



2017 Beach Monitoring Survey

TOWN OF SULLIVAN'S ISLAND, SC

Elko Coastal Consulting, Inc. | July 2017



Technical Report

2017 Beach Monitoring Survey: Town of Sullivan's Island, SC

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Cover Photo: 2017 Ground photo of Monument 3035 near Station 19, looking south

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1. Introduction

The purpose of this work is to provide an annual condition survey to monitor the Sullivan's Island beach. The intention is to survey the beach annually at the beginning of hurricane season in order to monitor changes to the beach from normal and/or storm conditions. Annual monitoring will not only provide baseline conditions for each storm season, but also a comparison of past year's monitoring data that will yield change rates important for understanding beach performance over time.

The beach on Sullivan's Island has generally been accretional due to its location on the updrift side of the Charleston Harbor jetties (Figure 1). As a result, little data have been collected to quantify and understand the physical coastal processes as is common on barrier islands with erosion problems. The Town's Local Comprehensive Beach Management Plan¹ provides an overview of the studies to date.

This effort continues an annual data collection and analysis plan for the Town of Sullivan's Island that started in 2016.

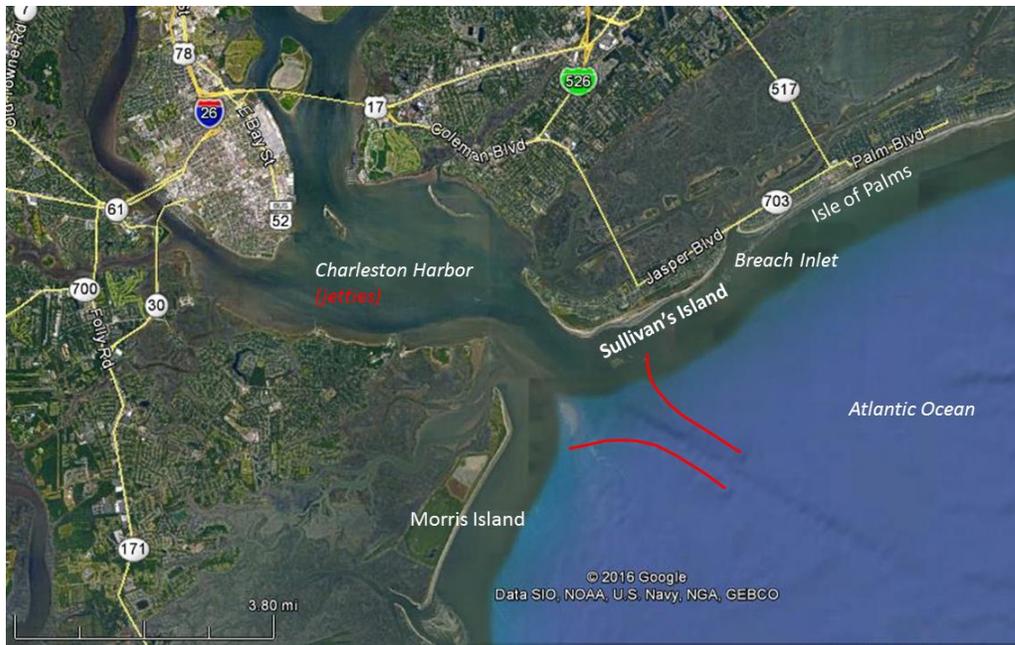


Figure 1. Location map of Sullivan's Island (image modified from Google Earth).

HURRICANE MATTHEW

During this monitoring period, Hurricane Matthew, a Category 1 hurricane at the time of landfall near McClellanville, 30 mi north of Charleston, SC, impacted the region. Matthew

¹ ATM, 1992. Local Comprehensive Beach Management Plan, Town of Sullivan's Island, May 1992, 233 p.

resulted in prolonged exposure to storm conditions from October 7-10, 2016. No structural damage occurred along the Sullivan's Island beachfront due to Matthew; thus, post-storm surveys were not conducted. Impacts from this storm are noted where applicable in this monitoring report.

2. Survey Methodology

Topographic and hydrographic data collection (beach profile surveys) occurred on June 12, 2017. A total of 11 profile surveys were conducted at existing Coastal Council/OCRM Monuments (Figure 2). On Sullivan's Island, the OCRM Monument spacing ranges from approximately 500 to 2,000 ft.

The monuments are survey benchmarks, which are permanent metal disks in the ground with information stamped on the face that mark a specific point that can be consistently reoccupied. On Sullivan's Island, these survey benchmarks begin with Monument 3010 at the southwest end of the island adjacent to the Entrance to Charleston Harbor and end at Monument 3095 at Breach Inlet. The lines illustrated in Figure 2 extending offshore from the monuments are the profile lines along which surveyors collect elevation measurements. These measured beach profiles describe a cross-section of the topography and bathymetry of the sand surface along the dry beach and nearshore/sand bar regions (e.g., Figure 7). By surveying the same line routinely, scientists can measure the change in sand volume or shoreline position, for example.



Figure 2. 2015 aerial photo illustrating the eleven (11) beach profile lines and corresponding SCDHEC-OCRM Monuments on Sullivan's Island. The solid black line running parallel to the shoreline through the dunes is the OCRM Baseline.

Surveys out to the “depth of closure” were collected in order to appropriately calculate volume changes along the beach. The depth of closure represents the offshore location where measurable sediment transport ceases. Here, closure depth is roughly -12 ft NAVD88.

Each profile extended from the OCRM Monument to either -14 NAVD88 or 1,400 feet from the toe of the dune, whichever was more landward. In some cases, this meant extending the profile lines up to 4,000 ft offshore to capture the nearshore sand bar feature and reach the depth of closure (e.g., Figure 3 and Figure 4).

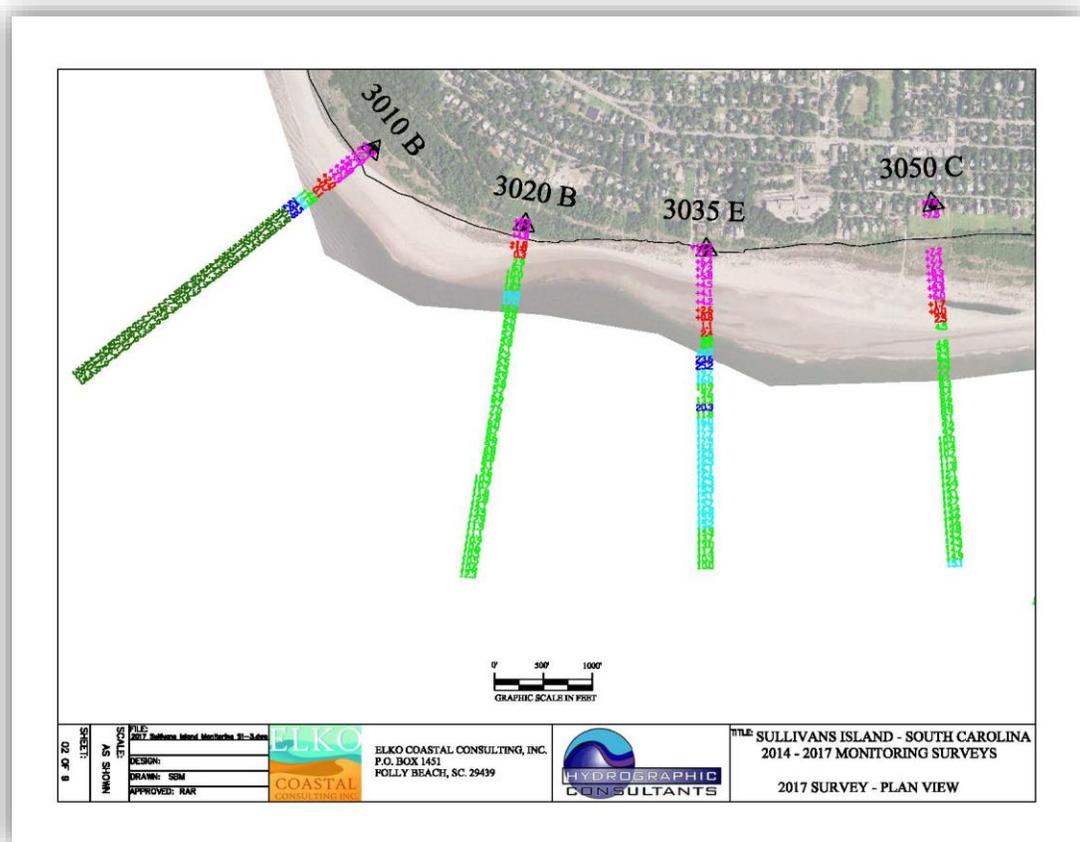


Figure 3. Topographic and bathymetric 2017 survey data illustrating the measured elevation along each line for the southwest end of Sullivan's Island.

