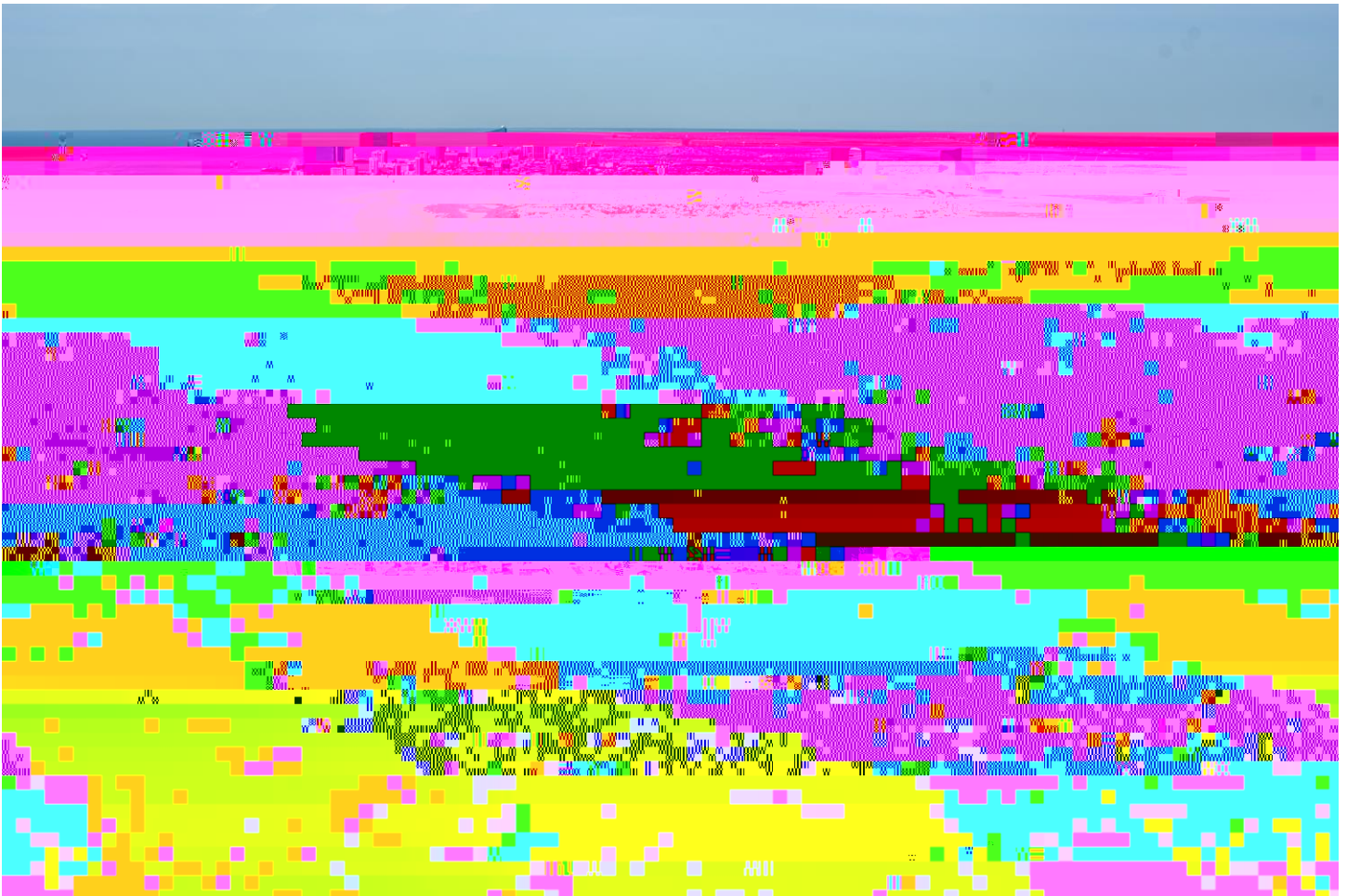


FINAL REPORT FOR 2018
ON THE CONDITION OF THE MUNICIPAL BEACHES
IN
THE CITY OF BRIGANTINE BEACH, ATLANTIC COUNTY, NEW JERSEY



View from a drone of the recently completed US Army Corps shore protection project's maintenance, which got underway January 26, 2018. The dredge obtained sand in Brigantine Inlet placed it starting on the "feeder beach" for about 1,500 feet north of development to provide added material as the project proceeded south to Roosevelt Blvd. The taper into the pre-existing beach can be seen in the distance where a series of nearshore sand bars already demonstrate sand transport south toward the Absecon Inlet jetty eventually. Also, the dramatic widening of the beach south of the resort hotel at 15th Street South demonstrates where oceanfront sand supplies are being preferentially deposited.

Introduction:

This report presents the status of the beaches within the City of Brigantine Beach from October 2017 to October 2018. This year January and February were cold and relatively quiet in terms of storms. But, in March, April and May, there were 5 significant northeast storms once per week starting March 2 & 3, 2018. They continued into April with lower intensity, and ended May 13th spring evaluation report that showed large volumes of sand moved south along the shoreline, but little negative impacts on beach widths or sand volumes. Sand moved offshore forming large bar systems, but no damage was observed to the dunes. The initial northeast storm event in the fall of 2018 occurred October 29 & 30, 2018 with minor impacts observed.

