



# 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.

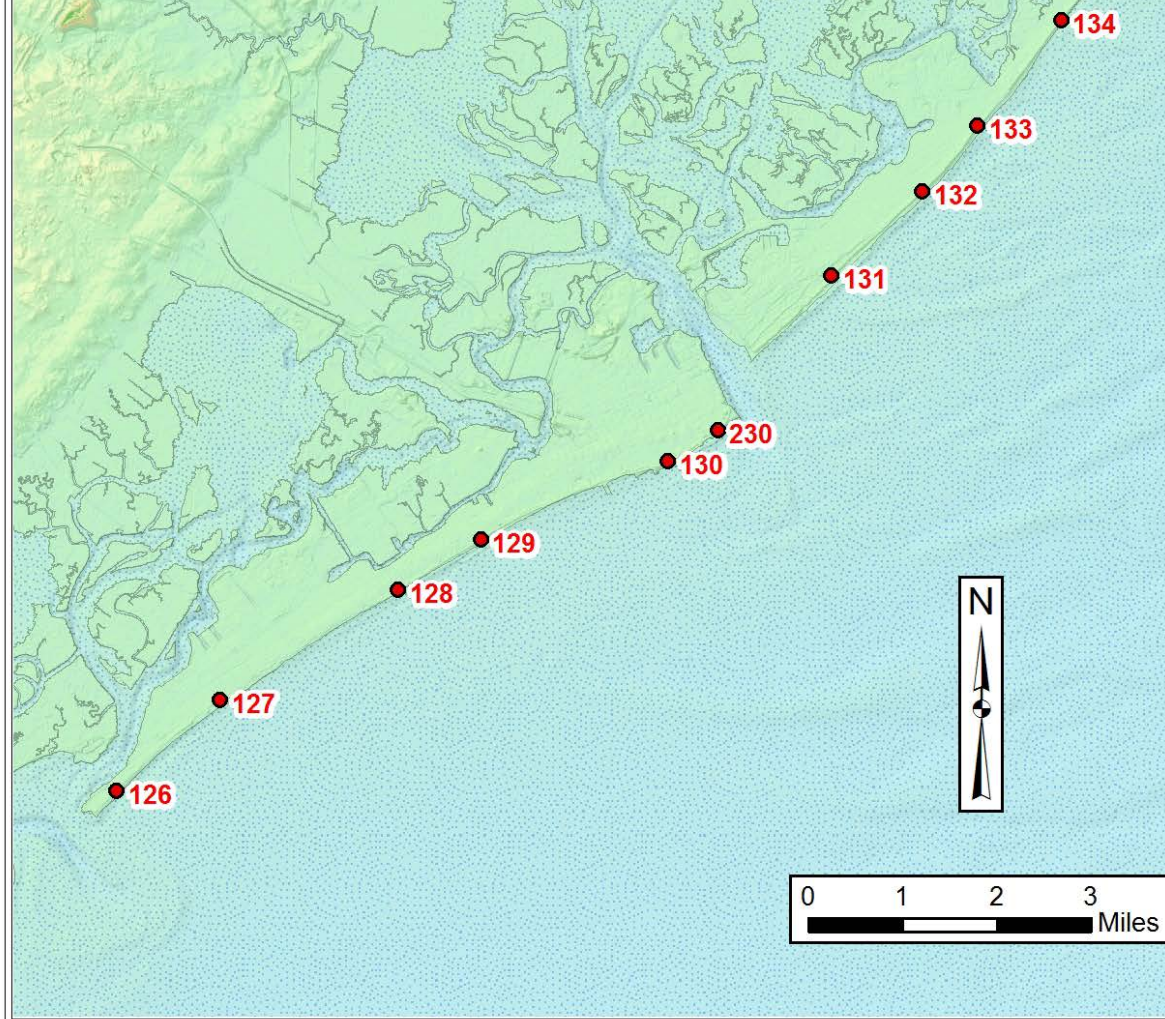


Figure 135. Location map for the 10 NJBPN profile sites in Atlantic County, NJ

## 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 2017 to 2018 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 this report provides the results of the sand placement as of spring 2018 following project completion. Also in 2018, the third federal maintenance cycle of the Brigantine Island Coastal Storm Risk Management (beachfill) project was completed. The evaluation of changes one-year post construction are included in this 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.

### **USACE Shore Protection Project 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 completed in 2018. No additional sand placement occurred in 2019.

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 the engineered beach footprint south of two prior State and local projects completed in 1997 and 2001. In 2011, an emergency maintenance effort 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. The third nourishment cycle commenced in 2018 over the winter to restore the project template. No further beach nourishment activity occurred in Brigantine during 2019. The 4<sup>th</sup> periodic nourishment cycle is scheduled for FY 2023, funding dependent.

## Site Descriptions:

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

The northernmost NJBPN profile site (#134) on the Island of Brigantine is located on the undeveloped northern end of the island now part of the North Brigantine State Natural Area administered by Bass River State Forest. This location is prone to periodic storm overwash. Hurricane Sandy in 2012 was the most recent event to cause widespread overwash of ocean waves reaching to the bay marshes. Much of the vegetation survived the overwash, so re-colonization of a small dune 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 magnitude of widespread overwash had occurred. Located approximately 7 tenths of a mile north of the USACE project Feeder Beach this site has never received any sand from either state or federal beach nourishment projects. Dominant littoral drift is to the south transporting the project sand away from this region. Periodic natural sand by passing of Brigantine Inlet (2.7 miles north) is the only source of new sand added to the natural area system to offset the storm erosion. The current dune width is approximately 60 feet wide with a crest elevation of approximately 12.5 feet. The beach is flat and low in elevation subject to wave runup with less than 30 feet of dry beach at or above elevation 5 ft NAVD88. Overall beach width above the zero datum is approximately 200 feet. During the 2018-2019 study interval onshore cross-shore sand transfer dominated the processes affecting changes with modest sand accumulation on the lower beach resulting in a 49-foot seaward advance in the shoreline position. While offshore a landward shift in the sand bar position and stable dune system resulted in no significant change in the profile's net sand volume (0.67yds<sup>3</sup>/ft.).

South of the State Natural Area the municipal shoreline rapidly transitions from a natural beach to a fully developed shoreline. The approximately 2000 feet of transition zone has been incorporated into the federal project as a "feeder beach" for a highly erosional section of shoreline from 9<sup>th</sup> Street north to 15<sup>th</sup> Street north seaward of the Brigantine Avenue promenade and revetment. This section of beach suffers accelerated erosion due to the orientation difference between this fixed physical infrastructure along the north end of Brigantine Avenue and the long-term regressive changes in the natural shoreline to the 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. No NJBPN profile exist in this immediate region although the municipality established a monitoring program with the CRC in 1992 to follow changes in this section of shoreline. The photo below shows the erosional hotspot along the northern developed shoreline in Brigantine one-year after completion of the third USACE nourishment cycle.



**Photo taken by Ted Kingston on March 28, 2019, note the orientation offset between the natural beach and Brigantine Ave.** At the erosional north end local engineered beach nourishment projects commenced in 1997 and 2001 with State sponsorship to mitigate deteriorating conditions. By 2006, the initial USACE project commenced along approximately 1.8 miles of coastline fronting the northern third of the city beaches, followed by maintenance projects in 2011, 2013. Brigantine beaches last received sand in 2018 during the 3<sup>rd</sup> USACE maintenance project (754,090 cubic yards, Erik Rourke, USACE).

Near 9<sup>th</sup> Street North, the bulkhead revetment bumps out seaward allowing development of properties east of Brigantine Avenue. 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 along with the orientation of the shoreline and revetment allowed development of an expanding dune system through aeolian processes. NJBPN site # 133 is located within this region at 4<sup>th</sup> Street North. In this location the primary dune width is approximately 100 feet with a crest elevation of 15 feet NAVD 88, seaward a developing foredune ridge has expanded to 70 feet in width at a crest elevation of 13 feet NAVD 88. Overall, the dune system provides significant shore protection and prevents storm waves from severely damaging the oceanfront properties and infrastructure in this section of Brigantine. Seaward of the dune a recreational beach berm extends 100 feet to the beachface slope. From April 2018 to October 2019 the post USACE beach configuration has eroded landward with 160 feet of shoreline retreat. Offshore the nearshore slope and bar position remained relatively stable through the recent study interval. This region is subject to long term erosion offset by periodic beach nourishment maintenance. During the recent study interval moderate erosion removed 31.77 yds<sup>3</sup>/ft. of sand, primarily from the beachface and USACE project beach berm resulting in 160.5 feet of shoreline retreat.

