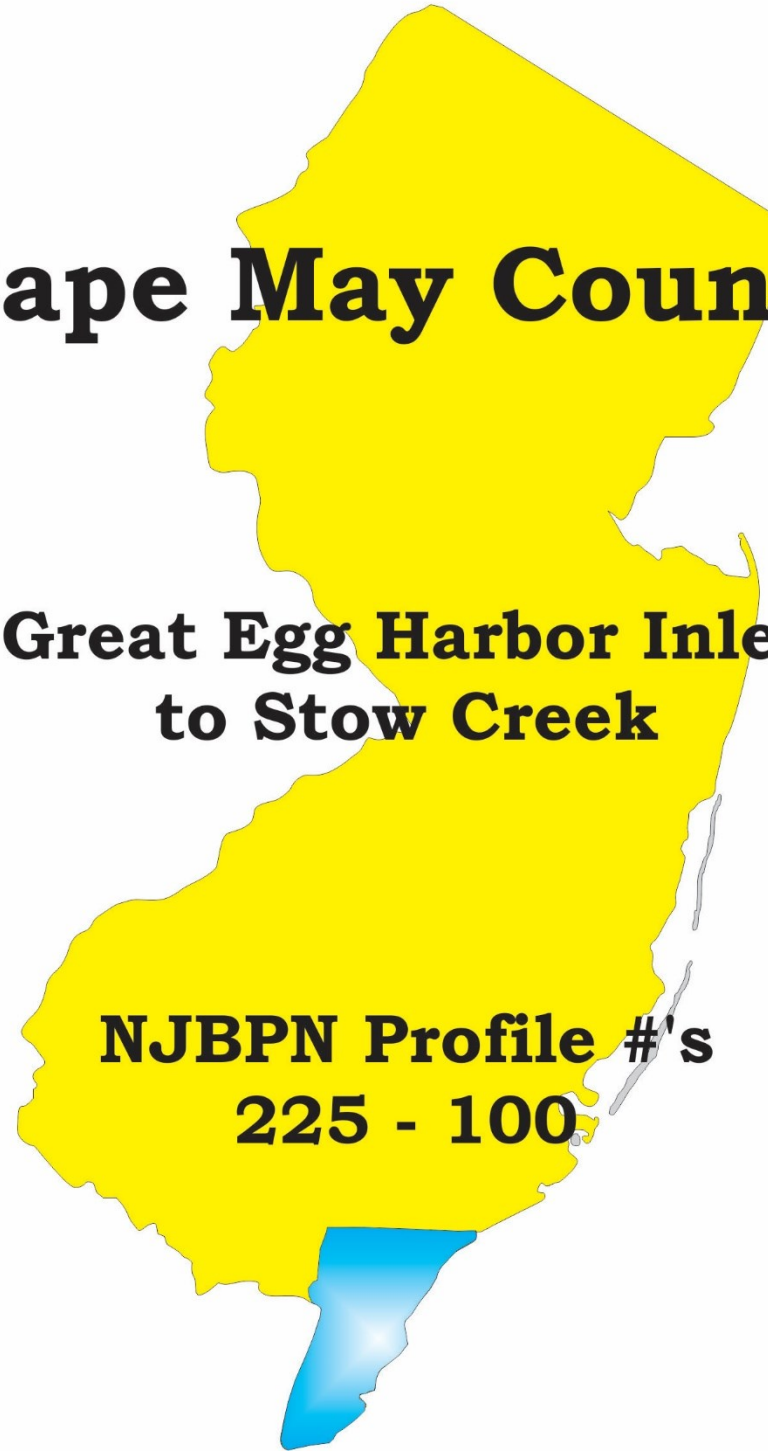
New Jersey Beach Profile Network

Cape May County



Great Egg Harbor Inlet to Stow Creek

NJBPN Profile #'s 225 - 100

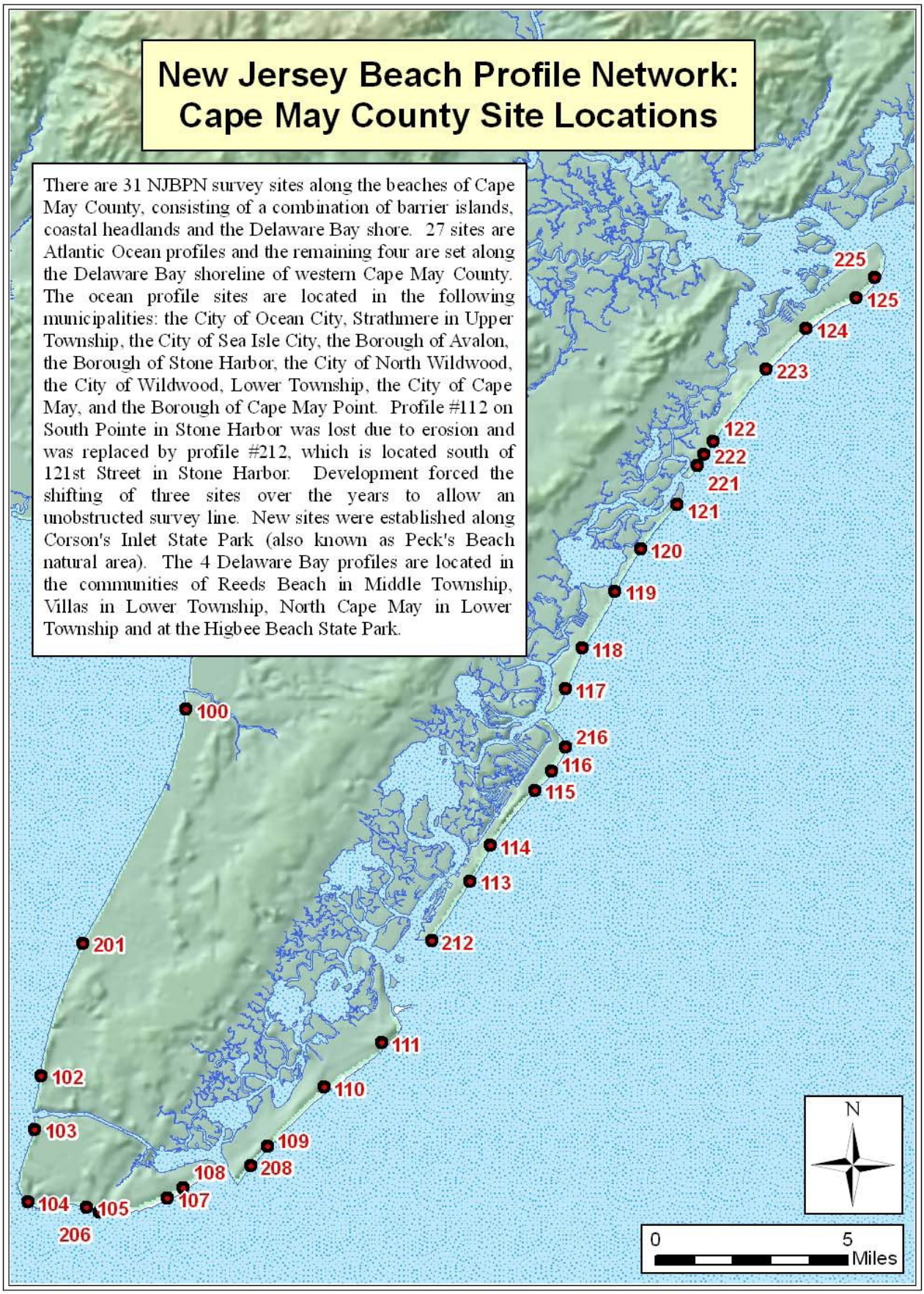


Figure 78. Map of Cape May County showing the locations of the 31 profile sites in the county.

Cape May County in 2015:

Cape May County has 31 survey stations between Reeds Beach on the Western Cape May County shoreline, around Cape May Point and up the ocean coastline to Great Egg Inlet in Ocean City. This county has five tidal inlets separating four barrier islands and a complex coastal geomorphic compartment that is the site of Cape May City, a US Coast Guard base and Cape May Point. Each inlet has near identical geomorphic conditions with a narrow, rapidly changing southern spit that curves deep into the inlet, a large ebb-tidal delta offshore and a distinct offset in the seaward position of the southern inlet shoreline due to wave refraction around the ebb-tidal delta. This makes the northeast corner of each island vulnerable to northeast wave conditions especially when the main tidal channel lies close to the southern shoreline of the inlet. Each island has at least one profile location where the 29-year surveying history is one of repetitive erosion cycles following each restoration attempt going back to 1983 in Ocean City and 1984 at Strathmere (NJ State/local projects followed later by Federal work). Avalon conducted a State/local project in 1987, followed 22 years later by the State and North Wildwood in 2009. Episodic deposition has occurred in the mid-section of the four barrier islands yielding generous dunes and wide beaches (20th Street in Ocean City, Williams Road in Strathmere, 35th Street in Avalon, and Cresse Avenue in Wildwood Crest). Sand moves eventually to the southern tip of each island creating a rapidly changing environment at the northern side of each tidal inlet (Corson's Inlet state park, Townsend's Inlet, South Point in Stone Harbor, and the Cape May Nature Conservancy).

The large scale federal shore protection projects are guaranteed to accelerate these two processes with evidence well in hand that the spectacular growth in South Point on Seven-Mile Island since 1995 is entirely due to beach nourishment in Stone Harbor derived from the sand in the ebb-tidal shoals of Hereford Inlet. The expansion of the Nature Conservancy beach south of Cape May City since 1989 beach nourishment commencement in Cape May City is due to sand migration via longshore transport.

Western Delaware Bay Shoreline of Cape May County;

During 2014 habitat restoration work commenced under an umbrella of wildlife oriented groups funded with National Fish & Wildlife Sandy recovery money. Attention has been focused on the western shoreline of Cape May County over the past two and a half years largely due to the loss of horseshoe crab egg laying habitat at the marsh edge beaches. These thin veneers of coarse sand have been the choice area for millions of the crabs to lay eggs each May. The result was their separate use by the Red Knot shorebird as fuel for their long breeding flight from south to north each spring. Sand was supplied from Cape May County quarries and engineered to have a sloping berm and an elevation just above normal mean higher high water. Work expanded during 2015 westward along the Delaware Bay shoreline into Cumberland County (Fortescue and Money Island) providing additional locations where the marshes at the water's edge received quantities of suitable sand to replace horseshoe crab egg-laying sites wiped out by Hurricane Sandy. Other efforts focused on sediment distribution budgets and documentation of wave energy flux (heights, periods and direction of travel) along the lower Delaware Bay NJ shoreline.

Sandy ripped up the sand veneer and washed it inland among the marsh grasses leaving bare sod and mud in place of sand. Work included habitat restoration using quarry sand and building oyster reef sites along the bayshore in relatively shallow water. Marsh restoration is being incorporated into the Maurice River delta area to convert extensive mud flats back into viable marsh habitat. In addition, a federal project long on the sidelines, is being re-examined for implementation on the western Cape May County bayshore using Delaware Bay dredge sand that has been discharged at what is called "buoy 10" at the mouth of the bay.

Cape May City;

Cape May City beaches all added sand to the berm as a wedge during the summer of 2014. This material was stable until a series of days in early October 2015 that transported about 35,000 cubic yards of sand around the

3rd Avenue groin into "The Cove" on the conservancy beach. This was repeated by a factor of two January 23, 2016 (NE Storm Jonas). Added studies were approved by the City to better understand the beach configuration and seaward slope data following a number of injury complaints alleged to be the result of a too steep a beach and enhanced wave breaking at the beach.

The Wildwoods;

The North Wildwood profile appears to have lost a substantial sand volume as the shoreline retreated 195 feet and shed 99.44 yds^3/ft. in sand volume, but sand continued to accumulate at the southern three sites. Cresse Avenue advanced seaward another 43 feet as the berm grew ever wider. The other two advanced between 40 and 13 feet further seaward.

Work by the Philadelphia District ACOE continues toward an approved design document for the Wildwoods that includes sand harvesting from Wildwood and Wildwood Crest and passing it back north to the erosion zone in North Wildwood as opposed to pumping in new sand from offshore or Hereford Inlet tidal shoals. The City of North Wildwood is conducting mirrored sand harvesting work as well transferring 37,000 cy of Wildwood sand north in early 2015 and receiving 38,000 cy in dredged sand from Beach Creek in the fall of 2015 all placed between 2nd and 5th Avenues on the oceanfront. Sand backpassing from Wildwood continues in early 2016.

Avalon & Stone Harbor;

These two communities have been leaders in shore protection by having successfully managed to have Federal shore protection projects constructed and have for years, promoted wider, higher dunes with coordinated development of pedestrian access pathways that do not make a breach easier at street end access points. The US Army Corps of Engineers completed a project restoration from the 8th Street jetty to 31st Street in Avalon and from 70th Street in Avalon south to the terminal groin south of 123rd Street in Stone Harbor. This work was completed under PL 113-2 Emergency Restoration funds for Hurricane Sandy damage to ACOE project. Since that was completed in early 2013, erosion claimed the sand to the revetment rocks at 12th Street in Avalon. The Borough conducted its individual beach project in 2015 adding 740,000 cy between 9th and 25th Streets. Currently a sand backpassing operation is underway to move sand from the mid-island borrow zone beaches to the erosional part of the island. Stone Harbor's southern oceanfront has suffered severe loss rates culminating in NE storm damage in early 2016 leading to substantial dune erosion. An effort to utilize sand extracted from lagoon dredging along the bayshore as beach augmentation has run into difficulties with fine sediment storage failure of geo-textile bags bursting in the municipal marina parking lot.

Sea Isle City & Strathmere;

A 2009 NJ State and locally sponsored shore protection project saved these two communities substantial damage from Hurricane Sandy with about 230,000 cubic yards of sand lost that is proposed to be replaced starting April 17, 2015 in Ocean City under ACOE responsibility for Ludlam Island. This project covers from 42nd Street to 59th Street in Ocean City then will extend from Seaspray Avenue south to 93rd Street in Stone Harbor and will be accomplished using sand from offshore borrow sites previously defined. Sand was added first in Ocean City, then starting in Strathmere and working south finishing at 93rd Street in Sea Isle City. Over 3.4 million cubic yards of new sand was pumped onto this island from offshore borrow sites in 2015.

The Corson's Inlet State Park shoreline south of development in Ocean City suffered dune loss of considerable magnitude during Hurricane Sandy. Since sand moves south naturally under wave dominance from the northeast, this shoreline should benefit from any sand losses in Ocean City's part of the new project. The dune will need fencing to encourage reconstruction as the beach widens. The position of the main tidal channel in

Corson's Inlet has been monitored because it's position vis-à-vis the Strathmere inlet shoreline is critical to the rates of erosion seen on the southern shoreline.

Ocean City;

The Ludlam island project also includes 1.5 million cubic yards of sand for the southern shoreline of Ocean City that was damaged by Hurricane Sandy due to low, narrow dunes. This places the shoreline between Great Egg Inlet in Ocean City and Hereford Inlet in Stone Harbor under ACOE project jurisdiction with a 3 to 5 year expectancy of maintenance work on restoring these beaches to the design specifications.

NJBPN 225 - Gardens Road, Ocean City

The Gardens Road site is the northernmost profile in Ocean City and located near Great Egg Inlet. (Left photo is from September 8, 2014. Right photo is from September 1, 2015). The dune and some of the berm that was created by the 2013 Federal emergency beach fill remained throughout 2014 and 2015. Seasonal volume losses (-59.34 yds^3/ft.) occurred between surveys 49 and 50. The summer 2015 gains did not sufficiently rebuild the dry beach to its design width but the dunes remained in good condition.

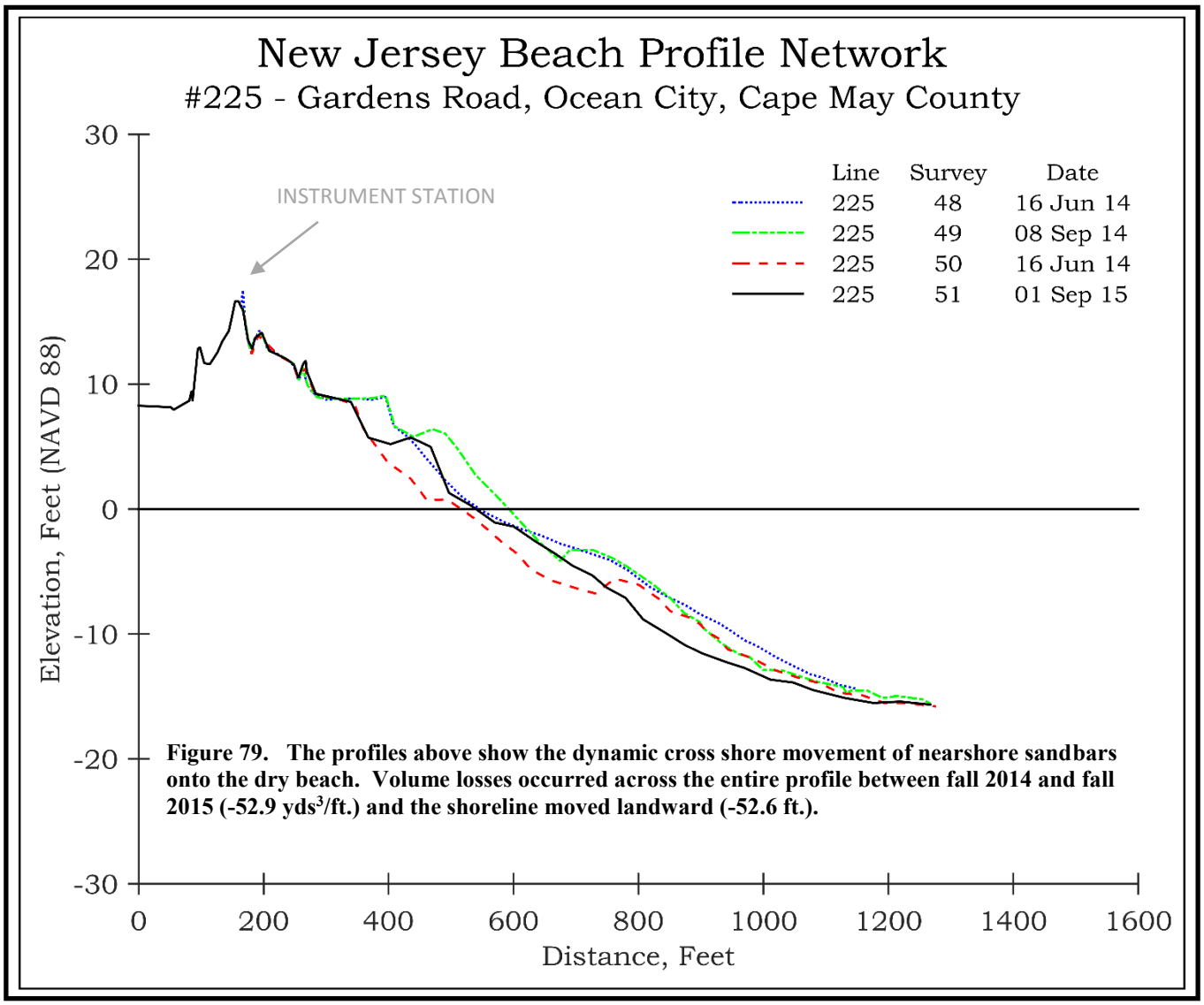


Figure 79. The profiles above show the dynamic cross shore movement of nearshore sandbars onto the dry beach. Volume losses occurred across the entire profile between fall 2014 and fall 2015 (-52.9 yds^3/ft.) and the shoreline moved landward (-52.6 ft.).

NJBPN 125 - 6th Street, Ocean City

The left photo (taken September 8, 2014) shows a wide berm still present from the USACE (2013) beach fill. The right photo (taken September 1, 2015) shows a narrowed berm. Some dune scarping occurred over the course of the year, but vegetation was healthy.

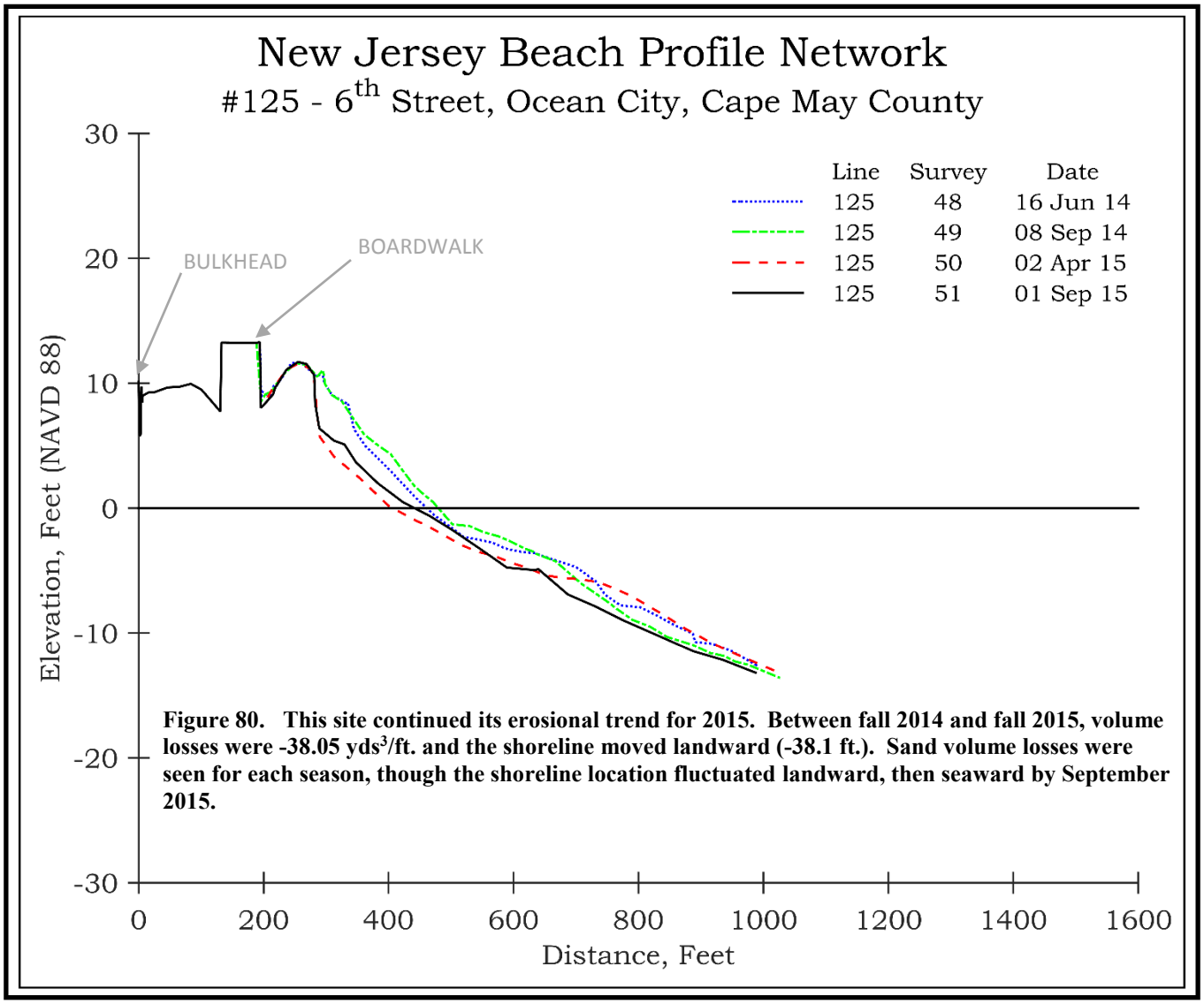


Figure 80. This site continued its erosional trend for 2015. Between fall 2014 and fall 2015, volume losses were -38.05 yds^3/ft. and the shoreline moved landward (-38.1 ft.). Sand volume losses were seen for each season, though the shoreline location fluctuated landward, then seaward by September 2015.

NJBPN 124 - 20th Street, Ocean City

The 20th Street profile is located near the center of the island and hosts an extensive dune and wide berm. The area now appears stable since the initial beach restoration in 1992. Photo on left taken September 8, 2014. Right photo taken September 1, 2015. The dune continued to move slightly seaward and there were volumetric gains over the course of 2015.

