



New Jersey Beach Profile Network

Cape May County

**Great Egg Harbor Inlet
to Stow Creek**

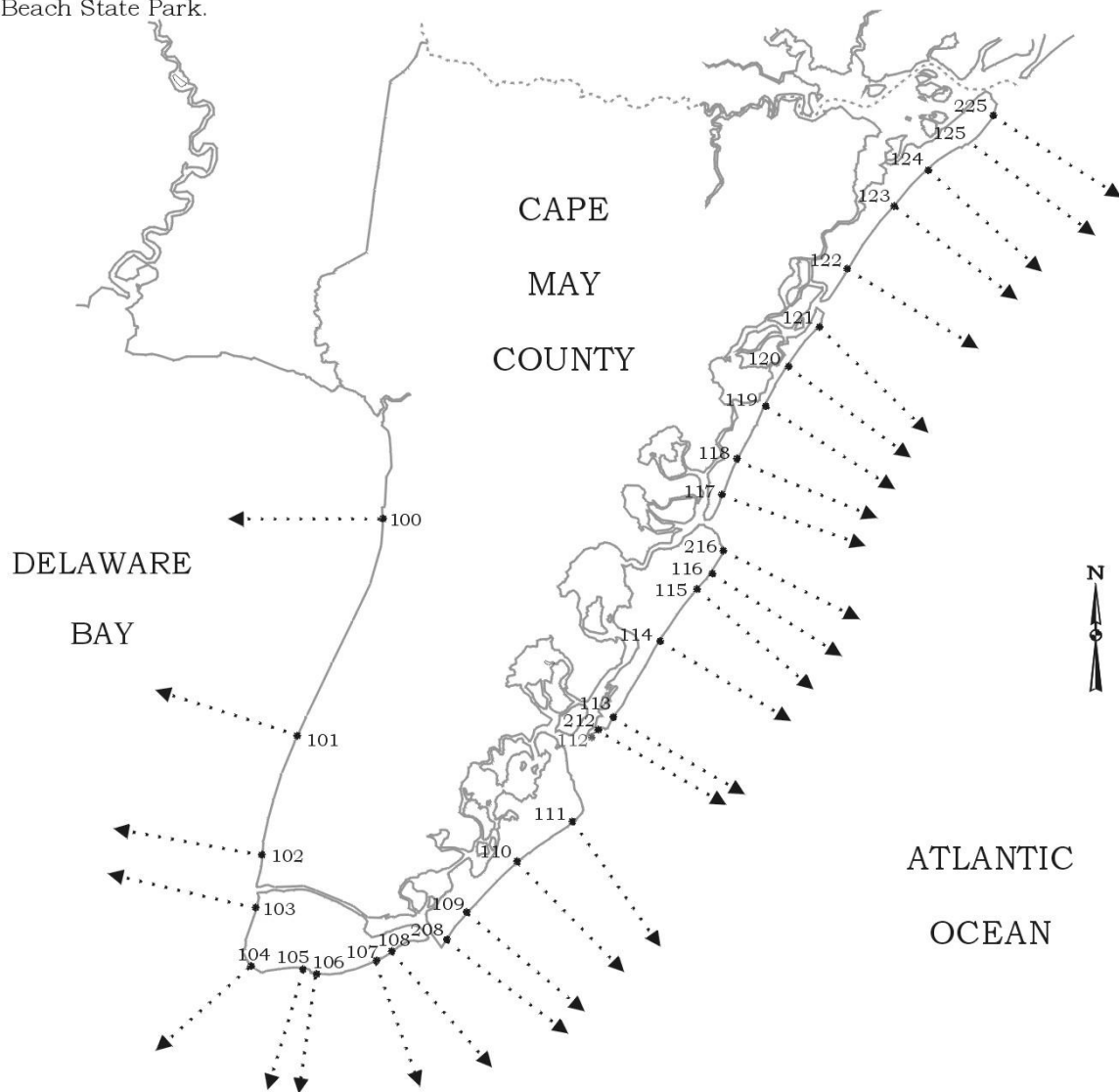
**NJBPN Profile #'s
225 - 100**



New Jersey Beach Profiles Network Cape May County Profile Site Locations

Figure 81

There are twenty-nine NJBPN survey sites along the beaches of Cape May County, which are a combination of barrier islands, coastal headlands and bayshore. Twenty-five sites are Atlantic Ocean profiles and the remaining four are set along the Delaware Bay shoreline of western Cape May County. The ocean profile sites are located in the following municipalities: the City of Ocean City, Strathmere in Upper Township, the City of Sea Isle City, the Borough of Avalon, the Borough of Stone Harbor, North Wildwood, the City of Wildwood, Lower Township, the City of Cape May, and the Borough of Cape May Point. Profile #112 on South Pointe in Stone Harbor was lost due to continuous erosion and was replaced by profile #212, which is located south of 121st Street in Stone Harbor. The four Delaware Bay profiles are located in the communities of Reeds Beach in Middle Township, Villas in Lower Township, North Cape May in Lower Township and at the Higbee Beach State Park.





Photoplate 7a. Picture taken October 29, 2001 looking north from 15th Street in North Wildwood, NJ. Erosion since 1999 has already removed hundreds of feet in shoreline width at this site. The small dune on the right is a relict of backbeach dunes formerly between the shoreline and the old dunes to the left.



Photoplate 7b. By Dec. 17, 2004 all the dry sand was gone and waves were cutting into the dunes and old vegetation north of the survey site. Conditions have deteriorated to the point where intervention may become necessary. Hereford Inlet must return to a southwest exit into the ocean to stop this erosion.



Photoplate 8a. Picture taken Sept. 27, 2000 looking south toward the Cape May lighthouse. Long term growth in sand volume has been triggered by the Cape May City beach restoration project completed in 1989-1990. Southerly migration of sediment has produced the advance in shoreline width starting at the signboard.



Photoplate 8b. By Oct. 28, 2004 the growth in vegetation and advance in the shoreline had further increased the sand volume present at this natural site. Keep in mind that in 1986, the waves commonly reached the toe of the slope in the foreground.

TABLE 13
CAPE MAY COUNTY
ANNUAL BEACH VOLUME CHANGES
SPRING 2003 - SPRING 2004 & FALL 2003 - FALL 2004

PROFILE SITE LOCATION	Survey	
	26 - 28	27 - 29
	S2003 - S2004	F2003 - F2004
	(volume expressed as cubic yards per foot)	
225: Ocean City, Gardens Rd.	29.76	13.62
125: Ocean City, 6th St.	138.81	92.84
124: Ocean City, 20th St.	-14.82	19.80
223: Ocean City, 34th St.	3.14	5.54
122: Ocean City, 56th St.	17.23	-9.97
121: Strathmere, Williams Rd.	-29.90	-132.01
120: Sea Isle City, 1st St.	-10.01	2.83
119: Sea Isle City, 25th St.	26.13	10.12
118: Sea Isle City, 57th St.	25.94	4.10
117: Sea Isle City, 80th St.	-12.43	-14.48
216: Avalon, 9th St.	-9.31	-15.57
116: Avalon, 23rd St.	-49.82	-19.23
115: Avalon, 35th St.	13.86	-5.20
114: Avalon, 70th St.	38.51	15.29
113: Stone Harbor, 90th St.	-21.84	-21.53
212: Stone Harbor, 121st St.	-45.95	-49.98
112: Stone Harbor, South Pointe	** NO LONGER ACTIVE **	
111: North Wildwood, 15th Ave.	-36.62	-85.43
110: Wildwood, Cresse Ave.	37.80	23.82
109: Lower Township, Raleigh Ave.	24.13	28.61
208: Lower Township, U.S.C.G. Base	3.07	26.32
108: Cape May, Beach Club	9.69	12.38
107: Cape May, Baltimore Ave.	3.81	2.07
206: Cape May, Broadway Ave.	42.05	46.57
105: Cape May, Nature Conservancy	24.99	-37.86
104: Cape May Point, Lake Dr.	6.71	2.60
103: Higbee Beach State Park	1.80	1.22
102: North Cape May, Whittier	7.57	2.91
101: Villas, Pacific Ave.	-1.44	-4.17
100: Reeds Beach, Beach Ave.	1.79	-1.03

TABLE 14
CAPE MAY COUNTY
ANNUAL SHORELINE CHANGES
SPRING 2003 - SPRING 2004 & FALL 2003 - FALL 2004

PROFILE SITE LOCATION	Survey	
	26 - 28 S2003 - S2004	27 - 29 F2003 - F2004
	(shoreline change expressed in feet)	
225: Ocean City, Gardens Rd.	70.4	0.4
125: Ocean City, 6th St.	141.0	130.0
124: Ocean City, 20th St.	-37.5	34.2
223: Ocean City, 34th St.	48.1	-32.6
122: Ocean City, 56th St.	56.4	-11.9
121: Strathmere, Williams Rd.	-64.3	-232.8
120: Sea Isle City, 1st St.	-7.3	16.1
119: Sea Isle City, 25th St.	40.5	68.4
118: Sea Isle City, 57th St.	89.7	13.3
117: Sea Isle City, 80th St.	15.6	-34.0
216: Avalon, 9th St.	-40.4	-42.9
116: Avalon, 23rd St.	-30.9	-35.1
115: Avalon, 35th St.	39.9	2.2
114: Avalon, 70th St.	139.7	-11.4
113: Stone Harbor, 90th St.	-7.2	-54.0
212: Stone Harbor, 121st St.	-41.5	-82.9
112: Stone Harbor, South Pointe	** NO LONGER ACTIVE **	
111: North Wildwood, 15th Ave.	-78.9	-27.9
110: Wildwood, Cresse Ave.	84.0	-21.1
109: Lower Township, Raleigh Ave.	48.2	25.0
208: Lower Township, U.S.C.G. Base	-40.6	57.5
108: Cape May, Beach Club	15.3	15.2
107: Cape May, Baltimore Ave.	-4.5	-13.5
206: Cape May, Broadway Ave.	57.4	52.0
105: Cape May, Nature Conservancy	85.6	-107.3
104: Cape May Point, Lake Dr.	-6.1	-2.5
103: Higbee Beach State Park	-20.8	-7.8
102: North Cape May, Whhittier	27.5	6.8
101: Villas, Pacific Ave.	21.9	-38.4
100: Reeds Beach, Beach Ave.	-6.3	-1.9

