



New Jersey Beach Profile Network

Cape May County

Great Egg Harbor Inlet
to Stow Creek

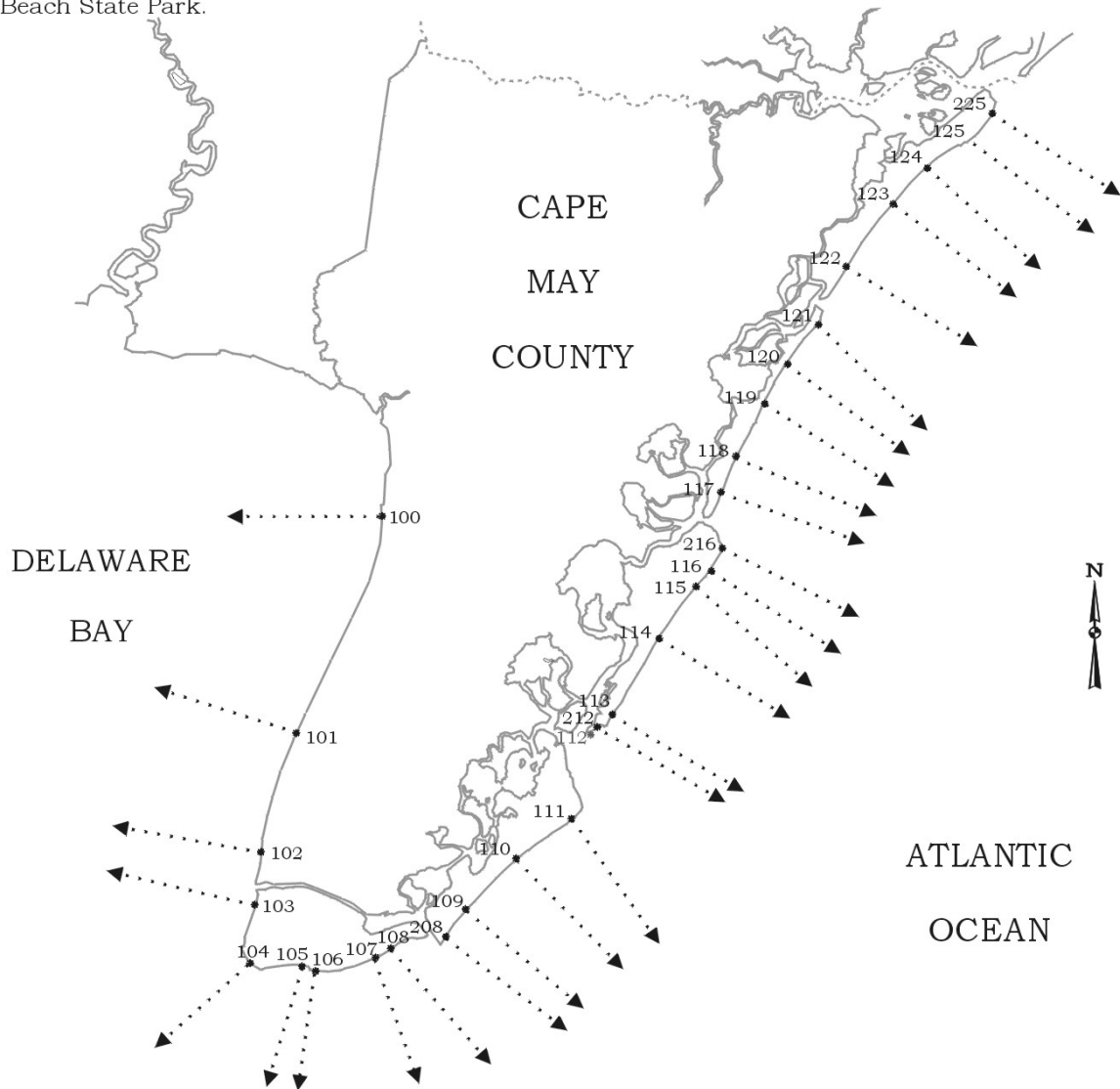
NJBPN Profile #'s
225 - 100



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. A view to the southeast along the undeveloped Higbee Beach showing the bluff and beach as of December 18, 2000. The shoreline remains relatively stable for periods of time except when northwest or southwest winds drive waves against the bluff at high tide and generate erosion.



Photoplate 7b. By October 24, 2005 growth in vegetation had produced a well-covered bluff at Higbee Beach. There is never much sand on the beach in front of the bluff mostly due to relatively infrequent bouts of erosion. This situation came undone in the spring of 2006 when a storm cut the bluff back by 10 feet.



Photoplate 8a. Picture taken May 7, 2001 shows the developed berm and densely vegetated dune following 10 years of Federal beach restoration project management. Three lines of snow fence are buried and the beach remains wide for recreational purposes at Baltimore Avenue, Cape May City.



Photoplate 8b. By September 9, 2005 the new homes built on the old Admiral Hotel site stand along the street behind a growing diversity of dune vegetation. No new sand was added to the shoreline since 2001, but the project remains stable. Sand was placed south on the Cape May Meadows and at the north end of this beach.

TABLE 13
CAPE MAY COUNTY
ANNUAL BEACH VOLUME CHANGES
SPRING 2004 - SPRING 2005 & FALL 2004 - FALL 2005

PROFILE SITE LOCATION	Survey	
	28 - 30 S2004 - S2005	29 - 31 F2004 - F2005
	(volume expressed as cubic yards per foot)	
225: Ocean City, Gardens Rd.	-29.68	-23.20
125: Ocean City, 6th St.	-84.99	-45.28
124: Ocean City, 20th St.	41.63	-1.01
223: Ocean City, 34th St.	28.23	14.63
122: Ocean City, 56th St.	-25.07	-14.35
121: Strathmere, Williams Rd.	-139.96	-31.91
120: Sea Isle City, 1st St.	-4.52	16.34
119: Sea Isle City, 25th St.	22.99	22.11
118: Sea Isle City, 57th St.	-0.79	-14.71
117: Sea Isle City, 80th St.	-1.33	4.36
216: Avalon, 9th St.	-84.49	-91.70
116: Avalon, 23rd St.	-53.55	-54.90
115: Avalon, 35th St.	-5.87	4.17
114: Avalon, 70th St.	8.86	17.49
113: Stone Harbor, 90th St.	17.03	10.07
212: Stone Harbor, 121st St.	6.69	-10.36
112: Stone Harbor, South Pointe	** NO LONGER ACTIVE **	
111: North Wildwood, 15th Ave.	-62.09	3.69
110: Wildwood, Cresse Ave.	7.02	10.77
109: Lower Township, Raleigh Ave.	30.95	27.49
208: Lower Township, U.S.C.G. Base	23.31	28.75
108: Cape May, Beach Club	5.21	-14.87
107: Cape May, Baltimore Ave.	24.67	15.90
206: Cape May, Broadway Ave.	18.33	2.27
105: Cape May, Nature Conservancy	67.44	84.68
104: Cape May Point, Lake Dr.	70.67	45.75
103: Higbee Beach State Park	-6.64	-5.27
102: North Cape May, Whittier	14.50	12.21
101: Villas, Pacific Ave.	-3.86	4.20
100: Reeds Beach, Beach Ave.	-1.81	-0.93

TABLE 14
CAPE MAY COUNTY
ANNUAL SHORELINE CHANGES
SPRING 2004 - SPRING 2005 & FALL 2004 - FALL 2005

PROFILE SITE LOCATION	Survey	
	28 - 30 S2004 - S2005	29 - 31 F2004 - F2005
	(shoreline change expressed in feet)	
225: Ocean City, Gardens Rd.	-38.4	39.5
125: Ocean City, 6th St.	-135.3	-59.0
124: Ocean City, 20th St.	69.4	-8.6
223: Ocean City, 34th St.	66.8	154.3
122: Ocean City, 56th St.	-49.9	30.5
121: Strathmere, Williams Rd.	-236.2	59.3
120: Sea Isle City, 1st St.	9.5	-8.5
119: Sea Isle City, 25th St.	-38.1	5.1
118: Sea Isle City, 57th St.	-52.1	-67.8
117: Sea Isle City, 80th St.	-31.0	9.7
216: Avalon, 9th St.	-181.3	-93.6
116: Avalon, 23rd St.	-67.6	-23.4
115: Avalon, 35th St.	6.8	-36.5
114: Avalon, 70th St.	-56.6	49.7
113: Stone Harbor, 90th St.	-55.2	-7.9
212: Stone Harbor, 121st St.	12.2	8.6
112: Stone Harbor, South Pointe	** NO LONGER ACTIVE **	
111: North Wildwood, 15th Ave.	-110.8	-20.1
110: Wildwood, Cresse Ave.	16.8	92.2
109: Lower Township, Raleigh Ave.	5.0	5.9
208: Lower Township, U.S.C.G. Base	63.1	17.7
108: Cape May, Beach Club	2.8	-15.2
107: Cape May, Baltimore Ave.	38.0	35.3
206: Cape May, Broadway Ave.	26.2	4.8
105: Cape May, Nature Conservancy	116.1	167.1
104: Cape May Point, Lake Dr.	104.2	26.4
103: Higbee Beach State Park	-11.7	4.6
102: North Cape May, Whhittier	18.0	10.5
101: Villas, Pacific Ave.	0.7	86.1
100: Reeds Beach, Beach Ave.	6.0	7.2

TABLE 15
CAPE MAY COUNTY
SEASONAL BEACH VOLUME CHANGES

PROFILE SITE LOCATION	Survey	28-29	29-30	30-31	28-31
		S04-F04	F04-S05	S05-F05	S04-F05
		(volume expressed as cubic yards per foot of beachfront)			
225: Ocean City, Gardens Rd.		-16.31	-13.48	-9.37	-39.00
125: Ocean City, 6th St.		-48.37	-38.98	-6.33	-90.34
124: Ocean City, 20th St.		54.46	-11.22	6.32	45.42
223: Ocean City, 34th St.		16.10	5.47	10.47	39.60
122: Ocean City, 56th St.		-9.95	-9.04	-6.41	-32.23
121: Strathmere, Williams Rd.		-100.52	-37.36	5.25	-133.35
120: Sea Isle City, 1st St.		9.89	-14.40	30.45	26.10
119: Sea Isle City, 25th St.		6.41	16.31	3.27	28.00
118: Sea Isle City, 57th St.		5.18	-5.55	-9.22	-10.48
117: Sea Isle City, 80th St.		1.02	-3.25	8.67	4.87
216: Avalon, 9th St.		-8.12	-78.22	-9.75	-98.82
116: Avalon, 23rd St.		7.57	-61.23	3.64	-40.09
115: Avalon, 35th St.		12.47	-19.27	25.34	17.30
114: Avalon, 70th St.		9.65	-1.26	18.82	27.06
113: Stone Harbor, 90th St.		1.62	10.10	-0.13	16.88
212: Stone Harbor, 121st St.		1.33	5.44	-15.86	-9.16
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **			
111: North Wildwood, 15th Ave.		-59.29	-6.38	10.15	-51.26
110: Wildwood, Cresse Ave.		10.47	-10.64	22.59	29.32
109: Lower Township, Raleigh Ave.		17.73	14.07	13.62	44.55
208: Lower Township, U.S.C.G. Base		17.65	6.96	21.88	41.43
108: Cape May, Beach Club		15.35	-10.04	-4.87	0.52
107: Cape May, Baltimore Ave.		-2.45	27.13	-10.69	13.70
206: Cape May, Broadway Ave.		17.64	0.40	1.40	20.63
105: Cape May, Nature Conservancy		-33.92	101.25	-16.86	50.13
104: Cape May Point, Lake Dr.		4.57	65.07	-18.07	52.30
103: Higbee Beach State Park		-2.50	-4.06	-1.20	-7.95
102: North Cape May, Whittier Ave.		7.20	10.31	1.94	16.45
101: Villas, Pacific Ave.		-4.18	0.09	4.22	0.02
100: Reeds Beach, Beach Ave.		-1.89	0.22	-1.15	-2.86

TABLE 16
CAPE MAY COUNTY
SEASONAL SHORELINE CHANGES

PROFILE SITE LOCATION	Survey	28-29	29-30	30-31	28-31
		S04-F04	F04-S05	S05-F05	S04-F05
		(shoreline change expressed in feet)			
225: Ocean City, Gardens Rd.		-44.0	5.6	33.9	-4.6
125: Ocean City, 6th St.		-41.5	-93.8	34.8	-100.5
124: Ocean City, 20th St.		36.0	33.3	-41.9	27.5
223: Ocean City, 34th St.		-84.1	150.9	3.4	70.2
122: Ocean City, 56th St.		-46.0	-3.8	34.3	-15.6
121: Strathmere, Williams Rd.		-175.3	-60.9	120.1	-116.0
120: Sea Isle City, 1st St.		36.4	-26.9	18.4	27.9
119: Sea Isle City, 25th St..		-4.9	-33.2	38.3	0.2
118: Sea Isle City, 57th St..		-18.7	-33.4	-34.5	-86.5
117: Sea Isle City, 80th St..		-43.6	12.7	-2.9	-33.9
216: Avalon, 9th St.		-26.5	-154.8	61.2	-120.1
116: Avalon, 23rd St.		22.4	-90.1	66.6	-1.0
115: Avalon, 35th St.		32.8	-26.1	-10.4	-3.6
114: Avalon, 70th St.		-28.1	-28.5	78.2	21.6
113: Stone Harbor, 90th St.		-3.7	-51.5	43.6	-11.6
212: Stone Harbor, 121st St.		-58.3	70.5	-61.9	-49.7
112: Stone Harbor, South Pointe		** NO LONGER ACTIVE **			
111: North Wildwood, 15th Ave.		-73.1	-37.7	17.7	-93.1
110: Wildwood, Cresse Ave.		43.9	-27.1	119.3	136.1
109: Lower Township, Raleigh Ave.		11.5	-6.5	12.4	17.4
208: Lower Township, U.S.C.G. Base		69.9	-6.8	24.5	87.6
108: Cape May, Beach Club		21.1	-18.3	3.2	5.9
107: Cape May, Baltimore Ave.		-2.4	40.4	-5.1	32.9
206: Cape May, Broadway Ave.		28.6	-2.5	7.3	33.5
105: Cape May, Nature Conservancy		-49.7	165.8	1.3	117.4
104: Cape May Point, Lake Dr.		26.0	78.3	-51.9	52.3
103: Higbee Beach State Park		1.5	-13.2	17.7	6.1
102: North Cape May, Whittier Ave.		3.1	15.0	-4.5	13.6
101: Villas, Pacific Ave.		-32.1	32.8	53.3	54.0
100: Reeds Beach, Beach Ave.		-1.6	7.6	-0.4	5.5

Cape May County Beach Volume & Shoreline Position Changes - Spring 2004 to Spring 2005

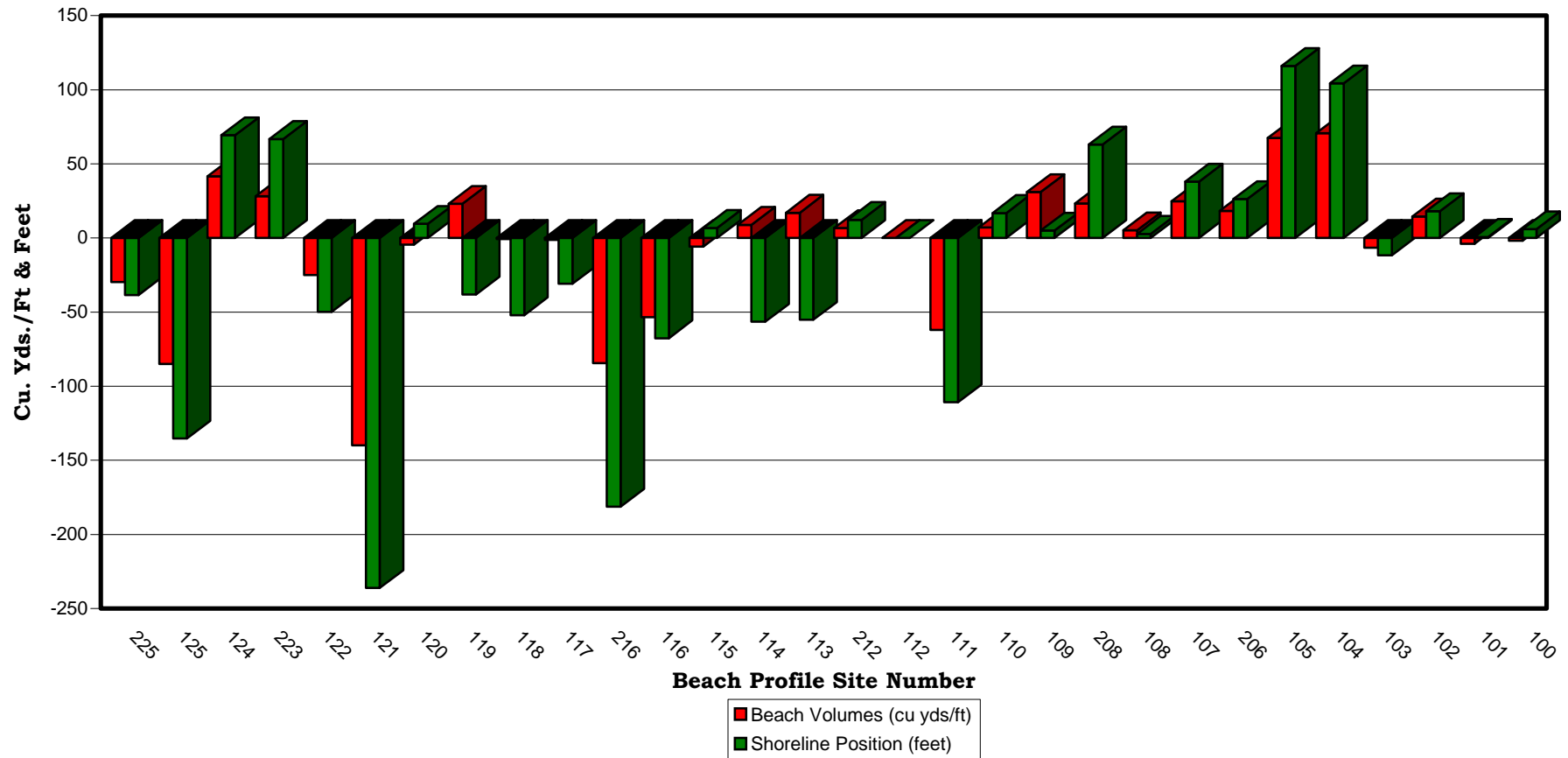


Figure 82a. The winter of 2003 – 2004 was about the same as 2004 - 2005. Sites 121 and 216 represent sand volume losses and significant shoreline retreat, both associated with inlet locations. The large loss seen previously on the North Wildwood beach at 15th Street diminished slightly.