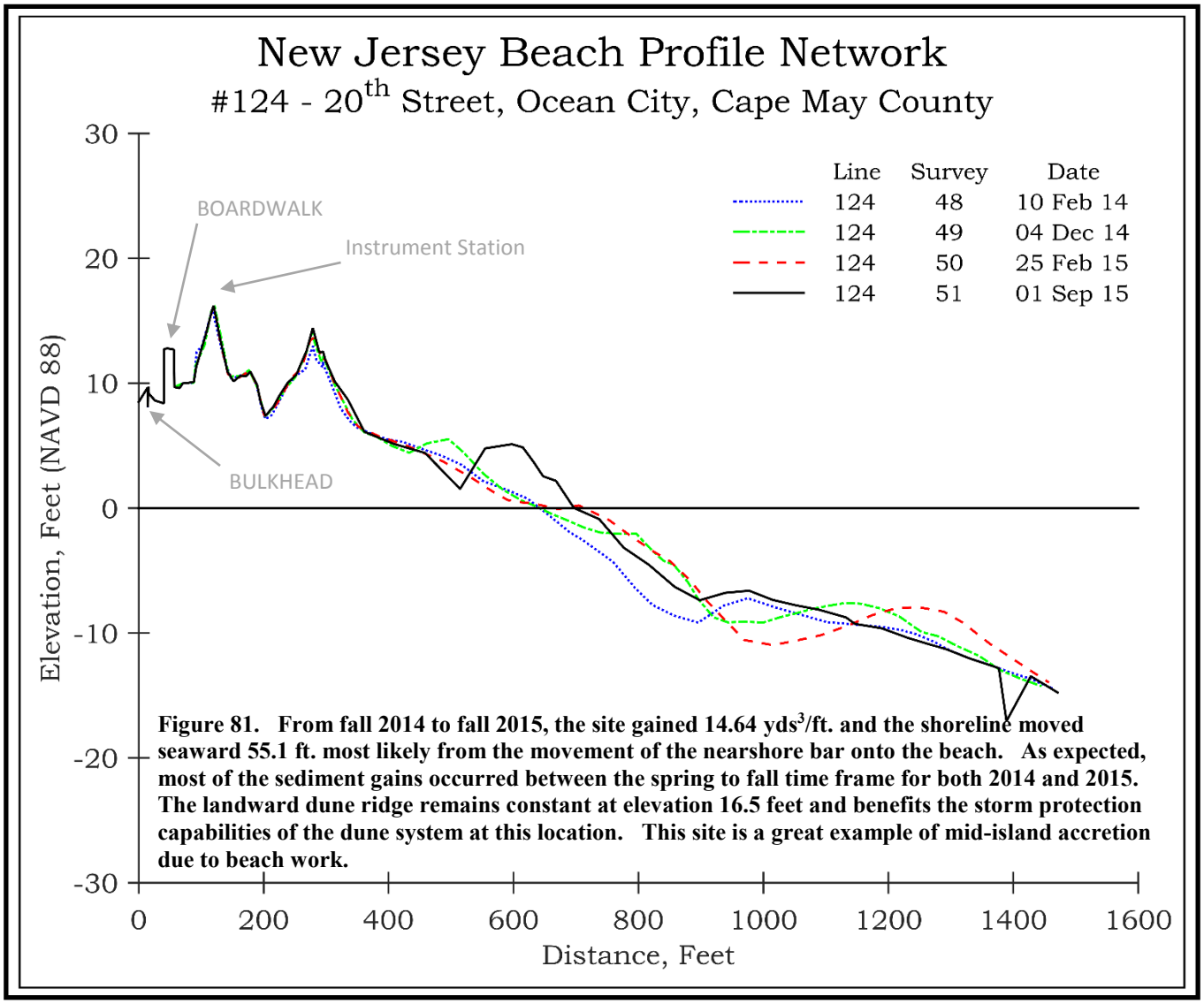


Figure 81. From fall 2014 to fall 2015, the site gained 14.64 yds^3/ft. and the shoreline moved seaward 55.1 ft. most likely from the movement of the nearshore bar onto the beach. As expected, most of the sediment gains occurred between the spring to fall time frame for both 2014 and 2015. The landward dune ridge remains constant at elevation 16.5 feet and benefits the storm protection capabilities of the dune system at this location. This site is a great example of mid-island accretion due to beach work.

NJBPN 223 - 34th Street, Ocean City

The comparison photos to the south (left taken September 5, 2014 and right photo taken August 31, 2015) show minimal changes to the dune vegetation with respect to the location of the dune fencing. This profile is located nearly in the center of the island and continued modest volumetric gains for both 2014 and 2015.

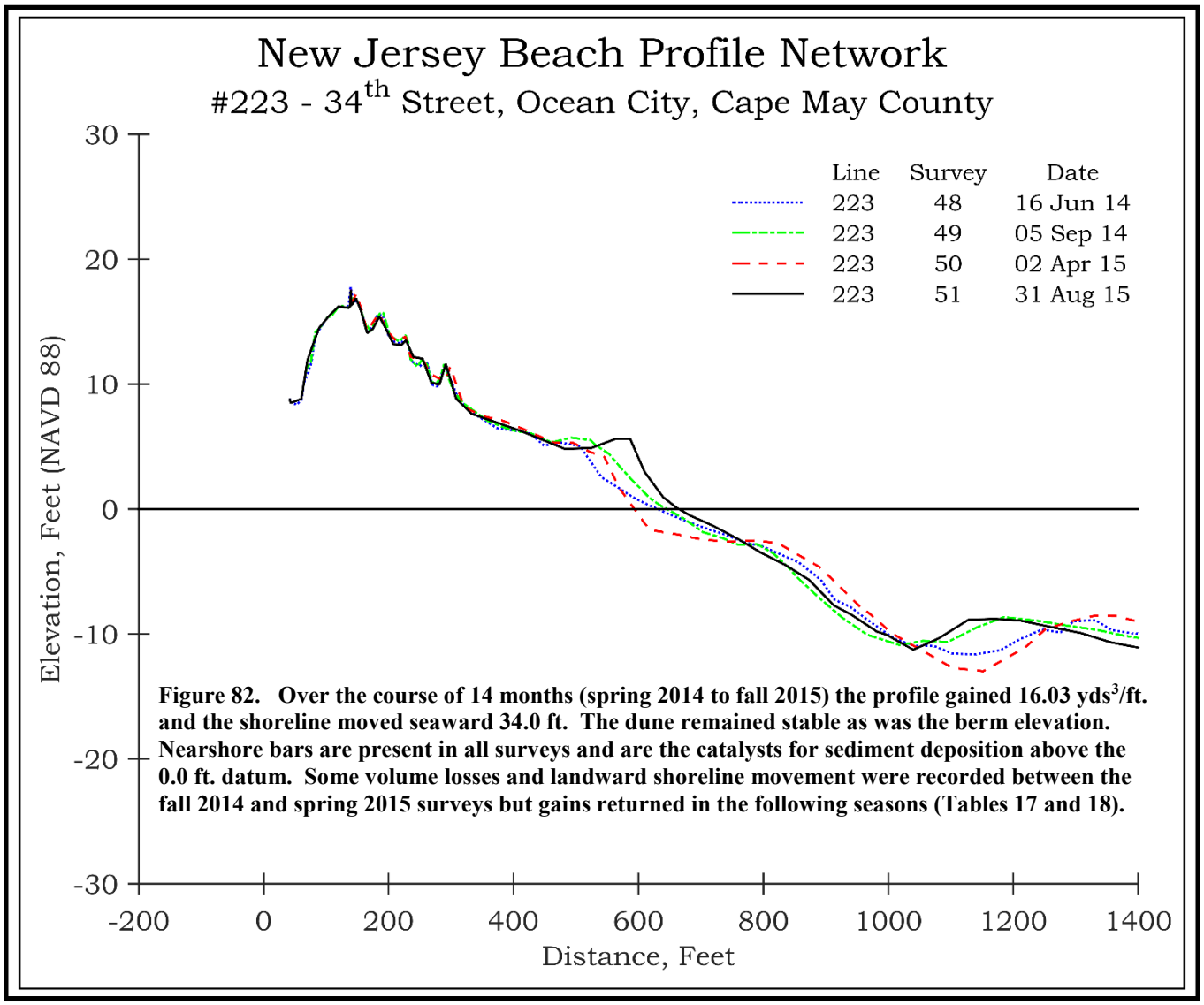
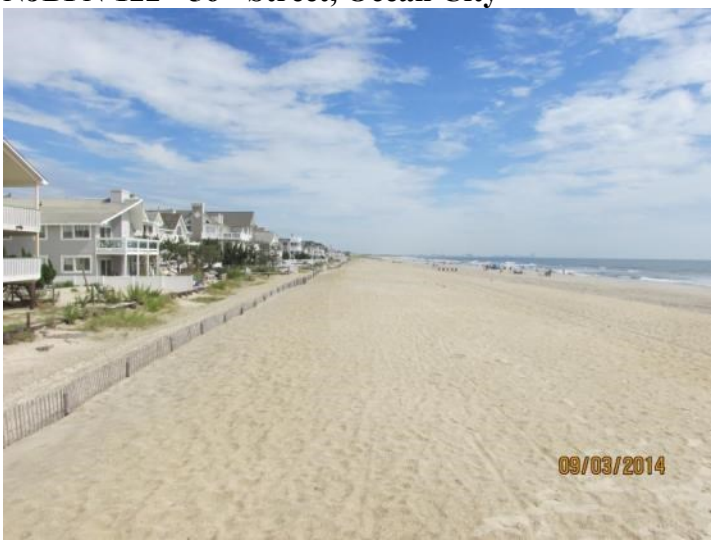


Figure 82. Over the course of 14 months (spring 2014 to fall 2015) the profile gained 16.03 yds^3/ft. and the shoreline moved seaward 34.0 ft. The dune remained stable as was the berm elevation. Nearshore bars are present in all surveys and are the catalysts for sediment deposition above the 0.0 ft. datum. Some volume losses and landward shoreline movement were recorded between the fall 2014 and spring 2015 surveys but gains returned in the following seasons (Tables 17 and 18).

NJBPN 122 - 56th Street, Ocean City



In 2015, the 56th Street site received its first sand replenishment since the 1995 state beach fill. In the past few years, the profile experienced seasonal gains and losses. The site is now included in the federally authorized project. The September 3, 2014 (left) photo shows the pre-project dune and berm. On the right (photo taken November 24, 2015 after completion of the federal project) the dune was constructed and planted with vegetation and fenced at the dune's seaward toe.

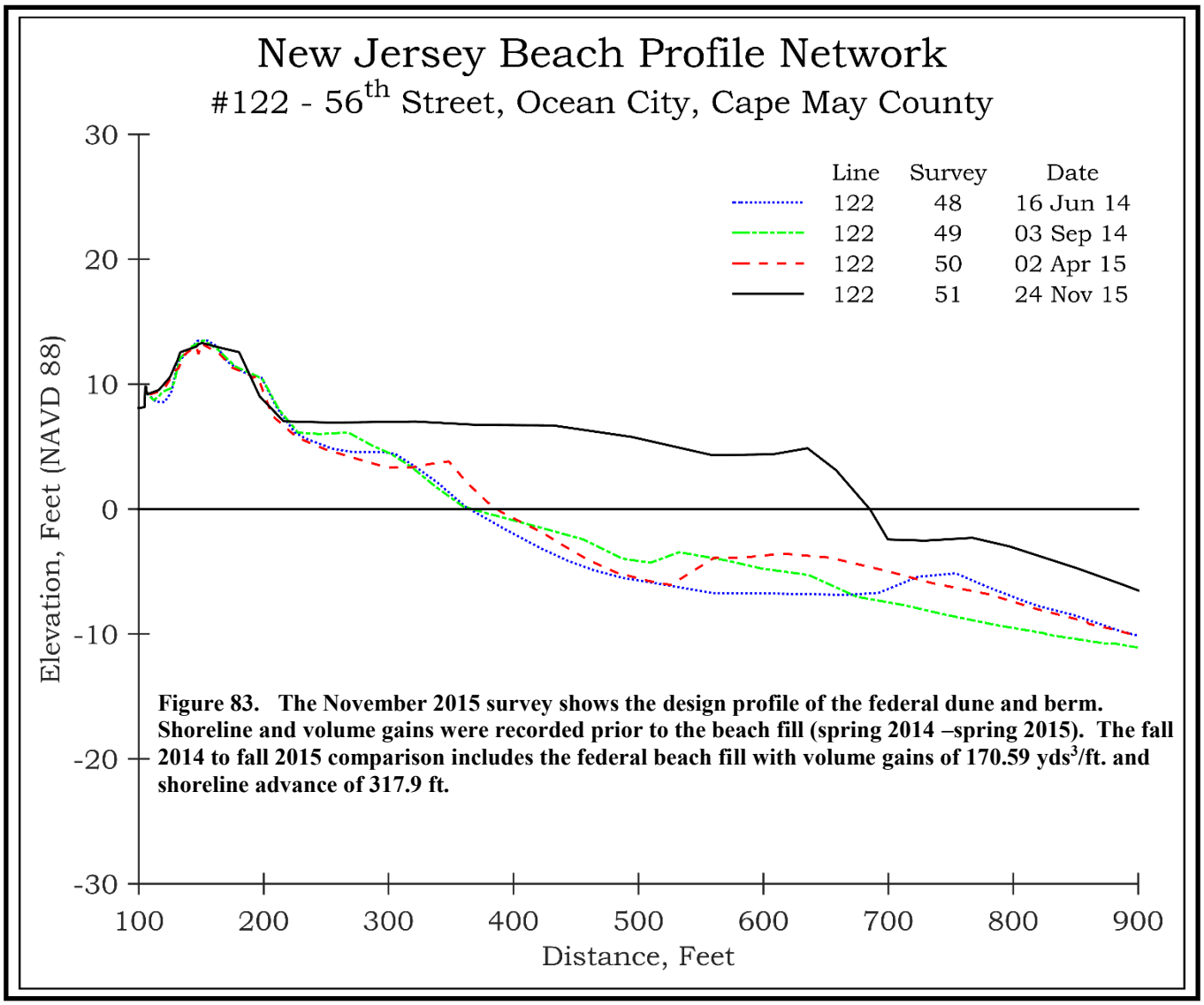
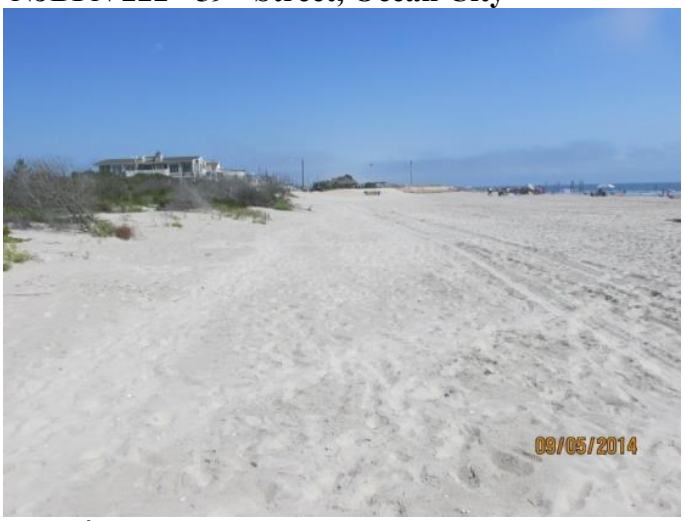


Figure 83. The November 2015 survey shows the design profile of the federal dune and berm. Shoreline and volume gains were recorded prior to the beach fill (spring 2014 –spring 2015). The fall 2014 to fall 2015 comparison includes the federal beach fill with volume gains of 170.59 yds^3/ft. and shoreline advance of 317.9 ft.

NJBPN 222 - 59th Street, Ocean City



The 59th Street site is located at the southern end of the developed section of Ocean City within the Corson's Inlet State Park. This site is also within the 2015 federal beach fill project area. Since 2013, the profile has experienced natural dune growth (left photo taken September 5, 2014). The right photo (taken October 19, 2015) shows the federal contractor's construction equipment and a wide berm.

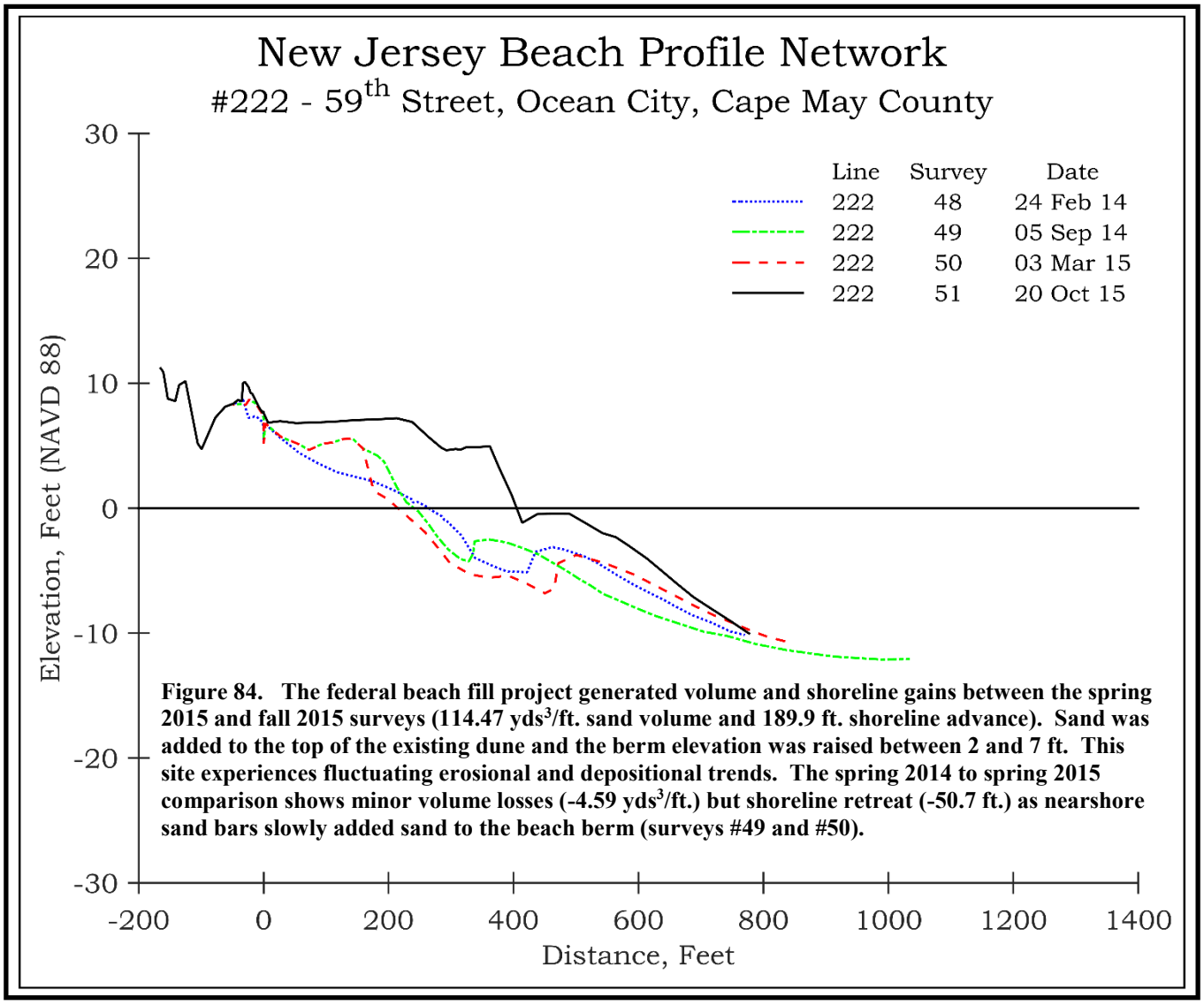


Figure 84. The federal beach fill project generated volume and shoreline gains between the spring 2015 and fall 2015 surveys (114.47 yds^3/ft. sand volume and 189.9 ft. shoreline advance). Sand was added to the top of the existing dune and the berm elevation was raised between 2 and 7 ft. This site experiences fluctuating erosional and depositional trends. The spring 2014 to spring 2015 comparison shows minor volume losses (-4.59 yds^3/ft.) but shoreline retreat (-50.7 ft.) as nearshore sand bars slowly added sand to the beach berm (surveys #49 and #50).

NJBPN 221 - Corson's Inlet State Park, Ocean City

Natural dune recovery has occurred following Hurricane Sandy which destroyed the foredune. Photo on left taken September 5, 2014 shows the berm and a narrow dry beach. The right photo taken October 19, 2015 followed the federal project with erosion on the beach, but a vast deposit offshore.

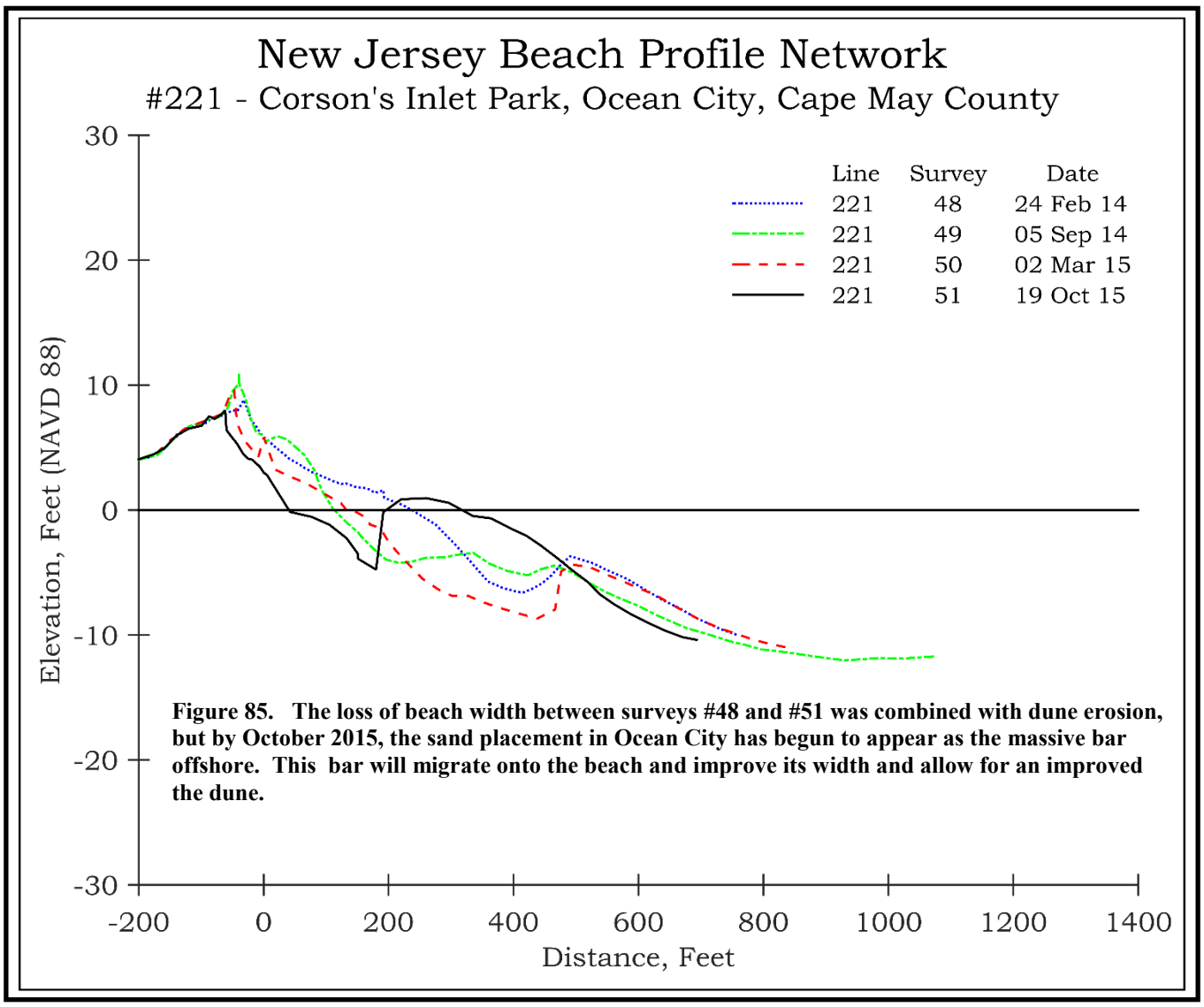


Figure 85. The loss of beach width between surveys #48 and #51 was combined with dune erosion, but by October 2015, the sand placement in Ocean City has begun to appear as the massive bar offshore. This bar will migrate onto the beach and improve its width and allow for an improved the dune.

NJBPN 121 - Williams Road, Strathmere

The Williams Road site is strongly influenced by the ebb-tidal delta at Corson's Inlet. In 2013, there was a wide dune that continued into September 3, 2014 (left photo), but the beach width decreased and eventually the dune eroded dramatically. Right photo was taken August 31, 2015 and shows the impact of the federal project. The dune was rebuilt and combined with a 500 foot wider dry beach.

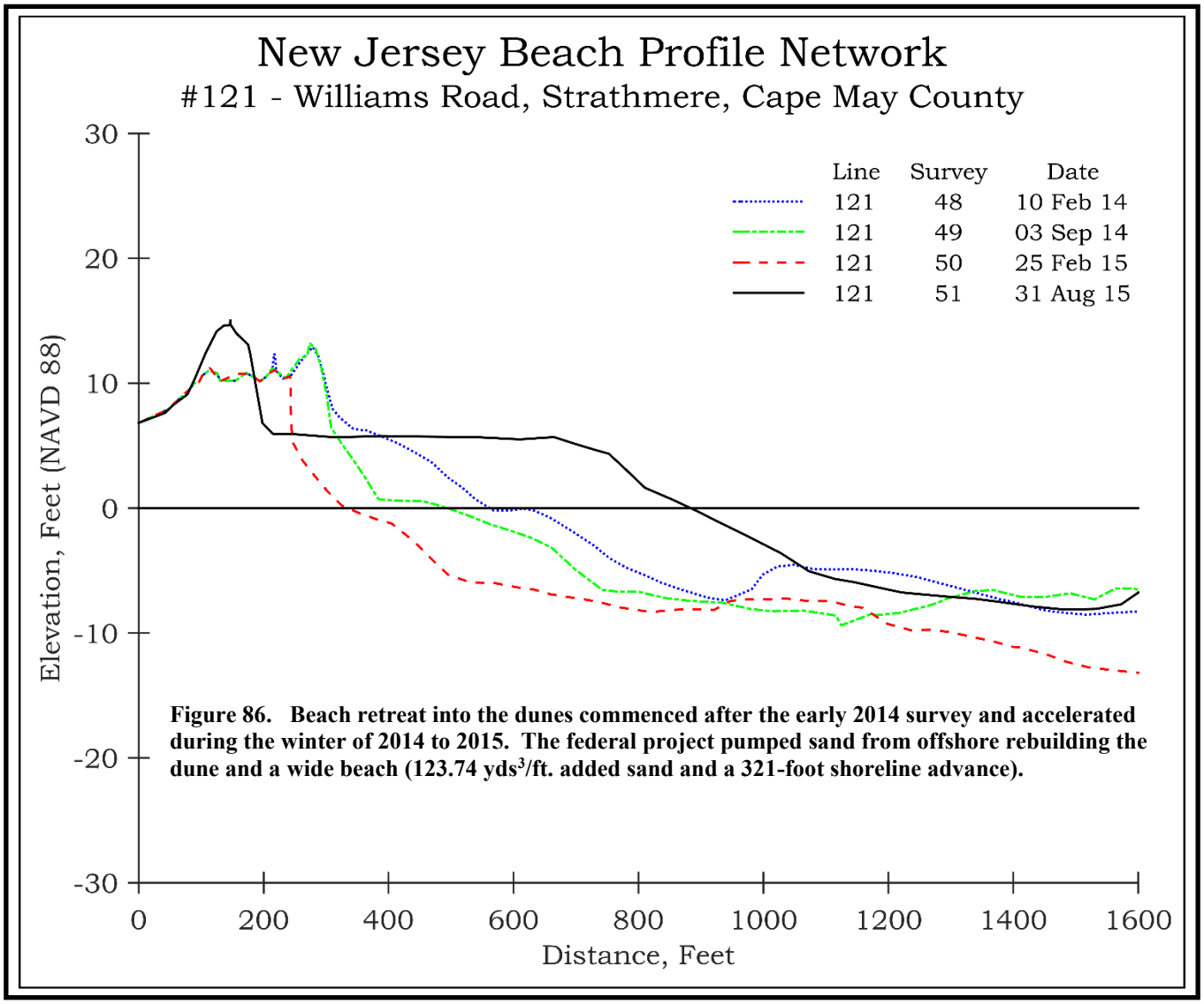


Figure 86. Beach retreat into the dunes commenced after the early 2014 survey and accelerated during the winter of 2014 to 2015. The federal project pumped sand from offshore rebuilding the dune and a wide beach (123.74 yds^3/ft. added sand and a 321-foot shoreline advance).

