



# New Jersey Beach Profile Network

## Atlantic County

Little Egg Inlet  
to Great Egg Harbor Inlet

NJBPN Profile #'s  
134 - 126

## New Jersey Beach Profile Network Atlantic County Site Locations

There are 10 NJBPN survey sites on the Atlantic County shoreline. The beach profile sites are located in the City of Brigantine, Atlantic City, the City of Ventnor, the City of Margate, and the Borough of Longport. The Atlantic County coastline consists of three barrier islands. Little Beach is part of the Forsythe National Wildlife Refuge and is not surveyed. Brigantine Island is south of Brigantine Inlet, the northern third of which remains undeveloped as part of North Brigantine Natural Area managed by the NJ Division of Lands and Forest. The Absecon Island communities, Atlantic City, Ventnor, Margate, and Longport, are all highly developed. There are six beach profile survey sites in the communities of Absecon Island.

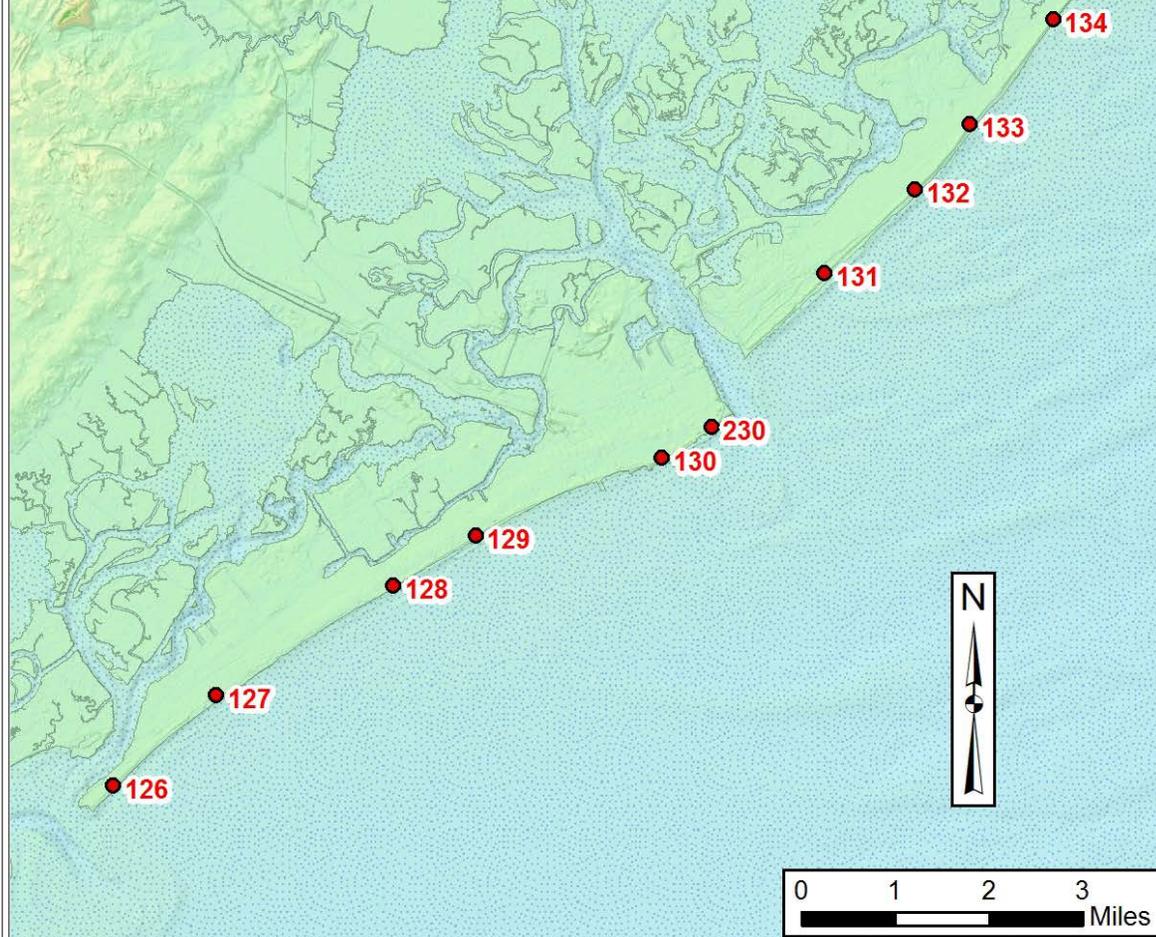


Figure 135. Location map for the 10 NJBPN profile sites in Atlantic County, NJ

## Atlantic County

Data collected at the ten Atlantic County NJBPN oceanfront beach profile locations cover the municipal beaches from the City of Brigantine Beach to the Borough of Longport. During the 2016 to 2017 evaluation, the third nourishment cycle of the Absecon Island Storm Damage Reduction (beachfill) project was underway that added sand to Atlantic City and Ventnor and commenced initial construction in Margate and Longport. (By spring 2018, work was completed but this report provides only the results of the sand placement as of late fall 2017 while the project progressed. Federal restoration for Brigantine Island Coastal Storm Risk Management (beachfill) project were underway in winter of 2018. The evaluation of changes will be included in the 2018 report. Little Beach on Pullen Island to the north of Brigantine is the third barrier island within Atlantic County but as a natural area is not included in the NJBPN assessment.

### **Shore Protection Summary;**

In 2002-3 the USACE, Philadelphia District, conducted an initial 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 dune crest 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 began in 2011 when the USACE placed sand on the northern portion of the Atlantic City shoreline. Fortunately, this task was completed (June 2012) prior to Hurricane Sandy. Although Sandy caused extensive erosion, the beach and dune provided oceanfront properties with protection from direct wave and storm surge impacts. A second beach maintenance cycle began in July 2013 in response to Sandy. This project authorized under PL 113-2 funding restored the constructed federal project beaches on both Absecon Island and Brigantine Island to project specifications at 100% federal cost.

The City of Margate filed litigation in Superior Court seeking relief from having dunes constructed as part of the USACE shore protection project within City oceanfront limits on Absecon Island. The case went to trial in February 2016 and a decision rendered April 11, 2016, affirmed the federal design and the relevance of dunes to the protection levels sought by the project. With this decision, without Margate City's further appeals, the project went to initial construction in 2017. During this project, the third nourishment cycle was included for Atlantic City and Ventnor in conjunction with initial construction of dunes and beach enhancements for Margate and Longport. The project commenced in spring 2017 and in July 2017 was impacted by a severe rainfall event that left persistent ponding landward of the design dune. This resulted in a federal/local redesign of the stormwater management system that now empties into the ocean. The project is scheduled for completion in 2018.

The federal Brigantine project area includes the northern third of the developed shoreline (approximately 1.8 miles.) A feeder beach designed into the project overfilled the 1,600 feet of the natural area north of development to supply sand to the downdrift beaches seaward of the developed areas. The project extends south to 5<sup>th</sup> Street South in the City. In 2006, the initial federal beach restoration was completed and extended to the south of the footprint of two prior State and local projects from 1997 and 2001. In 2011, an emergency maintenance completed under the Flood Control and Coastal Emergencies (FCCE) funding program used trucked-in sand. By February 2013, the Brigantine portion of Atlantic County's post Sandy recovery was complete using appropriations from PL-113-2. No further beach activity occurred in Brigantine until 2018 when the third nourishment cycle commenced over the winter.

