

The Coastal Research Center

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NEW JERSEY'S DISTINCTIVE PUBLIC UNIVERSITY

Mr. Robert Smith, Administrator  
Borough of Stone Harbor  
9508 Second Avenue  
Stone Harbor, New Jersey 08247

May 12, 2020

Dear Mr. Smith,

The spring 2020 municipal oceanfront beach survey was completed on April 15<sup>th</sup> and 16<sup>th</sup> at the eight established sites in Stone Harbor. The Stockton University Coastal Research Center (CRC) completed the first of two scheduled seasonal surveys for 2020. Semi-annual shoreline and sand volume changes were calculated between survey #55 (conducted in October 2019) and survey #56 to determine changes over the 2019 to 2020 winter season and review changes to the Corps project on the Borough beaches. This spring has been perhaps, the most storm-free since the beginning of the 21<sup>st</sup> Century. Storms did occur, but seemed to pass northwest of the region, moving across the country directly into New England and from there, out to sea. Minor periods of northeast weather did occur, but limited to wind velocities under 25 MPH. March 23, 2020 was the single noted northeaster thus far in 2020. The spring has seen extensive periods of southeast winds which generate northerly sand transport. The trend is evident on the cross sections as small ridges of sand have appeared in the nearby offshore region that usually migrate onto the beach as the spring advances into summer.

The CRC is unaware of additional developments in the push to renew access by the US Army Corps of Engineers (USACE) to the sand supplies held within the ebb-tidal deposits of Hereford Inlet, previously authorized for beach nourishment use. The US Department of Interior Secretary's, Mr. Bernhardt, letter providing relief from the closure of the Coastal Barrier Resource System (CBRS) source to federal funding does not appear to have advanced to general agency acceptance with relief agreements in place for future USACE project work.

The following is a list of the eight monitoring sites surveyed in the spring 2020 study, their corresponding locations and defined beach cell:

<b>Profile Number</b>	<b>Street Location</b>	<b>Beach Cell</b>
SH-82	82 <sup>nd</sup> Street	North Boundary – 84 <sup>th</sup> St. Groin
SH-90	90 <sup>th</sup> Street	84 <sup>th</sup> & 92 <sup>nd</sup> Street Groins
SH-95	95 <sup>th</sup> Street	92 <sup>nd</sup> & 98 <sup>th</sup> Street Groins
SH-103	103 <sup>rd</sup> Street	98 <sup>th</sup> & 106 <sup>th</sup> Street Groins
SH-108	108 <sup>th</sup> Street	106 <sup>th</sup> & 111 <sup>th</sup> Street Groins
SH-112	112 <sup>th</sup> Street (paper)	111 <sup>th</sup> & 114 <sup>th</sup> Street Groins
SH-116	116 <sup>th</sup> Street	114 <sup>th</sup> & 122 <sup>nd</sup> Street Groins
SH-123	123 <sup>rd</sup> Street (paper)	122 <sup>nd</sup> & the Terminal Groins

**Stone Harbor Beach Performance**

The 2017 maintenance effort was conducted by the NJ State Div. of Coastal Engineering and the USACE. The combined effort with State and federal sand supplies resulted in 320,000 CY (from Townsends) plus 394,000 CY (from Hereford), totaling 714,000 CY in new sand added to the municipal shoreline. No new sand was

added during the 2019 maintenance cycle due to the restriction on federal funds to access the Hereford Inlet material. The Borough determined that mining the dune material found to be in excess of the USACE design beach cross section template mostly within the zone between 112<sup>th</sup> and 116<sup>th</sup> Streets was not entirely consistent with overall shore protection management goals.

Table 1 displays the semi-annual changes in shoreline positions and sand volumes from the recent survey #55 conducted in October 2019 to survey #56 from April 2020. Shoreline changes are calculated by comparing the zero datum positions in the recent survey to the previous survey. Sand volume changes are expressed in cubic yards of sand per linear foot of beachfront (yds<sup>3</sup>/ft.); the total beach volume change is calculated using this value. The distance (cell width) between groins along the beachfront of Stone Harbor was measured between the centerlines of adjacent groins. Each cell's net sand volume change is computed by multiplying each cross-section volume change by its corresponding groin cell width.

**Table 1**  
**Stone Harbor Semi-Annual Comparison (55 & 56)**  
**Shoreline and Sand Volume Changes**  
**October 2019 to April 2020**

<b>Profile Number</b>	<b>Shoreline Change (feet)</b>	<b>Volume Change (yds<sup>3</sup>/ft)</b>	<b>Cell Distance (feet)</b>	<b>Cell Volume Change (yds<sup>3</sup>)</b>
<b>SH-82</b>	27	13.95	1,381	19,258
<b>SH-90</b>	17	-7.51	2,240	-16,829
<b>SH-95</b>	-56	-16.22	1,680	-27,246
<b>SH-103</b>	-31	-17.52	2,208	-38,689
<b>SH-108</b>	14	-6.09	1,433	-8,726
<b>SH-112</b>	22	10.27	804	8,260
<b>SH-116</b>	5	18.01	2,273	40,928
<b>SH-123</b>	-9	22.14	1,058	23,423
<b>Total Volume Change =</b>				<b>380</b>

Northeast storm damage was relatively minor, but losses did occur between the 90<sup>th</sup> and 103<sup>rd</sup> Street locations. Sand accumulated at the 82<sup>nd</sup> Street site, likely derived from southerly transport from Avalon into Stone Harbor with additional gains from 108<sup>th</sup> Street south to the terminal groin south of the 123<sup>rd</sup> Street location. The net winter seasonal sand volume change was a meager 380 cubic yards across the entire Stone Harbor beachfront. Three of the eight sites had shoreline retreat numbers, with only two in double digits.