The US Army Corps of Engineers (USACE) completed its most recent maintenance work on their Brigantine shore protection project in 2018 to replace sand along the engineered segment of the Brigantine beach from the feeder zone north of development, to approximately Roosevelt Boulevard along the oceanfront. The dredge pumped the sand slurry along a submerged pipeline from the inlet to the discharge locations along the project beach. The 2013 USACE post-Sandy restoration project was conducted in two phases (phase one 667,000 cubic yards [CY], January 2013 and phase two 250,000 CY, July 2013) and placed a reported 917,000 CY of sand on the project beaches. The 2018 effort placed 767,000 CY of material to the north end beach was complete by the end of March 2018 (Erik Rourke, USACE-NAP project manager).

Beach Monitoring Program Methodology

The CRC established a coastal monitoring program for the City of Brigantine in June 1992, commencing research on the beaches between two major northeast events that affected the Jersey shore in October 1991 and December 1992. The program collects data from nine shoreline-perpendicular beach profile stations, initially monitored on a quarterly basis, to analyze beach changes. Starting in 2008 the program was resumed at a survey frequency of twice annually. Beginning at a fixed reference position, a profile includes the dune system, beach, berm, nearshore and offshore to a water depth of approximately -14.0 feet (NAVD88). Table 1 lists the Brigantine sites where cross sections, photographs and field notes are presented.

**Table 1:
Beach Profile Locations**

Brig 134	-	North end Green Acres undeveloped area (NJBPN #134)
Brig 220	-	At the north end of the feeder beach, 1200 feet from road end
Brig 12	-	12 th Street North
Brig 4	-	4 th Street North (NJBPN #133)
Brig 5	-	5 th Street South
Brig 15	-	15 th Street South (NJBPN #132)
Brig 27	-	27 th Street South
Brig 43	-	43 rd Street South (NJBPN #131)
Brig 1	-	

Surveys Completed

The CRC completed three surveys between October 2017 and October 2018.

October 4, 2017

Table 2
Brigantine Shoreline and Sand Volume Changes
Fall 2017 to Fall 2018

Table 3
Brigantine Shoreline and Volume Changes
March 15, 2018 to October 31, 2018

Table 3 shows the summer seasonal trend. The shoreline retreated at 4 sites starting at the northern natural location, and ending at the Absecon Inlet jetty. No one of the retreats was significant and expected at 12th Street North as this site erodes rapidly. Apparently, either sand from the natural area arrived at the feeder beach (Brig 220) or sand from the promenade segment moved north this summer as southeast winds dominated the wave directions adding to the feeder beach. The 12th Street North site saw the beachface from the berm elevation to the offshore trough retreat 50 feet landward in a uniform amount across that elevation difference. This summer the largest gains occurred between 15th Street and 43rd Street South. This corresponds with the annual accumulation reported for this area, meaning this sand arrived in large part this summer. These three locations provided 168,817 cubic yards of the total 268,470 documented for the entire oceanfront in the year.

Individual Profile Descriptions

This section describes the changes documented at each of the beach profile locations from October 2017 to October 2018 and includes photographs and cross-sections that show the semi-annual and annual comparisons (Figures 1 – 27).

Profile Brig-134: Green Acres - North end

(Figures 1a, 1b & 1c)

The profile line is located 4,752 feet north of the promenade at the north end of Brigantine Avenue. Located within the NJ Green Acres Park, there has been no sand added to the site during any of the past nourishment projects. The closest sand placement activity occurred at the almost 3,500 feet south of this location. This region is typically influenced by the dynamics in action at Brigantine Inlet to the north. Aperiodic episodes of sand supplies crossing the inlet from Little Beach and moving south adds to the beach in this region.

The Hurricane Sandy dune damage has been restored as material has slowly increased the dune elevation and grasses have propagated on the ridge generated. The beach remained quite stable with the greatest shifts in elevation occurring offshore in the height of the bar system decreased between October 2017 and the following spring.

Profile Brig-134: Green Acres - North end

(Figures 1a & 1b)