TABLE 15
CAPE MAY COUNTY
SEASONAL BEACH VOLUME CHANGES

PROFILE SITE LOCATION	Survey	26-27	27-28	28-29	26-29
		S03-F03	F03-S04	S04-F04	S03-F04
(volume expressed as cubic yards per foot of beachfront)					
225: Ocean City, Gardens Rd.		-0.56	30.11	-16.31	12.50
125: Ocean City, 6th St.		-0.36	140.59	-48.37	91.66
124: Ocean City, 20th St.		12.19	-27.23	54.46	34.00
223: Ocean City, 34th St.		16.41	-10.74	16.10	24.23
122: Ocean City, 56th St.		18.19	1.82	-9.95	9.47
121: Strathmere, Williams Rd.		0.97	-32.71	-100.52	-132.91
120: Sea Isle City, 1st St.		-2.97	-7.10	9.89	1.11
119: Sea Isle City, 25th St.		19.86	4.38	6.41	33.10
118: Sea Isle City, 57th St.		26.53	-0.35	5.18	32.53
117: Sea Isle City, 80th St.		2.97	-15.47	1.02	-11.48
216: Avalon, 9th St.		2.02	-7.64	-8.12	-15.92
116: Avalon, 23rd St.		-22.15	-26.61	7.57	-41.06
115: Avalon, 35th St.		31.65	-17.83	12.47	26.46
114: Avalon, 70th St.		33.18	5.69	9.65	48.55
113: Stone Harbor, 90th St.		1.40	-28.09	1.62	-19.01
212: Stone Harbor, 121st St.		3.45	-50.92	1.33	-45.65
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **			
111: North Wildwood, 15th Ave.		-14.59	-26.13	-59.29	-95.40
110: Wildwood, Cresse Ave.		22.08	15.75	10.47	51.81
109: Lower Township, Raleigh Ave.		13.78	11.03	17.73	42.78
208: Lower Township, U.S.C.G. Base		-5.14	7.83	17.65	19.34
108: Cape May, Beach Club		12.81	-3.09	15.35	25.11
107: Cape May, Baltimore Ave.		-0.59	4.54	-2.45	1.43
206: Cape May, Broadway Ave.		13.76	28.90	17.64	60.11
105: Cape May, Nature Conservancy		27.13	-4.59	-33.92	-6.51
104: Cape May Point, Lake Dr.		8.36	-2.85	4.57	10.58
103: Higbee Beach State Park		-1.75	3.56	-2.50	0.45
102: North Cape May, Whittier Ave.		8.77	-0.86	7.20	11.07
101: Villas, Pacific Ave.		-1.16	-0.15	-4.18	-5.50
100: Reeds Beach, Beach Ave.		0.85	0.83	-1.89	-0.33

TABLE 16
CAPE MAY COUNTY
SEASONAL SHORELINE CHANGES

PROFILE SITE LOCATION	Survey	26-27	27-28	28-29	26-29
		S03-F03	F03-S04	S04-F04	S03-F04
(shoreline change expressed in feet)					
225: Ocean City, Gardens Rd.		26.0	44.5	-44.0	26.4
125: Ocean City, 6th St.		-30.5	171.5	-41.5	99.5
124: Ocean City, 20th St.		-35.7	-1.9	36.0	-1.5
223: Ocean City, 34th St.		-24.5	72.6	-84.1	-57.0
122: Ocean City, 56th St.		22.3	34.1	-46.0	10.4
121: Strathmere, Williams Rd.		-6.7	-57.5	-175.3	-239.6
120: Sea Isle City, 1st St.		13.0	-20.3	36.4	29.0
119: Sea Isle City, 25th St..		-32.8	73.3	-4.9	35.6
118: Sea Isle City, 57th St..		57.6	32.0	-18.7	71.0
117: Sea Isle City, 80th St..		6.0	9.6	-43.6	-28.0
216: Avalon, 9th St.		-24.0	-16.5	-26.5	-66.9
116: Avalon, 23rd St.		26.7	-57.6	22.4	-8.5
115: Avalon, 35th St.		70.6	-30.7	32.8	72.8
114: Avalon, 70th St.		122.9	16.7	-28.1	111.6
113: Stone Harbor, 90th St.		43.1	-50.3	-3.7	-10.9
212: Stone Harbor, 121st St.		-16.9	-24.6	-58.3	-99.8
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **			
111: North Wildwood, 15th Ave.		-124.1	45.2	-73.1	-152.0
110: Wildwood, Cresse Ave.		148.9	-65.0	43.9	127.9
109: Lower Township, Raleigh Ave.		34.6	13.5	11.5	59.6
208: Lower Township, U.S.C.G. Base		-28.1	-12.4	69.9	29.3
108: Cape May, Beach Club		21.2	-5.9	21.1	36.4
107: Cape May, Baltimore Ave.		6.5	-11.0	-2.4	-6.9
206: Cape May, Broadway Ave.		34.0	23.4	28.6	86.0
105: Cape May, Nature Conservancy		143.3	-57.6	-49.7	36.0
104: Cape May Point, Lake Dr.		22.3	-28.4	26.0	19.8
103: Higbee Beach State Park		-11.6	-9.3	1.5	-19.3
102: North Cape May, Whittier Ave.		23.7	3.7	3.1	30.5
101: Villas, Pacific Ave.		28.2	-6.3	-32.1	-10.2
100: Reeds Beach, Beach Ave.		-6.1	-0.2	-1.6	-8.0

Cape May County Beach Volume & Shoreline Position Changes - Spring 2003 to Spring 2004

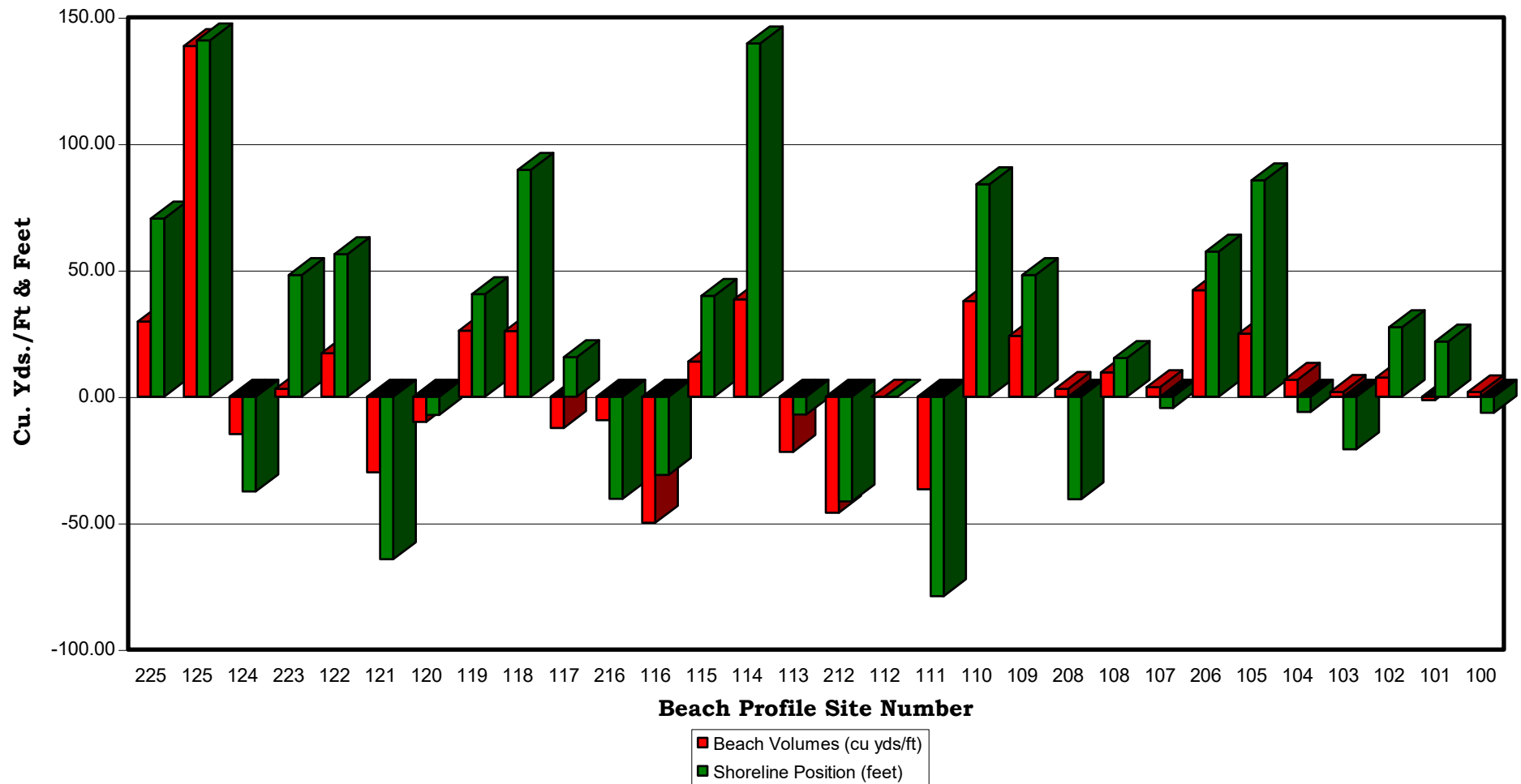


Figure 82a. The winter of 2003 – 2004 was less severe than the previous one, with the only large sand volume (#125) due to ACOE beach maintenance. Sites 223 and 206 represent minor lateral movements of the line to avoid recent construction on the shoreline. The largest loss was seen on the North Wildwood beach at 15th Street.

