The Coastal Research Center

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NEW JERSEY'S DISTINCTIVE PUBLIC UNIVERSITY

June 8, 2022

Mayor Corson and Township Committee Township of Upper P.O. Box 205 Tuckahoe, New Jersey 08250

Dear Mayor Corson and Committee Members:

The Stockton University Coastal Research Center (CRC) surveyed the Strathmere beaches on June 2, 2022 as the second quarter review for 2022. The winter was more intense in January with northeast storms as of January 17th with 30 MPH winds followed by a 16-inch snowstorm on January 28 and 29, 2022. February and March were reasonable with mild storms. April hit the beaches with a northeaster on the 17th and 18th with 35 MPH winds. But the Mother's Day weekend storm of May 7 and 8, 2022 made up with a long duration of winds that the intensity fortunately, did not augment. Another event occurred May 14th with 40 MPH winds. There was a review of damages that did not produce any disaster declaration at any governmental level. The CRC did visit several municipal beaches to gather emergency erosion data that showed dune damage and beach width loss.

The Strathmere beaches lost substantially in the offshore region at all sites except the southernmost beach at the Sea Isle City boundary. The net change in sand volume for the six sites was a net loss of 266,664 cubic yards of sand. However, it was skewed strongly toward offshore losses with 222,937 cubic yards removed below the zero-elevation datum while the beach and dune system shed just 43,727 cubic yards. Heavy losses were seen concentrated at Williams and Tecumseh Avenue sites this spring. The southern three locations saw shoreline advances seaward with minimal beach sand loss while UT-5 had a 147-foot shoreline retreat. Oddly, the prime erosional site at Seaview Avenue (UT-6) lost far less than the next two sits to the south and the beach above zero elevation only lost 1.14 yds³/ft.

The central beach took the greatest losses while sand accumulated to the south and minimally left the inlet zone during the spring 2022.

The six quarterly monitoring sites are as follows:

UT-1	First Street at the border with Sea Isle City (NJBPN site #120)
UT-2	2400 Commonwealth Avenue
UT-3	Jasper Avenue
UT-4	Tecumseh Avenue
UT-5	Williams Avenue (NJBPN site #121)
UT-6	Seaview Avenue at Corson's Inlet

Table 1 shows the sand volume and shoreline change values calculated for each of the six monitoring sites. It displays the values for the period from February to June 2022. Individual shoreline (feet) and sand volume (yds³/ft.) changes are displayed along with an average volume change between sites. The average of two adjacent profile volume changes multiplied by the distance between sites determines a net cell volume change. Summation of the net cell volume changes produces a total net sand volume change for the Strathmere

oceanfront beaches. Figure 1 is the most recent aerial photograph of Strathmere from March 16, 2022, about a month after the first quarter beach survey. The subsequent storm activity was the apparent cause for the beach losses reported for June.



Figure 1. March 16, 2022, aerial view of the middle and northern Strathmere shoreline showing the beach including Seaview Avenue. Beach width by mid-March remained as it had been in December 2021, so the losses seen in the June survey occurred from the April and May northeast storms. (Photo by Ted Kingston).

Profile	Shoreline	Volume	Avg.Volume	Distance	Net Volume
	Change	Change	Change	Between	Change
	(feet)	(yds ³ /ft)	(yds ³ /ft)	(feet)	(yds ³)
Southern Township Boundary					
UT-1	41	10.31			
			-1.26	1,410	-1,782
UT-2	55	-12.84			
			-19.41	2,938	-57,035
UT-3	4	-25.99			
			-39.86	2,297	-91,564
UT-4	-62	-53.74			
			-59.38	1,323	-78,556
UT-5	-147	-65.02			
			-41.41	911	-37,725
UT-6	-38	-17.81			
Northern Township Boundary					
			Total Volume Change =		-266,664

Table 1.				
Sand Volume and Shoreline Position Changes at Six Strathmere Survey Sites				
February 2022 to June 2022				

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The spring loss in sand volume for the Strathmere oceanfront amounted to 266,664 cubic yards with the loss concentrated at the mid-section of Strathmere (Tecumseh to Williams Avenues).