Cape May County Beach Volume & Shoreline Position Changes - Fall 2004 to Fall 2005

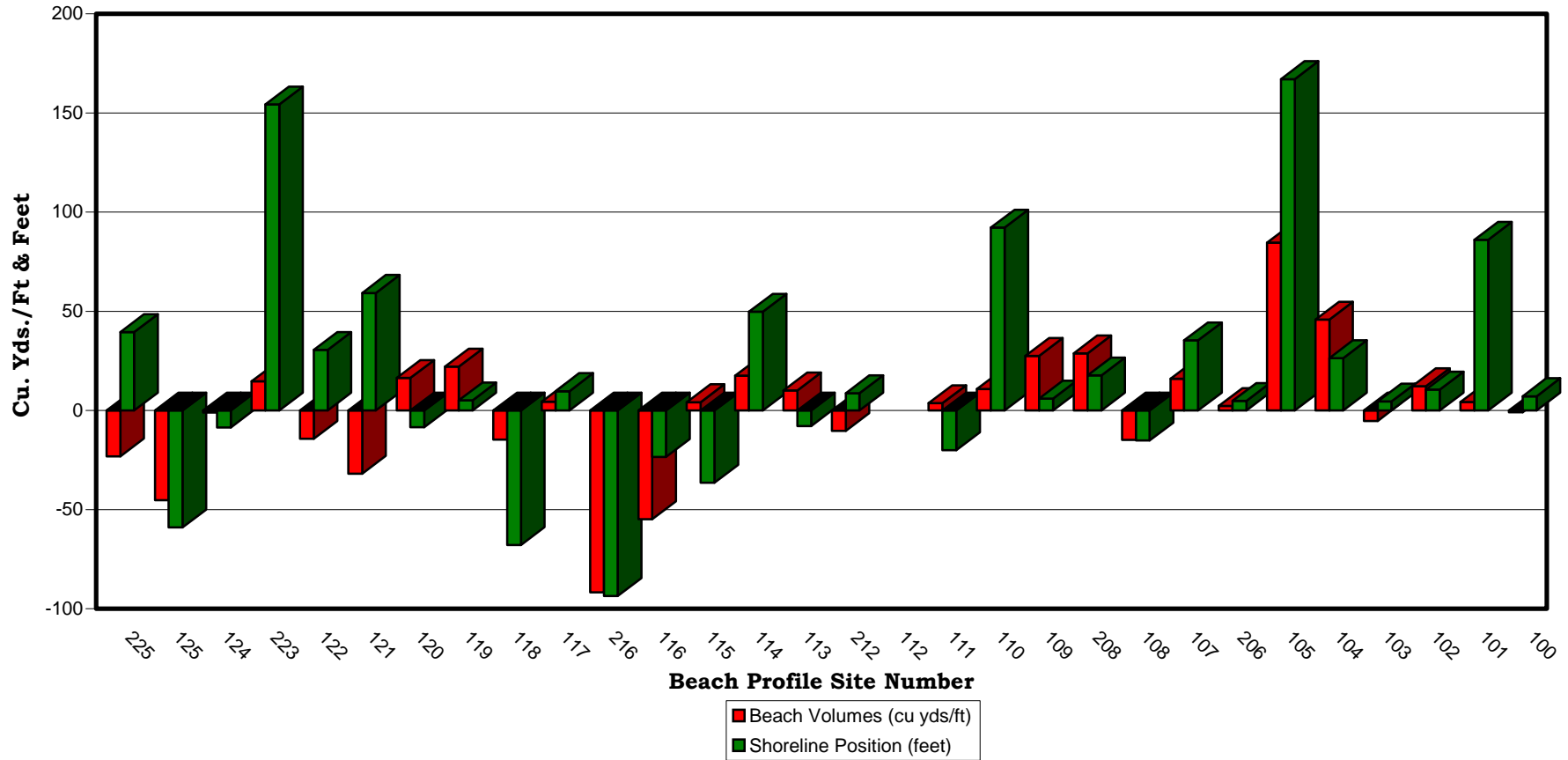


Figure 82b. The fall to fall comparison shows modest sand volume gains or losses, but large shoreline advances at 34th Street in Ocean City and at Lake Drive in Cape May Point (due to the ACOE beach project).

Seasonal Cape May County Beach Sand Volume Changes - Fall 2004, Spring 2005 & Fall 2005

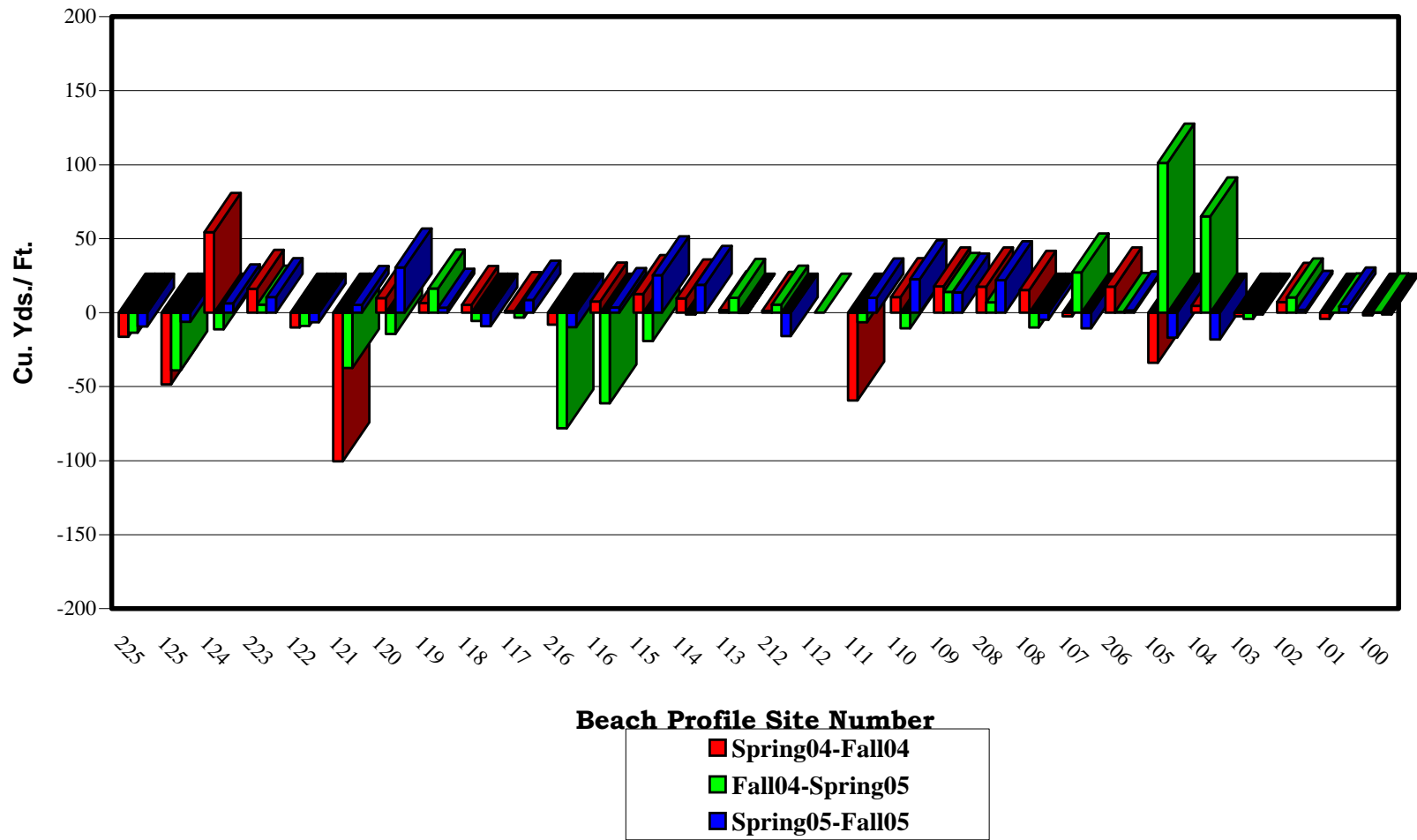


Figure 82c. The three seasonal comparisons for sand volume change are presented as three bars for each site. Sand was lost at Williams Avenue near Corson’s Inlet, at 9th and 23rd Streets in Avalon and at 15th Street in North Wildwood. The gains during the winter at Cape May Point were due to beach nourishment (105 and 104). The summer 2005 accretion was modest at most sites.

Seasonal Cape May County Beach Shoreline Changes - Fall 2004, Spring 2005 & Fall 2005

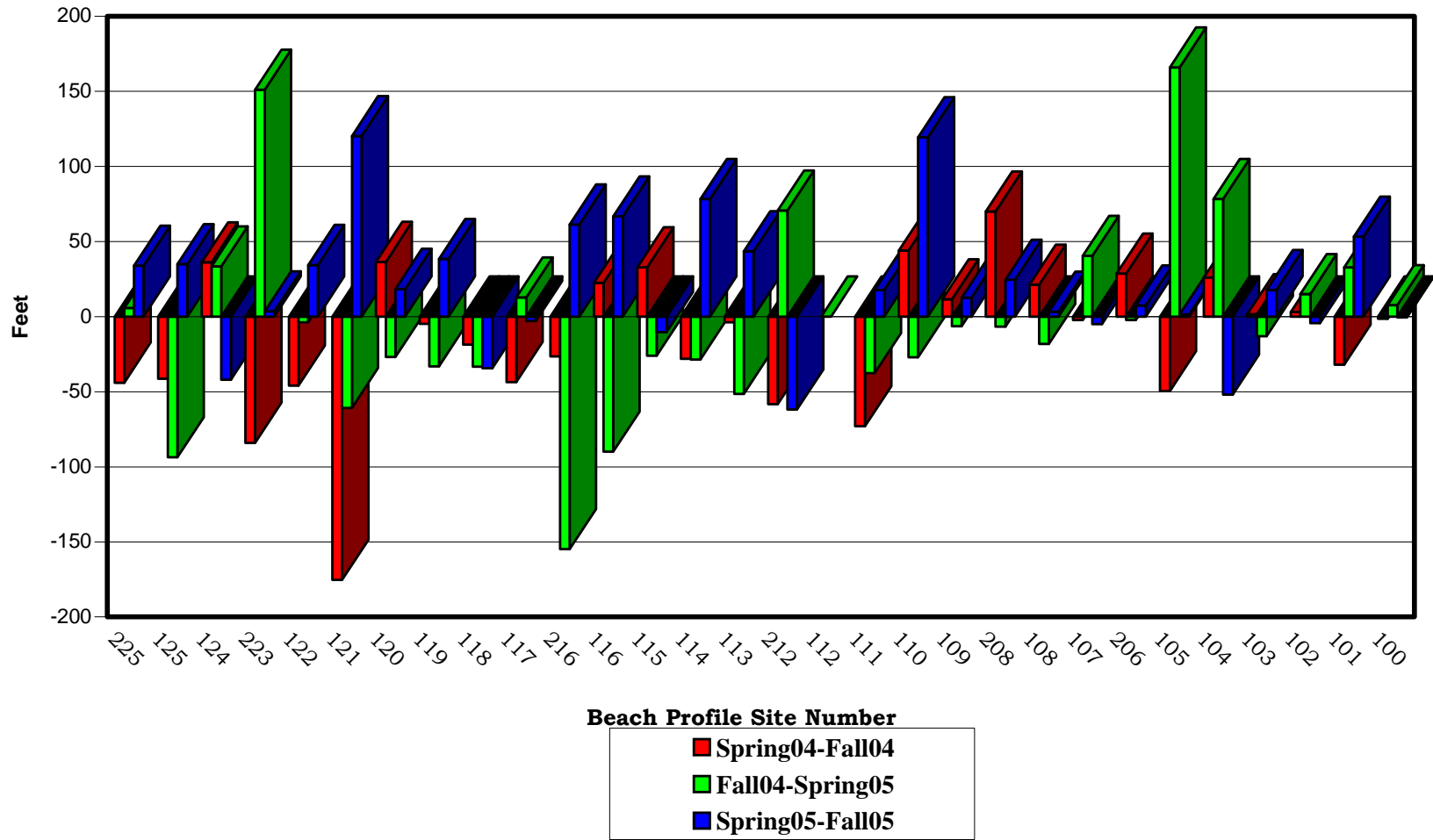


Figure 82d. Seasonal changes in shoreline position are more active, and were spread across the county’s shoreline. The advance at sites 104 and 105 were due to direct sand placement. All other changes to the shoreline position were due to environmental conditions.

Cape May County Beach Volume & Shoreline Position Changes - Spring 2004 to Fall 2005

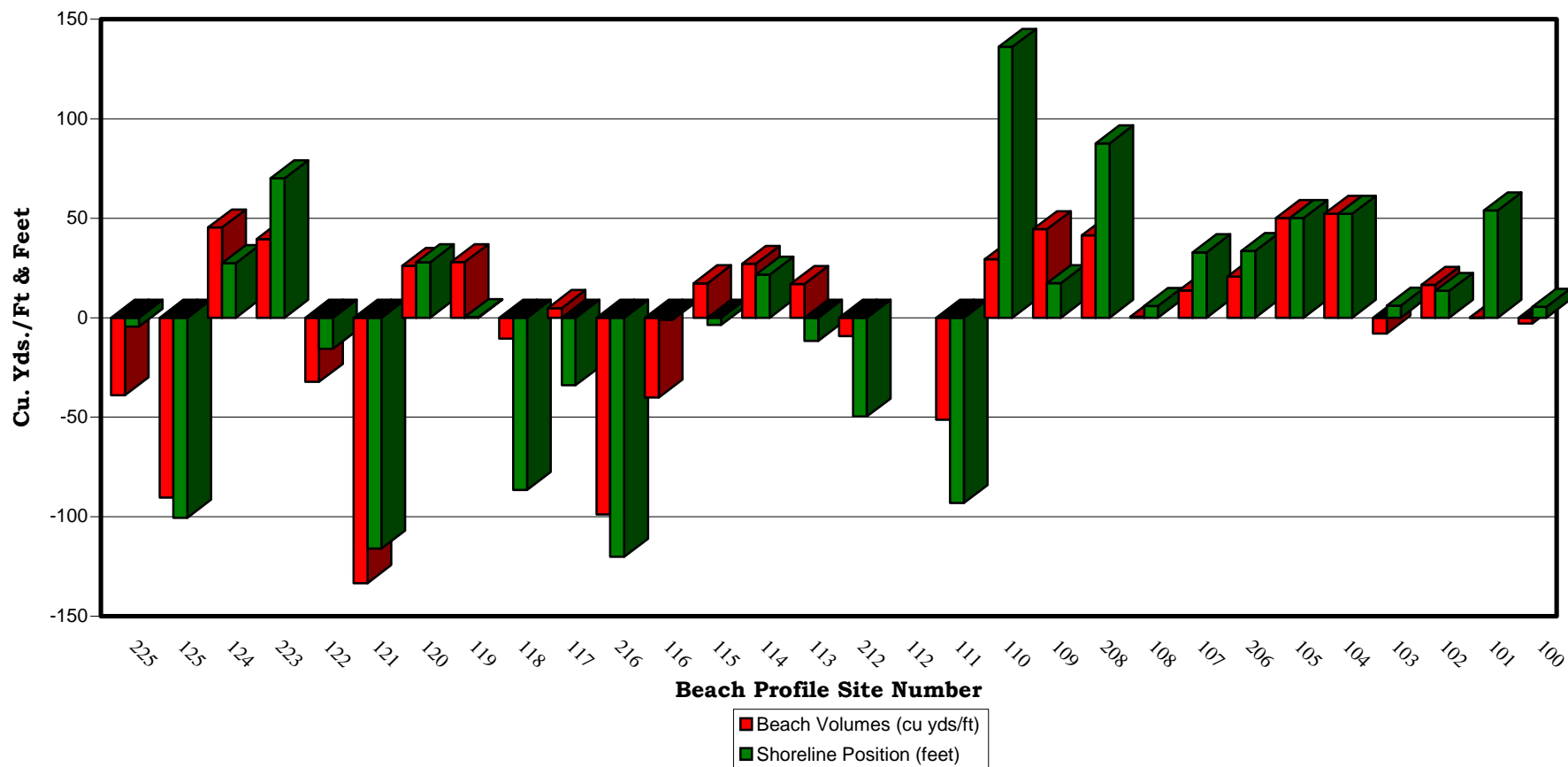


Figure 82e. The 18-month study interval shows severe loss at three inlet locations (#125 <6th St. Ocean City> #121, #216 and #111) with recovery on the beaches a general occurrence during the summer of 2005. Sites proximal to inlets tend to be sensitive to tidal channel and current changes making them change rapidly and substantially.

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. Erosion commenced following the May 2004 survey and continued every survey that followed. The losses amounted to 17.61, 10.43, and 1.98 yds³/ft. within the area of the dune each season.

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 loss diminished seaward of the zero elevation line with very minor retreat in the position of the shoreline (-5 feet) and features under water. The dune losses amounted to two thirds of the total sand volume loss over the past 18 months.

- **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.

Retreat continued to remove beach width established in 2002 with the last maintenance fill by the ACOE. Seasonally, the loss rate was -48.37, -38.98, and -6.33 yds³/ft. since May 2004. The summer season of 2005 was especially good for accretion of sand on all beaches, so the much smaller loss in 2005 probably reflects these conditions. The fall 2005 survey did occur prior to the pair of mid-October northeast storms however. The total shoreline retreat was 100 feet since May 2004.

- **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. Over the past 18 months, the all sand added to the dune system was deposited on the seaward foredune positioned 100 feet seaward of the boardwalk. The gain was 2.64 yds³/ft. with the elevation increasing by a half-foot in 18 months. Prevention of excessive elevation increase on the higher back dunes has been an objective by Ocean City since the project was completed. It appears to be working with the foredune collecting all the new sand with an elevation of 12.5 feet, which is 1.5 feet lower than the boardwalk deck. This dune can grow 4.5 feet vertically before it exceeds the agreement on dune height presently under litigation.

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. Substantial seasonal variations occurred with bar migration dominating the shifts in sand volume. Clearly, the 2005 summer saw large-scale berm growth as 16.46 yds³/ft. was deposited on the beach. Other changes were in the same order of magnitude offshore, but the net gain was only 6.32 yds³/ft. for the season. This shows the potential scope of “erosion” and “deposition” seasonally on a beach with no real change in the net sand supply at the site. The net volume change was 6.32 yds³/ft. while the gross volume change was 84.38 yds³/ft. adding up all the segments of gain or loss between the boardwalk and a point 1,400 feet seaward.

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

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.

Smaller berm development occurred at this site, but it still was by far the larger of the two summer seasons. Sand was added to the foredune slope, but no increase in the 18-foot crest elevation was observed. The entire profile gained 39.60 yds³/ft. as sand moved closer to the shoreline from beyond the 1,500-foot profile length.

- **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. The State and local project completed in 1995 enhanced the beach width to allow 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 70 feet in width and gain sand across its width beyond the crest. The dune and upper beach grew by 6.19 yds³/ft. by fall 2005.

Bar migration dominated the offshore and lower beach configuration. Sand was closest to the shoreline at the end of the summer of 2005, again, with the survey occurring prior to northeast storm activity. The 18-month sand volume showed a loss of 32.23 yds³/ft. with a shoreline retreat of 16 feet.

- **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. By June 2005 the offshore was contributing 32.46 yds³/ft. while the beach was continuing to lose sand. This season saw 37.36 yds³/ft. additional loss and a 61-foot further shoreline retreat. The summer of 2005 finally produced a reversal in sand volume change but only a 5.25 yds³/ft. gain accompanied by a 120-foot shoreline advance as sand moved onto the beach. The 18-month period saw a 133.35 yds³/ft. sand volume loss and a 116-foot shoreline retreat. Given the nature of change at Corson's Inlet shorelines, these losses could be reversed at any time or get much worse.

- **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. Cape May County personnel put the sand back and during the spring of 2005 bulldozed beach sand up to the exposed seaward face of the geo-textile core of the dune recovering the toe apron and the face. Sand did accumulate on the beach during the very accretional summer of 2005. The fall survey documented 30.45 yds³/ft. added to the beach as a bar moved landward. The 18-month trend was positive with 26.10 yds³/ft. added and a 28-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 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. Sand added to the seaward slope in the summer of 2005.

A berm was created during the summer of 2005 and bar migration dominated the offshore. 28 yds³/ft. were added to the cross section with no change to the shoreline position in 18 months.

- **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.

This beach actually became lower and slightly narrower over the study interval and during the summer of 2005 when most locations showed serious accumulations of sand on the berm. The site lost 10.48 yds³/ft. (23.42 yds³/ft. loss on the beach itself) overall, with a 87-foot shoreline retreat in 18 months.

- **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 13.4 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.

This low, flat beach did not develop a berm during the summer 2005 season either. A low-profile bar offshore migrated steadily toward the shoreline each season surveyed, but the net gain was only 4.87 yds³/ft. with a 34-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. 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. Very modest growth occurred on the crest of the low foredune during the winter of 2004 to 2005.

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. During the winter of 2004 to 2005 the site lost 78.22 yds³/ft. with a 155-foot shoreline retreat. During the following summer the shoreline advanced 61 feet, but the site continued to lose sand (-9.75 yds³/ft.). This and losses further south prompted Avalon to undertake a combined pumped sand replenishment and a truck-hauled back passing of sand in early 2006.

- **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 was completed.

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. Loss during the winter of 2004 – 2005 took a toll at 23rd Street too (-61.23 yds³/ft. and -90-foot shoreline retreat). The shoreline recovered 67 feet the following summer, but only 3.64 yds³/ft. in sand volume was added. The Borough of Avalon placed truck-hauled sand at this site in early 2006.

- **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 800 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 red 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. Sand added to the lowermost slope of the foredune during this interval of study.

Positioned about 800 feet south of the ACOE beach project, the area received material eroded and sent south by wave transport. This site gained 17.30 yds³/ft. with a 4-foot shoreline retreat as bars migrated onto the beach filling the trough existing at the base of the beachface. These changes were not as dramatic as the losses to the north would suggest indicating that sand from the north moved further seaward.

- **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. The site saw berm growth with the final cross section having the highest elevation beach, but narrower than earlier. The final cross section had a bar far offshore not present earlier. The net change over 18 months was 27.06 yds³/ft. gained with a 22-foot shoreline advance.

- **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. 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 seen on successive surveys ending fall 2005.

The berm, shoreline position and other offshore features have remained constant as this site adjusted to the ACOE fill project. Offshore, the bar system steadily migrated toward the beach, but never reached the point of joining it. The 18-month net sand volume gain was 16.88 yds³/ft. with a 12-foot shoreline retreat.