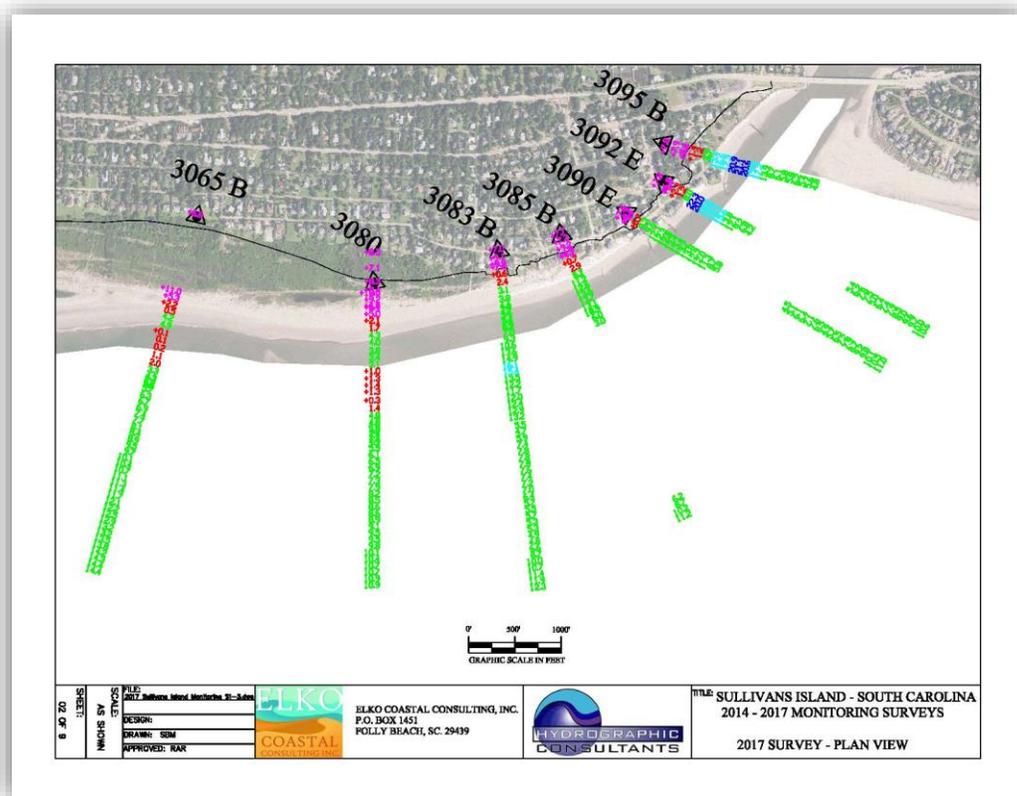


Figure 4. Topographic and bathymetric 2017 survey data illustrating the measured elevation along each line for the northeast end of Sullivan's Island.

The upland portion of the profiles was conducted by RTK standard land surveying techniques and extended seaward to a wading depth deep enough to overlap with the offshore portion of the profile survey. Profile data points were collected at a maximum interval of 20 feet and at all significant elevation changes such as dunes, berms, scarp lines, seawalls, or sand bars.

The offshore portion of the survey was conducted by hydrographic techniques using a vessel mounted fathometer along with kinematic GPS. The survey equipment and methodology complied with USACE standards for hydrographic surveying.

OTHER DATA UTILIZED IN THIS STUDY

Beach profile data was also collected during the summer of 2014 and 2015 by SCDHEC OCRM and served to the general public through the S.C. Beach Erosion and Monitoring ([BERM Explorer](#)) application. The combination of these data and the survey data collected for this work provided four years of data over a study period of 2014 to 2017.

3. Shoreline and Volume Change Analysis

The shoreline change analysis was conducted by measuring the position of the Mean High Water (MHW) contour (2.03 ft NAVD88) relative to the OCRM baseline. The volume change analysis was conducted by measuring the volume of sand on the profile from the seawardmost dune crest to the depth of closure (-12ft NAVD88) when possible.

3.1 MHW POSITION RELATIVE TO THE OCRM BASELINE: 2014-2017

The position of MHW relative to the baseline is a useful measurement

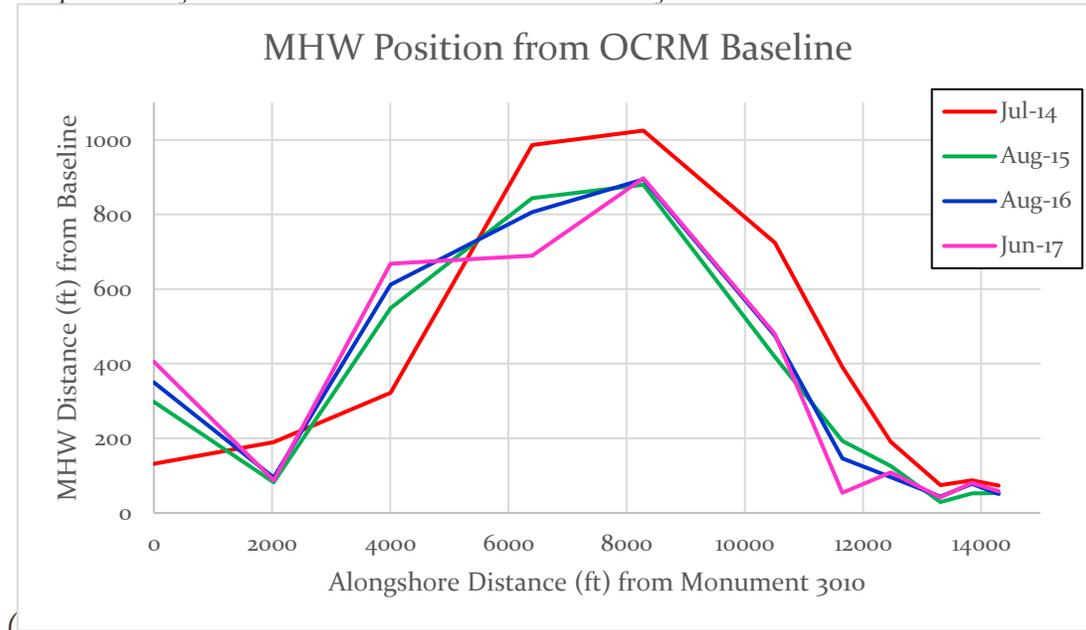


Figure 5) because it illustrates both the change in shoreline position from year to year, as well as the distance between the shoreline and baseline – an indicator of the level of storm damage protection provided by the beach/dune system at each monument.