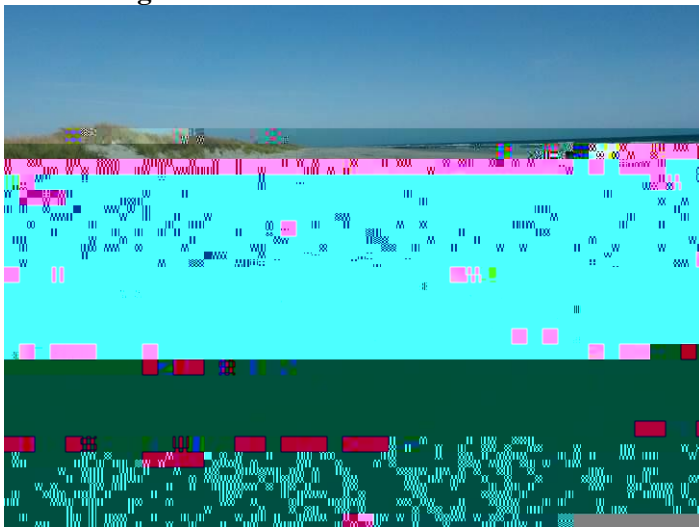


Figure 1a taken on October 4, 2017 demonstrates a low

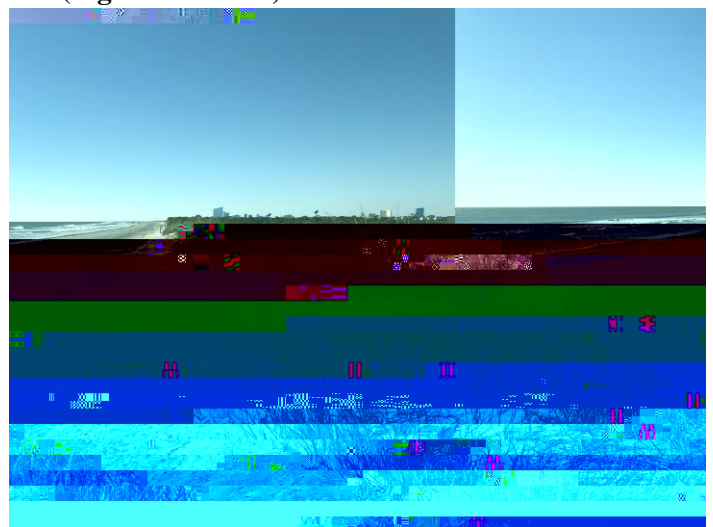


Figure 1b taken October 30, 2018 looking south along the edge of the dunes: a minor storm on the 28th and 29th clipped the seaward slope and left debris at the base of the grass. The beach became flatter in profile slope as well.

City of Brigantine - Annual Comparison

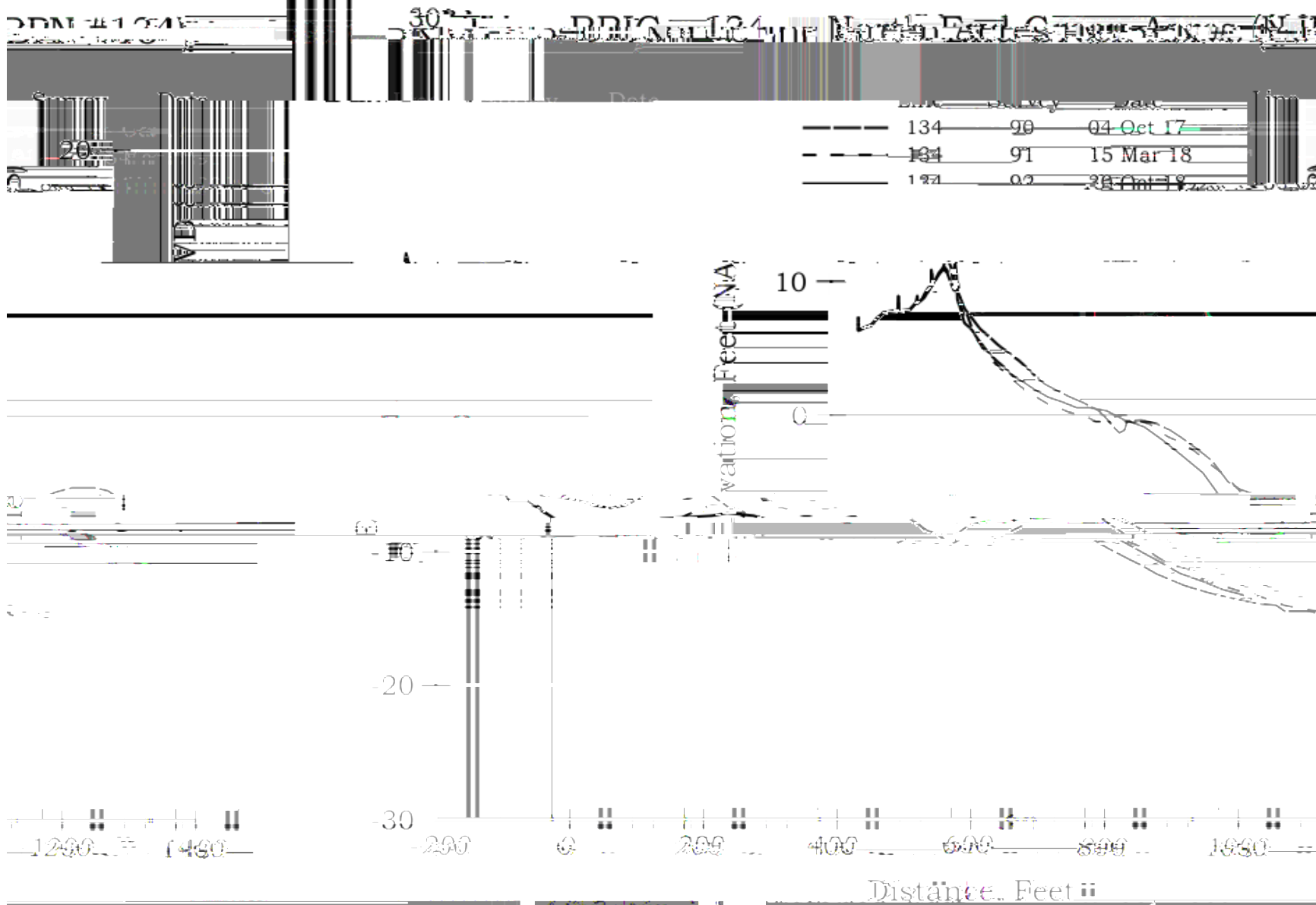


Figure 1c - Three cross sections show modest loss at the beach and immediately offshore. The October northeast storm a day earlier produced a flatter beach which advanced seaward 18 feet in spite of a 23.72 yds³/ft. sand volume loss.