## **Site Descriptions:**

### **Brigantine #134, #133, #132, and #131;**

The northernmost profile site on the Island of Brigantine is located on the undeveloped northern end of the island now part of the State of New Jersey's open space program. This location is prone to periodic storm overwash. Hurricane Sandy in 2012 was the most recent event to cause widespread overwash by waves from the ocean reaching to the bay marshes. Much of the vegetation survived the overwash, so re-colonization occurred rapidly, but at a more landward location causing a regression in the shoreline position episodically over time with larger storm events. 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 to the south and the long-term regressive changes in the shoreline to the north. The Federal project includes sand placement on a part of the natural shoreline to act as a feeder beach to the worst of the erosional segment from 15<sup>th</sup> Street North to 9<sup>th</sup> Street North. Within this erosional hotspot, the beach is narrow with no oceanfront development on the east side of Brigantine Avenue a rock revetment provides the primary storm protection for public infrastructure and properties west of the road. This region's rapid erosion rate prevents development of a significant dune system despite several attempts during early-engineered beach projects to establish one. Consequently, this region has been subject to several episodes of storm overwash, the most recent occurred as Sandy moved onshore. South of 9<sup>th</sup> Street North, the bulkhead revetment bumps out seaward allowing development of properties east of Brigantine Avenue. The orientation of the shoreline has allowed for development of a dune system that widens moving from north to south towards 15<sup>th</sup> Street South. Multiple engineered beach projects over the last two decades significantly increased the sand budget in this region. Wider beaches and an increase in sand source continued the development of an expanding dune system through aeolian processes. The dunes prevented storm waves from affecting the oceanfront properties and infrastructure in this section of Brigantine. At 15<sup>th</sup> Street South, there is a transition to a depositional shoreline. A large, multi-story resort building interrupts the continuous footprint of the located dune north and south of this site. However, south of 15<sup>th</sup> Street South to the Absecon Inlet jetty, the ever-widening beaches continued to accumulate sand moving from north to south along the Brigantine shoreline. The wider beaches absorb storm wave energy allowing aeolian processes across these wide beaches to expand the dune system with a series of new foredune ridges forming a formal shore protection feature that protected the oceanfront properties in this region during Sandy.

The erosional trend on the Brigantine beaches within the engineered project area continued from spring 2016 to fall 2017. At 4<sup>th</sup> Street North (NJBPN 133), the beach lost -29.06 yds<sup>3</sup>/ft. of sand while the shoreline position retreated landward -54 feet. Drown-drift beaches continued to accumulate sand adding 51.51 yds<sup>3</sup>/ft. of sand at 15<sup>th</sup> Street South (NJBPN 132) and 10.44 yds<sup>3</sup>/ft. of sand at 43<sup>rd</sup> Street (NJBPN 131) during the same period. While sand accumulation on the southern beaches is typical as prevailing sand movement along the Brigantine shoreline is from north to south, a large gain at the north end Green Acres (NJBPN 134) site also occurred during 2017. The net profile volume at site #134 increased 30.27 yds<sup>3</sup>/ft. of sand during the study interval with 32 feet of shoreline advancement. Potential source for this significant sand influx is sand bypassing Brigantine Inlet moving south through this location. Restoration work of the federal engineered beach commenced in early 2018.

### **Atlantic City, #230, #130, and #129;**

Founded in 1852, Absecon Island has undergone continued development making it the most densely developed barrier island in New Jersey. To protect the properties and infrastructure from storm damages beach nourishment has been a part of the shoreline management strategy since the 1930's. Multiple projects including local, state and federally sponsored projects constructed bolstered the islands storm protection. In 2003, a Federal project went to initial construction placing sand to restore dunes and widen the beaches. The USACE

initial beach nourishment occurred only from Absecon Inlet to the Ventnor City/Margate City boundary. The towns of Margate and Longport (received 190,000 cubic yards in 1990) declined to participate in the Federal project. The dunes, constructed to an elevation of 14.5 feet NAVD88, were just high enough to withstand the wave run-up during Sandy. A maintenance project just prior to Sandy restored the oceanfront beach and dunes that prevented damage to the City's famous boardwalk. Emergency restoration during 2013 put the beach width and dune back to the design specifications following erosion from Sandy. In 2017, the USACE conducted the 3<sup>rd</sup> periodic nourishment cycle for Atlantic City and work was completed in spring 2018.

The northernmost site in Atlantic City is at Rhode Island Ave (NJBPN 230), located approximately 1400 feet south of Absecon Inlet between the Vermont and Massachusetts Avenue groins. This site is subject to rapid erosion and is a hot spot of concern for Atlantic City. The beach and dune eroded from spring 2016 through spring 2017 but the USACE 3<sup>rd</sup> nourishment cycle restored the dune and beach in fall 2017 for a net gain of 142.29 yds<sup>3</sup>/ft. of sand and a 147-foot shoreline position advance for this study interval. NJBPN 130 is located at North Carolina Ave just south of the Steel Pier approximately 4800 feet south of Absecon Inlet. Here the beach and dune are more stable but still subject to long-term erosion. The 2017 USACE project added approximately 56.77 yds<sup>3</sup>/ft. of sand for a net gain of 49.56 yds<sup>3</sup>/ft. of sand for the study period. The additional sand extended the shoreline 53 feet seaward as of December 2017 for a net advance of 37 feet from spring 2016 to fall 2017. Raleigh Avenue (NJBPN #129) is located at the south end of Atlantic City within the mid-section of Absecon Island where the beaches are wider and the dune system continued to expand through natural aeolian processes. The site demonstrated typical seasonal volume and shoreline variations over the study interval, losing sand in the winter followed by recovery over the summer for a net gain of 32.95 yds<sup>3</sup>/ft. of sand and 36 feet of shoreline advancement.

#### **Ventnor City, #128;**

Ventnor chose to participate in the 2002-2003 Federal beachfill and again received sand during subsequent nourishment projects including the 2017 3<sup>rd</sup> nourishment cycle. Similar to Raleigh Avenue, the beaches in Ventnor City are located with the mid-section of Absecon Island and benefit from the supply of sand moving north to south along the shoreline that form wider beaches and a stable to accretive dune system. NJBPN 128 located at Dorset Avenue in Ventnor City is approximately 850 feet north of the fishing pier. The pier does not appear to have a significant impact on sand transport. The site is located about 15 blocks north of the original taper to the 2003 federal project beach and subject to end-effect erosion as the adjacent downdrift unfilled beaches came to equilibrium with the up-drift filled beaches. In 2017, the USACE project in addition to maintenance nourishment finally constructed the full beach and dune template south of Ventnor City stabilizing the southern end of Ventnor City beaches. Over the winter of 2017, the site lost -20.37 yds<sup>3</sup>/ft. of sand and 69 feet of shoreline width. Following the 2017 USACE project the beach recovered 31.75 yds<sup>3</sup>/ft. of sand and 67 feet of shoreline for a net change of 15.12 yds<sup>3</sup>/ft. of sand and 6 feet of shoreline position advancement from spring 2016 to fall 2017.

#### **Margate City, #127;**

A contingency of residents and property owners in Margate City objected to initial construction of the dunes and beach in Margate City blocking participation in the 2003 USACE project. The Margate beaches did benefit indirectly from the project through an influx of sand by littoral currents moving sediment from the up-drift project beaches towards the downdrift Margate shoreline. However, during Sandy Margate City suffered from significant amounts of water washing over the timber bulkhead at the development limit that inundated the streets and properties immediately landward. At the Benson Avenue site (NJBPN 127), a lack of consistent 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. Some spots did have "island" dunes that acted to protect from the overwash process, but in many cases the water breached into the City. During 2015, some street-end oceanfront bulkheads were raised to elevation 13.0 NAVD 1988, but storm water drain scuppers on each side of the street end allowed ocean water

into the street often flooding curb to curb (Jonas 1-23-2016). In 2017, the USACE started construction of work in Margate and Longport as part of the flood and coastal storm damage reduction project for Absecon Island, work was completed in spring 2018. The net changes from the project as it progressed extended the shoreline position seaward 110 feet increasing the net gain in shoreline position for the study interval to 157 feet. A similar gain in sand volume increased the net profile volume by 80.01 yds<sup>3</sup>/ft. of sand for the study interval with a gain of 55.50 yds<sup>3</sup>/ft. of sand occurring from spring 2017 to fall 2017. As the USACE project was still ongoing in this region during the final survey for 2017, it is likely this net volume change will increase because of continued sand placement.