During the study period, the Sullivan’s Island shoreline changed dramatically between 2014 and 2015, but exhibited less shoreline change between 2015 and 2017

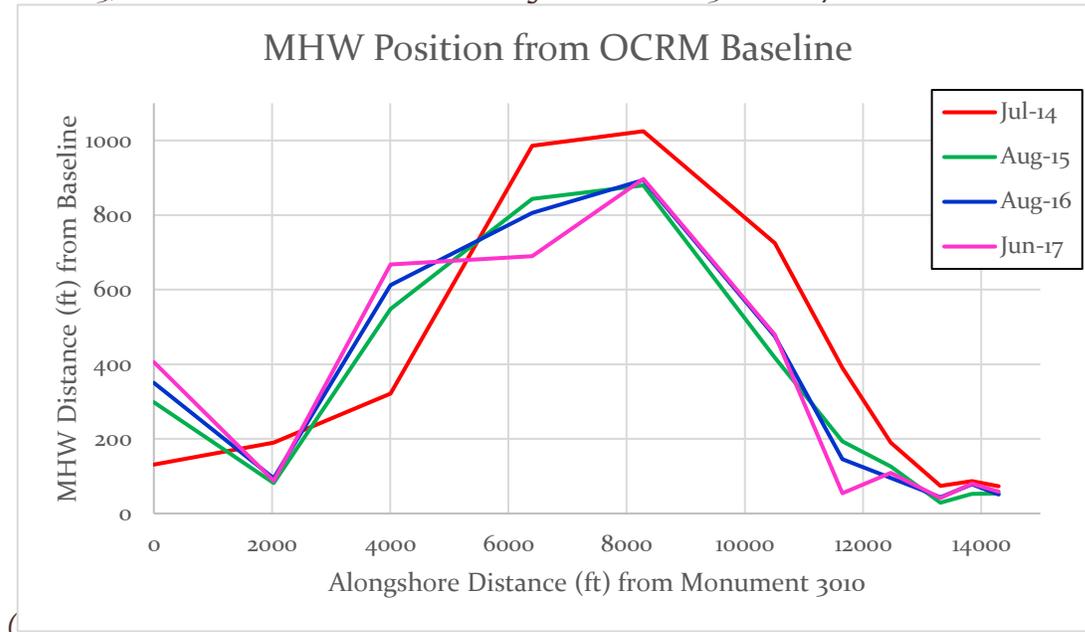


Figure 5). Several areas were flagged in the 2016 monitoring report and are discussed below. Two additional monuments are flagged in this 2017 monitoring report: 3050 and 3083 which have been eroding rapidly over the last four years.

The northeast end of the island, between Monuments 3090 and 3095 and adjacent to Breach Inlet, was flagged in last year’s report. It is under continual erosional pressure due to the southwesterly migration of Breach Inlet, but has been stabilized by erosion control structures. Little shoreline change occurred along this northeastern end during the study period; however, the small distance between the shoreline and the OCRM baseline suggests erosional pressure and the need for continued monitoring. There is little storm damage protection at this location.

The shoreline between Station 31 and 22 (OCRM Monuments 3050 and 3085) was also flagged in last year’s report because the shoreline position moved landward an average of 180

ft between 2014 and 2016

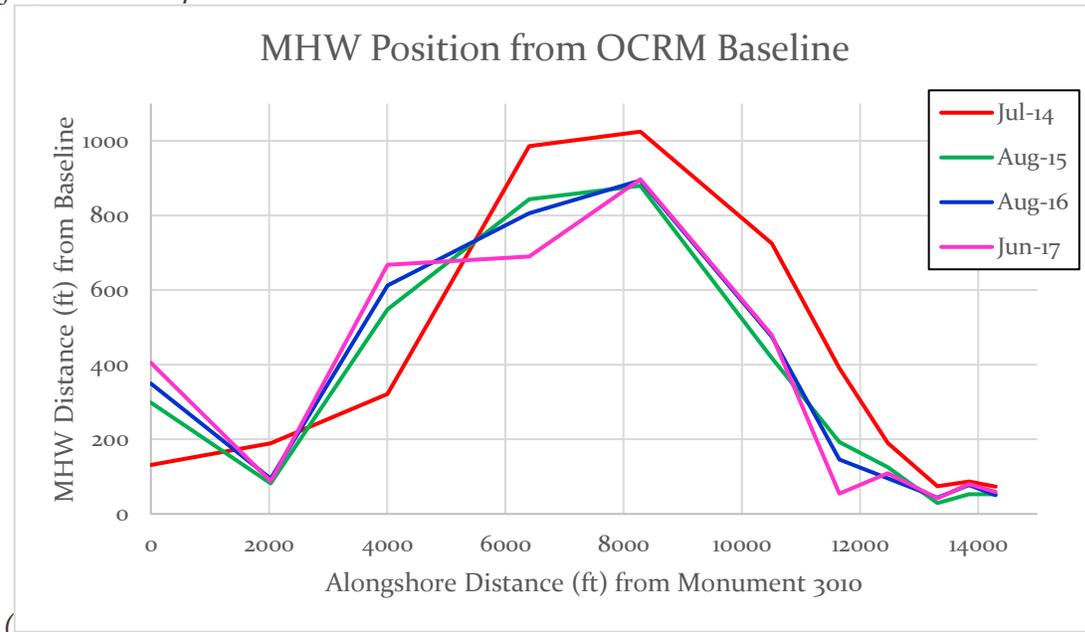


Figure 5). This dramatic shoreline retreat has stopped and shoreline positions have stabilized at most of the monuments in this section with two previously mentioned exceptions.

The shoreline along this portion of the island tends to fluctuate in response to Breach Inlet shoal attachment events². Based on examination of beach profile data (see Section 3.3), the landward migration of the shoreline in this area represented the onshore migration and spreading (mostly downdrift transport) of sediment associated with a sand bar (i.e., a shoal) attachment event that occurred in 2014.

Downdrift of this region, in the vicinity of the Charleston Harbor jetty, the shoreline has been stable to accretional over the last four years.

² ATM, 1992. LCBMP (see Footnote 1).

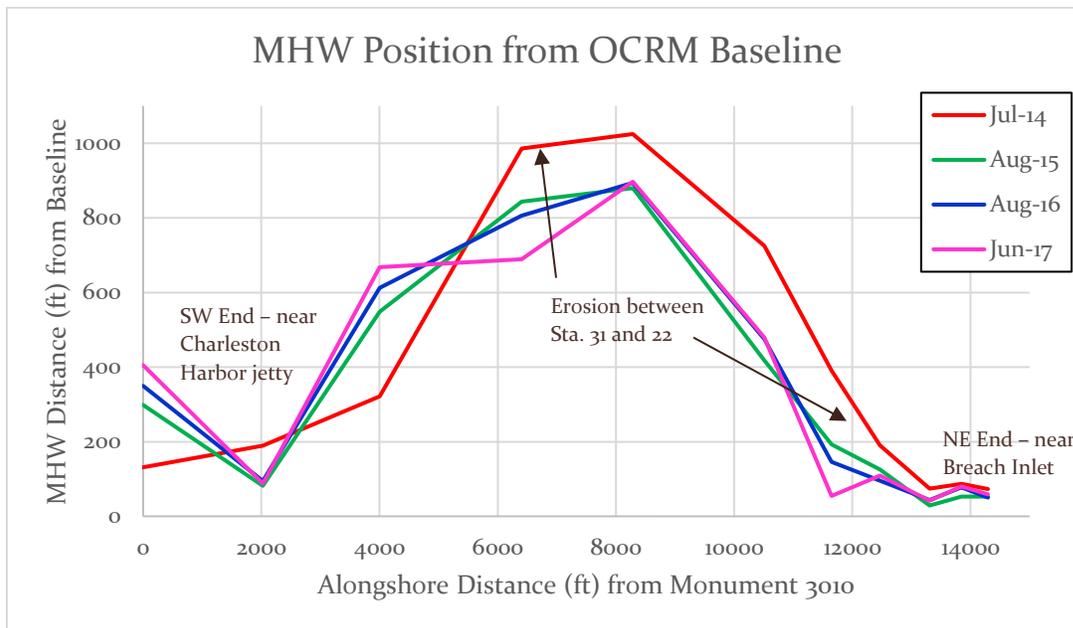


Figure 5. Annotated MHW Position graph illustrating the change in shoreline position from 2014 to 2017, as well as the distance between the shoreline and baseline.