Cape May County Beach Volume & Shoreline Position Changes - Fall 2003 to Fall 2004

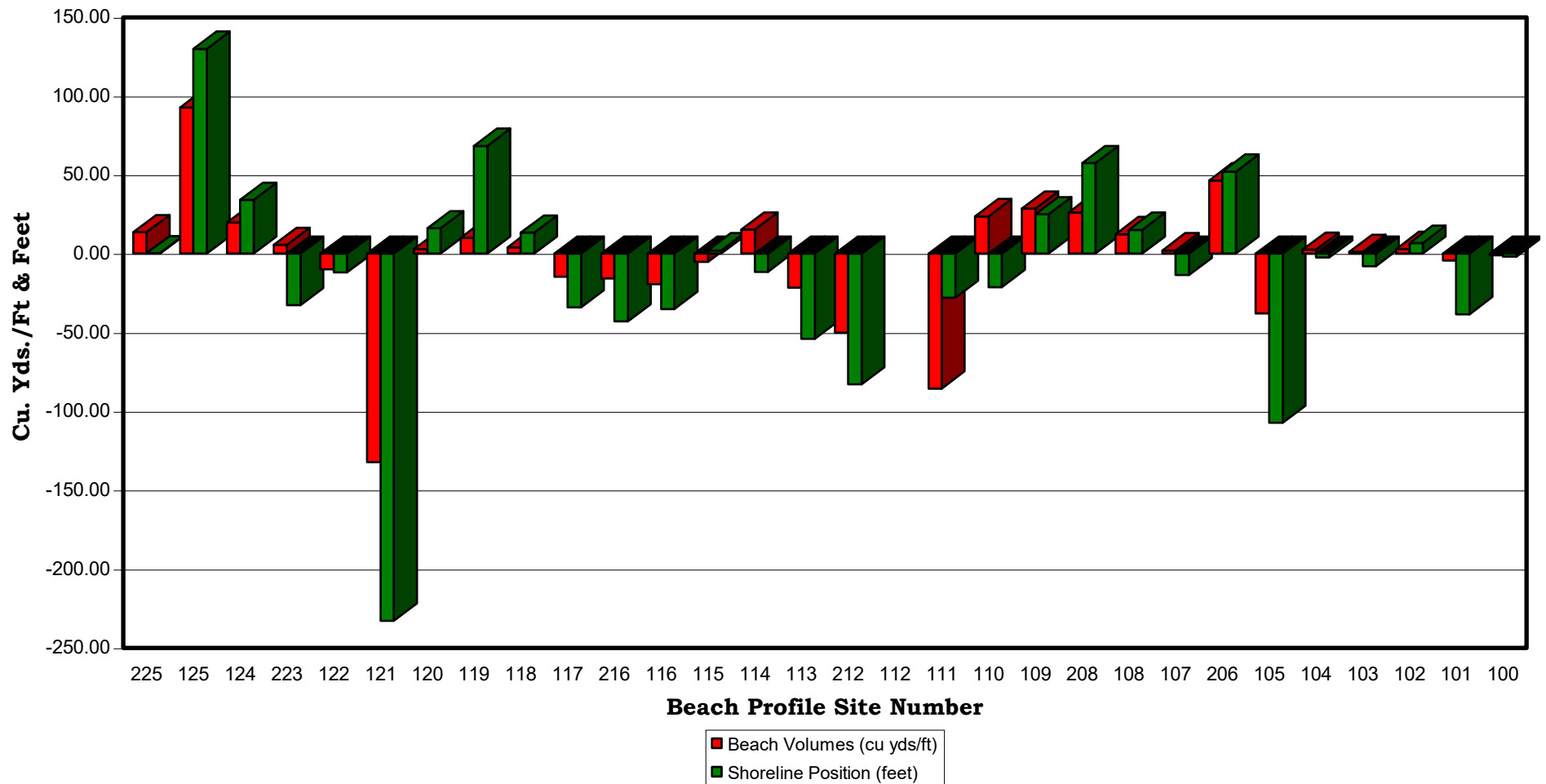


Figure 82b. The direct comparison of the 2003 and 2004 fall surveys show a retreat at site 121, but low rates of change elsewhere along the Cape May County shoreline.

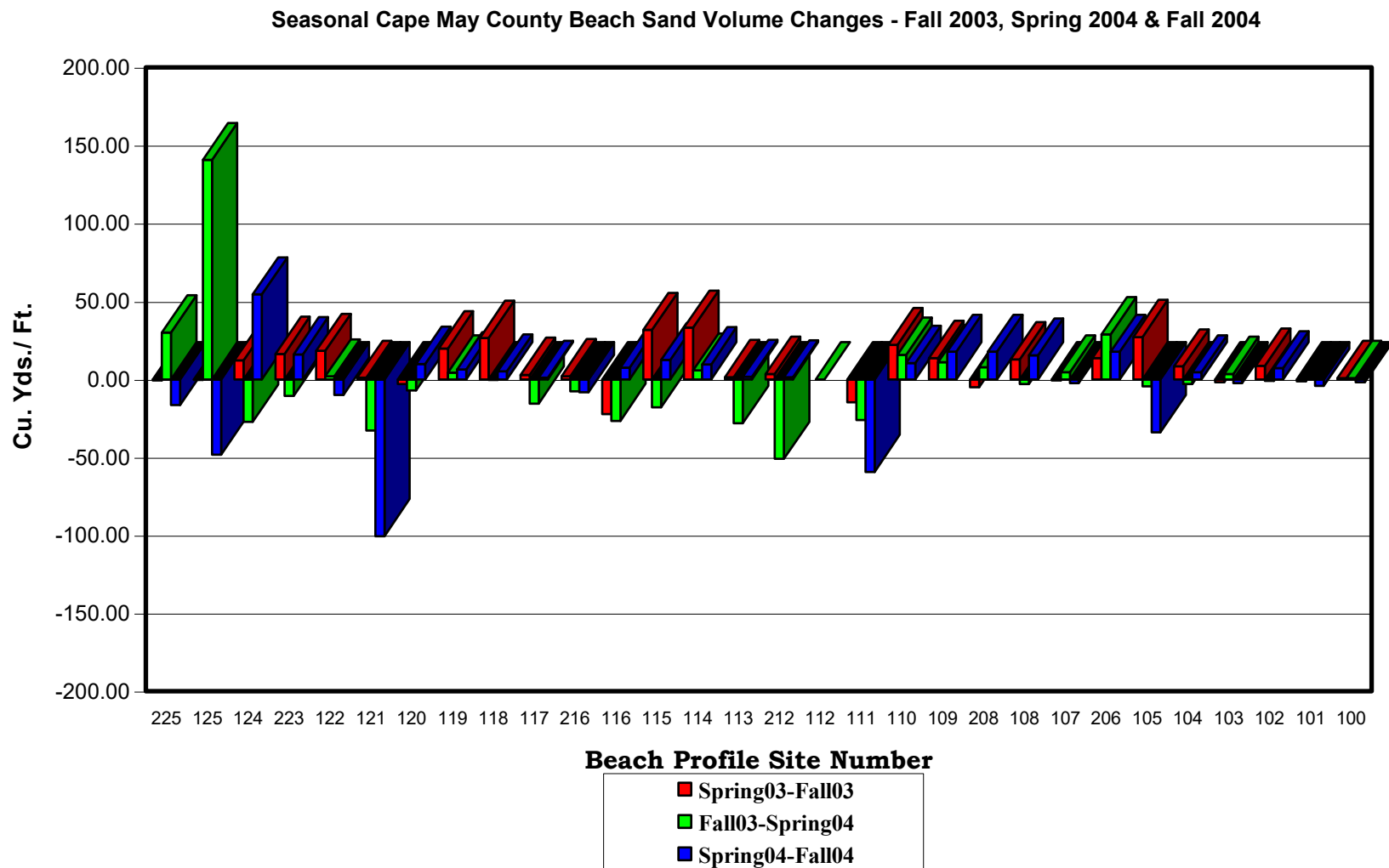


Figure 82c. The three seasonal comparisons for sand volume change are presented as three bars for each site. The fill at site 125 took place following the fall 2003 survey. Other changes ranged between plus and minus 50 cubic yards of sand per foot of shoreline distance.

Seasonal Cape May County Beach Shoreline Changes - Fall 2003, Spring 2004 & Fall 2004

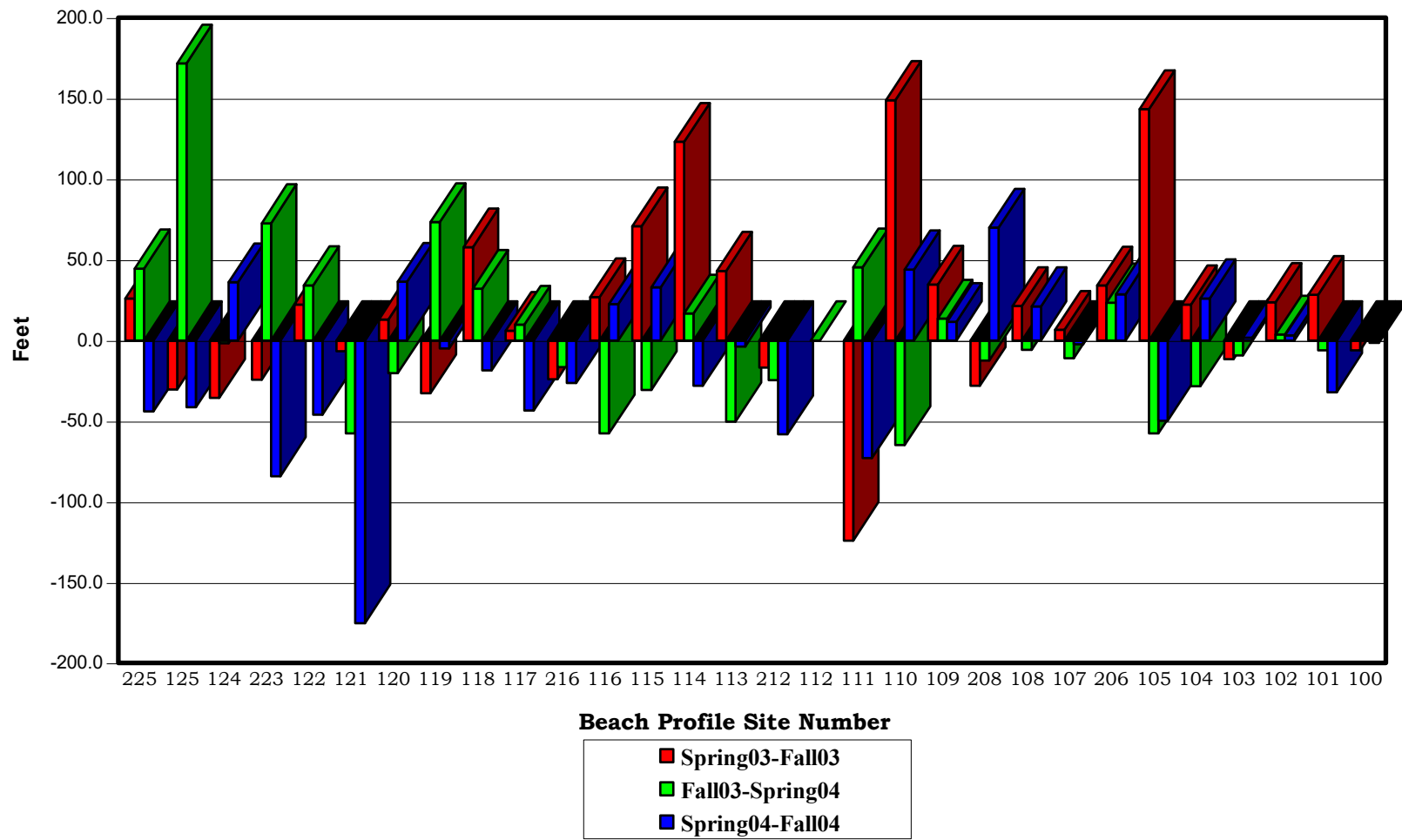


Figure 82d. Seasonal changes in shoreline position are more active, with site 125 leading the advances due to ACOE beach maintenance activity. Shoreline positions generally advance in the summer and retreat in the winter and that seems to hold true in most cases.