### **Borough of Longport, #126;**

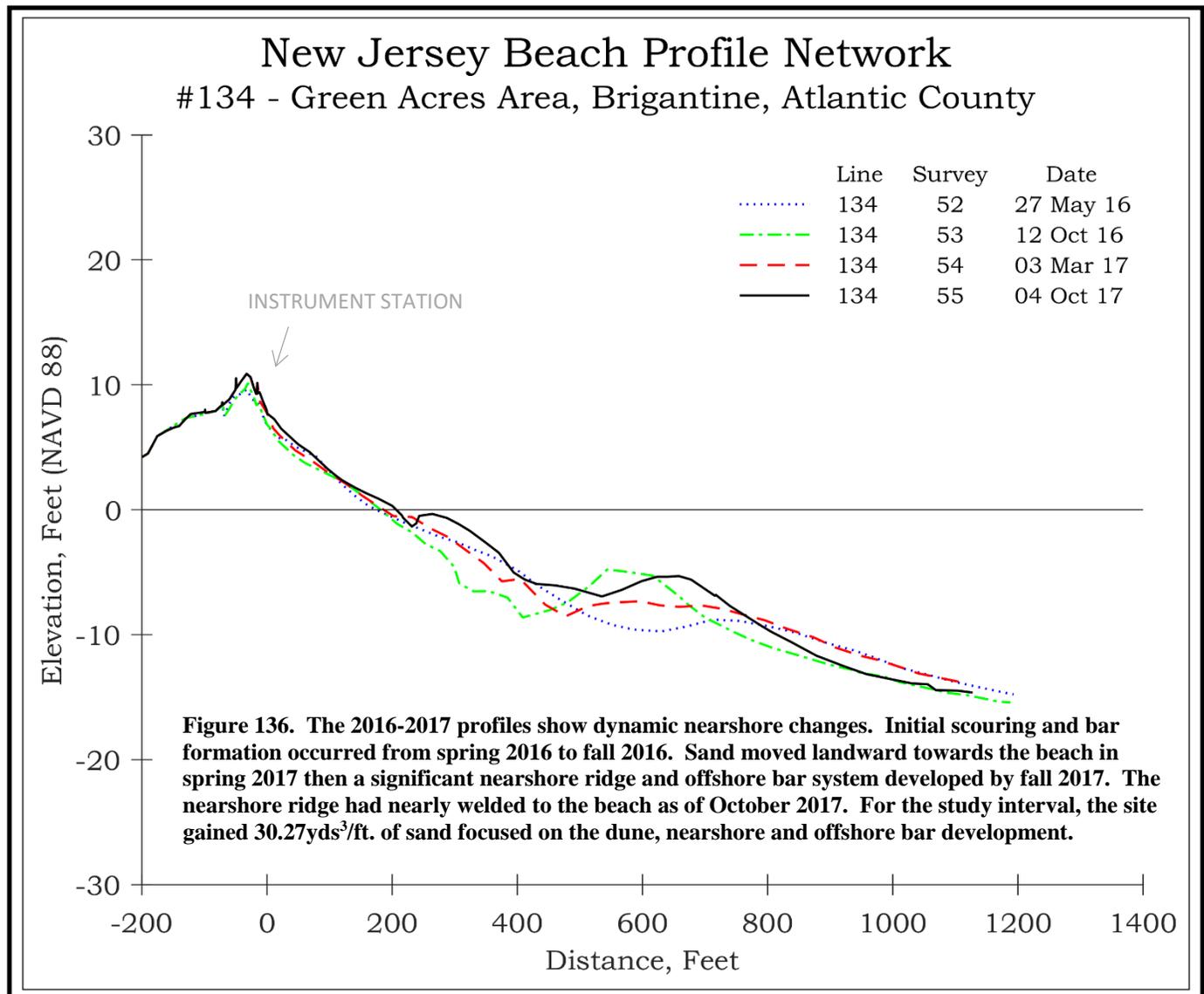
The southern community has a narrow, low elevation beach seaward of an old concrete seawall with a buried rock revetment protecting some of the development. Similar to Margate, some residents and property owners successfully fought to block construction of the initial USACE project in 2003. During Sandy, waves crashed into the wall and poured over it and down most of the Borough streets into Atlantic Avenue. Since the homes are very close to the wall, house damage was evident as well. Local agreement has resulted in Longport's eventual inclusion in the Absecon Island shore protection design plan with construction finally starting in 2017-2018 of the engineered dune and beach template. The USACE authorized project ends at the north side of the 11<sup>th</sup> Street jetty that effectively defines the north entrance into Great Egg Inlet. This jetty is too short to retain the large volume of new sand added to the system during the recent project. With no plans existing for extending the jetty, a significant sand volume will bypass the jetty. The USACE has maintained that any such project be considered under "project betterment" regulations to the existing shore protection design for Absecon Island and done at the expense of the local state and municipal non-federal sponsors.

The site at 17<sup>th</sup> Street in Longport (NJBPN 126) is the southernmost site on Absecon Island. Located approximately 1800 feet north of the Great Egg Harbor Inlet the beach is subject to inlet dynamics that affect sediment distribution around the mouth of the inlet. The USACE project had not reached this location as of the final survey in 2017 (Dec.) but there was evidence of sediment carried longshore reaching the area. After a loss of sand onshore during the summer of 2016, the beach began to gain sand through 2017 with a large bar developing and moving landward in the nearshore. From fall 2016 to fall 2017, the site gained 58.42 yds<sup>3</sup>/ft. of sand without direct sand placement and the shoreline advanced seaward 99 feet. Some of this volume increase and shoreline recovery was natural recovery and beach building restoring eroded sand in 2016 but the net results show a significant longshore component contributed. This site gained a net 54.33 yds<sup>3</sup>/ft. of sand over the study interval with 49 feet of shoreline advancement.

**NJBPN 134 – Green Acres Area, Brigantine**



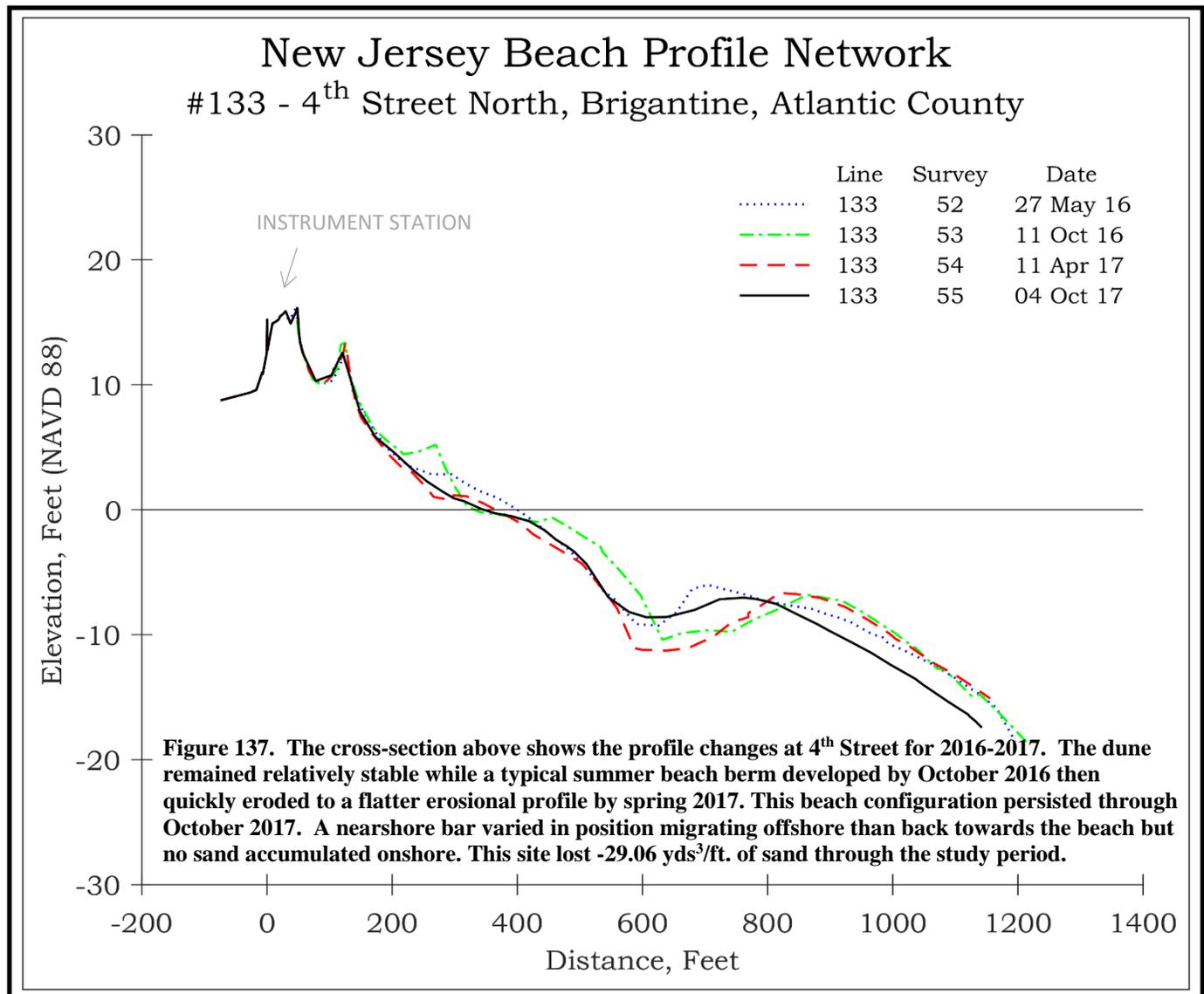
This site is located in the natural area on the northern segment of Brigantine Island preserved as public open space. On the left (May 27, 2016) the view is south along the upper beach. Note the position of the roped off area just seaward of the thick wrack line. Right photo taken on October 4, 2016 shows the same view looking south. Beach width remained relatively constant through the study interval with modest sand accumulation on the dune and upper beach.