3.2 VOLUMETRIC ANALYSIS

As noted above, the volume change analysis was conducted by measuring the volume of sand on the profile from the seawardmost dune crest to the depth of closure (-12ft NAVD88) when possible. These two locations were selected to approximate the limits of measurable sand movement across the beach portion of the profile; however, the nearshore sand bar on Sullivan’s Island often complicates beach profile volume calculations. In the two cases where the profile did not “close” at or before -12 ft, volume was calculated out to the location where the four lines intersected (i.e., the visible depth of closure). This distance corresponded to an elevation of -32 NAVD88 at Monument 3010 and to -16 NAVD88 at Monument 3020.

There is no doubt that the nearshore sand bar and the beach exchange sediment, but in order to understand the beach volume change, an effort was made to separate the beach profile from the nearshore sand bar when the bar was separated by a channel and not welding to the beach face. The volume of the nearshore bar can be approximated in the future if necessary.

3.2.1 Unit volume to DOC by Monument: 2014-2017

As suggested in the MHW analysis, northeastern Sullivan’s Island has less storm protection in place than the rest of the island. Despite the narrow beach, the average unit volume to the depth of closure (DOC) has been stable between 128 and 129 cubic yards per foot (cy/ft) in 2016 and 2017. The rest of the island has at least 200 cy/ft of volume along each measured profile (Figure 6).

Last year’s monitoring report detailed a sandbar attachment event that occurred in 2014. Evidence of another sandbar attachment was observed in 2017. The next section details the beginning of the new sandbar attachment using beach profile data from each monument. The sandbar attachment event is also evident in the unit volume measurements from 2014 to 2017 which indicates an increase in sediment volume at monument 3065 (near ~8,000 ft on the x-axis; Figure 6). Due to an effort to separate the beach from the sandbar, early onshore sandbar migration is not detected by the unit volume analysis, but is evident in the individual beach profile survey lines (next Section).

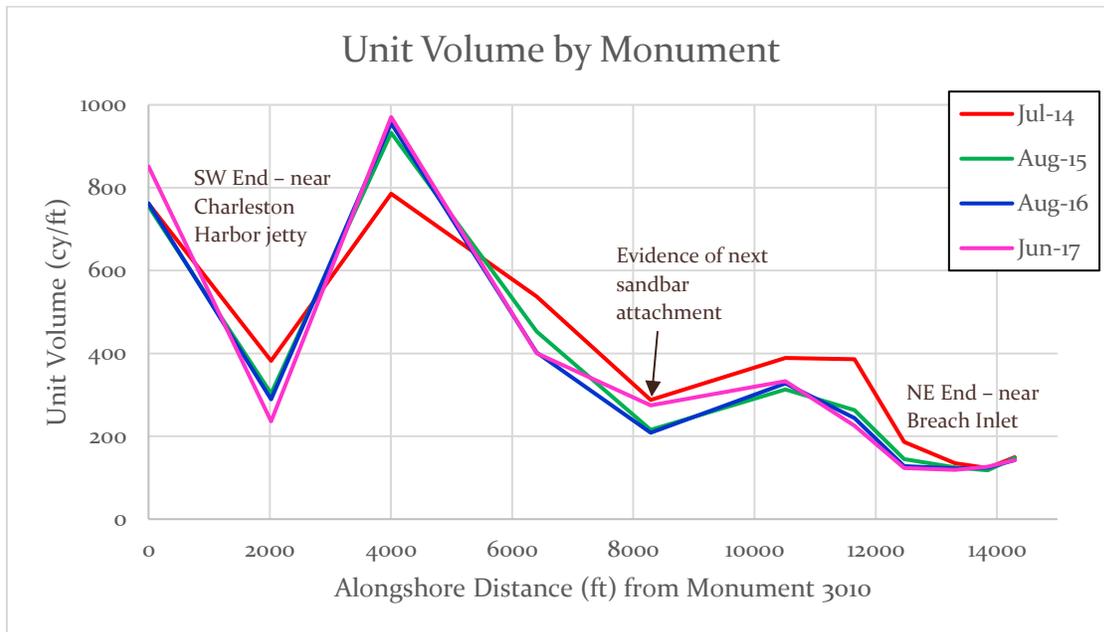


Figure 6. Annotated Unit Volume graph illustrating the change in unit volume at each profile from 2014 to 2017.

3.2.2 Island-wide Volume Change Estimates

Due to the large distance between OCRM Monuments on Sullivan’s Island, it is difficult to calculate total volume statistics for the island using data from only 11 profiles. Small fluctuations in volume at a single beach profile translate to relatively large volume change statistics when applied over long distances. Thus, the volume change estimates provided in Table 1 should be treated as approximations. Based on the 11 profiles only, the total volume change on Sullivan’s Island from 2014 to 2016 was a loss of nearly 694,000 cubic yards (cy) of sediment.

From 2016 to 2017, the total volume change was a gain of 190,719 cy. Most of the volume increase occurred in the vicinity of monument 3065 (Table 1) indicating that the onshore sandbar migration is a significant contributing factor to the volumetric increase.

Table 1. Volume change estimate for Sullivan’s Island from 2014 to 2016 and for 2016 to 2017.

Monument	cy/ft	2014-2016		2016-2017	
		Avg. Change Between Profiles (cy/ft)	Total Between Profiles (CY)	Avg. Change Between Profiles (cy/ft)	Total Between Profiles (CY)
3010 B	1				
		-57	(153,420)	28.5	76,980
3020 B	-114				
		28	57,454	-8.7	(17,808)
3035 E	170				
		18	42,965	6.4	15,547
3050 C	-135				
		-107	(187,665)	32.3	56,467
3065 B	-80				
		-71	(163,696)	35.9	83,169
3080	-62				
		-102	(149,087)	-6.4	(9,123)
3083 B	-142				
		-100	(101,567)	-11.1	(11,282)
3085 B	-58				
		-36	(34,027)	-4.0	(3,796)
3090 E	-13				
		-6	(3,288)	-0.3	(157)
3092 E	1				
		-3	(1,504)	0.5	228
3095 B	-7				
		Total Volume Change	(693,835)		190,719

3.3 BEACH CONDITIONS BY MONUMENT

In addition to survey data collection, this study also conducted a beach condition assessment by taking ground photographs at each OCRM Monument and noting the condition of the beach. This section includes the condition assessment information and a beach profile data plot for each OCRM Monument.

3010

This is the southwesternmost OCRM Monument on Sullivan’s Island, located along the long beach access path at Station 16 with the nature trail. In 2017, this access path was flooded with standing water. The beach is located on the Charleston Harbor side (“inside”) of the jetty. Consistent with the measured beach profile data (Figure 7), the beach displayed some evidence of past erosion, but in June 2017, the beach exhibited accretionary, healthy conditions. The dry beach and the beachface have accreted sediment in the last year.

Incipient dunes were abundant at this location. The dry beach between the high tide line and the incipient dunes was wide and low with evidence of repeated recent overtopping in the form of multiple rack lines (Figure 8 and Figure 9).