Cape May County Beach Volume & Shoreline Position Changes - Spring 2003 to Fall 2004

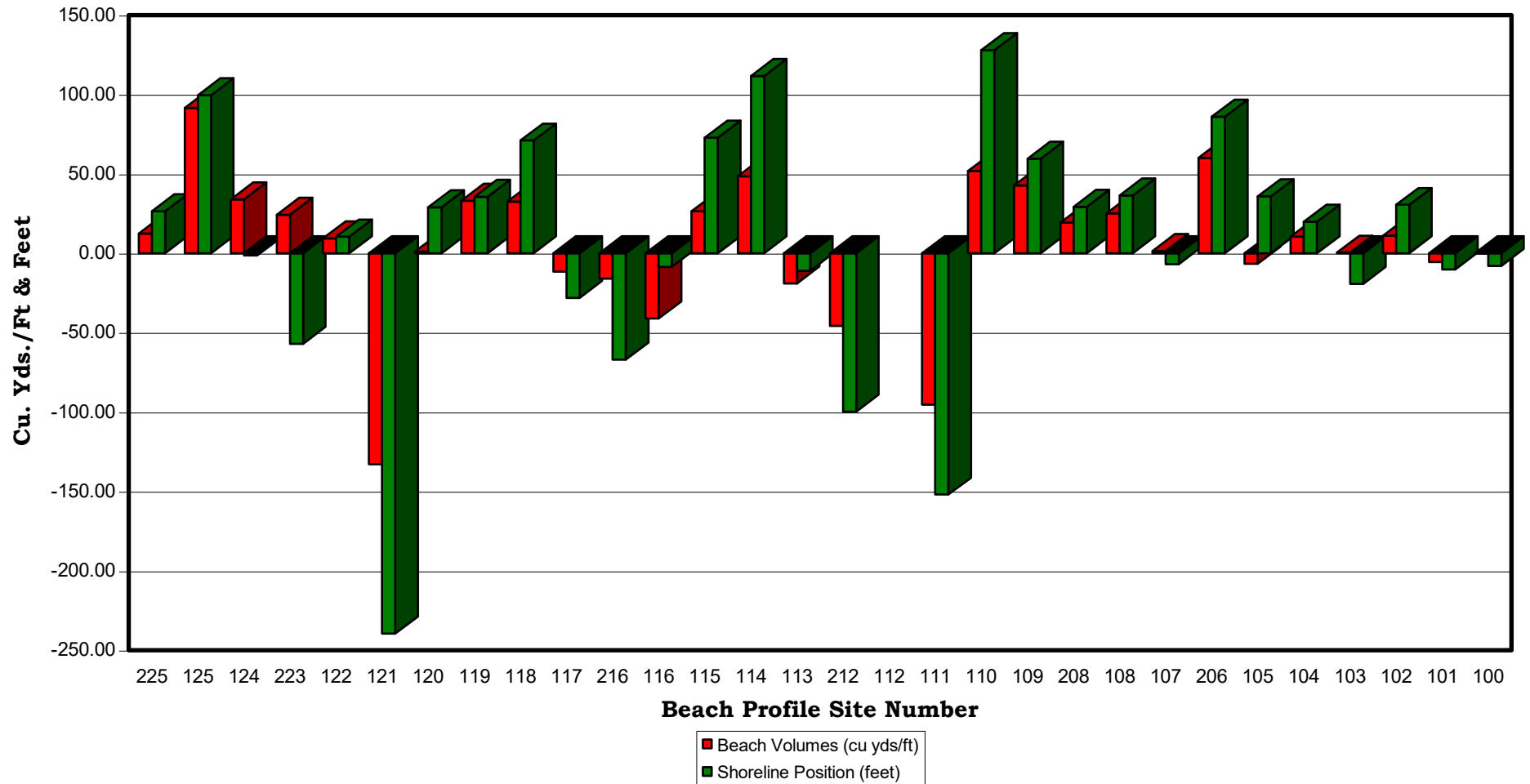


Figure 82e. The 18-month study interval shows severe loss at three inlet locations (#121, #212 and #111) with recovery on the beaches a general occurrence during the summer of 2004. Sites proximal to inlets tend to be sensitive to tidal channel and current changes rather quickly.

SUMMARY OF INDIVIDUAL SURVEY STATIONS LOCATED IN CAPE MAY COUNTY

- **Profile #225 – Gardens Road, Ocean City, Cape May County** (fig. 83)

This site was added to the network in 1994 to monitor the shoreline near Great Egg Inlet at the north end of Peck's Beach in Ocean City. The profile starts at the seaward end of Gardens Road, crosses over Beach Road and continues over a 260 foot-wide dune system. The landward dune slope and crest are very stable, covered in a dense blanket of dune grass mixed with a few bayberry shrubs and Seaside Goldenrod plants. The elevation of the primary dune crest is about 17 feet NGVD. From the primary crest seaward to the foredune, dune grass flourishes with a few goldenrod and Sea Rockets that inhabit the foredune. The wide dune continued to grow at the seaward margin adding sand to the slope and foredune crest (1.28 yds³/ft.) This wider natural area begins near North Avenue and continues north past Gardens Road towards Great Egg Inlet.

The Philadelphia District Corps of Engineers project for beach restoration in Ocean City is co-sponsored by the State of New Jersey and local municipality and was started in the summer of 1992. The Corps of Engineers is committed to a 50-year program to maintain these beaches in Ocean City. This site is very sensitive to gains or losses because inlet tidal currents combine with waves to move sand quickly off the beach into the inlet channel system or further northwest along the inlet shoreline toward the bridge to Longport. The site is supplied sand from northerly littoral currents that have acted to move substantial quantities of sand from the oceanfront shoreline to the inlet beaches.

The four surveys of the beach seaward of the dune toe remained very stable over the 18-months of this study. The position of the offshore sand surface was more constant than might be expected so close to an inlet. The net change in sand volume was 24.26 yds³/ft. gained at the beach with a loss offshore yielding the net sand volume gain of 12.50 yds³/ft. with a 26-foot shoreline advance.

- **Profile #125 – 6th Street, Ocean City, Cape May County** (fig. 84)

The site was established in 1982 during an early cooperative beach nourishment agreement between Ocean City and the State of New Jersey. This profile was set at the seaward end of 6th Street and includes the street end wooden bulkhead and boardwalk. Situated at the center of an intense erosional segment of shoreline, this site has documented enormous sediment budget fluxes over the entire period of surveying. Prior to the 1992 Corps of Engineers (ACOE) project, the low tide shoreline position was landward of the boardwalk and wave run-up frequently overtopped the bulkhead presently near the street-end reference position for the profile line. The shoreline continues to have problems retaining sand even during periods of very calm seas. The losses have been continuous over the long-term study and indicate no substantial change in the erosion rate seen at 6th Street beaches for the last twenty years. However, structural damage from storm waves to the boardwalk, which occurred frequently prior to the 1992 project, has been prevented by the additional beach width provided by the beach nourishment project.

Sixth Street has been an area of high sand loss rates since the 1980's when the State tried an early beachfill in 1982. Between October 2003 and May 2004, 140.59 yds³/ft. of sand were added to the beach by a maintenance effort by the ACOE. Retreat commenced during the following summer with 32.46 yds³/ft. removed from the beach as the berm retreated about 100 feet at the 10-foot elevation (42 feet at the zero datum position). The offshore portion of the profile became lower in elevation as well (-48.37 yds³/ft. in total sand volume loss). This loss

rate during a summer where accretion is normal argues for a very unstable shoreline position in the 4th to 12th Street oceanfront in Ocean City.

- **Profile #124 – 20th Street, Ocean City, Cape May County** (fig. 85)

Profile #124 is located at the seaward end of 20th Street. The profile includes the street end wooden bulkhead and boardwalk located landward of the dune. A substantial dune system 200 feet wide with a crest elevation of 17 feet NGVD continues to expand seaward. The dune is covered by an abundance of dune grass mixed with sporadic goldenrod and other early colonizing species such as Sea Rocket on the foredune. This dune started to develop after the completion of the initial ACOE beach nourishment project in 1992. The dune gained 2.68 yds³/ft. in sand volume during the 18 months of study.

This location is near the southern end of the initial phase of the ACOE beachfill project completed October 1992 when 2.6 million cubic yards of sand were added to the Ocean City beaches. Prior to this project the street end wooden bulkhead provided the only shore protection for the oceanfront property and public infrastructure. This hard structure was repeatedly overtopped by storm waves as water surged under the boardwalk during small northeast events. The boardwalk frequently suffered significant damage from storm waves that reflected off the bulkhead, impacted the next incoming wave, which forced the water to shoot up through the boardwalk, lifting the decking boards from support timbers. Since completion of the project and subsequent dune development there has been no storm wave damage to any of the oceanfront property or infrastructure within the project area, including the boardwalk.

The beach varied considerably during the study with the growth and decay of the berm on a seasonal basis combined with the landward migration of offshore bars. The largest bar system was surveyed in November 2004 with sand moved in its closest proximity to the shoreline. The net sand volume change was 34.00 yds³/ft. largely due to the landward migration and growth of the bar. The shoreline only changed by –1.5 feet.

- **Profile #223 – 34th Street, Ocean City, Cape May County** (fig. 86a)

During the spring 2004 the Coastal Research Center created another profile (site 223) positioned approximately 60 feet south of the original profile (site 123). This new profile will replace the original (123) for the purpose of incorporating the significant dune system, which is a key component in the overall performance of the profile.

At this newly established profile site changes had already occurred between May and November 2004. The creation of a double-tiered berm had taken place by survey 29 as well as significant increases in offshore elevations. The dune remained unchanged through this time period.

