



New Jersey Beach Profile Network

Atlantic County

**Little Egg Inlet
to Great Egg Harbor Inlet**

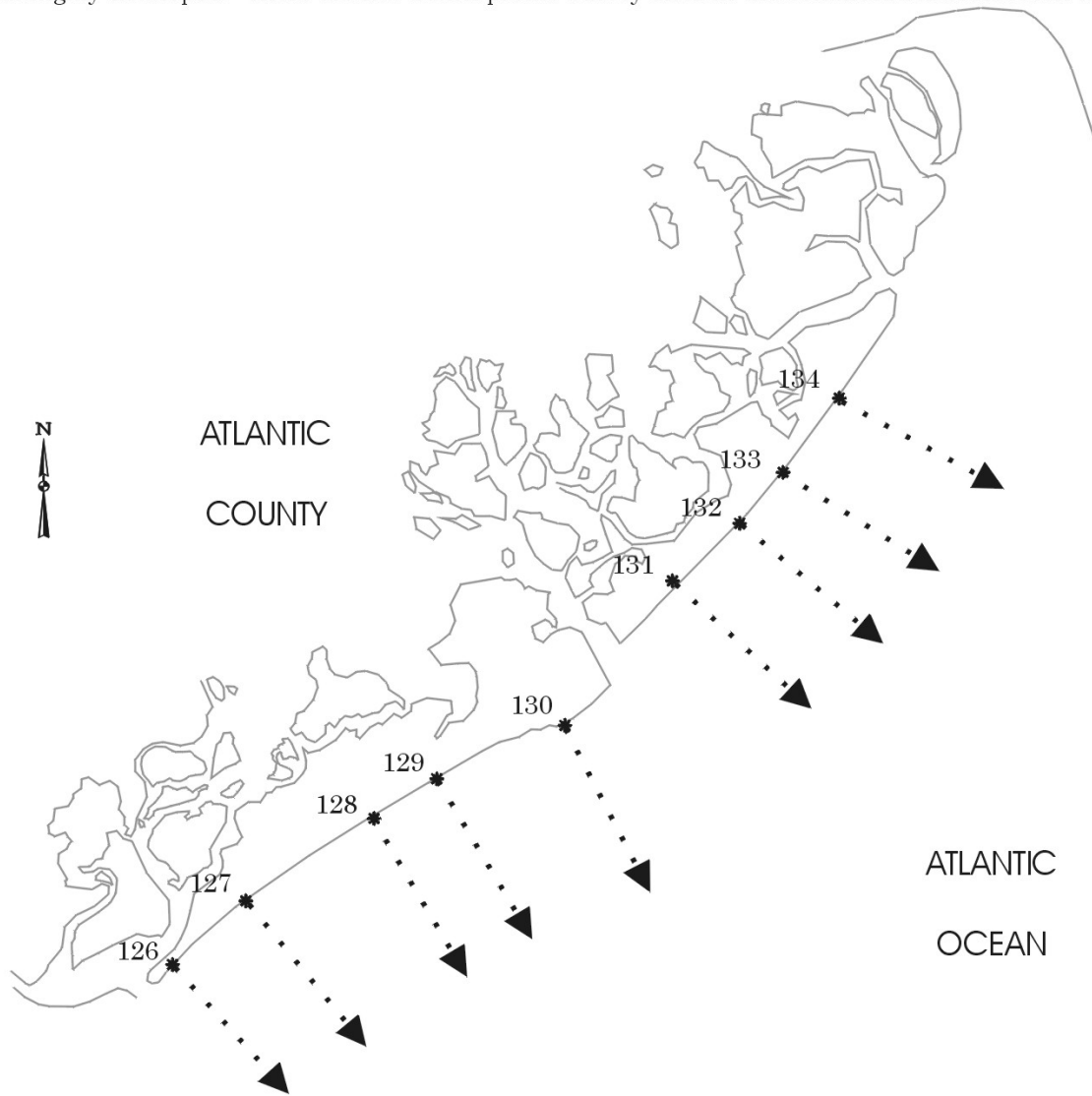
**NJBPN Profile #'s
134 - 126**



New Jersey Beach Profile Network Atlantic County Profile Site Locations

Figure 70

There are nine NJBPN survey sites on the Atlantic County shoreline. The beach profile sites are located in the City of Brigantine, Atlantic City, the City of Ventnor, the City of Margate, and the Borough of Longport. The Atlantic County coastline consists of three barrier islands. Little Beach is bordered by Little Egg Inlet to the north and by Brigantine Inlet to the south. Little Beach is part of the Forsythe National Wildlife Refuge and is therefore not surveyed. South of Brigantine Inlet lay Brigantine Island, the northern third of which remains undeveloped as part of the New Jersey Green Acres program. There is one survey site along the undeveloped portion of the Brigantine shoreline and three additional sites on the developed portion. Absecon Inlet separates Brigantine Island from Absecon Island. The Absecon Island communities, Atlantic City, Ventnor, Margate, and Longport, are all highly developed. There are five beach profile survey sites in the communities of Absecon Island.





Photoplate 5a. While not an NJBPN profile site, this location is situated about 2000 feet north of site #133 in the zone of worst erosion. This shot was taken October 12, 2005 just prior to a northeast storm event that made this situation worse.



Photoplate 5b. By June 8, 2006 the US Army Corps of Engineers had finished a long-awaited beach restoration along a mile of shoreline starting about 2000 feet north of this spot. Sand was placed past site #133 for an additional mile.



Photoplate 6a. A view of the Ventnor City beach from October 20, 2000 showing the limited width and elevation to the dune system prior to the ACOE Federal beach restoration project completed in 2002.