Last year there was a significant difference between a gain in sand volume on the beach/dune area above the zero-elevation position and large losses offshore. This spring the same display was used to compare the differences or similarities on the beach versus offshore. This year the beaches and dunes above zero gained sand while the offshore region lost less material. Offshore supplied material to the beaches by migration onto the shoreline. Each seasonal transition appears to have its own signature as to beach condition variability.

**Table 2**  
**Stone Harbor Study Area – Beach & Dunes Above the Zero Datum (55 v 56)**  
**Shoreline and Sand Volume Changes**  
**October 2019 to April 2020**

<b>Profile Number</b>	<b>Shoreline Change (feet)</b>	<b>Volume Change (yds<sup>3</sup>/ft)</b>	<b>Cell Distance (feet)</b>	<b>Cell Volume Change (yds<sup>3</sup>)</b>
<b>SH-82</b>	27	5.26	1,381	7,264
<b>SH-90</b>	17	5.06	2,240	11,330
<b>SH-95</b>	-56	-0.72	1,680	-1,216
<b>SH-103</b>	-31	-4.07	2,208	-8,987
<b>SH-108</b>	14	0.21	1,433	301
<b>SH-112</b>	22	1.43	804	1,150
<b>SH-116</b>	5	1.76	2,273	3,996
<b>SH-123</b>	-9	8.41	1,058	8,897
<b>Total Volume Change =</b>				<b>22,734</b>

During the winter of 2018 to 2019 all eight sites gained sand on the beach totaling 81,250 cubic yards. Since the entire width of the transect evaluation showed a 95,825 cubic yard net loss, evaluating just the offshore regions shows they lost 177,074 cubic yards as sand was transferred south or further seaward.

This winter, the beaches gained 22,734 cubic yards across the entire oceanfront, while sites at 95<sup>th</sup> and 103<sup>rd</sup> Streets lost minimal sand volumes. The difference between Tables 1 and 2 is 22,354 cubic yards of sand that represents the net loss in the offshore regions. Clearly there was a much lower sand volume in transition between beach and the seabed offshore this year than was seen last year. There also was a significantly lower storm incidence rate thus far in late 2019 into early 2020.

### **Individual Site Descriptions**

Below is a review of data collected at each of the eight individual sites. A photo is included for each location to show conditions as of April 2020. Comparison plots are provided to show beach and nearshore profile changes from the fall of 2018 to spring 2020.

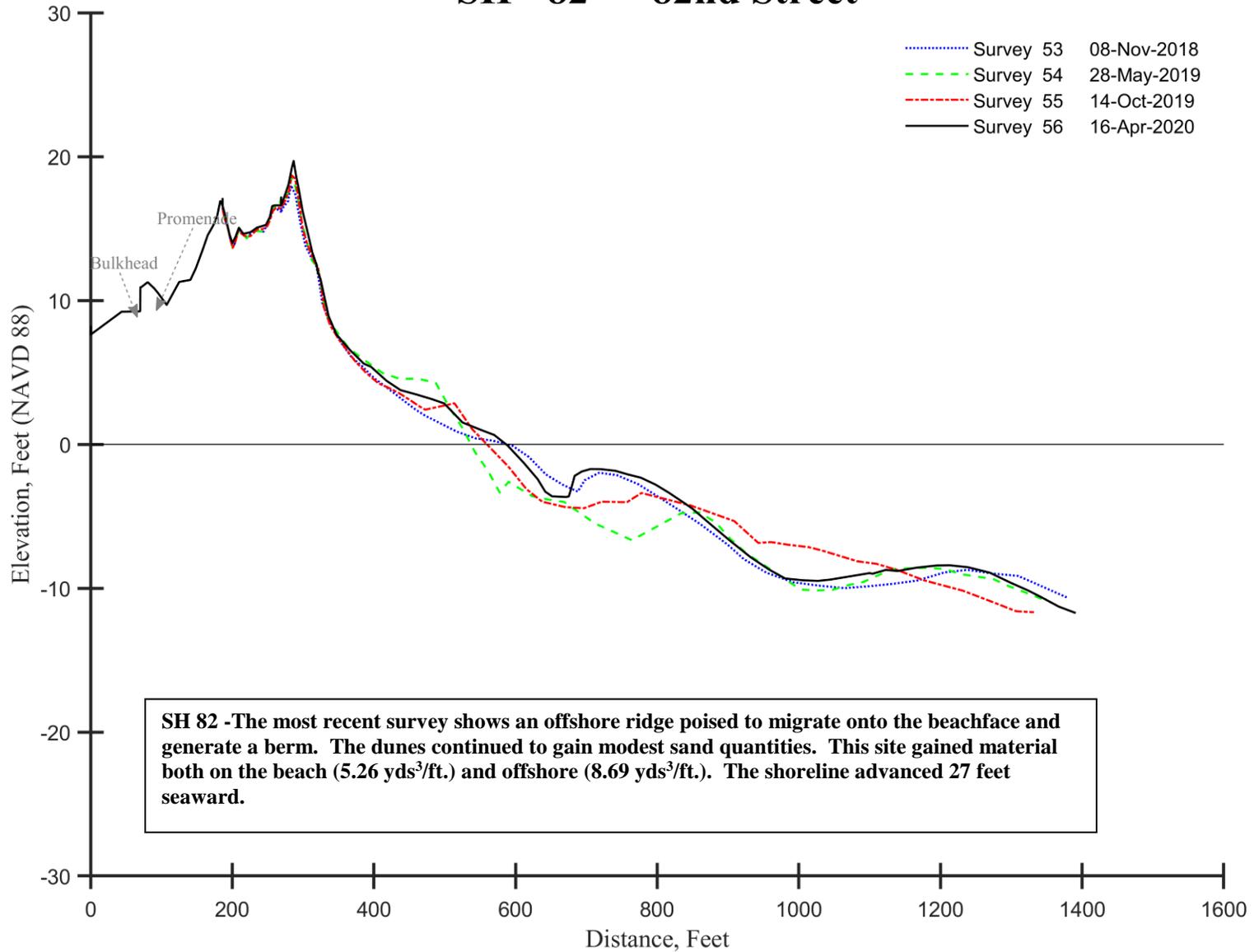
**SH-82**, located at 82<sup>nd</sup> Street, this beach received sand later in 2017 derived from Townsend’s Inlet. This April 16, 2020 view shows the sand accumulated at the dune fencing over the past 2 winters and a wide beach looking north towards Avalon.