**NJBPN 133 – 4<sup>th</sup> Street North, Brigantine**



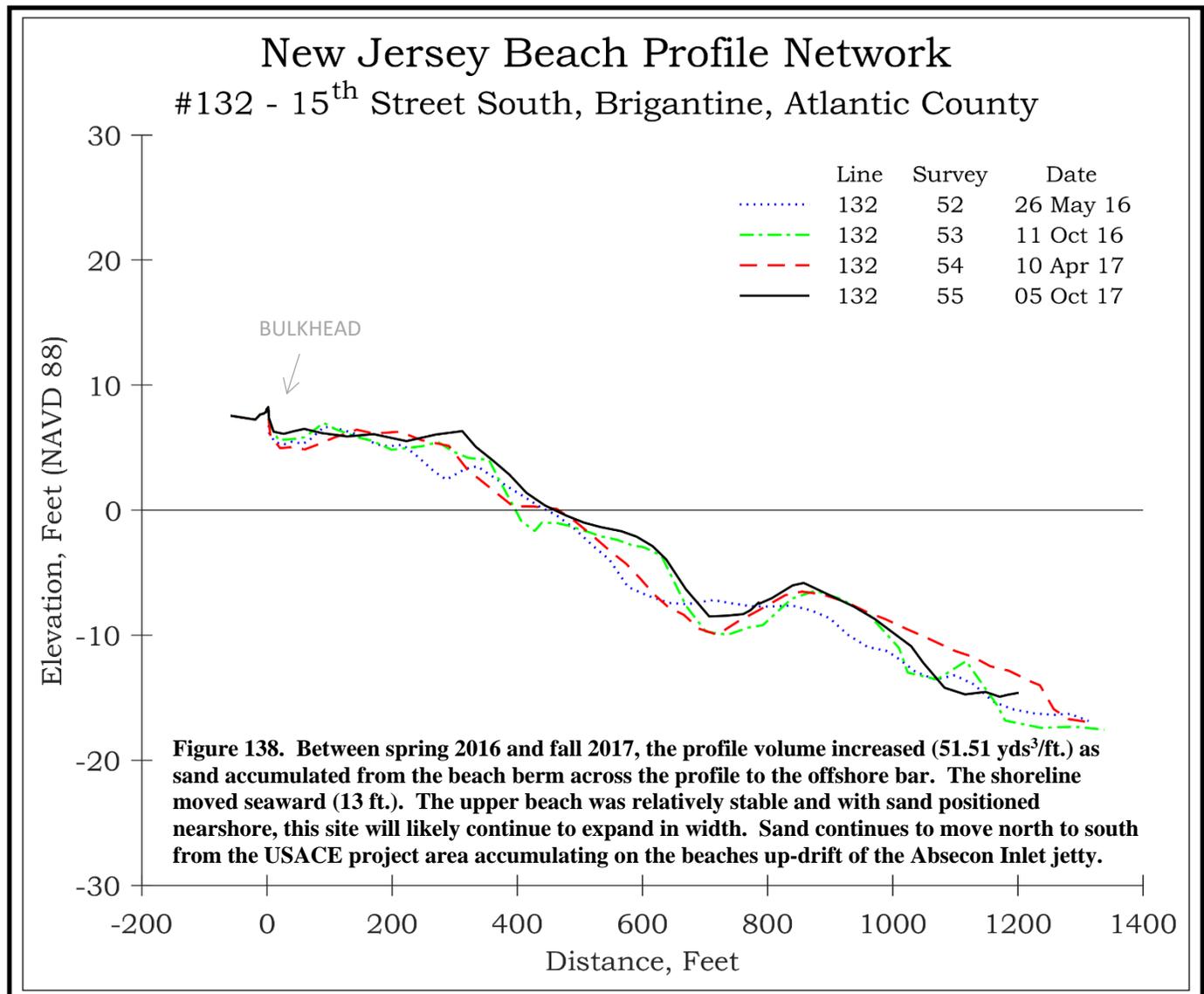
This site is located near the northern limit of development and within the 1997, 2001, 2006 and 2013 beach fill projects. Photo on the left (May 27, 2016) shows a developing foredune ridge that has built up along a row of fencing. On the right (October 4, 2017), is a view down the foredune ridge built naturally from sand extracted from the beach by the wind over time and now fully colonized by American Beach grass.



**NJBPN 132 – 15<sup>th</sup> Street South, Brigantine**



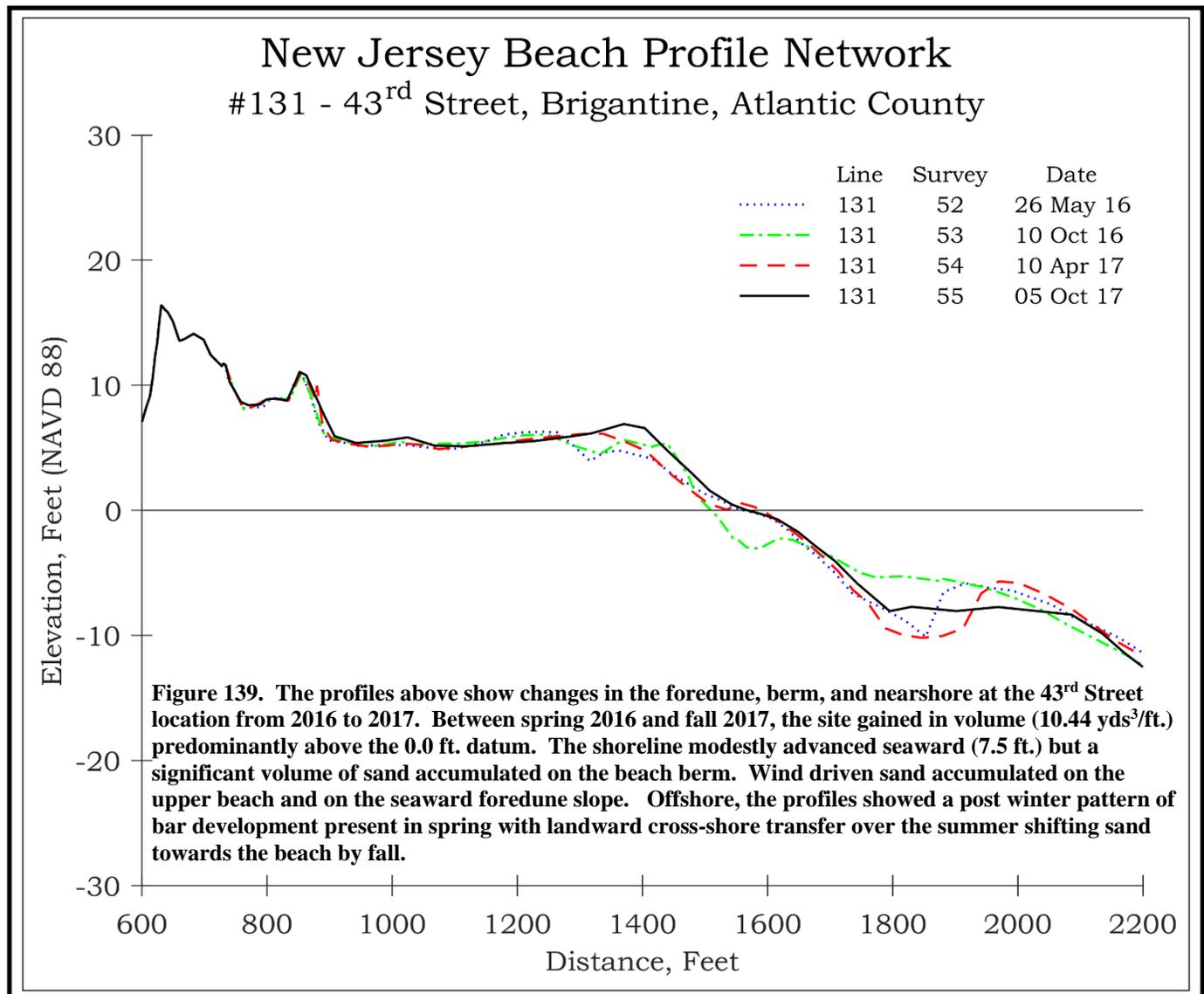
The left photo (May 26, 2016) shows the wide beach seaward of the beachfront resort that interrupts the continuous dune system north and south of this two blocks of oceanfront. Photo on the right taken October 5, 2017, shows the same view with little to no change in the general beach configuration but the site continued to accumulate sand and expand seaward.