- **Profile #123 – 34th Street, Ocean City, Cape May County** (fig. 86b)

This site is located at the seaward end of 34th Street adjacent to the local lifeguard headquarters'. Because of the building and vehicle beach access path there is a break in the dune system at this site. Consequently, the large dune system present north and south of the profile site is not documented on the profile plots. The landward "dune" toe is located just seaward of a partially buried wooden bulkhead adjacent to the oceanfront properties. The hill of sand has a width of approximately 100 to 140 feet with about 6 feet of elevation relief from the beach grade to the crest. To more clearly illustrate the nature of this shoreline including its dune, this profile was moved about 60 feet south so that the line now crosses the dune developed at the beach. The change came during the spring of 2004 and the comparison plot is included to show the difference made by the dune. The wide access pathway at the 34th Street end still exists and would easily funnel major storm water into the developed area

landward. The dune represents a 23.44 cubic yard sand volume buffer rising to 19 feet elevation.

The southerly shift in the cross section alignment did not materially change the beach position, width or offshore configuration very much. True volume data only exist for the spring 2003 to fall 2003, and fall 2003 to spring 2004 for the old position (#123) and for the summer of 2004 for the new position (#223). The net change for 2004 was a gain of 16.10 yds³/ft. with a 84-foot shoreline retreat. Omitting the dune difference the net 18-month change was a 24.23 yds³/ft. sand volume increase and a 57-foot shoreline retreat. These numbers do not count the dune volume indicated in the paragraph above, but might be slightly affected by the shift in position to the south in spite of efforts to align the reference position exactly 90 degrees from the alignment of the old profile line at the reference marker for the old line.

- **Profile #122 – 56th Street, Ocean City, Cape May County** (fig. 87)

The site is located at the seaward end of 56th Street. The profile includes the street end, a wooden bulkhead with rocks partially buried below the sand along the seaward side that forms a significant storm protection revetment for oceanfront property. Efforts to establish a dune have been limited by a minimal beach width that allows storm wave run up high on the upper beach. The State and local project completed in 1995 enhanced the beach width to allow some minor dune development. A small dune was pushed in place and subsequently planted and fence installed around the perimeter. Accretional processes allowed for the dune to grow nearly 45 feet in width and gain sand across its width beyond the crest. The tiny fore dune grew by 1.04 yds³/ft. by the spring of 2004 and added about the same volume of sand during the following summer.

The beach varied seasonally, gaining during the summer months and eroding a bit during the winter periods. Offshore, bar migration had a significant impact on sand volume location as it moved landward. The November cross section clearly shows a large volume of sand moved to about 500 feet from the reference position. Gain at the crest is offset by the loss further seaward as the bar moved landward. The net change was a gain in sand volume of 9.47 yds³/ft. and a 10-foot shoreline advance.

- **Profile #121 – Williams Road, Strathmere, Cape May County** (fig. 88)

Profile #121 is located at the seaward end of Williams Road adjacent to a beach access path and a lifeguard shack erected several years after the site was established. As a result of the beach access path and alterations to the dune area from the lifeguard staging area that surrounds the shack the dune configuration is not typical of the region. The dune configuration is marginally wider north of the profile line while the crest elevation is several feet higher than on the line. Dune grass and goldenrod with a few bayberry plants provide ground cover for the dune off of the profile line.

The site lies within the influence of Corson's Inlet, which can cause significant changes along the shoreline and seafloor. This tendency exploded during the summer of 2004 as the beach vanished and the offshore region grew 3 feet deeper in spite of a huge offshore bar. The loss on the beach amounted to 135.58 yds³/ft. accompanied by a 175-foot shoreline retreat. Since then no further retreat into the dunes has occurred, but bar migration still causes large sand volume changes. All other variations on the profile line amounted to no significant changes because the net 18-month change was 132.91 yds³/ft. lost from the entire 1,650 feet of cross section length. The total shoreline retreat was an impressive 240 feet.

- **Profile #120 – 1st Street, Sea Isle City, Cape May County** (fig. 89)

This site consists of abundant dune grass on the landward slope and crest with a dune fence installed at the landward toe to prevent foot traffic across the dune. Minor to moderate storms have destroyed the dune four times since 1984. A pair of northeast storms in late January and early February 1998 removed a 2000-foot section of the original dune and washed the sand across the highway onto the salt marsh in some cases. The dune was restored in 1998 with a core composed of 10-foot diameter geo-textile tubes and covered with sand. Positioned on the northern boundary of Sea Isle City, the site represents a narrow, low elevation beach that has not been sufficient to prevent storm overwash of the highway west of the artificial dune. Currently the beach elevation is so low that wave run-up during normal astronomical high tide cycles frequently reach the dune toe causing minor erosion on the seaward slope.

Since 1998 there has been no serious storm activity. The geo-textile core was fabricated in 300-foot lengths with the point of junction of bags being filled with sand. Here is where erosion finds an avenue to breach and overwash into the roadway. This has happened several times, but the county responds and shovels the lost sand off the road and back into the gap. The beach profile changed offshore far more extensively than it did on land as bars migrated under changing wave conditions. The net 18-month beach volume change was a gain of only 1.11 yds³/ft. with a 29-foot shoreline advance.

- **Profile #119 – 25th Street, Sea Isle City, Cape May County** (fig. 90)

Profile #119 starts at the landward dune toe located less than fifty feet from the oceanfront property. The landward slope is relatively stable and supports a thick stand of bayberry plants mixed with a few small pine trees. Dune grass is thick on the crest but bayberry shrubs are rapidly colonizing large portions of the region. Dune grasses continue over the seaward crest and onto the seaward slope mixed with goldenrod then tapering to Virginia Creeper, panic grass, and other early colonizing species lower on the slope. The dune width is about 100 feet at the base with a crest elevation of approximately 17 feet NGVD.

Large seasonal variation in the position and size of the offshore bar dominated this site's changes over the study interval. Sand was migrating up the beachface by early November 2004 survey. The dune and beach did not change, but the offshore region received 50.68 yds³/ft. over half of which came from the outermost 300 feet of the profile line. The net change was 33.10 yds³/ft. with a 36-foot shoreline advance.

- **Profile #118 – 57th Street, Sea Isle City, Cape May County** (fig. 91)

The site was established at the southern end of the Sea Isle City promenade that is located in the middle of Sea Isle City's municipal beachfront. The profile includes the street end and asphalt promenade located adjacent to the landward dune toe. A dune fence along the landward toe inhibits significant quantities of sand from spilling onto the promenade and prevents foot traffic across the dune. An opening through the dune allows vehicles and foot traffic to access the beach directly from 57th Street. The dune is relatively narrow, about 45 feet wide between the seaward and landward toes. The crest of the dune was approximately 17 feet NGVD. Although relatively narrow, the landward slope and crest of the dune support a diverse number of native species including pitch pine, bayberry, goldenrod and beach pea all intertwined with a thick stand of dune grass. The density and diversity of plants is dramatically reduced over the seaward crest with a sparse number of dune grass stalks and rhizomes mix with a few early colonizing plants such as Sea Rocket on the seaward slope.

The berm is relatively flat and slopes seaward in all four cross sections. The position of the zero datum intersection shifted in a narrow range, ending the interval advancing by 71 feet.

Offshore, the bar system changed within a small part of the profile and sand could be observed migrating onto the shoreline by November 2004. The net volume gain was 32.53 yds³/ft.

- **Profile #117 – 80th Street, Sea Isle City, Cape May County** (fig. 92)

This site is set at the seaward end of 80th Street along the sidewalk on the north side of the road. The profile includes the street end, and then continues over the dune. The dune is approximately 50 feet wide at the base and about 12 feet high. Dune grass with some goldenrod flourishes on the landward crest and continues over the seaward crest where it becomes sparse on the seaward slope.

In spite of being rather low and flat, the beach can develop a sharp berm (Survey 28). This results from the culmination of deposits from the small offshore bars that migrate onto the beachface. Two such bars are shown on the November 2004 profile indicating that sand does move onto and off of the shoreline along this part of the Sea Isle City coast. The net sand volume change was -11.48 yds³/ft. with a 28-foot shoreline retreat.

- **Profile #216 – 9th Street, Avalon, Cape May County** (fig. 93)

The site was originally established at the seaward end of 9th Street as part of a municipally sponsored erosion study and was added to the New Jersey Beach Profile Network when the program was expanded in 1994. This site is located about 700 feet south of the Eighth Street jetty along Townsend's Inlet. This section of shoreline is subject to inlet tidal currents and exposed to direct northeast wave approach because of the inlet configuration. Consequently, this stretch of shoreline has been very erosional since the site was included in the program. The profile begins at the landward toe of the dune and includes a small aluminum bulkhead set near the street end to prevent street flooding. The landward slope and crest of this artificially constructed dune are stable with an abundance of dune grasses mixed with goldenrod. Overall growth had taken place in the foredune area through the final two surveys.

The most recent beach renourishment project completed by the ACOE in the fall of 2002 placed nearly 1.5 million yds³/ft of sand to Avalon's beaches with direct deposit of material at the 9th Street site. The result of this fill was a recreational beach at elevation 9 feet NGVD nearly 400 feet wide and an average offshore elevation increase of 6 feet. Early sand losses declined as the beach retreated and became more protected by the 8th Street jetty on the south side of Townsend's Inlet. The berm shifted seaward by September 2004 and some sand was lost offshore as the depth of water increased slightly. The net change was a loss of 15.92 yds³/ft. and a 67-foot shoreline retreat. This continued the shoreline recession since the ACOE completed this project.

- **Profile #116 – 23rd Street, Avalon, Cape May County** (fig. 94)

This profile was established at the seaward end of 23rd Street and includes the street end and boardwalk located over the landward dune toe. The dune, destroyed during a period of rapid erosion, was reconstructed during the 1987 beach renourishment project and its configuration has remained fairly stable through the June 2002 survey. In the fall of 2002 the ACOE beach renourishment project enhanced the dune, raising its elevation to 16 feet NGVD as well as widening its width at the seaward base by 30 feet. Dune grasses mixed with sporadic goldenrod flourish from the boardwalk base to the seaward crest. Dune grass planting along the entire primary dune as well as fence installation on the seaward toe had been completed as of the June 2003 survey.