**Figure 1. View to the north at 82<sup>nd</sup> Street. The photo was taken on April 16, 2020. The beach width remains sufficient to absorb wave activity without the new fence installed following the 2017 USACE work being eroded. This fence row is nearly buried with wind deposited sand.**

# Borough of Stone Harbor - Semi-Annual Comparison

## SH - 82 82nd Street

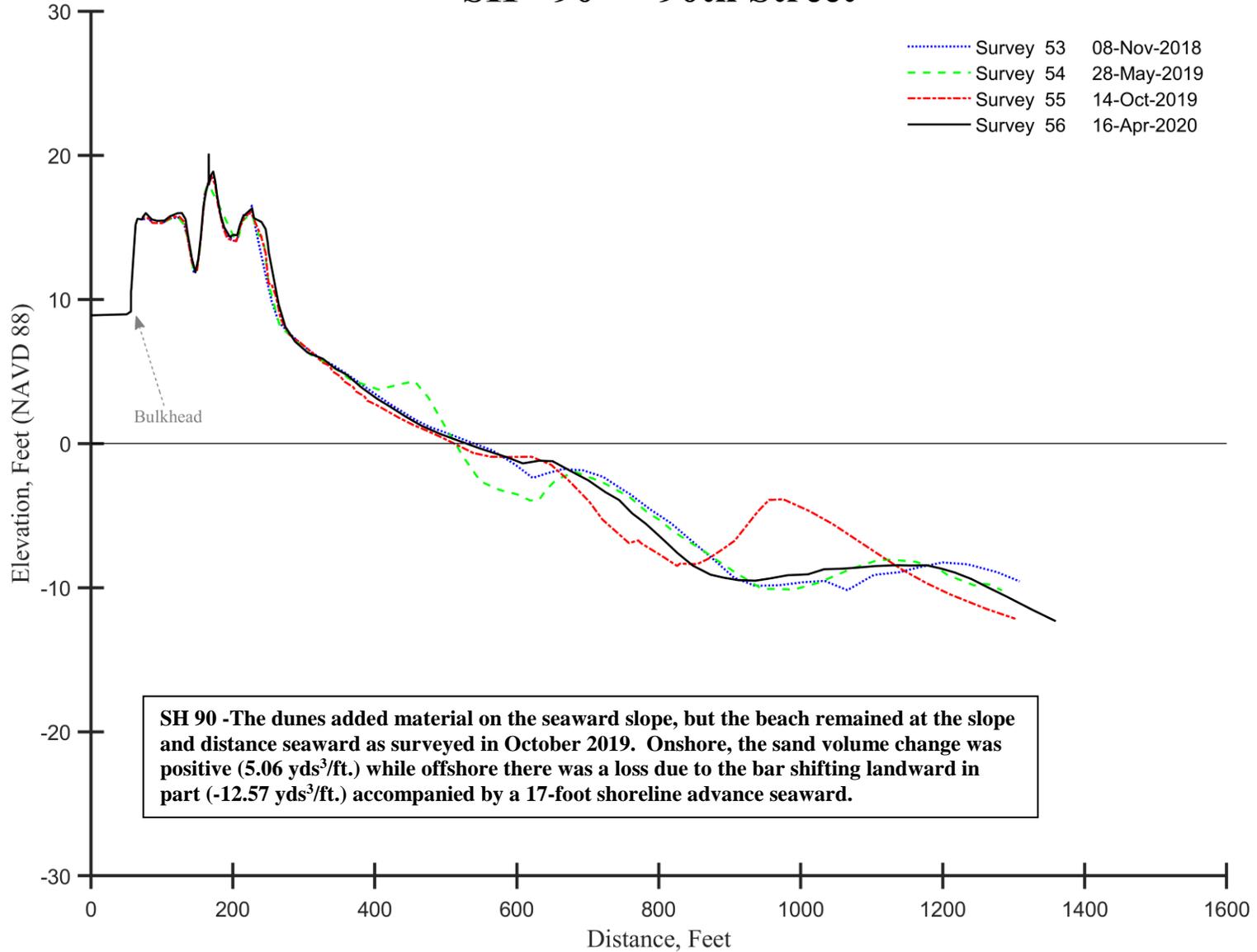


**SH-90**, located at 90<sup>th</sup> Street this beach also received sand during spring of 2017 adding 44.63 yds<sup>3</sup>/ft. The beach width sustained the dune's seaward slopes without any erosion. Storm debris does cover the dry beach indicating some winter activity.