Further south along the Brigantine beach, there is a transition zone from a highly erosional to a depositional shoreline. NJBPN site # 132 located at 15<sup>th</sup> Street South is within this transitional region. A large, multi-story resort building interrupts the continuous footprint of the large dune located north and south of this site. Instead, primary shore protection for this one-block region is the nearly 300-foot wide beach at elevation 6.5 NAVD 88 fronting a low revetment bulkhead located at the street ends with a top elevation of approximately 8 feet NAVD 88. The lower elevation makes these street ends subject to potential storm surge and wave overtopping and localized flooding events. From 2018 through 2019 sand accumulated on the lower beachface slope naturally expanding the beach width while a nearshore bar developed and moved landward. Further offshore a new bar developed as longshore transport from north to south continued to move sand eroded from the USACE project beaches through this location. This influx of sand resulted in a net gain of 25.13 yds<sup>3</sup>/ft of sand and 74 feet of seaward shoreline advancement during the recent study interval.

South of 15<sup>th</sup> Street South the shoreline rapidly transitions into a highly accretional beach to the Absecon Inlet jetty. These seemingly 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. NJBPN Site #131 located at 43<sup>rd</sup> Street is within this accumulation zone. From 1987 to 2019 the dune continued to accumulate sand and expand seaward into a system of multiple ridges with an overall width currently over 800 feet forming a formable shore protection feature. The expansive recreational beach extends seaward 600 feet from the foredune toe, from 2018 to 2019 the beachface and berm accumulated sand extending the shoreline an additional 42 feet. During the study interval sand accumulated nearshore developing a new bar that became emergent during fall 2019. Longshore transport continued to move sand north to south with an additional 40.33 yds<sup>3</sup>/ft. accumulating here from spring 2018 to fall 2019. While sand accumulation on the southern beaches is typical, as prevailing sand movement along the Brigantine shoreline is from north to south, the large gain at 43<sup>rd</sup> demonstrates the extraordinary natural accretion rates and resiliency of this region as sand lost from the northern project area moves south accumulating updrift of the Absecon jetty. This region remains a potential source for mechanical sand back-passing efforts, moving sand north to the erosional area, as an option or complement to repetitive federal maintenance projects.

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

Absecon Island is 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 placed sand 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 began the 3<sup>rd</sup> periodic nourishment cycle for Atlantic City and Ventnor plus included construction of the full federal dune and beach project for Margate and Longport, work was completed in spring 2018 with 3,493,599 cubic yards placed from 2017 to 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 due to its proximity to the inlet and associated wave and current dynamics. The USACE 3<sup>rd</sup> nourishment cycle restored the dune and beach in fall 2017. The project added 118.55 yds<sup>3</sup>/ft. of sand to the beach advancing the shoreline position. The cycle of erosion immediately returned over the winter, removing -61.44 yds<sup>3</sup>/ft. of sand by spring 2018. Erosion continued over the summer months and by fall 2018 another -26.39 yds<sup>3</sup>/ft. of sand was lost. Over the winter of 2019, the losses continued with another -44.83 yds<sup>3</sup>/ft of sand removed, essentially eliminating the volume placed in 2017. Erosion rates slowed over the summer, but another -7.77 yds<sup>3</sup>/ft of sand eroded from the profile by fall 2019. By October 2019, the dune width was cut back from 100 feet to 30 feet as the entire profile including the offshore and nearshore retreated landward. The remaining beach width is less than 75 feet at approximately elevation 5 feet NAVD88 providing minimal storm protection to the dune and boardwalk. Net change from spring 2018 to fall 2019 was a loss of -81.08 yds<sup>3</sup>/ft. of sand while the shoreline position retreated an additional -54 feet. This loss consisted of over two thirds of the dune volume as well as significant losses from the beach berm, beachface and nearshore slopes.

Moving south towards North Carolina Ave (NJBPN #130) just south of the Steel Pier dune and beach erosion rates slow as tidal effects diminish associated with Absecon Inlet located approximately 4800 feet north. Although beach and dune stability improve in this region the site is still subject to long-term erosion, especially evident nearshore during the recent study interval. The 2017 USACE project added approximately 56.77 yds<sup>3</sup>/ft. restoring the project dune and beach template. In response, the shoreline advanced 109 feet from spring 2017 to spring 2018. Over the summer of 2018 into fall, the site lost -34.87 yds<sup>3</sup>/ft. of sand, scoured from the berm and nearshore. During the winter of 2019, the site continued to erode losing an additional 24.77 yds<sup>3</sup>/ft. of sand. Shoreline retreat from spring 2018 to spring 2019 totaled -71 feet. Loss rates diminished in summer of 2019, but another -12.14 yds<sup>3</sup>/ft of sand eroded from the site. The net changes were limited to the nearshore and beach as the dune width (140 ft) and crest height (15 ft NAVD88) remained stable. The project beach berm elevation was reduced but the recreational beach width remained approximately 180 feet. Offshore, below the zero datum, erosion was substantial and removed sand from the shoreline position to the profile limits (~700 feet). Net changes from spring 2018 to fall 2019 were a loss of 72.4 yds<sup>3</sup>/ft of sand with about two thirds of that lost from below the zero datum while the shoreline position retreated landward -102 feet.

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 was stable to accretive through natural aeolian processes. This region is a transitional zone between erosion to the north and stability to modest accretion on the southern Atlantic City beaches. No direct sand placement occurred here during the recent USACE project as sand moves longshore from the northern project area through this location. From spring 2017 to fall 2018, a modest volume of sand (4.10 yds<sup>3</sup>/ft.) accumulated while the shoreline advanced seaward 32 feet. Over the summer of 2018 the site added 7.24 yds<sup>3</sup>/ft of sand as the shoreline advanced seaward 8 feet. During the winter of 2019 the site continued to accumulate sand with 9.41 yds<sup>3</sup>/ft of sand added despite a modest shoreline retreat as the winter wave climate eroded the lower beachface slope but sand accumulated nearshore. Sand continued to accumulate during the spring and summer on the beach berm, nearshore and offshore through fall 2019, resulting in a gain of 21.78 yds<sup>3</sup>/ft. During the study interval, the dune remained stable approximately 140 feet in width with a crest elevation between 15 to 16 feet NAVD88. The recreational beach was stable and accumulated sand along the berm and beachface. An impressive 300 feet of dry beach width provided both storm wave protection and a source of aeolian sand for continued dune growth over time. Net volume change for the recent study interval was a gain of 37.85 yds<sup>3</sup>/ft of sand.

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

NJBPN 128 located at Dorset Avenue in Ventnor City is approximately 850 feet north of the fishing pier. Ventnor received sand during the initial 2002-2003 USACE beachfill and continued to receive sand during subsequent maintenance nourishment projects including the recent 2017-2018 3<sup>rd</sup> nourishment cycle. The site is located about 15 blocks north of the original taper to the 2003 federal project beach and was 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, eliminating the end effect erosion here. Ventnor City beaches located within the mid-section of Absecon Island benefit from the supply of sand moving north to south along the Absecon Island shoreline, forming wider beaches and a stable to accretive dune system in this region. Following the 2017 USACE project, the beach recovered 31.75 yds<sup>3</sup>/ft. of sand and the shoreline advanced 67 feet. The dune width is approximately 100 feet with a 13-foot NAVD 88 crest elevation. A 200-foot-wide recreational beach extends seaward of the dune toe providing both storm protection and a source of sand for continued aeolian dune growth. During the recent study interval, the beach continued to accumulate sand with 15.21 yds<sup>3</sup>/ft added from spring 2018 to fall 2018 and 13.37 yds<sup>3</sup>/ft added from fall 2019 to spring 2019. This trend continued over the summer of 2019 with 18.28 yds<sup>3</sup>/ft of sand added by fall 2019 for a net gain of 47.26 yds<sup>3</sup>/ft. of sand. The shoreline position advanced seaward 70 feet in response sand accretion along the beachface and beach berm. Further offshore a large bar accumulated sand as longshore

transport of sediments along Absecon Island continued to feed this region with sand eroded from the northern beaches.

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

Margate City declined to participate in the 2003 USACE project to construct dunes and widen beaches City beaches. The 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 (end effect erosion). During Sandy, Margate City suffered from significant flooding over the street end timber bulkheads 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.