- **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.

The beach widened as sand moved landward, especially during the summer of 2005. The net change was relatively small with the sand volume declining by 9.16 yds³/ft. and the shoreline retreating by 50 feet. The beach gained 25.50 yds³/ft., but the loss offshore as the bar moved onto the beach negated that increase.

- **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 that covered with wind-blown 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 presently undergoing erosion, showing a vertical scarp at all times.

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 is related to changes in the tidal dynamics occurring in Hereford Inlet. A period of sustained shoreline retreat commenced in October 1997 and has marched into the primary dunes. By May 2005 it was less than 50 feet from the berm crest to the reference piling that was once an 800-foot distance in 1995.

The first three cross sections show the progressive recession to the shoreline (-59.29, -6.38 yds³/ft. with 73 and 38-foot shoreline retreats). The summer of 2005 actually reversed both trends causing a 10.15 yds³/ft. sand supply increase and an 18-foot advance to the zero elevation shoreline. The entire North Wildwood shoreline is impacted and a look at the Hereford Inlet shoreline shows where all the lost sand went. The last time this expanse of dry sand was deposited along the inlet shoreline was in 1965. 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 950 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 950-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 volume changes were modest since the area is in equilibrium between gain and loss of sand. The summer of 2005 saw a 22.59 yds³/ft. sand volume increase with a 119-foot shoreline advance. The 18-month change was 29.32 yds³/ft. gain and a 136-foot

shoreline advance. Clearly the North Wildwood erosional trend is related to sand moving into Hereford Inlet and depositing along the North Wildwood inlet 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 14 feet NGVD and 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 dune gained 3.5 yds³/ft. since spring 2004, the beach widened by 17 feet and the sand volume grew by 44.55 yds³/ft.

- **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. Sand was deposited on the small foredune area in front of the main dune on the plots. The beach gained sand and offshore bars migrated landward.

The beach gained 41.43 yds³/ft. and the shoreline advanced by 88 feet as offshore sand moved onto the beach over the past 18 months.

- **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 2005 as the beach

stayed exactly where it was in April 2005 (volume change +0.52 yds³/ft.). The shoreline advanced 6 feet over 18 months. 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 120 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. Sand was deposited on a second low rise toward the front of the dune area (3.66 yds³/ft.). This should develop into a second line of dunes.

The dry upper beach is flat and currently extends 180 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. The site gained 13.70 yds³/ft. and the shoreline advanced 33 feet between spring 2004 and fall 2005.

- **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 #29 (October 2004). The gain remained constant over the next winter and minor additions took place the summer of 2005. These gains are attributed to the beach renourishment projects, which occurred in both the spring 2003 and the fall 2004. The net change was a 20.63 yds³/ft. gain in sand volume and a 33-foot shoreline advance.

- **Profile #105 – Beach Avenue, Lower Township, Cape May County** (fig. 106)

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 original instrument station was moved 270 feet seaward to allow visibility across the ever-growing profile.

Sand deposited on the beach produced an 89.41 yds³/ft. gain in sand volume with a 166-foot shoreline advance. Over the summer 15.22 yds³/ft. were removed as the profile adjusted to wave conditions. The shoreline did not change. The 18-month changes reflect the early 2005 beach nourishment effort.

- **Profile #104 – Lake Drive, Cape May Point, Cape May County** (fig. 107)

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 18 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 rebuilt dune towers over the previous seaward dune and the spring 2005 survey shows the extent of beach nourishment (+65.07 yds³/ft. and +78 feet of shoreline advance). Over the summer the beach retreated 52 feet at the shoreline as the new berm lost 24.32 yds³/ft. Redistribution of sand offshore is suggested but survey 31 ended 100 feet earlier than survey 30. However, the net change was a gain of 52.30 yds³/ft. and a 52-foot shoreline advance.

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

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. This stability ended during the early fall of 2005 as waves cut the bluff back 12 feet causing 4.54 yds³/ft. sediment volume to be transferred into the littoral system. Offshore the material was distributed creating a gain that made the overall loss only 1.20 yds³/ft. The zero elevation shoreline actually advanced 18 feet in 2005.

- **Profile #102 – Whittier Avenue, North Cape May, Cape May County** (fig. 109)

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. Sand appeared on the beach seaward of the dune during the winter of 2004 – 2005. Offshore, the changes in bar position produced localized erosion and re-deposition. The volume change was 16.45 yds³/ft., a considerable quantity of sand added to a Delaware Bay profile, and the shoreline advanced 14 feet.

- **Profile #101 – Pacific Avenue, Villas, Cape May County** (fig. 110)

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 a minor retreat at the beach.

The intertidal and sub-tidal flats are very stable and change slowly in incremental fashion. The net beach volume change was -1.59 yds³/ft. with a 54-foot shoreline advance. This seemingly dramatic shoreline advance is made possible by the deposition of 2.32 yds³/ft. at an elevation of -0.42 feet spread over a 200-foot width at the base of the beach slope. The flat terrace further seaward into the bay gained enough sand to produce an overall net change of just +0.02 yds³/ft. across 1,425 feet of profile line.

- **Profile #100 – Reeds Beach, Cape May County** (fig. 111)

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 varied in width and height, but from maintenance activities rather than natural processes. The beach showed only -0.74 yds³/ft. loss since March 2004 with the terrace offshore losing an additional 2.12 yds³/ft. spread across 438 feet as a layer 0.13 feet in average thickness removed.

SUMMARY OF CAPE MAY COUNTY

The Cape May County oceanfront consists 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 2003 to 2004 had few storms of low intensity. The next winter produced similar

results as hurricanes slammed into Florida, but left the Mid-Atlantic States unscathed. The 2005 winter started with a pair of northeasters in mid-October that all but erased an excellent summer's gain on all the beaches. The fear was real that NJ was about to feel the wrath of a truly stormy winter. However, this was not to be as the remainder of October, November, December and most of January 2006 consisted of repeated west-to-east cold fronts and no northeast storm activity. Small spring northeast storms did finally take place, but the cross sections show little trace of storm impacts.

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, the State Park and around the point 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 is complete in North Wildwood and nearly complete in Avalon. Beach nourishment on the North Wildwood oceanfront beach is being considered as a joint effort between the City and the State of NJ. 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.

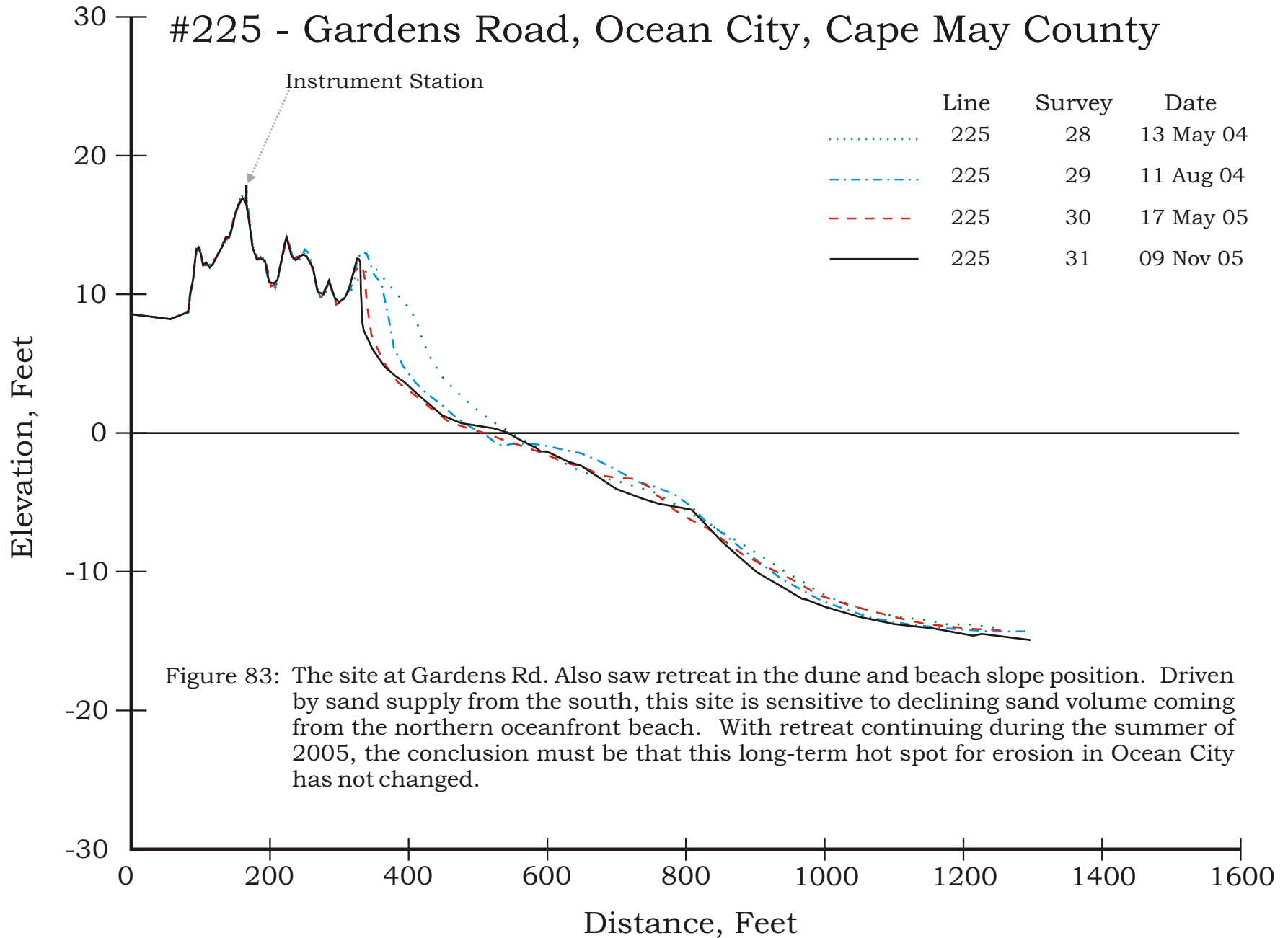
There is an ecosystem restoration of 116 acres planned for Stone Harbor Point. The State of New Jersey and the Borough of Avalon completed a 400-foot extension of the 8th Street inlet jetty at Townsend's Inlet in 2002.

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. At present there is no Congressional funding for any of these proposed projects primarily due to the Water Resources Development Act (WRDA) being stalled in the 107th Congress in spite of being passed by both houses. As of publication of this report the WRDA bill died with the 107th Congress and it will be up to interested stakeholders to revive the Water Resources Development Act in the 108th Congress as a new piece of financial legislation.

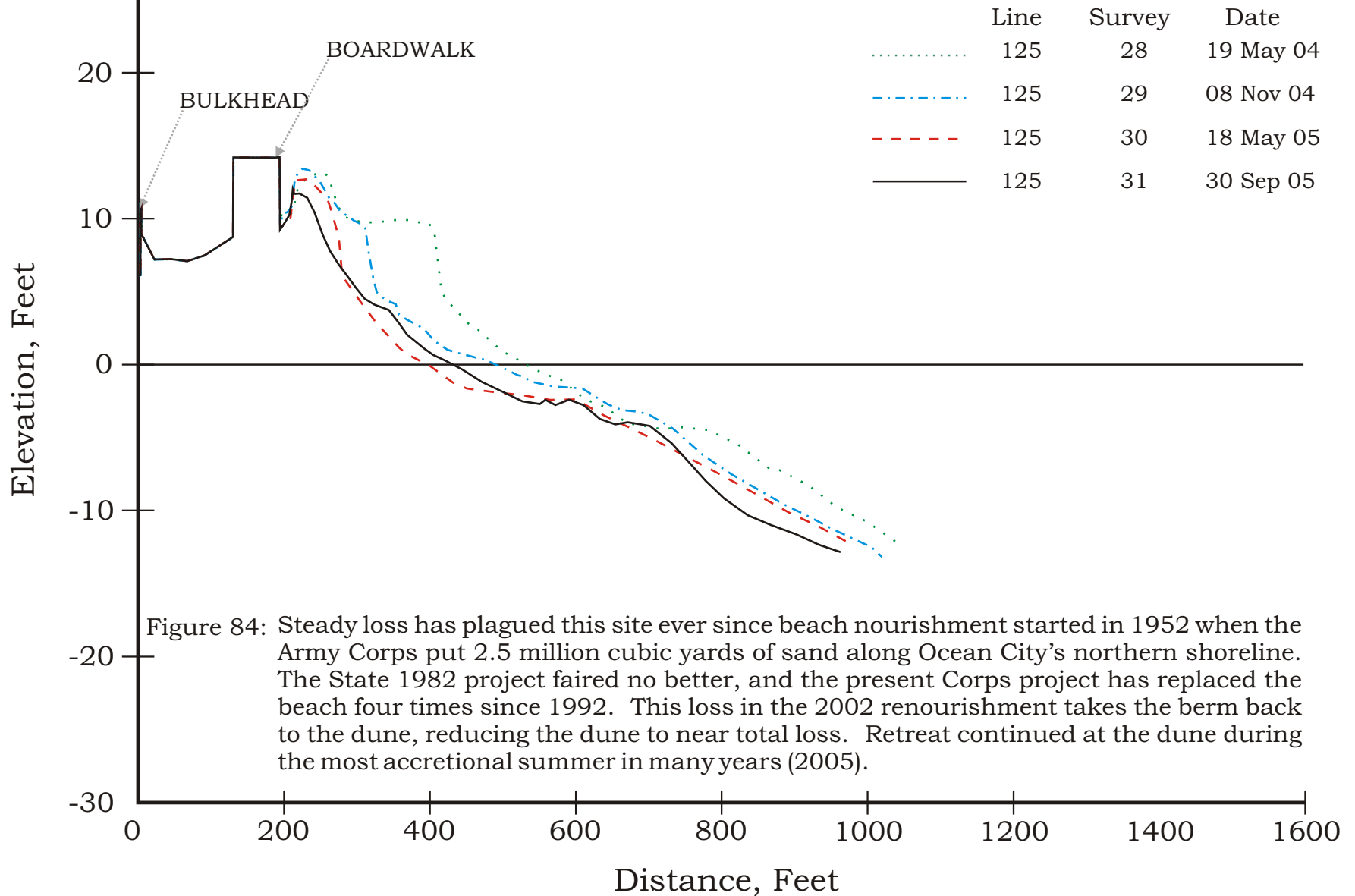
New Jersey Beach Profile Network

#225 - Gardens Road, Ocean City, Cape May County



New Jersey Beach Profile Network

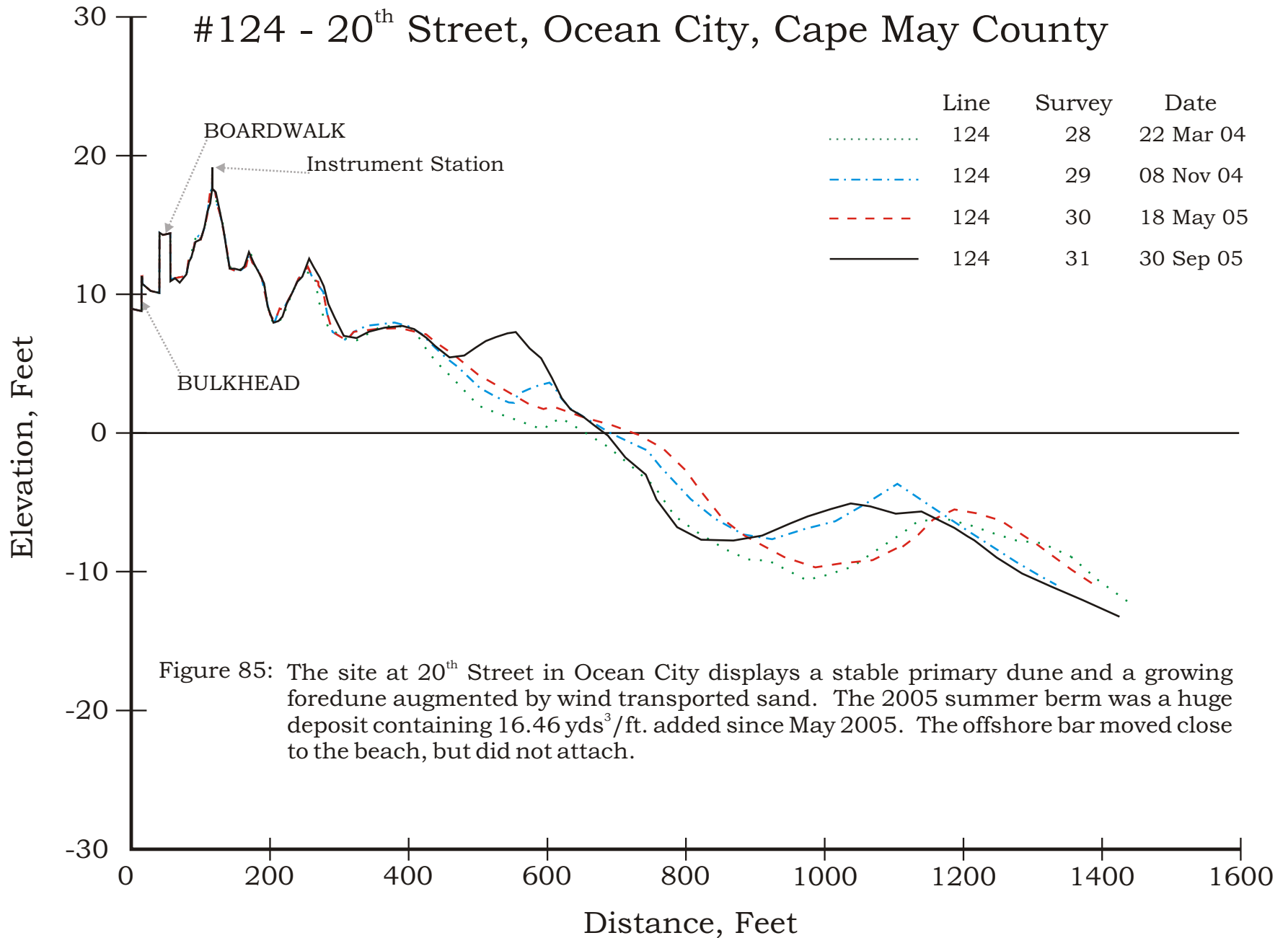
#125 - 6th Street, Ocean City, Cape May County



New Jersey Beach Profile Network

#124 - 20th Street, Ocean City, Cape May County

174



New Jersey Beach Profile Network

#223 - 34th Street, Ocean City, Cape May County

Line	Survey	Date	
.....	223	28	22 Mar 04
-.-.-.-	223	29	09 Nov 04
- - - -	223	30	18 May 05
————	223	31	30 Sep 05