The elevation at the seaward end of the dune access path is low relative to the adjacent dunes, leaving a discontinuity in the dune system. According to the 2017 volume calculation, this profile has a unit volume of 851 cy/ft.

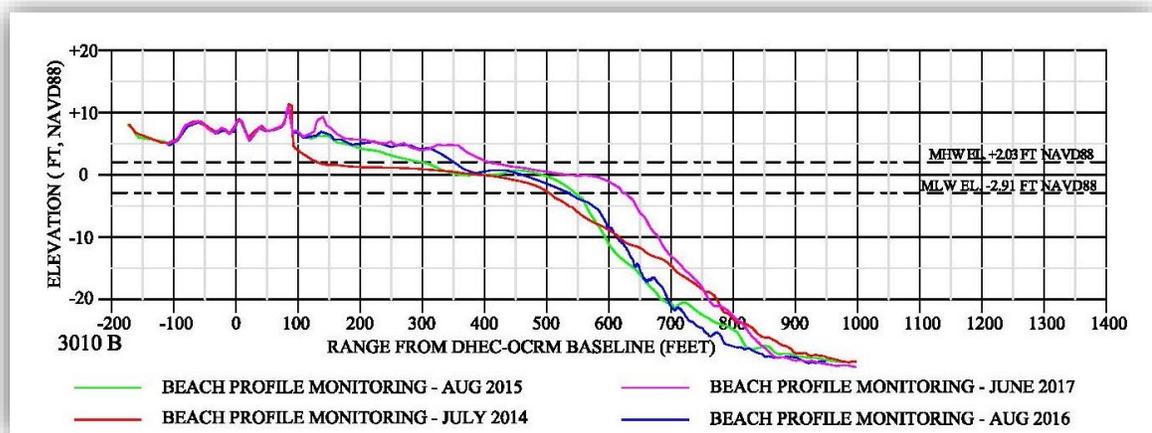


Figure 7. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3010.



Figure 8. Ground photo taken at Monument 3010 looking east on August 4, 2016 (top) and June 12, 2017 (bottom). Note the higher elevation of the berm in 2017.



Figure 9. Ground photo taken at Monument 3010 looking west on August 4, 2016 (top) and June 12, 2017 (bottom). Note the higher elevation of the berm in 2017.

3020

Monument 3020 is located along the long beach access path at the Sand Dunes Club. As in 2016, the beach at Monument 3020 exhibited erosional conditions in contrast to the beach conditions at the two adjacent monuments in June 2017. All dune vegetation here has been removed and the toe of vegetation location is occupied by dead trees. Evidence of a high storm tide also exists extending landward into the adjacent maritime forest, likely due to Hurricane Matthew. Matthew's storm surge likely eroded the frontal dune that existed in 2016 (Figure 10). More recently, there is some evidence of recovery with storm high tides not reaching the (dead) vegetation, but rather stopping about 30 ft seaward.

Hurricane Matthew was not solely responsible for the condition of the beach at this location. Significant erosion has taken place here since 2014 that included loss of a large dune and submerged nearshore sand body (Figure 10). Now, sediment in the offshore sandbar is accumulating and the bar is migrating onshore. A sand bar was attaching to the updrift beach (Figure 11) in 2017. Both may eventually supply sediment to this location. Considerable ongoing dune erosion was evident to the southwest in 2016, but some recovery was evident in 2017



Figure 12).

According to the 2017 volume calculation, this profile has a unit volume of only 236 cy/ft, which is in stark contrast to the surrounding accretional areas. This monument is influenced by its location downdrift of the Charleston Harbor jetty.

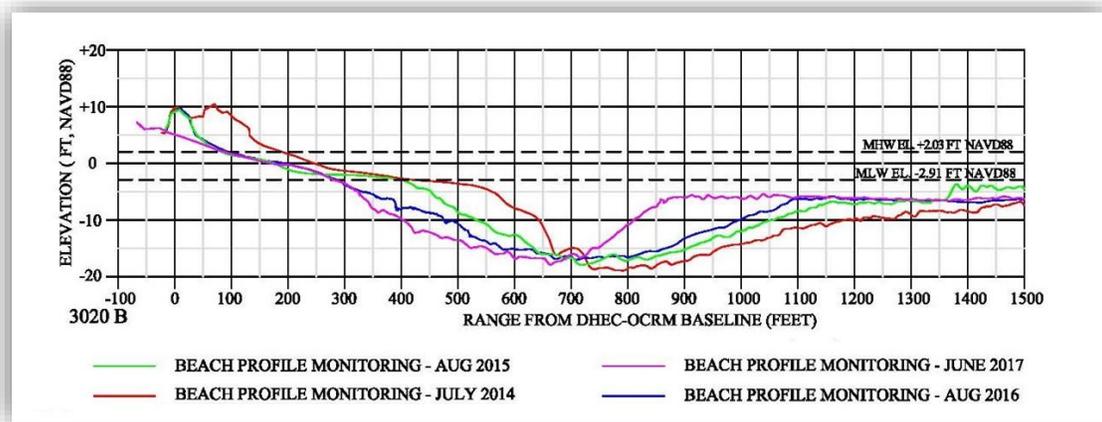


Figure 10. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3020.





Figure 11. Ground photo taken at Monument 3020 looking northeast on August 4, 2016 (top) and June 12, 2017 (bottom).





Figure 12. Ground photo taken at Monument 3020 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom). Note the recovery of dune vegetation to the southwest in 2017.

3035

Monument 3035 is located along the long beach access path at Station 19. This area has been the beneficiary of the 2014 sandbar attachment event (Figure 13). The beach was wide and accreting in August 2016 and June 2017 with about 120 ft of dry beach between the vegetation line and the high tide line (Figure 14 and Figure 15). Continued accretion has occurred between 2016 and 2017 with the growth of the incipient dunes (Figure 15). Ponding was observed during both years in the backbeach (Figure 14), which is common on very wide, accreting beaches.

According to the 2017 volume calculation, this profile has a unit volume of 970 cy/ft. The beach profile at this monument is influenced by the sediment trapping effect of the Charleston Harbor jetty.

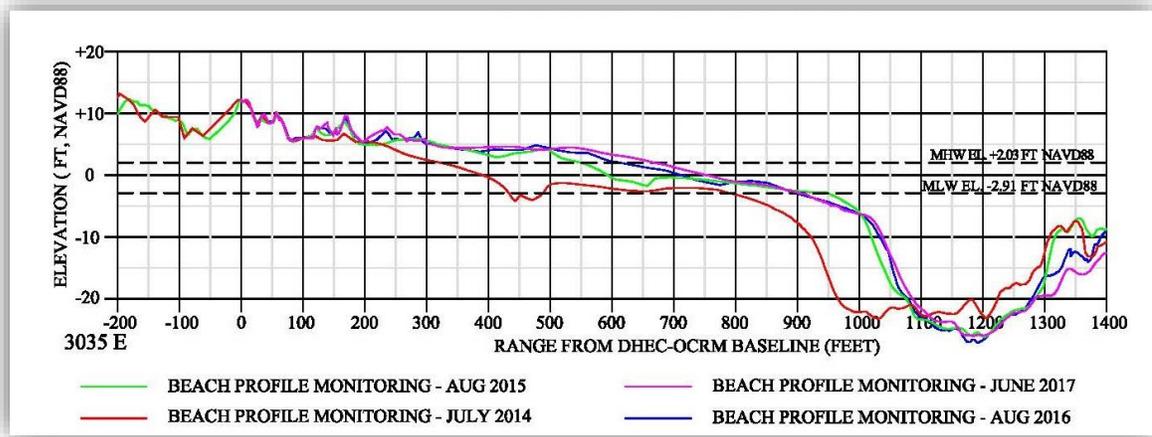


Figure 13. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3035.