By 2017, Margate and Longport had agreed to participate in the USACE flood and coastal storm damage reduction project for Absecon Island, construction work was completed in spring 2018. The dune system created during the project is approximately 150 feet wide at the base and 80 feet wide on the crest at elevation 14 feet NAVD88 significantly enhancing storm protection. The new beach berm width extended approximately 400 feet seaward of the street end bulkhead as the shoreline position advanced seaward 161 feet with 117.48 yds<sup>3</sup>/ft. of sand placed.

Following the project there was initial losses on the nearshore slope as the Benson Avenue profile adjusted with the site losing -18.86 yds<sup>3</sup>/ft of sand from spring 2018 to fall 2018. By spring 2019 the site accumulated sand offshore developing a significant bar feature while nearshore sand moved onshore developing a wider seasonal berm crest. During the same time period the dune feature was apparently modified mechanically to a smaller configuration as there is no evidence in the data or photos that indicate natural erosional processes. The modified dune feature was reduced to 100 feet wide at the base and 30 feet across the dune crest. Overall, the beach and dune width extended over 400 feet seaward of the street end revetment as of fall 2019. Net change for the study interval from spring 2018 to fall 2019 was a minor loss of -1.43 yds<sup>3</sup>/ft. of sand with a shoreline position retreat of -20 feet, indicating relative stability post construction.

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

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 beach in this southern community is narrow, at a low elevation absent of a dune 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, flooding and property damage occurred as a result of waves overtopping the wall cascading water down most of the Borough streets into Atlantic Avenue. In 2017, local agreement resulted in Longport's inclusion in the Absecon Island shore protection plan with construction completed in 2018 on the engineered dune and beach, completing the Absecon Island from Absecon Inlet to Great Egg Inlet USACE project.

The USACE project pumped 95.33 yds<sup>3</sup>/ft. of sand onto this beach. The shoreline advanced seaward 116 feet supporting development of a wider beach berm and a new dune ridge. This new dune feature was established approximately 20 feet seaward of the concrete and rock revetment, approximately 100 feet wide at the dune toe with a crest elevation of approximately 14 feet NAVD88. A beach berm at approximately 8 feet NAVD88 extended nearly 250 feet seaward of the seawall location. Both features significantly enhance storm protection for the local community.

Over the summer months, aeolian transport moved sand to the upper beach building a new foredune ridge on the seaward dune slope while nearshore wave scouring, and bar migration removed some sand as the new



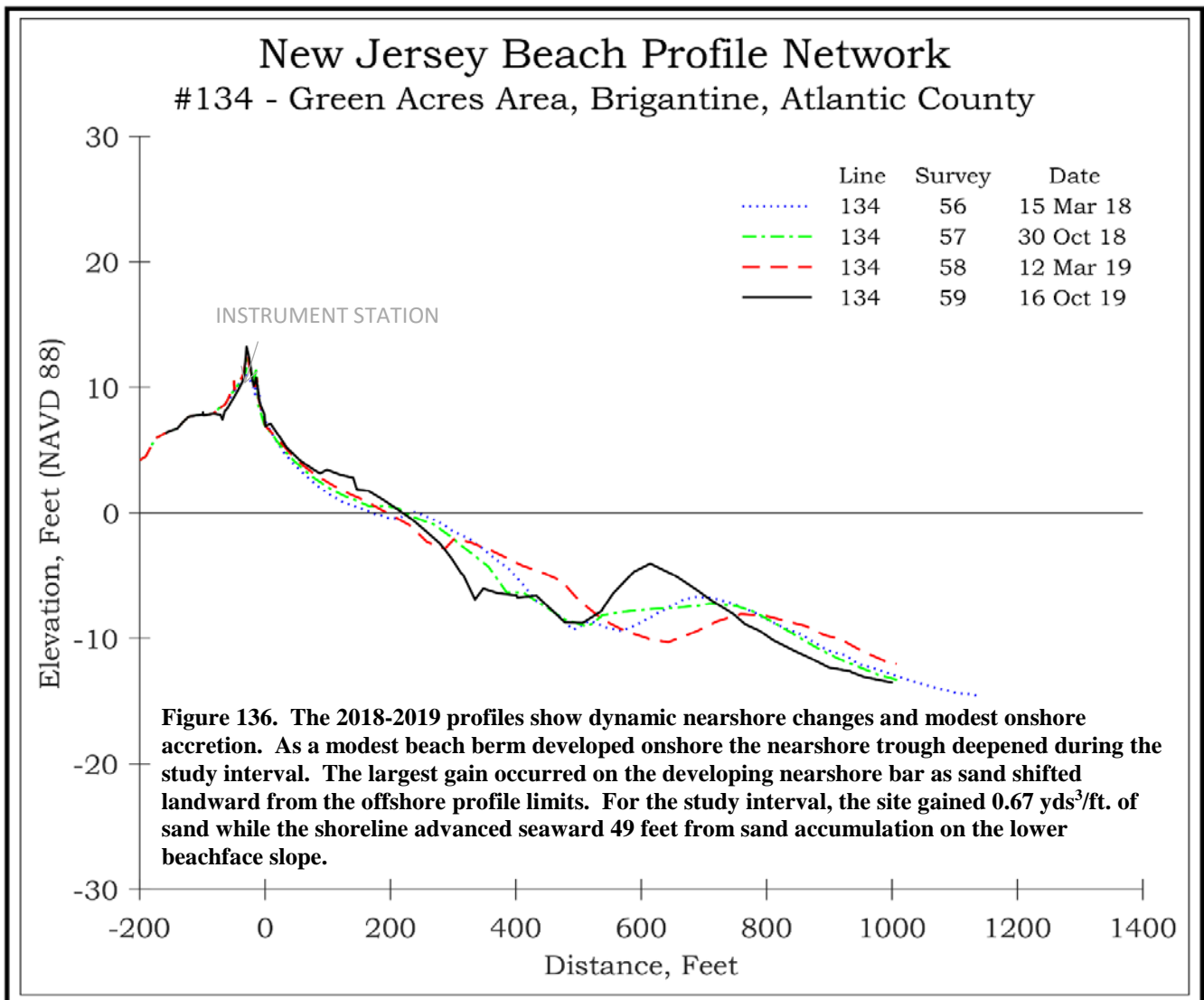
project beach profile adjusted to the wave climate. Net change from spring 2018 to fall 2018 included a modest loss of -19.47 yds<sup>3</sup>/ft. of sand and 29 feet of shoreline retreat. During the winter of 2019, the site lost an additional -24.61 yds<sup>3</sup>/ft of sand focused again on the nearshore beachface slope. As the project profile approached equilibrium the site stabilized and gained a modest 4.39 yds<sup>3</sup>/ft. of sand focused on a new nearshore bar but the shoreline continued to retreat landward -34 feet. Overall, for the study interval (spring 2018-fall 2019) the shoreline position retreated landward -98 feet with a loss of -41.01 yds<sup>3</sup>/ft. of sand following completion of the USACE project.