Prior to the 1987 fill, the high tide shoreline had been pushed landward to a point between the boardwalk and the oceanfront properties, which were exposed to direct wave assault. By December 2002 the ACOE fill project had been completed raising the recreational beach area to

nearly 10 feet NGVD and extending the width 300 feet seaward. This wide berm retreated about 80 feet in a sequence of steps producing sand volume decline (-41.06 yds³/ft.) during this study's 18-month cycle. The offshore region remained nearly the same as sand provided an offshore bar in the September 2004 survey. The shoreline retreated 9 feet.

- **Profile #115 – 35th Street, Avalon, Cape May County** (fig. 95)

The profile begins at the seaward end of 35th Street. Thirty-fifth Street is located at the northern end of an undeveloped segment of the Avalon shoreline where the oceanfront homes are over 500 feet from the seaward dune toe. Called the “high dune area”, the beach is backed up with a prominent foredune ridge shown on this cross section. This dune lays at the seaward edge of a wide vegetated sand plain that grades into old dunes up to 50 feet above sea level between 40th Street and 55th Street in Avalon. These “high dunes” are covered with a climax forest of cedar and cherry trees. At 35th Street the crest elevation is only 15 feet NGVD and the back dune area is covered with bayberry and pitch pine. The profile follows along the beach access path for the initial 300 feet of the plot, which is in the area of dense bayberry and pine growth. The original instrument station for this site in 1987 was located on the first ridge approximately 300 feet seaward of the street end. As a result of extraordinary dune growth during the last decade the instrument station was moved seaward to what has developed into the primary ridge 440 feet seaward of the street end. This region between the old instrument station on the rear ridge and the primary ridge is covered with dune grasses mixed with several other native species including goldenrod and some sporadic bayberry plants. Seaward of the primary dune ridge a foredune has continued to accumulate sand, further expanding the dune system seaward. Dune grasses mixed with goldenrod inhabit the swale and landward slope of the foredune up to the crest. Aeolian sand accretion on the seaward foredune slope limited the vegetation growth to a few dune grass rhizomes and early colonizers such as sea rocket. During this study interval the seaward slope advanced minimally (1.15 yds³/ft. of added sand).

Positioned about 800 feet south of the ACOE beach project, the area received material eroded and sent south by wave transport. The majority accumulated offshore in the bar system, but some accretion occurred on the beach (7.03 yds³/ft.). The remainder of the profile added the balance to arrive at 26.46 yds³/ft. total accumulation. The shoreline advanced 73 feet.

- **Profile #114 – 70th Street, Avalon, Cape May County** (fig. 96)

This site is located at the seaward end of 70th Street. The profile includes the street end then continues along the beach access path through the back dune. Continued dune growth along this stretch of beach has been documented with the addition of the seaward ridge during the last decade. During this study interval an accumulation of sand continued on the seaward slope and crest of the growing foredune, widening the area 20 feet and raising the crest elevation to 17 feet NGVD. Bayberry and pitch pine inhabit the back dune area seaward of the oceanfront property. Grasses flourish on the landward slope of the primary dune ridge and are mixed with sporadic bayberry plants. Seaward of the primary crest an abundance of dune grass provides dense ground cover through the swale to the developing foredune. The overall dune system width is 200 feet from toe to toe with a primary crest elevation of 18 feet NGVD.

The central segment of the Avalon beach was not part of the ACOE project due to the wide dunes and beaches that exist naturally. Sand was added north of 78th Street and some material may have migrated north along the beach to add sequentially to the berm shown in the plots. Every six months the berm added sand (19.83, 9.36, then 5.37 yds³/ft.). Some sand may have arrived as small bars migrated onto the beachface. Offshore the sequence shows that the bar moved 200 feet closer to the beach over 18 months, but did not add to the beach. The net change was 48.55 yds³/ft. with a 112-foot shoreline advance, all due to berm growth.

- **Profile #113 – 90th Street, Stone Harbor, Cape May County** (fig. 97)

Profile #113 is located at the seaward end of 90th Street. The plot includes the street end and a wooden bulkhead buried along the landward dune toe at the street end. Fill material was placed north to south along Seven-Mile-Island in early 2003, so this site was completed prior to site 212. The resulting primary dune width was increased to approximately 100 feet with a crest elevation of 18 feet NGVD. Currently dune grasses flourish over the dune ridge and onto the seaward slope. The foredune, shifted seaward due to the nourishment efforts, grew to an elevation 13 feet NGVD by the succeeding survey (#27). Growth continued through survey #29 creating another minor foredune seaward of the second ridge. Dune grass and goldenrod are sparse through the swale and onto the foredune but efforts to establish denser coverage have been made by planting new grass plugs on this developing feature. The dune fence installation along the seaward toe shows signs of stabilizing the seaward slope and foredune, by collecting aeolian sand and encouraging continued growth.

The advances produced by the ACOE project in 2003 remained relatively constant as more sand accumulated offshore in the bar system. The net change was gain on the beach with a loss offshore for a -19.01 yds³/ft. volume change with an 11-foot shoreline retreat as sand came ashore.

- **Profile #212 – South End, Stone Harbor, Cape May County** (fig. 98)

Site #212 was established to replace site #112 lost when the entire length of South Pointe vanished into Hereford Inlet between 1989 and 1992. The current profile location is just north of the terminal groin, which keeps the beach in place. The profile begins on the western edge of a vehicle access path to the groin and is included on the plot. Along the western edge of the path a thick stand of bayberry shrubs are flourishing. A dune fence along the eastern edge of the path confines the landward dune toe preventing sand from spilling onto the path. On the seaward slope a wooden bulkhead and revetment is buried below the current sand surface but a few pilings and stretches of the bulkhead emerge north and south of the profile site. Due to the recently completed ACOE project on Seven-Mile-Island (early 2003) the dune width widened by 120 feet while gaining nearly a foot in elevation to its current 16.5-foot NGVD position. Dune grasses that were planted along the landward and seaward slopes of the dune as part of the project maintain the current configuration of the primary dune while aiding in the growth of the foredune. The dune prevents breaches into the natural area west of this site with the closest developed property located over 500 feet north of the profile.

Some sand left the beach over 18 months (-27.58 yds³/ft.) with bar migration reducing the seabed elevation by 5 feet. This lower elevation continued the loss in sand offshore to total 45.65 yds³/ft. for the time interval. The shoreline retreated 100 feet as well.

- **Profile #111 – 15th Avenue, North Wildwood, Cape May County** (fig. 99)

This site is located at the seaward end of 15th Avenue set along the south side of the lifeguard headquarters and beach access path. The elevated boardwalk ends at this site just south of the profile line. North of 15th Avenue a densely vegetated dune line is established along the seaward side of the ground level path parallel to the beach that continues north from the boardwalk position. South of the site a wide, flat dry beach area separates the boardwalk from dune hummocks established several hundred feet seaward of the boardwalk. These dune “islands” continue in a broken chain from the pier several blocks south of the site, north towards Hereford Inlet. The hummocks were established on beach raking debris piles covered with sand. The municipality installed dune fence around the perimeter of each pile. These piles were planted with dune grasses mixed with goldenrod to complete the process. The hummock that developed on this line during the last decade was destroyed by erosion between

October 1997 and June 1998. Continued erosion has claimed the remaining “islands” since 2000, with the main dune ridge threatened should it continue much further.

This site is located thirteen blocks south of Hereford Inlet and the erosion problem intensifies as you approach the inlet. The driving force behind this erosion appears to be related to changes in the tidal dynamics occurring in Hereford Inlet. A period of sustained shoreline retreat commenced in October 1997 and has marched to the foot of the primary dunes. Less than 100 feet now remain between the reference piling and the high tide line that was once an 800-foot distance in 1995.

Looking at the plots, the retreat appears as a horizontal recession in profile shape, with the berm tracking landward in 50-foot increments each successive survey. The seabed has become deeper as well, adding to the loss. The net loss during this interval was 95.40 yds³/ft. with a 152-foot shoreline retreat. There is not much farther to retreat before infrastructure damage begins along the North Wildwood shoreline. To the south, the problem fades as seen in the discussion on the site at Cresse Avenue.

- **Profile #110 – Cresse Avenue, Wildwood, Cape May County** (fig. 100)

The Cresse Avenue site is located at the southern end of the Wildwood boardwalk. This profile begins at the street end barricade adjacent to the base of the boardwalk. The profile continues across a wide flat expanse of open dry beach that extends approximately 1000 feet to the berm ridge. There is no dune along the profile line but a well-developed dune begins less than 100 feet south of the profile site and continues south along the Wildwood Crest shoreline, past the fishing pier located several blocks further south. This feature is approximately 75 feet wide at the base with about 6 feet of elevation relief and planted with dune grass mixed with goldenrod. North of the site up to the new convention pier the dune is absent.

The upper beach is extremely stable and provides abundant opportunity for public recreational activities. Unlike many communities in Monmouth and Ocean Counties where public beach access is quite restricted, in Cape May County the municipal governments encourage tourism and public beach access. Consequently, wide beaches such as this site support an abundance of seasonal public activity and economic prosperity. The upper beach elevation is above 6 feet NGVD, which prevents normal tidal overwash but berm top ponds do occur frequently on the 1100-foot width beach. The water in these ponds is less than a foot deep, heats up rapidly in the summer sun with the resulting explosive growth of fecal bacteria from shorebirds. Testing revealed this potential health hazard for beach patrons; especially young children who enjoy playing in these calm beach pools. The Philadelphia District Army Corps of Engineers has begun a study that includes alternatives to alleviate this condition.

Unlike the North Wildwood profile, the berm at Cresse Avenue advanced relatively steadily every six months. The increments were in the range of 25 feet and the sand volume associated with the advance amounted to 32.74 yds³/ft. in additional berm sand. Offshore bar migration was moving sediment between 10 feet of water and the shoreline repetitively, changing the entire profile's sand volume by +51.81 yds³/ft. and adding 128 feet to the shoreline distance from the reference position. Clearly the problem seen at 15th Street in North Wildwood is related to the inlet dynamics, not an erosion problem along the entire shoreline.

- **Profile #109 – Raleigh Avenue, Lower Township, Cape May County** (fig. 101)

This site is located at the seaward end of Raleigh Avenue. The profile was established along the south side of a beach access path between large beachfront condominiums. A wooden bulkhead adjacent to the seaward edge of the buildings is partially buried but separates the dune and beach from the densely developed area west of the beach. A low elevation dune extends from the bulkhead seaward approximately 165 feet. The crest elevation of the dune

along the profile line is just 12 feet NGVD but is slightly higher along the north side of the beach access path. Dune grasses mixed with some non-grass species provide moderate ground cover on the landward dune region but the plant density is diminished seaward where sand continued to accumulate forming a foredune ridge during the study interval.

