major problem however. Further north in Brigantine, a narrow beach allowed waves to wash across Ocean Avenue and in the natural area north of development, overwash was a common natural process.

Beach/Dune Damage Assessment by Municipal Segment:

To measure the erosion, information previously collected at the 10 Atlantic County New Jersey Beach Profile Network (NJBPN) monitoring sites was used to provide the pre-storm view of existing shoreline conditions. On November 6, and 12, 2012 each site was visited and a GPS-based survey of the dune, beach and shallow offshore region was completed to provide an accurate comparison and assessment of storm related shoreline and beach volume changes. Data collected at the 10 oceanfront beach profile locations cover the municipal beaches from the City of Brigantine Beach to the Borough of Longport. Little Beach on Pullen Island to the north of Brigantine is a natural area and is not included in the NJBPN program. Aerial photography post-Sandy does show overwash of the Little Beach Island's central portion with shoreline retreat now at a dune system that first developed in the 1880's and had remained well inland since then.

Federal or NJ State Coastal Projects;

In 2004 the US Army Corps of Engineers, Philadelphia District, conducted a Shore Protection project from Absecon Inlet, south to the Ventnor City/Margate City boundary on Absecon Island. The design was for a 150-foot wide beach in Atlantic City and a 100-foot beach width in Ventnor backed up by a 14.5-foot elevation at the crest dune that was vegetated and fenced with sand fencing and pedestrian access pathways to the beach. Since Margate and Longport declined to participate, their municipal shorelines did not receive direct sand placement. The maintenance cycles were delayed until 2011 when the ACOE return to place sand on the northern portion of the Atlantic City shoreline. Fortunately, this task was very recently completed when Sandy came ashore (June 2012). A second maintenance cycle is set to begin in 2013. An Absecon Inlet project to rebuild the inlet rock revetment to a uniform standard and remove over a century of accumulated debris from earlier shore protection efforts along the inlet sand beach is moving toward construction under ACOE jurisdiction.

The ACOE project for Brigantine was focused on the northern third of the developed shoreline. A feeder beach was designed into the project at the southern 1,600 feet of the natural area north of development. The project extends south to 5th Street South in the City. In 2006 the initial Federal beach restoration was completed and extended to the south the footprint of two prior State and local projects from 1997 and 2001. In 2011 an emergency maintenance was completed under the Flood Control and Coastal Emergencies funding program using trucked-in sand. Restoration plans are in process to complete the Brigantine beach replenishment as well.

Brigantine;

The northern-most profile site on the Island of Brigantine is located on the undeveloped northern end of the island now in the possession of the State of New Jersey. This location was overwashed by waves from the ocean to the bay marshes by Sandy. The vegetation survived behind the dune ridge, so re-growth is assured, but at a more landward location. The northeast storm of 1992 was the last time this occurred.

Where development begins, the beach has been erosional due to the orientation difference between the physical infrastructure and the long-term changes in the shoreline. The Federal project includes a part of the natural shoreline where sand is placed to act as a feeder beach to the worst of the erosional segment. Waves crashed over the promenade and flooded Brigantine Boulevard. Prior to Sandy, the beach was wet to the toe of the rock revetment, so provided little protection. Dunes and a dry beach appear near the southern end of the promenade where steep scarps were in evidence going south to approximately 25th Street South. The dune-defended section did much better in stopping the storm waves except at 15th Street South where a large, multistory building occupies the footprint of the dune. Both the 15th and 14th Street ends and the building's parking lot were overrun by waves and sand was transported into Ocean Avenue.

However, south of 15th Street South, the ever-widening beach absorbed the storm surge and the wave energy with no ill effects on any public or private property. The berm was eroded and sand pushed landward into the seaward-most part of the dune area.

Atlantic City;

Absecon Island has been under development since 1852 when Atlantic City was founded. Beach nourishment has been a part of the shoreline management strategy since the 1930's with a Federal project in place since 2003. Most of the material has been placed between Absecon Inlet and Iowa Avenue. In 2003 the ACOE placed sand between Absecon Inlet and the Ventnor City/Margate City boundary. The towns of Margate and Longport declined to participate in the Federal project and the last beach material applied to either was 190,000 cubic yards deposited in Longport in 1990. The dunes were constructed to an elevation of 14.5 feet NAVD88 and were just high enough to withstand the wave run-up during Sandy. Post storm surveys encountered large dimensioned timber debris on the crest of the dune at North Carolina Avenue and among the lower dunes in Ventnor. The lack of consistent shore protection allowed significant wave damage to occur along the Absecon Inlet shoreline in the City. One source of debris causing damage was the decking from the inlet boardwalk that was destroyed. Slated for demolition, the decayed structure came apart during the storm and large sections of decking washed into the City along the inlet. The oceanfront beach lost width and elevation, but the dunes prevented damage to the City's famous boardwalk.

Ventnor City;

Ventnor chose to participate in the 2003-2004 Federal beach restoration project. The Dorset Avenue site saw no serious impact from Sandy other than beach elevation loss and a narrower berm width. Further south toward Margate, the end-effect losses to the Federal project allowed waves to reach the timber bulkhead protecting the upland development and water came over the bulkhead at a variety of locations.

Margate City;

Margate City had significant amounts of water wash over the timber bulkhead at the development limit and inundate the streets and properties immediately landward. At the Benson Avenue site a lack of dunes, but a very wide beach permitted wave energy to deposit sand to the very top of the bulkhead, over it and into the street. Workers were busy shoveling it into wheelbarrows and rolling it out of the restaurant kitchen that backs up to the bulkhead at the street end. The berm supplied most of the material transported landward. Some spots did have “island” dunes that acted to protect from the overwash process, but in many cases the water came into the City.

Borough of Longport;

The southern community has an old concrete seawall protecting some of the development with a narrow, low elevation beach to the seaward. Waves crashed into the wall and poured over it down most of the Borough streets into Atlantic Avenue. Since the homes are very close to the wall, house damage was evident as well. Flooding was apparent and structural damage was wide spread. Many oceanfront properties had expensive landscaping with outside structures in abundance. These were destroyed. Longport also has a southern tip with no beach and a rock revetment seaward of a timber bulkhead with homes pressed right up to the top of the timber structure. Each of these expensive properties had the first floor of each residence ripped open and flooded with enough force to transport the electric distribution substation into the street. The homes can be restored, but the price will be high.

A seldom discussed issue emanating from Hurricane Sandy damage that is not included in any recovery program was the destruction of tens of thousands of high-quality, and therefore, expensive landscaping projects surrounding homes subject to either wave overwash or flooding from the bayside storm surge. Salt water percolating into the soil killed or is the process of killing millions of plants that will need replacing at each owner's expense.