**Site Photographs and Profile Plots:**

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



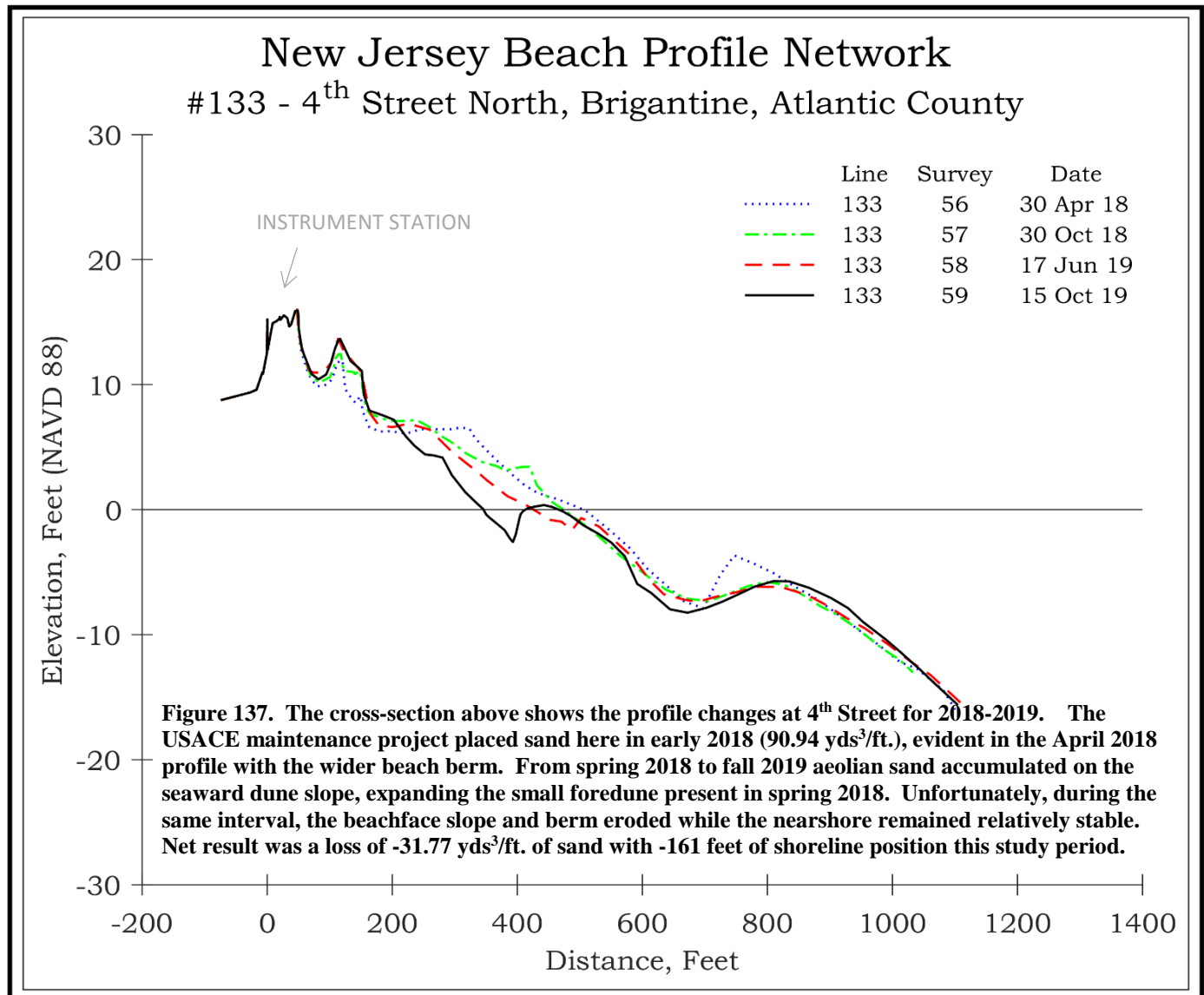
This site is located in the natural area on the northern segment of Brigantine Island preserved as public open space. On the left (March 15, 2018) the view is south along the seaward dune crest. The seaward slope rapidly transitions into a narrow flat beach with a nearshore sand ridge visible in the distance welding to the shoreline. Photo on the right taken October 16, 2019 is a similar view from the seaward dune crest showing little change in the dune configuration but modest sand accumulation on the upper beach and a hint of development of a lower berm ridge.



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



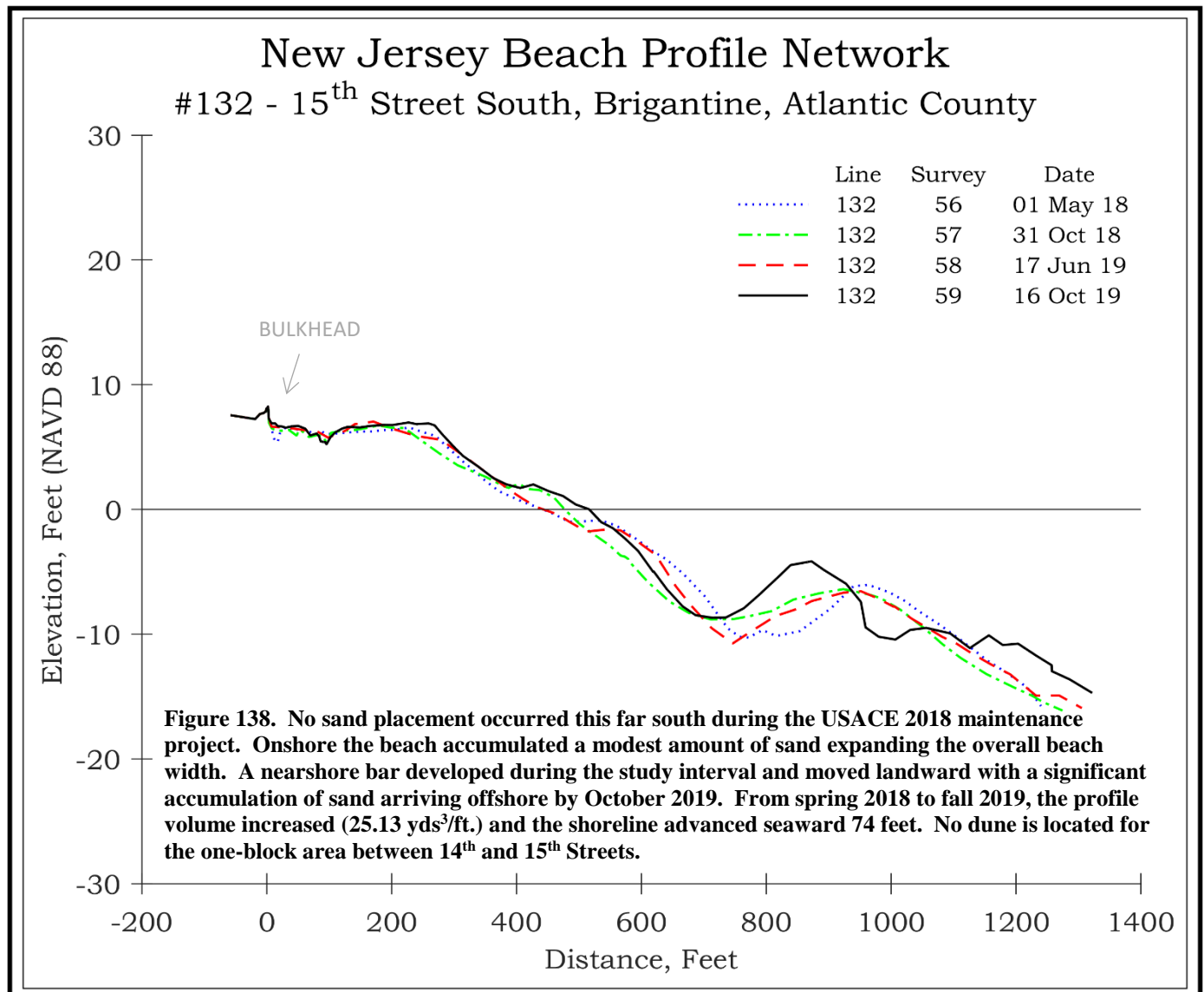
This site is located near the northern limit of development and within the 1997, 2001, 2006, 2013 and 2018 beach fill projects. Photo on the left (April 30, 2018) is a view down the foredune ridge built naturally from aeolian processes over time and now fully colonized by American Beach grass. The wide post fill beach berm is evident in the background. Photo on the right (October 15, 2019) shows some sand accumulated along the seaward dune toe while the beach eroded, elevation and width.