NJBPN 131 – 43<sup>rd</sup> Street South, Brigantine



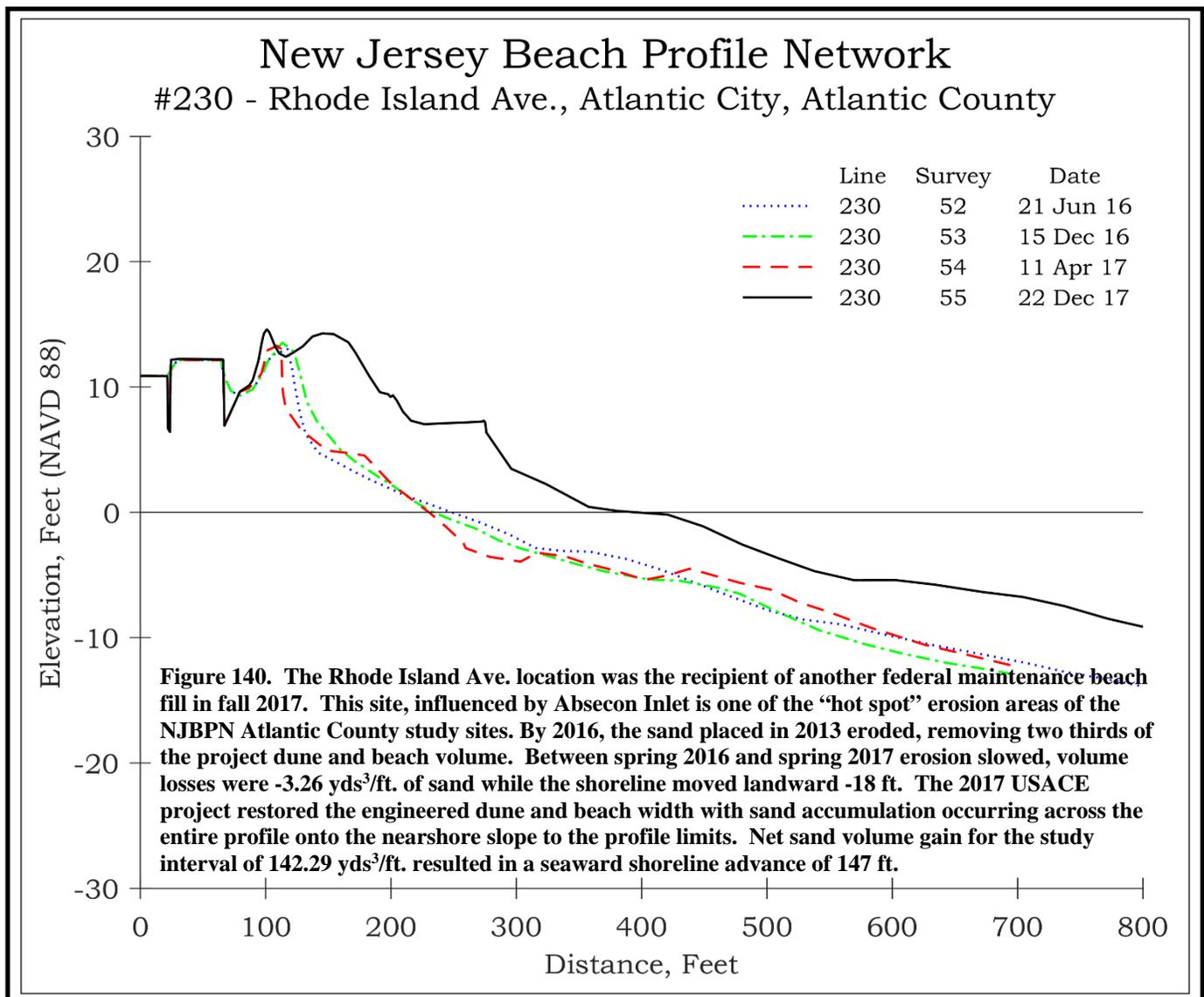
The photo on the left is a view to the north taken from the dune toe (May 26, 2016). The expansive wide beach continues to provide abundant aeolian sand to the dune system leading to the seaward expansion of the foredune. Photo on the right, taken on October 5, 2017, shows the massive 600-foot wide recreational beach located between the dune and high water line.



**NJBPN 230 – Rhode Island Avenue, Atlantic City**



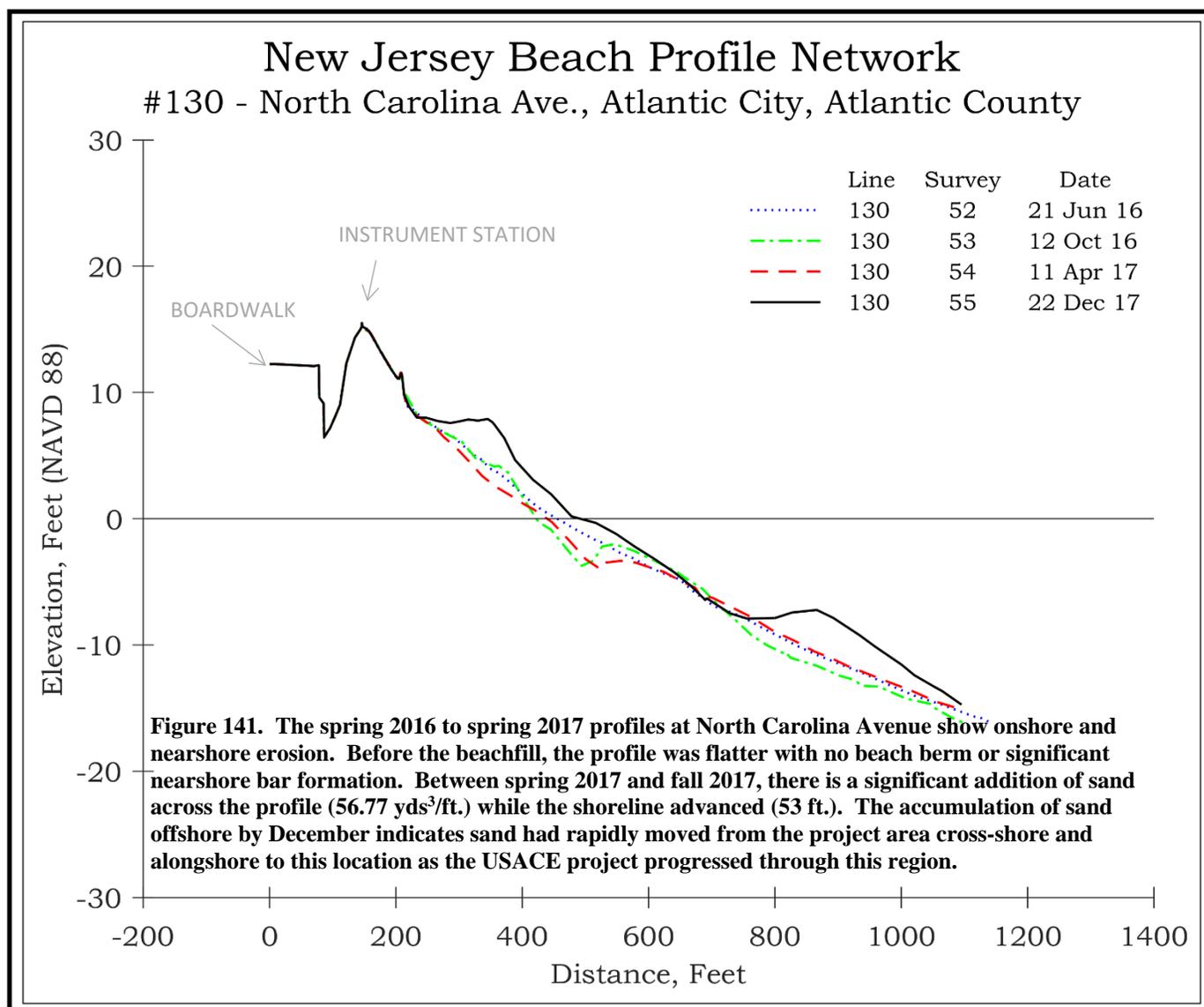
This profile site is located near the Absecon Inlet south jetty. The June 21, 2016 (left, view to the south) shows a scarp cut into the dune with damaged fence and steps remaining at the beach access path. The right photo (taken December 22, 2017) shows the restored beach and dune following the USACE 2017 maintenance project.