Individual Site Locations in Atlantic County:

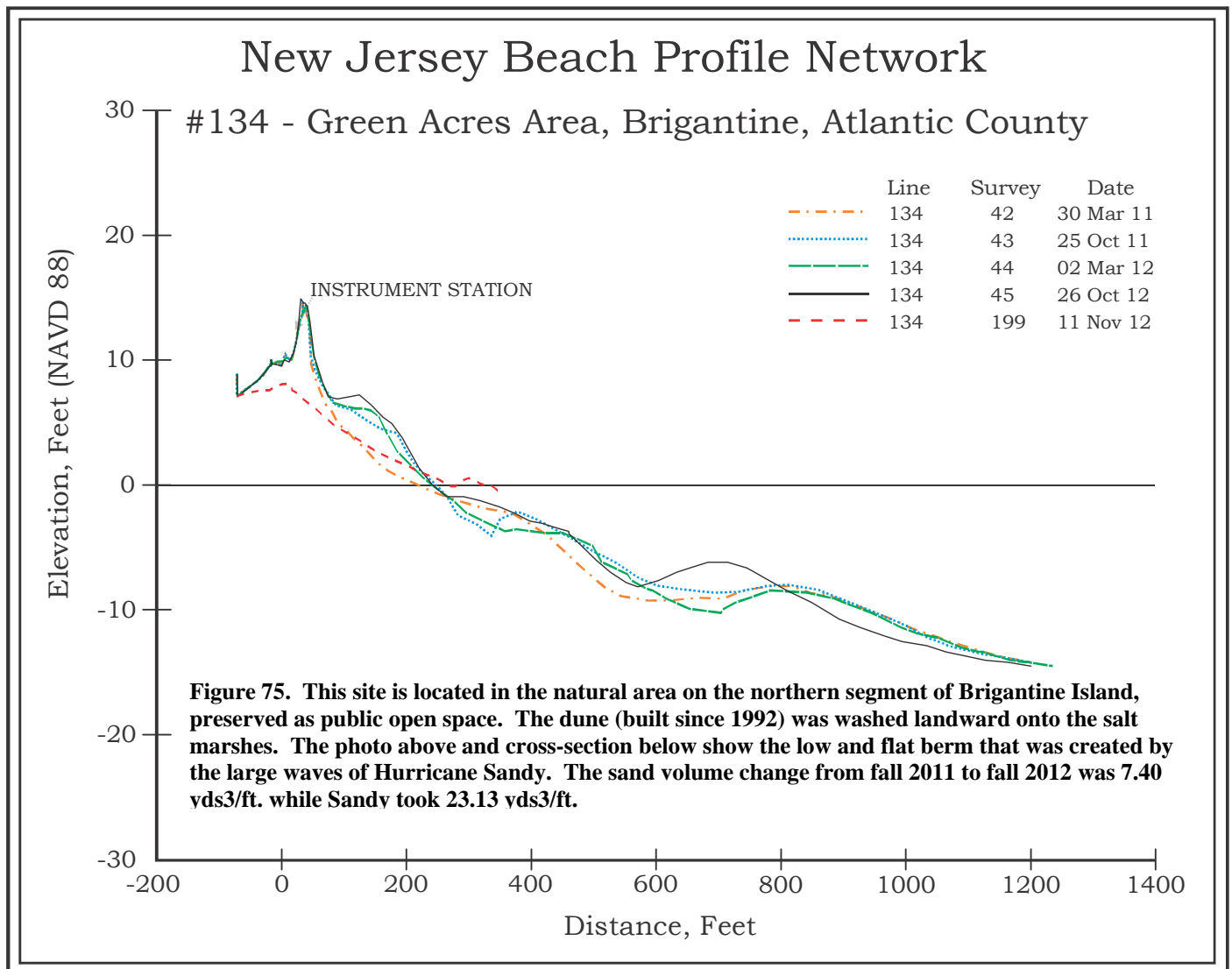
All Atlantic County sites had been visited earlier in the fall of 2012, so required site visits as soon as possible following the storm. The photographs show the fall, pre-Sandy beach conditions as compared to the photographs taken on the day the site was surveyed following the storm. As the post-storm surveys progressed, the natural sand volume recovery on the beach was easily observed and can be seen in the cross sections. The early November time frame of Atlantic County shows a small step-berm built near the low tide line as the initial wave transport moved sand transported offshore during the storm began moving landward, back to the beach. Therefore, only minimal recovery had occurred by the 11th of November 2012.

The normal activity showed that just prior to Hurricane Sandy, the county beaches all had decent width berms with as wide a beach as could be expected following a benign summer of constructional waves. There had been no storm activity for exactly one year between events that resulted in Federal Disaster declarations.

NJBPN 134 – Green Acres Area, Brigantine



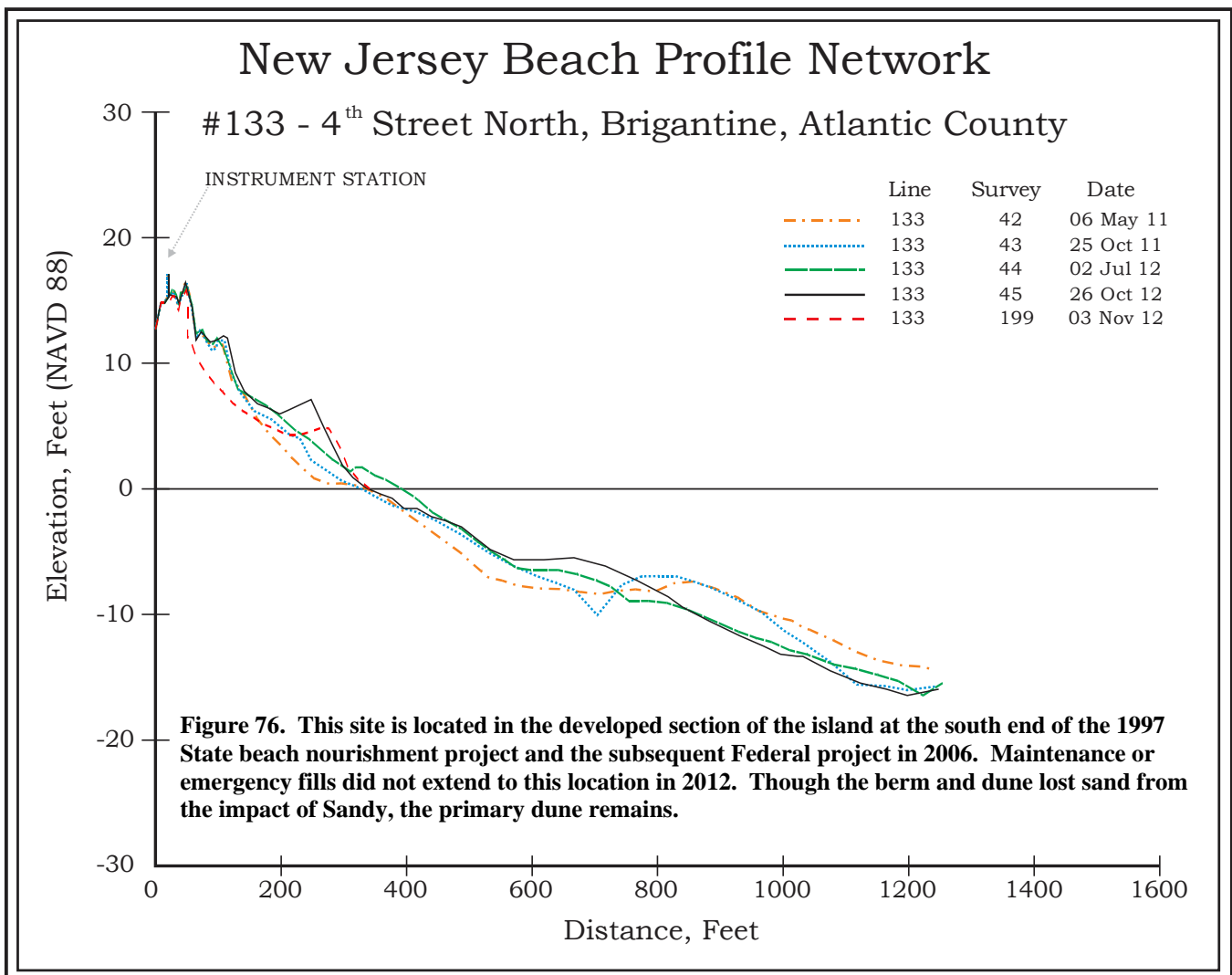
The photographs above were taken on October 26, 2012 (left) and November 11, 2012 (right). The dune on the left started from nothing in January 1993, and was washed flat by Sandy (right). It is likely that the posts in the right picture date from the original 1992 post-storm effort to re-create the dune along this open-space beach.