Photoplate 6b. The restored dune was much wider and planted with vegetation following the ACOE project completion. The City was responsible for planting the grass. The photograph was taken May 16, 2005 and shows that the project was quite stable further north than erosion seen the terminus of the project at the Margate City border.

TABLE 9
ATLANTIC COUNTY
ANNUAL BEACH VOLUME CHANGES
SPRING 2004 - SPRING 2005 & FALL 2004 - FALL 2005

| PROFILE SITE | Survey | |
|---|--|----------------------|
| | 28 - 30 | 29 - 31 |
| LOCATION | S2004 - S2005 | F2004 - F2005 |
| | (volume expressed as cubic yards per foot) | |
| 134: Brigantine, Green Acres | -12.11 | -12.76 |
| 133: Brigantine, 4th Street North | 0.59 | -6.66 |
| 132: Brigantine, 15th Street South | 41.63 | 47.00 |
| 131: Brigantine, 43rd Street South | 29.13 | 37.02 |
| 130: Atlantic City, North Carolina Ave. | -46.26 | -21.92 |
| 129: Atlantic City, Raleigh Ave. | -45.16 | -29.13 |
| 128: Ventnor City, Dorset Ave. | 46.63 | 37.70 |
| 127: Margate City, Benson Ave. | 28.62 | 35.58 |
| 126: Longport, 17th St. | 43.81 | 17.76 |

TABLE 10
ATLANTIC COUNTY
ANNUAL SHORELINE CHANGES
SPRING 2004 - SPRING 2005 & FALL 2004 - FALL 2005

| PROFILE SITE | Survey | |
|---|--------------------------------------|----------------------|
| | 28 - 30 | 29 - 31 |
| LOCATION | S2004 - S2005 | F2004 - F2005 |
| | (shoreline change expressed in feet) | |
| 134: Brigantine, Green Acres | -40.0 | 0.9 |
| 133: Brigantine, 4th Street North | -44.6 | -10.1 |
| 132: Brigantine, 15th Street South | 20.8 | 74.4 |
| 131: Brigantine, 43rd Street South | 30.1 | 73.7 |
| 130: Atlantic City, North Carolina Ave. | -79.1 | -57.2 |
| 129: Atlantic City, Raleigh Ave. | -81.8 | 46.2 |
| 128: Ventnor City, Dorset Ave. | 3.2 | 8.5 |
| 127: Margate City, Benson Ave. | 59.6 | 29.7 |
| 126: Longport, 17th St. | 27.4 | -7.4 |