NJBPN 120 - 1st Street, Sea Isle City

The dune here at the 1st Street location consists of a geotextile core covered by sand. Storm damage was minimal and natural recovery has blended in well with the surviving vegetation. Photo on left taken September 3, 2014 at the toe of the original dune finished in 1998. Right photo taken August 31, 2015 following the federal project building an addition to the dune plus the new beach template.

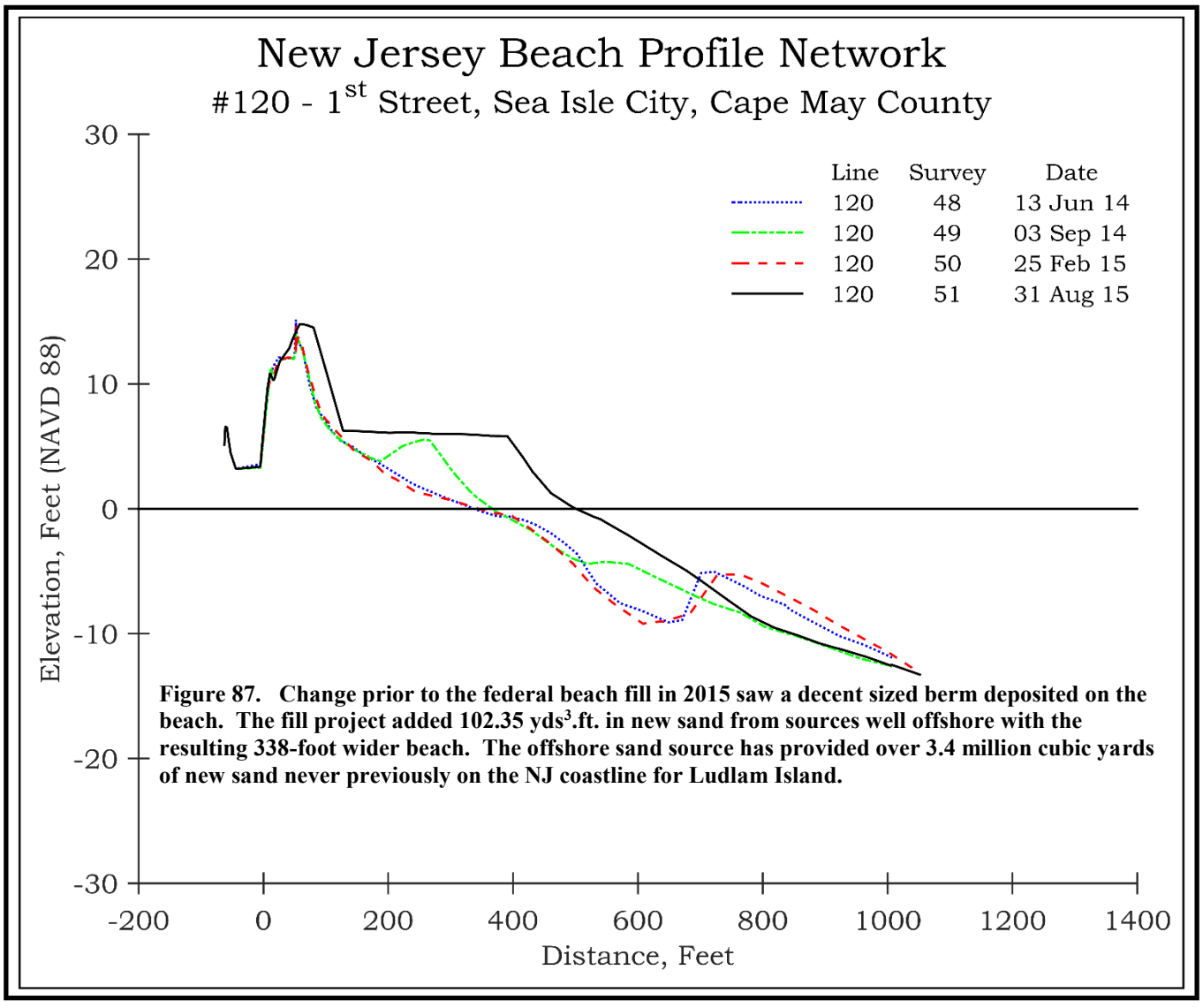


Figure 87. Change prior to the federal beach fill in 2015 saw a decent sized berm deposited on the beach. The fill project added 102.35 yds^3.ft. in new sand from sources well offshore with the resulting 338-foot wider beach. The offshore sand source has provided over 3.4 million cubic yards of new sand never previously on the NJ coastline for Ludlam Island.

NJBPN 119 - 25th Street, Sea Isle City

The 25th Street site is positioned near the northern limit of development east of Commonwealth Avenue. The site is reasonably stable and was enhanced in 2009 under the NJ State project. The left photo taken on September 2, 2014 and shows the foredune development with growing vegetation. The right photo taken on November 24, 2015, shows the fenced off dune zone located seaward of the original feature with new pedestrian access path fencing installed.

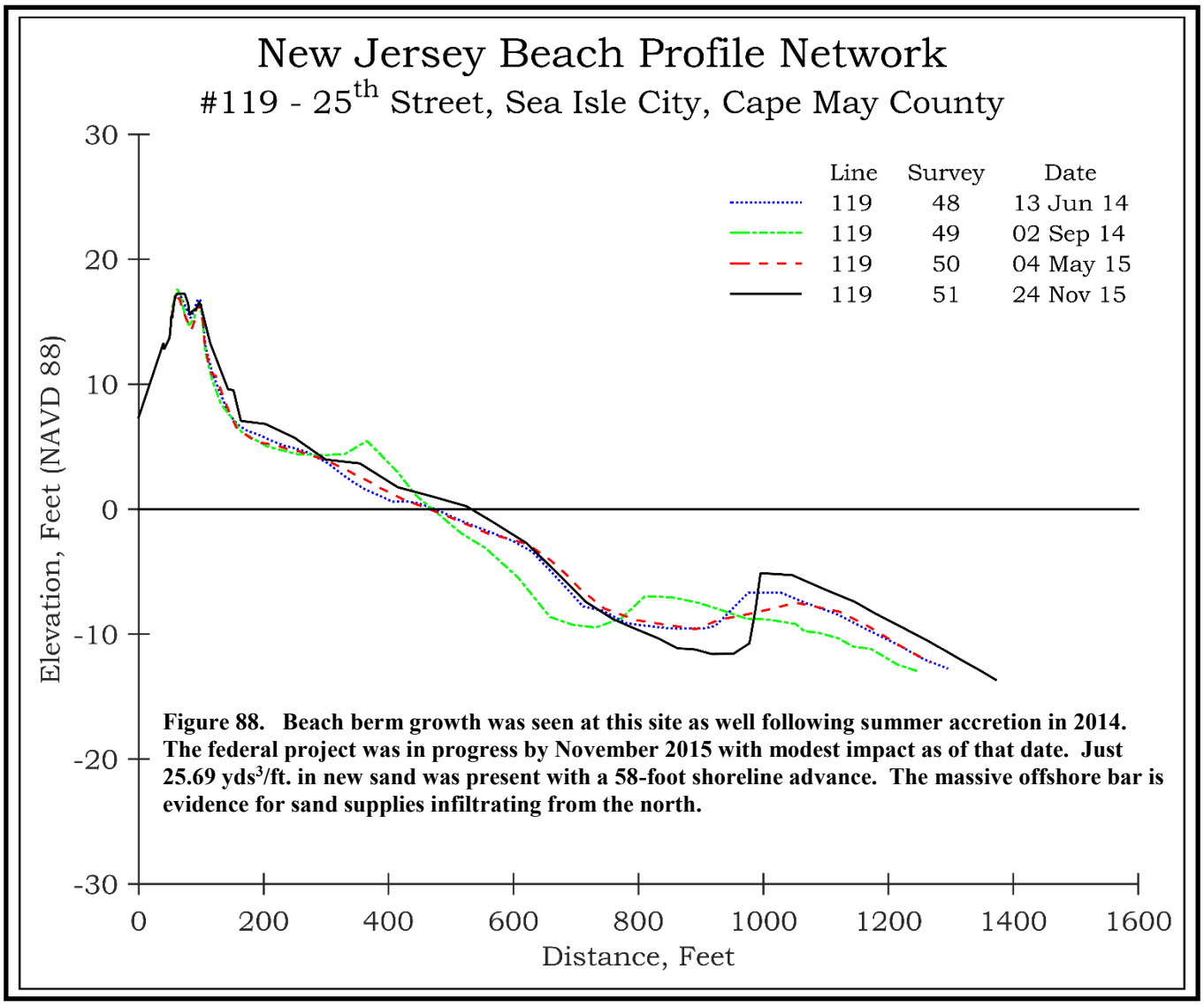


Figure 88. Beach berm growth was seen at this site as well following summer accretion in 2014. The federal project was in progress by November 2015 with modest impact as of that date. Just 25.69 yds^3/ft. in new sand was present with a 58-foot shoreline advance. The massive offshore bar is evidence for sand supplies infiltrating from the north.

NJBPN 118 - 57th Street, Sea Isle City

The left photo (taken September 2, 2014 shows sand accumulating around the fencing at this site. The right photo taken on November 24, 2015 shows work in progress for the federal project as it worked its way south toward Townsend's Inlet.

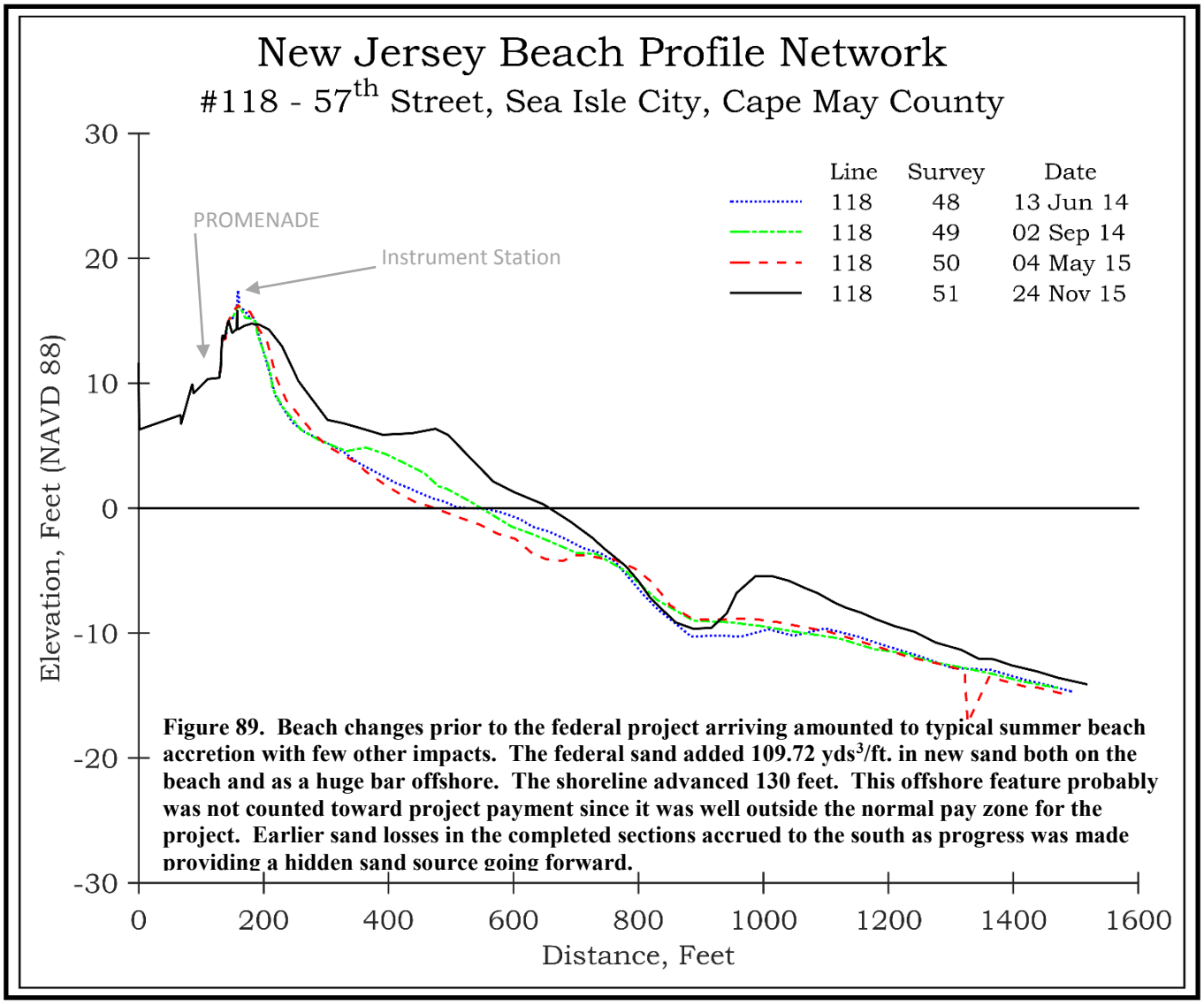


Figure 89. Beach changes prior to the federal project arriving amounted to typical summer beach accretion with few other impacts. The federal sand added 109.72 yds^3/ft. in new sand both on the beach and as a huge bar offshore. The shoreline advanced 130 feet. This offshore feature probably was not counted toward project payment since it was well outside the normal pay zone for the project. Earlier sand losses in the completed sections accrued to the south as progress was made providing a hidden sand source going forward.

NJBPN 117 - 80th Street, Sea Isle City

The left photo was taken September 2, 2014 and shows the southern beach and dunes prior to the federal work. The right photo, taken on November 24, 2015, shows the new fencing line on the added dune feature along with the wider beach in Sea Isle City.

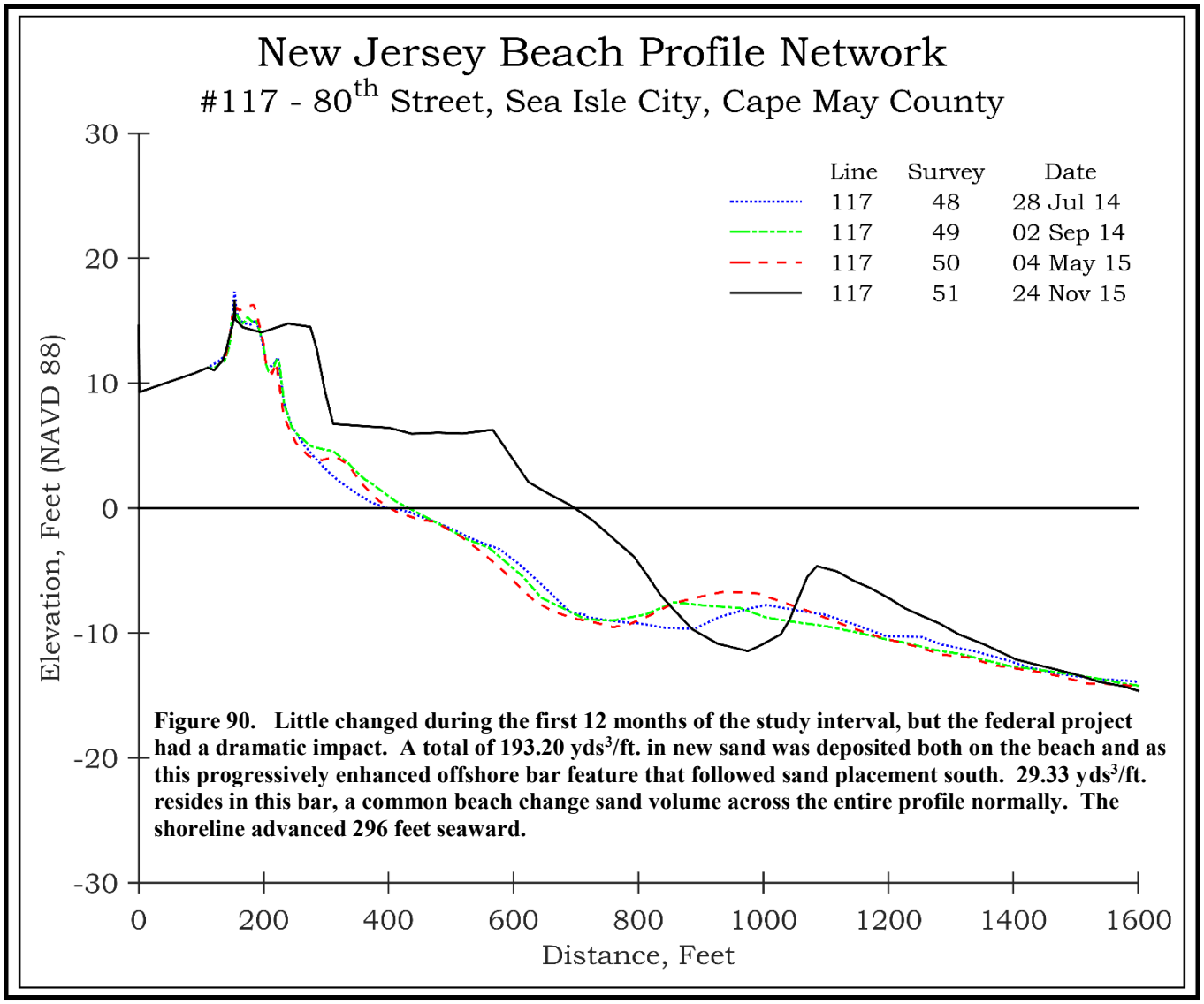


Figure 90. Little changed during the first 12 months of the study interval, but the federal project had a dramatic impact. A total of 193.20 yds^3/ft. in new sand was deposited both on the beach and as this progressively enhanced offshore bar feature that followed sand placement south. 29.33 yds^3/ft. resides in this bar, a common beach change sand volume across the entire profile normally. The shoreline advanced 296 feet seaward.

NJBPN 216 - 9th Street, Avalon

The 9th Street site is located near the Townsend's Inlet south jetty. There was no wave attack on the properties due to Sandy and the beach was restored during 2013. The dune fence shows a considerable accumulation at the fence with a narrow beach beginning to emerge to the south by September 15, 2014. The right photo taken, on October 7, 2015, followed an Avalon-funded beach restoration in 2015 augmenting the post-Sandy federal work in 2013.

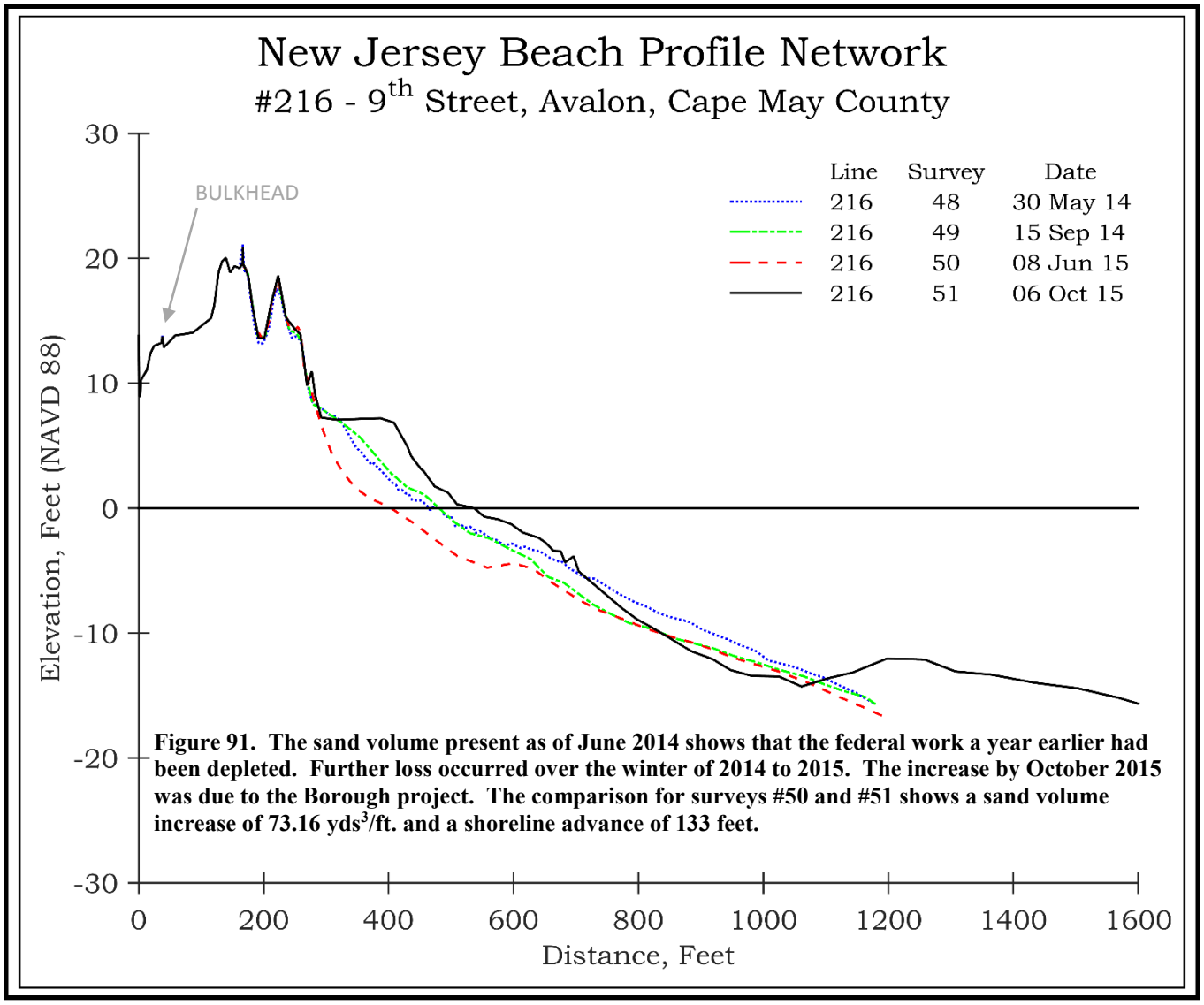


Figure 91. The sand volume present as of June 2014 shows that the federal work a year earlier had been depleted. Further loss occurred over the winter of 2014 to 2015. The increase by October 2015 was due to the Borough project. The comparison for surveys #50 and #51 shows a sand volume increase of 73.16 yds^3/ft. and a shoreline advance of 133 feet.

NJBPN 116 - 23rd Street, Avalon

The left photo (taken September 15, 2014) shows a narrow dry beach following the loss of the majority of the federal post-Sandy fill effort. The right photo taken on October 7, 2015 following the local response in placing 740,000 cy of added sand.

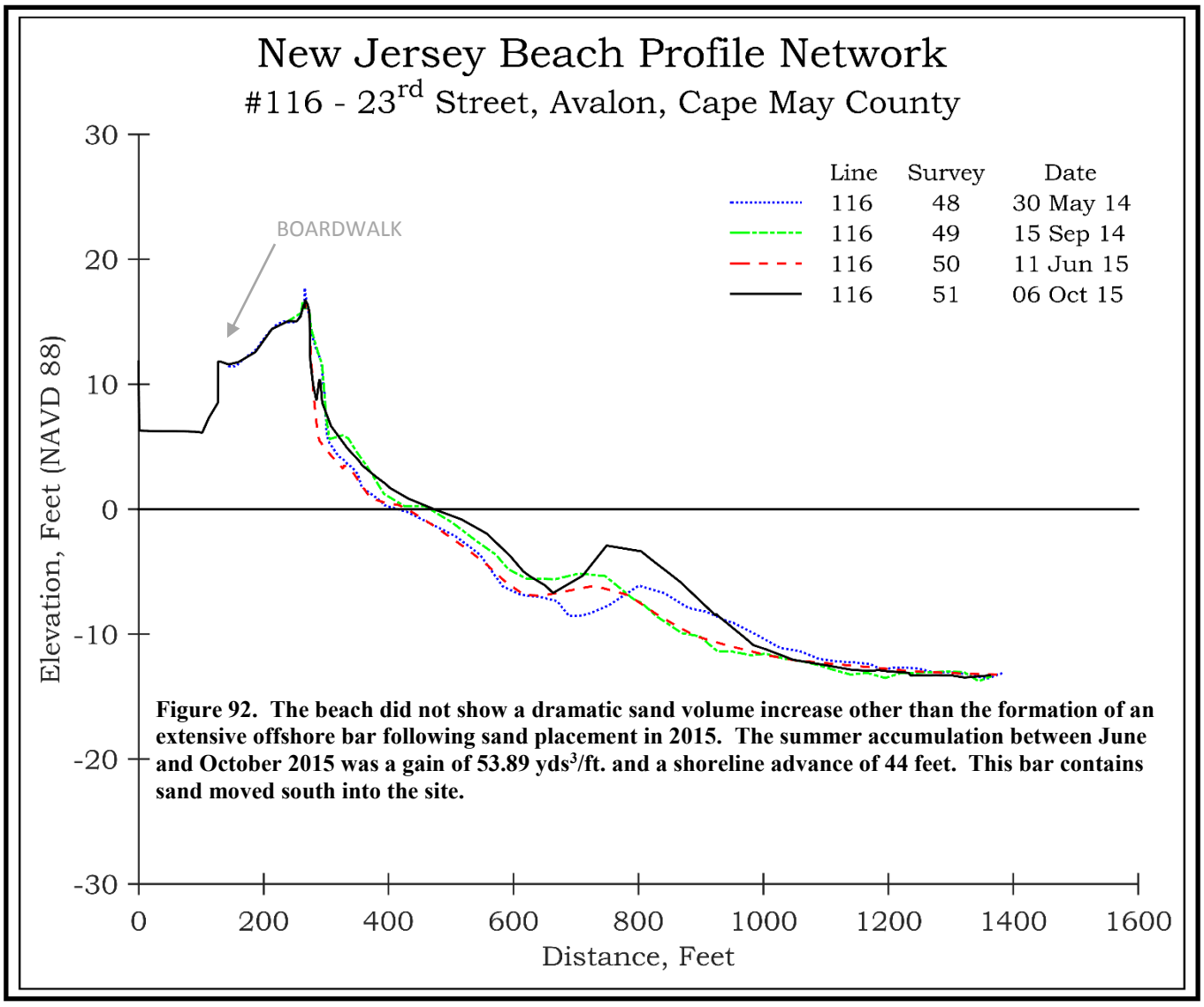


Figure 92. The beach did not show a dramatic sand volume increase other than the formation of an extensive offshore bar following sand placement in 2015. The summer accumulation between June and October 2015 was a gain of 53.89 yds^3/ft. and a shoreline advance of 44 feet. This bar contains sand moved south into the site.