NJBPN 133 – 4th Street North, Brigantine



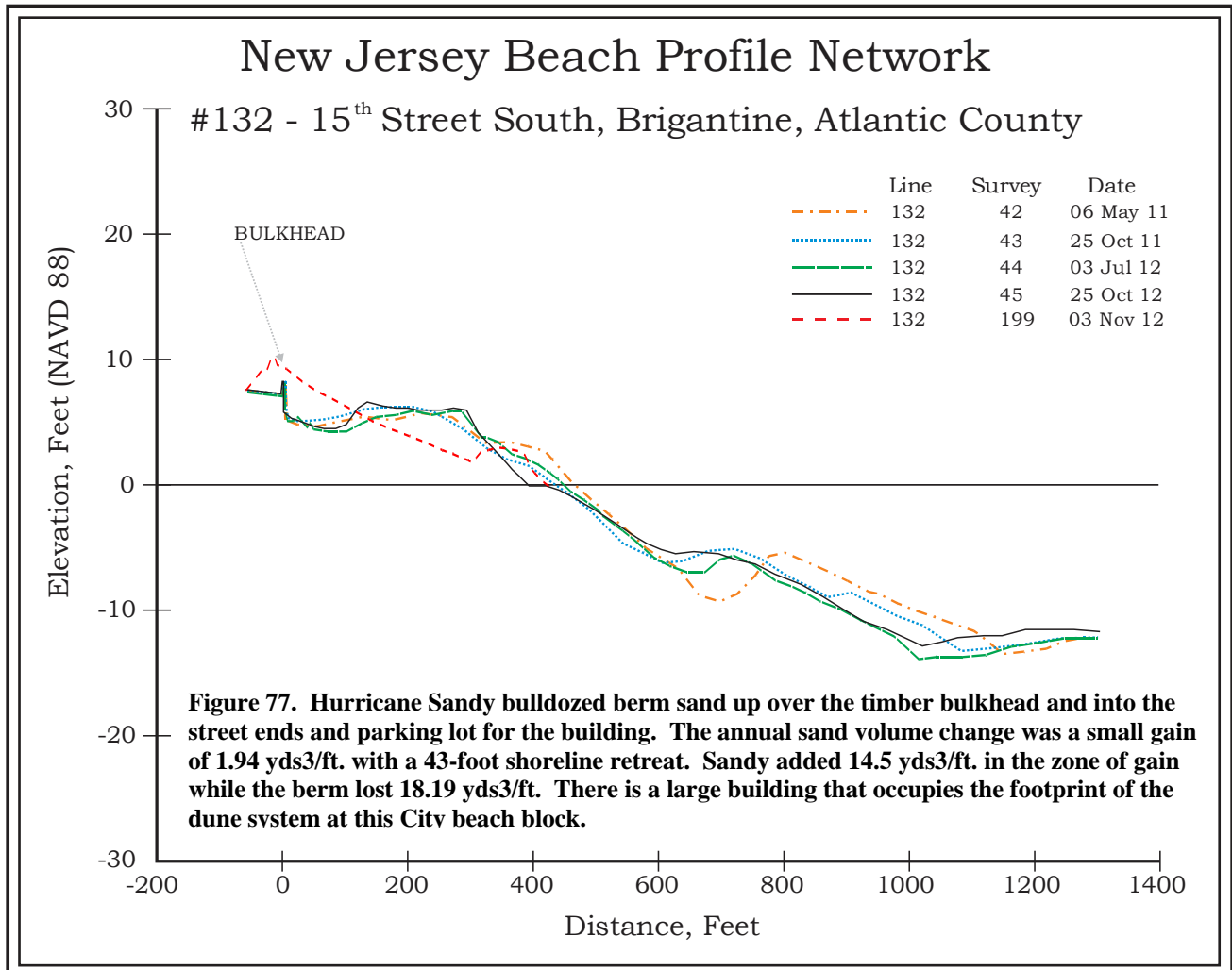
The photographs above were taken on October 26, 2012 (left) and November 3, 2012 (right). The seaward slope of the dunes was truncated by Sandy with sand moved seaward. Minor overwash at street ends occurred in places, but wholesale damage was absent.