TABLE 11
ATLANTIC 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) | | | |
| 134: Brigantine, Green Acres | | 21.25 | -33.58 | 20.57 | 8.59 |
| 133: Brigantine, 4th Street North | | 11.02 | -10.22 | 2.91 | 3.97 |
| 132: Brigantine, 15th Street South | | 9.87 | 30.78 | 16.76 | 57.08 |
| 131: Brigantine, 43rd Street South | | 14.77 | 14.98 | 21.93 | 51.16 |
| 130: Atlantic City, North Carolina Ave. | | -19.03 | -25.28 | 4.19 | -43.17 |
| 129: Atlantic City, Raleigh Ave. | | -4.29 | -37.76 | 7.91 | -36.11 |
| 128: Ventnor City, Dorset Ave. | | 7.98 | 37.48 | -3.33 | 46.34 |
| 127: Margate City, Benson Ave. | | 6.21 | 21.46 | 15.51 | 44.77 |
| 126: Longport, 17th St. | | 3.03 | 40.86 | -21.80 | 21.06 |

TABLE 12
ATLANTIC 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) | | | |
| 134: Brigantine, Green Acres | | -40.7 | 0.7 | 0.2 | -39.8 |
| 133: Brigantine, 4th Street North | | -45.2 | 0.6 | -10.8 | -55.4 |
| 132: Brigantine, 15th Street South | | -15.7 | 36.5 | 37.9 | 58.7 |
| 131: Brigantine, 43rd Street South | | 11.6 | 18.4 | 55.3 | 85.3 |
| 130: Atlantic City, North Carolina Ave. | | -7.6 | -71.5 | 14.2 | -64.8 |
| 129: Atlantic City, Raleigh Ave. | | -52.3 | -29.5 | 75.7 | -6.1 |
| 128: Ventnor City, Dorset Ave. | | -10.0 | 13.2 | -4.7 | -1.5 |
| 127: Margate City, Benson Ave. | | -5.5 | 65.1 | -35.5 | 24.1 |
| 126: Longport, 17th St. | | -1.8 | 29.2 | -36.6 | -9.2 |