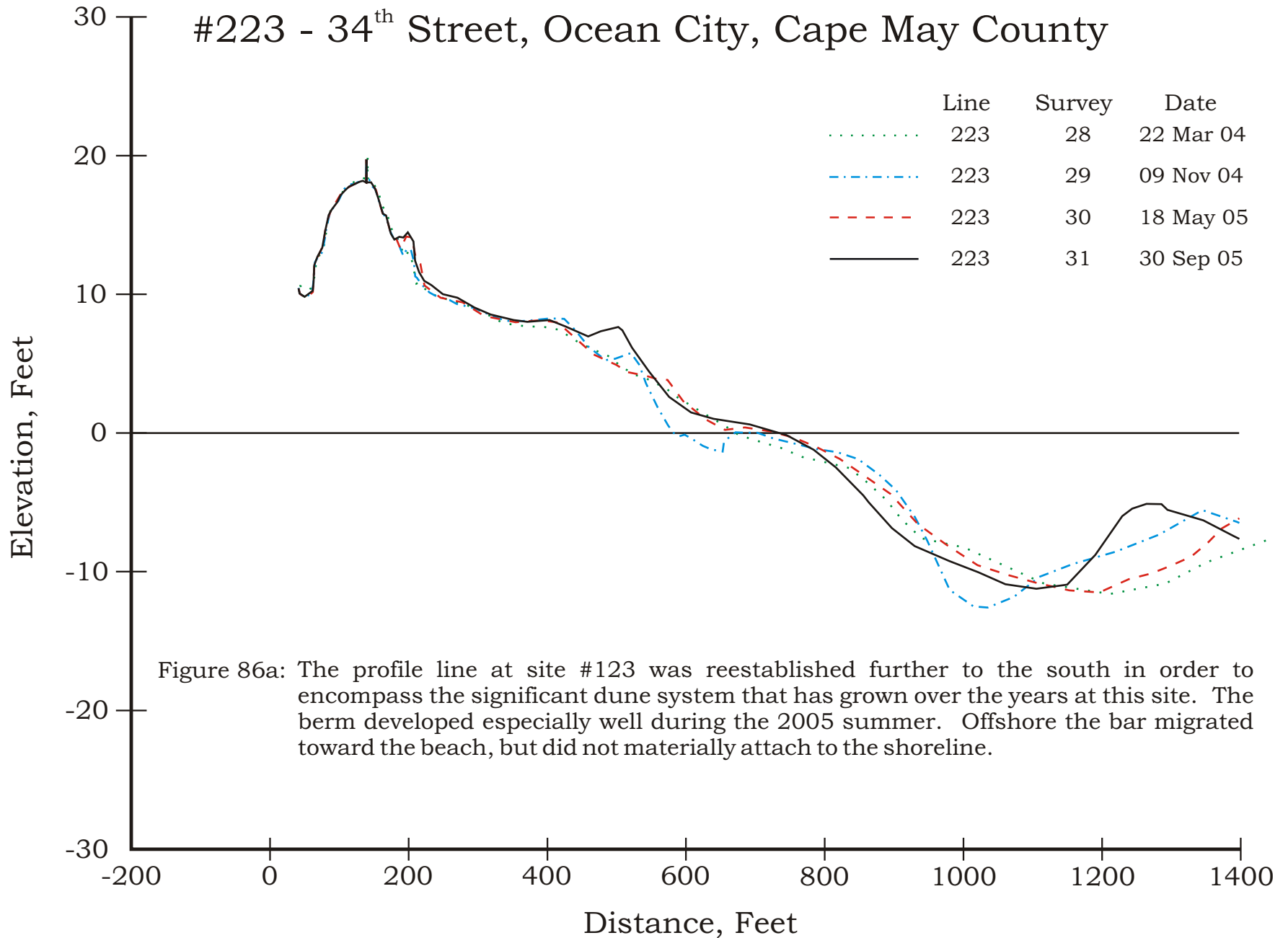
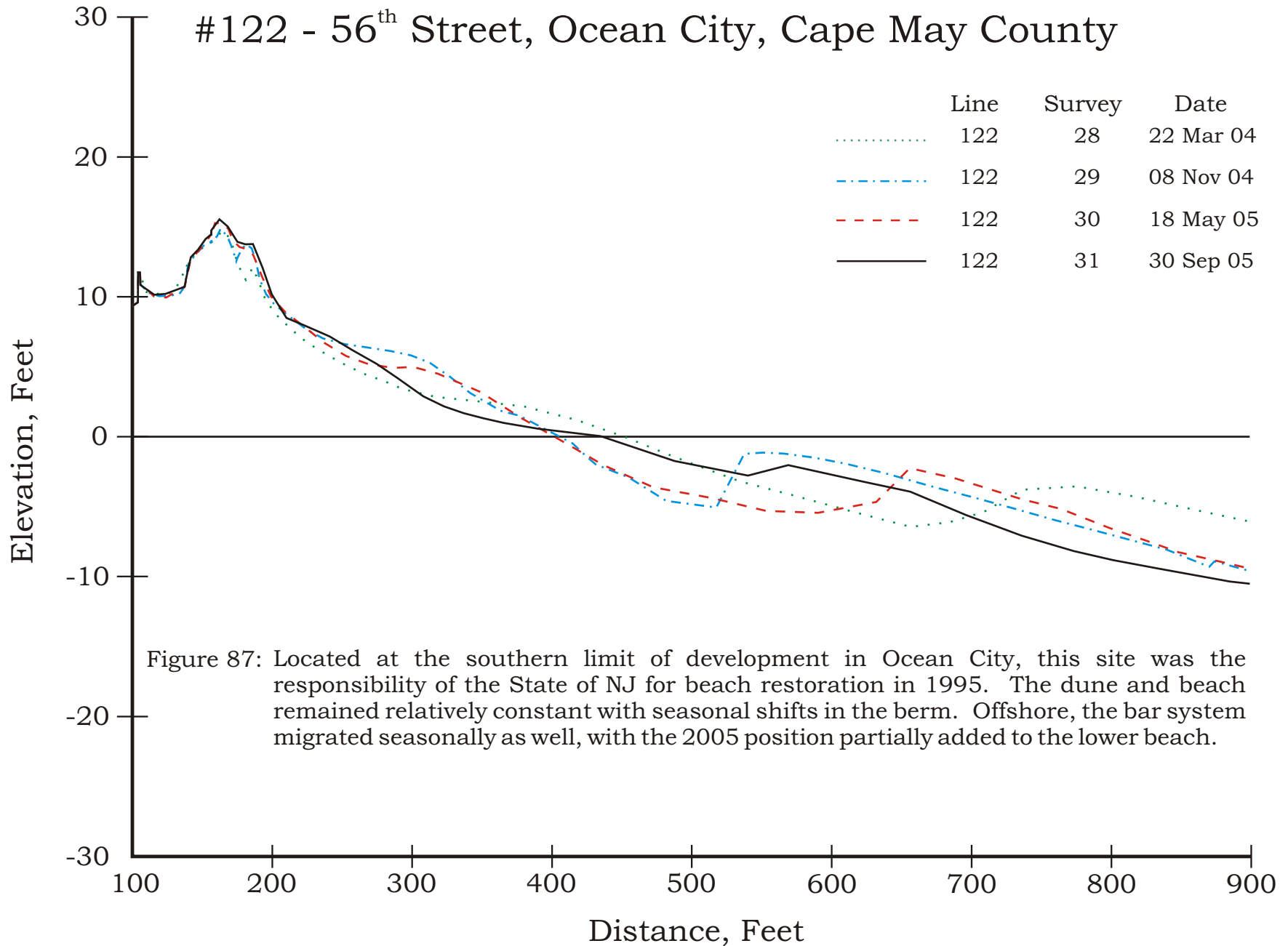


Figure 86a: The profile line at site #123 was reestablished further to the south in order to encompass the significant dune system that has grown over the years at this site. The berm developed especially well during the 2005 summer. Offshore the bar migrated toward the beach, but did not materially attach to the shoreline.

New Jersey Beach Profile Network

#122 - 56th Street, Ocean City, Cape May County



New Jersey Beach Profile Network

#121 - Williams Road, Strathmere, Cape May County

Line	Survey	Date	
.....	121	28	08 Mar 04
-.-.-.-	121	29	22 Dec 04
- - - -	121	30	21 Jun 05
————	121	31	15 Sep 05

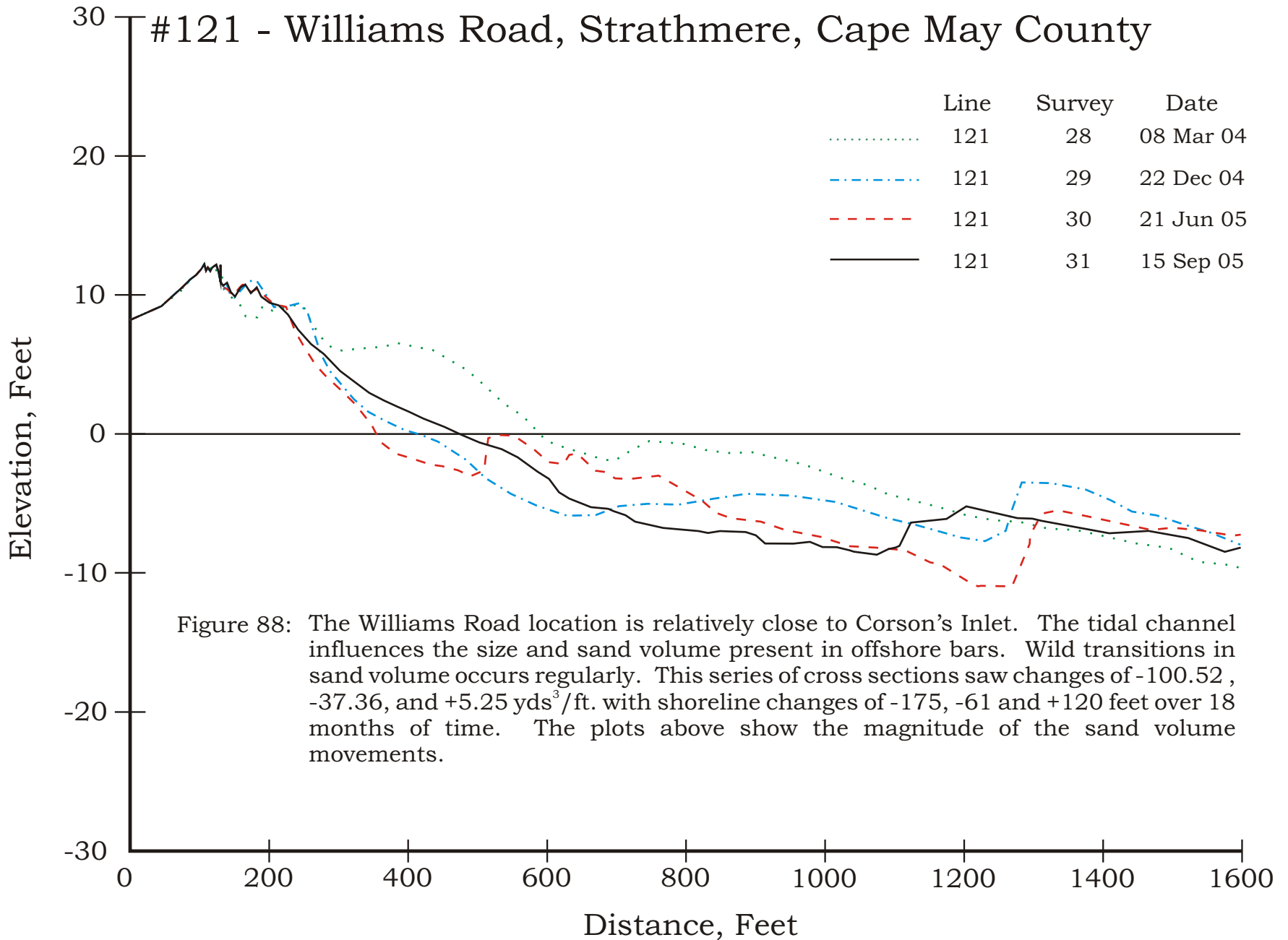
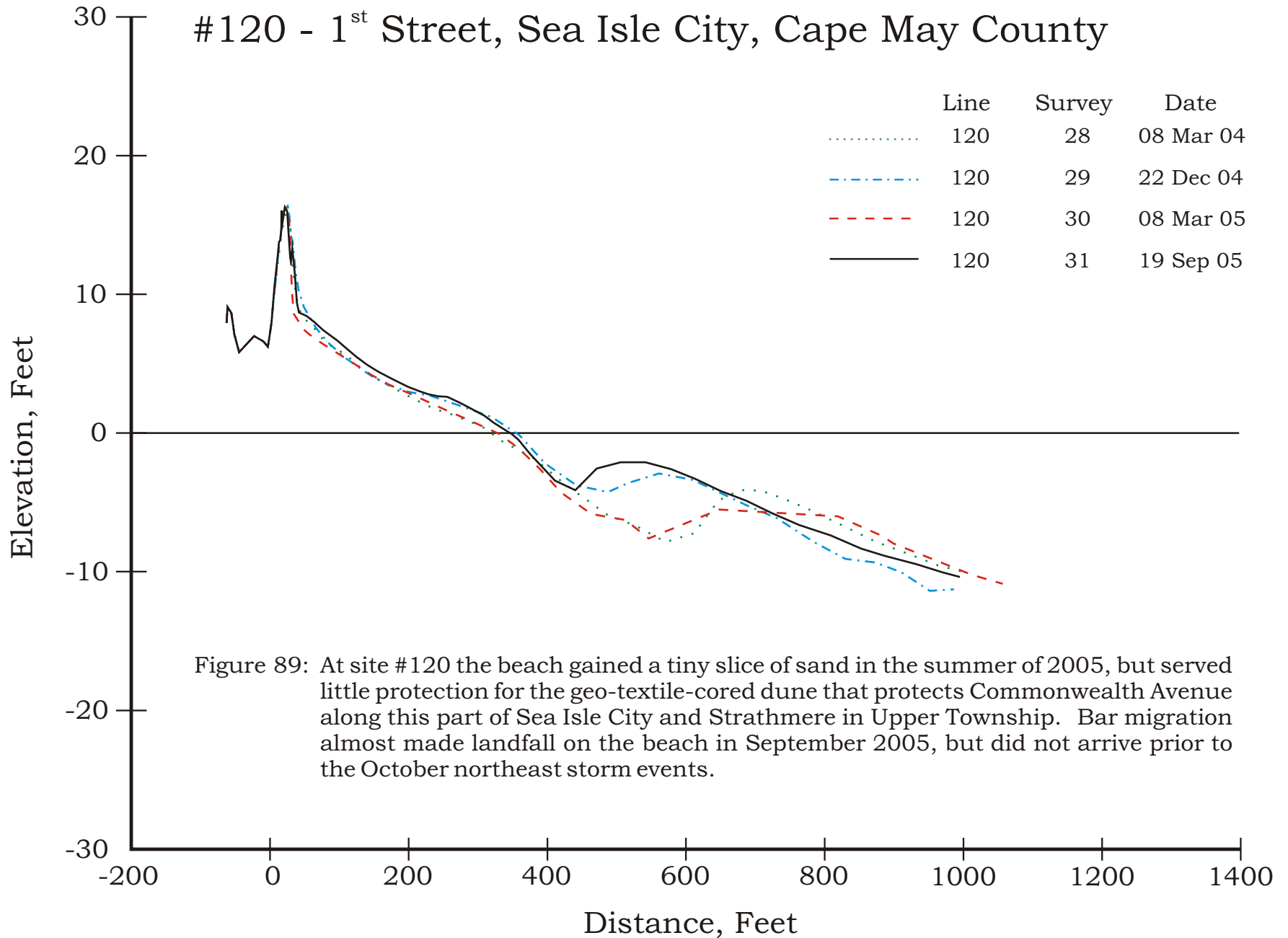


Figure 88: The Williams Road location is relatively close to Corson's Inlet. The tidal channel influences the size and sand volume present in offshore bars. Wild transitions in sand volume occurs regularly. This series of cross sections saw changes of -100.52 , -37.36, and +5.25 yds³/ft. with shoreline changes of -175, -61 and +120 feet over 18 months of time. The plots above show the magnitude of the sand volume movements.

New Jersey Beach Profile Network

#120 - 1st Street, Sea Isle City, Cape May County



New Jersey Beach Profile Network

#119 - 25th Street, Sea Isle City, Cape May County

Line	Survey	Date	
.....	119	28	10 May 04
-.-.-.-	119	29	09 Nov 04
-.-.-.-	119	30	04 May 05
————	119	31	05 Dec 05

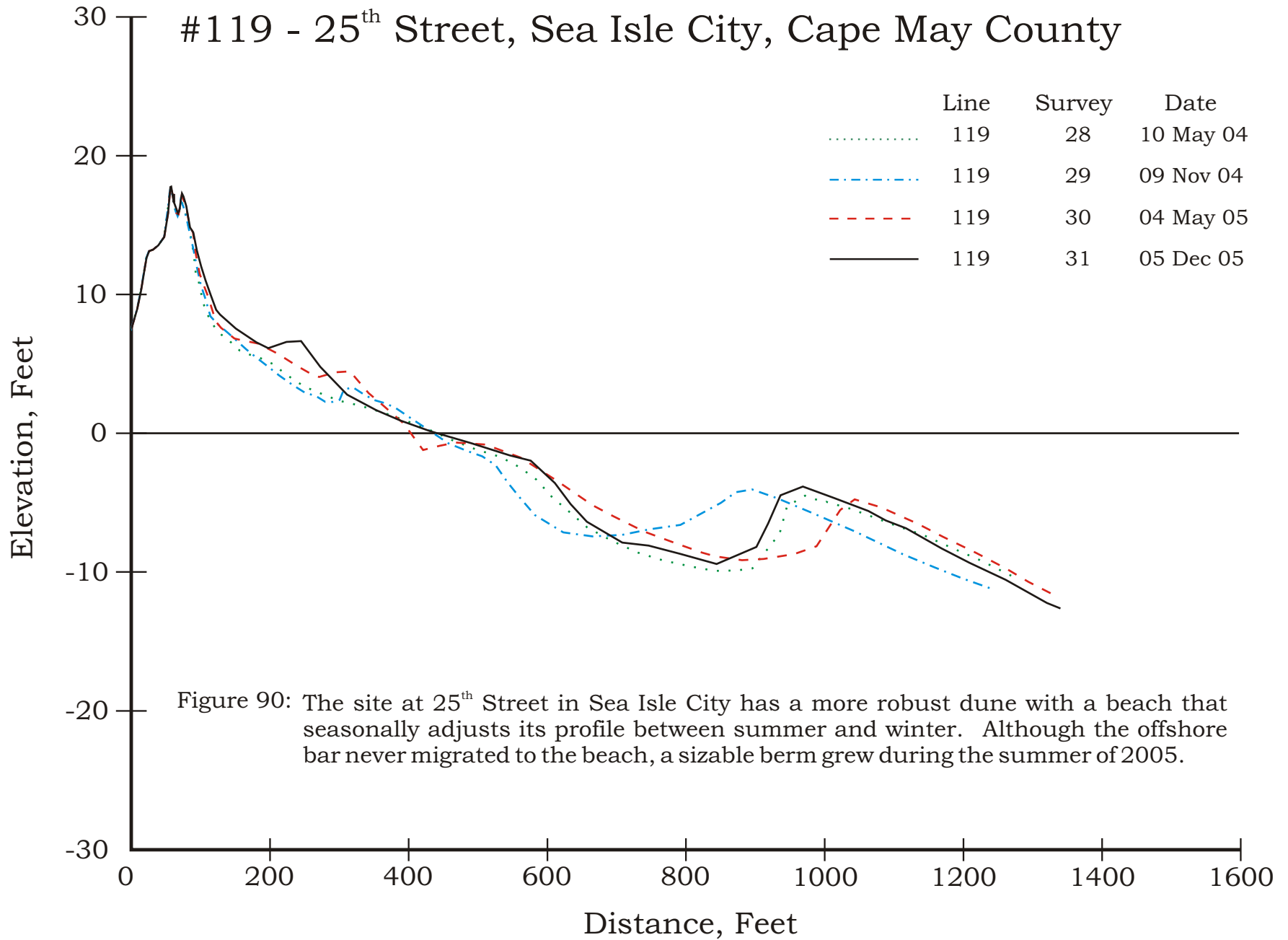


Figure 90: The site at 25th Street in Sea Isle City has a more robust dune with a beach that seasonally adjusts its profile between summer and winter. Although the offshore bar never migrated to the beach, a sizable berm grew during the summer of 2005.