Table 2 shows the changes seen just in the dunes and across the dry beach to the zero-elevation point on each profile transect. Table 2

February to June Sand Volume Changes on the Dunes & Beach Only					
Profile	Shoreline	Volume	Avg.Volume	Distance	Net Volume
	Change	Change	Change	Between	Change
	(feet)	(yds ³ /ft)	(yds ³ /ft)	(feet)	(yds ³)
Southern Townsh	ip Boundary				
UT-1	41	0.38			
			-2.38	1,410	-3,355
UT-2	55	-5.14			
			-2.68	2,938	-7,884
UT-3	4	-0.23			
			-5.36	2,297	-12,317
UT-4	-62	-10.50			
			-10.94	1,323	-14,470
UT-5	-147	-11.38			
			-6.26	911	-5,701
UT-6	-38	-1.14			
Northern Township Boundary					
			Total Volume Change = -43,727		

Table 2						
February to June Sand Volume Changes on the Dunes & Beach Only						

It appears that the beaches did not suffer severe losses from the northeast storms. Offshore sand loss was more severe at -222,937 total cubic yards of sand with massive losses at Tecumseh, Williams and less from Seaview Avenue (-43.24 yds³/ft., -53.64 yds³/ft., and -16.67 yds³/ft. respectively). Only UT-1 at the Sea Isle City boundary gained sand offshore.

Table 3 Exhamout A. Long Sourd Malana Changes Offshamo Only						
Profile	Shoreline Volume Avg.Volume Distance Net Volume					
	Change	Change	Change	Between	Change	
	(feet)	(yds ³ /ft)	(yds ³ /ft)	(feet)	(yds ³)	
Southern Township Boundary						
UT-1	41	9.93				
			1.12	1,410	1,573	
UT-2	55	-7.70				
			-16.73	2,938	-49,151	
UT-3	4	-25.76				
			-34.50	2,297	-79,248	
UT-4	-62	-43.24				
			-48.44	1,323	-64,086	
UT-5	-147	-53.64				
			-35.15	911	-32,025	
UT-6	-38	-16.67				
Northern Township Boundary						
			Total Volume Change = -222,937			

Table 3 shows that this winter' northeast storms eroded sand from the mid-section of Strathmere and transported it south into Sea Isle City for the large part. The loss at Seaview Avenue was less than expected.

Individual Survey Sites on the Strathmere Oceanfront:

These locations are listed from south to north, starting at the Sea Isle City/Strathmere boundary and ending at the north curb line for Seaview Avenue south of the boundary with the NJ State Corson's Inlet Park.

UT-1, First Avenue (NJBPN #120).

This site positioned near the boundary between Sea Isle City and Strathmere, has a 36-year survey history. Following the federal project, the dune crest height is 15 feet NAVD88, while width at the toe is approximately 160 feet. The beach width extends another 300 feet seaward to the MHW line with a berm crest height of approximately 5-6 feet NAVD88.

The later spring northeast events flattened the beachface slope removing any residual berm crest. Subsequently, a tiny berm has developed on the June 2^{nd} cross section showing recovery is underway to some extent. The deep offshore bar trough was compensated for with a huge bar crest further seaward after the Mother's Day storm.



Figure 2. This view to the north across the seaward dune slope on June 2, 2022, shows the continued advance of dune grass progression onto the wider dry beach. Island dunes are appearing on the back beach as the wind produces high spots that vegetate. The site was the only one with positive sand amounts added since February 2022.



UT-2, Located at 2400 Commonwealth Avenue.

The site is located along the southern undeveloped eastern side of Commonwealth Avenue across the road from 2400 Commonwealth Avenue. The current dune crest elevation is 15 feet NAVD 88 and 160 feet in width at the toe. The beach extended an additional 300 feet seaward from the dune toe to the MHW line. This cross section performed similar to the UT-1 site to the south with minimal beach sand loss and a very large bar developed offshore. Here the bar gained a little less sand deposited since February than the trough lost through storm wave excavation when compared to the UT-1 site.



Figure 4. The dune toe slope has generously expanded since the federal project was completed and gradually merges with the dry beach as grass plants colonize toward the ocean. Since the Mother's Day storm, the flat beachface slope has developed a tiny berm and a small bar lies just offshore as recovery begins. The storm generated an enormous offshore bar and a deep trough between it and the beach.



UT – 3, Jasper Avenue.

This site is located at Jasper Avenue, where development of property on the eastern side of Commonwealth Avenue is virtually complete. The site appears to have lost more sand than the two more southerly sites, but the reasons lie in a smaller offshore bar deposit as compared to the deep trough excavated into the nearshore sea bottom. The Mother's Day storm left a very flat beachface slope that has yet to recover, but the beach and dune losses were minimal at -0.23 yds³/ft. and just a 4-foot shoreline retreat since February 2022.