NJBPN 115 - 35th Street, Avalon

This site lies south of the beach nourishment areas and is located in an accreting area of the municipality. The left photo, taken September 16, 2014, shows the wide dry beach and dunes looking north toward the fishing pier. The right photo, taken on October 9, 2015, shows yet more sand added near the fencing with work in progress extending the pier seaward to put its seaward end back over water.

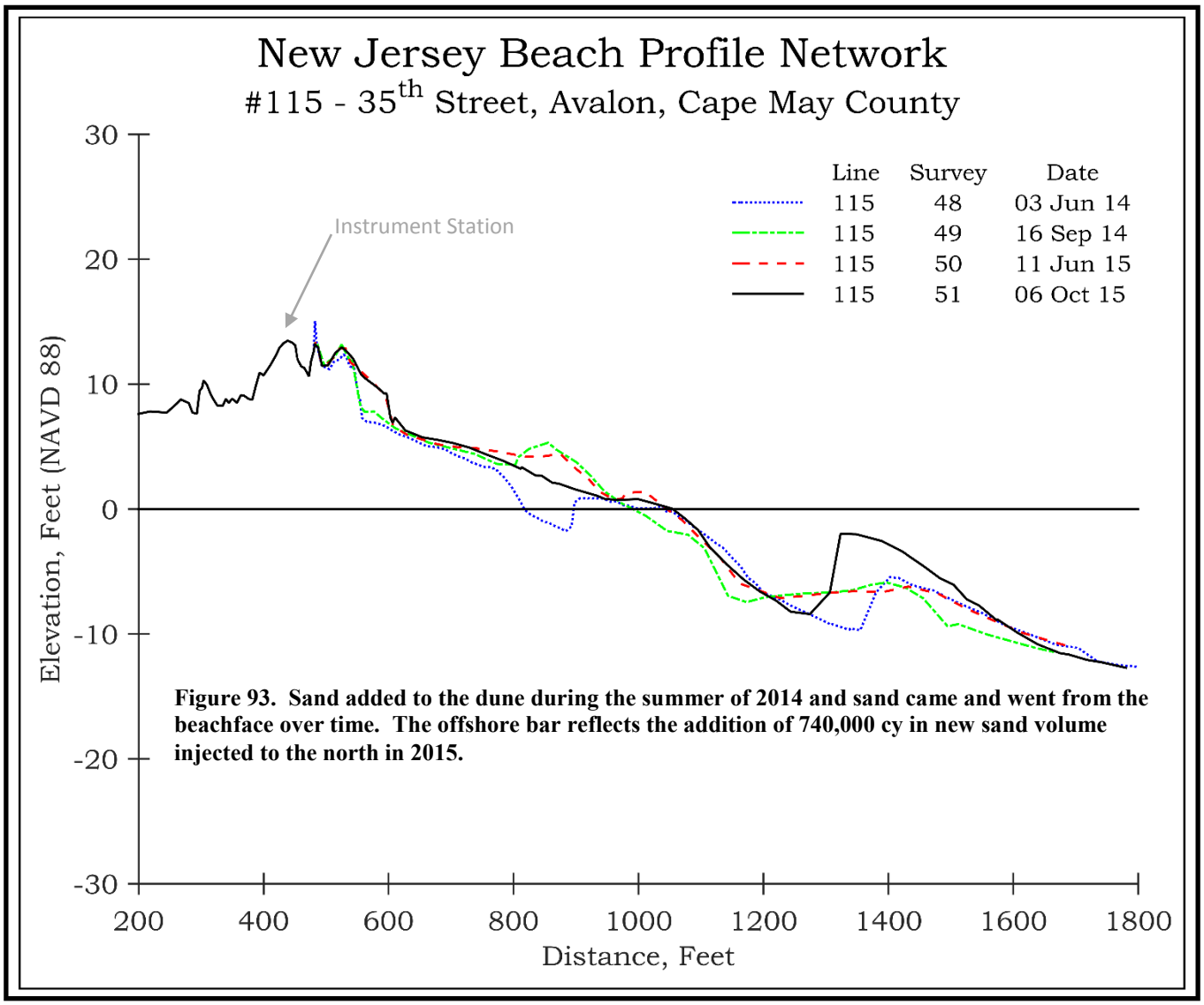


Figure 93. Sand added to the dune during the summer of 2014 and sand came and went from the beachface over time. The offshore bar reflects the addition of 740,000 cy in new sand volume injected to the north in 2015.

NJBPN 114 - 70th Street, Avalon

The 70th Street location has been a stable area for decades and lies at the very north limit of the Stone Harbor segment of the ACOE shore protection project that has a break between 31st Street and 70th Street due to the segment having long term shoreline stability not requiring maintenance. The left photo was taken September 16, 2014 and shows the wide seaward dune slope with grass advancing onto the beach. The right photo, taken October 8, 2015, shows fencing added since 2014, yet partially buried by constant wind transport of sand into the dune area.

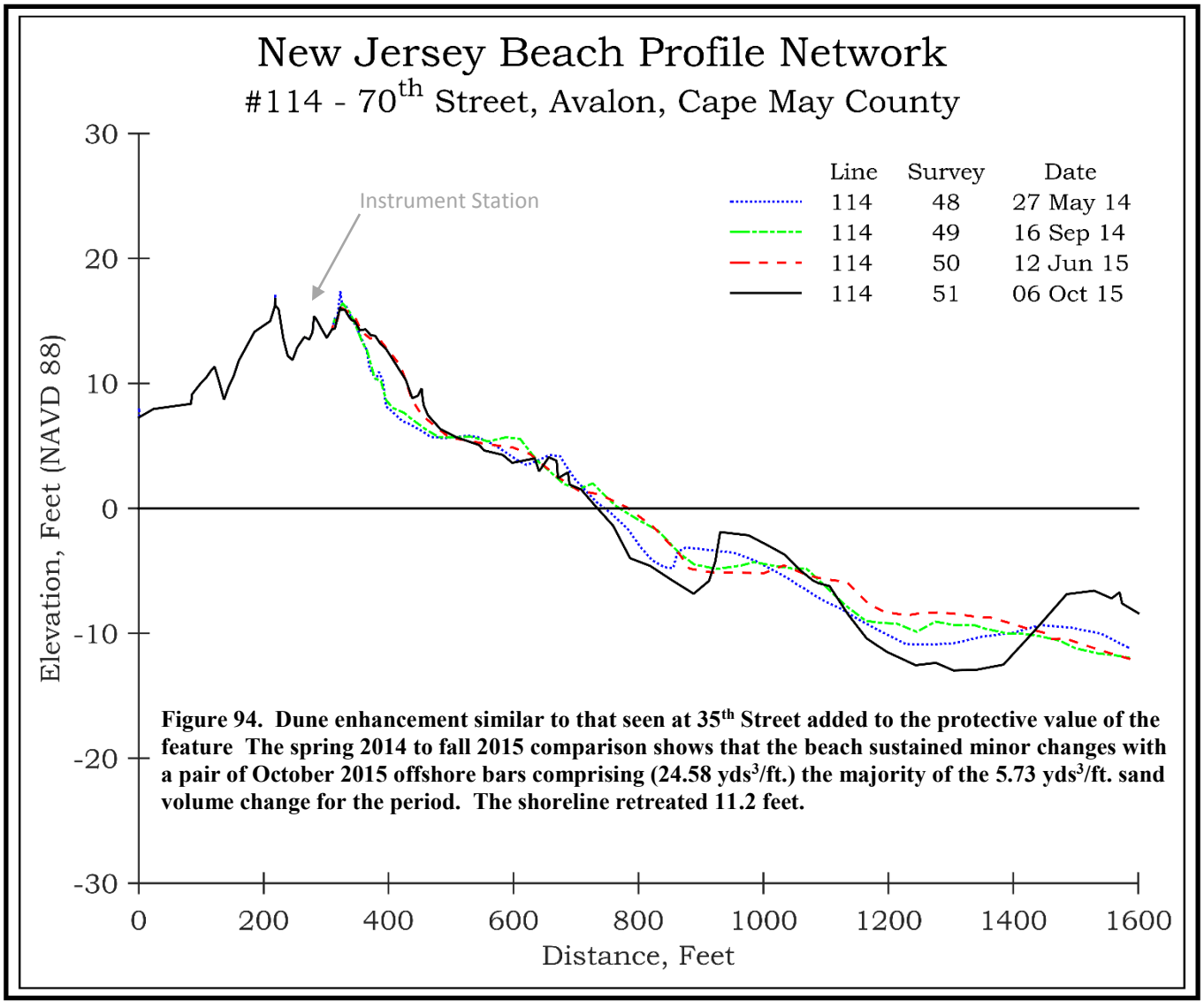


Figure 94. Dune enhancement similar to that seen at 35th Street added to the protective value of the feature The spring 2014 to fall 2015 comparison shows that the beach sustained minor changes with a pair of October 2015 offshore bars comprising (24.58 yds^3/ft.) the majority of the 5.73 yds^3/ft. sand volume change for the period. The shoreline retreated 11.2 feet.

NJBPN 113 - 90th Street, Stone Harbor

The 90th Street location is about a third the length of the Borough and has been quite stable not needing maintenance as frequently as sites further south. The left photo, taken September 12, 2014, shows the sand added at the fence producing a foredune feature. The right photo, taken on October 12, 2015, shows a narrower beach with more sand around the fencing.

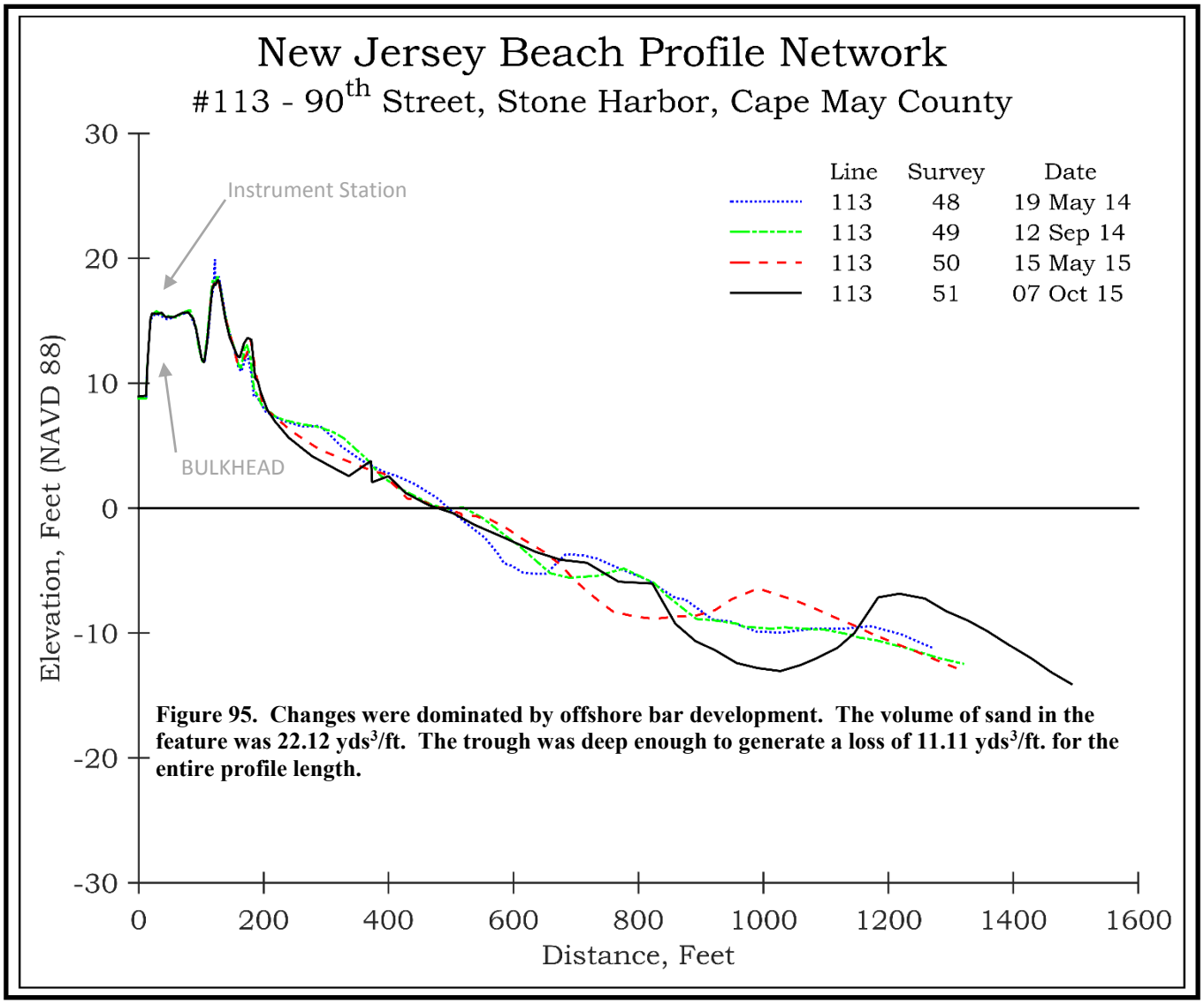


Figure 95. Changes were dominated by offshore bar development. The volume of sand in the feature was 22.12 yds^3/ft. The trough was deep enough to generate a loss of 11.11 yds^3/ft. for the entire profile length.

NJBPN 212 - 121st Street, Stone Harbor

The south end Stone Harbor site has shown a long-term erosional trend that may be influenced by changes surrounding Hereford Inlet. The site has been the recipient of numerous beach nourishment projects including municipal and Federal efforts. Most recent was spring 2013 as a post-Sandy restoration. September 12, 2014 (left photo) shows the southern beach flat to the dune toe. The right photo, taken on October 13, 2015, shows near identical conditions.

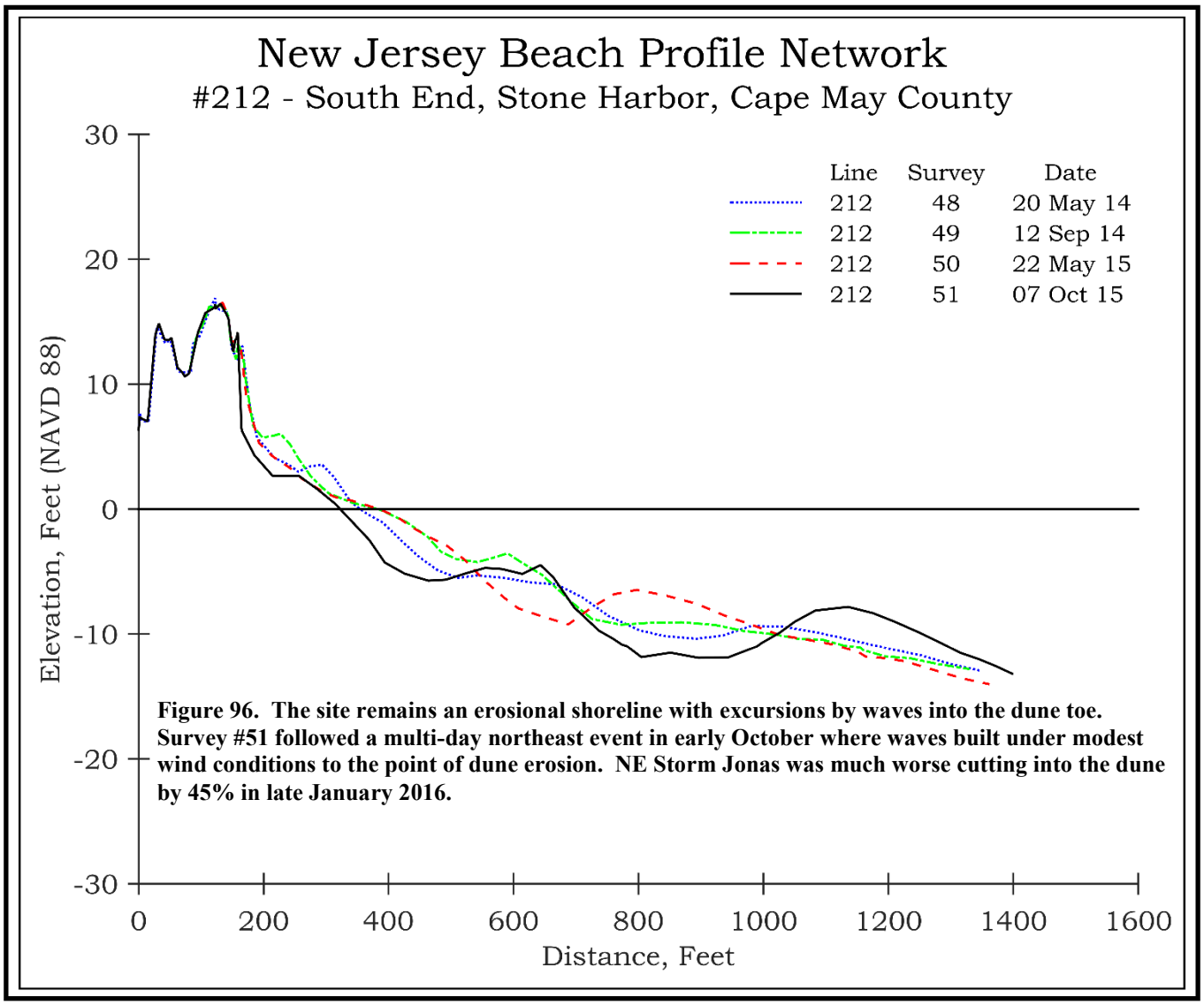


Figure 96. The site remains an erosional shoreline with excursions by waves into the dune toe. Survey #51 followed a multi-day northeast event in early October where waves built under modest wind conditions to the point of dune erosion. NE Storm Jonas was much worse cutting into the dune by 45% in late January 2016.

NJBPN 111 - 15th Avenue, North Wildwood

The 15th Avenue site is influenced by the dynamics at Hereford Inlet. A NJ State sponsored 2009 beach fill reversed a decade of erosion here. Photo on left was taken October 6, 2014. The right photo, taken on December 9, 2015 shows a somewhat narrower beach as a result of the early October 2015 NE storm event.

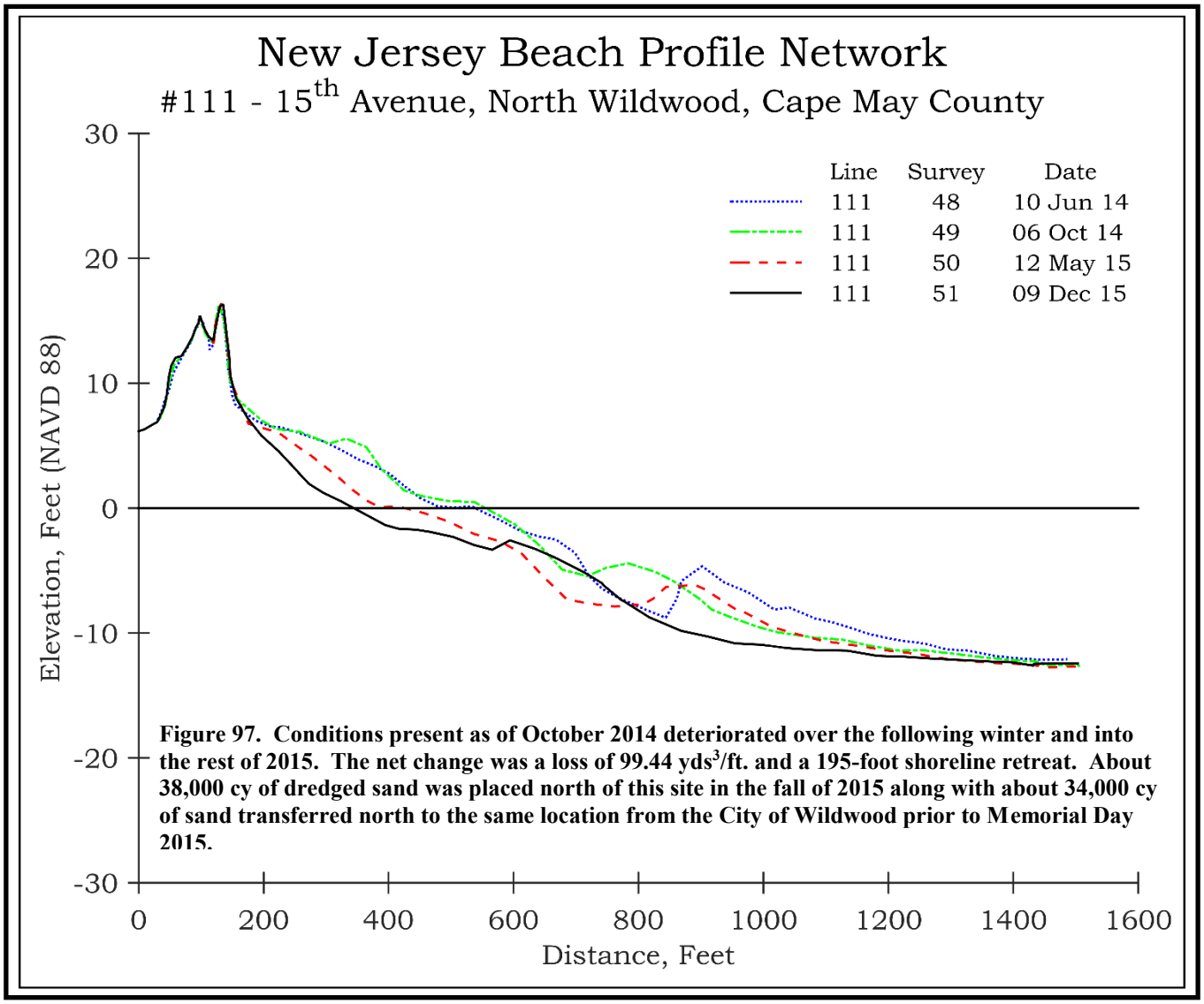


Figure 97. Conditions present as of October 2014 deteriorated over the following winter and into the rest of 2015. The net change was a loss of 99.44 yds^3/ft. and a 195-foot shoreline retreat. About 38,000 cy of dredged sand was placed north of this site in the fall of 2015 along with about 34,000 cy of sand transferred north to the same location from the City of Wildwood prior to Memorial Day 2015.

NJBPN 110 - Cresse Avenue, Wildwood

The Cresse Avenue site has been accumulating sand volume since 1992. Sand lost from North Wildwood migrates south adding to the beach width each year. The left photo, taken October 6, 2014, shows the vast beach width. The right photo, taken on December 9, 2015, repeats the expansive view but wider by 43 feet.

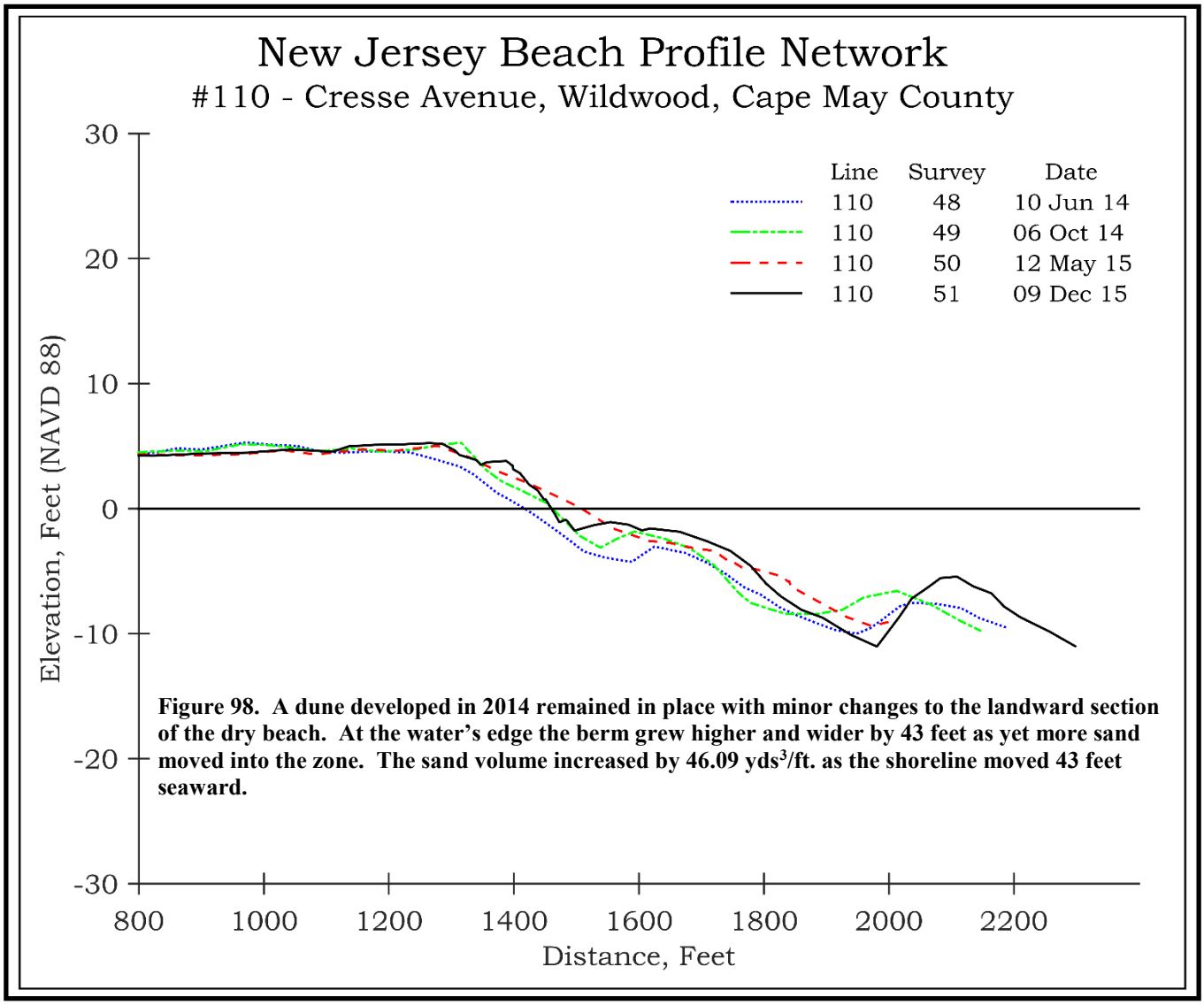


Figure 98. A dune developed in 2014 remained in place with minor changes to the landward section of the dry beach. At the water's edge the berm grew higher and wider by 43 feet as yet more sand moved into the zone. The sand volume increased by 46.09 yds^3/ft. as the shoreline moved 43 feet seaward.