New Jersey Beach Profile Network

#118 - 57th Street, Sea Isle City, Cape May County

180

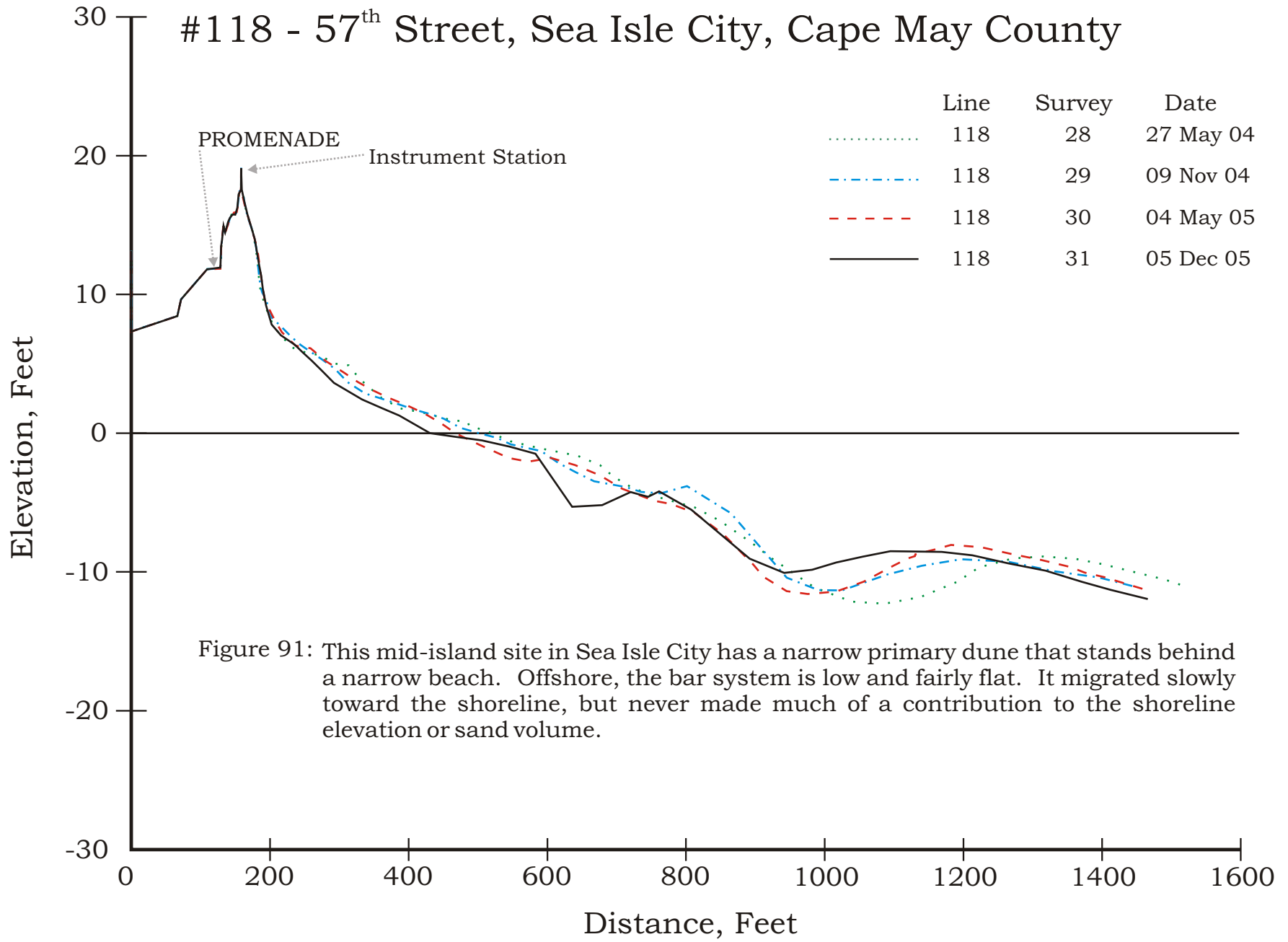
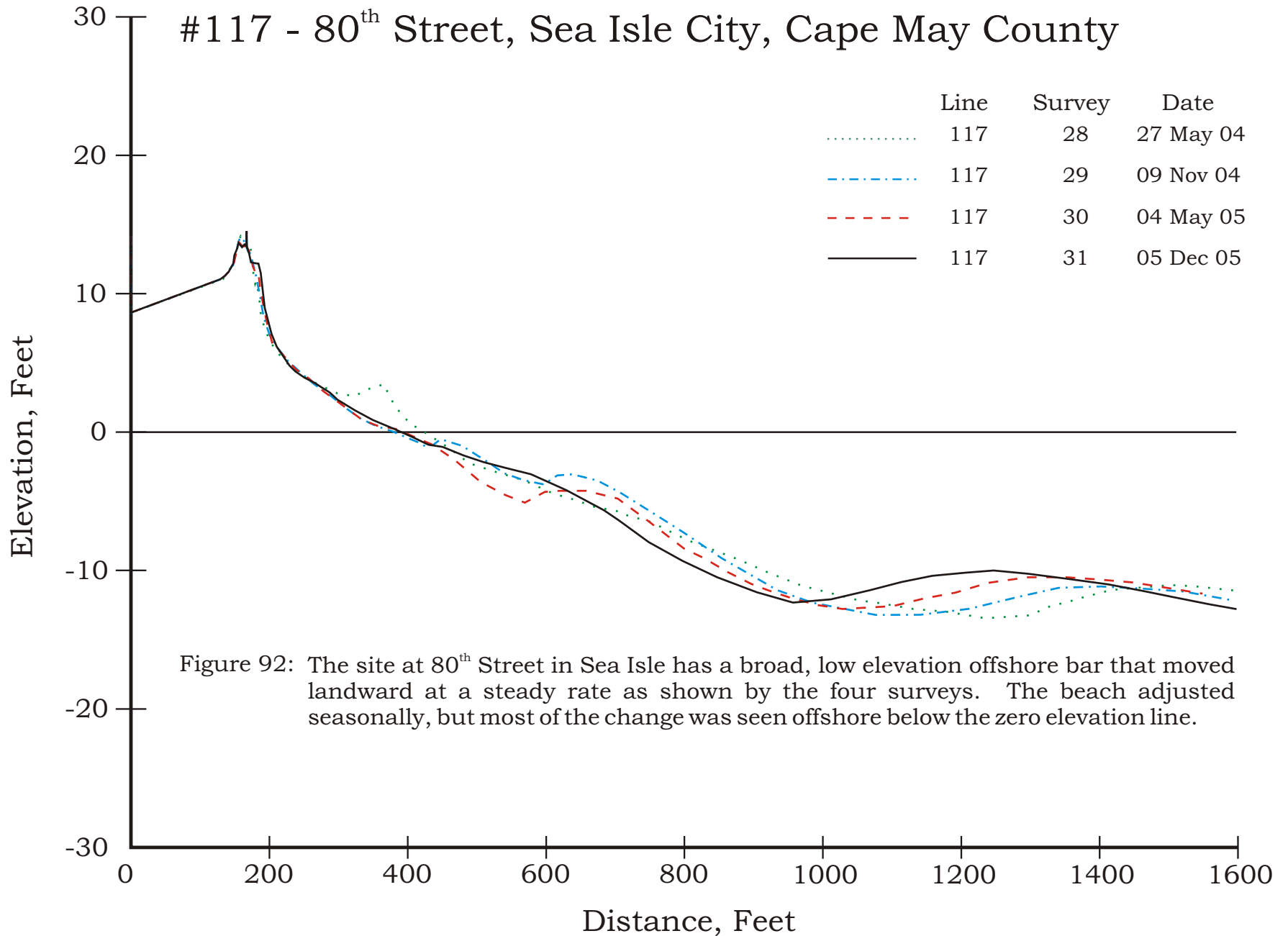


Figure 91: This mid-island site in Sea Isle City has a narrow primary dune that stands behind a narrow beach. Offshore, the bar system is low and fairly flat. It migrated slowly toward the shoreline, but never made much of a contribution to the shoreline elevation or sand volume.

New Jersey Beach Profile Network

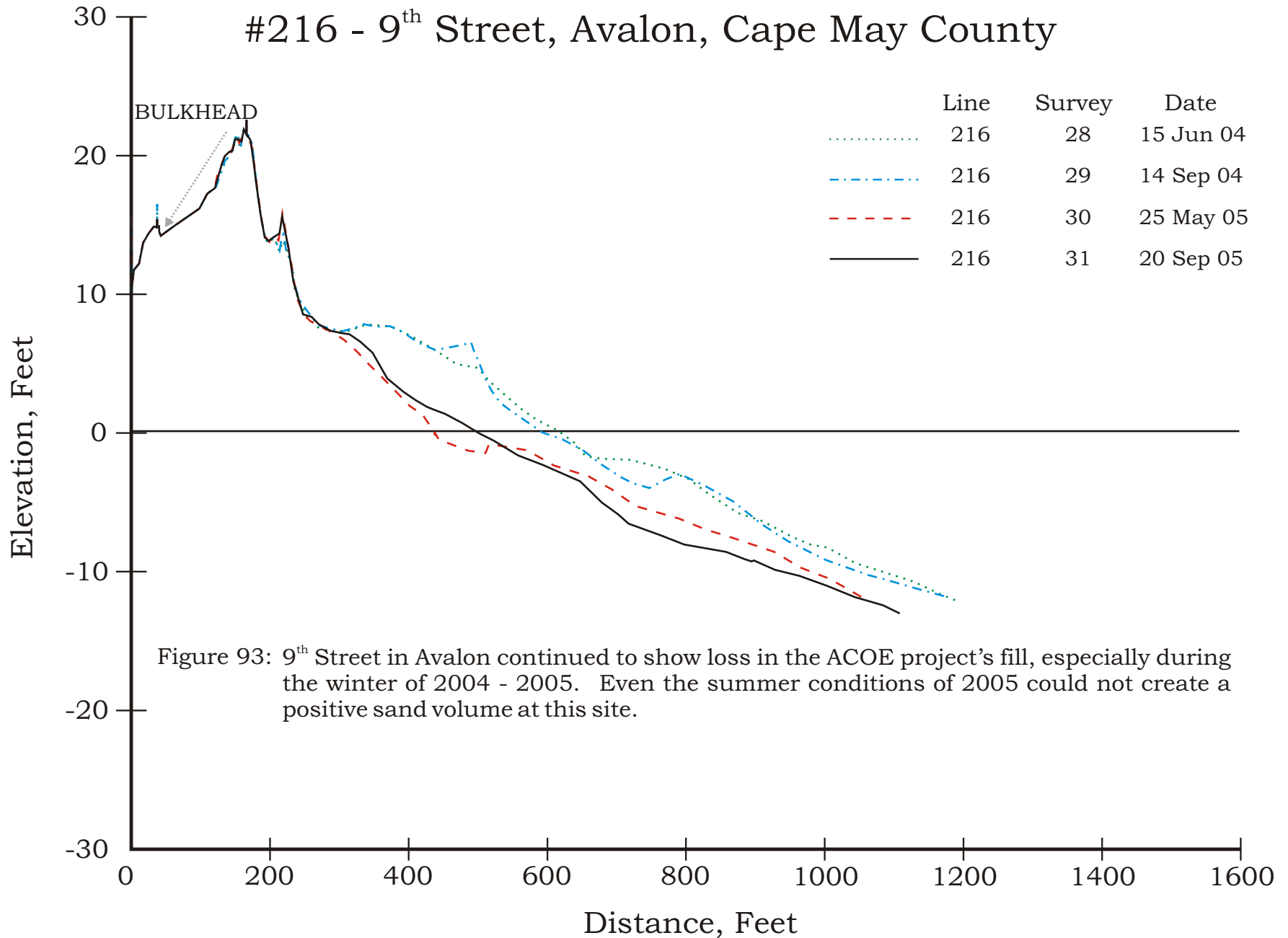
#117 - 80th Street, Sea Isle City, Cape May County

Line	Survey	Date	
.....	117	28	27 May 04
-.-.-.-	117	29	09 Nov 04
- - - -	117	30	04 May 05
————	117	31	05 Dec 05