Figure 14. Ground photo taken at Monument 3035 looking northeast on August 4, 2016 (top) and June 12, 2017 (bottom). Note the ponding on the backbeach.



Figure 15. Ground photo taken at Monument 3035 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom).

3050

Monument 3050 is located along the long beach access path at Station 22 in the center of the island. Beach profile data indicate the recent sand bar attachment event that occurred here in 2014 (Figure 16). Over the last four years, sediment from this attachment bar has welded to the shoreface and resulted in the 2017 beach which includes a higher primary dune and a slightly reduced berm width. In 2017, a substantial amount of accretion was evident along the berm and backbeach with evidence of multiple storm events (rack lines) intermixed with incipient dune formation.

The elevation at the seaward end of the dune access path is low relative to the adjacent dunes, leaving a discontinuity in the dune system. According to the 2016 volume calculation, this profile has a unit volume of 400 cy/ft. The beach profile at this monument benefits from its location updrift of the Charleston Harbor jetty and indications are that accretion will continue.

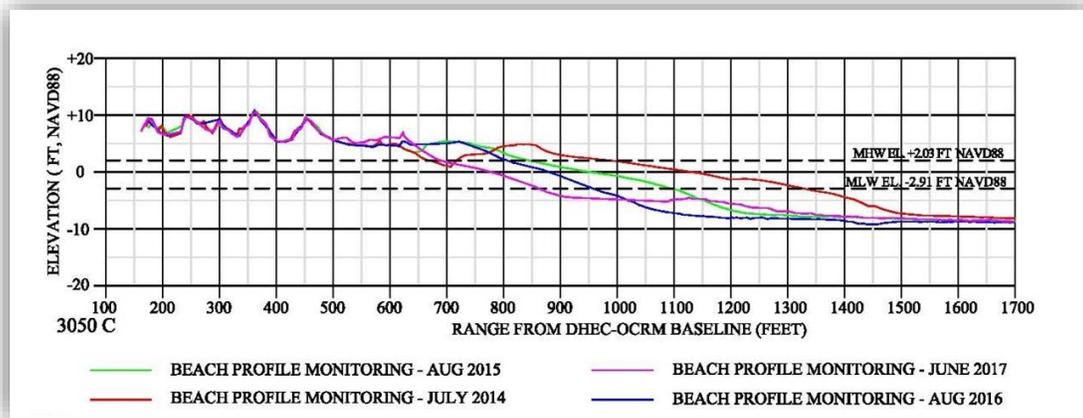


Figure 16. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3050.



Figure 17. Ground photo taken at Monument 3050 looking northeast on August 4, 2016 (top) and June 12, 2017 (bottom). Note the accretion and incipient dune formation along the backbeach in 2017.



Figure 18. Ground photo taken at Monument 3050 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom). Note the accretion and incipient dune formation along the backbeach in 2017.

3065

Monument 3065 is located along the long beach access path at Station 26, which traverses a beachfront marsh environment. Shoreline and beach profile data indicate that this is the widest maritime forest, beachfront marsh, dune and beach system on the island. Six inches of standing water was present along the beach access path in 2017.

This is the sandbar attachment point. In June 2017, another sandbar was attaching to the beach profile. Prior to the attachment of this sandbar, past beach profile data indicated substantial beachface erosion following the 2014 attachment event (Figure 19). In 2017, incipient dunes were forming and accretional conditions were dominant. The recent storm rack line was 15 ft from the toe of vegetation with some evidence of previous dune erosion. The dry beach is 50 ft wide at high tide. exhibits a wide, gently sloping low tide terrace and a robust dune system (Figure 20 and Figure 21).

The elevation at the seaward end of the dune access path is low relative to the adjacent dunes, leaving a discontinuity in the dune system. According to the 2017 volume calculation, this profile has a unit volume of 275 cy/ft.

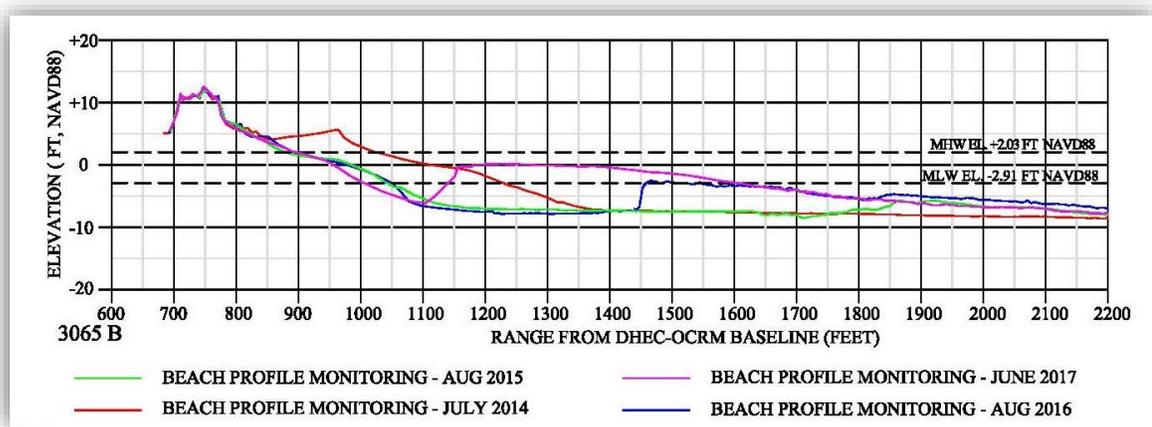


Figure 19. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3065.



Figure 20. Ground photo taken at Monument 3065 looking northeast on August 4, 2016 (top) and June 12, 2017 (bottom).



Figure 21. Ground photo taken at Monument 3065 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom).

3080

Monument 3080 is located along the long beach access path at Station 28. Substantial standing water was present along the access path in 2017.

Beach profile data indicate a sand bar attachment event in 2014 (Figure 22). The sand bar was farther offshore at this location than at profile 3065 in 2017. The beach at this location displayed classic signs of accretion with no dune erosion in 2016 and 2017 (Figure 23 and Figure 24). The high tide dry beach is 75 ft wide and the dune vegetation is healthy and flourishing. Backbeach ponding was no longer present in 2017.

According to the 2017 volume calculation, this profile has a unit volume of 333 cy/ft.

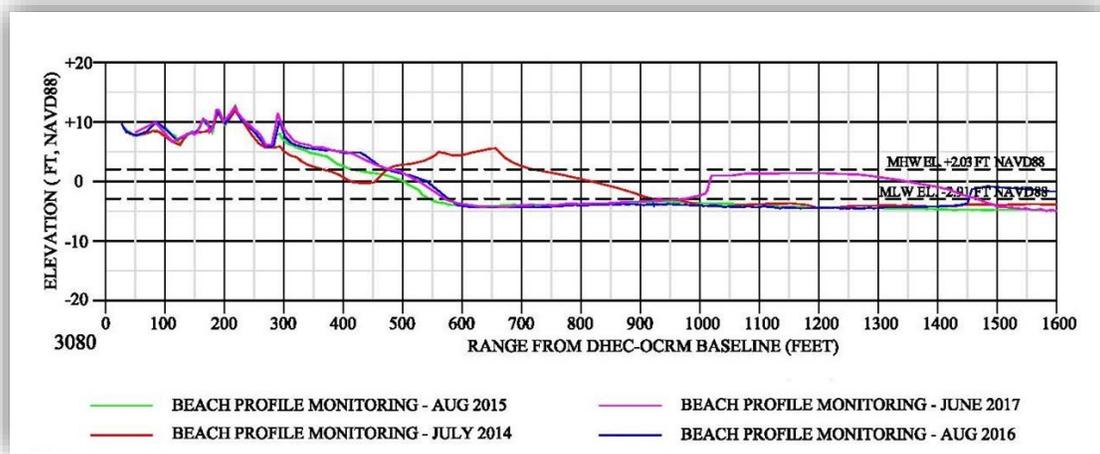


Figure 22. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3080.