NJBPN 109 - Raleigh Avenue, Lower Township

Left photo was taken on October 6, 2014 showing bar formation and the wide beach. The right photo, taken on December 9, 2015, shows the central zone of the beach and gives a good view of the width.

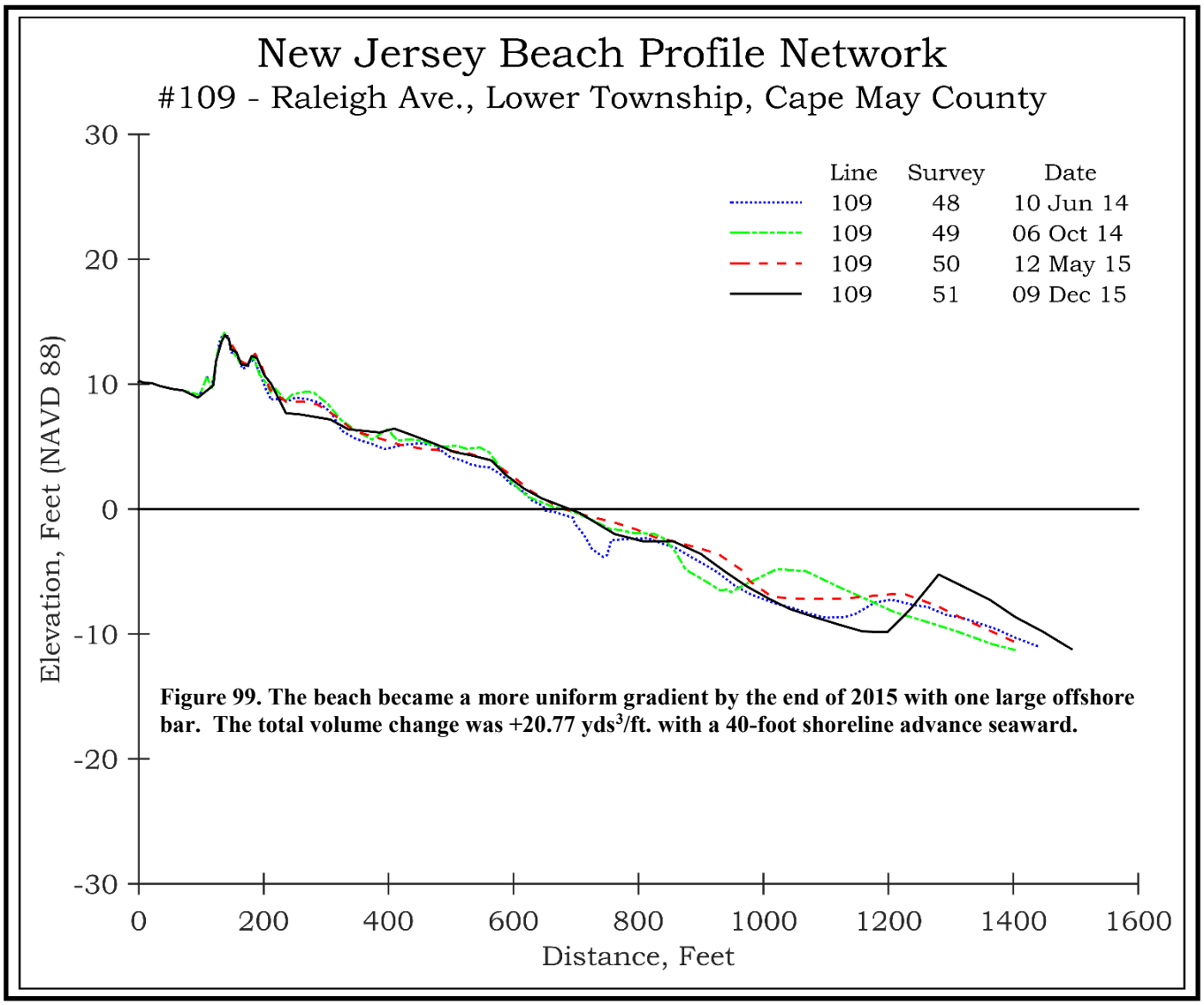


Figure 99. The beach became a more uniform gradient by the end of 2015 with one large offshore bar. The total volume change was +20.77 yds^3/ft. with a 40-foot shoreline advance seaward.

NJBPN 208 – Cape May National Wildlife Refuge, Lower Township

The left photo was taken October 3, 2014 and is a view across the dunes and gentle shoreward gradient developed on the wide beach. The right photo was taken on December 9, 2015 and shows little change.

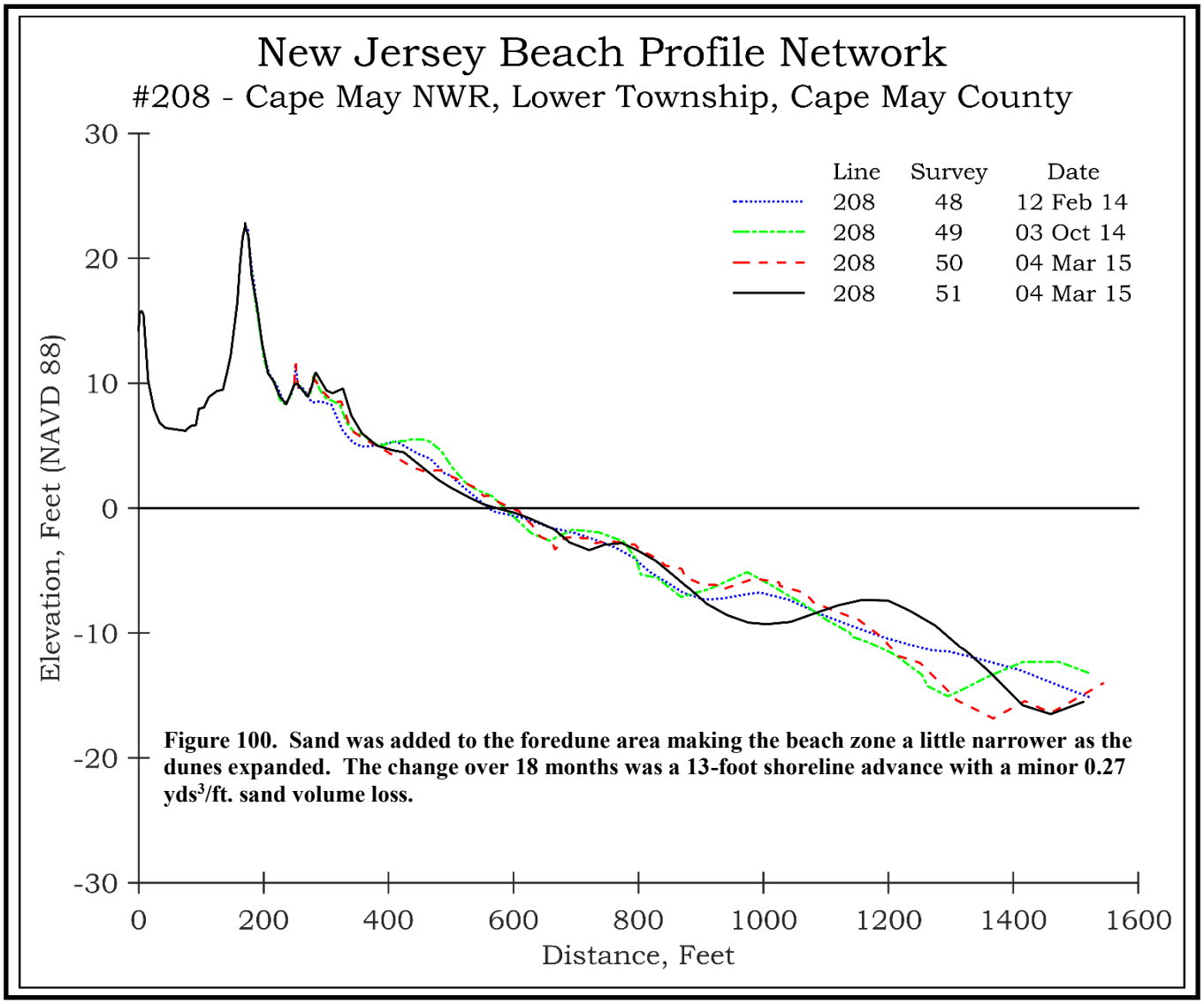


Figure 100. Sand was added to the foredune area making the beach zone a little narrower as the dunes expanded. The change over 18 months was a 13-foot shoreline advance with a minor 0.27 $yds^3/ft.$ sand volume loss.

NJBPN 108 - Cape May Beach Club, Cape May City

The left photo was taken August 27, 2014. The right photo was taken on September 17, 2015 and in comparison shows relative consistency in configuration and beach elevation.

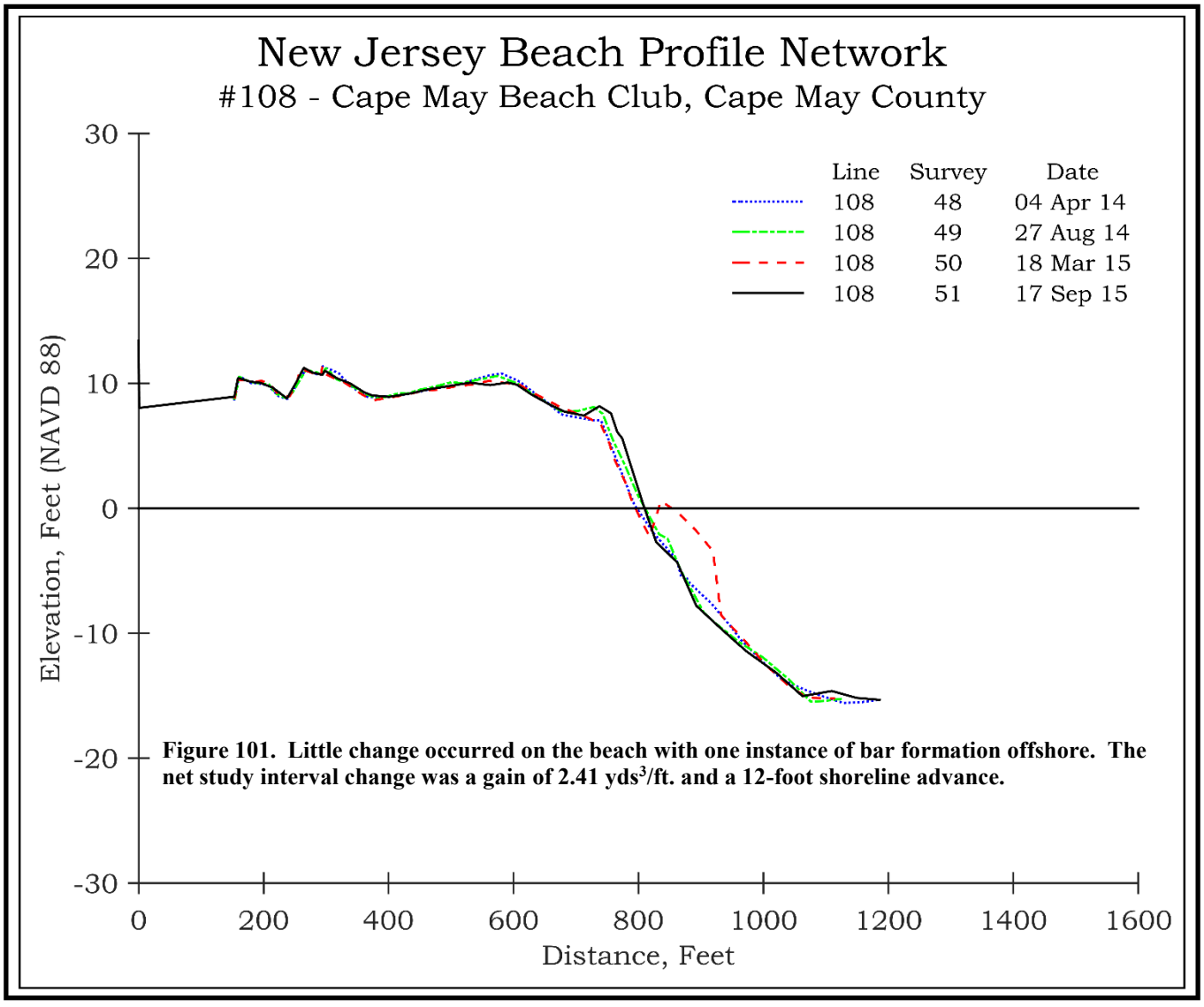


Figure 101. Little change occurred on the beach with one instance of bar formation offshore. The net study interval change was a gain of 2.41 yds^3/ft. and a 12-foot shoreline advance.

NJBPN 107 - Baltimore Avenue, Cape May City

The left photo was taken on August 27, 2014. The right photo was taken on September 17, 2015. Prior to 1989 the spot the photographer was standing at would have been 300 feet from the shoreline.

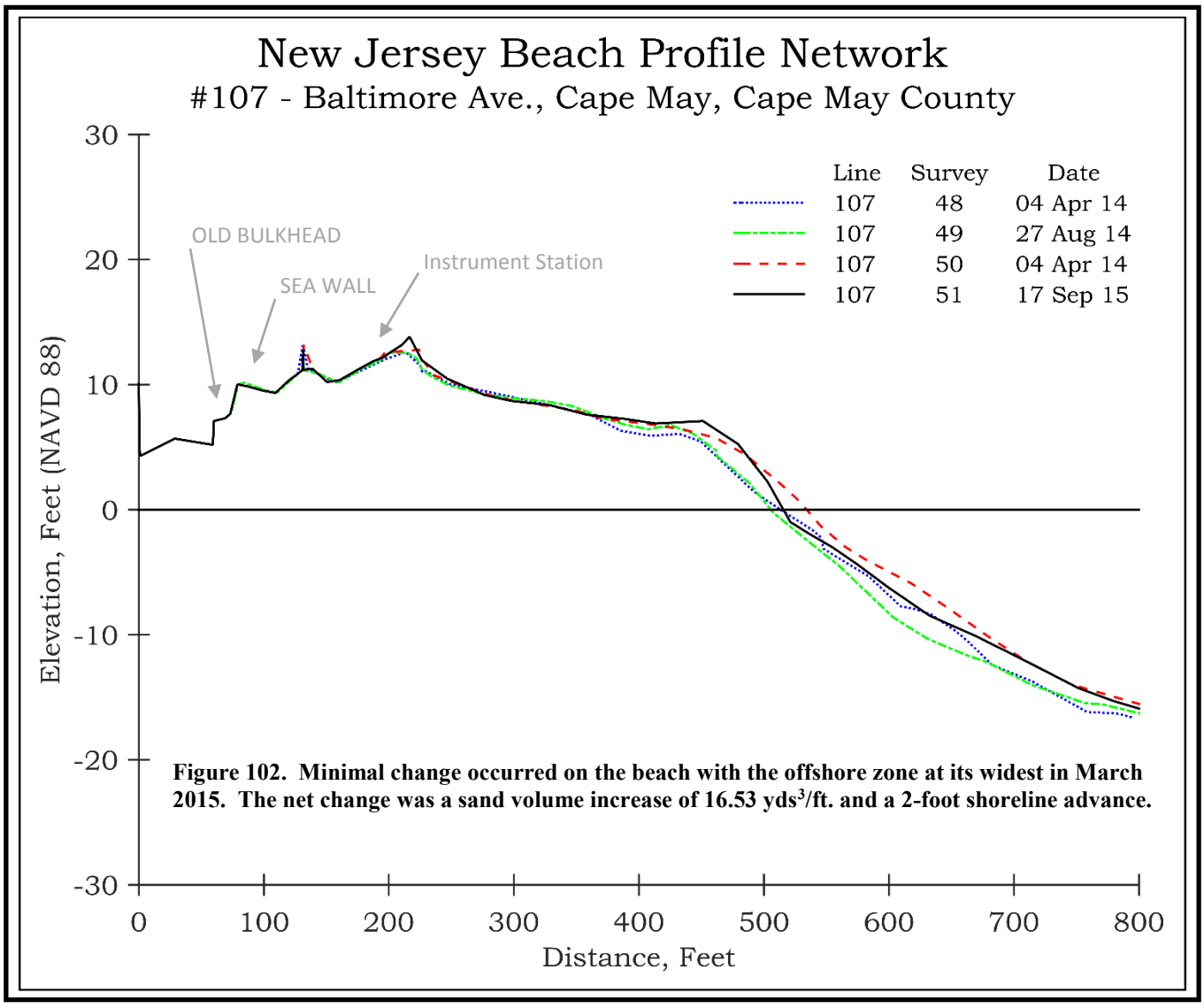


Figure 102. Minimal change occurred on the beach with the offshore zone at its widest in March 2015. The net change was a sand volume increase of 16.53 yds^3/ft. and a 2-foot shoreline advance.

NJBPN 206 - Broadway Avenue, Cape May City

The left photo was taken on August 27, 2014. The right photo was taken on September 17, 2015 and does show a wider beach relative to the rock groin in the distance.

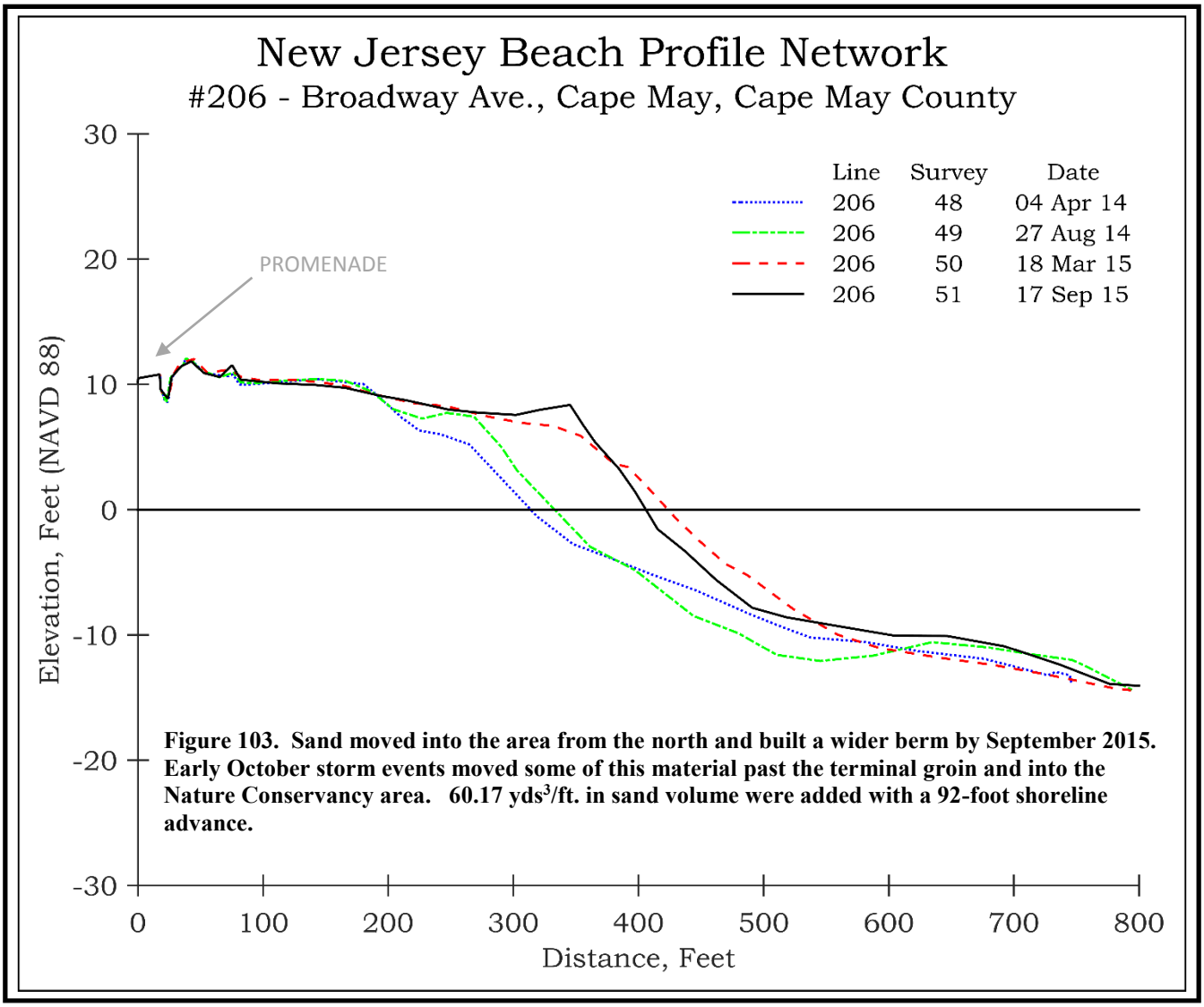


Figure 103. Sand moved into the area from the north and built a wider berm by September 2015. Early October storm events moved some of this material past the terminal groin and into the Nature Conservancy area. 60.17 yds^3/ft. in sand volume were added with a 92-foot shoreline advance.

NJBPN 105 - Nature Conservancy, Cape May

The left photo was taken August 28, 2014. The right photo taken on November 18, 2015, shows a flatter beachface and the deposition of new sand at the base of the groin bordering the development in the distance.

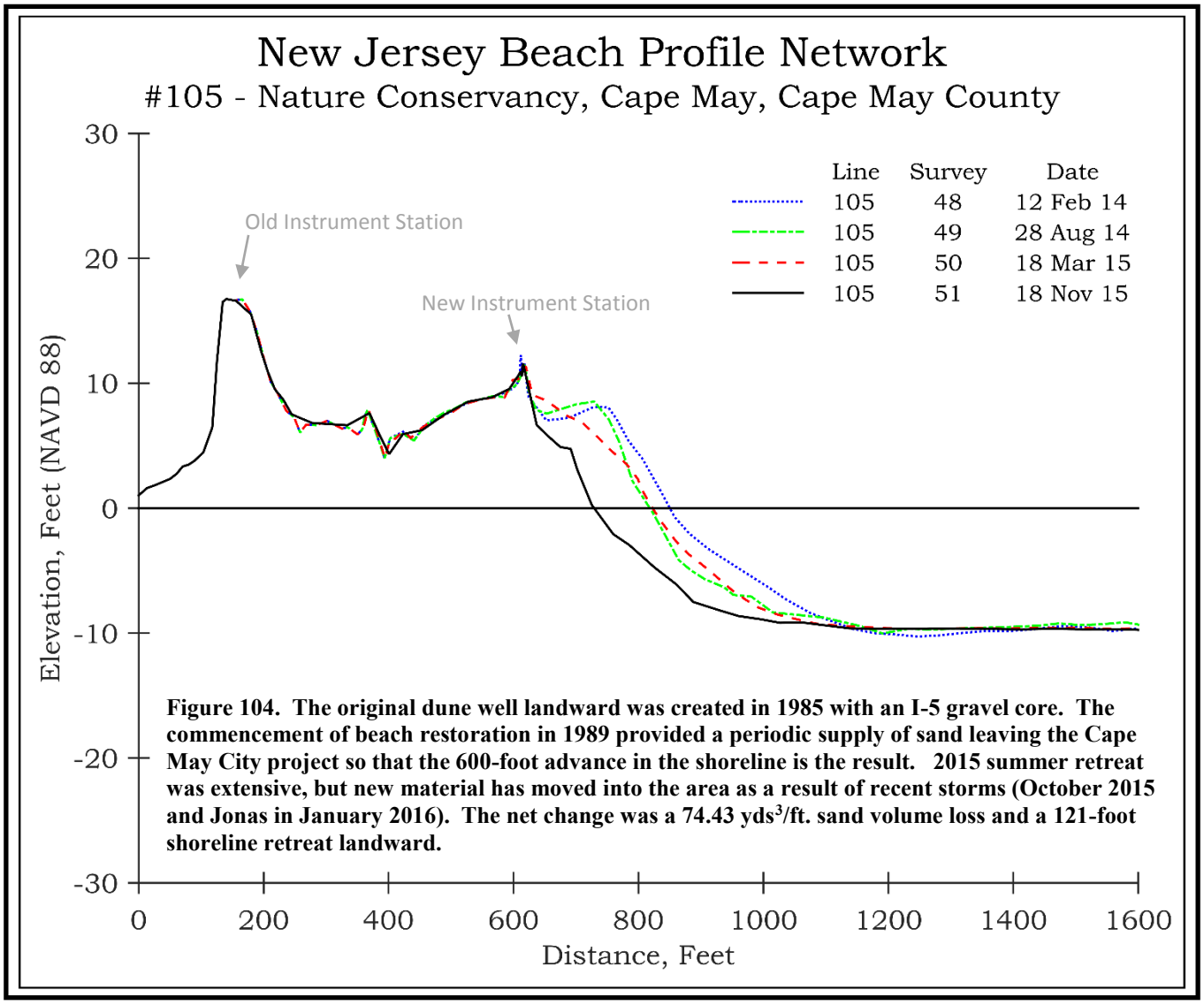


Figure 104. The original dune well landward was created in 1985 with an I-5 gravel core. The commencement of beach restoration in 1989 provided a periodic supply of sand leaving the Cape May City project so that the 600-foot advance in the shoreline is the result. 2015 summer retreat was extensive, but new material has moved into the area as a result of recent storms (October 2015 and Jonas in January 2016). The net change was a 74.43 yds^3/ft. sand volume loss and a 121-foot shoreline retreat landward.