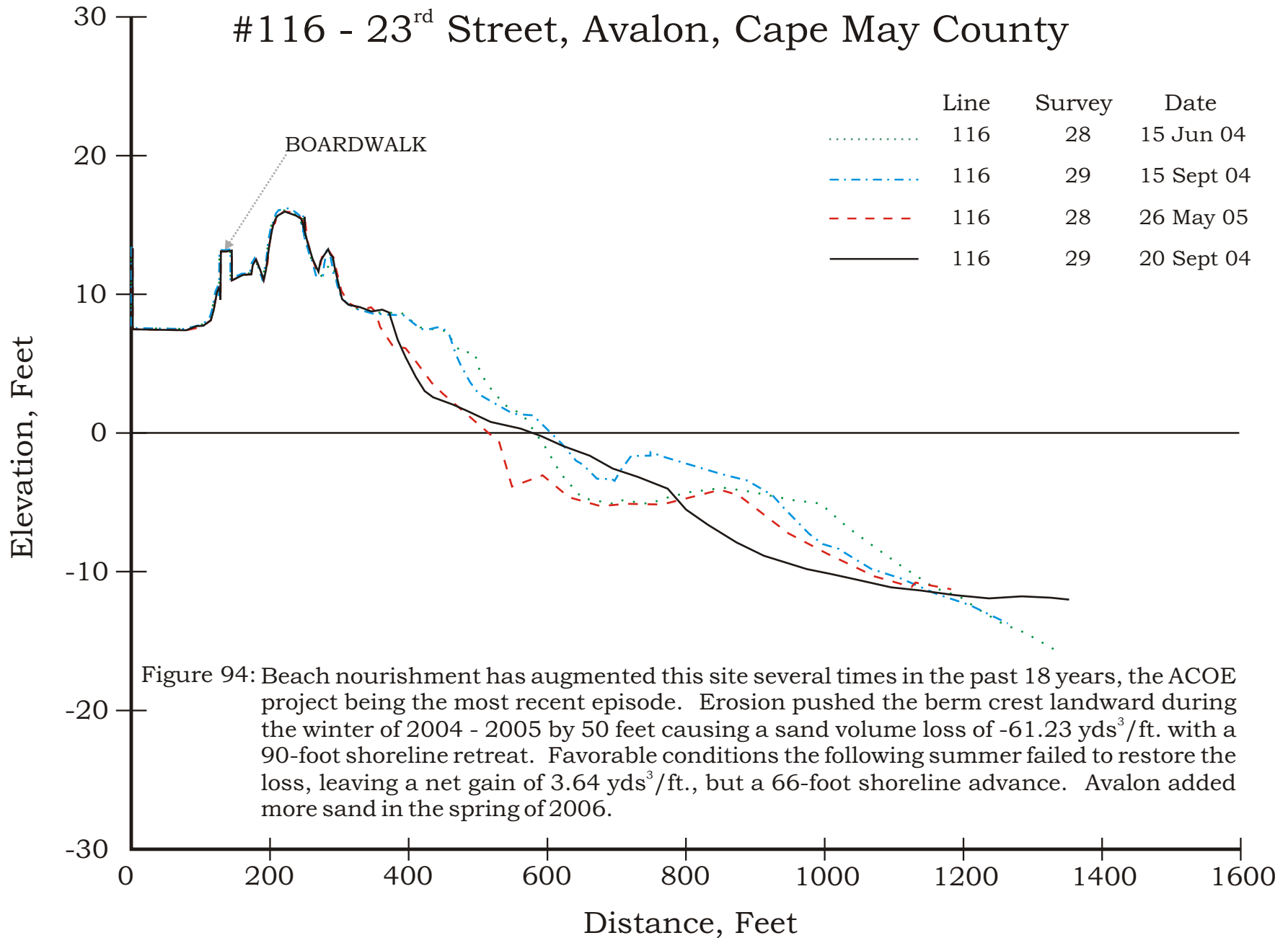
New Jersey Beach Profile Network

#216 - 9th Street, Avalon, Cape May County



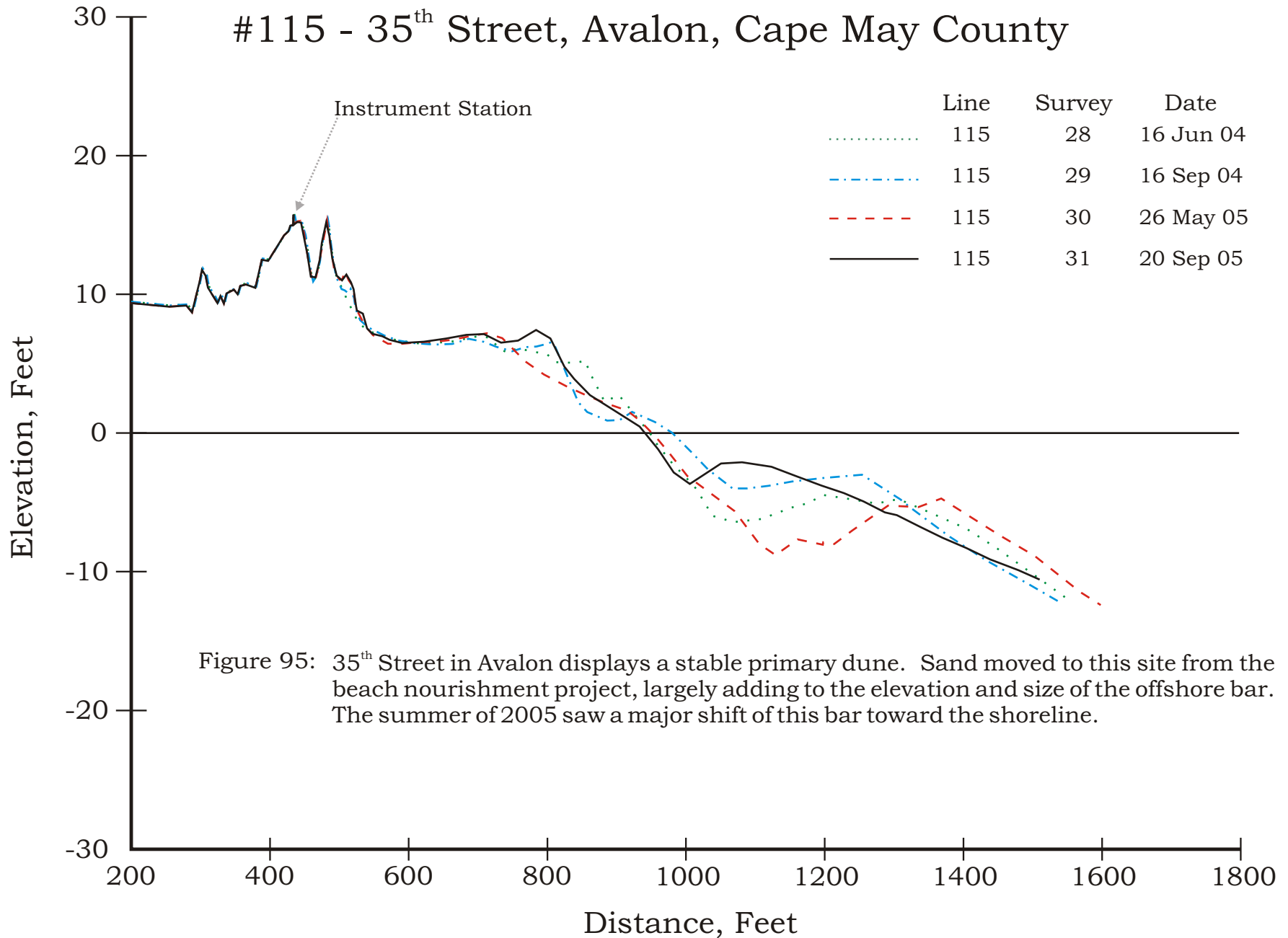
New Jersey Beach Profile Network

#116 - 23rd Street, Avalon, Cape May County



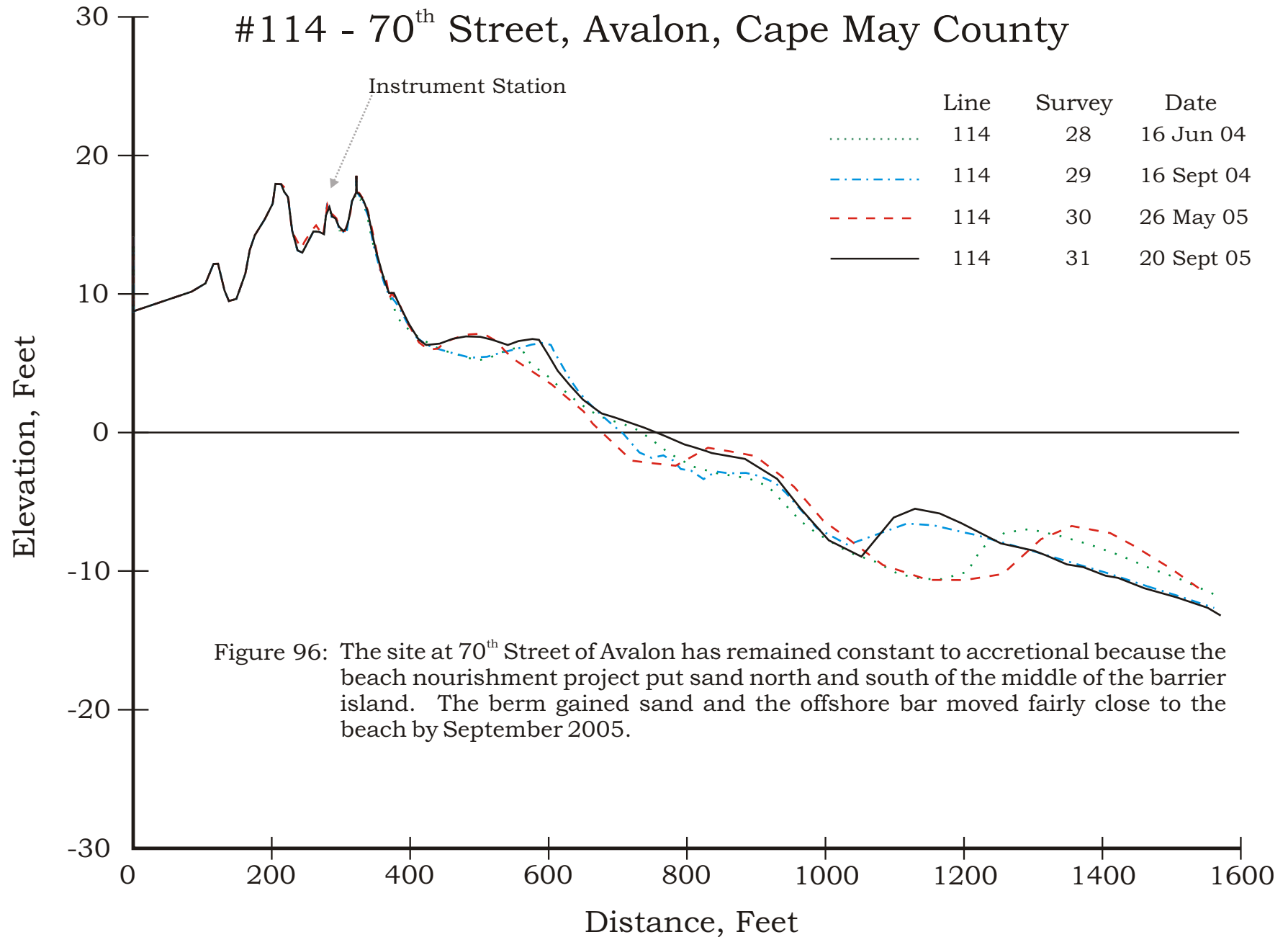
New Jersey Beach Profile Network

#115 - 35th Street, Avalon, Cape May County



New Jersey Beach Profile Network

#114 - 70th Street, Avalon, Cape May County



New Jersey Beach Profile Network

#113 - 90th Street, Stone Harbor, Cape May County

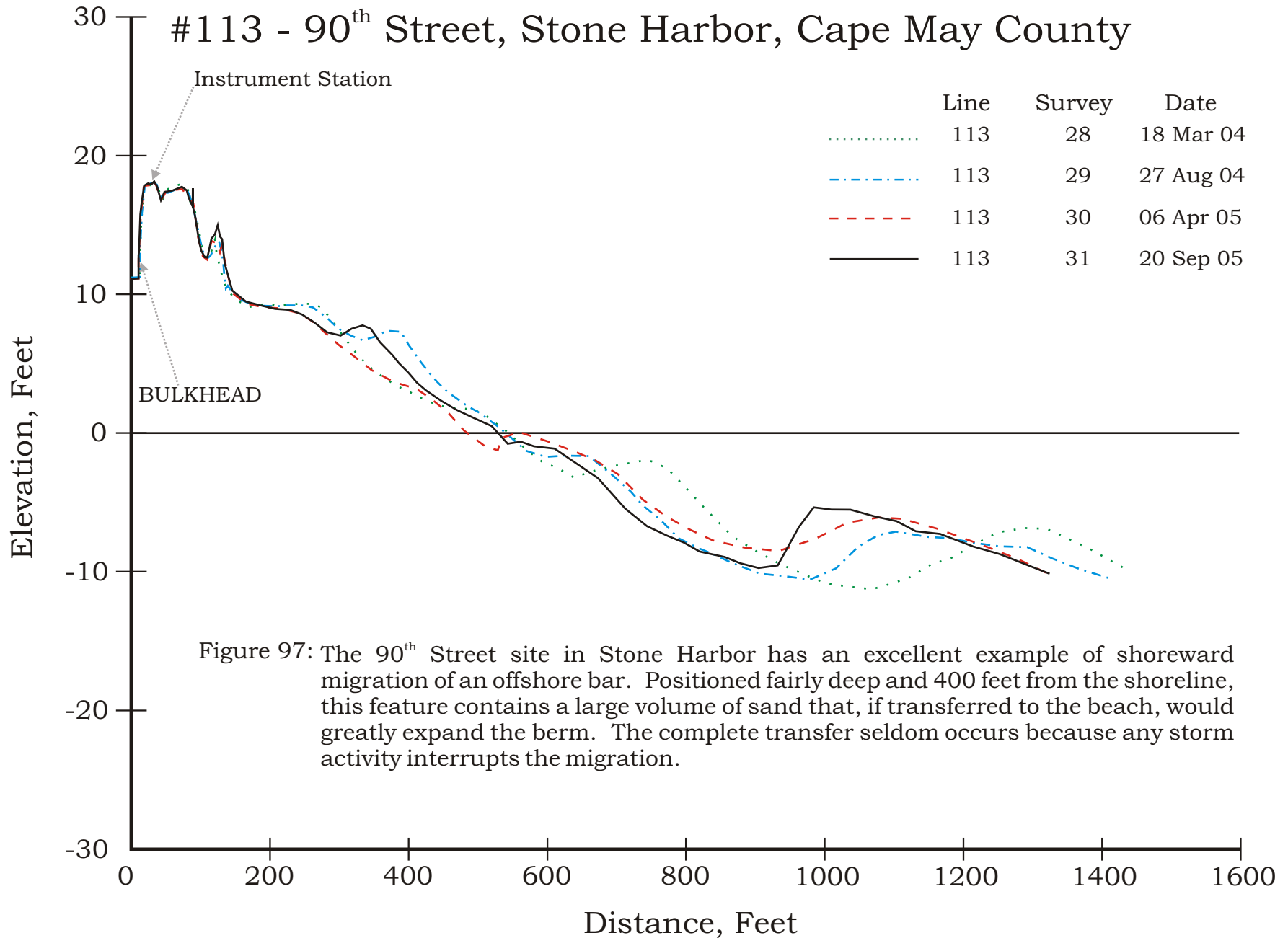
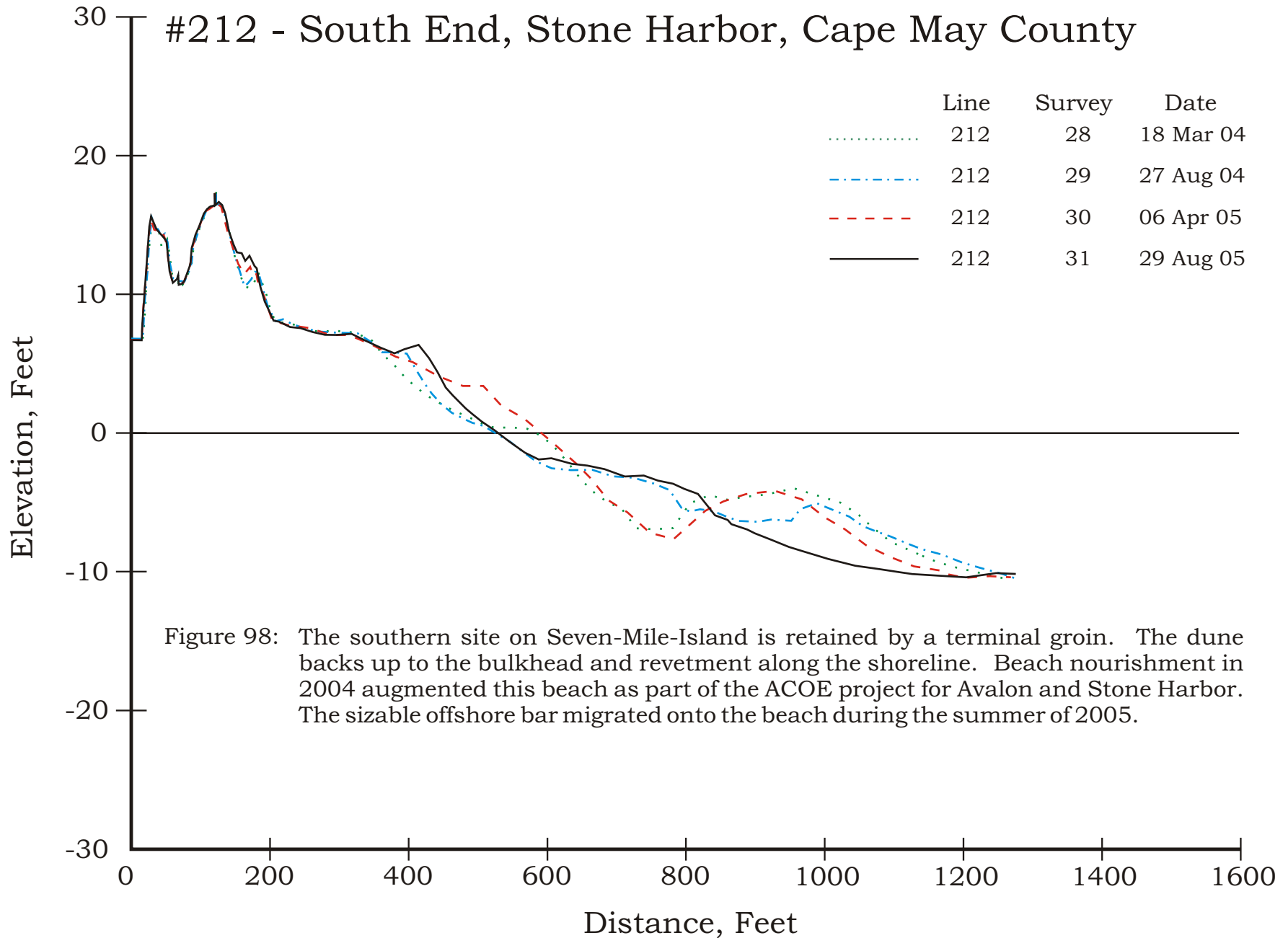


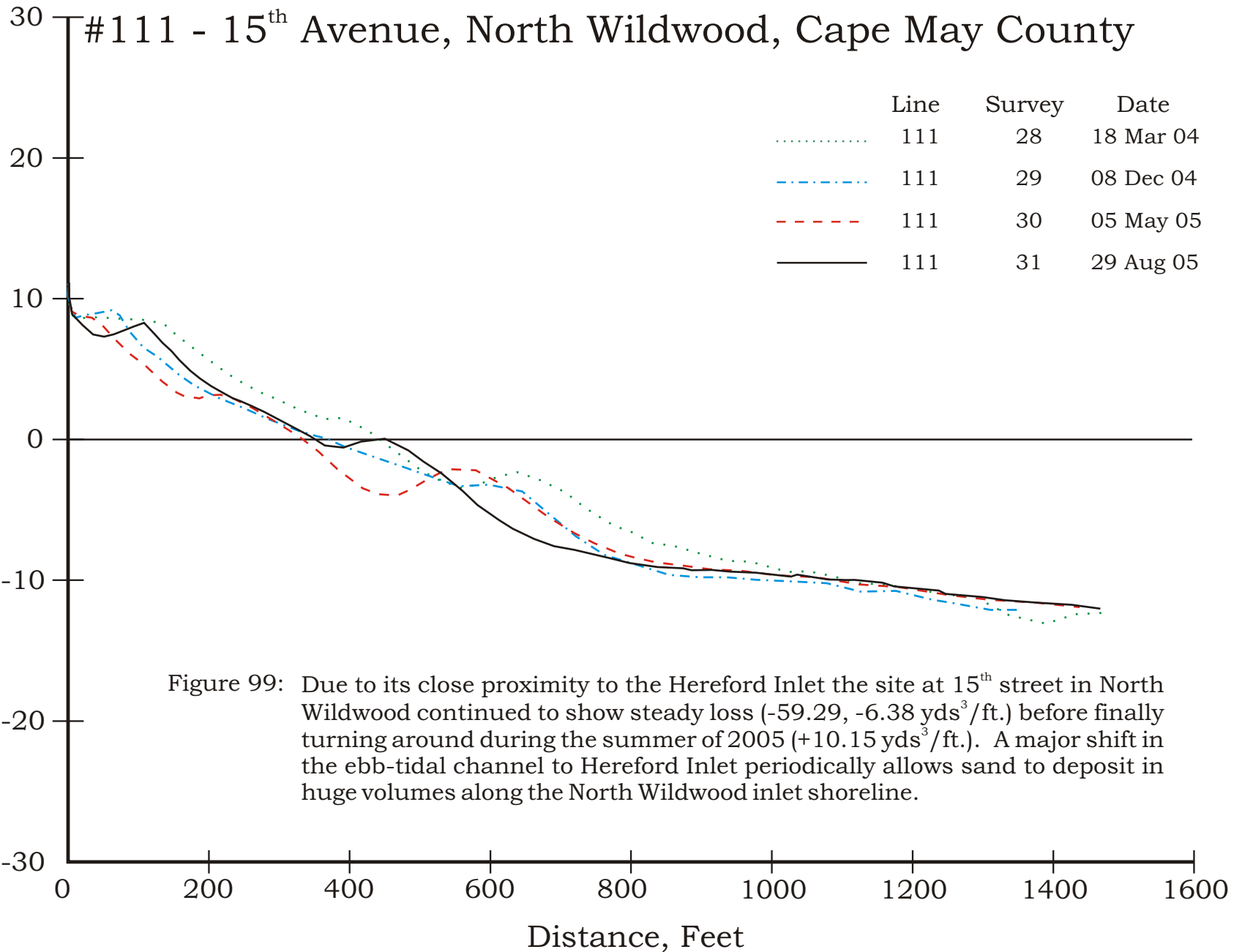
Figure 97: The 90th Street site in Stone Harbor has an excellent example of shoreward migration of an offshore bar. Positioned fairly deep and 400 feet from the shoreline, this feature contains a large volume of sand that, if transferred to the beach, would greatly expand the berm. The complete transfer seldom occurs because any storm activity interrupts the migration.

New Jersey Beach Profile Network

#212 - South End, Stone Harbor, Cape May County



New Jersey Beach Profile Network



New Jersey Beach Profile Network

#110 - Cresse Avenue, Wildwood, Cape May County

Line	Survey	Date	
.....	110	28	18 Mar 04
-.-.-.-	110	29	08 Dec 04
- - - -	110	30	05 May 05
————	110	31	28 Nov 05

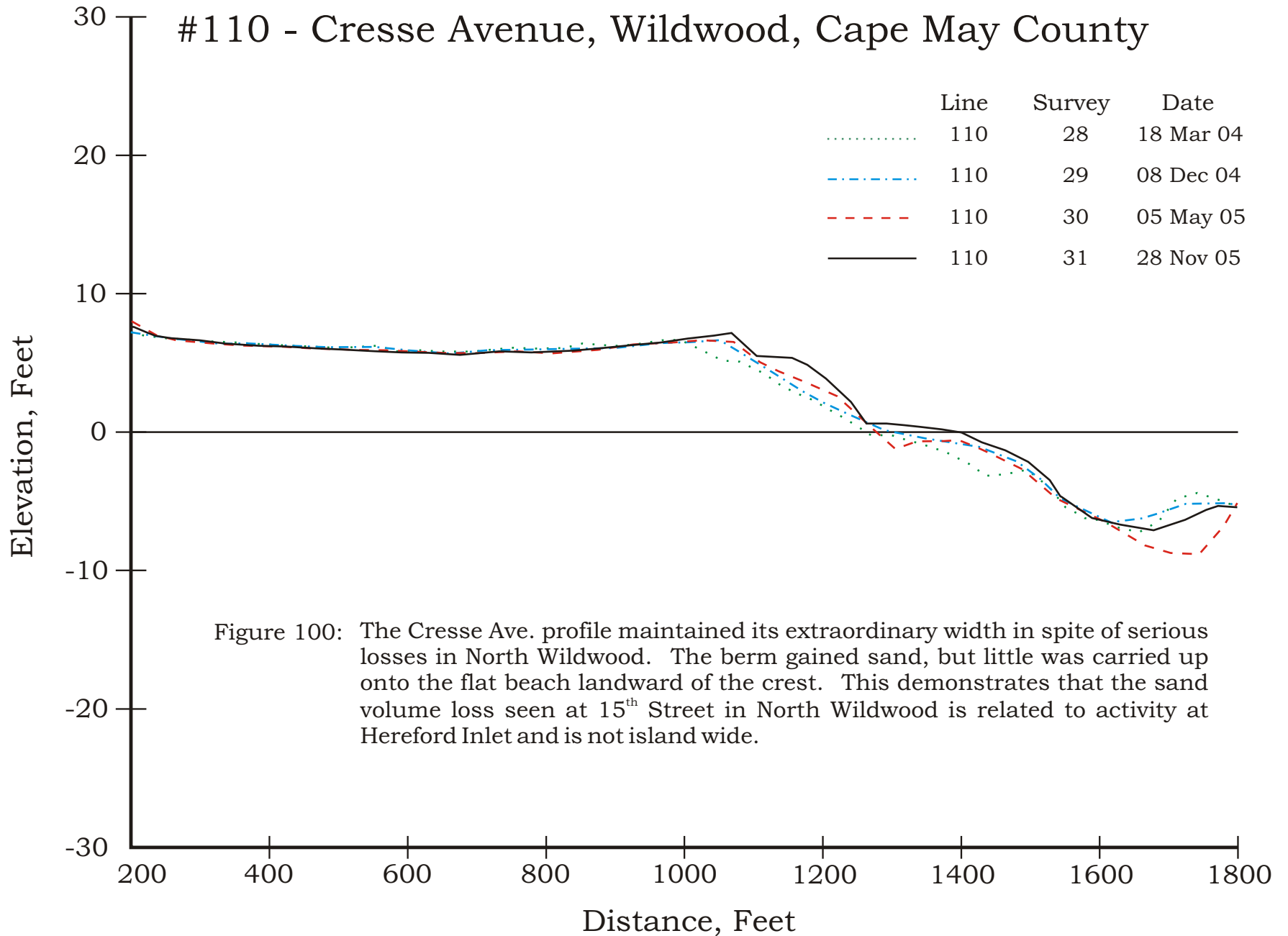


Figure 100: The Cresse Ave. profile maintained its extraordinary width in spite of serious losses in North Wildwood. The berm gained sand, but little was carried up onto the flat beach landward of the crest. This demonstrates that the sand volume loss seen at 15th Street in North Wildwood is related to activity at Hereford Inlet and is not island wide.

New Jersey Beach Profile Network

#109 - Raleigh Ave., Lower Township, Cape May County

	Line	Survey	Date
.....	109	28	18 Mar 04
-.-.-.-	109	29	08 Dec 04
- - - -	109	30	05 May 05
————	109	31	28 Nov 05