Figure 23. Ground photo taken at Monument 3080 looking northeast on August 4, 2016 (top) and June 12, 2017 (bottom). Note the backbeach accretion in 2017.



Figure 24. Ground photo taken at Monument 3080 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom). Note the backbeach accretion in 2017.

3083

Monument 3083 is located near Station 28 ½. This area of the island has experienced considerable erosion since the last sand bar attachment event in 2014 (Figure 25), including the loss of three rows of low sand dunes. This is the typical beach response after a sand bar attachment event, as the sand migrates downdrift. Interestingly, the sand bar that attached to the shoreface just to the southwest did not benefit this beach profile. Some of the sand may spread to this location over the next year. This profile will be closely monitored.

This location marks the transition between the northeast end of the island, which has been stabilized with erosion control structures (Figure 26) and the wide, fluctuating beach of the central portion of the island to the southwest (Figure 27). There is little to no dry beach at high tide to the northeast

According to the 2017 volume calculation, this profile has a unit volume of 226 cy/ft.

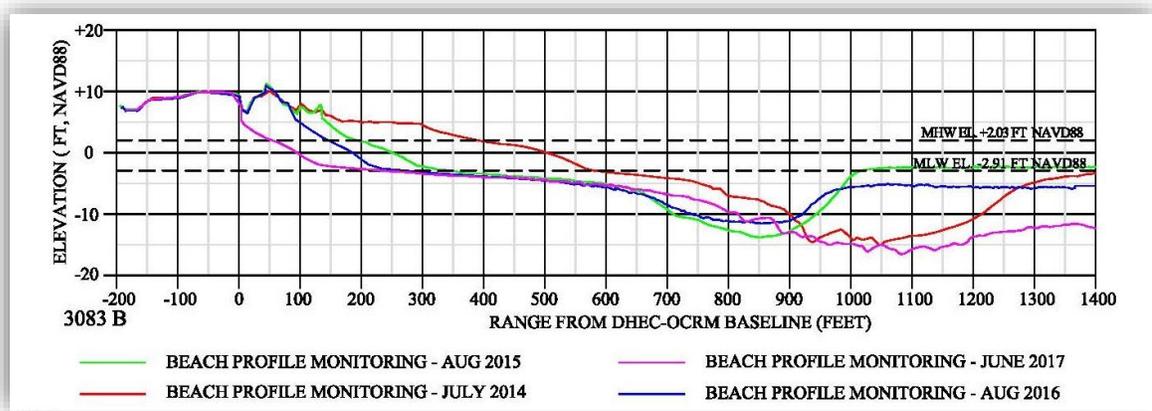


Figure 25. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3083.



Figure 26. Ground photo taken at Monument 3083 looking northwest on August 4, 2016 (top) and looking seaward on June 12, 2017 (bottom).



Figure 27. Ground photo taken at Monument 3083 looking southwest on August 4, 2016.

3085

Monument 3085 is located near Station 29. This profile represents the southwest end of the groin field along northeastern Sullivan's Island. This area is influenced by both erosion control structures and the sand bar attachment events. Beach profile data indicates evidence of the 2014 sand bar attachment and the subsequent beachface erosion (Figure 28). In August 2016, another sandbar was forming and beginning to migrate onshore. By June 2017, this sand bar was subaerially exposed at high tide to the southwest.

This pocket beach between groins is stable to erosional. The high tide rack line was under the houses in 2017. No dunes are present in front of the houses. Despite the lack of dry beach at high tide, the structures appear to have stabilized this portion of the island (Figure 29 and Figure 30).

According to the 2017 volume calculation, this profile has a unit volume of 123 cy/ft.

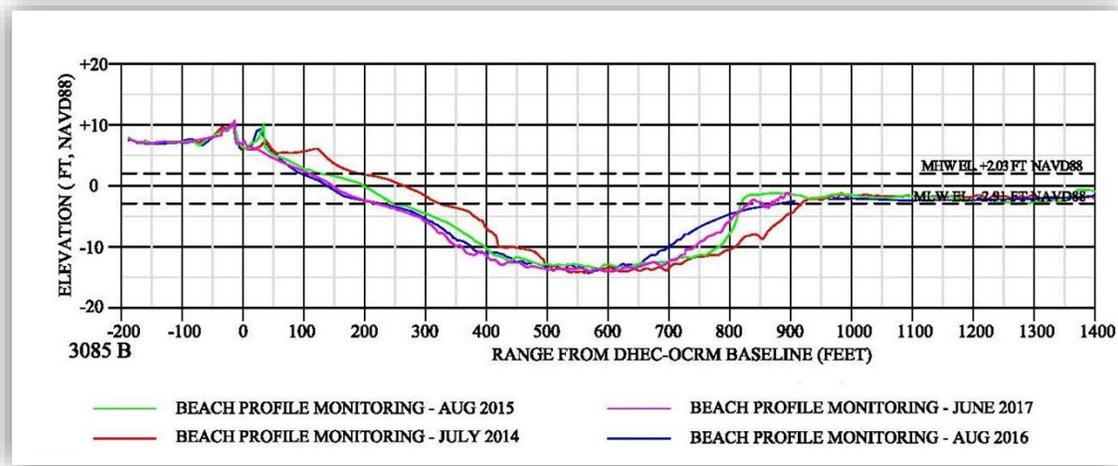


Figure 28. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3085.



Figure 29. Ground photo taken at Monument 3085 looking northwest on August 4, 2016 (top) and June 12, 2017 (bottom). Notice the profile deflation under the deck in 2017.



Figure 30. Ground photo taken at Monument 3085 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom).

3090

Monument 3092 is located south of Station 31 on northeastern Sullivan’s Island near Breach Inlet. It represents a small (<250 ft long) pocket beach that has been stabilized between two groins. The beach profile has exhibited some change despite the stabilization structures (Figure 31). No dry beach is exposed at high tide and no dunes are present. The 2017 condition is the most eroded over the past four years of monitoring. The structures appear to have stabilized this portion of the beach (Figure 32 and Figure 33).

According to the 2017 volume calculation, this profile has a unit volume of 119cy/ft.

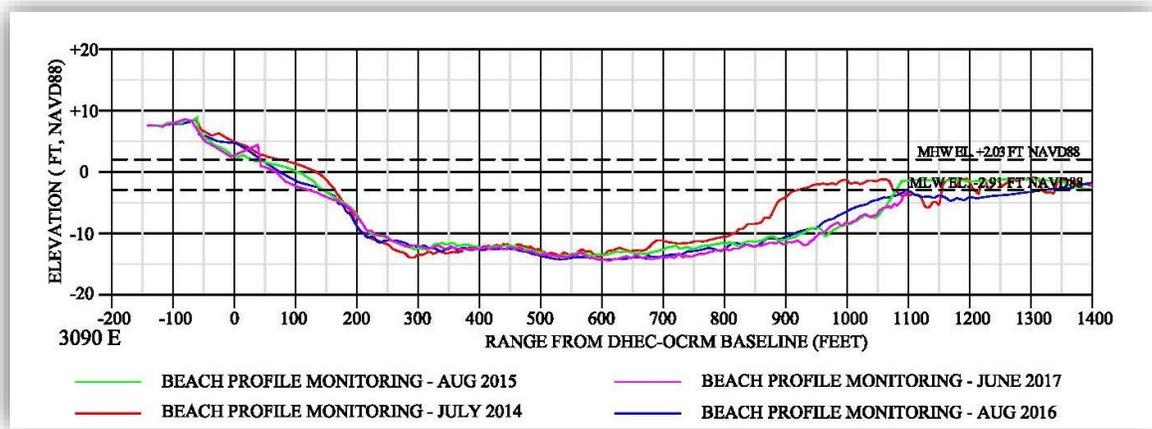


Figure 31. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3090.