**Figure 2.** View to the north taken from the foredune toe on April 16, 2020. The dry beach width absorbed the winter wave activity as evidenced by the multiple rows of grass debris. The dune toe remains undamaged by erosion.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 90 90th Street

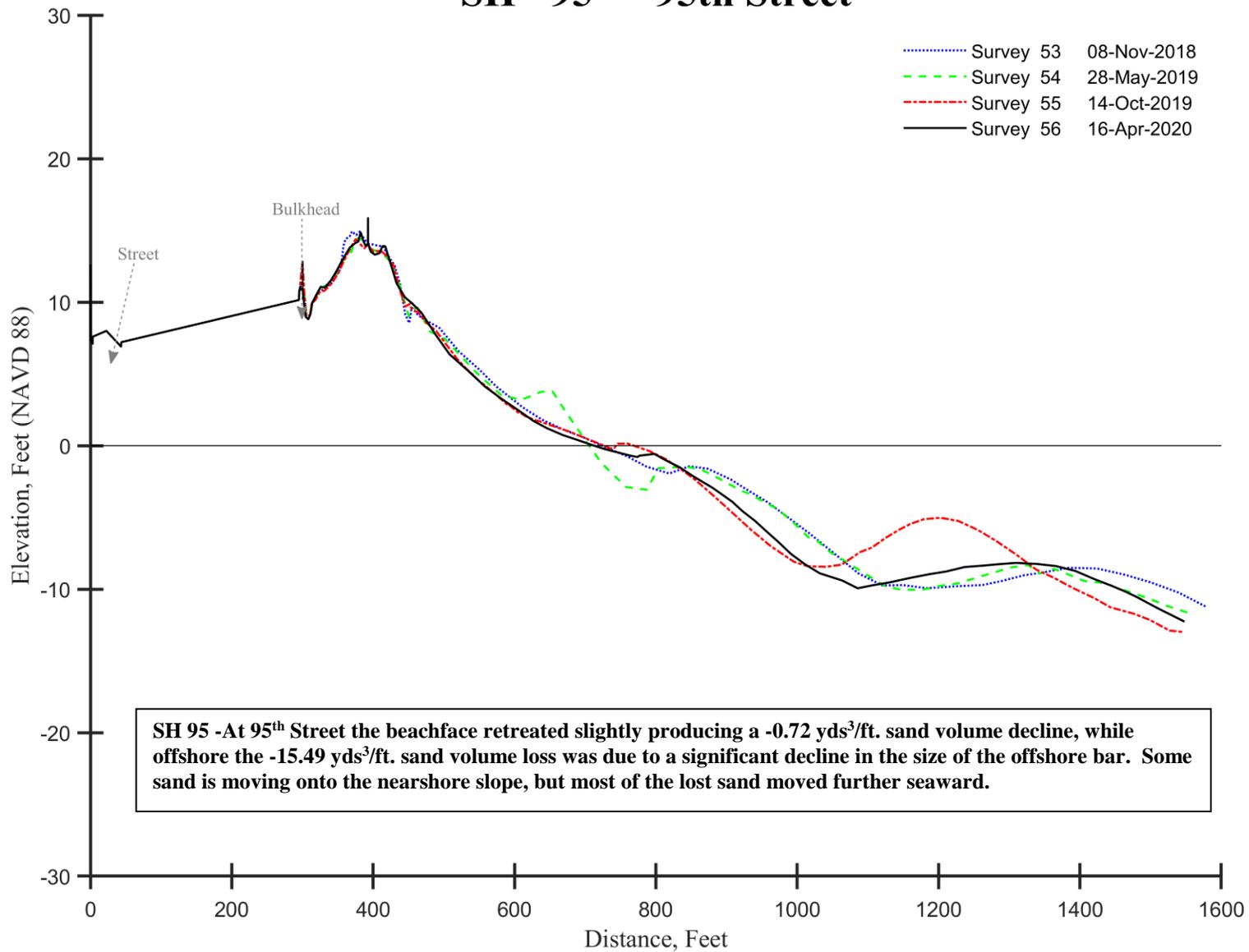


**SH-95**, located at 95<sup>th</sup> Street this site received sand by June 12, 2017, providing a 99-foot wider beach as 53.73 yds<sup>3</sup>/ft. were placed above the zero elevation. The beach remains in decent shape with sand deposited by the wind in the dunes in substantial quantities over the past 2 years.



**Figure 3.** This foredune toe view to the south taken April 16, 2020 and shows the handicapped access ramp with extensive sand accumulation at the fencing to the south. The beach width remains at a suitable level to allow considerable recreational space in 2020.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 95 95th Street