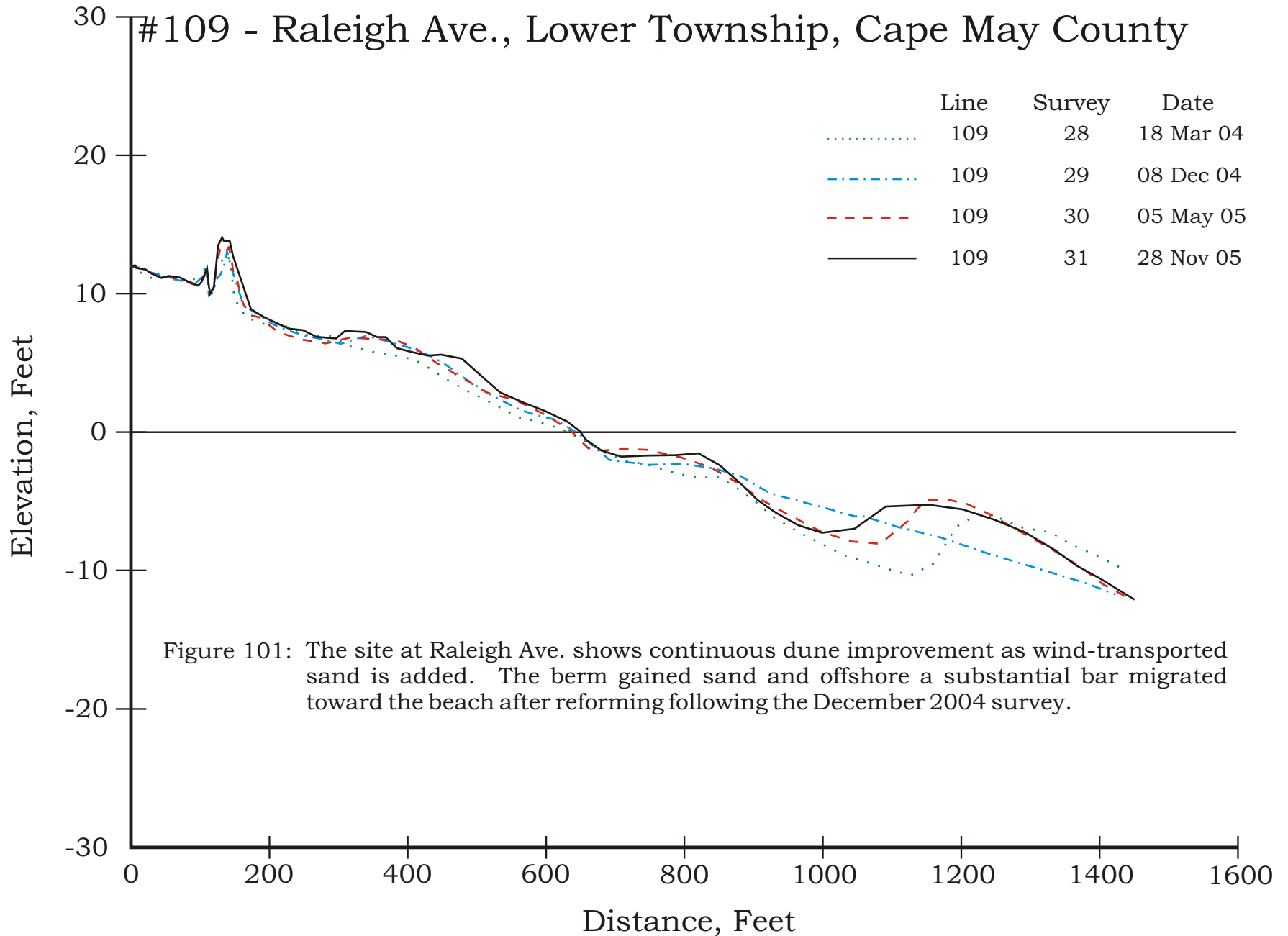
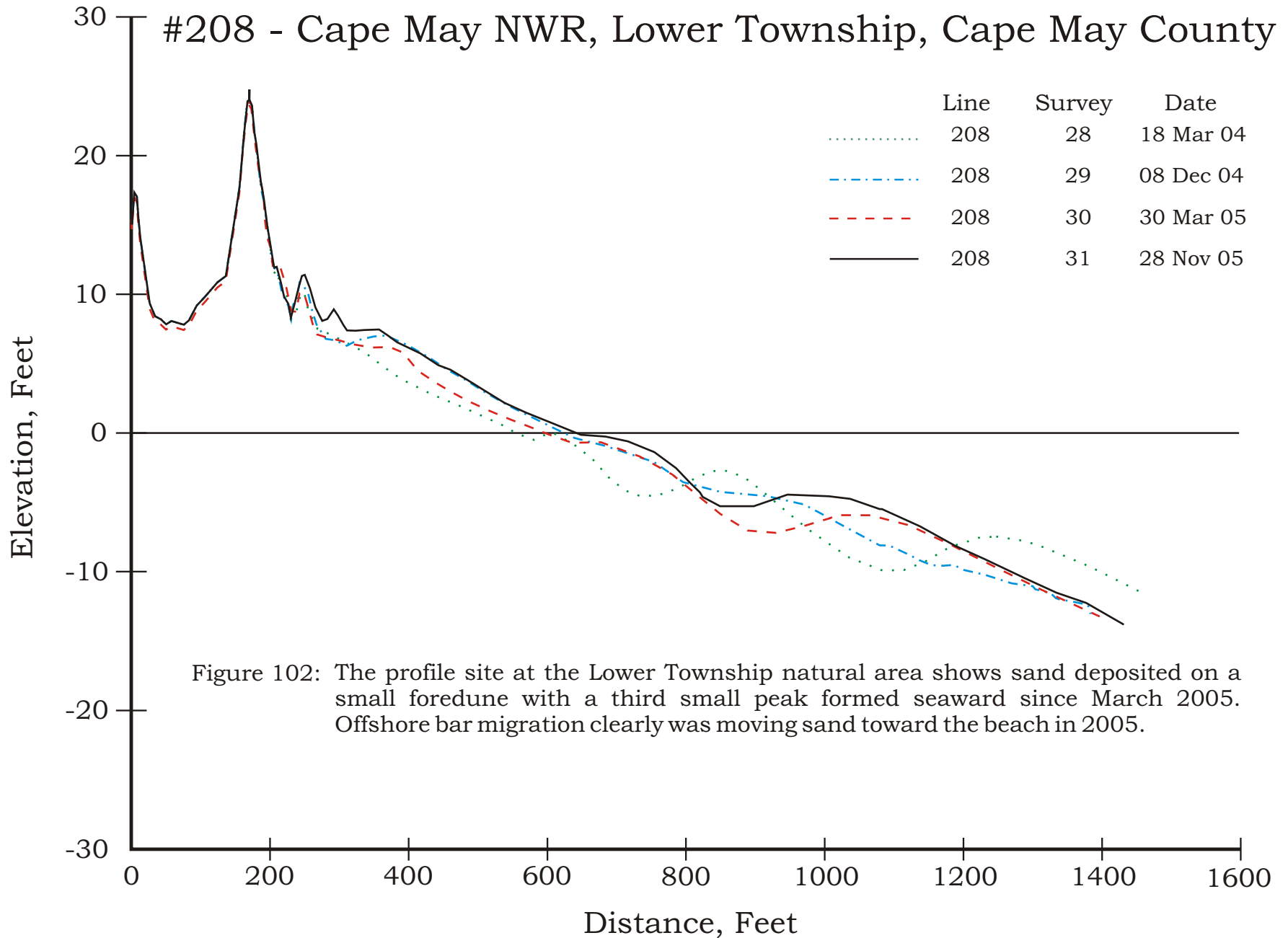


Figure 101: The site at Raleigh Ave. shows continuous dune improvement as wind-transported sand is added. The berm gained sand and offshore a substantial bar migrated toward the beach after reforming following the December 2004 survey.

New Jersey Beach Profile Network

#208 - Cape May NWR, Lower Township, Cape May County



New Jersey Beach Profile Network

#108 - Cape May Beach Club, Cape May County

Line	Survey	Date	
.....	108	28	17 Mar 04
-.-.-.-	108	29	24 Nov 04
- - - -	108	30	21 Apr 05
————	108	31	06 Sep 05

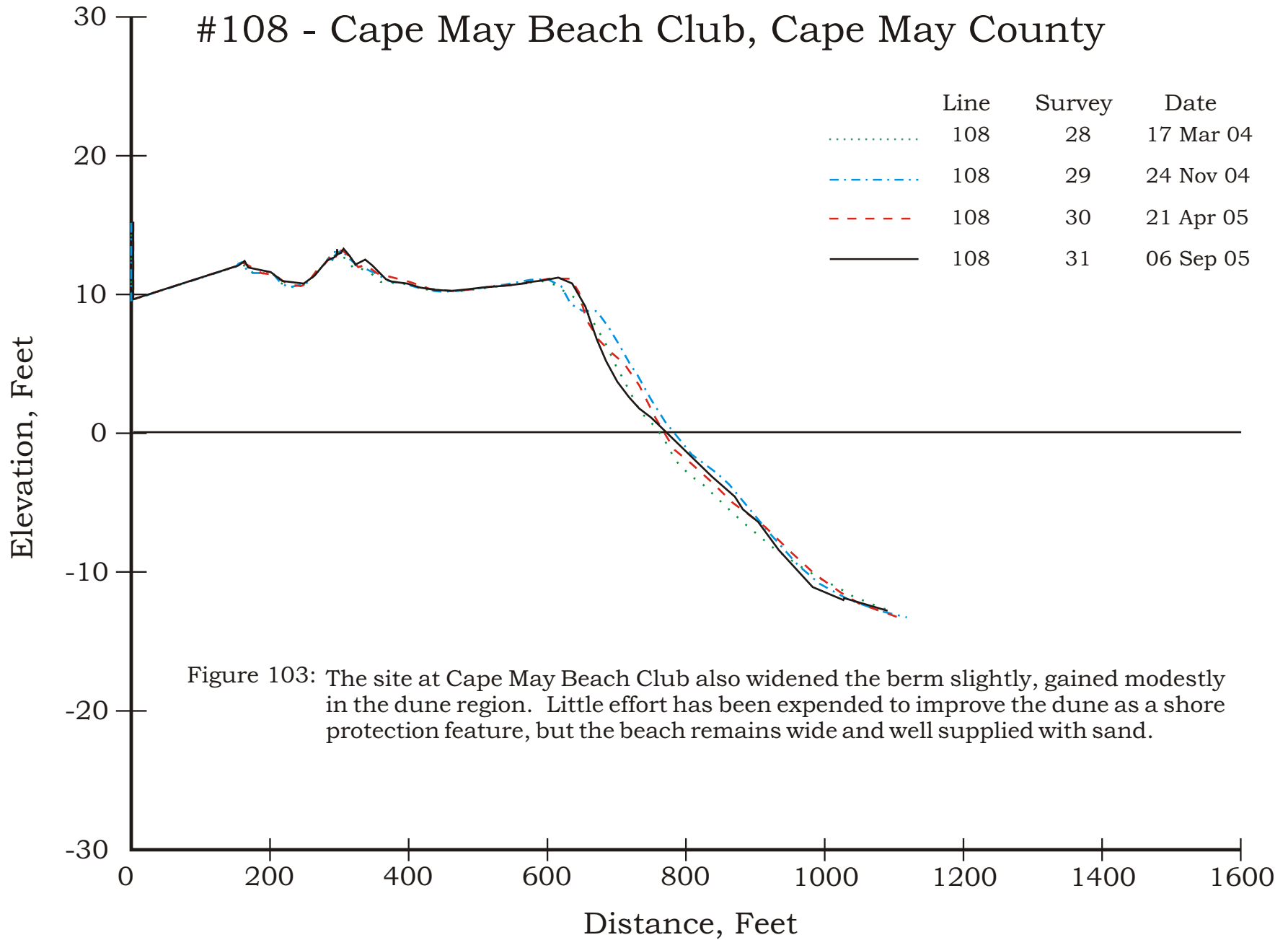
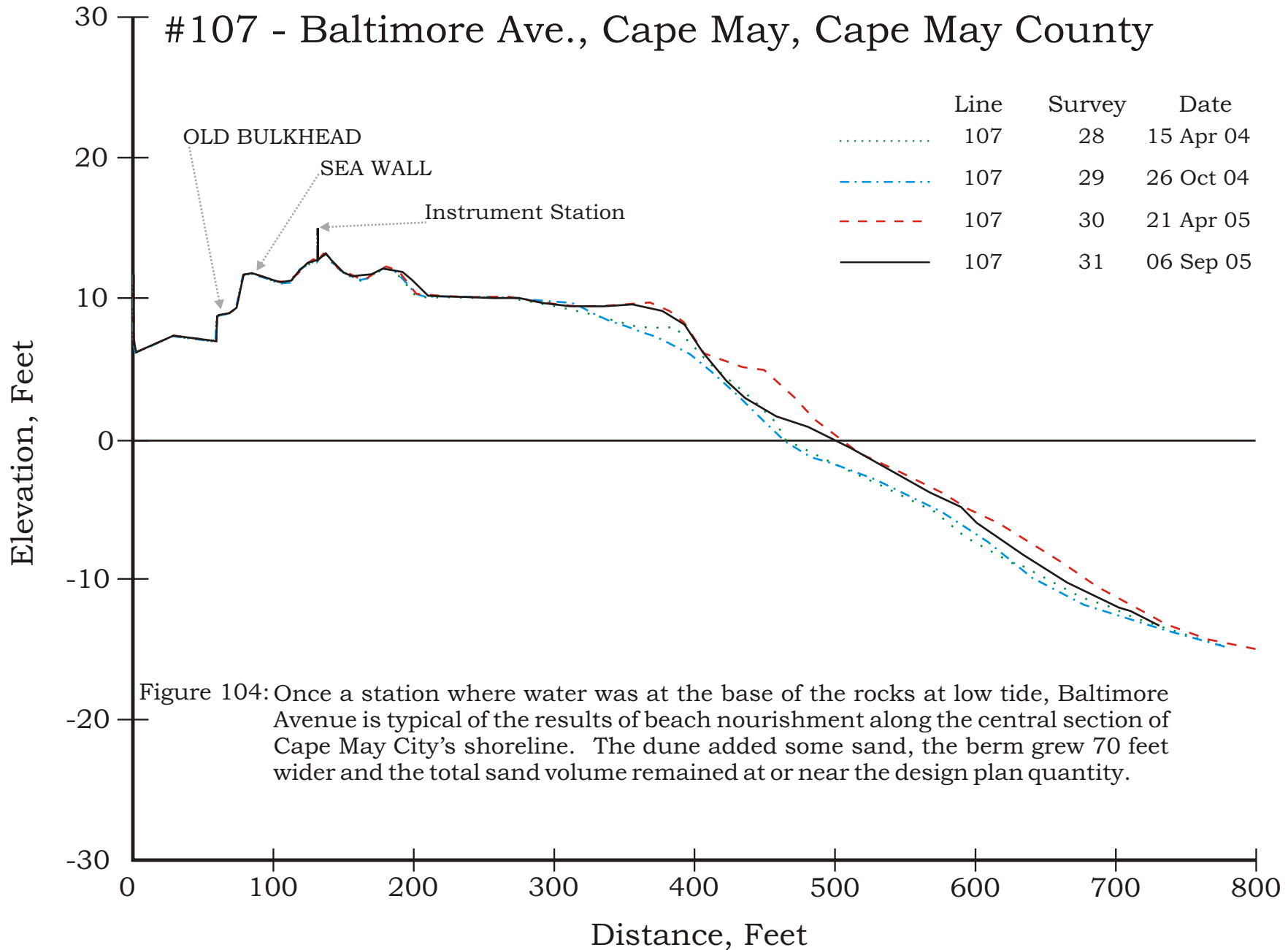


Figure 103: The site at Cape May Beach Club also widened the berm slightly, gained modestly in the dune region. Little effort has been expended to improve the dune as a shore protection feature, but the beach remains wide and well supplied with sand.

New Jersey Beach Profile Network

#107 - Baltimore Ave., Cape May, Cape May County



New Jersey Beach Profile Network

#206 - Broadway Ave., Cape May, Cape May County

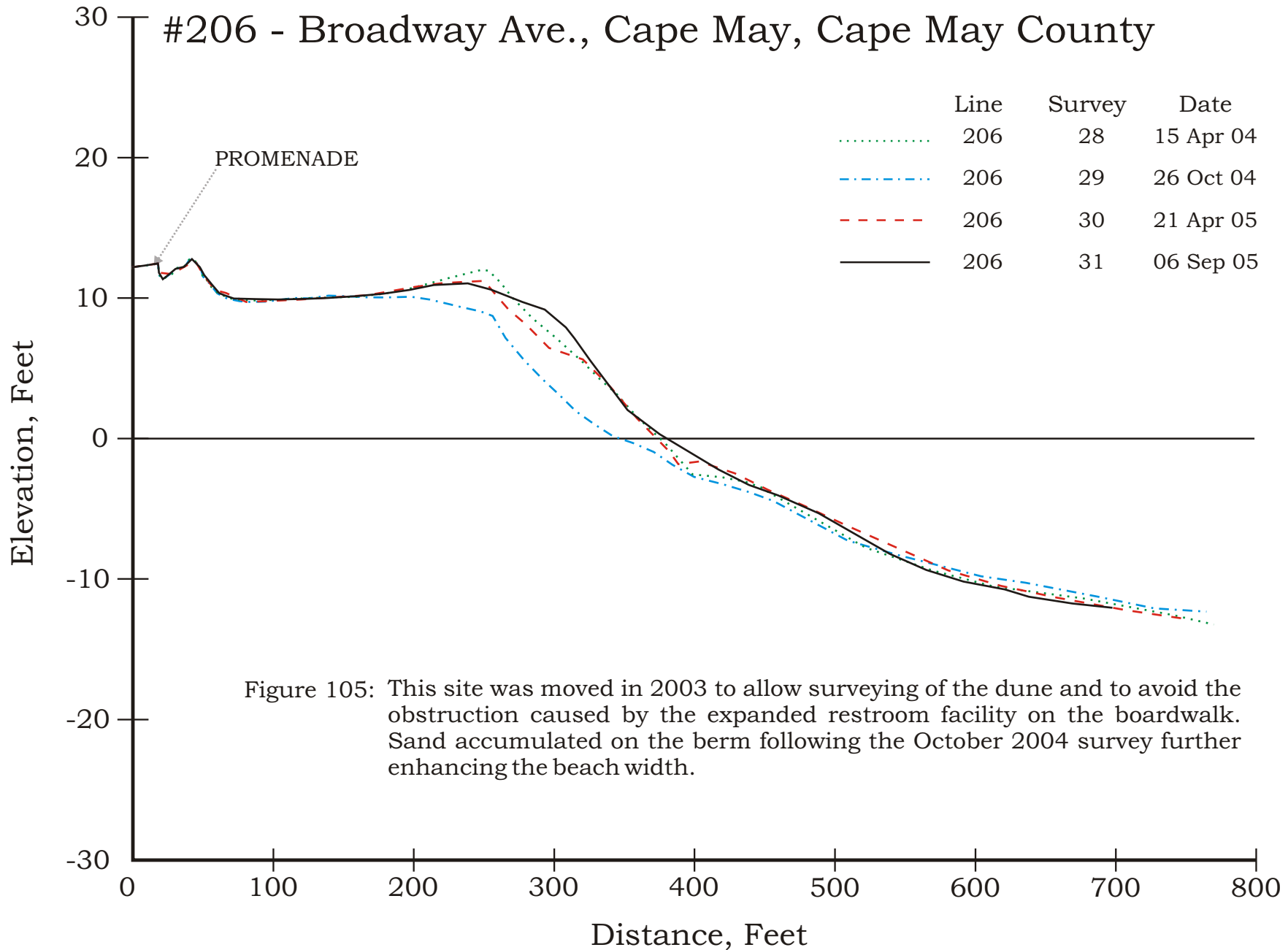
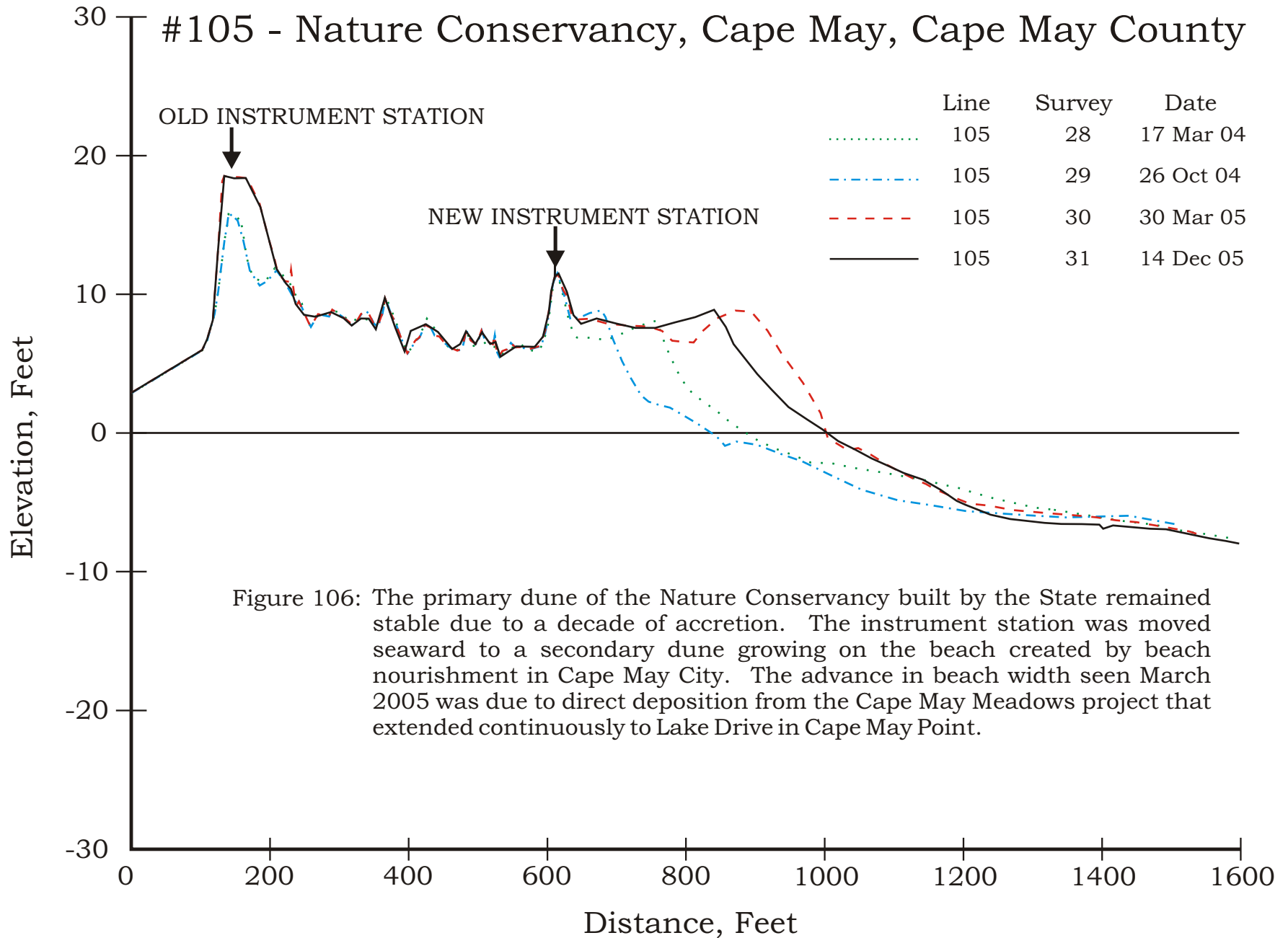