Profile Brig-220: Feeder Beach - Line 00+1200

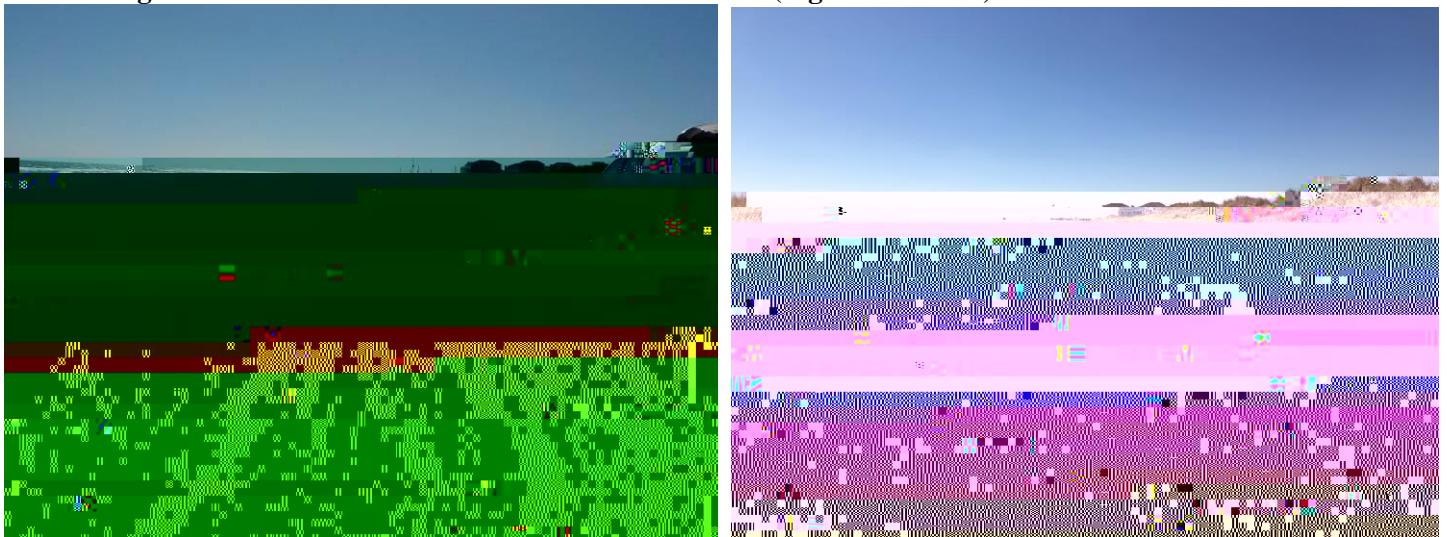
(Figures 2a, 2b & 2c)

The site is located 1200 feet north of the promenade in the natural area. Sand shed from this location provides advance nourishment to the downdrift erosional area that is located to the south along the revetment/promenade. Established in 1996 during the very first municipal beach project between the NJDEP and the City of Brigantine, the goal for this section of beach was to provide an available sand source for recreational beaches to the south. This sand source was intended to erode and move south into the developed portion of the project area to slow erosion in front of the revetment to a more sustainable rate and extend project benefits for a longer period. This process has been documented and has performed better than expected since initial construction, provided sufficient sand volume remains in this segment of beach. Over the course of the past year (2016-2017) sand did erode from this location, however, the shoreline did not migrate toward the dunes meaning that sand was arriving in the area just slightly slower than it was leaving to move south.

The beach was initially created to be 2,400 feet in length extending 600 feet beyond the municipal boundary with the NJ State owned open space of northern Brigantine. Park officials declined to permit future activities of beach nourishment within the park boundaries, so all subsequent work extends 1,600 feet north of all oceanfront development to the City boundary with the open space lands.

Profile Brig-220: Feeder Beach - Line 00+1200

(Figures 2a & 2b)



Figure

Figure 2c - Sand placed here by the USACE added substantially to the beach elevation and width, while offshore the bar developed at the 1,000-foot distance. The site gained 95.87 yds³/ft. as the shoreline advanced 148 feet seaward.

Profile Brig-12: 12th Street North

(Figures 3a, 3b & 3c)

This profile site was established June 1992 along the north side of 12th Street North. The profile includes the road, promenade and bulkhead revetment structure that was completely reconstructed prior to the 1997 beach nourishment project. The Federal project placed sand here in February 2006, eventually adding 171.45 yds³/ft. of sand to the beach. This site is within a region of chronic erosion due to the orientation of the beach and revetment that protects the north end of Brigantine Blvd. As the beach retreats to the promenade the rock revetment protection is exposed. The hard structure revetment reflects wave energy, so return flow scours the beach elevation downward rapidly. Left unchecked, the erosion spreads rapidly south along the revetment towards oceanfront development near 8th Street North. This structure was designed to alleviate this from occurring by providing advanced sand nourishment to this region in order to maintain a minimal beach seaward of the revetment and prevent exposure of the hard structure.