## NJBPN 130 – North Carolina Avenue, Atlantic City



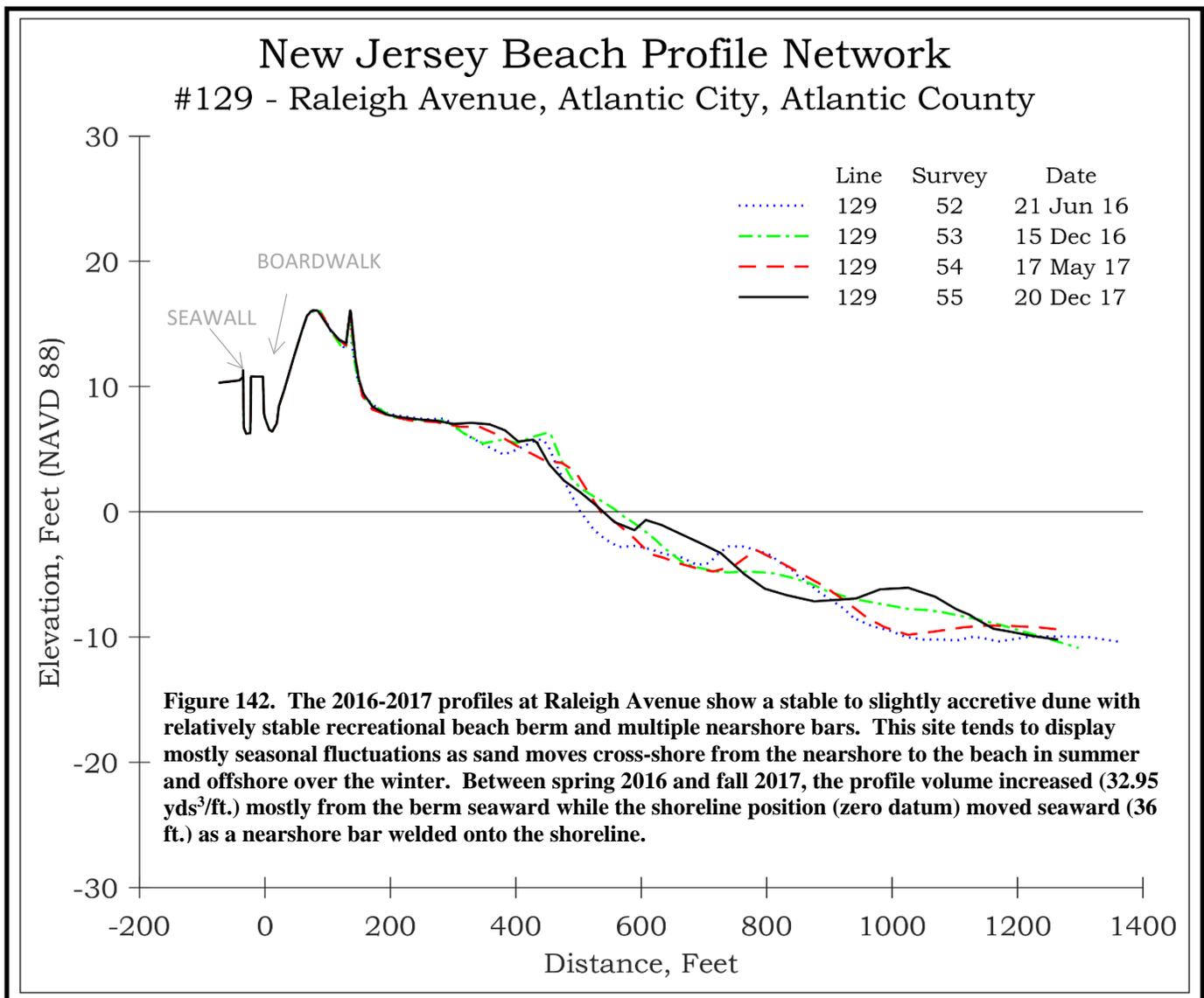
This location is also within the Absecon Island Federal shore protection project just south of Steel Pier. The left photo (June 21, 2016) shows the beach looking south to Central Pier. The right photo, taken December 22, 2017, shows the beach under construction.



**NJBPN 129 – Raleigh Avenue, Atlantic City**



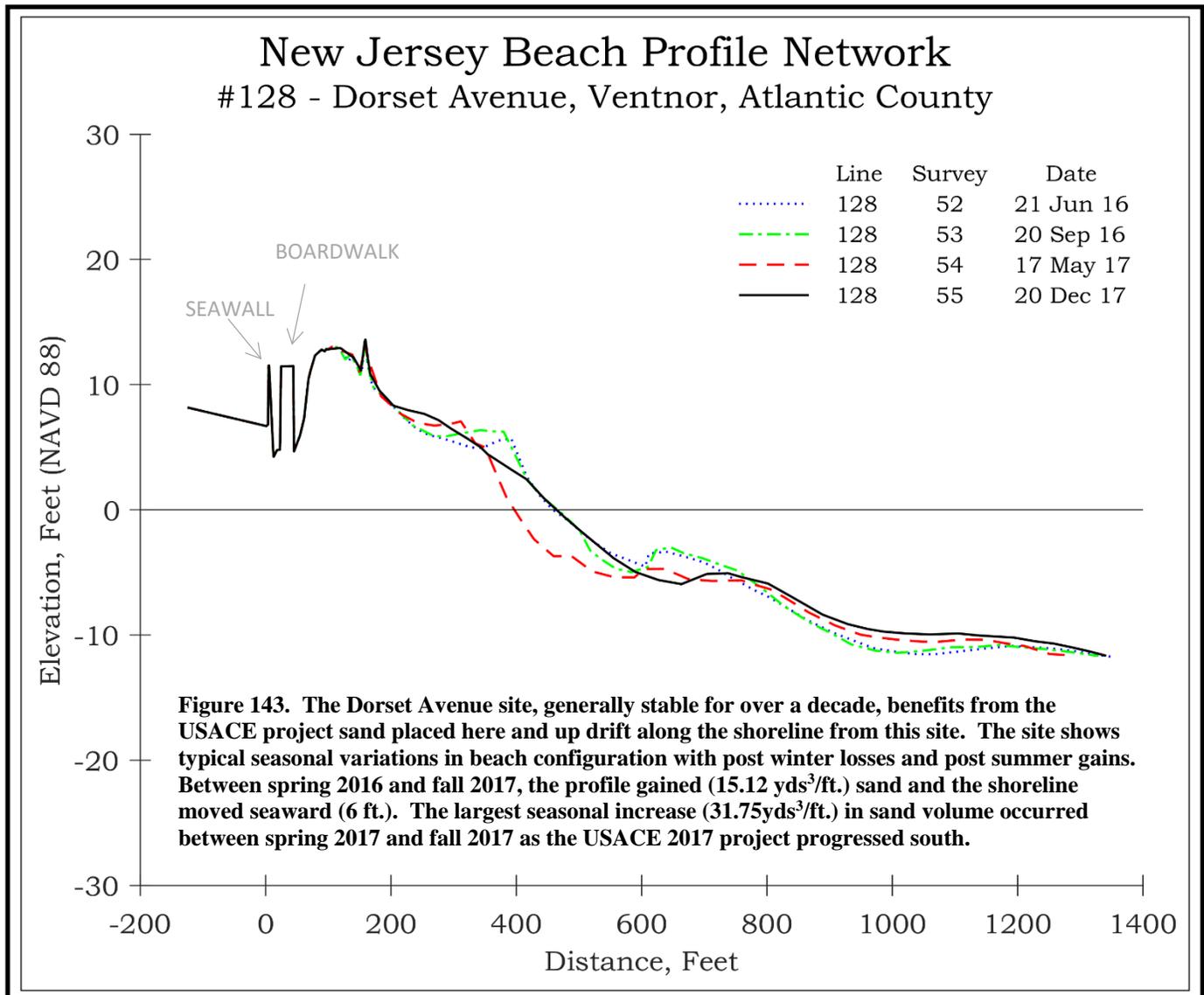
This site lies near the middle of the initial USACE shore protection project on Absecon Island where erosional loss is minimal. On the left (June 21, 2016) looking north along the seaward dune toe sand is collecting along fencing placed relatively recently. The photo on the right taken December 20, 2017 shows that sand accumulated at the fence now completely buried, dune grass colonized the seaward slope to the toe.