NJBPN 132 – 15th Street South, Brigantine



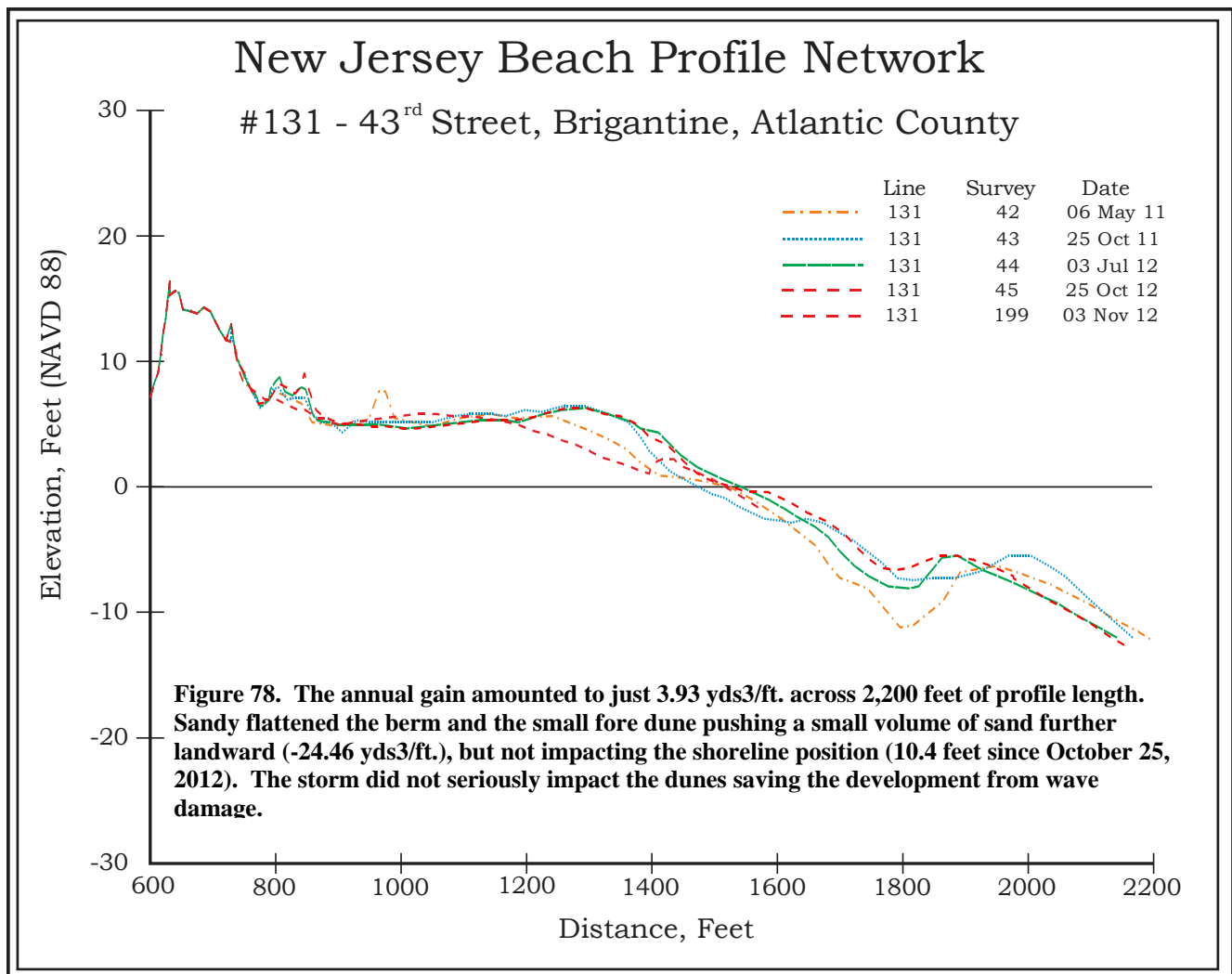
The photographs above were taken on October 25, 2012 (left) and November 3, 2012 (right). This part of the beach lies in a zone where little erosion or accretion has occurred until beach nourishment started in 1997. Since then the shoreline has moved seaward by 200 feet. But the damage was caused by a lack of dunes in front of the parking lot and the building at 15th Street South.



NJBPN 131 – 43rd Street South, Brigantine



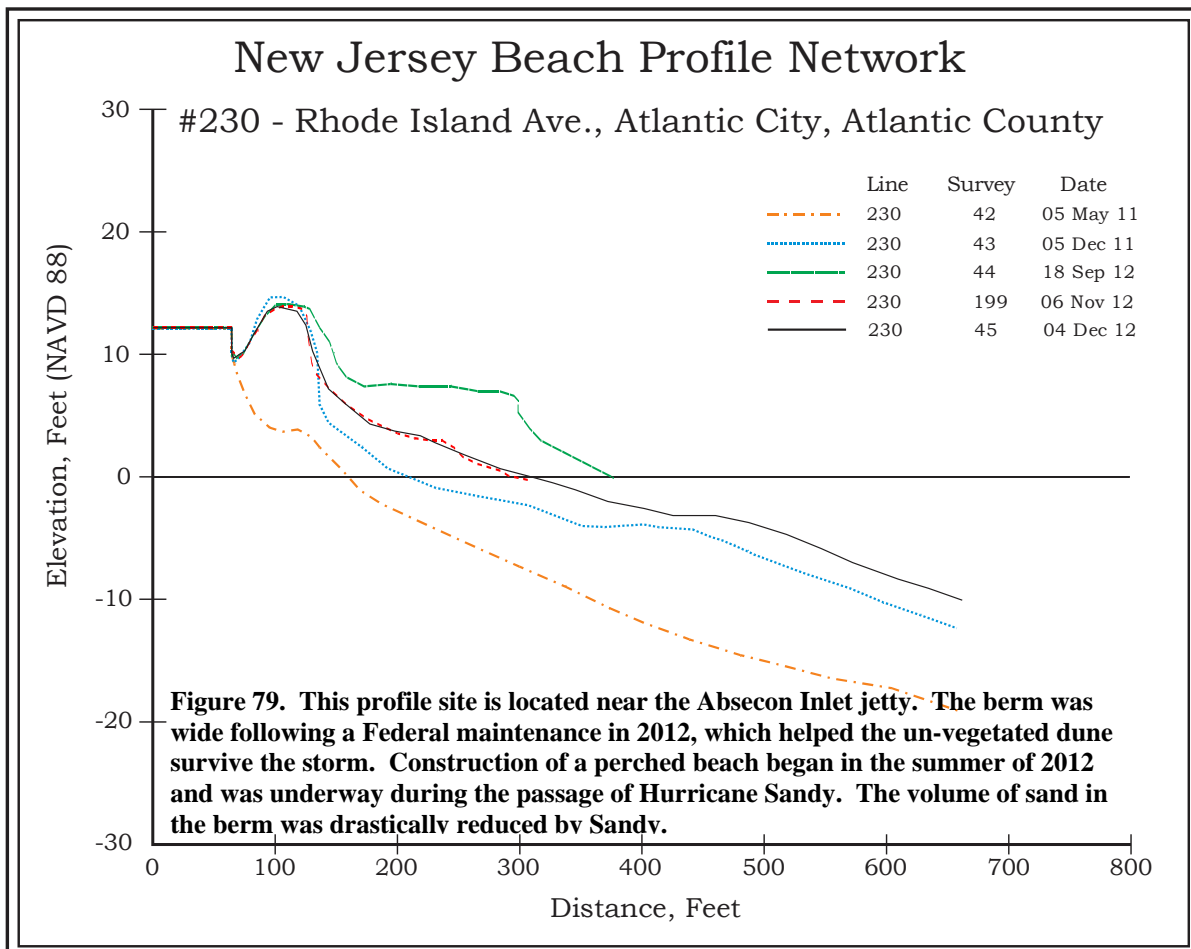
The photographs above were taken on October 25, 2012 (left) and November 3, 2012 (right). The large building at 15th Street South shows in both pictures in the distance. From the large building at 15th Street, to a mile south of this site, the beach width is huge with multiple rows of vegetated dune ridges to the landward site. The storm surge and wave energy expended itself in the dunes closest to the back beach margin with no ill effect on the development.