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

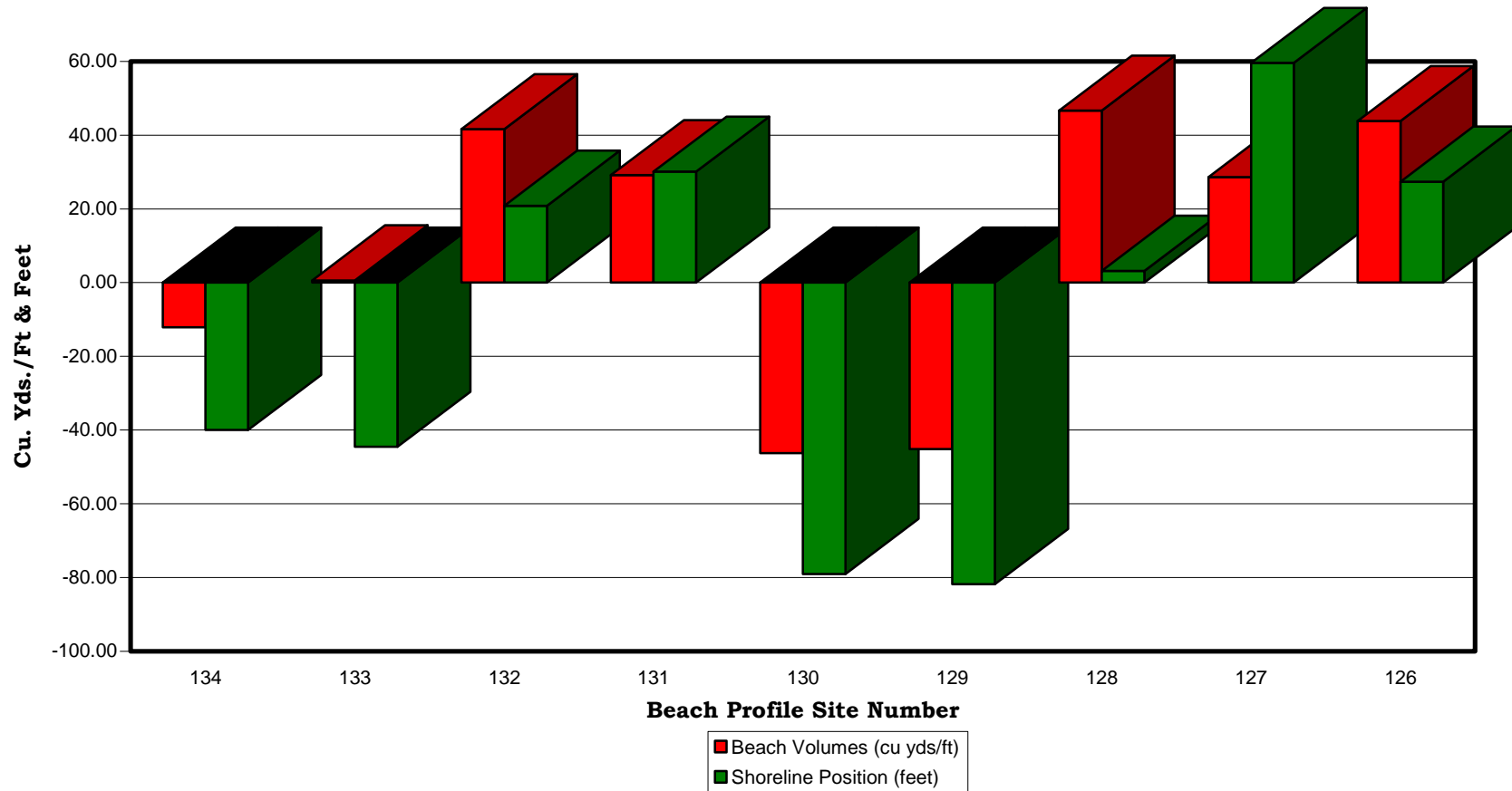


Figure 71a. This graph displays the year changes using the spring-to-spring surveys for the comparison. Two of three Absecon Island cross sections receiving beach nourishment from the US Army Corps of Engineers (ACOE) project show loss during the winter. Site #128 gained sand offshore as did the two sites located south of the ACOE project extent. Sand appeared to move south on Brigantine Island as well (left four sites).