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



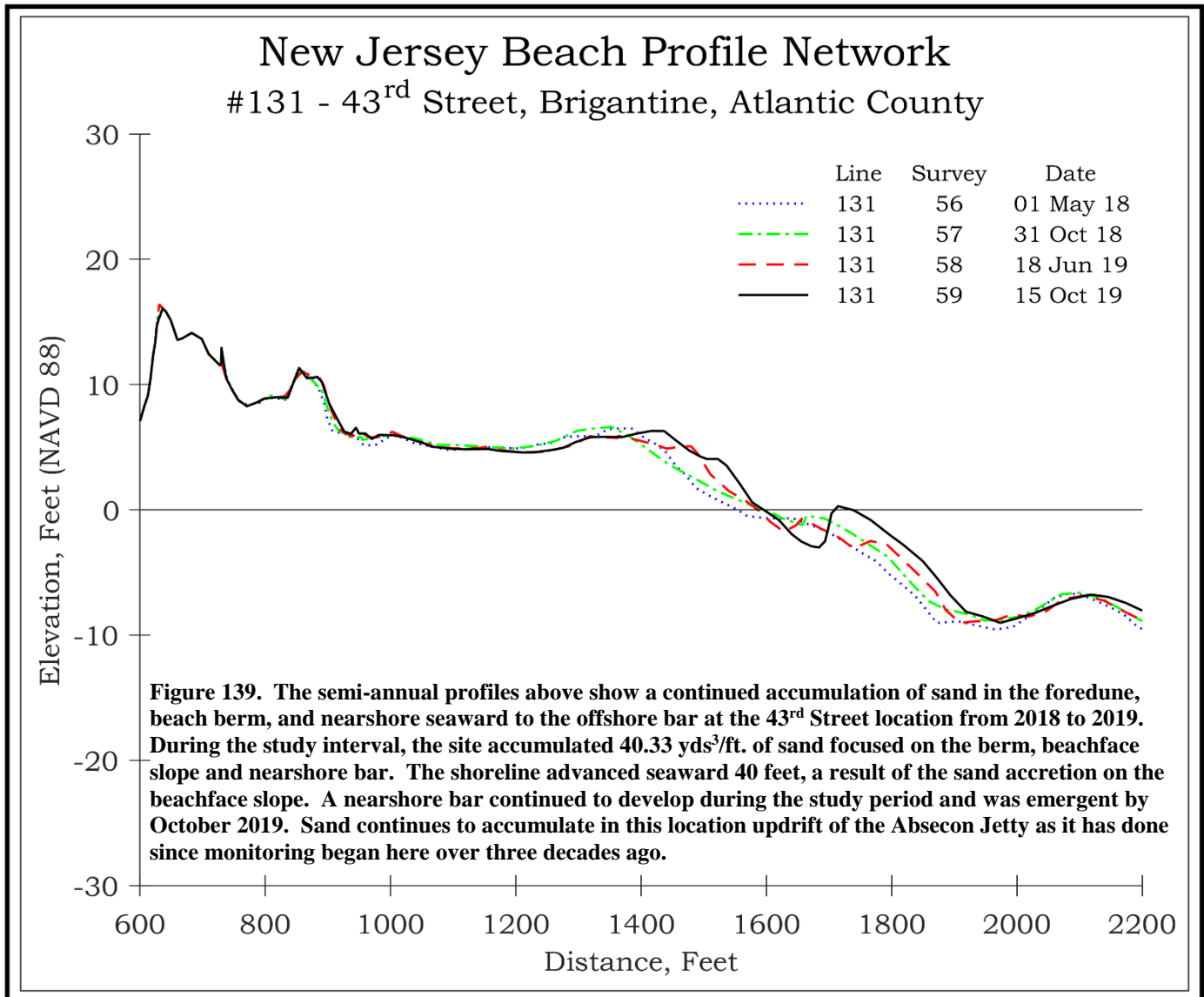
The left photo taken May 1, 2018, shows the view north and seaward of the beach club. Immediately seaward of the beach club the beach is wide and dry, but the dune is absent while to the north the dune is well developed. Photo on the right shows a similar view on October 16, 2019, there is visible evidence (wrack debris) of recent tides reaching the beach club fence.



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



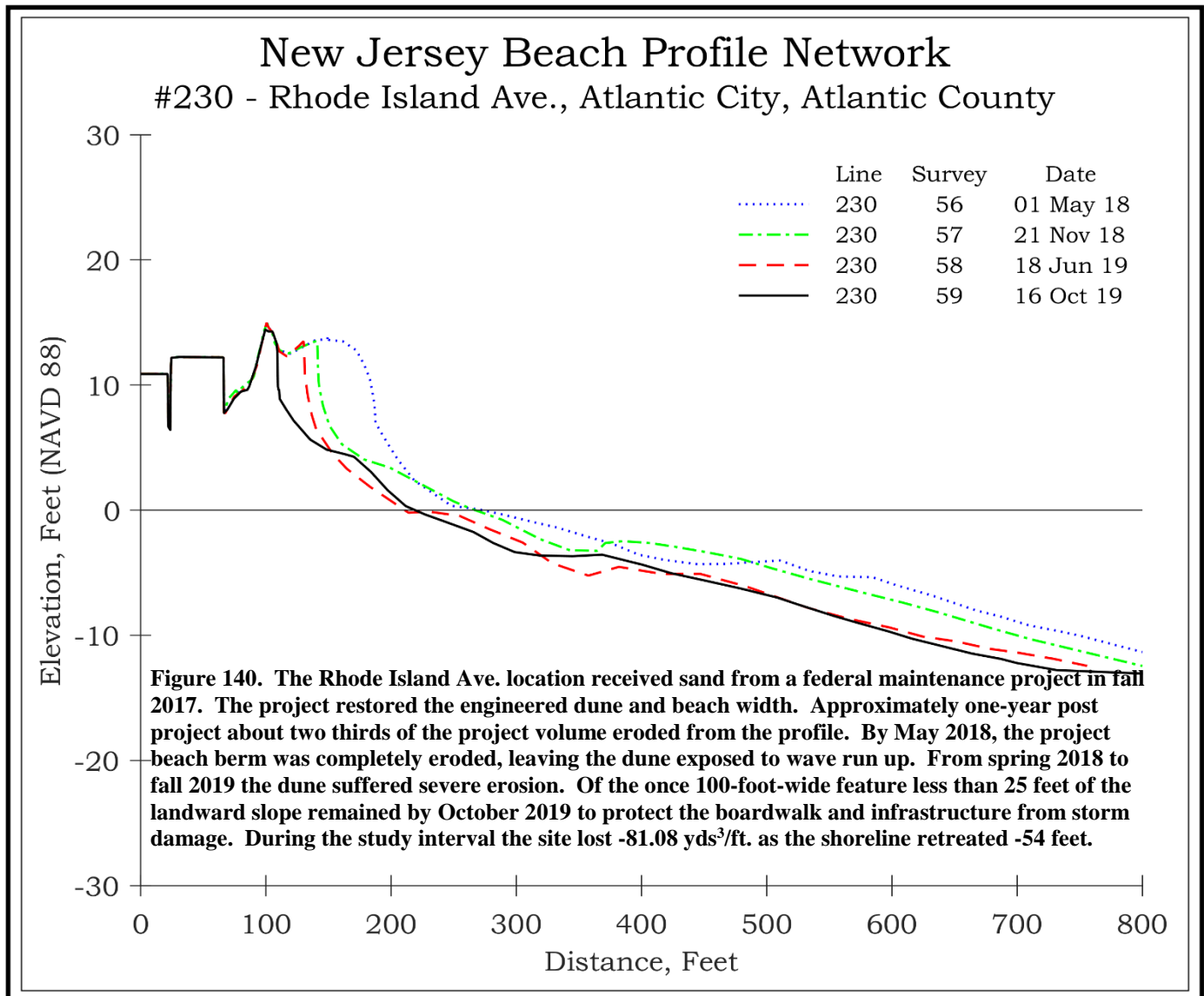
The photo on the left is a view to the north taken on May 1, 2018, shows the massive 600-foot wide recreational beach located between the dune and high-water line. Photo on the right taken October 15, 2019 shows the section of beach continued to accumulate sand along the seaward beach berm ridge. The line of waves breaking just offshore indicates the position of a nearshore sand bar building landward.