NJBPN 104 - Lake Drive, Cape May Point

The left photo was taken on August 28, 2014. The right photo was taken on November 18, 2015 after the visitors departed.

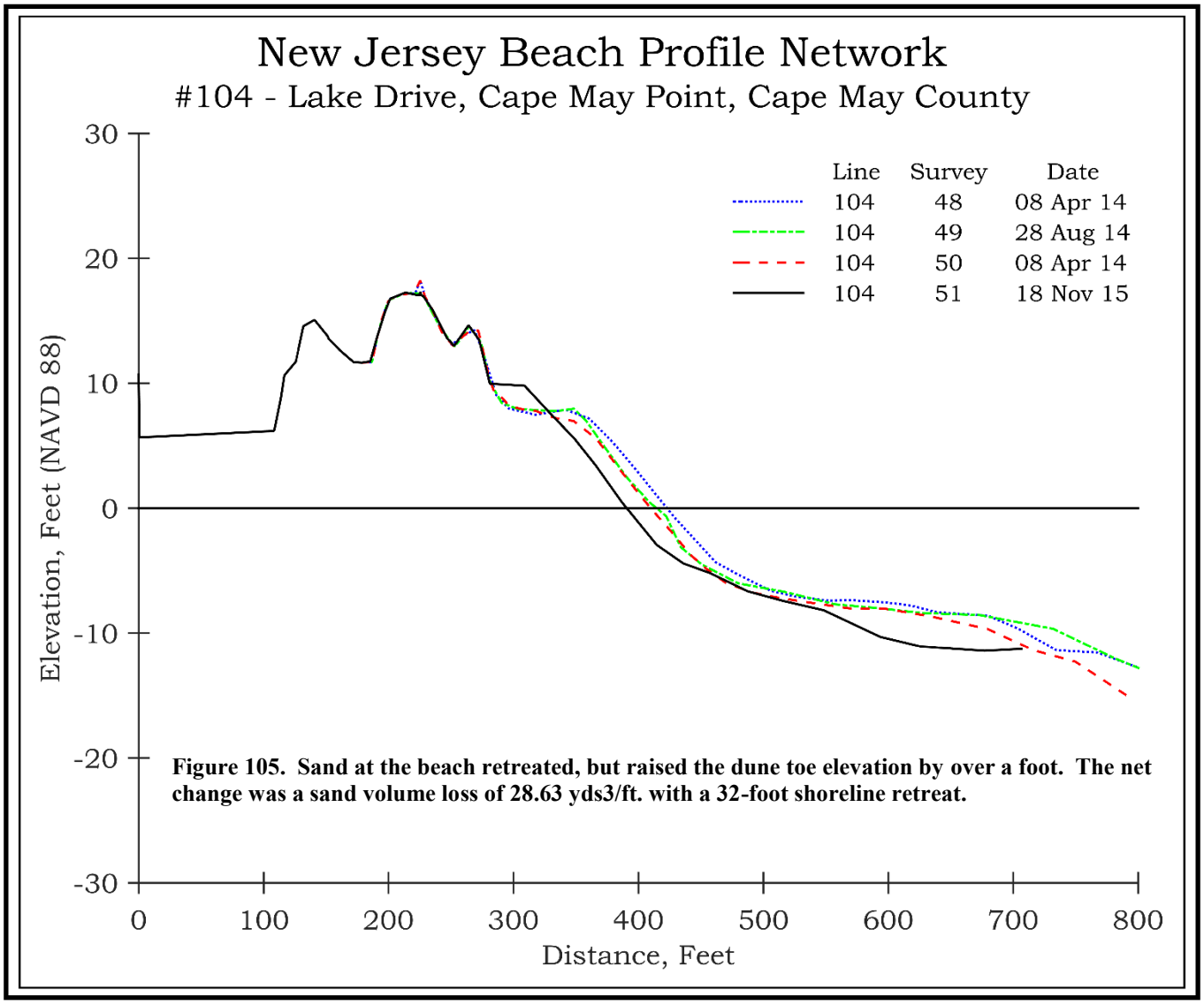


Figure 105. Sand at the beach retreated, but raised the dune toe elevation by over a foot. The net change was a sand volume loss of 28.63 yds3/ft. with a 32-foot shoreline retreat.

NJBPN 103 - Higbee Beach State Park, Lower Township

The left photo was taken August 28, 2014. The right photo taken November 18, 2015, shows some sand cut from the mid-beach area, but few other changes.

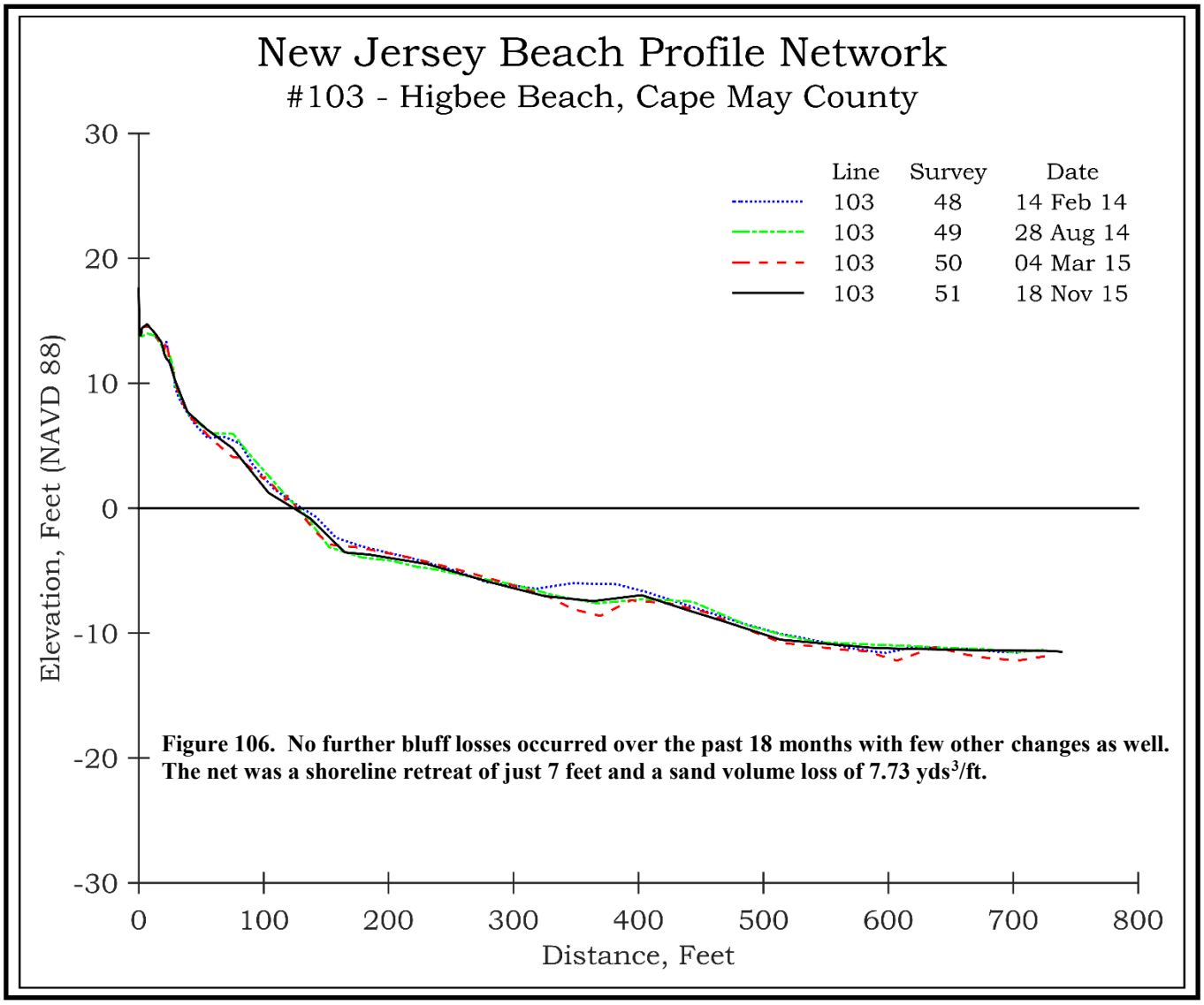


Figure 106. No further bluff losses occurred over the past 18 months with few other changes as well. The net was a shoreline retreat of just 7 feet and a sand volume loss of 7.73 yds^3/ft.

NJBPN 102 - Whittier Avenue, North Cape May

The left photo was taken on September 24, 2014. The right photo, taken on November 17, 2015, shows a narrower beach.

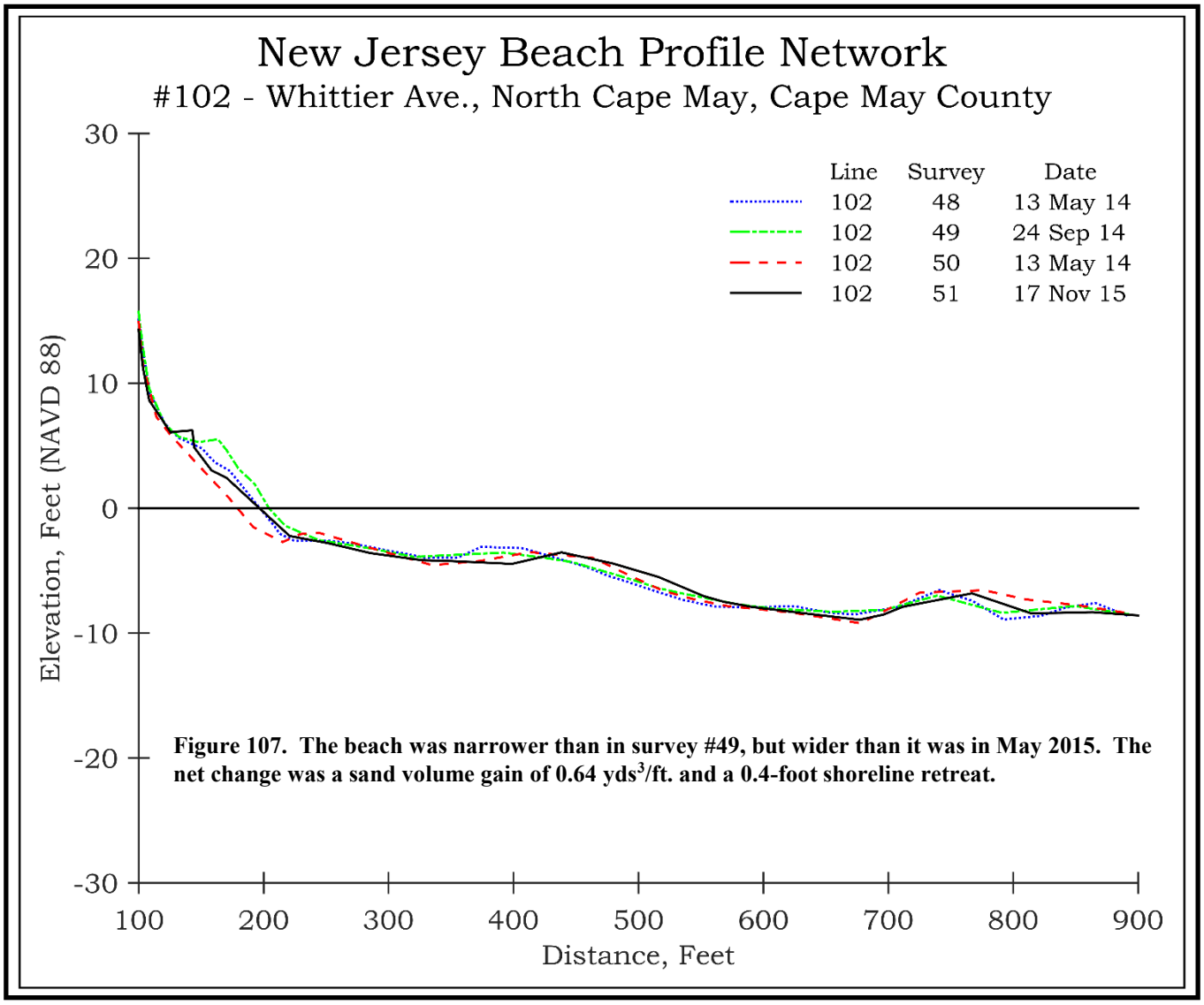


Figure 107. The beach was narrower than in survey #49, but wider than it was in May 2015. The net change was a sand volume gain of 0.64 yds^3/ft. and a 0.4-foot shoreline retreat.

NJBPN 201 - Pacific Avenue, Villas

The left view was taken September 24, 2014. Right photo was taken on November 17, 2015. Minimal change occurred at Pacific Avenue with some dune grass growth toward the bay.

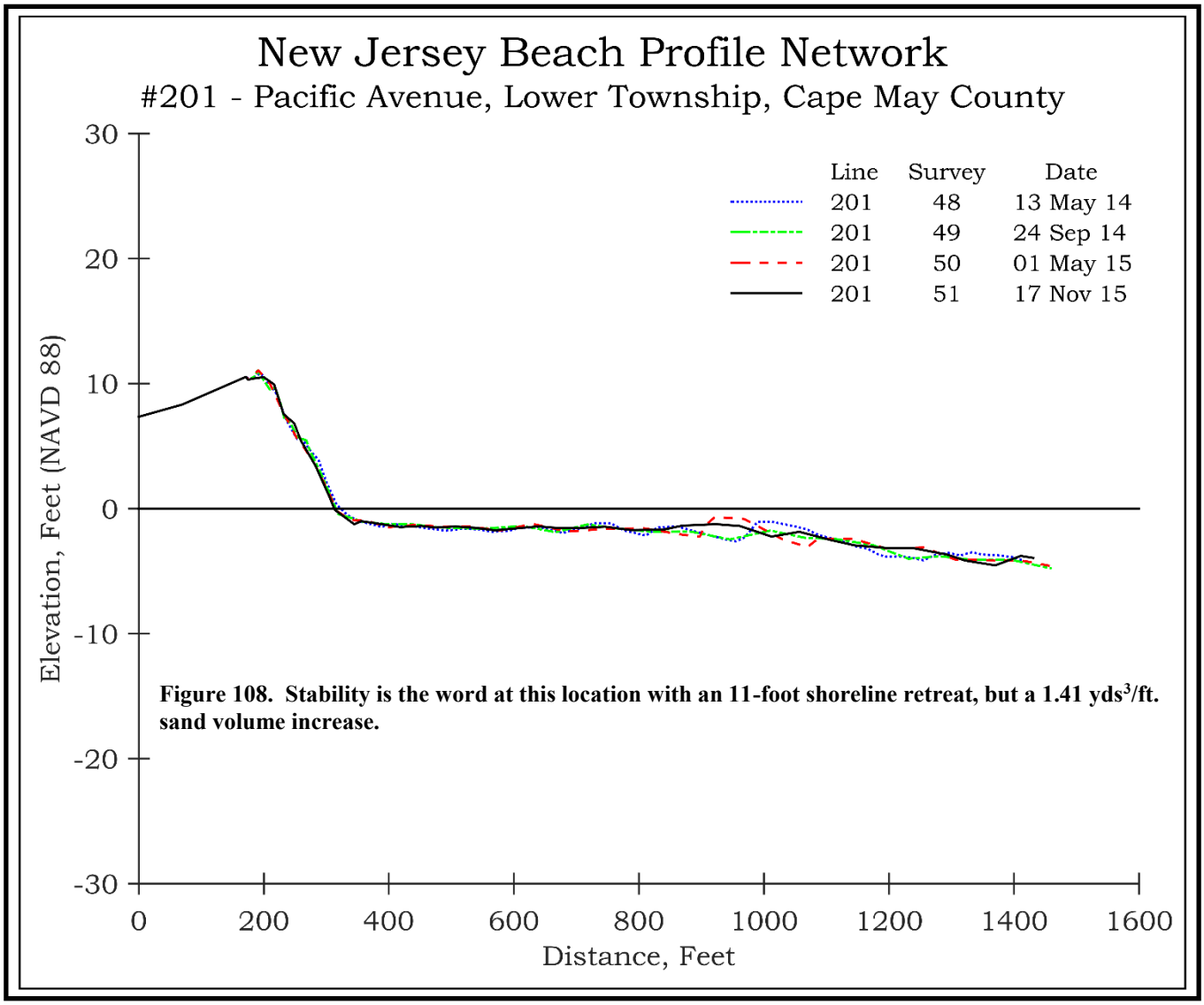


Figure 108. Stability is the word at this location with an 11-foot shoreline retreat, but a 1.41 yds^3/ft. sand volume increase.

NJBPN 100 - Reeds Beach, Middle Township

The left photograph was taken on September 24, 2014. The right photo was taken on November 17, 2015. The two views show the road and dune landward of the road and the new ridge of sand placed on the upper beach to hold back minor wave/storm events.

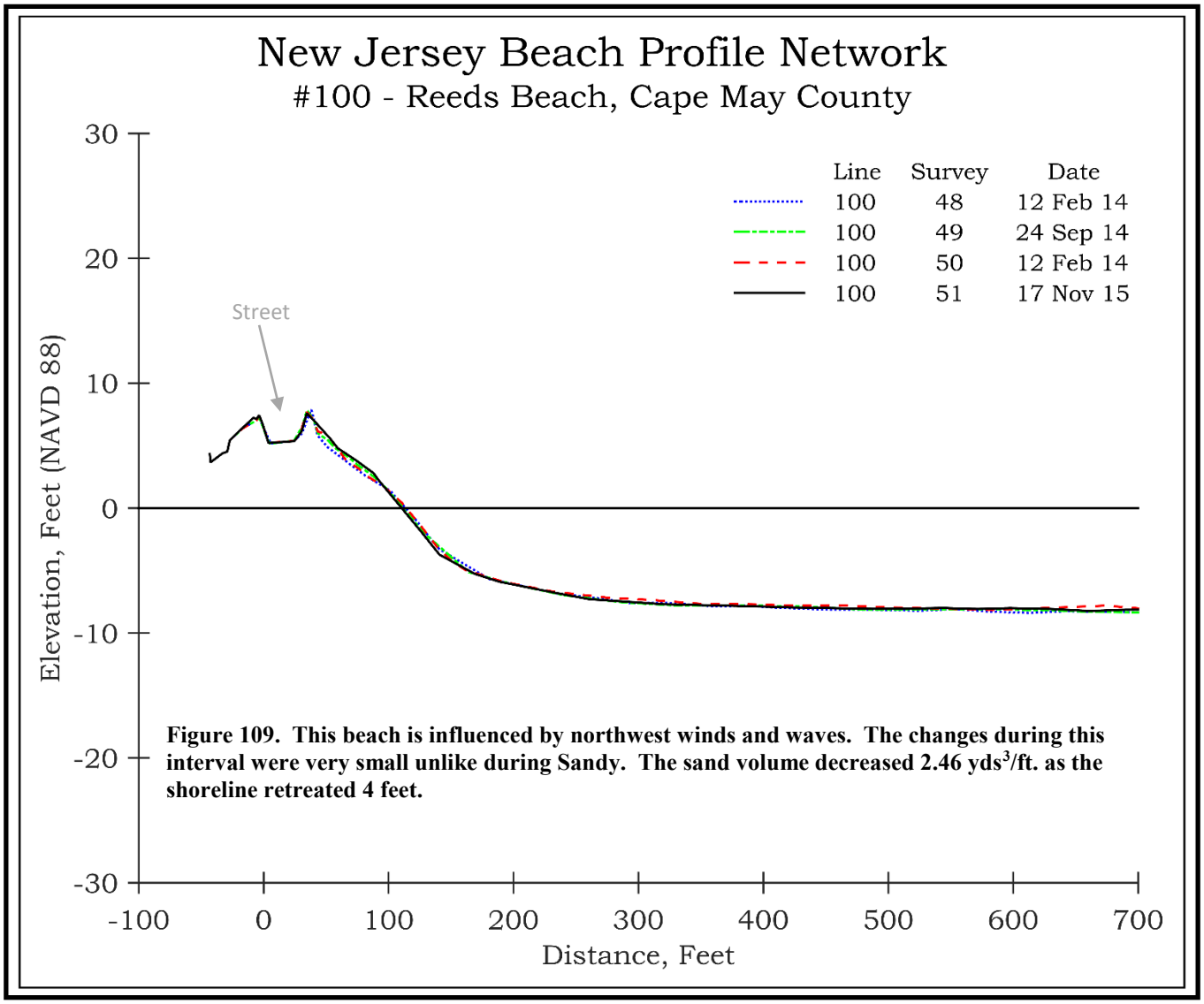


Figure 109. This beach is influenced by northwest winds and waves. The changes during this interval were very small unlike during Sandy. The sand volume decreased 2.46 yds^3/ft. as the shoreline retreated 4 feet.

Summary and Conclusions for Cape May County:

The restoration of the ACOE constructed projects removed any significant Sandy storm losses and provided a source of sand to spread along the various shorelines. There were few storm events following Sandy with the worst being NE Storm Jonas on January 23, 2016 that produced beach erosion and significant tidal flooding equal in southern Cape May County to that from Sandy. A limited disaster declaration resulted in DR-NJ-4264 for the snow removal and coastal damage by the federal government, March 14, 2016.

Erosion continued to plague the northeast segment of Ocean City, Strathmere, Avalon and North Wildwood. Each site required additional maintenance in 2014 and into 2015. Ocean City appears in satisfactory condition, with the 2015 Army Corps project covering its southern shoreline to Corson's Inlet State Park, south along all of Ludlam Island

Avalon continues to shed sand from the 10th to 21st Street segment and accumulate it between 35th and 70th Street beaches. The Borough executed a 740,000 cubic yard restoration by May 2015. In North Wildwood, back-passing was being used to provide minor sand volumes (38,000 cy) to enhance the northern 5 city oceanfront beach blocks. An additional 37,000 cy was made available in the fall of 2015 from sand dredged by the NJDOT from the Beach Creek NJ State navigation channel entrance from Hereford Inlet.

Since Sandy, work by the Philadelphia District ACOE has restored all authorized and constructed projects back to individual project design specifications (the Table below courtesy of Jeffery Gebert, USACE).

Table 2. Cape May County ACOE Project Sand Volumes due to Sandy

SITE LOCATION	CONTRACTOR	SAND VOLUME (cy)	
Ocean City (berm)	Great Lakes Dredge and Dock	1,746,206	
Ocean City (dune betterment)	Great Lakes Dredge and Dock	56,110	
TCM - Avalon	Norfolk Dredging Company	336,359	
TCM - Stone Harbor	Norfolk Dredging Company	674,224	
CM Inlet to Lower Township	Weeks Marine Inc	585,328	
Lower Cape May Meadows - CM Pt	Weeks Marine Inc	345,000	Scheduled periodic nourishment (not post-Sandy FCCE work)

The 2015 Ludlam Island and Ocean City project resulted in placing 3.4 million cubic yards of sand at a cost of $82.3 million between 34th Street to 59th Street in Ocean City, then between Seaspray Road in Strathmere and 93rd Street on Ludlam Island. Completed under PL 113-2 passed by Congress in early 2013, this project required NJ as the non-federal sponsor for initial construction, but was done at 100% federal expense. The Ocean City portion planned for 1.603 million cubic yards of which 403,000 cy represented advance fill. Strathmere to Sea Isle City was planned to require 5.146 million cu. yds. of which 1.82 million cu. yds. would be advanced nourishment (ACOE, 2001). The 2001 feasibility report also discussed the usual 65% federal share supported by the 35% non-federal sponsor share, a fact altered by PL 113-2 to 100% federal cost for this project's initial construction.

Work continues on the final design for the project for North Wildwood to Wildwood Crest utilizing some form of sand harvesting from the excesses seen in Wildwood and Wildwood Crest beaches to produce a sand "recycling" program, termed "Back Passing".

The final element in the future is the revitalization of a one-time effort project to provide environmental enhancement to the Delaware Bay shoreline of western Cape May County. This project is not part of the Hurricane Sandy PL 113-2 work, so must be funded separately. Back in the 1990's it was proposed as an environmental restoration for the western county coast, but never received Congressional appropriations to proceed to construction. Recently the Philadelphia District is re-assessing this project. Other ACOE projects have been completed along Delaware Bay in Oakwood Beach, Salem County (354,000 cu. yds. of sand, costing $12 million.

A Delaware Bayshore, Downe Township, NJ feasibility study under Section 103 of the River and Harbor Act of 1962 (PL 87-874), to design and construct small beach erosion and flood damage reduction projects is in progress. Signed in May 2015, the project's estimated cost is $740,000 at a 65 – 35 percent federal, non-federal sponsor share. The objective is to design projects to mitigate against future damages similar to Hurricane Sandy's damages seen to impact the region (Fortescue and Gandys Beach within Downe Township.