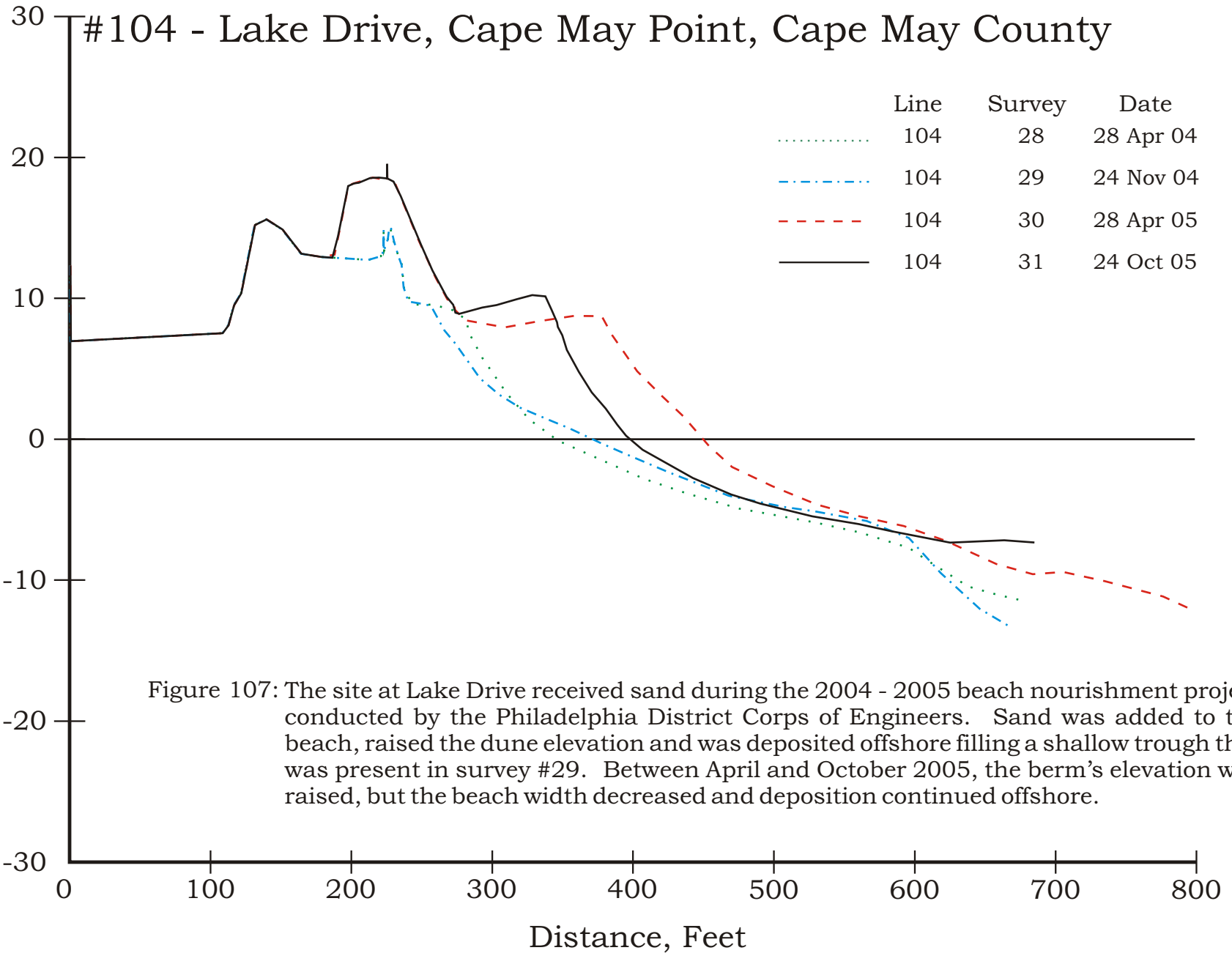
Figure 105: This site was moved in 2003 to allow surveying of the dune and to avoid the obstruction caused by the expanded restroom facility on the boardwalk. Sand accumulated on the berm following the October 2004 survey further enhancing the beach width.

New Jersey Beach Profile Network

#105 - Nature Conservancy, Cape May, Cape May County



New Jersey Beach Profile Network



New Jersey Beach Profile Network

#103 - Higbee Beach, Cape May County

Line	Survey	Date	
.....	103	28	10 May 04
-.-.-.-	103	29	24 Nov 04
- - - -	103	30	21 Apr 05
————	103	31	24 Oct 05

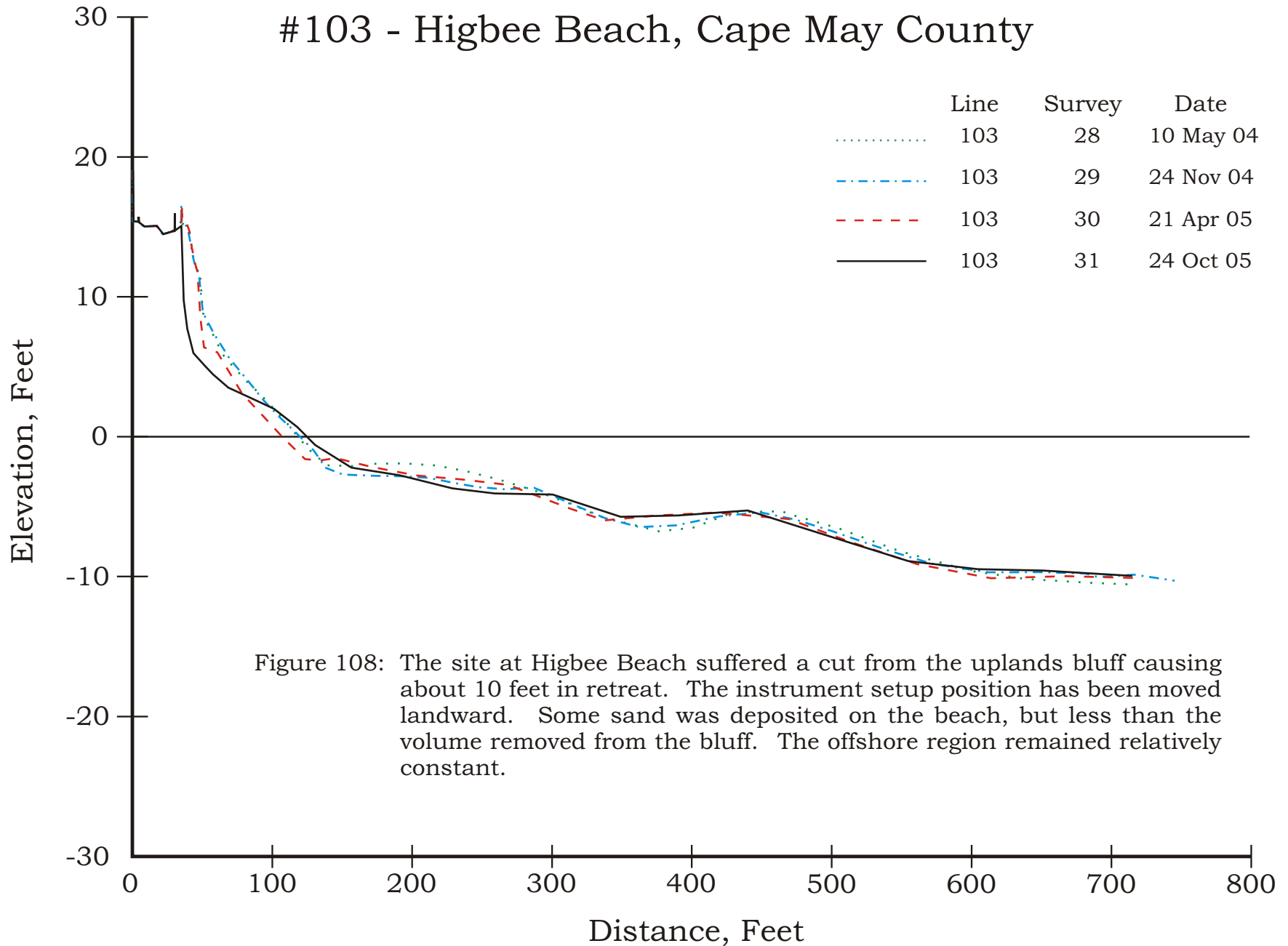


Figure 108: The site at Higbee Beach suffered a cut from the uplands bluff causing about 10 feet in retreat. The instrument setup position has been moved landward. Some sand was deposited on the beach, but less than the volume removed from the bluff. The offshore region remained relatively constant.

New Jersey Beach Profile Network

#102 - Whittier Ave, North Cape May, Cape May County

Line	Survey	Date	
.....	102	28	29 Mar 04
-.-.-.-	102	29	29 Nov 04
- - - -	102	30	06 May 05
————	102	31	16 Sep 05

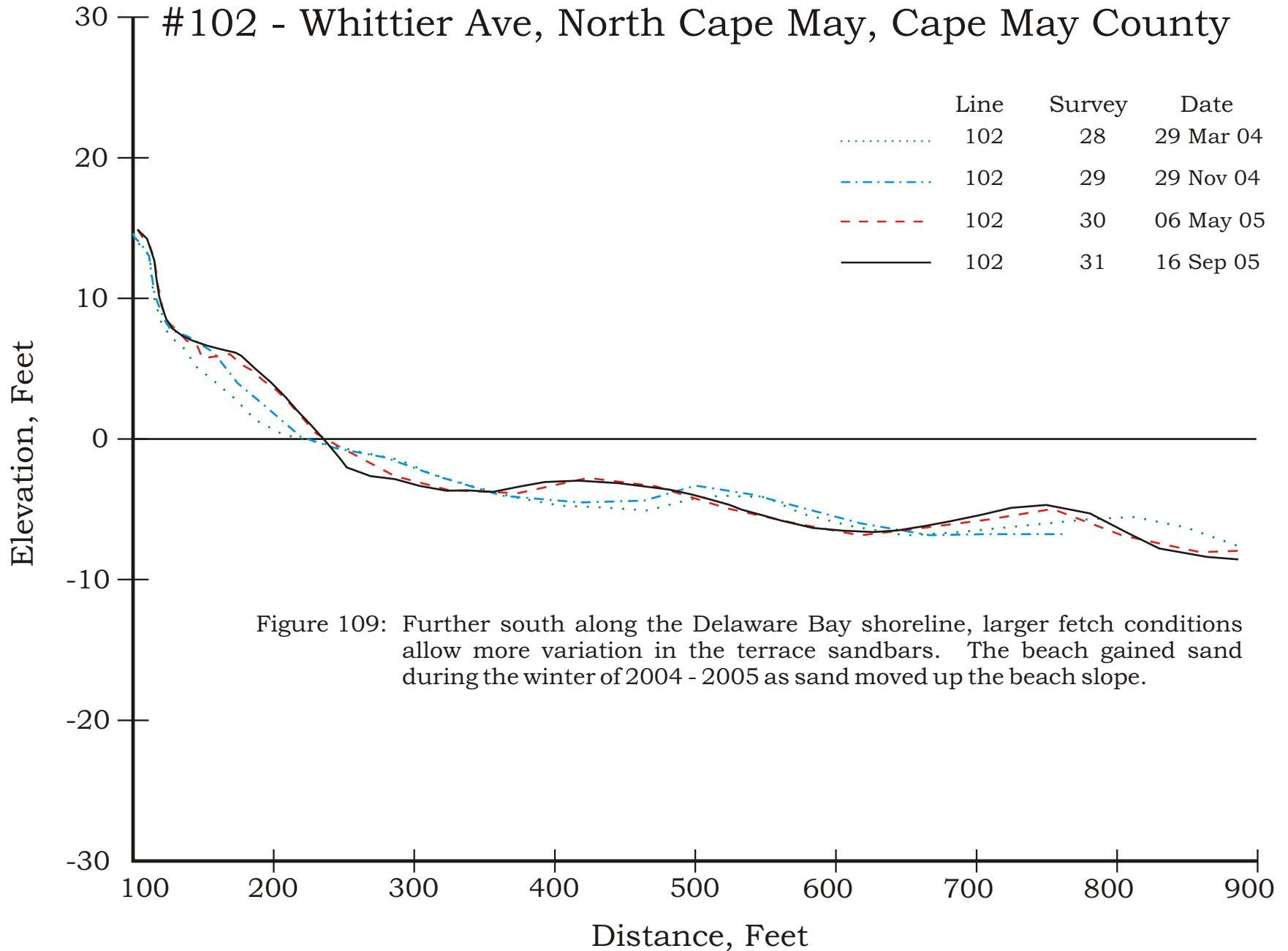
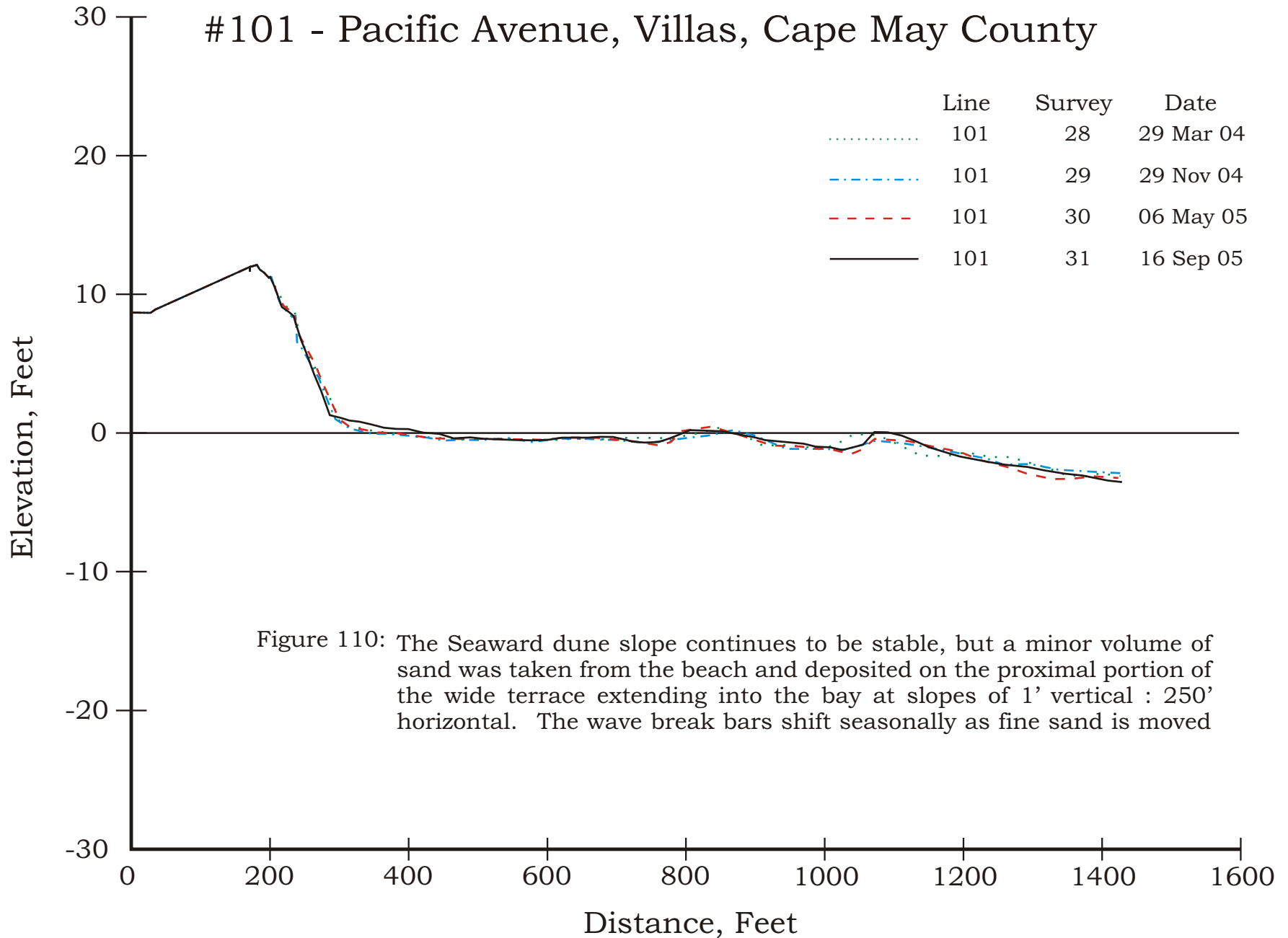


Figure 109: Further south along the Delaware Bay shoreline, larger fetch conditions allow more variation in the terrace sandbars. The beach gained sand during the winter of 2004 - 2005 as sand moved up the beach slope.

New Jersey Beach Profile Network

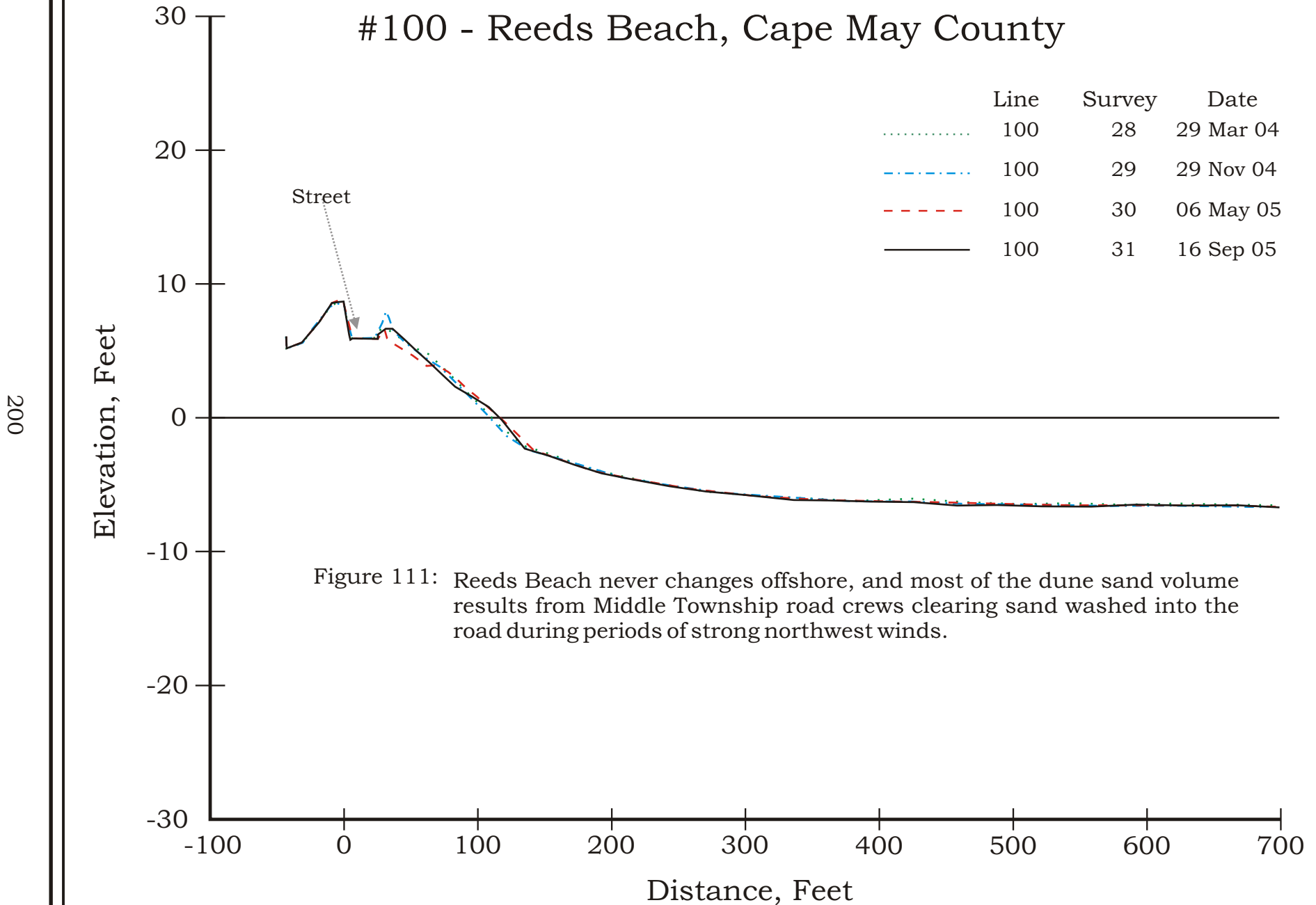
#101 - Pacific Avenue, Villas, Cape May County

199



New Jersey Beach Profile Network

#100 - Reeds Beach, Cape May County





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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