NJBPN 230 – Rhode Island Avenue, Atlantic City



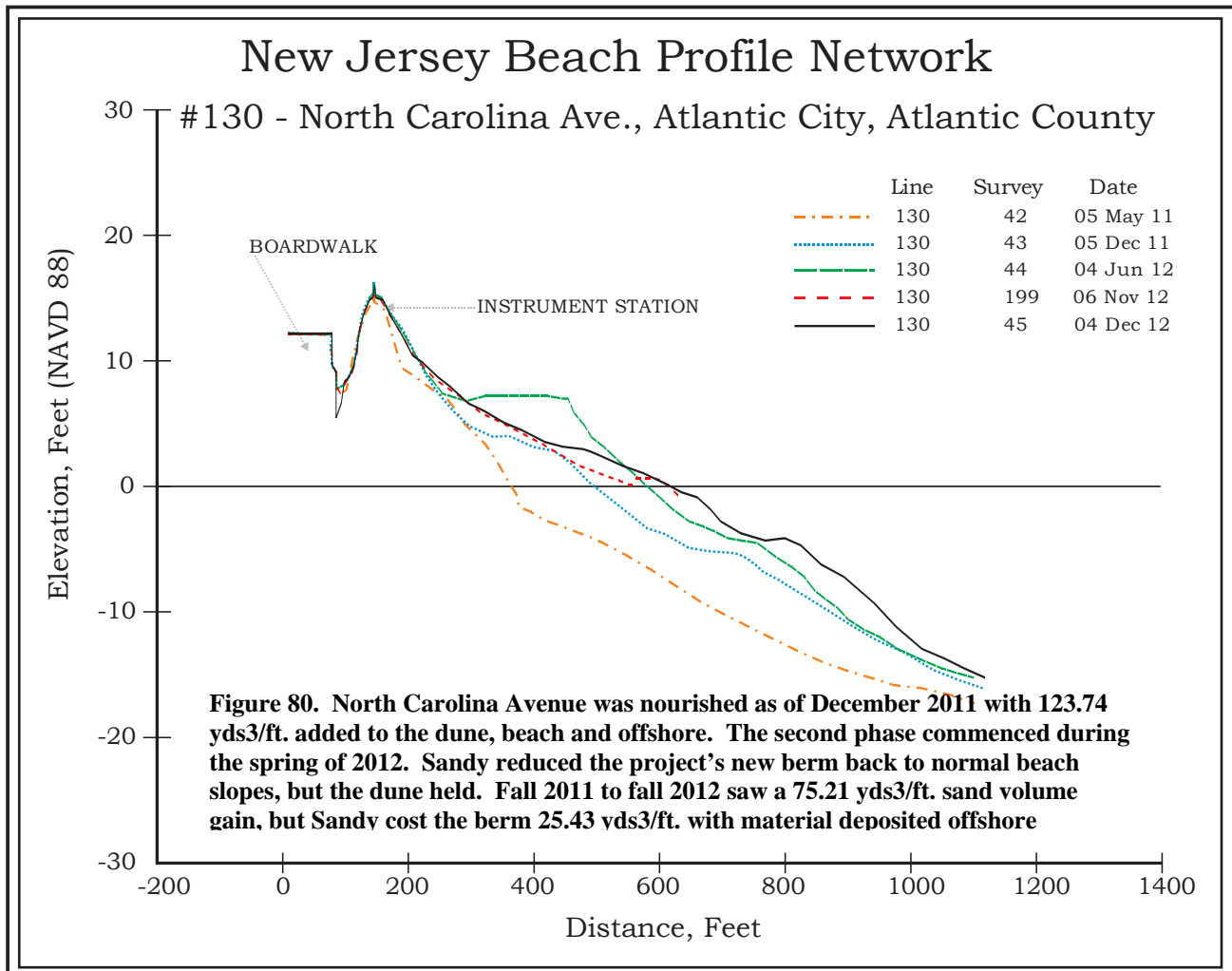
The photographs were taken on September 18, 2012 (left) and November 6, 2012 (right). Work was continuing on the rock sill being placed between the Massachusetts and Vermont Avenue groins in northern Atlantic City. The new Revel Entertainment casino was built here and a submerged, shore-parallel rock sill between the two groins was built to trap sand as a “perched” beach for a longer time period between the maintenance interval for the Federal beach project. Since the maintenance was just completed following hurricane Irene in 2011, the dune/beach system resisted the storm damage from Sandy with about three quarters of the dune surviving.



NJBPN 130 – North Carolina Avenue, Atlantic City



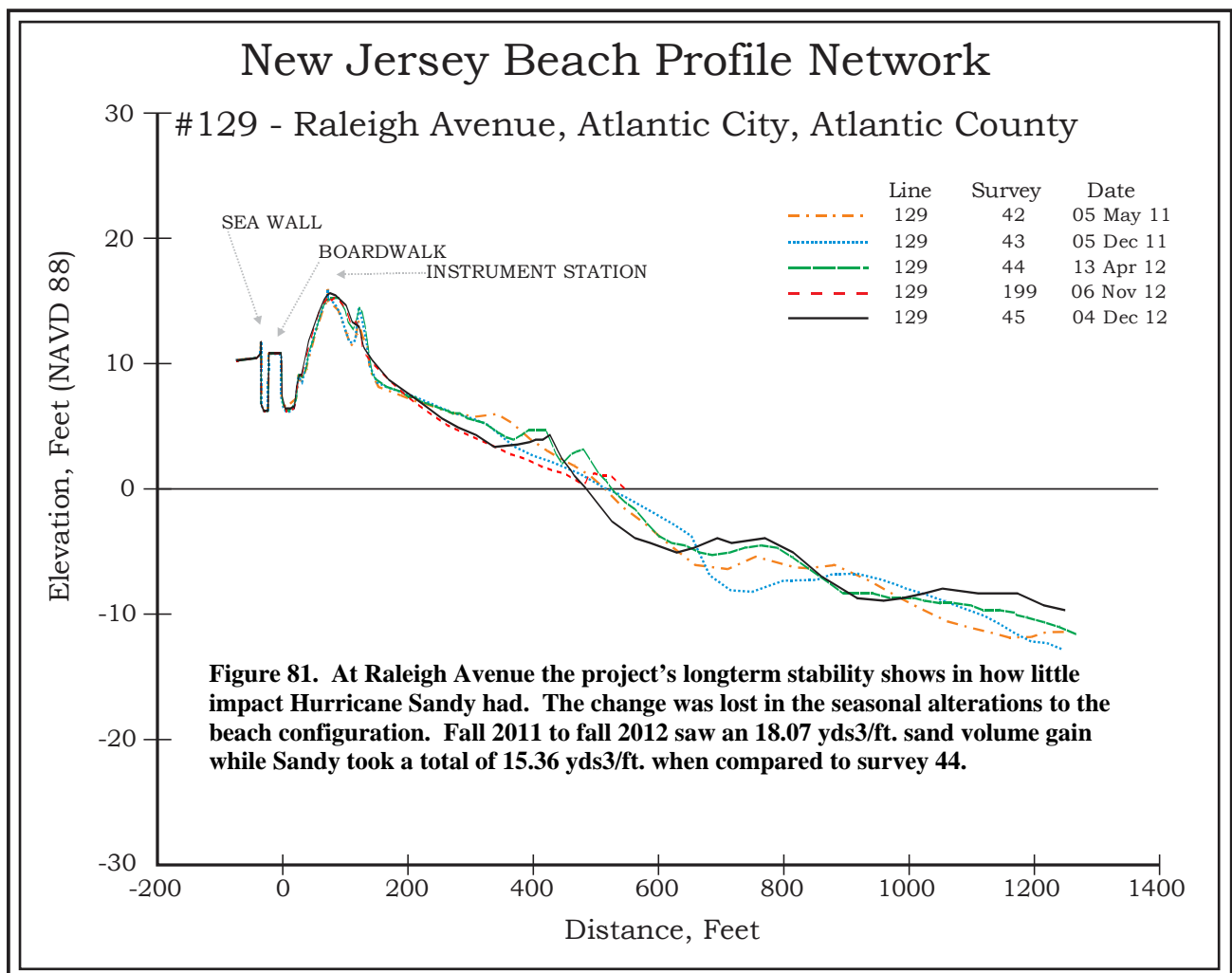
The photographs above were taken on June 4, 2012 (left) and November 6, 2012 (right). The beach lost much of the berm sand volume, but the dune survived by being just high enough. Note that there is abundant debris deposited near the crest of the dune and stream gulying was in evidence on the landward side of the dune indicating that sea water had crossed it in significant volume at the height of the storm.