Hurricane Sandy eroded the beach to the revetment. In 2013, the USACE restored the damaged shoreline to the full beach template design at this site. The Federal project placed 209.55 yds³/ft. of sand while the shoreline position advanced seaward 311 feet. Over 2014, this section of shoreline rapidly eroded losing nearly 77 yds³/ft. of sand, along with 113 feet of shoreline retreat. Combining the 2014 and 2015 losses accounted for 80% of the placed sand lost in just two years following sand placement in 2013.

The October 2017 survey preceded the start of the current Federal maintenance effort designed to add 755,000 cubic yards of Brigantine Inlet sand to this par00912BT/F10 the cetreaq@b.51 Tm0 g0 GcrBT/F10 12 Tf1 0 0 1 36 471.

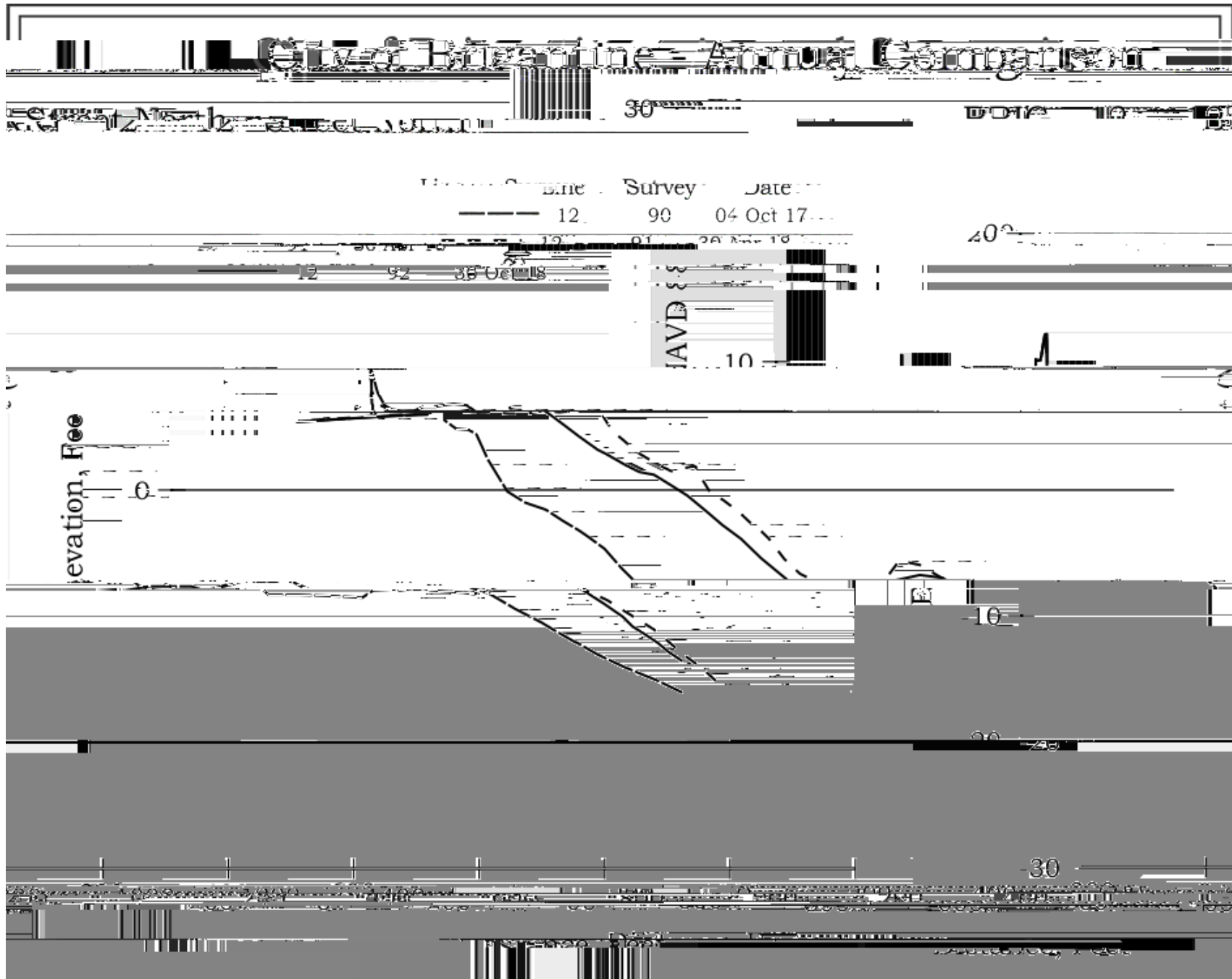


Figure 3c - This profile site was restored by the USACE project with 160.43 yds

Profile Brig-4: 4th Street North

(Figures 4a & 4b)

Brig-4 was established as part of the New Jersey Beach Profile Network in 1986, and included in the City's monitoring project in June 1992. The location is at the southern end of the original city engineered beach nourishment project area approximately 100 feet south of station 2800-00. The initial Federal project extended further south and placed 80.57 yds

Profile Brig-5: 5th Street South

(Figures 5a, 5b & 5c)

This profile station was selected and established at 5th Street South in December 1998. The location is approximately midway between the end of the initial (1997) project beach at 4th Street North and the established site at 15th Street South. This site has a well-developed dune system composed of three significant ridges. The dune system is more expansive than along the northern engineered beach at approximately 225 feet in width. Seaward growth through aeolian processes had added volume and width to the dunes annually until Sandy cut into the developed foredune ridge. Monitoring trends at this site over the years indicate a transitional zone exist in this region between chronic erosion to the north and accumulation on the southern beaches as sand moves south through this region on littoral currents. The initial Federal project placed a small volume of sand on this beach in 2006 and no sand was placed this far south during the 2011 USACE maintenance project.