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

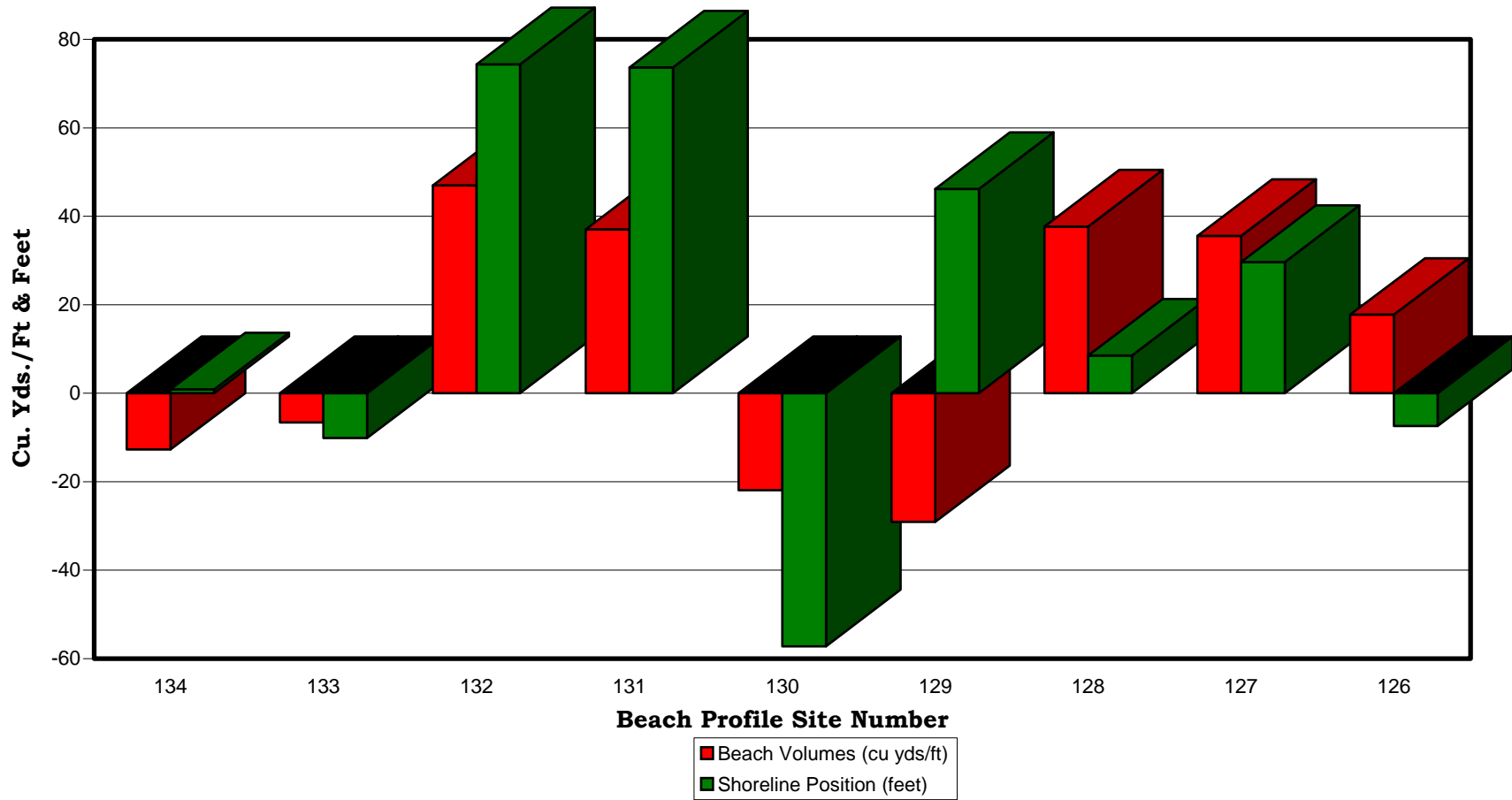


Figure 71b. The comparison from fall to fall also shows the sand volumes and shoreline changes associated with the ACOE beach restoration project. Substantial movement to the south provided accumulation at the two southern sites on both barrier islands in Atlantic County.

Seasonal Atlantic County Beach Volume Changes - Fall 2004, Spring 2005 & Fall 2005