**NJBPN 128 – Dorset Avenue, Ventnor City**



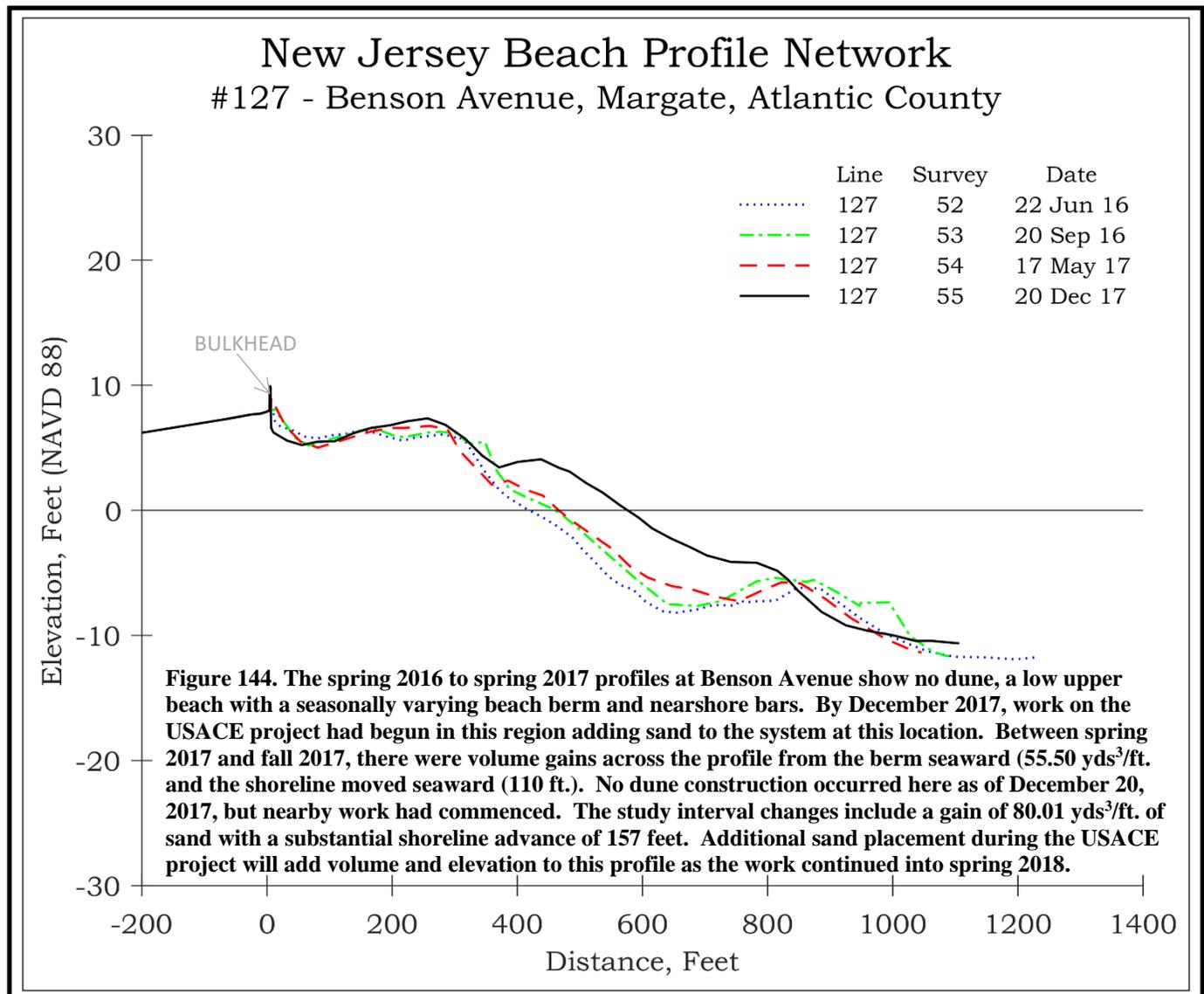
The Dorset Avenue site positioned centrally on Absecon Island is stable in terms of net storm losses, seasonal changes and any long-term erosion trends. Left photo taken June 21, 2016 shows a view south along the seaward dune toe towards the fishing pier. The right photo taken December 20, 2017 shows the same view with modest sand accumulation at the dune toe and on the upper beach.