NJBPN 230 – Rhode Island Avenue, Atlantic City



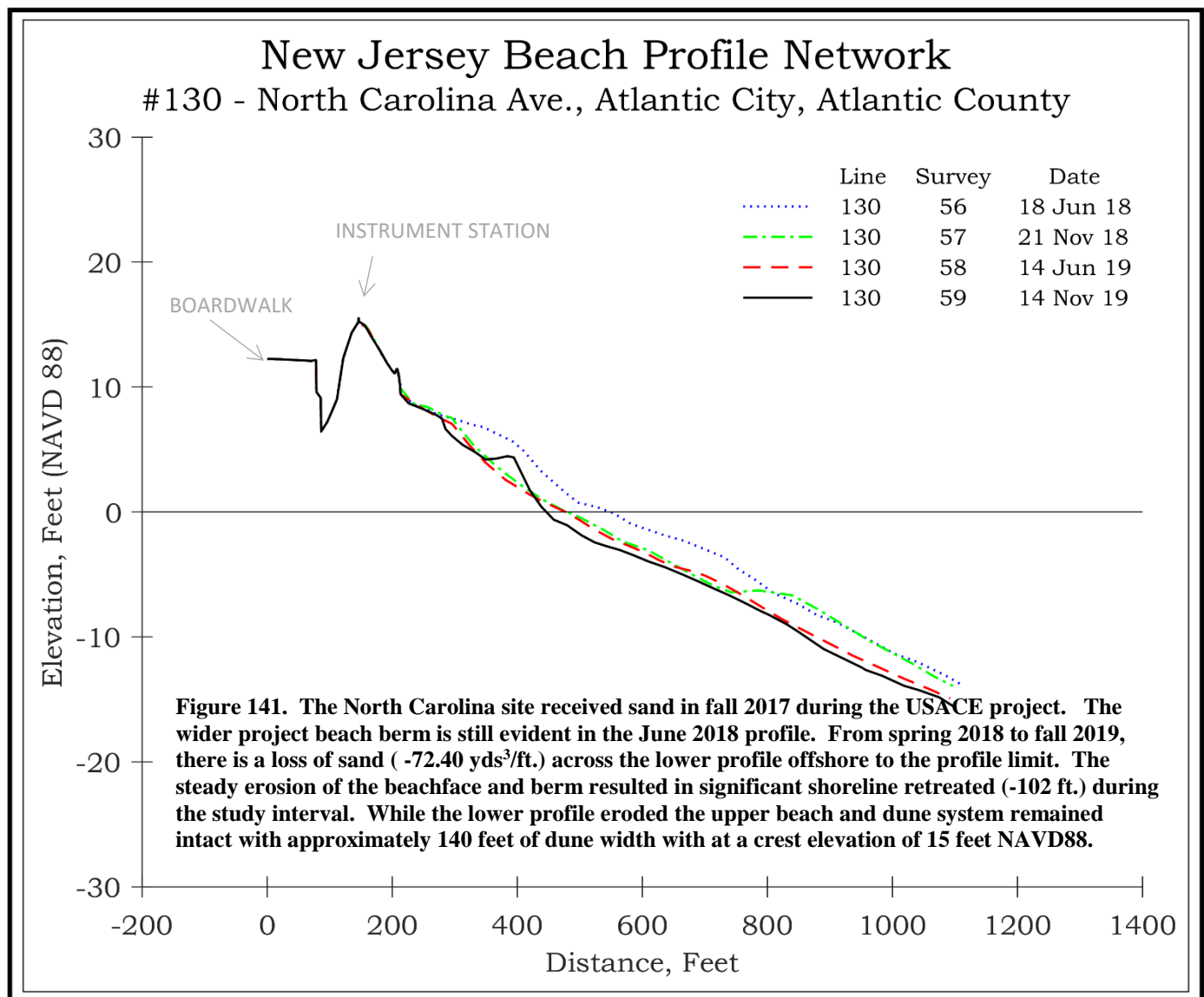
This profile site is located near the Absecon Inlet south jetty. The left photo (taken May 1, 2018) shows the fill material placed in 2017 has eroded and the beach is narrow with waves starting to cut into the seaward dune slope. By October 16, 2019 (right photo) erosion had cut the away the dune to the landward crest and reduced the overall beach width. This site remains an erosional hotspot for Atlantic City despite rehabilitation and modifications to the adjacent rock groins.



**NJBPN 130 – North Carolina Avenue, Atlantic City**



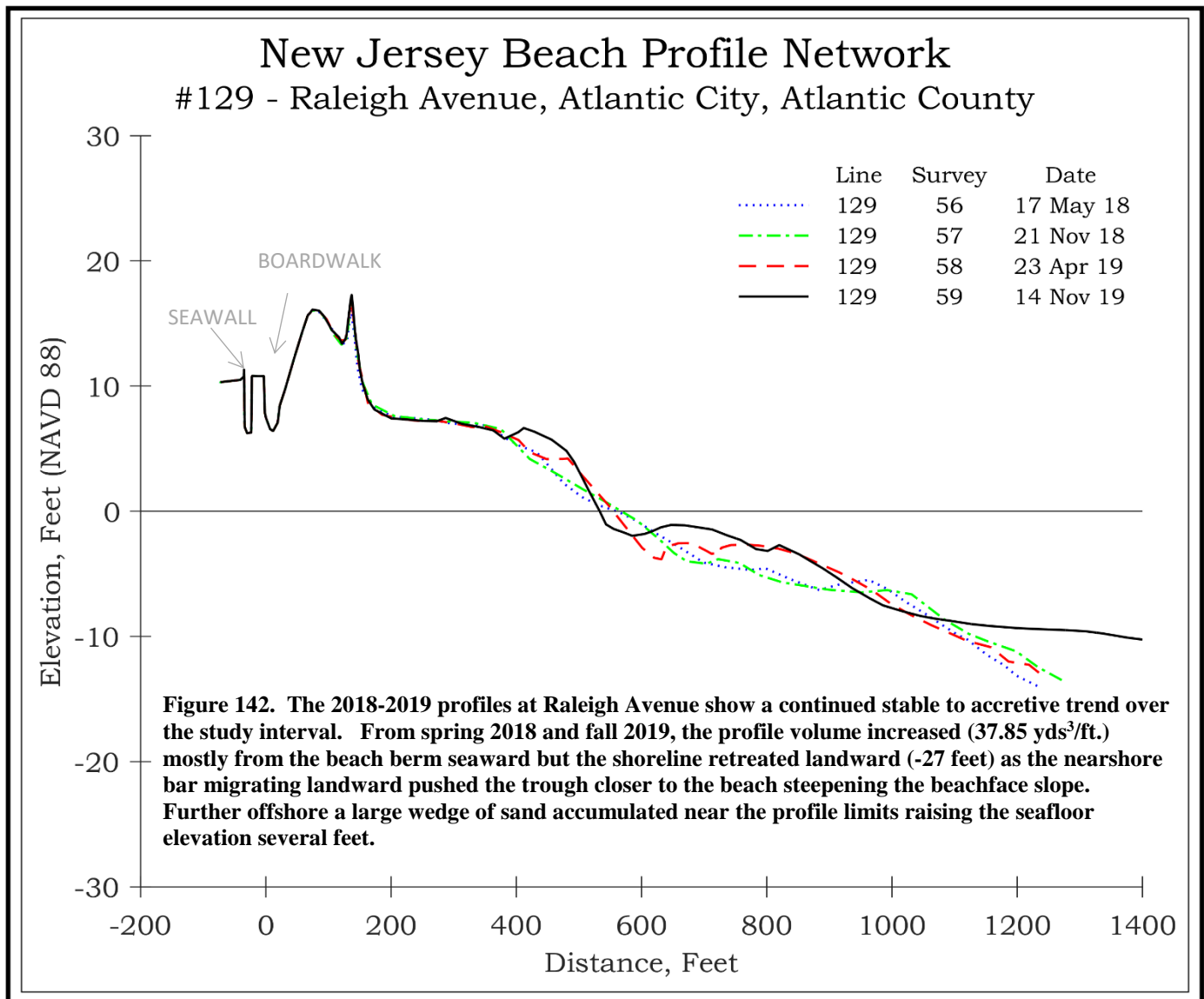
This location is also within the Absecon Island Federal shore protection project just south of Steel Pier. The left photo, taken June 18, 2018, shows the beach after grading with the established dune system. Photo on the right, shows a modest reduction in the overall beach width but the upper beach and dune remained intact as of November 14, 2019.



**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. Photo on the left taken May 17, 2018 shows the sider beaches and an expanding foredune nearly burying the dune fence in the foreground. Photo on the right taken November 14, 2019 shows the stability of the beach and continued growth of the dune with colonization of beach grass onto the seaward slope.