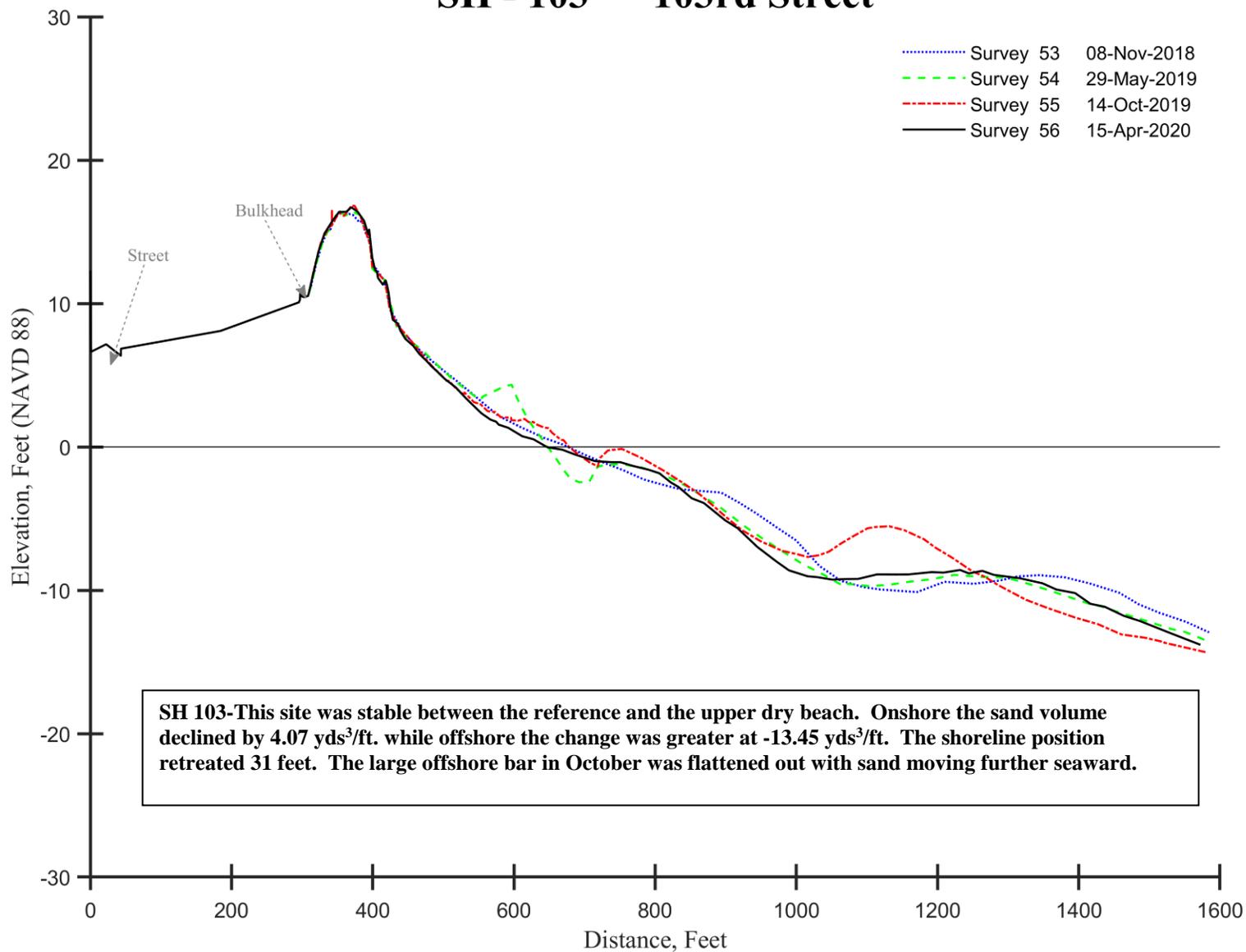


**SH-103**, the 103<sup>rd</sup> Street beach gained sand at the dune fencing burying the most recently placed row of fencing (2017). The beach width remained sufficient to protect the dunes from erosion as well.



**Figure 4.** View to the north at 103<sup>rd</sup> Street taken April 15, 2020. The extensive sand deposition around the 2017 fence installation has buried the fence. The site retained the wider beach and saw no dune damage this past winter.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 103 103rd Street