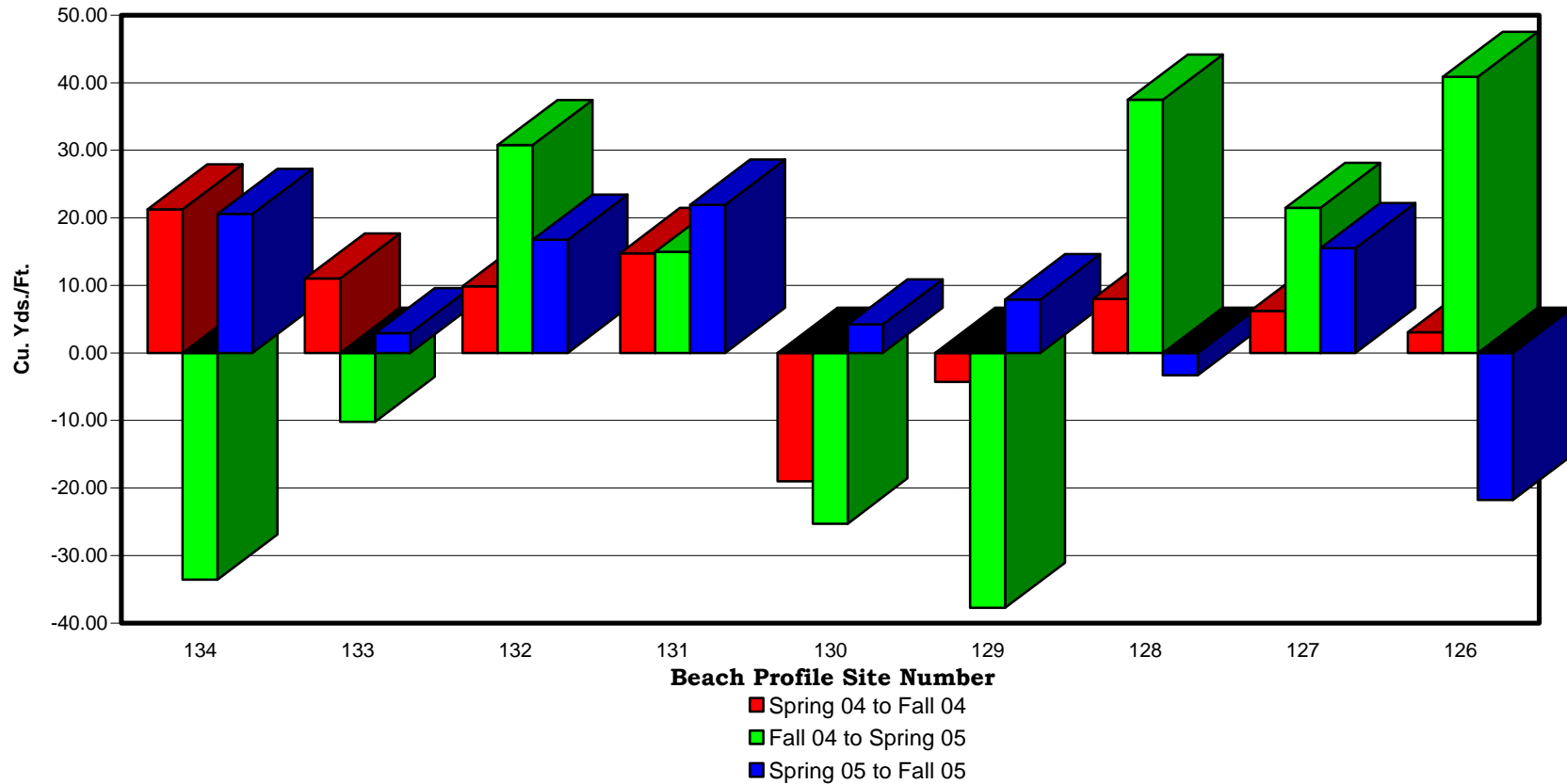


Figure 71c. The comparison of surveys taken six months apart shows the volume spikes associated with northeast wave transport of sand to the south along both barrier islands (green bars). Winter movement added sand to the southern profile sites while the two northern sites on both islands lost sand during the winter of 2004 to 2005.