No sand was placed directly on this section of shoreline during the 2013 USACE post-Sandy maintenance fill project. The project tapered into the existing beach conditions just north of this location at 3rd Street South. The current (2018) Federal project will stop at Roosevelt Avenue five blocks to the north. The site has experienced swings in volume gains and losses since 2014, but overall remains stable.

Profile Brig-5: 5th Street South

(Figures 5a & 5b)

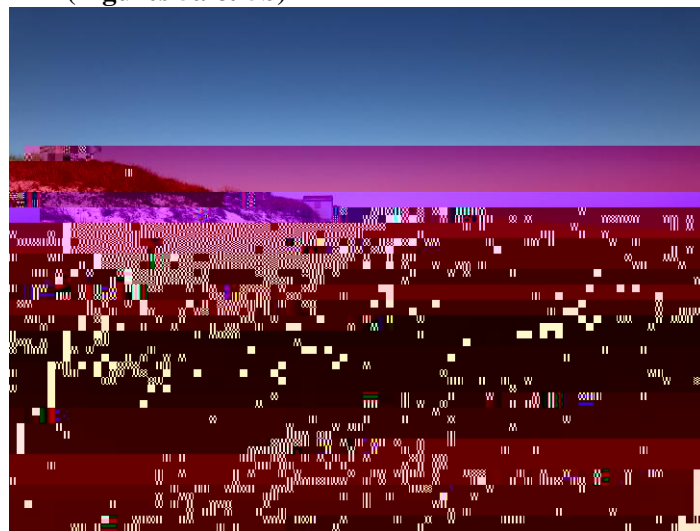