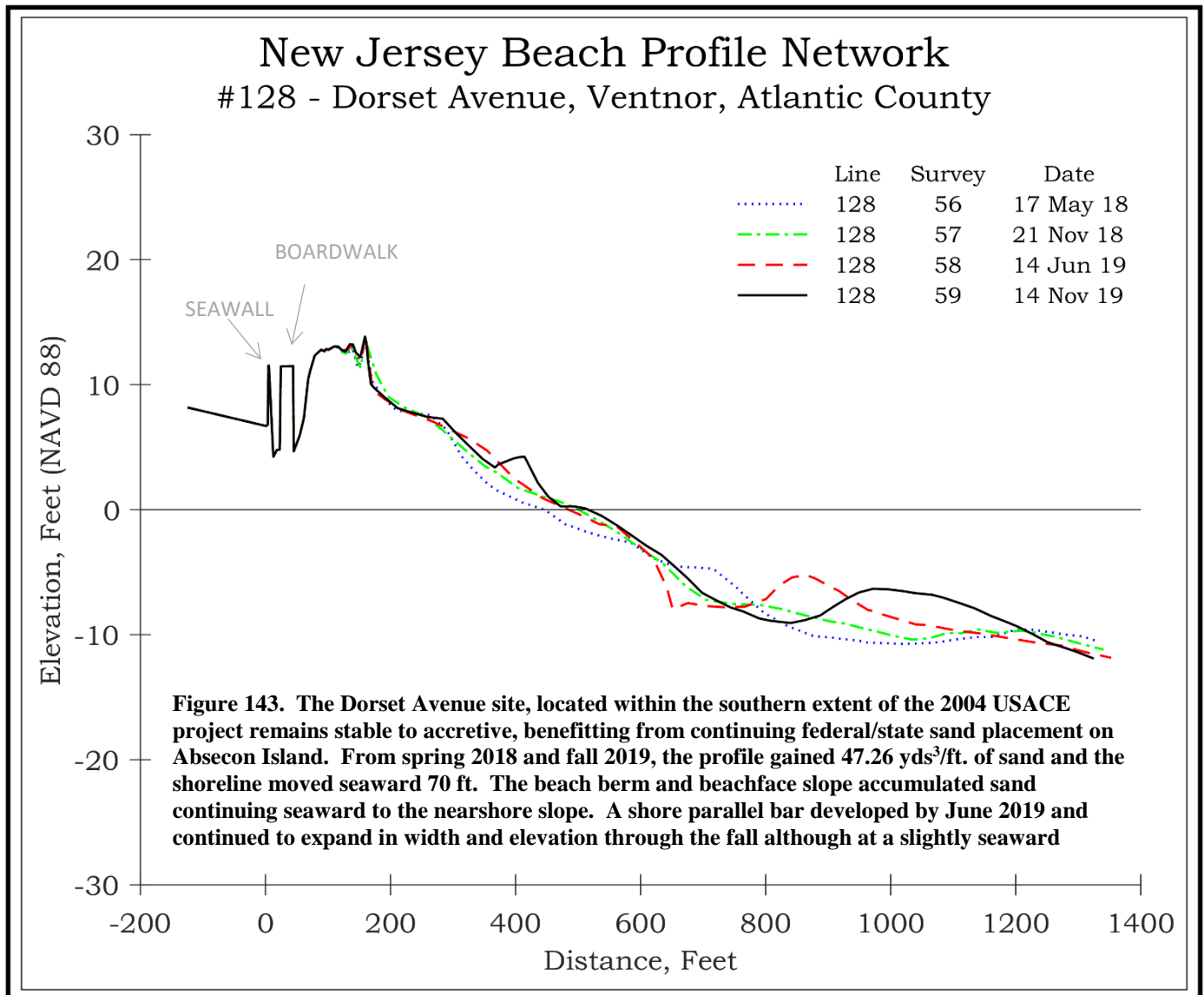




**NJBPN 128 – Dorset Avenue, Ventnor City**



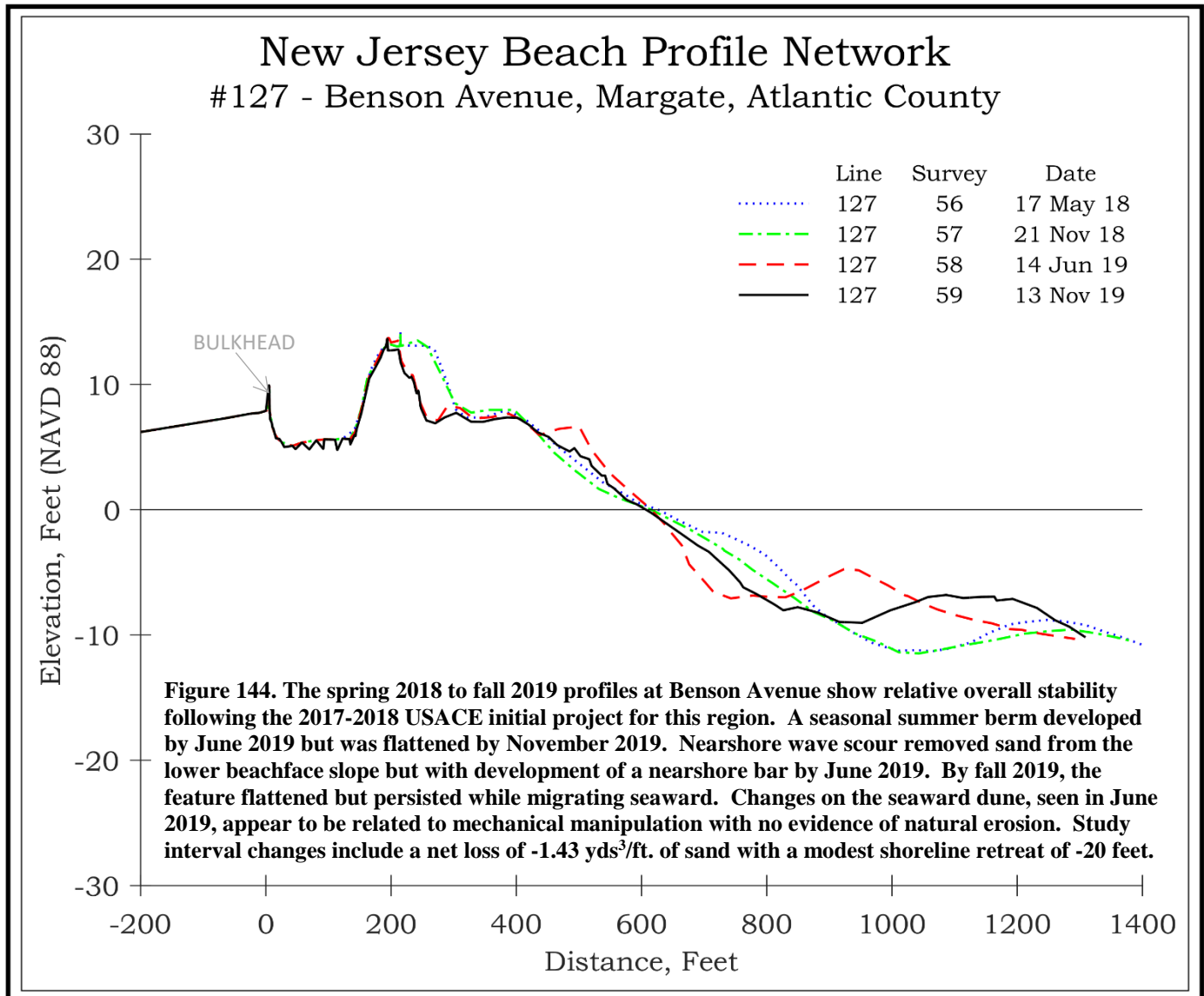
The Dorset Avenue site positioned centrally on Absecon Island is stable in terms of net storm losses, seasonal changes and any long-term erosion trends. Left photo taken May 17, 2018 shows a view to the south of the dune and beach with the Ventnor pier in the background. A similar view taken on November 14, 2019 shows a wider beach and significant spread of beach grass over the seaward slope.