**NJBPN 127 – Benson Avenue, Margate City**



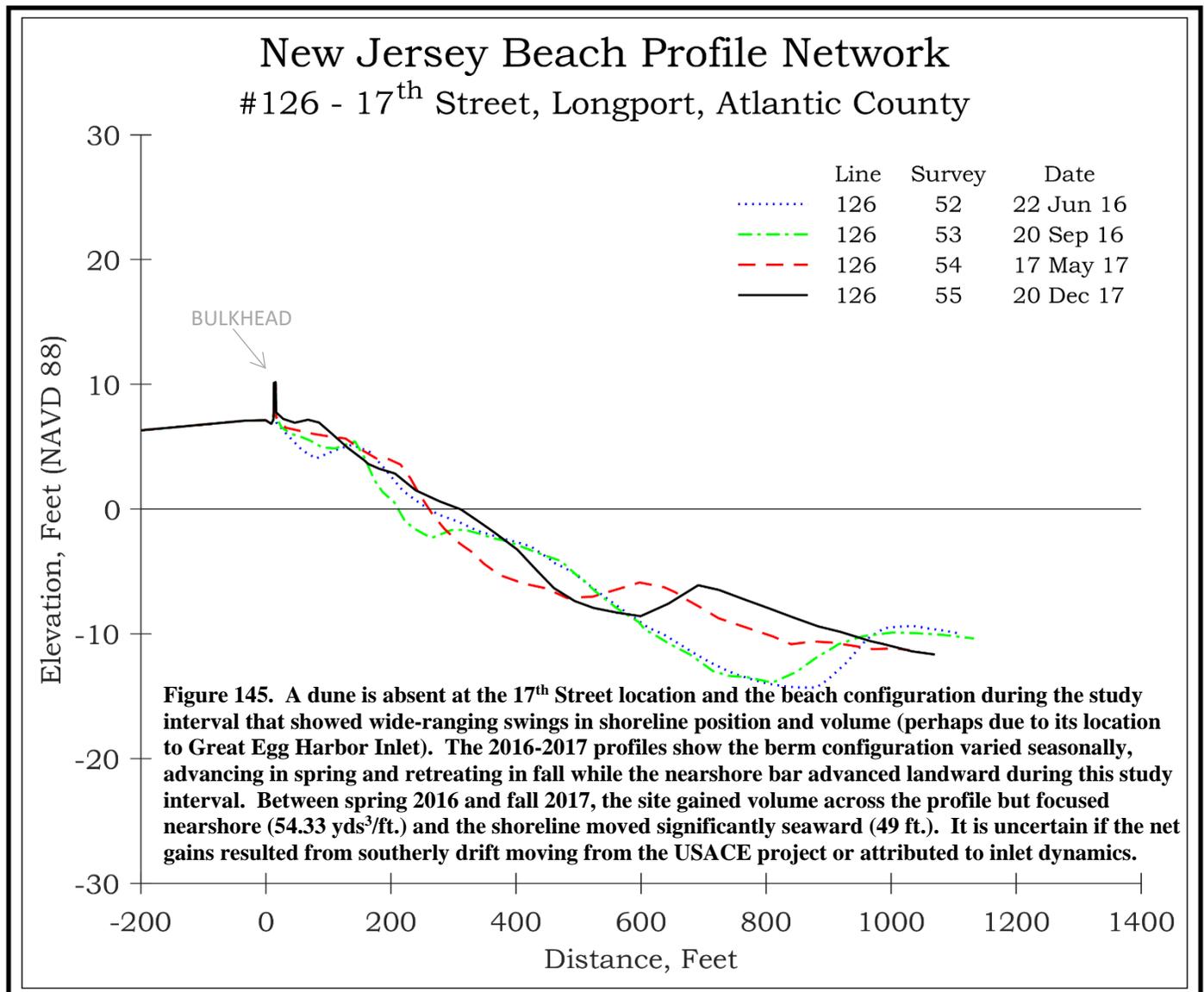
The Benson Avenue site is located approximately one mile south of the end of the original USACE project in Ventnor. The left photograph taken June 22, 2016 looking north shows breaks in the dune system. The right photo taken December 20, 2017 looking south shows the start of the USACE project in this region had finally begun with dune construction underway.



NJBPN 126 – 17<sup>th</sup> Street, Longport



The 17<sup>th</sup> Street profile is located about 6 blocks north of the Great Egg Harbor Inlet jetty and well south of the constructed USACE project. The photo on the left (June 22, 2016) shows a view north up the beach along the concrete seawall where no dune is present. The right photo, taken December 20, 2017, shows modest sand accumulation on the upper beach but no indication of the USACE project under construction. This site is located near the southern taper for sand nourishment.



## Summary & Conclusions

Atlantic County received emergency maintenance funding following Hurricane Sandy to restore the severely eroded federal project beaches to the initial design with work completed in 2013. Over the next four years, periodic storm events and hotspot erosion combined to degrade the beach and dune at the northern extents of Brigantine Island and Absecon Island. The USACE scheduled the 3<sup>rd</sup> nourishment cycle on Absecon Island that began in spring 2017 and scheduled for completion in spring 2018. On Brigantine Island, restoration work began during the winter of 2018 (results are not included in this 2017 report).

For Absecon Island, the storm damage from Sandy in Longport convinced Borough officials to seek inclusion in the 2017 USACE project to continue construction of the full dune and beach design template south from Ventnor. Some residents in Margate continued to oppose the USACE project design and took legal action to block construction. In 2016, the Superior Court ruled in favor of the NJ DEP and USACE that the project specifications and accepted design were not arbitrary and capricious as they applied to the Margate City oceanfront. This decision, allowed the execution of the remainder of the Absecon Island shore protection effort to proceed through Margate City with construction starting in spring 2017.

Appendix Tables 6 and 7 provide the seasonal and annual profile volume and shoreline changes for Atlantic County. Between the spring of 2016 and the fall of 2017, the Absecon Island average sand volume change at the six cross sections gained 62.38 yds<sup>3</sup>/ft. in sand volume accompanied by a 72-foot average shoreline advance. These numbers provide an average across the federal project beach with the 2017 nourishment project offsetting any losses that occurred in 2016. The most significant changes occurred at Rhode Island Avenue at the north end of Atlantic City within the erosional hotspot where the seaward dune scarp had retreated landward to within 50 feet of the boardwalk. The USACE project placed approximately 56.77 yds<sup>3</sup>/ft. of sand on this site between spring 2017 and fall 2017, resulting in 165 feet of seaward shoreline position advancement and nearly 100 feet of additional dune width. At Benson Avenue in Margate, the net gain (spring 2016 to fall 2017) was 80 yds<sup>3</sup>/ft. of sand with 157 feet of shoreline position advancement as the USACE project extended south through Longport. Volume gains at mid-island sites on Absecon Island were more moderate ranging from 15.12 yds<sup>3</sup>/ft. at Dorset Avenue in Ventnor to 49.56 yds<sup>3</sup>/ft. at North Carolina Ave in Atlantic City.

On Brigantine Island, the four cross sections gained an average of 15.79 yds<sup>3</sup>/ft. of sand from spring 2016 to fall 2017. Only the site at 4<sup>th</sup> Street north located within the federal project area hot spot lost sand (-29.06 yds<sup>3</sup>/ft.) during the study interval. The remaining three sites gained on average 34.74 yds<sup>3</sup>/ft. of sand with the largest gain (51.51 yds<sup>3</sup>/ft.) at 15<sup>th</sup> Street South while 43<sup>rd</sup> Street gained only 10.44 yds<sup>3</sup>/ft. of sand. The average shoreline change was -0.25 foot during the same study interval for the four profile sites. The only site to lose sand was a large shoreline position retreat of -54-feet on the engineered beach at 4<sup>th</sup> Street North skewed the average. The three other sites in Brigantine advanced 32 feet to 8 feet with the largest occurring at the Green Acres site 43rd Street. An average shoreline change was 17.5 feet. No nourishment activities took place during the current study interval so all changes resulted from natural processes.

With the southern segment of USACE Absecon Island shore protection project completed with beach nourishment, the stable middle segment of the Absecon Island oceanfront will likely extend south well into Margate City. However, losses from the terminal groin at 11<sup>th</sup> Street in Longport depositing into Great Egg Inlet will be problematic with no planned changes to this terminal groin and jetty system at Longport Point. In Brigantine, sand placement on the federal project beach at the northern erosional hotspot will continue to feed sand north to south along the island shoreline. A sand backpassing program established on the southern beaches could remove a small percentage of the accumulated sand to transfer north back to the federal project beaches. The program would maintain the design template between nourishment cycles enhancing community storm protection in this often critically exposed region where development and infrastructure remain vulnerable. Moving sand in a sustainable rate from the southern beaches to the federal project area would significantly extend the period between required large scale and expensive nourishment projects.

In 2017, a federal revetment re-construction project was underway along the Atlantic City inlet shoreline of Absecon Inlet from the Oriental Jetty to Gardner's Basin. This work replaced an aging rock structure and the severely damaged inlet boardwalk. The top of the new revetment will serve as a public walkway to Gardner's Basin. The inlet beach re-development with modest sand placement would follow revetment construction. An extensive debris removal project took place in 2013 extracting material from the shoreline in preparation for the restoration efforts. Information regarding the project can be found at the USACE Philadelphia District website (<http://www.nap.usace.army.mil/Media/News-Stories/Article/1534767/district-celebrates-completion-of-absecon-inlet-seawall-and-boardwalk/>).

While Atlantic County has a relatively high percentage of undeveloped shoreline, the intensity and density of the existing development makes this the most developed of the NJ coastal counties. Absecon Island has a moderate storm exposure risk, even with completion of the federal project. The southern two thirds of Brigantine Island has the lowest storm damage risk due to consequences of extending the north jetty at Absecon Inlet well out to sea 60 years ago. Sand redistribution toward the jetty resulted in hundreds of feet in wider beaches and multiple ridges of dunes between 15<sup>th</sup> Street South and the jetty. Despite the federal projects, the erosional hotspot area north of 4<sup>th</sup> Street North remains at moderate risk to storm exposure as rapid erosion quickly reduces the beach width following federal projects preventing establishment of a significant dune system as a primary barrier to storm wave overwash of the bulkhead revetment.