Figure 5a

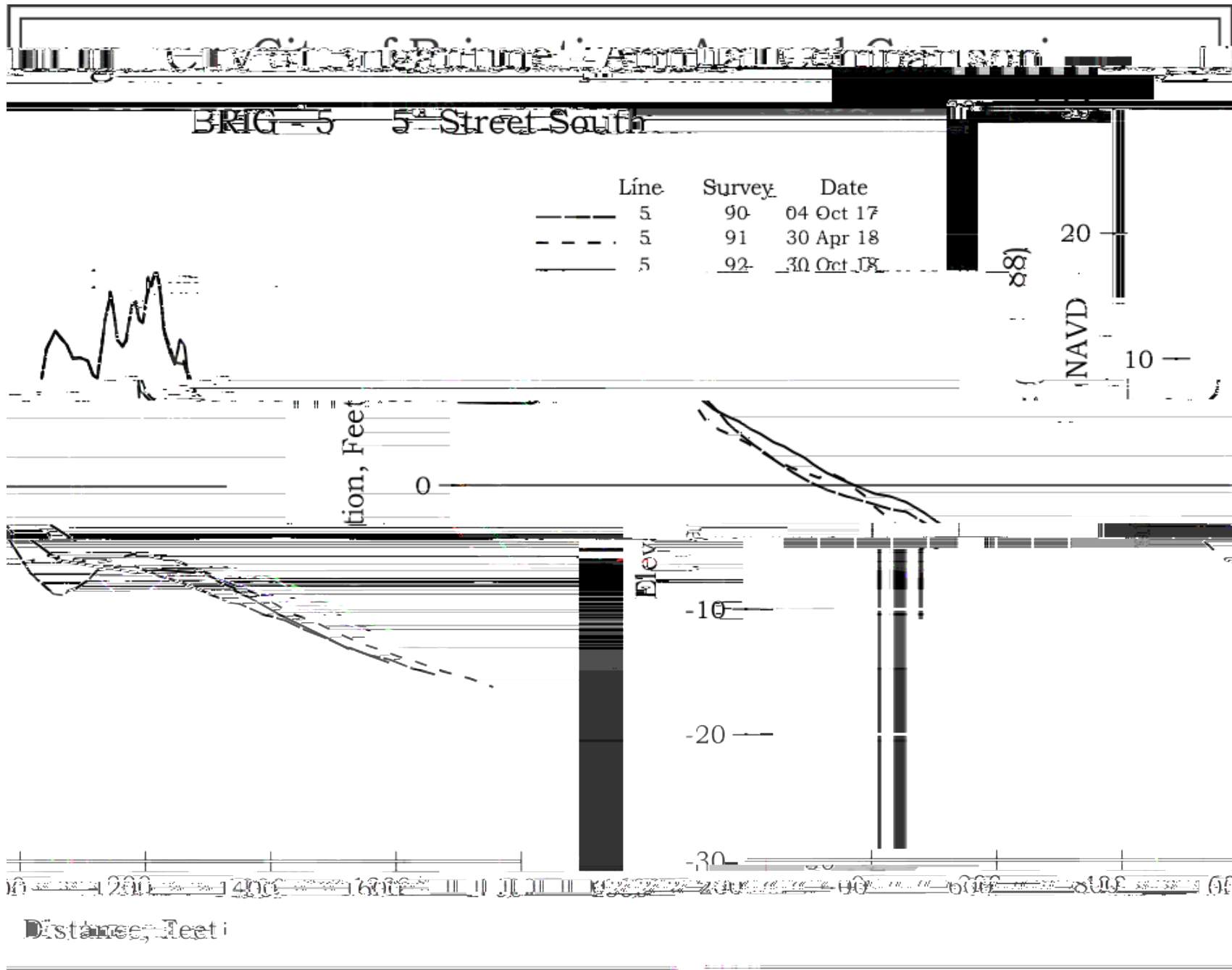


Figure 5c - The 5th Street South site

Profile Brig-15: 15th Street South

(Figures 6a, 6b & 6c)

At 15th Street South, the dune is

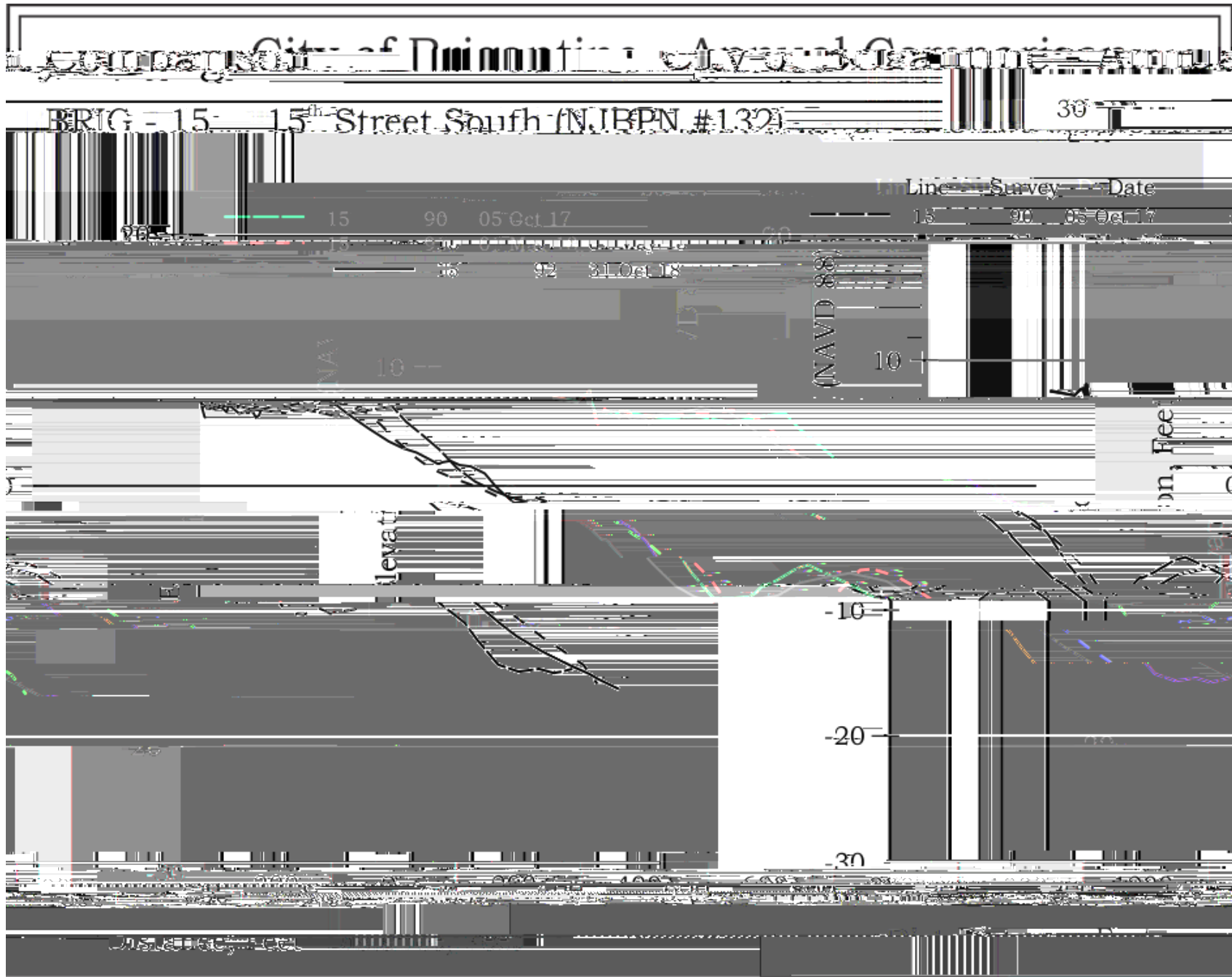


Figure 6c - At 15th Street South sand has been delivered by littoral processes ever since 1997. This year 3.44 yds³/ft. were lost as the shoreline advanced 17 feet seaward largely due to beach surface flattening by the northeast storm. The recent USACE material has yet to arrive.