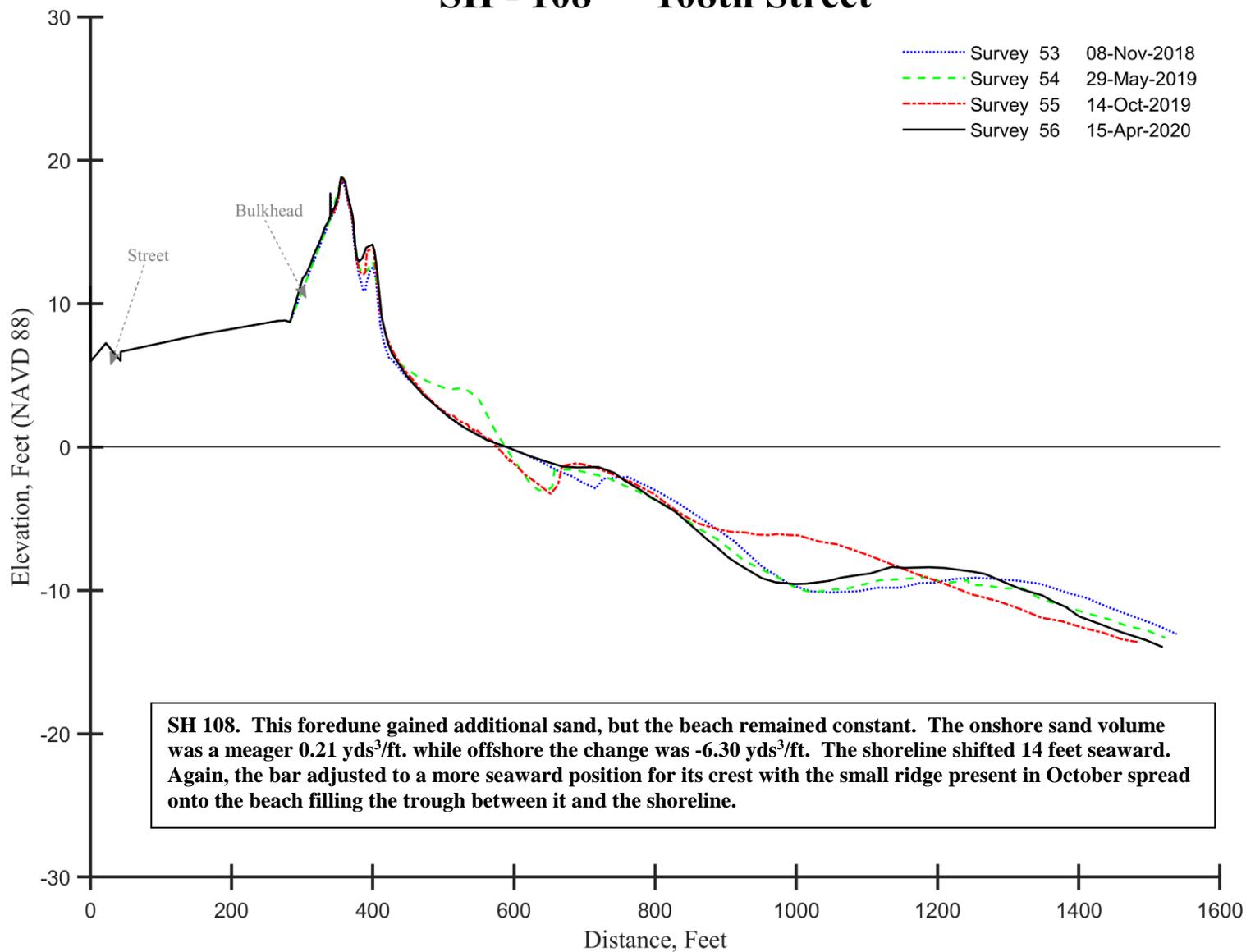


**SH-108**, the project beach at 108<sup>th</sup> Street was restored by March 27, 2017. Since the project, the dunes have been brushed by wave erosion, but largely undamaged. The beach width has declined considerably since 2017.



**Figure 5.** View to the south taken on April 15, 2020. At this site, the wave-deposited debris reached to the seaward dune toe this past winter. The beach is narrow, but with a gentle slope seaward. The dunes escaped erosion thus far as the seasons begin to change over to summer wave conditions.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 108 108th Street

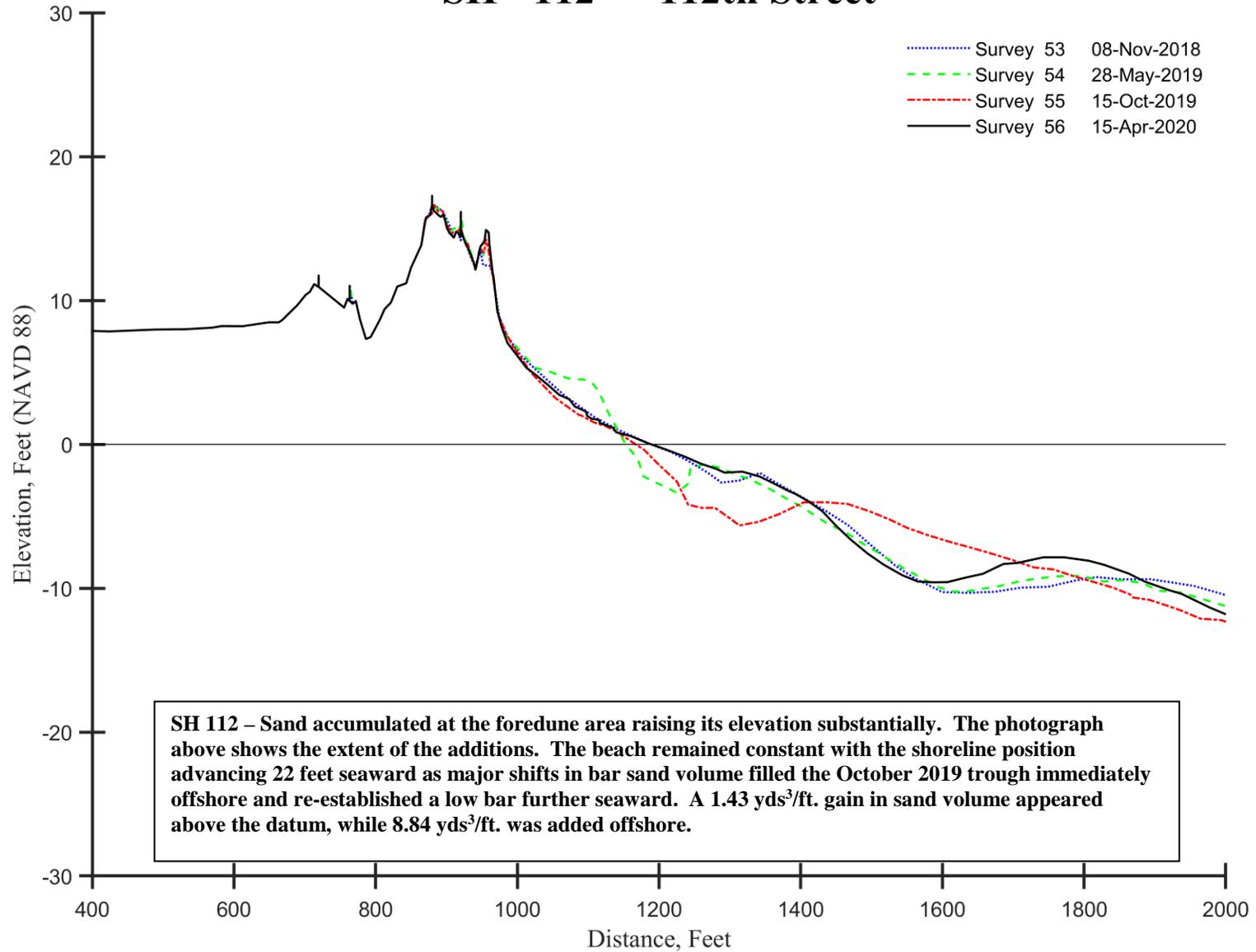


**SH-112.** The 112<sup>th</sup> Street beach re-nourishment was completed by March 27, 2017. The new fencing is all but buried by April 2020 and the beach width remains excellent.