NJBPN 129 – Raleigh Avenue, Atlantic City



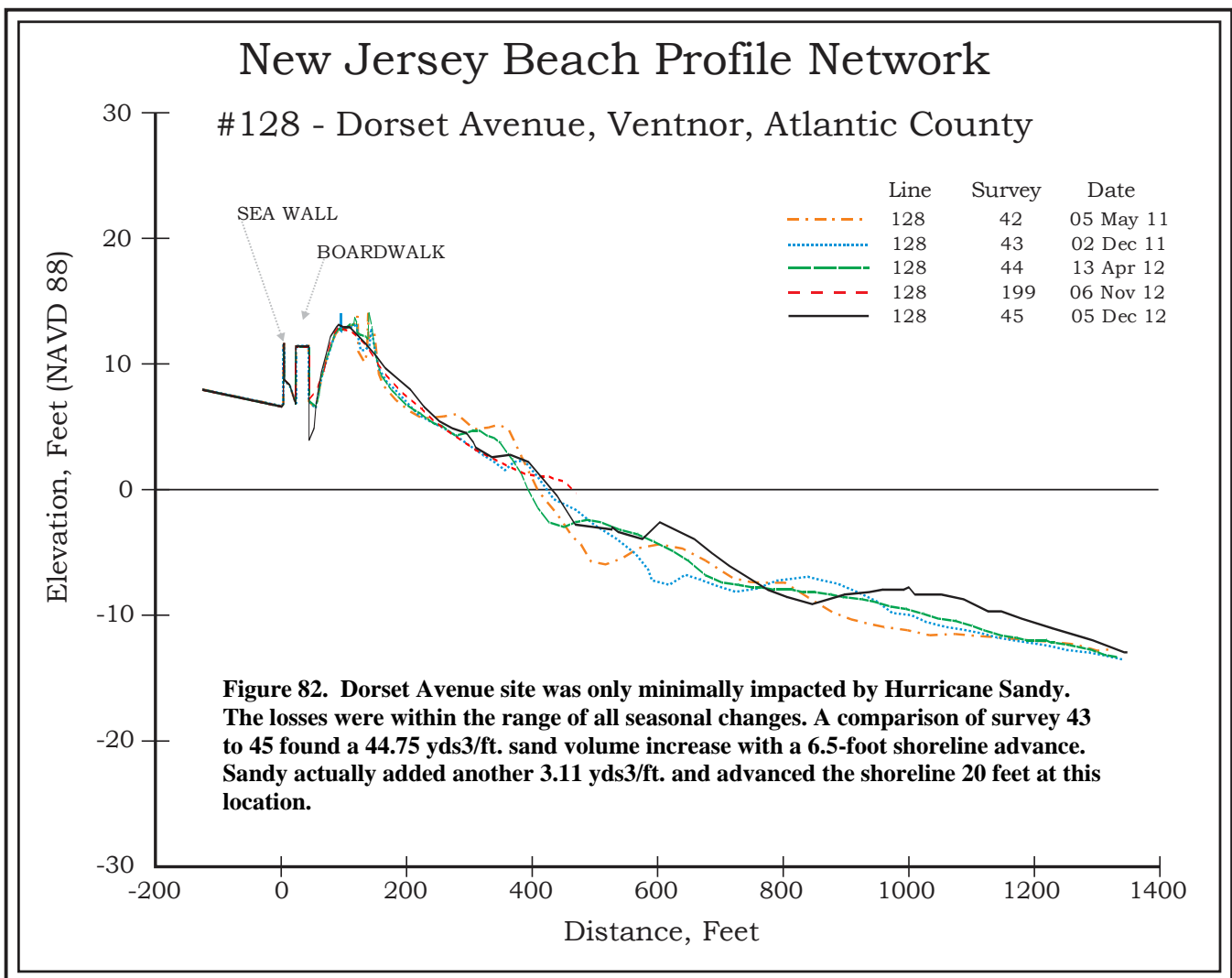
The photographs above were taken on April 13, 2012 (left) and November 6, 2012 (right). Raleigh Avenue lies in the middle of the Federal beach project and this meant that little damage was done. The dunes were invaded on the seaward slope depositing sand in the grass and knocking down an incipient foredune.



NJBPN 128 – Dorset Avenue, Ventnor City



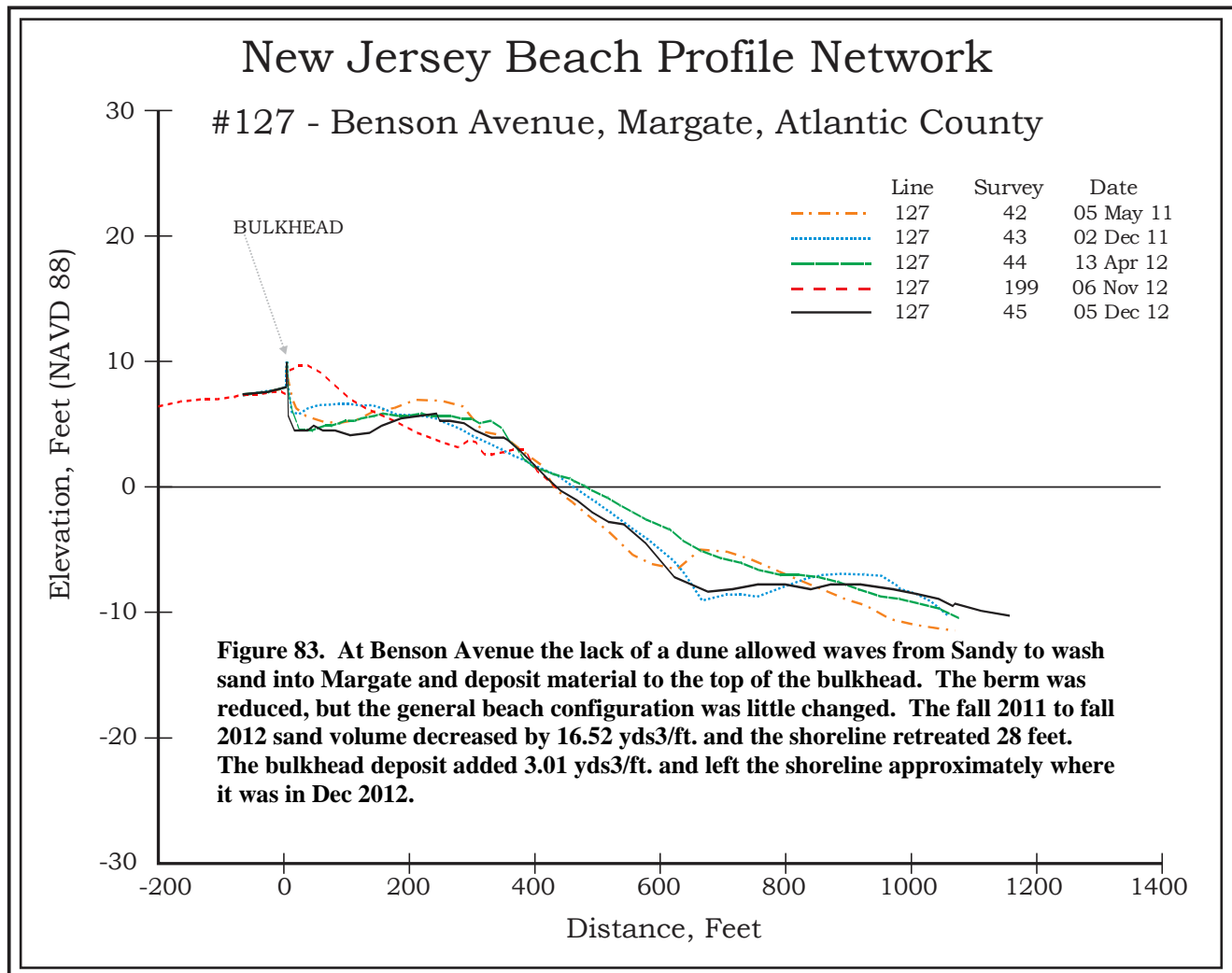
The photographs above were taken on April 13, 2012 (left) and November 6, 2012 (right). Dorset Avenue in Ventnor City also is located in the middle of the Federal project with excellent retention of the sand placed in 2004.