Profile Brig-27: 27th Street South

(Figures 7a, 7b & 7c)

void between two pre-existing NJBPN sites, located at 15th Street South and 43rd Street south. In contrast to 15th Street South, Brig-27 has a well-established dune system nearly 375 feet wide supported with a 300-foot wide beach. Multiple dune ridges provide significant storm protection against storm wave damage to the oceanfront properties. The Absecon Inlet jetty has created a region of sand accumulation that

City of Brigantine - Annual Comparison

BRIG - 27 - 27th Street South

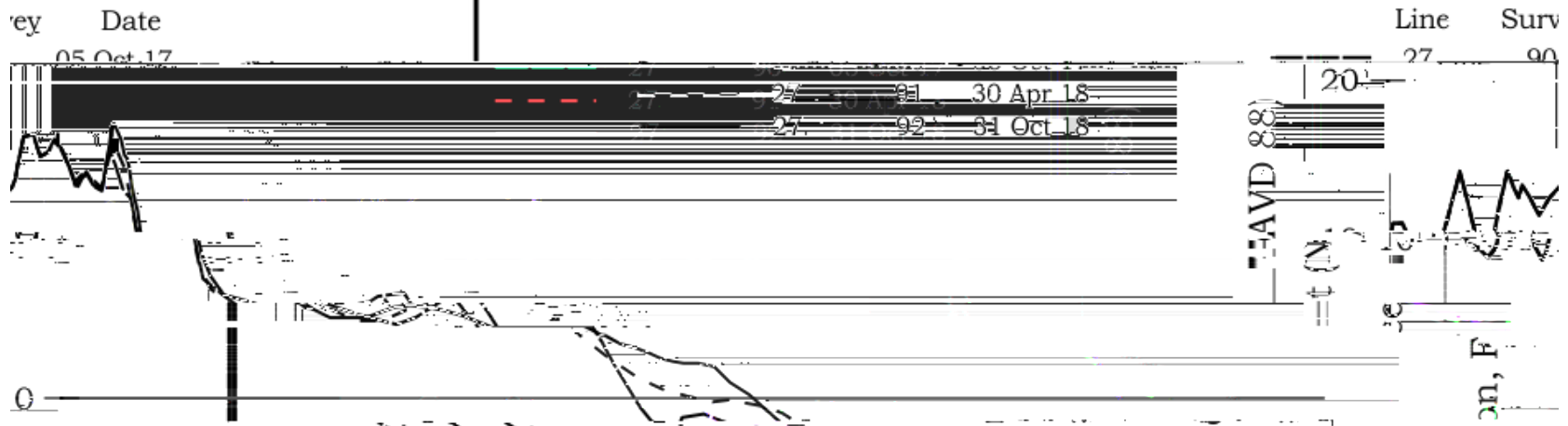


Figure 7c - 27th Street South expanded substantially as storm processes impacted bar material that added to the beach this summer. The sand volume gain was 39.89 yds³/ft. and the shoreline advanced seaward 150 feet, which is impressive for an un-nourished beach in one year.

Profile Brig-43: 43rd Street South

(Figures 8a, 8b & 8c)

This site was established in 1986 as part of the New Jersey Beach Profile Network and was incorporated in the City's monitoring project in June 1992. The profile is located in an area dominated by the sand retention characteristics (94.42 (the N)-5(f)-9(mi)-3(na)4(ted b)-7(y)20(ET42 Tm0 Or600912 0 6c)4(ts/F9 11.04 6r)5(0 bs-4 s00912

City of Brigantine Annual Comparison

Figure 8c ó This site has tripled its width over the 32-year monitoring history. This year the site added 38.37 yds³/ft. as the shoreline advanced 28 feet seaward. No dramatic features were enhanced or removed this year, but sand keeps arriving almost every season.

Profile Brig-1: South Beach

(Figure 9a, 9b & 9c)

This site is located just 600 feet from the jetty, established to determine if sand is retained, eroded and

Figure 9c ó Positioned just 600 feet north of the inlet jetty, this site exhibits gains and losses more related to storm wave interaction with the jetty. The October 28th & 29th northeast storm acted on this beach to move material around or over the structure. This year the beach volume declined by 5.25 yds³/ft. as the shoreline retreated 7 feet.

Summary:

In 2018, the net gain was 1,035,470 cubic yards (the largest gain in profiling history), largely due to the shore protection maintenance by the USACE adding 767,000 cubic yards of new sand derived from Brigantine Inlet -nourishment material destined for the promenade oceanfront shoreline, while the majority of the sand was deposited from 14th Street North to 5th Street South. Material had yet to appear at 15th Street South, but the transfer process is underway as the cover picture demonstrates.

In addition, the southern non-nourished beaches added almost 300,000 cubic yards of sand to the collected oceanfront profile, on the dunes, on the beach and offshore at all but the BRIG-1 site 600 feet north of the Absecon Inlet jetty. A mild northeast event October 28 & 29th as evident at the grass edge in the dunes at site BRIG-220 and at the northern natural site (BRIG-134).

The Coastal Center requests that City officials study the cover photograph with care and contemplate research into a funding mechanism to utilize some of the millions of cubic yards of sand deposited between 15th Street South and the Absecon Inlet jetty as management material to prolong the residence time for the USACE project efforts. The back-passing methodology is now established along the J98 th