TABLE 3

MONMOUTH COUNTY

ANNUAL BEACH VOLUME CHANGES

SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015

			Survey	
		48 - 50		49 - 51
PROFILE SITE		**S2014-S2015**		**F2014 - F2015**
LOCATION		(volume expressed as cubic yards per foot)		
187: Cliffwood Beach Park		-0.74		0.49
286: Union Beach		0.46		-2.81
185: Port Monmouth, Spy House Museum		137.31		-20.58
285: Gateway National R. A., Gunnison Beach		12.06		30.98
284: Gateway National R. A., Parking Lot E		31.75		30.41
184: Highland Beach, Gateway Entrance		6.02		-54.33
183: Highland Beach, Via Ripa St.		-20.74		10.88
282: Sea Bright, Shrewsbury Way		45.19		8.86
182: Sea Bright, North of Route 520		2.02		-0.48
181: Sea Bright, Municipal Beach		-9.30		-32.45
180: Sea Bright, Sunset Court		-8.31		-17.69
179: Monmouth Beach, Cottage Rd.		-4.77		-28.08
178: Monmouth Beach, Beach Club		2.92		-7.21
177: Long Branch, 404 Ocean Ave.		59.92		-5.71
176: Long Branch, Seven Presidents Park		-1.28		13.25
175: Long Branch, North Broadway Ave.		20.32		-0.33
174: Long Branch, Morris Ave.		-6.30		-25.88
173: Long Branch, West End Ave.		-143.87		-61.24
272: Long Branch 805 Ocean Ave.		-13.09		0.70
171: Elberon, Pullman Ave.		17.94		26.71
170: Deal, Roosevelt Ave.		0.71		9.78
169: Deal, Darlington Ave.		2.41		240.80
168: Allenhurst, Corlies Ave.		94.42		98.83
267: Asbury Park, 7th Ave.		-24.16		-6.20
167: Asbury Park, 3rd Ave.		-16.73		-6.47
166: Ocean grove, Ocean Pathway		0.02		5.22
165: Bradley Beach, McCabe Ave.		-2.68		4.81
164: Avon-By-The-Sea, Sylvania Ave.		-0.21		2.54
163: Belmar, 5th Ave.		20.02		11.04
162: Belmar, 18th Ave.		3.96		21.47
161: Spring Lake, Brighton Ave.		40.73		11.18
160: Spring Lake, Salem Ave.		7.17		33.53
159: Sea Girt, New York Ave.		3.97		-11.52
158: Sea Girt, Trenton Ave.		-9.82		-21.88
157: Manasquan, Riddle Way		-10.74		19.42
256: Manasquan, Pompano Ave.		-4.41		30.66
MONMOUTH VOLUME CHANGE STATISTICS		**48 - 50**		**49 - 51**
GROSS SAND VOLUME CHANGE	(cy/ft)	**232.18**		**308.70**
AVERAGE PROFILE SAND VOLUME CHANGE	(cy/ft)	**6.45**		**8.57**
8 Sea Bright Profiles Gross Change		**13.03**		**-120.51**
Average	(cy/ft)	**1.6**		**-15.1**
13 Sites Asbury to Manasquan		**7.12**		**93.79**
Average	(cy/ft)	**0.5**		**7.2**
6 Long Branch Sites		**-71.2**		**-79.9**
Average	(cy/ft)	**-11.9**		**-13.3**
Oceanfront Sites		**95.2**		**331.6**
Average	(cy/ft)	**2.9**		**10.0**
STATE WIDE AVERAGE VOLUME CHG	**48 - 51**	**16.14**	**(CY/FT)**	
STATE WIDE AVERAGE SHORELINE CHG	**48 - 51**	**24.67**	**FT**	

TABLE 4

MONMOUTH COUNTY

ANNUAL SHORELINE CHANGES

SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015

		Survey		
		48 - 50		49 - 51
PROFILE SITE		**S2014-S2015**		**F2014 - F2015**
LOCATION		(shoreline change expressed in feet)		
187: Cliffwood Beach Park		-0.5		7.6
286: Union Beach		0.4		-0.3
185: Port Monmouth, Spy House Museum		259.2		-5.4
285: Gateway National R. A., Gunnison Beach		83.6		66.6
284: Gateway National R. A., Parking Lot E		22.1		-30.3
184: Highland Beach, Gateway Entrance		-5.9		-99.1
183: Highland Beach, Via Ripa St.		-67.8		153.0
282: Sea Bright, Shrewsbury Way		151.9		79.8
182: Sea Bright, North of Route 520		8.8		16.7
181: Sea Bright, Municipal Beach		-3.4		-73.5
180: Sea Bright, Sunset Court		-18.6		-42.0
179: Monmouth Beach, Cottage Rd.		-46.5		-36.9
178: Monmouth Beach, Beach Club		50.8		22.4
177: Long Branch, 404 Ocean Ave.		114.4		-21.4
176: Long Branch, Seven Presidents Park		-51.6		7.6
175: Long Branch, North Broadway Ave.		69.2		-9.5
174: Long Branch, Morris Ave.		1.6		-5.6
173: Long Branch, West End Ave.		-188.2		-72.1
272: Long Branch 805 Ocean Ave.		-44.62		-16.5
171: Elberon, Pullman Ave.		40.3		43.8
170: Deal, Roosevelt Ave.		1.9		-9.8
169: Deal, Darlington Ave.		-3.3		341.6
168: Allenhurst, Corlies Ave.		128.5		96.6
267: Asbury Park, 7th Ave.		-12.2		-26.4
167: Asbury Park, 3rd Ave.		-30.0		-23.3
166: Ocean grove, Ocean Pathway		9.9		-28.9
165: Bradley Beach, McCabe Ave.		4.0		9.2
164: Avon-By-The-Sea, Sylvania Ave.		-19.6		-54.8
163: Belmar, 5th Ave.		20.4		-0.4
162: Belmar, 18th Ave.		-16.0		5.1
161: Spring Lake, Brighton Ave.		57.7		19.2
160: Spring Lake, Salem Ave.		29.3		11.2
159: Sea Girt, New York Ave.		24.3		-57.7
158: Sea Girt, Trenton Ave.		-5.2		-46.3
157: Manasquan, Riddle Way		9.8		-11.1
256: Manasquan, Pompano Ave.		-24.9		-5.6
MONMOUTH SHORLINE CHANGE STATISTICS		**48 - 50**		**49 - 51**
GROSS SHORELINE POSITION CHANGE		**549.41**		**203.39**
AVERAGE PROFILE SHORELINE CHANGE	(ft)	**15.26**		**5.65**
8 Sea Bright Profiles Gross Change		**69.17**		**20.36**
Average	(ft)	**8.6**		**2.5**
13 Sites Asbury to Manasquan		**47.45**		**-209.76**
Average	(ft)	**3.7**		**-16.1**
6 Long Branch Sites		**-54.7**		**-101.0**
Average	(ft)	**-9.1**		**-16.8**
Oceanfront Sites		**290.4**		**201.5**
Average	(ft)	**8.8**		**6.1**

TABLE 5

MONMOUTH COUNTY

SEASONAL BEACH VOLUME CHANGES

		Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE			**S14-F14**	**F14-S15**	**S15-F15**	**S14-F15**
LOCATION			(volume expressed as cubic yards per foot of beachfront)			
187:	Cliffwood Beach Park		-1.60	0.74	-0.16	-1.01
286:	Union Beach		-1.28	1.72	-4.50	-4.11
185:	Port Monmouth, Spy House Museum		142.11	-4.79	-16.67	122.13
285:	Gateway National R. A., Gunnison Beach		-13.05	24.91	6.19	15.94
284:	Gateway National R. A., Parking Lot E		-8.56	42.94	-10.20	14.59
184:	Highland Beach, Gateway Entrance		25.71	-19.07	-35.13	-29.26
183:	Highland Beach, Via Ripa St.		-4.81	-10.76	19.93	6.16
282:	Sea Bright, Shrewsbury Way		27.14	17.86	-8.76	36.20
182:	Sea Bright, North of Route 520		2.49	-0.44	-0.02	1.99
181:	Sea Bright, Municipal Beach		9.15	-18.47	-13.89	-23.31
180:	Sea Bright, Sunset Court		-4.44	-3.91	-13.71	-22.05
179:	Monmouth Beach, Cottage Rd.		12.59	-16.72	-11.28	-16.31
178:	Monmouth Beach, Beach Club		5.20	-2.78	-4.48	-1.30
177:	Long Branch, 404 Ocean Ave.		64.82	-5.60	-0.55	59.06
176:	Long Branch, Seven Presidents Park		-7.67	6.45	6.82	5.51
175:	Long Branch, North Broadway Ave.		-9.52	29.03	-30.35	-8.99
174:	Long Branch, Morris Ave.		8.06	-15.12	-10.77	-17.19
173:	Long Branch, West End Ave.		-99.59	-45.27	-16.81	-160.69
272:	Long Branch 805 Ocean Ave.		-23.75	12.66	-11.50	-28.34
171:	Elberon, Pullman Ave.		0.27	17.75	9.83	26.76
170:	Deal, Roosevelt Ave.		-2.04	2.73	7.50	8.44
169:	Deal, Darlington Ave.		1.29	1.27	241.39	231.44
168:	Allenhurst, Corlies Ave.		4.88	89.54	9.11	104.09
267:	Asbury Park, 7th Ave.		-9.71	-13.96	9.74	-15.82
167:	Asbury Park, 3rd Ave.		-4.97	-11.77	5.22	-11.44
166:	Ocean grove, Ocean Pathway		0.86	-0.86	6.00	6.19
165:	Bradley Beach, McCabe Ave.		-0.66	-2.68	7.29	3.83
164:	Avon-By-The-Sea, Sylvania Ave.		12.07	-11.82	14.35	14.68
163:	Belmar, 5th Ave.		12.25	7.57	3.44	24.10
162:	Belmar, 18th Ave.		-6.80	10.77	10.73	14.38
161:	Spring Lake, Brighton Ave.		40.47	0.20	10.96	51.67
160:	Spring Lake, Salem Ave.		-1.96	9.11	27.77	31.74
159:	Sea Girt, New York Ave.		3.23	0.91	-12.36	-9.65
158:	Sea Girt, Trenton Ave.		-1.55	-8.42	-13.48	-23.45
157:	Manasquan, Riddle Way		-13.74	2.87	15.94	3.25
256:	Manasquan, Pompano Ave.		-14.99	10.06	20.47	14.03
SEASONAL SITE VOLUME CHANGES			**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
GROSS SAND VOLUME CHANGE			**141.89**	**96.65**	**218.06**	**423.25**
AVERAGE SAND VOLUME CHANGE		(cy/ft)	**3.94**	**2.68**	**6.06**	**11.76**
8 Sea Bright Profiles			**73.03**	**-54.29**	**-67.33**	**-47.88**
Average		(cy/ft)	**9.13**	**-6.79**	**-8.42**	**-5.98**
13 Sites Asbury to Manasquan			**14.50**	**-8.02**	**106.07**	**103.50**
Average		(cy/ft)	**1.1**	**-0.6**	**8.2**	**8.0**
6 Long Branch Sites			**-43.89**	**-30.51**	**-51.66**	**-122.30**
Average		(cy/ft)	**-7.32**	**-5.09**	**-8.61**	**-20.38**
Oceanfront Sites			**2.7**	**99.0**	**239.4**	**306.2**
Average		(cy/ft)	**0.1**	**3.0**	**7.3**	**9.3**

TABLE 6

MONMOUTH COUNTY

SEASONAL SHORELINE CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-S15**	**S15-F15**	**S14-F15**
LOCATION			(shoreline change expressed in feet)		
187: Cliffwood Beach Park		-2.9	2.4	5.2	4.7
286: Union Beach		-4.8	5.17	-5.5	-5.16
185: Port Monmouth, Spy House Museum		260.9	-1.7	-3.7	255.5
285: Gateway National R. A., Gunnison Beach		1.8	81.9	-15.3	68.4
284: Gateway National R. A., Parking Lot E		2.9	19.2	-49.5	-27.4
184: Highland Beach, Gateway Entrance		10.4	-16.3	-82.8	-88.7
183: Highland Beach, Via Ripa St.		-60.7	-7.1	160.2	92.3
282: Sea Bright, Shrewsbury Way		74.2	77.7	2.1	154.0
182: Sea Bright, North of Route 520		1.0	7.7	9.0	17.7
181: Sea Bright, Municipal Beach		8.2	-11.5	-62.0	-65.3
180: Sea Bright, Sunset Court		-40.6	22.0	-64.0	-82.6
179: Monmouth Beach, Cottage Rd.		-12.5	-34.0	-2.9	-49.4
178: Monmouth Beach, Beach Club		12.5	38.3	-15.9	34.8
177: Long Branch, 404 Ocean Ave.		119.9	-5.5	-16.0	98.4
176: Long Branch, Seven Presidents Park		-33.3	-18.3	25.9	-25.7
175: Long Branch, North Broadway Ave.		-2.3	71.4	-80.9	-11.8
174: Long Branch, Morris Ave.		-13.0	14.7	-20.3	-18.6
173: Long Branch, West End Ave.		-178.6	-9.6	-62.6	-250.8
272: Long Branch 805 Ocean Ave.		-94.2	49.53	-66.0	-110.6
171: Elberon, Pullman Ave.		5.3	35.0	8.7	49.0
170: Deal, Roosevelt Ave.		10.5	-8.6	-1.25	0.7
169: Deal, Darlington Ave.		8.0	-11.4	353.0	349.7
168: Allenhurst, Corlies Ave.		18.1	110.4	-13.8	114.7
267: Asbury Park, 7th Ave.		-11.4	-0.8	-25.5	-37.7
167: Asbury Park, 3rd Ave.		-4.9	-25.1	1.8	-28.2
166: Ocean grove, Ocean Pathway		11.5	-1.7	-27.2	-17.3
165: Bradley Beach, McCabe Ave.		-11.9	15.8	-6.6	-2.7
164: Avon-By-The-Sea, Sylvania Ave.		19.1	-38.7	-16.1	-35.6
163: Belmar, 5th Ave.		22.5	-2.1	1.7	22.1
162: Belmar, 18th Ave.		-28.7	12.8	-7.7	-23.6
161: Spring Lake, Brighton Ave.		12.7	45.0	-25.9	31.8
160: Spring Lake, Salem Ave.		-6.0	35.4	-24.2	5.1
159: Sea Girt, New York Ave.		13.5	10.8	-68.5	-44.2
158: Sea Girt, Trenton Ave.		15.2	-20.3	-25.9	-31.1
157: Manasquan, Riddle Way		-7.6	17.4	-28.5	-18.8
256: Manasquan, Pompano Ave.		-31.6	6.7	-12.3	-37.2
SEASONAL SHORELINE CHANGES	Survey	**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
GROSS SHORELINE CHANGES		83.02	466.35	-262.98	286.42
AVERAGE SHORELINE CHANGE	(ft)	2.31	12.95	-7.31	7.96
8 Sea Bright Profiles		**-7.54**	**76.71**	**-56.36**	**12.81**
Average	(ft)	**-0.94**	**9.59**	**-7.05**	**1.60**
13 Sites Asbury to Manasquan		**-7.60**	**55.03**	**-264.81**	**-217.35**
Average	(ft)	**-0.6**	**4.2**	**-20.4**	**-16.7**
6 Long Branch Sites		**-107.40**	**52.71**	**-153.75**	**-208.43**
Average	(ft)	**-17.90**	**8.79**	**-25.63**	**-34.74**
Oceanfront Sites		**-170.1**	**460.5**	**-259.0**	**31.4**
Average	(ft)	**-5.2**	**14.0**	**-7.8**	**1.0**

TABLE 7				
OCEAN COUNTY				
ANNUAL BEACH VOLUME CHANGES				
SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015				
		Survey		
		48 - 50		49 - 51
PROFILE SITE		**S2014-S2015**		**F2014 - F2015**
LOCATION		(volume expressed as cubic yards per foot)		
156: Point Pleasant, Water St.		-25.51		-48.02
155: Point Pleasant, Maryland Ave.		-3.27		0.72
154: Bay Head, Johnson Ave.		-6.19		-20.32
153: Mantoloking, 1117 Ocean Ave.		-4.06		7.17
152: Brick Township, Public Beach		31.20		9.86
151: Normandy Beach, 1st Ave		12.29		44.05
150: Lavallette, White Ave.		-11.84		-13.06
149: Ortley Beach, 8th Ave.		-3.03		14.00
248: Seaside, Franklin Ave.		-18.39		-18.35
148: Seaside Park, 4th Ave.		9.12		-23.62
347: Berkeley Township, 6th Ave.		6.13		28.98
247: Island Beach State Park, North		31.87		-25.93
246: Island Beach State Park, Middle		22.22		36.55
146: Island Beach State Park, South		-16.25		12.90
245: Barnegat Light, 10th St.		-43.31		0.52
145: Barnegat Light, 26th St.		7.74		25.08
144: Loveladies, La Baia St.		10.33		8.88
143: Harvey Cedars, 73rd St.		-32.05		-22.36
142: Harvey Cedars, Tranquility Drive		11.80		-6.81
241: Surf City, 20th St.		8.07		4.64
141: Ship Bottom, 8th St.		82.85		24.88
140: Long BeachTownship, 32nd St.		3.04		31.14
139: Long Beach Township, 81st St.		3.66		219.58
138: Long Beach Township, Old Whaling Rd.		27.77		145.55
137: Beach Haven, Taylor Ave.		11.22		27.91
136: Beach Haven, Dolphin Ave.		14.77		2.23
135: Long Beach Township, Webster Ave.		0.06		22.94
234: Long Beach Township, Border w/ Refuge		40.67		75.46
OCEAN SAND VOLUME STATISTICS		**48 - 50**		**49 - 51**
GROSS SAND VOLUME CHANGE		**170.89**		**564.56**
AVERAGE SAND VOLUME CHANGE	**(cy/ft)**	**6.10**		**20.16**

TABLE 8				
OCEAN COUNTY				
ANNUAL SHORELINE CHANGES				
SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015				
		Survey		
		48 - 50		49 - 51
PROFILE SITE		**S2014-S2015**		**F2014 - F2015**
LOCATION		(shoreline change expressed in feet)		
156: Point Pleasant, Water St.		-20.15		-42.31
155: Point Pleasant, Maryland Ave.		32.03		17.89
154: Bay Head, Johnson Ave.		30.26		7.58
153: Mantoloking, 1117 Ocean Ave.		3.77		-6.06
152: Brick Township, Public Beach		28.11		-1.70
151: Normandy Beach, 1st Ave		11.86		-6.11
150: Lavallette, White Ave.		-4.78		-34.03
149: Ortley Beach, 8th Ave.		22.48		-3.57
248: Seaside, Franklin Ave.		-22.94		-20.91
148: Seaside Park, 4th Ave.		11.37		-30.16
347: Berkeley Township, 6th Ave.		-12.39		-4.35
247: Island Beach State Park, North		18.44		-59.00
246: Island Beach State Park, Middle		24.69		-30.97
146: Island Beach State Park, South		-19.22		3.51
245: Barnegat Light, 10th St.		-24.39		4.98
145: Barnegat Light, 26th St.		16.21		78.87
144: Loveladies, La Baia St.		3.77		26.28
143: Harvey Cedars, 73rd St.		-34.08		4.01
142: Harvey Cedars, Tranquility Drive		-21.15		20.95
241: Surf City, 20th St.		17.79		21.64
141: Ship Bottom, 8th St.		137.65		61.18
140: Long Beach Township, 32nd St.		-1.02		59.62
139: Long Beach Township, 81st St.		12.41		282.28
138: Long Beach Township, Old Whaling Rd.		17.85		184.75
137: Beach Haven, Taylor Ave.		32.09		26.15
136: Beach Haven, Dolphin Ave.		-4.72		-30.37
135: Long Beach Township, Webster Ave.		18.48		10.22
234: Long Beach Township, Border w/ Refuge		154.05		200.85
OCEAN SHORELINE STATISTICS		**48 - 50**		**49 - 51**
GROSS SHORELINE CHANGE		**428.47**		**741.22**
AVERAGE SHORELINE POSITION CHANGE		**15.30**		**26.47**

TABLE 9

OCEAN COUNTY

SEASONAL BEACH VOLUME CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-S15**	**S15-F15**	**S14-F15**
LOCATION		(volume expressed as cubic yards per foot of beachfront)			
156: Point Pleasant, Water St.		17.61	-43.04	-4.75	-30.45
155: Point Pleasant, Maryland Ave.		-1.72	-0.71	2.31	-0.94
154: Bay Head, Johnson Ave.		9.24	-14.87	-5.79	-11.76
153: Mantoloking, 1117 Ocean Ave.		-7.94	3.90	3.32	-0.65
152: Brick Township, Public Beach		18.62	12.52	-2.69	28.04
151: Normandy Beach, 1st Ave		-5.42	18.05	26.09	37.93
150: Lavallette, White Ave.		-11.47	0.07	-12.66	-24.44
149: Ortley Beach, 8th Ave.		-0.30	-2.76	16.53	13.54
248: Seaside, Franklin Ave.		-2.40	-16.98	-1.59	-19.96
148: Seaside Park, 4th Ave.		24.12	-15.01	-8.58	0.53
347: Berkeley Township, 6th Ave.		17.46	-11.57	40.61	46.73
247: Island Beach State Park, North		34.06	-0.97	-25.14	8.69
246: Island Beach State Park, Middle		-15.03	37.84	0.65	23.03
146: Island Beach State Park, South		-18.31	2.05	10.88	-5.21
245: Barnegat Light, 10th St.		-29.53	-14.24	14.71	-29.06
145: Barnegat Light, 26th St.		8.30	0.04	25.49	33.09
144: Loveladies, La Baia St.		0.92	8.19	-0.02	9.72
143: Harvey Cedars, 73rd St.		14.04	-45.38	20.74	-8.16
142: Harvey Cedars, Tranquility Drive		9.34	1.93	-9.20	1.61
241: Surf City, 20th St.		-7.12	15.31	-10.66	-2.36
141: Ship Bottom, 8th St.		-14.99	97.33	-71.21	7.20
140: Long BeachTownship, 32nd St.		16.27	-13.24	44.37	44.05
139: Long Beach Township, 81st St.		-13.12	16.76	202.82	206.48
138: Long Beach Township, Old Whaling Rd.		-16.85	45.33	100.82	128.00
137: Beach Haven, Taylor Ave.		12.97	-1.32	29.26	41.07
136: Beach Haven, Dolphin Ave.		3.67	10.75	-5.72	7.66
135: Long Beach Township, Webster Ave.		4.23	-4.14	28.20	27.81
234: Long Beach Township, Border w/ Refuge		-25.93	66.76	8.98	49.38
SEASONAL STATISTICS					
VOLUME CHANGES for OCEAN CO.	Survey	**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
		(cy/ft)	**(cy/ft)**	**(cy/ft)**	**(cy/ft)**
SUM of SAND VOLUMES for 28 SITES		**20.74**	**152.61**	**417.75**	**581.57**
AVERAGE SAND VOLUME per SITE		**0.74**	**5.45**	**14.92**	**20.77**
Northern Ocean Co. Sand Volume Change		**76.84**	**-33.54**	**28.29**	**70.28**
Average Northern Ocean Co. Volume Change		**5.49**	**-2.40**	**2.02**	**5.02**
Long Beach Island Sand Volume Change		**-37.79**	**184.09**	**378.58**	**516.50**
Averge Long Beach Island Volume Change		**-2.70**	**13.15**	**27.04**	**36.89**

TABLE 10

OCEAN COUNTY

SEASONAL SHORELINE CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-S15**	**S15-F15**	**S14-F15**
LOCATION			(shoreline change expressed in feet)		
156: Point Pleasant, Water St.		9.05	-29.21	-13.10	-33.25
155: Point Pleasant, Maryland Ave.		17.93	14.10	3.79	35.82
154: Bay Head, Johnson Ave.		-5.31	35.57	-27.99	2.27
153: Mantoloking, 1117 Ocean Ave.		4.70	-0.94	-5.12	-1.35
152: Brick Township, Public Beach		18.23	9.88	-11.58	16.53
151: Normandy Beach, 1st Ave		8.81	3.05	-9.16	2.69
150: Lavallette, White Ave.		-9.74	4.96	-38.99	-43.77
149: Ortley Beach, 8th Ave.		13.67	8.81	-12.38	10.10
248: Seaside, Franklin Ave.		3.75	-26.69	5.78	-17.16
148: Seaside Park, 4th Ave.		28.87	-17.50	-12.66	-1.29
347: Berkeley Township, 6th Ave.		23.18	-35.57	31.22	18.83
247: Island Beach State Park, North		33.61	-15.16	-43.83	-25.39
246: Island Beach State Park, Middle		3.72	20.97	-51.94	-27.25
146: Island Beach State Park, South		2.13	-21.36	24.87	5.65
245: Barnegat Light, 10th St.		-15.98	-8.41	13.39	-11.00
145: Barnegat Light, 26th St.		16.05	0.16	78.71	94.92
144: Loveladies, La Baia St.		8.60	-4.83	31.11	34.88
143: Harvey Cedars, 73rd St.		18.28	-52.36	56.38	22.29
142: Harvey Cedars, Tranquility Drive		-2.31	-18.84	39.79	18.64
241: Surf City, 20th St.		18.76	-0.96	22.60	40.40
141: Ship Bottom, 8th St.		-12.80	150.45	-89.27	48.38
140: Long BeachTownship, 32nd St.		6.89	-7.91	67.53	66.51
139: Long Beach Township, 81st St.		6.30	6.11	276.17	288.58
138: Long Beach Township, Old Whaling Rd.		0.97	16.88	167.87	185.72
137: Beach Haven, Taylor Ave.		32.39	-0.30	26.45	58.54
136: Beach Haven, Dolphin Ave.		6.70	-11.41	-18.96	-23.68
135: Long Beach Township, Webster Ave.		33.11	-14.63	24.85	43.33
234: Long Beach Township, Border w/Refuge		-48.80	202.85	-2.00	152.05
SEASONAL STATISTICS					
SHORELINE CHANGES for OCEAN CO	Survey	**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
		(feet)	**(feet)**	**(feet)**	**(feet)**
SUM of SHORELINE CHANGES for 28 SITES		**220.76**	**207.71**	**533.53**	**961.99**
AVERAGE SHORELINE CHANGE per SITE		**7.88**	**7.42**	**19.05**	**34.36**
Northern Ocean Co. Shoreline Change		**150.47**	**-27.73**	**-185.96**	**-63.22**
Average Northern Ocean Co. Shoreline Change		**10.75**	**-1.98**	**-13.28**	**-4.52**
Long Beach Island Shoreline Change		**68.16**	**256.80**	**694.62**	**1019.56**
Average Long Beach Island Shoreline Change		**4.87**	**18.34**	**49.62**	**72.83**