The small dune grew by a modest amount with substantial sand added to the beach as small offshore bars welded to the beach. The beach gained 6.41 yds³/ft. in 18 months and the entire cross section accreted by 42.78 yds³/ft. with a 60-foot shoreline advance.

- **Profile #208 – Coast Guard Base, Lower Township, Cape May County** (fig. 102)

This site is located in Lower Township at the south end of Five-Mile Beach along the boundary between the US Coast Guard Electronics Engineering Center and the recently established U.S. Fish, Game and Wildlife Service wildlife management area on land previously owned by the US Coast Guard. The beach is only several hundred feet north of the Cold Springs Inlet jetty on an undeveloped section of beach. An extensive natural dune is present, which is only partially, documented on the profile plots. The construction of a wooden dune overpass was completed during this study interval aiding the bird watching aspect, and is located adjacent to the profile line. Landward of the reference position, located on the back ridge, the vegetation is too extensive, approaching a maritime forest, to allow access for surveying. Consequently, the cross-section includes the back ridge crest, swale and large front dune. The seaward slope of the back ridge is covered by flourishing bayberry plants and dune grasses. Abundant dune grasses and native non-grass species inhabit the swale and landward primary dune slope including occasional bayberry shrubs. From the crest seaward dune grasses flourish and rhizomes extend seaward to the dune toe. Early colonizing plants are appearing over the upper beach near the dune toe where a foredune is in the early stage of development.

The narrow beach received a large volume of sand during the summer of 2004 (31.45 yds³/ft.). The source of the material appears to have been the offshore bar system migrating onto the beach. The net change was a gain of 19.34 yds³ with a shoreline advance of 29 feet.

- **Profile #108 – Cape May Beach Club, Cape May County** (fig. 103)

The site is located directly seaward of the Cape May Beach Club. There is a low dune seaward of the beach club security fence, which is slowly accumulating sand. The dune has modest ground cover consisting of a variety of dune grass species that help collect and stabilize the sand. No efforts have been made to establish a dune fence, which would increase the rate of sand accumulation along this section of the dune toe. The dune width extends nearly 200 feet seaward of the club fence with a crest elevation of 12.5 feet NGVD. This beach was restored by the ACOE starting in 1989 as part of the initial phase of a 50-year commitment to maintain the beaches in the City of Cape May. This initial phase placed sand along the US Coast Guard Training Center in Cape May from the Cold Springs Inlet west jetty to Patrol Ave.

Since restoration, periodic maintenance projects nourished the city beaches that resulted in remarkable stability since 1997. This stability has continued through 2004 as the beach advanced about 21 feet during the summer of 2004. A steep offshore slope seldom supports an offshore bar system. Additional sand was pumped onto the military portion of the shoreline between here and the Cold Springs Inlet jetty during 2004.

- **Profile #107 – Baltimore Avenue, Cape May City, Cape May County** (fig. 104)

This profile is located at the seaward end of Baltimore Avenue along the north side of Beach Avenue. The profile includes the road, an old wooden bulkhead adjacent to the south side of Beach Avenue, continues over a rock seawall and onto a developing dune system. Prior to restoration in 1991 by the ACOE project, low tide reached the base of the now almost

completely buried seawall, only the tops of the cap rocks and a portion of the landward edge are currently exposed. The nourishment project extended the dry berm approximately 300 feet seaward. Dune fencing was installed on the wide, dry beach seaward of the buried seawall and aeolian sand accumulated forming a small low dune 150 feet wide with a crest elevation of 13 feet NGVD. Dune grass was planted and flourished providing stability and collecting additional sand. Rhizomes extended seaward from the dune toe to continue the dune advancement onto the beach. This foredune accretion can clearly be seen by the September 2003 survey.

The dry upper beach is flat and currently extends nearly 200 feet to the berm ridge. The upper beach elevation is 10 feet NGVD and is an ideal platform for continued dune growth. This wide beach provides a substantial area for recreational activities and provides a significant buffer to damage from moderate storms. Sand added to the berm (4.90 yds³/ft.) through wind and wave transport. Otherwise, little change is seen in the cross sections to the outer limit of the survey. The net change was only 1.43 yds³/ft. and a 7-foot shoreline retreat.

- **Profile #206 – Broadway Avenue, Cape May City, Cape May County** (fig. 105)

During the fall 2003 survey the Coastal Research Center created another profile (site 206) positioned approximately 75 feet west of the comfort station to replace the existing 106 site. The purpose of this move was two fold. The first, and most significant reason is the new position now incorporates the dune system, which is a key component in the overall performance of the profile. Second, the practicality of the setup (visually) was compromised when the new, larger comfort station replaced the old, smaller one.

Significant increases in the berm, nearshore, and offshore regions had taken place by survey #28 (April 2004) and continued this growth through survey #29 (October 2004). These gains are attributed to the beach renourishment projects which occurred in both the spring 2003 and the fall 2004.

- **Profile #106 – Broadway Avenue, Cape May City, Cape May County** (fig. 106)

The site is located near the end of the promenade at Broadway Avenue in the final groin cell before entering the natural beach area along the Cape May Meadows Nature Conservancy property. The profile includes the asphalt promenade and wooden bulkhead located along the seaward edge of the promenade. This profile line is set along the eastern edge of a comfort station built after the profile was established. Changes to this comfort station forced the relocation of the profile to the north by about 50 feet. Now the dune appears in the cross section. This change was done in the fall 2003 survey with both profiles run to continue the context of sand volume data.

This site is at the southern end of the current Cape May City ACOE beach commitment, which receives periodic re-nourishment. The beach along the Cape May City promenade is a popular recreational area with easy public access and abundant nearby parking available. The most recent renourishment cycle in Cape May City began during the fall of 2002 and was completed during the spring of 2003. This site did not receive direct sand placement, but it appears to display the evidence of sand migration along the shoreline adding to the berm in sequential fashion. The volumes gained are 10.12 and 21.11 yds³/ft. This material did not move ashore using the bar migration mechanism because no bars appear. The fill material simply moved south along the wave swash zone advancing the berm directly.

- **Profile #105 – Beach Avenue, Lower Township, Cape May County** (fig. 107)

This site is located over 500 feet west of the terminus of Beach Avenue along the natural beach area within the Cape May Meadows Nature Conservancy property. The profile begins at the landward dune toe along the edge of the back dune wetland area. The high primary “dune”

seen at the rear of the cross section plot was built by the State in 1985 to protect the marsh habitat from overwash. Currently this feature has bayberry and pine established along the landward slope and dune grasses have propagated over the crest and extend onto the foredune. The beachface slope began at the toe of the artificial ridge in 1987. Since 1987 this beach has grown tremendously. Until 2004, the sand responsible for this growth has been derived from losses from the Cape May City project and has resulted in beach accretion all the way to the State Park in the Borough of Cape May Point. The US Army Corps of Engineers (ACOE) commenced beach restoration along the nature conservancy shoreline in early 2005, eventually continuing into Borough Cape May Point.

The lower elevation dunes presently extend approximately 400 feet seaward of the original, manmade dune and have accumulated from wind-deposited sand blown in across the widening beach. Dune grass rhizomes, goldenrod and other early colonizing plants have spread across this region stabilizing the features and contributing to further growth.

The beach exhibits extensive seasonal growth in the summer of 2003, retreat in the fall, followed by sand bypassing from Cape May City's beach nourishment project by the spring of 2004. The large berm precedes the fill on the conservancy beaches, so must be from losses on the City beaches during the winter northeast events. The beach retreated during the summer so that the profile returned to nearly the spring 2003 conditions. The 18-month sand volume change was a loss of 6.51 yds³/ft. with a 36-foot shoreline advance. The gain between the fall of 2003 and the spring of 2004 amounted to 9.38 yds³/ft. on the beach, but a 58-foot shoreline retreat due to a steeper slope on the beachface as sand piled up to form the berm.

- **Profile #104 – Lake Drive, Cape May Point, Cape May County** (fig. 108)

This profile site is located at the seaward end of Lake Drive. The profile plot includes the street end then continues over a wide dune feature that is the primary shore protection feature along this stretch of beach. This feature is approximately 150 feet wide at the base and reaches a crest elevation of 15.5 feet NGVD. From the landward crest the profile slopes downward to cross a 50-foot wide flat area at elevation 13 feet NGVD where a volleyball field was present in 1987. The seaward crest rises above this flat area to form a peak with a crest elevation of 15 feet NGVD. The region between the landward and seaward crest is densely vegetated with bayberry plants and pitch pine trees mixed with dune grass, goldenrod and poison ivy. Dune grass continued to spread over the seaward crest down the seaward slope. The seaward slope has stabilized after several years of periodic dune scarping caused significant retreat. During this recent study interval the seaward slope and dune toe retreated slightly.

The Cape May Point beaches are part of a Philadelphia Corps of Engineers 227 demonstration project to focus on the effectiveness of submerged specially designed breakwater units compared to using a double tee concrete sill to retain sand in two additional groin cells. The "T"-shaped sill uses an engineered concrete shape normally employed to create multi-floored parking garages. A planned beach replenishment project using trucked-in fill was completed by February 2004 in the Lake Drive cell only. This was followed by a regional restoration that began in early 2005, reaching two cells west of Lake Drive.

The beachface was merging with the dune toe slope in 2003, recovering with the trucked-in sand to the spring 2004 position (7.66 yds³/ft.), and then losing 3.18 yds³/ft. from the berm during the summer of 2004. The regional beach nourishment will be evident in the 2005 surveys.

- **Profile #103 – Higbee Beach, Cape May County** (fig. 109)

This site is located at the Higbee Beach State Park wildlife management area. The profile is located a few hundred feet south of the beach access path that leads to the bay from the main parking lot. The cross-section begins on the dune bluff, which is densely vegetated with bayberry, pitch pine, poison ivy and dune grasses that blend into a maritime and upland forest landward of the reference position. This beach is part of a long reach of bluffs eroding during high tides with strong southwest or northwest winds. The beach is subject to wave approach generated by any westerly wind fetch across Delaware Bay. The seaward slope of the bluff has been scarped by periodic episodes of erosion during the last two decades but has been relatively stable during recent surveys. The erosion extended uniformly from the top of the bluff down to the base of the beach. Overall, the bluff retreated approximately 45 feet and the seafloor depth increased several feet during the 19-year monitoring history.