**Figure 6.** View to the south taken April 15, 2020 along the foredune crest. Wind deposition is universally present where the 2017 fence installation is buried and lobes of sand deposited by the wind extend from almost every plant cluster. A wider beach also is present at this location.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 112 112th Street

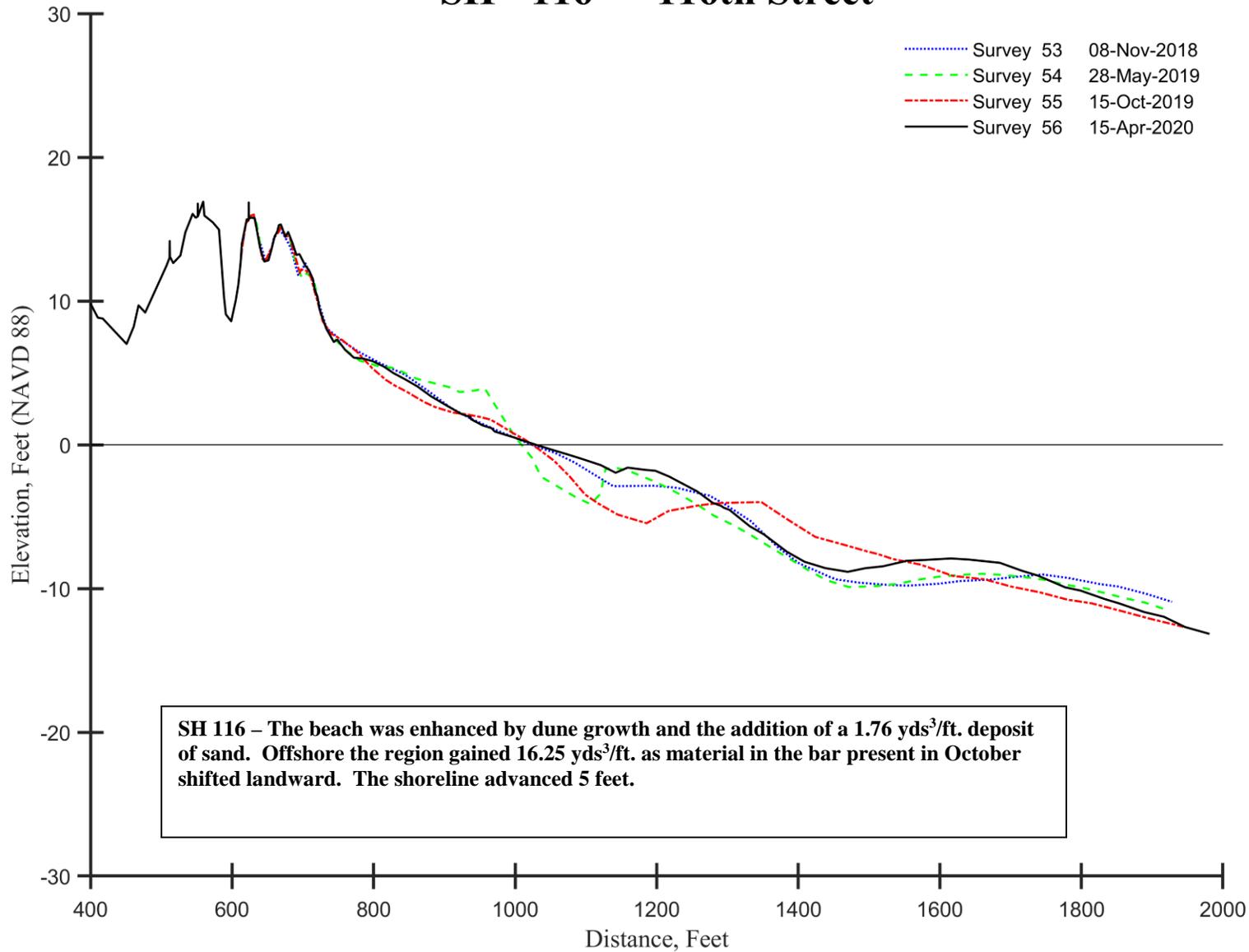


**SH-116**, This location has the widest dunes with foredunes advancing onto the USACE beach template. The 2017 fencing is buried and the beach width is extensive.



**Figure 7.** View to the south at 116<sup>th</sup> Street taken on April 15, 2020, showing extensive dune accumulation. The beach width allows the wind to scour the dry sand and move it into the dune field making this one of the best protected segments of the Stone Harbor oceanfront.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 116 116th Street