Figure 6. A view across the primary dune with its established vegetation and the expanse of wind deposition as a foredune system developing on the wide dry beach at this site. Jasper Avenue had a history of breaching and overwash starting in 1984 and 1985 with Hurricane Gloria that has dramatically changed because of beach nourishment projects both local/State and Federally sponsored.



UT – 4, Tecumseh Avenue.

This site provides data on the transition in the beach orientation and taper into a zone of influence of Corson's Inlet tidal dynamics on the northern beaches. The timber bulkhead jogs landward south of Sherman Avenue one block south of Sumner Avenue, because of a natural setback in the shoreline.

Tecumseh Avenue suffered severe shoreline erosion between February and June 2022 as the offshore was eroded into a deep trough close enough to the beachface slope to include loss to the beach itself. The shoreline retreated 62 feet landward, and this shows in the picture in figure 8 as a small scarp in the seaward edge of the fore dune system that was established over the past 8 years on the wider beach. The site lost 53.74 yds³/ft. since February 2022 and has become part of the two-site erosion zone developed on the Strathmere oceanfront this year.



Figure 8. This June 2, 2022, view to the south shows a very narrow dry beach remaining after the Mother's Day storm in May with debris on the small fore dunes that developed earlier on the wider beach here. Between Tecumseh and Williams Avenues the Strathmere shoreline saw considerable retreat not continuous either to the north at the inlet or to the south toward Sea Isle City.



UT – 5, Williams Avenue (NJBPN #121).

This site is located near the southern limit for direct inlet influences. However, this spring the site suffered the greatest sand loss of the six sites (-65.02 yds³/ft.) combined with a 147-foot shoreline retreat landward. A deep trough was excavated at the toe of the beachface slope into the water without a large offshore bar being added as a deposit of the storm-transported sand. The bar is fairly low in crest elevation but lies just offshore in position to readily move onto the beach as a recovery of some lost material.



Figure 10. This June 2, 2022, view to the south shows the storm debris washed up to the foredune toe and a narrower dry beach since the February survey. There was no dune erosion, but the beach retreat has been significant at the moment.



UT – 6, Seaview Avenue near the Park Boundary.

This site is located adjacent to Corson's Inlet. This makes it vulnerable to rapid beach changes from inlet dynamics and northeast storms. To mitigate these losses, the recent federal project created a wide bump out in the beach width. Shoreline retreat was limited to 9 feet by late February with a beachface slope sand volume loss of just -1.10 yds³/ft. The expectation would be for considerable added beach loss; however, the June 2, 2022, site survey found that the beach and dune system lost just 1.14 yds³/ft. with a 38-foot shoreline retreat. Figures 12 and 13 show the February 2022 view to the south across the access pathway compared to the June 2nd photograph (Figure 13). The remnant sand fencing present in February is gone by June, but the pathway fence posts at the scarp edge in February are still present in the June view.



Figure 12. The February 23, 2022 view at the scarp cut into the seaward dune toe slope is compared to the same view taken June 2, 2022.



Figure 13. The June 2, 2022 view across the same segment of the Seaview Avenue dune shows the same arrangement of pathway posts present on the beach seaward of the scarp with approximately the same distance between the posts and the scarp in both pictures. The beach loss was minimal, while offshore some vertical erosion took place generating the 17.81 yds³/ft. loss in sand volume. The beach and dune losses were 1.14 yds³/ft. of that total.



Summary:

Clearly the May 7 and 8th Mother's Day storm event (followed by another event May 14th) had a significant impact on the Strathmere shoreline that was confined mostly to the offshore region and was concentrated between Tecumseh and Williams Avenue sites (UT-4 and UT-5). At these two locations the shoreline retreated significantly as the offshore erosion cut into the beach width moving the zero-elevation position landward. The southern three locations saw a deep trough excavated offshore, but little in the way of beach erosion. The best news of the interval was that the Seaview Avenue site beach remained in place with little added erosion in spite of some offshore elevation decline on the bar shoals seaward of the low tide line.

The CRC will conduct the third quarterly survey after Labor Day. Please contact the Coastal Center with questions.

Sincerely,

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Dr. Stewart Farrell Executive Director Coastal Research Center