TABLE 11

ATLANTIC COUNTY

ANNUAL BEACH VOLUME CHANGES

SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015

		Survey	
	48 - 50		49 - 51
PROFILE SITE	**S2014-S2015**		**F2014 - F2015**
LOCATION	(volume expressed as cubic yards per foot)		
134: Brigantine, Green Acres	-4.48		-52.27
133: Brigantine, 4th Street North	-12.85		-29.75
132: Brigantine, 15th Street South	-13.60		-20.96
131: Brigantine, 43rd Street South	29.93		6.24
230: Atlantic City, Rhode Island Ave.	-37.68		-38.80
130: Atlantic City, North Carolina Ave.	-15.37		-23.60
129: Atlantic City, Raleigh Ave.	45.72		-12.30
128: Ventnor City, Dorset Ave.	9.75		-29.38
127: Margate City, Benson Ave.	16.47		15.02
126: Longport, 17th St.	6.77		-59.68

TABLE 12

ATLANTIC COUNTY

ANNUAL SHORELINE CHANGES

SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015

		Survey	
	48 - 50		49 - 51
PROFILE SITE	**S2014-S2015**		**F2014 - F2015**
LOCATION	(shoreline change expressed in feet)		
134: Brigantine, Green Acres	-35.0		-8.3
133: Brigantine, 4th Street North	-1.3		-68.6
132: Brigantine, 15th Street South	-54.4		-44.5
131: Brigantine, 43rd Street South	93.4		-81.6
230: Atlantic City, Rhode Island Ave.	-50.3		-24.5
130: Atlantic City, North Carolina Ave.	-46.3		-39.9
129: Atlantic City, Raleigh Ave.	32.4		51.9
128: Ventnor City, Dorset Ave.	-10.3		-51.1
127: Margate City, Benson Ave.	59.8		78.0
126: Longport, 17th St.	-29.7		-92.4
ATLANTIC COUNTY STATISTICS			
SAND VOLUME CHANGE	**48 - 50**		**49 - 51**
GROSS VOLUME CHANGE	**24.65**		**-245.48**
AVERAGE VOLUME CHANGE	**2.46**		**-24.55**
SHORELINE CHANGE STATS	**48 - 50**		**49 - 51**
GROSS SHORELINE CHANGE	**-41.63**		**-281.04**
AVERAGE SHORELINE CHANGE	**-4.16**		**-28.10**
ATLANTIC CITY SHORELINE			
CHANGES	**48 - 50**		**49 - 51**
GROSS SHORELINE CHANGE	**-64.13**		**-12.50**
AVERAGE SHORELINE CHANGE	**-21.38**		**-4.17**

TABLE 13
ATLANTIC COUNTY
SEASONAL BEACH VOLUME CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-F15**	**S15-F15**	**S14-F15**
LOCATION		(volume expressed as cubic yards per foot of beachfront)			
134: Brigantine, Green Acres		27.27	-31.82	-19.87	-25.07
133: Brigantine, 4th Street North		-3.10	-9.05	-23.91	-29.86
132: Brigantine, 15th Street South		17.39	-30.90	11.87	-2.71
131: Brigantine, 43rd Street South		22.68	10.32	0.38	19.86
230: Atlantic City, Rhode Island Ave.		-22.02	-16.03	-22.81	-59.09
130: Atlantic City, North Carolina Ave.		-4.21	-11.11	-12.00	-26.48
129: Atlantic City, Raleigh Ave.		60.45	-15.34	2.91	46.74
128: Ventnor City, Dorset Ave.		17.21	-8.76	-18.28	-9.33
127: Margate City, Benson Ave.		4.08	17.25	-0.02	-1.35
126: Longport, 17th St.		5.85	2.01	-60.36	-60.36

TABLE 14
ATLANTIC COUNTY
SEASONAL SHORELINE CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-F15**	**S15-F15**	**S14-F15**
LOCATION		(shoreline change expressed in feet)			
134: Brigantine, Green Acres		0.2	-35.3	26.9	-8.1
133: Brigantine, 4th Street North		-49.6	48.3	-116.9	-118.2
132: Brigantine, 15th Street South		0.5	-56.9	12.4	-44.0
131: Brigantine, 43rd Street South		96.3	-2.9	-78.8	14.7
230: Atlantic City, Rhode Island Ave.		-39.9	-10.4	-14.1	-64.4
130: Atlantic City, North Carolina Ave.		-16.8	-29.5	-10.4	-56.7
129: Atlantic City, Raleigh Ave.		24.2	8.2	43.7	76.1
128: Ventnor City, Dorset Ave.		-31.0	20.7	71.8	-82.1
127: Margate City, Benson Ave.		-12.2	72.0	6.0	65.8
126: Longport, 17th St.		-10.8	-18.8	-73.5	-73.5
ATLANTIC COUNTY STATISTICS					
ATLANTIC CO VOLUME CHANGE		**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
NET		**125.59**	**-93.42**	**-142.08**	**-147.65**
AVERAGE		**12.56**	**-9.34**	**-14.21**	**-14.76**
SHORELINE CHANGES	Survey	**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
NET		**-39.06**	**-4.55**	**-132.84**	**-290.44**
AVERAGE		**-3.91**	**-0.45**	**-13.28**	**-29.04**
ABSECON ISLAND					
VOLUME CHANGES		**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
NET		**83.38**	**-15.94**	**-87.74**	**-50.78**
AVERAGE		**13.90**	**-2.66**	**-14.62**	**-8.46**
ABSECON ISLAND					
SHORELINE CHANGES		**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
NET		**-86.48**	**42.19**	**23.48**	**-134.79**
AVERAGE		**-14.41**	**7.03**	**3.91**	**-22.47**

TABLE 15			
CAPE MAY COUNTY			
ANNUAL BEACH VOLUME CHANGES			
SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015			
		Survey	
		48 - 50	49 - 51
PROFILE SITE		**S2014-S2015**	**F2014 - F2015**
LOCATION		(volume expressed as cubic yards per foot)	
225: Ocean City, Gardens Rd.		-51.74	-52.97
125: Ocean City, 6th St.		-29.18	-38.05
124: Ocean City, 20th St.		31.98	14.64
223: Ocean City, 34th St.		4.99	5.46
122: Ocean City, 56th St.		18.76	170.59
222: Ocean City, 59th St.		-4.59	113.65
221: Corson's Inlet Park, Ocean City		-49.17	5.51
121: Strathmere, Williams Rd.		-224.04	187.25
120: Sea Isle City, 1st St.		-1.09	78.00
119: Sea Isle City, 25th St.		1.43	42.53
118: Sea Isle City, 57th St.		-4.86	97.12
117: Sea Isle City, 80th St.		-1.92	175.03
216: Avalon, 9th St.		-56.99	33.63
116: Avalon, 23rd St.		-17.06	32.36
115: Avalon, 35th St.		40.69	36.25
114: Avalon, 70th St.		31.36	-4.97
113: Stone Harbor, 90th St.		-2.79	-13.15
212: Stone Harbor, 121st St.		5.21	-31.74
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **	
111: North Wildwood, 15th Ave.		-63.56	-87.95
110: Wildwood, Cresse Ave.		42.45	19.01
109: Lower Township, Raleigh Ave.		28.26	-2.10
208: Lower Township, U.S.C.G. Base		-13.36	-2.52
108: Cape May, Beach Club		12.20	-0.82
107: Cape May, Baltimore Ave.		23.31	22.22
206: Cape May, Broadway Ave.		57.83	56.95
105: Cape May, Nature Conservancy		-20.61	-59.86
104: Cape May Point, Lake Dr.		-16.74	-22.48
103: Higbee Beach State Park		-11.15	-3.66
102: North Cape May, Whittier		-0.87	-3.58
201: Villas, Pacific Ave.		1.00	4.35
100: Reeds Beach, Beach Ave.		4.47	0.84
CAPE MAY COUNTY STATISTICS			
CAPE MAY SAND VOLUME STATISTICS		**48 - 50**	**49 - 51**
GROSS SAND VOLUME CHANGE		**-265.80**	**771.53**
AVERAGE SITE SAND VOLUME CHANGE		**-8.57**	**24.89**
Oceanfront Only Volume Changes			
GROSS SAND VOLUME CHANGE		**-259.2**	
AVERAGE OCEANFRONT SITE CHANGE		**-10.0**	

TABLE 16				
CAPE MAY COUNTY				
ANNUAL SHORELINE CHANGES				
SPRING 2014 - SPRING 2015 & FALL 2014 - FALL 2015				
		Survey		
		48 - 50		49 - 51
PROFILE SITE		**S2014-S2015**		**F2014 - F2015**
LOCATION		(shoreline change expressed in feet)		
225: Ocean City, Gardens Rd.		-29.94		-52.64
125: Ocean City, 6th St.		-54.32		-38.17
124: Ocean City, 20th St.		71.63		55.18
223: Ocean City, 34th St.		-37.37		19.10
122: Ocean City, 56th St.		21.81		317.93
222: Ocean City, 59th St.		-50.73		164.02
221: Corson's Inlet Park, Ocean City		-104.37		204.41
121: Strathmere, Williams Rd.		-227.04		389.70
120: Sea Isle City, 1st St.		7.45		133.72
119: Sea Isle City, 25th St.		-8.92		62.52
118: Sea Isle City, 57th St.		-54.32		109.25
117: Sea Isle City, 80th St.		1.80		265.55
216: Avalon, 9th St.		-74.59		55.99
116: Avalon, 23rd St.		14.48		6.72
115: Avalon, 35th St.		5.16		63.91
114: Avalon, 70th St.		38.06		-35.35
113: Stone Harbor, 90th St.		-5.62		-42.39
212: Stone Harbor, 121st St.		29.35		-59.29
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **		
111: North Wildwood, 15th Ave.		-113.05		-210.68
110: Wildwood, Cresse Ave.		90.97		-1.29
109: Lower Township, Raleigh Ave.		32.36		11.11
208: Lower Township, U.S.C.G. Base		35.86		-12.29
108: Cape May, Beach Club		56.03		-0.72
107: Cape May, Baltimore Ave.		21.05		9.92
206: Cape May, Broadway Ave.		109.61		72.89
105: Cape May, Nature Conservancy		-27.67		-89.10
104: Cape May Point, Lake Dr.		-13.07		-23.88
103: Higbee Beach State Park		-3.97		-3.77
102: North Cape May, Whittier		-18.02		-7.61
201: Villas, Pacific Ave.		-8.25		-2.65
100: Reeds Beach, Beach Ave.		0.61		-1.07
CAPE MAY COUNTY STATISTICS				
CAPE MAY SHORELINE CHANGES	survey	**48 - 50**		**49 - 51**
GROSS SHORELINE CHANGE		**-295.02**		**1361.02**
AVERAGE SHORELINE CHANGE		**-9.52**		**43.90**
Oceanfront Only Shoreline Change		**48 - 50**		**49 - 51**
GROSS SHORELINE CHANGE		**-167.92**		**-23.12**
AVERAGE OCEANFRONT SHORELINE CHANGE		**-6.46**		**-0.80**

TABLE 17

CAPE MAY COUNTY

SEASONAL BEACH VOLUME CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-S15**	**S15-F15**	**S14-F15**
LOCATION		(volume expressed as cubic yards per foot of beachfront)			
225: Ocean City, Gardens Rd.		5.53	-59.34	6.37	-45.13
125: Ocean City, 6th St.		-1.60	-27.02	-10.46	-39.64
124: Ocean City, 20th St.		33.11	-1.32	15.78	47.74
223: Ocean City, 34th St.		10.57	-5.42	11.07	16.04
122: Ocean City, 56th St.		2.65	16.14	156.07	174.27
222: Ocean City, 59th St.		-3.45	0.86	114.47	109.96
221: Corson's Inlet Park, Ocean City		-30.32	-16.93	26.16	-23.09
121: Strathmere, Williams Rd.		-78.74	-145.08	332.31	107.91
120: Sea Isle City, 1st St.		7.43	-8.48	85.72	85.42
119: Sea Isle City, 25th St.		-19.48	20.91	22.74	25.69
118: Sea Isle City, 57th St.		10.26	-14.89	112.50	107.98
117: Sea Isle City, 80th St.		2.16	-4.09	178.94	177.07
216: Avalon, 9th St.		-19.01	-38.06	73.16	14.28
116: Avalon, 23rd St.		4.41	-21.53	53.89	36.77
115: Avalon, 35th St.		16.86	23.74	11.68	51.56
114: Avalon, 70th St.		11.50	19.84	-24.60	5.73
113: Stone Harbor, 90th St.		-2.64	-0.71	-13.05	-22.74
212: Stone Harbor, 121st St.		13.35	-7.40	-22.17	-17.67
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **			
111: North Wildwood, 15th Ave.		-11.41	-52.24	-35.72	-99.44
110: Wildwood, Cresse Ave.		23.85	17.40	-6.76	46.09
109: Lower Township, Raleigh Ave.		20.86	7.51	-9.02	20.77
208: Lower Township, U.S.C.G. Base		3.01	-16.42	13.26	-0.27
108: Cape May, Beach Club		2.45	9.81	-10.85	2.41
107: Cape May, Baltimore Ave.		-4.47	29.63	-7.43	16.53
206: Cape May, Broadway Ave.		2.22	53.76	3.56	60.17
105: Cape May, Nature Conservancy		-14.48	-6.11	-53.84	-74.43
104: Cape May Point, Lake Dr.		-3.83	-12.93	-16.49	-28.63
103: Higbee Beach State Park		-4.06	-7.51	3.88	-7.73
102: North Cape May, Whittier Ave.		4.22	-5.09	1.50	0.64
201: Villas, Pacific Ave.		-2.81	4.02	0.50	1.41
100: Reeds Beach, Beach Ave.		1.12	3.30	-2.46	2.04
CAPE MAY COUNTY STATISTICS					
SEASONAL CAPE MAY VOL. CHANGES	Survey	**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
GROSS SAND VOLUME CHANGE		**-20.73**	**-243.65**	**1010.69**	**751.71**
AVERAGE SITE SAND VOLUME CHANGE		**-0.67**	**-7.86**	**32.60**	**24.25**

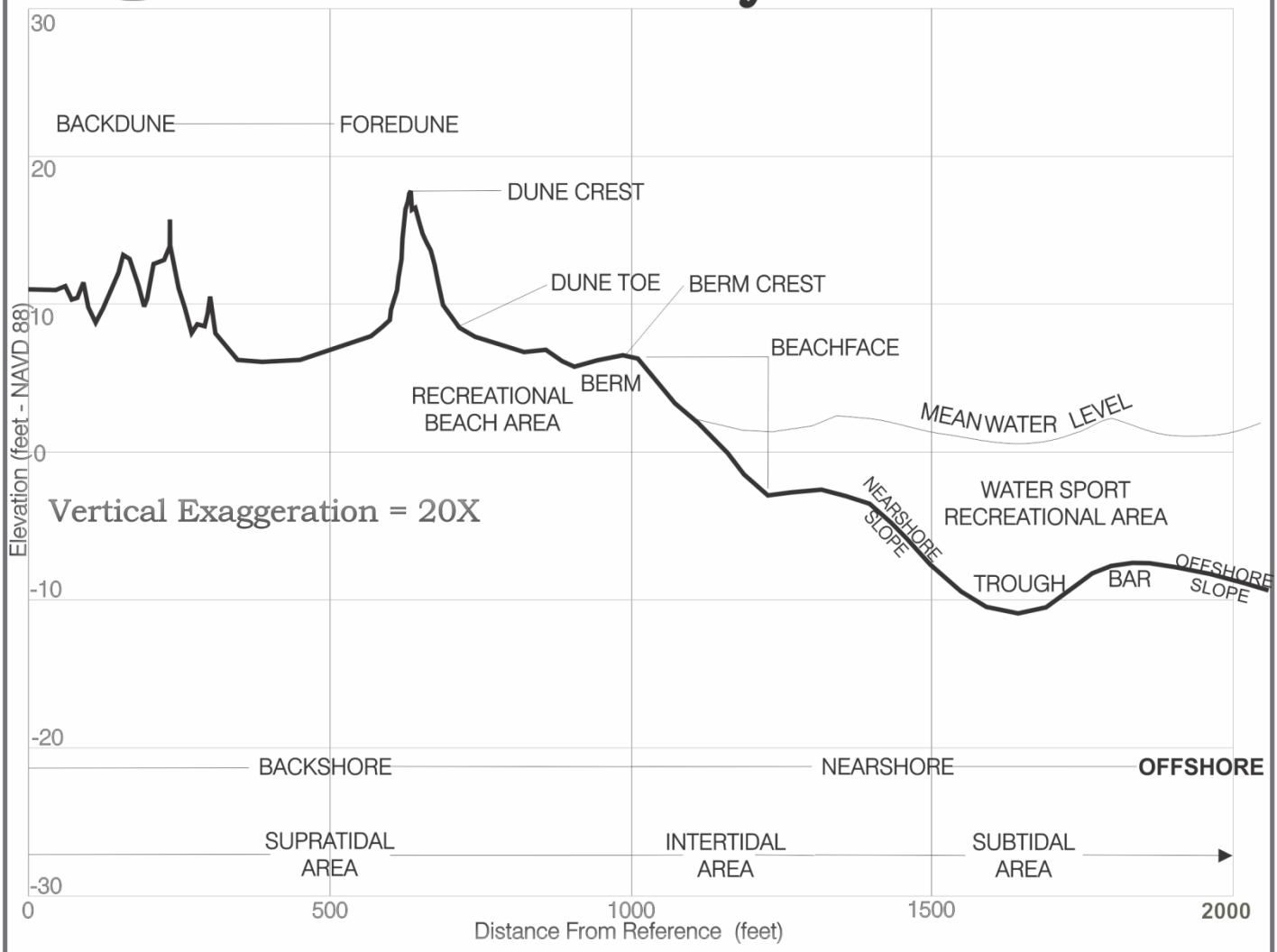
TABLE 18

CAPE MAY COUNTY

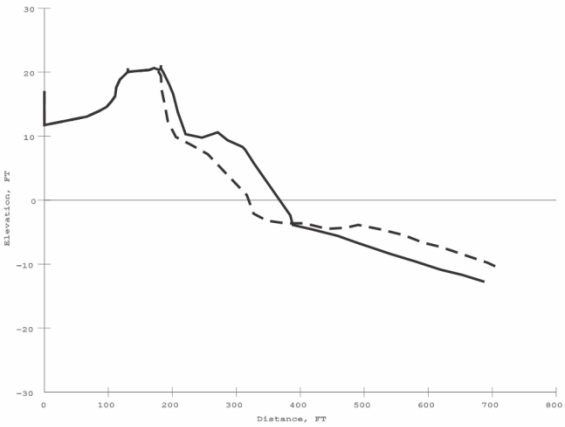
SEASONAL SHORELINE CHANGES

	Survey	48 - 49	49 - 50	50 - 51	48 - 51
PROFILE SITE		**S14-F14**	**F14-S15**	**S15-F15**	**S14-F15**
LOCATION			(shoreline change expressed in feet)		
225: Ocean City, Gardens Rd.		46.26	-76.20	23.56	-6.38
125: Ocean City, 6th St.		18.49	-72.81	34.64	-19.68
124: Ocean City, 20th St.		-0.06	71.69	-16.51	55.12
223: Ocean City, 34th St.		14.89	-52.26	71.36	34.00
122: Ocean City, 56th St.		2.15	19.66	298.27	320.08
222: Ocean City, 59th St.		-24.77	-25.97	189.98	139.25
221: Corson's Inlet Park, Ocean City		-124.04	19.67	184.74	80.37
121: Strathmere, Williams Rd.		-68.24	-158.80	548.50	321.46
120: Sea Isle City, 1st St.		29.24	-21.79	155.51	162.96
119: Sea Isle City, 25th St..		-4.14	-4.78	67.30	58.38
118: Sea Isle City, 57th St..		20.91	-75.22	184.47	130.15
117: Sea Isle City, 80th St..		30.88	-29.08	294.63	296.43
216: Avalon, 9th St.		2.31	-76.89	132.88	58.29
116: Avalon, 23rd St.		51.82	-37.35	44.07	58.54
115: Avalon, 35th St.		-49.13	54.29	9.62	14.78
114: Avalon, 70th St.		24.13	13.93	-49.28	-11.22
113: Stone Harbor, 90th St.		25.66	-31.28	-11.11	-16.73
212: Stone Harbor, 121st St.		26.88	2.47	-61.75	-32.41
112: Stone Harbor, South Pointe			** NO LONGER ACTIVE **		
111: North Wildwood, 15th Ave.		16.09	-129.14	-81.54	-194.59
110: Wildwood, Cresse Ave.		44.02	46.95	-48.24	42.73
109: Lower Township, Raleigh Ave.		28.85	3.51	7.60	39.96
208: Lower Township, U.S.C.G. Base		24.99	10.87	-23.16	12.70
108: Cape May, Beach Club		13.14	42.89	-43.61	12.42
107: Cape May, Baltimore Ave.		-7.55	28.60	-18.68	2.37
206: Cape May, Broadway Ave.		19.07	90.54	-17.66	91.96
105: Cape May, Nature Conservancy		-31.91	4.24	-93.34	-121.02
104: Cape May Point, Lake Dr.		-8.27	-4.80	-19.08	-32.15
103: Higbee Beach State Park		-2.95	-1.01	-2.75	-6.72
102: North Cape May, Whittier Ave.		7.18	-25.20	17.58	-0.43
201: Villas, Pacific Ave.		-7.96	-0.30	-2.35	-10.61
100: Reeds Beach, Beach Ave.		-1.98	2.59	-3.66	-3.05
CAPE MAY COUNTY STATISTICS					
SEASONAL SHORELINE CHANGES	Survey	**48 - 49**	**49 - 50**	**50 - 51**	**48 - 51**
GROSS CAPE MAY SHORELINE CHANGE		**115.96**	**-410.98**	**1771.99**	**1476.96**
AVERAGE SITE SHORELINE CHANGE		**3.74**	**-13.26**	**57.16**	**47.64**

Typical Beach Profiles in New Jersey



Above is a typical beach profile with major features and zones labeled. No beach will show every aspect of this diagram at all times, but it illustrates all important features that appear on the New Jersey shoreline..



Seasonal Variations

The pair of profiles to the left show typical seasonal beach profile changes. The dashed line profile develops during a winter season, where wave conditions move material offshore. The solid line profile is generated during a summer season, where wave conditions move sand onshore, building a well developed berm and wider beach and adding to the dune. The winter wave conditions shift this beach material to the offshore region of the profile.

Coastal Research Center
Glossary of Coastal Terms

Accretion - The addition of material to the beach cross section by natural processes.

Aeolian Accretion - Sand accumulation that results from wind driven processes.

Backshore - The area of the beach profile landward of the berm and seaward of upland dunes or bluffs.

Beachface - Also known as foreshore. The area of the beach exposed to regular wave action.

Berm - The nearly horizontal portion of the beach formed at the high water line as waves deposit material. A beach may have no berm or multiple berms depending on wave conditions.

Bulkhead - A structure that is built to retain or prevent the slumping of "earth" at the water's edge due to currents or wave action. Bulkheads are typically made of wood, steel, or plastic.

Cross-shore Transport - The transfer of sand perpendicular to the shoreline, or along the profile. A bar migrating onto the beach is an example of cross-shore transport.

Current - The flow of water in a channel or at the shoreline.

Downdrift - The direction of movement of sediment parallel to the coastline.

Datum - A reference level from which elevations are measured.

Dry Beach - The area of beach between the water and dune toe that is commonly used for recreation. Also referred to as recreational beach.

Dune - Unconsolidated hills or mounds of sand. Dunes are the result of aeolian processes and may have vegetation ranging from sparse to dense. Vegetation greatly stabilizes a dune.

Eddy - A circular current developed within or adjacent to the main current.

Erosion - The removal of material either vertically or horizontally by natural processes.

Foredune - The most seaward of the dune ridges along the profile.

Geotube - A geo-textile fabric installation filled with sand, typically used to retain material or to dissipate wave energy.

Groin - A shore-perpendicular erosion control structure, usually made of wood or rock. This structure acts to slow the process of littoral transport.

Hurricane - A tropical cyclone in the Northern Hemisphere, with sustained winds over 74 mph.

Jetty - A shore-perpendicular erosion control structure similar to a groin, however it is used to control the movement of sand at an inlet or channel.

Littoral Current - Current that moves parallel to shore, that results from the approach of waves not being perpendicular to the shoreline.

Littoral Drift - Also known as longshore transport. Movement of material parallel to the shoreline resulting from waves arriving at the shore at any angle not 90 degrees to the shore.

Coastal Research Center
Glossary of Coastal Terms

Longshore Transport - Also known as littoral drift. Movement of sand parallel to the coastline resulting from wave generated littoral currents.

NAVD - (the datum of 1988) New elevation reference developed to replace the 1929 engineering datum.

NGVD - (the datum of 1929) An elevation reference developed from a specific model of the Earths' surface.

Onshore - In the direction of the shoreline; landward.

Offshore - In the direction opposite of the shoreline; seaward.

Neap Tide - A tide reduced in total elevation ranges due to the orbital positions of the sun and moon. Neap tides occur at first and last quarter moon stages.

Nearshore - Region of beach profile extending from the berm seaward in the direction of the offshore.

Northeaster - Dominant type of coastal winter storm event experienced in New Jersey, with winds from the northeast that exceed 30 mph.

Revetment - Cover of stone placed on or along a shoreline to protect a slope or shore structure.

Ridge - A low elevation, shore-parallel continuous mound of sand, generated by wave action.

Riprap - Line of rocks placed randomly along a slope or structure for protection.

Runnel - A continuous area of lower elevation than, but parallel to and adjacent to, a ridge(s).

Scarp - A near vertical feature generated by erosion of material from the lower portion of a slope or bluff.

Scour - Underwater removal of material through currents and/or wave action.

Seawall - Hard structure that separates the land and water.

Shoreline - The narrow area of land in contact with the water. When referring to a profile plot, the point where the profile crosses the line representing the datum.

Spring Tide - Tide with the highest elevation ranges due to the orbital positions of the sun and moon. Spring tides occur at new or full moon stages.

Swale - A long, narrow, generally shallow depression between ridges.

Swash - The area of beachface exposed to breaking wave energy as waves come ashore at the beach.

Storm Surge - The abnormal rise in local sea level that accompanies a hurricane or other major storm event.

Updrift - In the direction opposite of the dominant direction of movement of sand driven by waves.

Wrack - Debris deposited on the beach by wave action.

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