Figure 32. Ground photo taken at Monument 3090 looking north on August 4, 2016 (top) and June 12, 2017 (bottom).



Figure 33. Ground photo taken at Monument 3090 looking southwest on August 4, 2016 (top) and June 12, 2017 (bottom).

3092

Monument 3092 is located north of Station 31 on northeastern Sullivan’s Island near Breach Inlet. This profile line represents a section of the island that has been stabilized with erosion control structures. The beach profile has exhibited little change due to the stabilization structures (Figure 34). In 2016, no erosion was evident; however, little to no dry beach is exposed at high tide. In 2017, a 50-ft-wide high tide beach existed indicating some minor accretion. The structures have stabilized this portion of the beach (Figure 35 and Figure 36).

According to the 2017 volume calculation, this profile has a unit volume of 127 cy/ft.

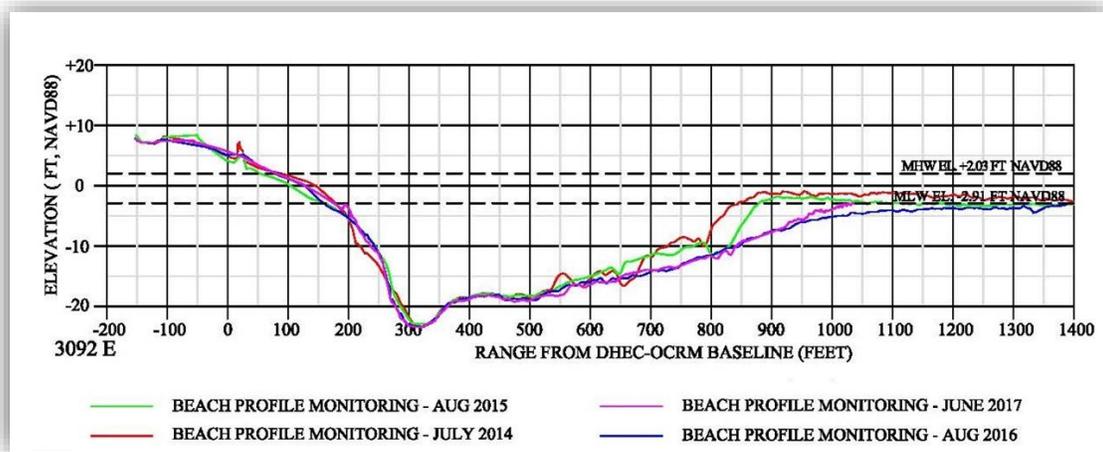


Figure 34. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3092.



Figure 35. Ground photo taken at Monument 3092 looking north on August 4, 2016 (top) and June 12, 2017 (bottom).



Figure 36. Ground photo taken at Monument 3092 looking south on August 4, 2016 (top) and June 12, 2017 (bottom). The yellow house in the foreground of the 2016 photo was removed in 2017.

3095

Monument 3095 is located near Station 32 at the northeastern tip of Sullivan’s Island on Breach Inlet. It represents a cusped beach anchored by erosion control structures (groins). The beach profile has exhibited little change over time due to the stabilization structures (Figure 37). In June 2017, some accretion was evident with a storm rack line 10 ft from the toe of vegetation and a 20 ft wide high tide beach. The structures have stabilized this portion of the beach (Figure 38 and Figure 39).

According to the 2017 volume calculation, this profile has a unit volume of 143 cy/ft.

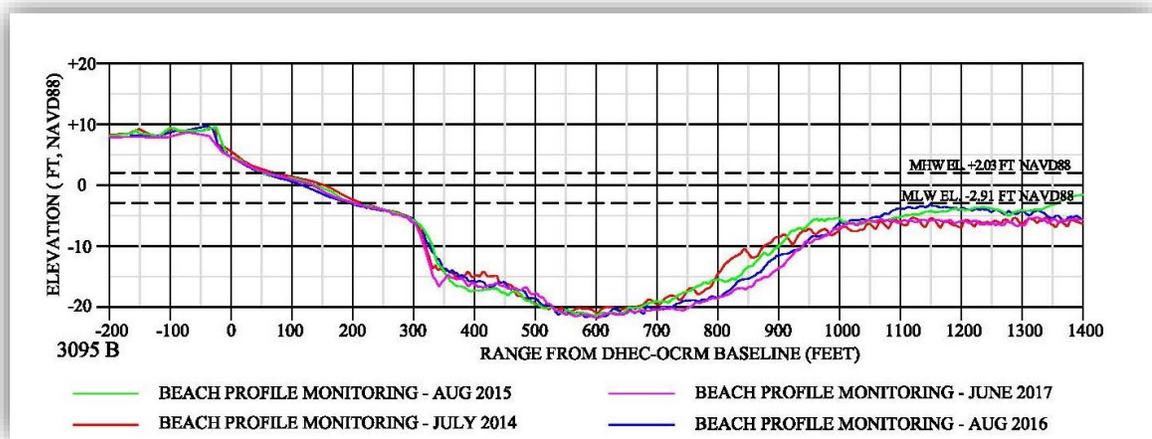


Figure 37. Beach profile monitoring data from 2014-2017 in cross-section view at Monument 3095.



Figure 38. Ground photo taken at Monument 3095 looking north on August 4, 2016 (top) and June 12, 2017 (bottom).



Figure 39. Ground photo taken at Monument 3095 looking south on August 4, 2016 (top) and June 12, 2017 (bottom).

4. Summary of 2017 Beach Monitoring Survey

This report provides an annual condition survey to monitor the Sullivan's Island beach. Beach profile data collected during August 2016 and June 2017 were compared to beach profile data collected by SCDHEC-OCRM in the summers of 2014 and 2015.

Analyses of the mean high water (MHW) position relative to the SCDHEC-OCRM Baseline and unit volume by monument were conducted. These analyses documented that the northeast end of the island, between Monuments 3090 and 3095, has little protective beach and dune system in place but has been stabilized with erosion control structures. Despite the relative stability of this section of the island, beachfront homes are located either on or seaward of the primary dune in vulnerable positions.

The data also documented a sandbar attachment event in 2014 and another that is just beginning in 2017. Most of the sediment from the 2014 attachment event has been transported downdrift, toward southwestern Sullivan's Island and the Charleston Harbor jetty. As a result, the shoreline between Station 31 and 22 (OCRM Monuments 3050 and 3085) moved about 180 ft landward between 2014 and 2016. The beach at Station 19 is extraordinarily wide and accretional with a unit volume of nearly 1,000 cy/ft due to the Charleston Harbor jetty. All indications suggest that the 2017 sand bar attachment will have similar results and the southwest end of Sullivan's Island will continue to accrete.

If the present management strategy is maintained, additional dune, beachfront marsh, and maritime forest progradation (seaward movement) is expected in the central portion of the island. Continued annual monitoring is recommended. By better understanding the beach performance following sandbar attachment events, improved management strategies may become obvious. In addition to the wide, accreting beaches in the central portion of the island, Sullivan's Island also has beach management challenges on the northeast end related to narrow beach widths and minimal storm protection. Several hot spots are being closely scrutinized.