NJBPN 127 – Benson Avenue, Margate City



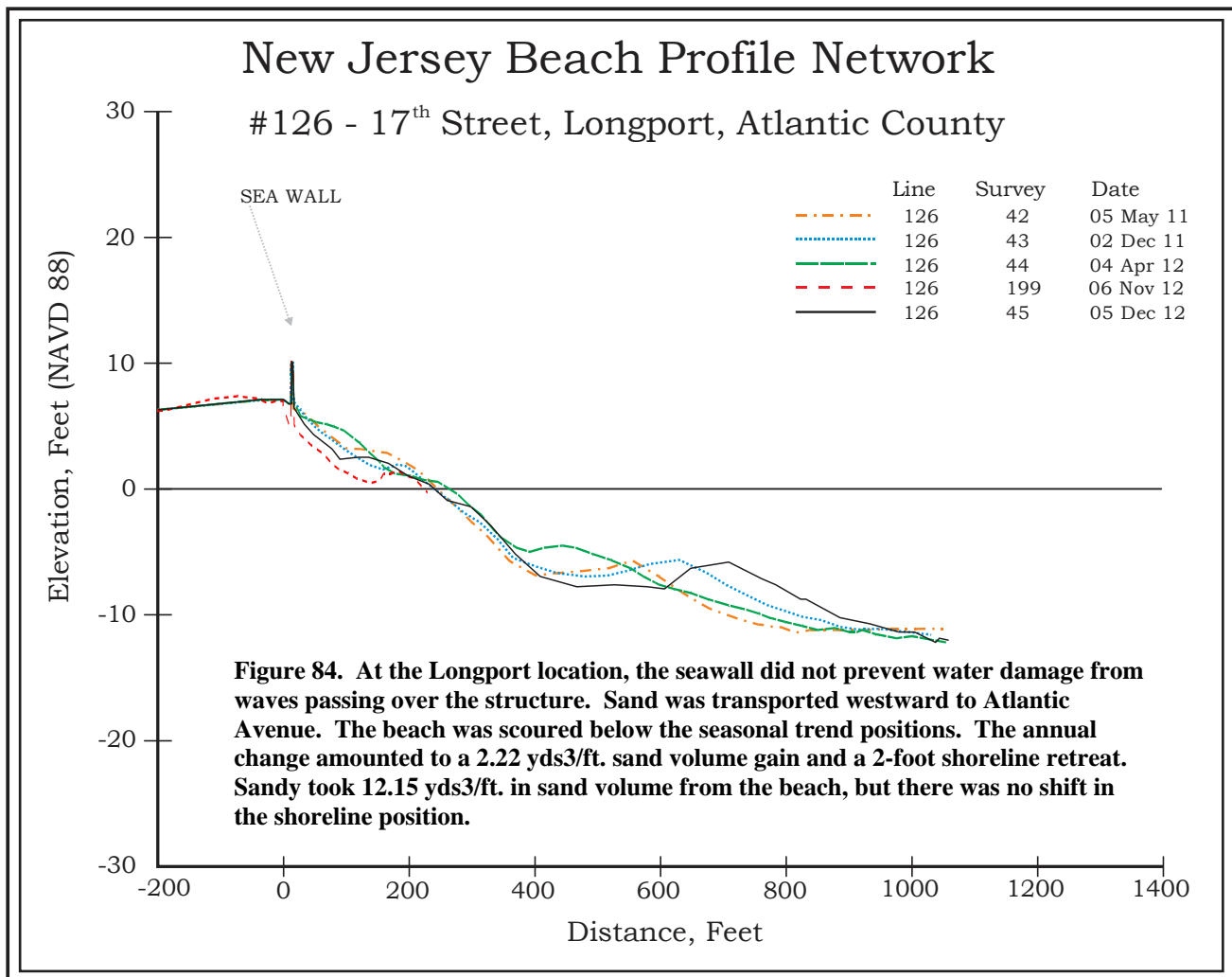
The photographs above were taken on April 13, 2012 (left) and November 6, 2012 (right). The relatively robust berm was cut down and pushed landward as a substantial deposit that included Benson Avenue and environs. The work was underway to excavate the sand at the sea-side of the bulkhead to keep water from simply running over it.



NJBPN 126 – 17th Street, Longport



The photographs above were taken on April 11, 2012 (left) and November 6, 2012 (right). The narrow beach allowed wave energy to explode on the seawall. The water bounced over it and crashed into the homes built at the base of the wall. Street end flooding, sand deposition to Atlantic Avenue and structural damage was spread along the shoreline.



Summary & Conclusions

<i>Atlantic County Post Sandy Volume Changes</i>				
Site	Volume Change (cu yds/ft)	Dates for Comparison	Dune Failure	Recent Beach Fill
134	-39.77	Oct 26, 2012 to Nov 11, 2012	Y	Never
133	-17.72	Oct 26, 2012 to Nov 3, 2012	N	2006 & 2011
132	-0.40	Oct 26, 2012 to Nov 3, 2012	No Dune	Never
131	-23.93	Oct 26, 2012 to Nov 3, 2012	N	Never
230	-30.27	Sep 18, 2012 to Nov 6, 2012	N	2011
130	-25.13	June 4, 2012 to Nov 6, 2012	N	2011
129	-15.36	Apr 13, 2012 to Nov 6, 2012	N	2004
128	-1.18	Apr 13, 2012 to Nov 6, 2012	N	2004
127	2.65	Apr 13, 2012 to Nov 6, 2012	No Dune	Never
126	-12.17	Apr 11, 2012 to Nov 6, 2012	No Dune	1990

Figure 85 shows a table of values for the 10 shoreline profile site locations in Atlantic County. The sand volume lost per foot of shoreline represents loss from the dune and the beach and does not include changes in the offshore region. These surveys were completed as rapidly as possible so no swimmers were brought to these sites. Dunes were damaged at some points, but performed in an excellent manner at sites numbered 131, 230, 130, 129 and 128.