NJBPN 127 – Benson Avenue, Margate City



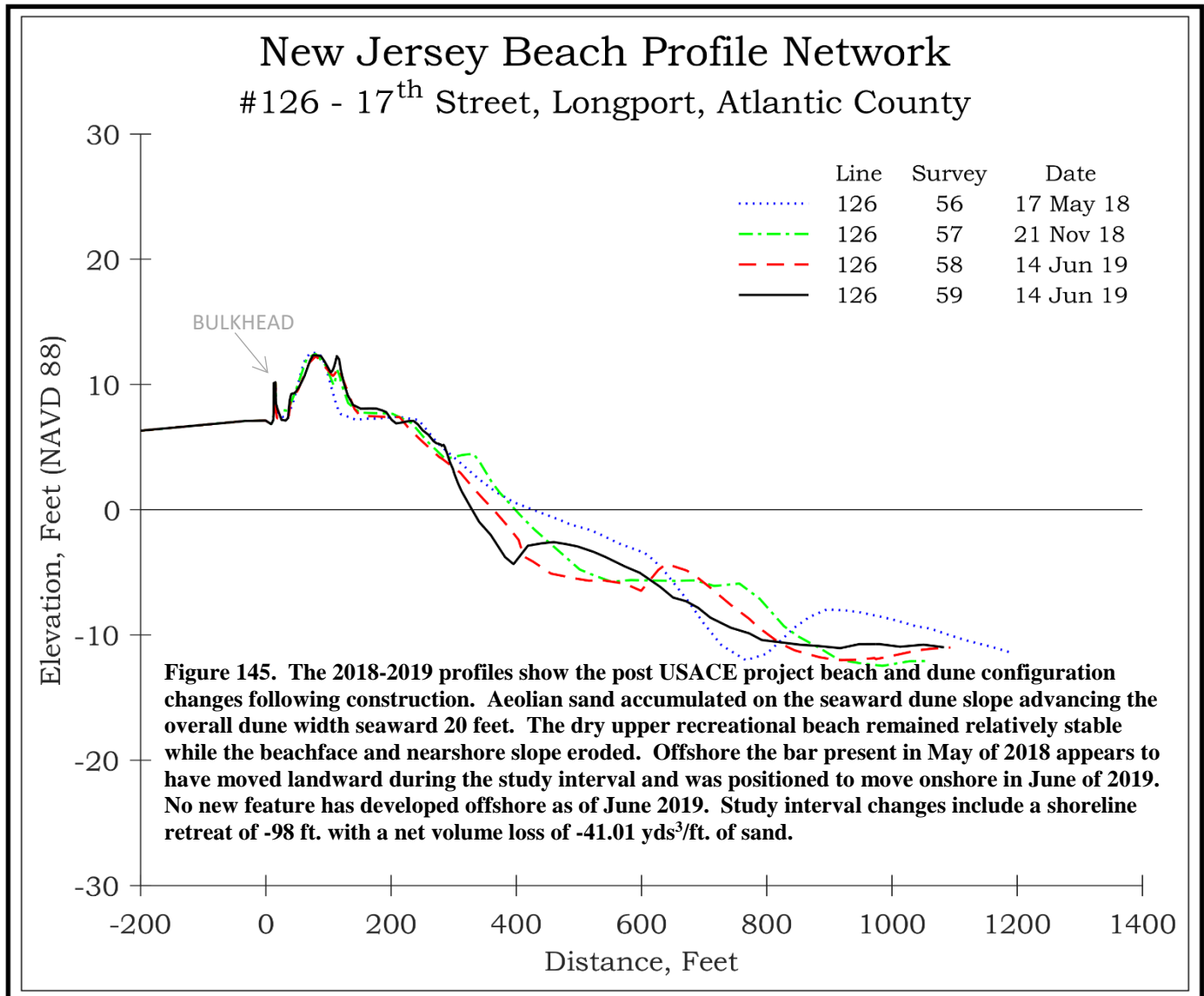
The Benson Avenue site is located approximately one mile south of the end of the original USACE project in Ventnor. The left photo taken May 17, 2018 shows the post project dune and beach configuration with a wide dry beach berm and newly planted dune. By November 13, 2019, the dune fence was installed, and the beach grass is growing with new plugs recently planted on the seaward slope. Following construction, the beach remained relatively stable throughout the study interval.



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. The left photo, taken May 17, 2018, shows the post USACE project established dune and wider beach conditions. By November 13, 2019 (right photo) aeolian sand accumulated along the seaward dune slope nearly burying the seaward beach access and dune fence while the dry recreational beach width remained relatively stable.



## Summary & Conclusions

The USACE completed the scheduled the 3<sup>rd</sup> nourishment cycle on Absecon Island in spring 2018 which following a Superior Court ruling included completion of the entire Absecon Island project from Absecon Inlet to Great Egg Harbor Inlet. 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. While some residents in Margate continued to oppose the USACE project design and took legal action to block construction overturned by the 2016 court ruling. On Brigantine Island, USACE restoration work was also completed in spring 2018.

Tables 1 and 2 provide the seasonal and annual profile shoreline and volume changes for Atlantic County. After completion of the USACE project, the Absecon Island average beach change at the six cross sections lost -18.47 yds<sup>3</sup>/ft. in sand volume accompanied by a -38.2-foot average shoreline retreat from spring of 2018 to the fall of 2019. These numbers provide an average across the federal project beach with readjustment of the recent USACE nourishment project sand to the prevailing currents and wave climate the major influencing factor in the absence of a major storm event. The most significant post project changes occurred at Rhode Island Avenue at the north end of Atlantic City within the erosional hotspot where the seaward dune slope and beach restored during the 2017/2018 project quickly retreated landward to within about 75 feet of the boardwalk by fall 2018. The USACE project placed approximately 118.55 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. By spring 2018, the shoreline had retreated 123 feet with a loss of -61.44 yds<sup>3</sup>/ft. of sand. The North Carolina site showed a similar pattern receiving approximately 89.56 yds<sup>3</sup>/ft. of sand followed by rapid erosion that removed -34.87 yds<sup>3</sup>/ft. of sand from spring 2018 to fall 2018. From fall 2018 to Spring 2019 another -24.77 yds<sup>3</sup>/ft of sand was lost with an additional -12.14 yds<sup>3</sup>/ft of sand eroded from spring 2019 to fall 2019 for a net -72.4 yds<sup>3</sup>/ft of sand eroded since the USACE project was completed. Changes at the mid-island sites on Absecon Island were more positive, ranging from a gain of 37.85 yds<sup>3</sup>/ft. at Raleigh Ave in Atlantic City to a gain of 47.26 yds<sup>3</sup>/ft of sand at Dorset Avenue in Ventnor. These gains indicate a net transfer of sand north to south along the Absecon northern shoreline as sand eroded from the northern sites moved longshore towards the middle of the island. At Benson Avenue in Margate, the site remained relatively stable with a net loss (spring 2018 to fall 2019) -1.43 yds<sup>3</sup>/ft. of sand. The 17<sup>th</sup> Street site in Longport is heavily influenced by inlet dynamics due to its proximity to the Great Egg Harbor Inlet, from spring 2018 to fall 2019 it suffered a net loss of -41.01 yds<sup>3</sup>/ft. of sand while the shoreline retreated -98 feet.

On Brigantine Island, the four cross sections gained an average of 8.59 yds<sup>3</sup>/ft. of sand from spring 2018 to fall 2019. The site at 4<sup>th</sup> Street north located within the federal project received 90.94 yds<sup>3</sup>/ft. of sand during the recent USACE maintenance project but was the only site to show a net loss of sand (-31.77 yds<sup>3</sup>/ft.) from spring 2018 to fall 2019. The northern Green Acres site was relatively stable with a net gain of 0.67 yds<sup>3</sup>/ft of sand during the study interval while the remaining two southern sites (15<sup>th</sup> St, 25.13 yds<sup>3</sup>/ft. & 43<sup>rd</sup> St, 40.33 yds<sup>3</sup>/ft.) gained on average 32.73 yds<sup>3</sup>/ft. of sand from spring 2018 to fall 2019. The average shoreline change for the four Brigantine profile sites was a seaward advance of one foot during the study interval. The 4<sup>th</sup> Street North site skewed the average with a large shoreline position retreat of -160.5 feet on the engineered beach having advanced 160 feet seaward immediately following the project. The three other sites in Brigantine advanced 42 feet to 74 feet with the largest occurring at 15<sup>th</sup> Street south. Average shoreline changes for the other three sites (#134, 49 ft, #132, 74 ft & #131, 42 ft) was an impressive advance of 55 feet.

Absecon Island has the highest density of development on any New Jersey barrier island with a moderate storm exposure risk, even with completion of the federal project. Completion of the initial construction for Margate and Longport with maintenance nourishment for Atlantic City and Ventnor City increased the Absecon Island sediment budget. With this additional sand and completion of the southern community beaches, the stable middle segment of the Absecon Island oceanfront expanded to include Margate. The northern hotspot persisted between Absecon Inlet and Steel Pier driven by proximity to the inlet and island orientation. This area

continued to suffer disturbingly higher erosion rates that threatened exposure of the boardwalk infrastructure near Rhode Island Ave. At the south end of Absecon Island, the southern beaches also experienced significant erosion rates following sand placement. With its proximity to Great Egg Harbor Inlet and no modifications to the terminal groin at 11<sup>th</sup> Street or jetty system at Longport Point terminal losses and sand bypassing is showing problematic initial loss rates.

From the Oriental Jetty towards Gardner's Basin the USACE constructed 0.3 miles of bulkhead, seawall and boardwalk, completed in April 2018. This work replaced an aging rock structure and the severely damaged inlet boardwalk. The project design reduced coastal storm damage risk while restoring city access and recreational opportunities along the inlet. Approximately 99,000 tons of stone placed in the new shore protection structure extending 1,776 feet fronting 2,650 feet of new boardwalk. 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/>).

The southern third of Brigantine Island continues to have the lowest storm damage risk due to expansion of the dune and beach width over the last 60 years, a result of extending the north jetty at Absecon Inlet and a persistent southerly littoral drift, moving sand along the shoreline. Consequently, sand placement on the federal project beach at the northern erosional hotspot continues to migrate north to south along the island shoreline. This continuing process supports the concept for development of a sand back-passing program established on the southern beaches to remove a percentage of the accumulated sand and transfer it north back to the federal project beaches. Moving sand at a sustainable rate from the southern beaches to the federal project area would keep sand in the system and benefit the regional sediment budget significantly extending the period between required large scale and expensive nourishment projects.