The beach became slightly steeper during the summer of 2003, then remained relatively constant. An offshore bar appeared as well that summer and remained between 400 and 500 feet from the reference position. The net change was a gain of just 0.45 yds³/ft. combined with a 19-foot shoreline retreat due to the steeper beachface.

- **Profile #102 – Whittier Avenue, North Cape May, Cape May County** (fig. 110)

This site is located along Beach Drive between Roslyn and Whittier Avenues. The profile starts along the landward side of Beach Avenue and includes the road. It then continues across a small open grass lot adjacent to the seaward edge of the road, which blends into typical dune vegetation at the landward crest of the dune system about 20 feet from the road edge. For all practical purposes the landward dune toe is essentially the seaward edge of the road. This dune system is approximately 60 feet wide from the road edge to the seaward toe with a crest elevation of 15 feet NGVD. Along this stretch of the Delaware Bay the dune is well established with a dense ground cover of dune grasses mixed with goldenrod and poison ivy adding stability to the sand. This feature has continued to grow during the NJBPN monitoring history forming the substantial foredune crest seen on the plot. Movement of the sub-tidal shelf sand waves took place throughout the sub-tidal and intertidal region to produce multiple minor gains or losses. The beach gained sand down the slope and onto the nearshore intertidal flats. The net change was 11.07 yds³/ft. increase in sand volume, with a 31-foot shoreline advance, a relatively large value for the bay shoreline profiles.

- **Profile #101 – Pacific Avenue, Villas, Cape May County** (fig. 111)

This site is located at the intersection of Millman Lane and Pacific Avenue. The profile reference position is located along the landward edge of Millman Lane, which is included on the profile plot. The profile continues through a private residential yard to the landward edge of a small dune bluff. At this point the vegetation abruptly changes to that of the native dune species with a dense cover of dune grasses mixed with goldenrod continuing to the seaward toe. In addition, a dense thicket of wild berries and briars with some sporadic bay berry plants are located along the landward crest. The dune and beach are remarkably stable along this section of shoreline with minimal changes to report on the beach.

The intertidal and sub-tidal flats are very stable and change slowly in incremental fashion. The net beach volume change was -1.31 yds³/ft. with a 10-foot shoreline retreat. The offshore region crosses multiple sand ridges generated and maintained by the wind-generated bay waves and had five cuts (-7.14 yds³/ft.) and four fills (2.95 yds³/ft.) totaling a net loss of 4.19 yds³/ft. over a 1,050-foot distance.

- **Profile #100 – Reeds Beach, Cape May County** (fig. 112)

This site is located along Beach Avenue approximately midway between Bidwell Creek Inlet and Reeds Beach Road. The profile begins on an open lot landward of the road along the edge of the salt marsh. The profile includes the landward lot and road before sloping seaward down the beachface to the water. The low, narrow nature of this beach allows repeated episodes of wave overwash to move sand onto the access road. Road crews clearing the road of sand formed a small dune in the vacant lot on the east side of the road. In addition, sand has been placed along the seaward edge of the road after past overwash events to form a small bayside dune in an effort to protect the road. This seaward dune showed some changes in overall shape but not in size. The changes observed are a direct result of the Townships maintenance project taking sand from the street and placing it on the crest of the small dune system.

Change is uncommon here, except following severe northwest winds. If high tide accompanies the wind event, the road is flooded and sand washes onto it with minor shoreline retreat. This has occurred frequently enough so that the section of shoreline has retreated to a position under many of the homes along the beach. Efforts to add sand to the shoreline have been slow in materializing, so the change remains slow and steady for retreat. The net movement during the past 18 months was -0.33 yds³/ft. with an 8-foot shoreline retreat.

SUMMARY OF CAPE MAY COUNTY

The Cape May County oceanfront consist of a series of four barrier islands, north to south Ocean City (Peck's Beach), Strathmere and Sea Isle City (Ludlam Island), Avalon and Stone Harbor (Seven Mile Island) and the Wildwoods and Lower Township (Five Mile Island). The winter of 2002 to 2003 had more storms with more intense wave activity than the following winter. This shows in the rates of berm retreat and limited recovery with the fall 2003 survey series. The less intense winter of 2003 – 2004 produced less beach damage, which was followed by better recovery and landward migration of sand to the beach. The worst loss continued to be in North Wildwood as the oceanfront beach retreated an additional 152 feet following 210 feet in the 18 months between spring 2001 and fall 2002 and lost over 200 yds³/ft. of sand moved to Hereford Inlet or south into Wildwood since 2001. This trend does appear to have reversed during 2004. The northern end of Peck's Beach has eroded back into the spite of the Federal beach nourishment project. Ludlam Island's northern beaches remain narrow, but the local/State project sand has proved reasonably stable in the Strathmere section. Cape May City continues under Federal maintenance and the Nature Conservancy to Cape May Point shoreline was recently completed after the fall 2004 surveys were done.

Recent local projects were concluded in February 2001 in the Borough of Avalon, (306,000 cubic yards) and Upper Township with assistance from the State of New Jersey (461,000 cubic yard restoration of the northern Strathmere beach on Ludlam Island in late 2001). The Borough of Cape May Point is part of the Lower Cape May Meadows to Cape May Point Ecosystem Restoration and Shore Protection Project. Cape May Point had two beach cells augmented with submerged breakwater sills installed between the outer tips of the adjacent groins with sand supplied to the cells using trucked-in material. The Cape May Meadows portion of this project was completed in early 2005 with 800,673 cubic yards of fill placed between the WWII bunker in the State Park to Cell #6 in Cape May Point.

Beach nourishment activity continued as both major ACOE projects completed maintenance at Ocean City (third cycle in 2000 with 1.35 million cubic yards placed) and the fourth periodic maintenance completed January 2004 (1.40 million cy). At Cape May City the fourth cycle in 1999 placed 400,000 cubic yards of sand, 267,000 cubic yards were added in March 2003, 283,000 cubic yards added in November 2004 with the 7th scheduled maintenance for the fall 2006.

Maintenance Contracts Completed in Ocean City:
Initial Construction Sand Volume = 5,741,000 Cu. Yds.

December 1994	606,000 cubic yards
August 1995	1,400,000 cubic yards
August 1995	360,000 cubic yards (south end) non-Federal effort
October 1997	800,000 cubic yards
December 2000	1,351,000 cubic yards (north end)
November 2000	303,000 cubic yards (south end) non-Federal effort
January 2004	1,400,000 cubic yards

The Philadelphia District is in the Planning and Engineering Design (PED) phase of project development for Great Egg Harbor Inlet to Townsend's Inlet. The reconnaissance report was completed in April 1996. The Final Feasibility Report was complete in September 2001. The PED work is scheduled to be complete by 2005, with Congressional authorization required to proceed to construction (Philadelphia District web page <http://www.nap.usace.army.mil/cenap-dp/projects/projects.htm>).

The Great Egg Harbor to Townsends Inlet project is in the same situation, needing Congressional authorization to begin construction.

The Townsend's Inlet to Cape May Inlet shore protection project: The initial Beachfill construction within Avalon and Stone Harbor was completed in FY03. Initial construction contracts were awarded for both the Avalon and North Wildwood seawalls in FY04. Construction on the two seawalls will continue through FY05, with the Avalon seawall scheduled for completion in FY06 and the North Wildwood seawall scheduled to complete in early FY07. Beach nourishment on the North Wildwood oceanfront beach is not being considered as the project develops. However, studies at 15th Street in North Wildwood have documented a rapid shoreline retreat as sand has moved north into and along the inlet shoreline since December 1999.

There is an ecosystem restoration of 116 acres planned for Stone Harbor Point. The State of New Jersey and the Borough of Avalon completed a 400-foot extension of the 8th Street inlet jetty at Townsend's Inlet in 2002.

The shoreline along western Cape May County has seen shoreline retreat following episodes of strong northwest winds. There are only modest sand volume shifts, but the shoreline exists at a smaller scale so that even ten cubic-yard-per-foot changes have considerable impact. The Philadelphia District ACOE is moving toward an Ecosystem Restoration and Protection project for Reeds Beach to Pierces Point along the Delaware Bay shoreline of Cape May County. The project covers 6,800 feet of shoreline and entails a one-time placement of sand for horseshoe crab and shorebird habitat. FY 01 funds of \$135,000 were added and were used to complete the PED. FY03/04/05 funds were appropriated for construction. A Limited Reevaluation Report (LRR), which updates costs and shows continued project viability is being prepared for submittal to HQ for approval. On 17 Aug 04, NJDEP LURP issued a favorable Federal consistency determination for the construction of this project.

The Villas and Vicinity Ecosystem Restoration and Protection project continued with PED funding from FY 02. This is also a one-time sand nourishment of 29,000 feet of shoreline within Middle and Lower Townships, Cape May County. FY 01 funds of \$155,000 were added and used to complete PED. FY 04 funds were added to initiate construction. Before actual construction can begin a Project Cooperation Agreement (PCA) must be signed and real estate acquired.



Coastal Research Center Glossary of Coastal Terms



Accretion - The addition of material by natural processes.

Aeolian Accretion - The accretion that results from wind driven processes.

Backs bore - 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.

Bulkhead - A structure that is built to retain or prevent the slumping of land at the influence of water and wave action. Bulkheads are typically made of wood, steel, or aluminum.

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.

Downdrift - The dominant direction of movement of littoral materials.

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 recreating. 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 running contrary to the main current.

Erosion - The removal of material by natural processes.

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

Geotube - A geotextile fabric tube 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 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 in the longshore direction, resulting from the littoral currents.



Coastal Research Center Glossary of Coastal Terms



Longshore Transport - Also known as littoral drift. Movement of material in the longshore direction, resulting from the littoral currents.

NGVD - (the datum of 1929) A common elevation reference developed from a specific model of the Earth's surface.

Onshore - In the direction of the shoreline; landward.

Offshore - In the direction opposite of the shoreline; seaward.
The region of the beach profile seaward of the first bar.

Neap Tide - A tide having significantly reduced variations from mean tide levels. Neap tides occur near quarter moon stages.

Nearshore - Region of beach profile extending from the berm seaward through 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, near shore parallel continuous mound of sand, pushed onshore 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 created through the erosion of material from the lower portion of a slope or bluff.

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

Seawall - 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 most extreme variations from mean tide levels. 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.

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 movement of littoral materials.

Wrack - Debris deposited on the beach by wave action.

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