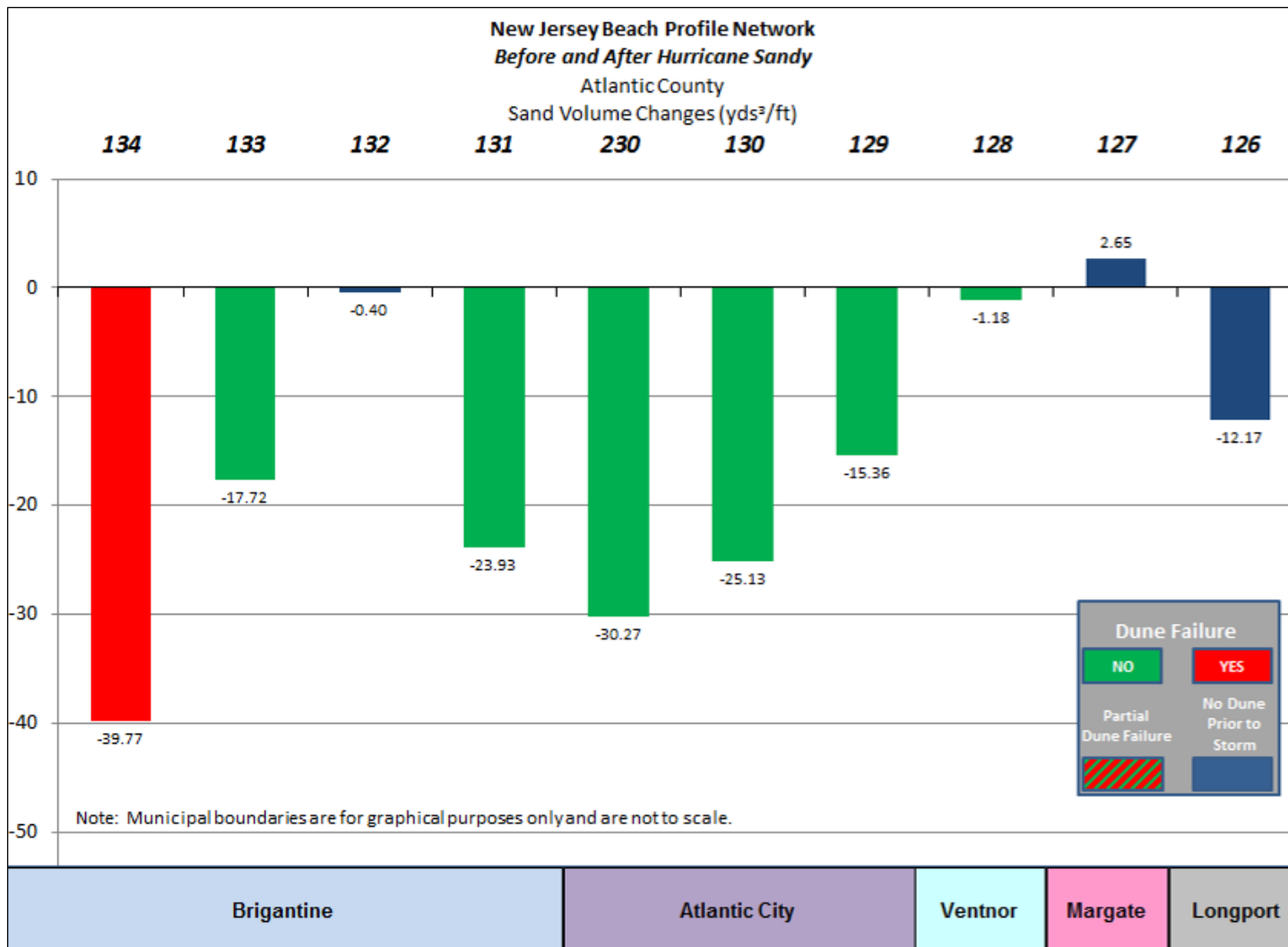


Figure 86. This graphic shows the sand volume loss figures for each of the communities within the developed sections of the Atlantic County shoreline. Federal shore protection projects have occurred along this portion of the New Jersey shoreline in Brigantine (northern portion), Atlantic City, and Ventnor. In Brigantine, prior to the storm the engineered had beach had been eroded away. Atlantic City and Ventnor’s engineered beach and dune systems have been maintained by the USACE recently and withheld the storm generated waves from breaching the dunes. All sites experienced berm erosion and dune losses except for site 127 in Margate, where sand had accumulated in front of the bulkhead adjacent to the street end (No dune at this location). The only true dune failure occurred in the national area on the north end of Brigantine (site 134), however sites 132 (Brigantine), 127 (Margate) and 126 (Longport) did not have dune systems in place prior to the storm and all experienced overwash of waves with sand being transported landward of the beach.

Atlantic County Post Sandy Volume Changes

MUNICIPALITY	NJBPN Site#	Shoreline Change in the Zero Elev. Position Since Sandy	Vol Change cu yds per ft	Average of Sand Loss Between Adjacent Sites (cy/ft)	Dune Failure	Recent Beach Fill	Distance Between Sites (FEET)	Vol Change - Cubic Yards Between Profiles (North to South)	Cumulative Volume Change - Cubic Yards (North to South)
North Brigantine Natural Area	134	-25	-39.77	-39.77	Y	Never	2,000	-79,540	-79,540
4th St. No. Brigantine	133	-18	-17.72	-28.75	N	2006 & 2011	7,554	-217,128	-296,668
15th St. So. Brigantine	132	0	-0.40	-9.06	No Dune	Never	4,762	-43,145	-339,813
43rd St. So. Brigantine	131	-10	-23.93	-12.17	N	Never	7,042	-85,661	-425,474
Rhode Is. Ave. Atlantic City	230	-65	-30.27	-30.27	N	2011	850	-25,730	-451,203
No. Carolina Ave. Atlantic City	130	47	-25.13	-27.70	N	2011	3,265	-90,454	-541,657
Raleigh Ave. Atlantic City	129	58	-15.36	-20.25	N	2004	11,384	-230,468	-772,125
Dorset Ave. Ventnor	128	73	-1.18	-8.27	N	2004	5,419	-44,816	-816,941
Benson Ave. Margate	127	-92	2.65	0.74	No Dune	Never	11,753	8,639	-808,302
17th St. Longport	126	-31	-12.17	-4.76	No Dune	1990	7,737	-36,830	-845,132
Total Volume Loss for Atlantic County =									-845,132

Figure 87. This table provides a summary of all the individual site sand volume losses from the dune and beach to the limit of the post-Sandy survey. The total is derived by adding two adjacent site losses and dividing by two, then multiplying by the distance in feet between the two sites. This is known in the dredging industry as “closed-end averaging” to obtain dredged volume along a channel. It is acknowledged that sand resources reside seaward of the short post-storm surveys, but the need for speed dictated that taking additional time to survey to 15-16 feet of water offshore would not add significantly to the losses seen within the beach/dune system. These longer surveys will be completed in due course however. A percentage of the sand carried offshore by Sandy will move back toward the beach over time in the absence of future storms. All sand lost from the dunes will require human intervention to replace, groom and re-vegetate in order to have the protection in place quickly. A natural dune system developing from scratch would require 15 to 20 years to re-establish close to what was lost.