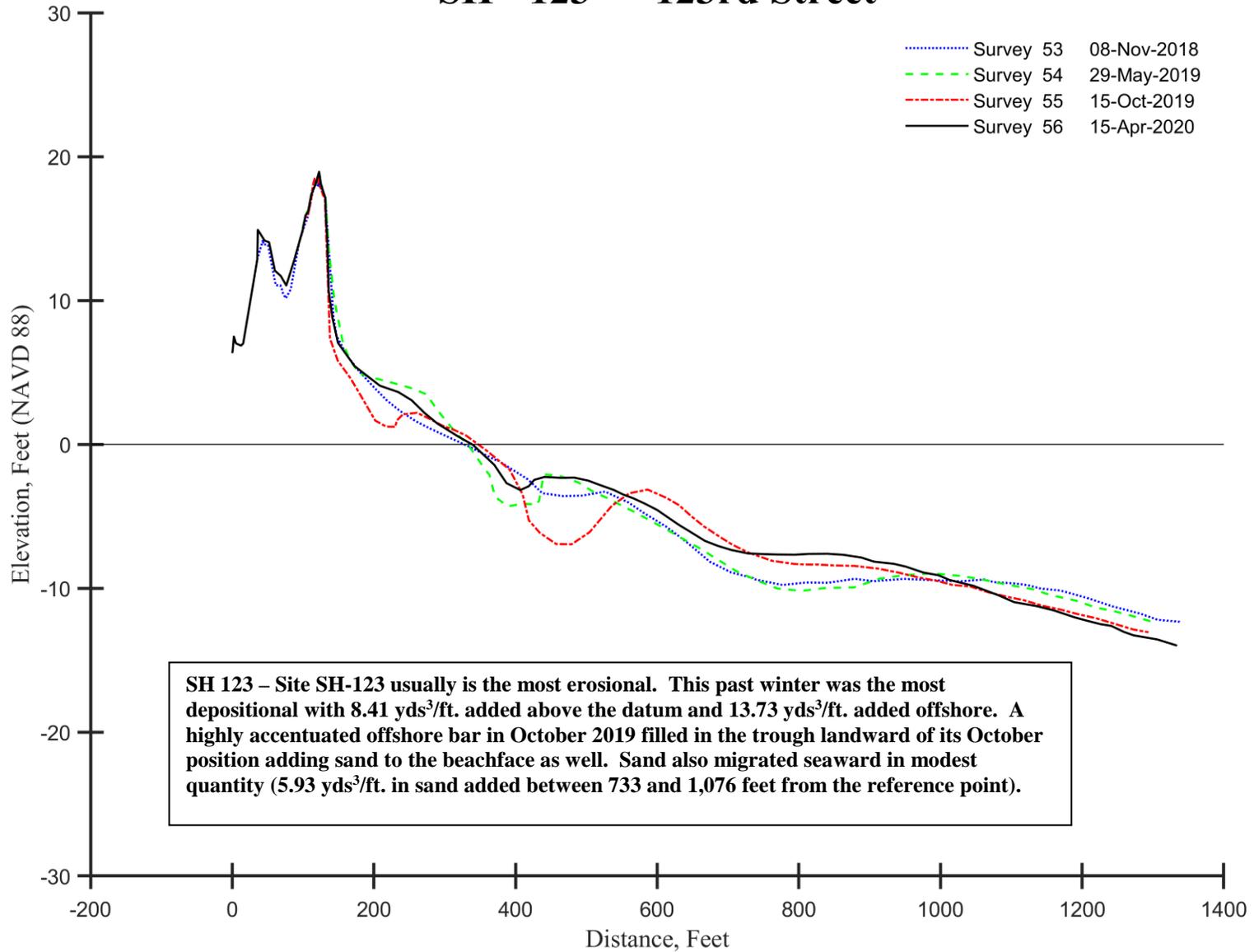


**SH-123**, site 123 is located just north of the terminal groin and the start of South Point. A new fence was installed last spring, but the fence itself was either removed or destroyed during the winter leaving only the posts. The low incidence of wave erosion is clear because this location did not suffer a new scarp into the seaward dune toe this winter.



**Figure 8.** View to the south taken on April 15, 2020, looking along the dune crest. The most recent row of sand fencing has been removed leaving the posts in place. This beach sees erosion under the least serious conditions and suffers dune loss almost every winter. The terminal groin in the distance captures some of the sand moving into this section, but the groin produces a severe offset in the shoreline further south by disrupting the uniform distribution of sand.

## Borough of Stone Harbor - Semi-Annual Comparison SH - 123 123rd Street



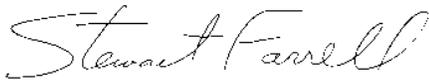
## Summary

The 714,000 cubic yards of new sand placed on Stone Harbor beaches during 2017 continues to provide extensive storm protection and good recreational conditions. Last winter's extensive beach accretion combined with an even greater offshore sand volume loss was not repeated this winter. The beaches continued to gain sand, but at a lower volume (22,734 cubic yards). The offshore regions did lose sand, but largely the material moved landward toward the shoreline or became fill in the deep troughs between the bar and the shoreline. The net sand volume change between the Avalon boundary and the 123<sup>rd</sup> Street groin was just 380 cubic yards between the landward slope of the dune system and points 800 to 1,200 feet into the ocean. Five of eight sites saw shoreline advances seaward, while two (95<sup>th</sup> and 103<sup>rd</sup> Streets, 56 and 31 feet) retreated more than any one site advanced (82<sup>nd</sup> Street, 27 feet). The net change appears to have been due to sand deposited in large bars offshore in October 2019 moving landward over the winter filling nearshore troughs, but not adding extensively to the beaches by April 2020. Some sand shifted further seaward creating lower elevation offshore bars near the end points of the profiling as much as 2,200 feet from a reference point.

This winter season, the 123<sup>rd</sup> Street locality did see the largest sand volume gain of any site in the Borough. This is a fairly unusual situation due to the ease with which sand passes around or over the terminal rock groin to South Point.

The CRC's next semi-annual survey is scheduled for early in the fall 2020 to assess the Borough beaches following the summer time period.

Sincerely,

A handwritten signature in cursive script that reads "Stewart Farrell".

Dr. Stewart Farrell  
Executive Director  
Coastal Research Center