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

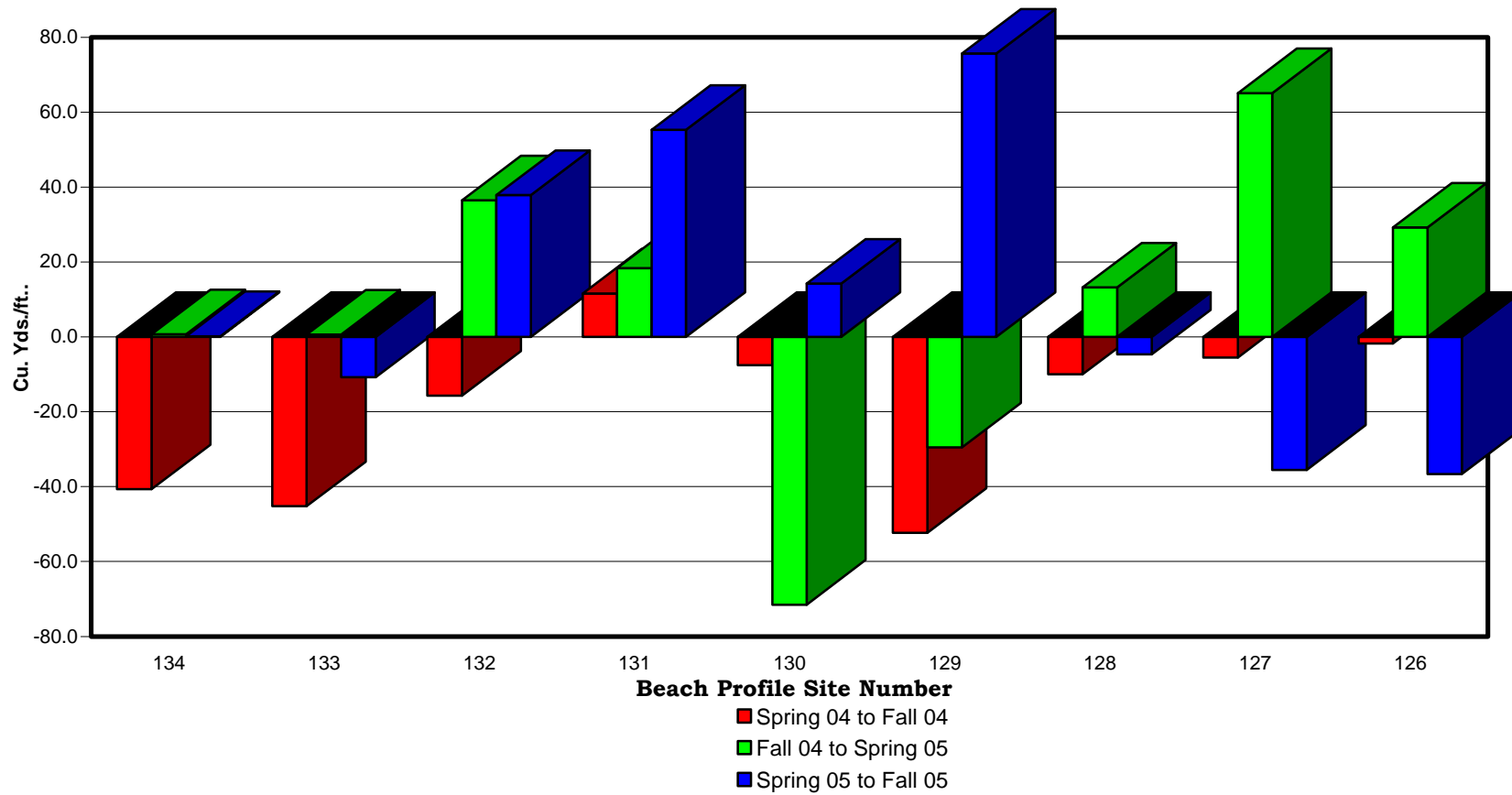


Figure 71d. Changes in the shoreline followed a similar pattern to the sand volumes where the shoreline advanced in the winter on the south end of both barrier islands (green bars), while the north end profiles saw shoreline retreat or little change.

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

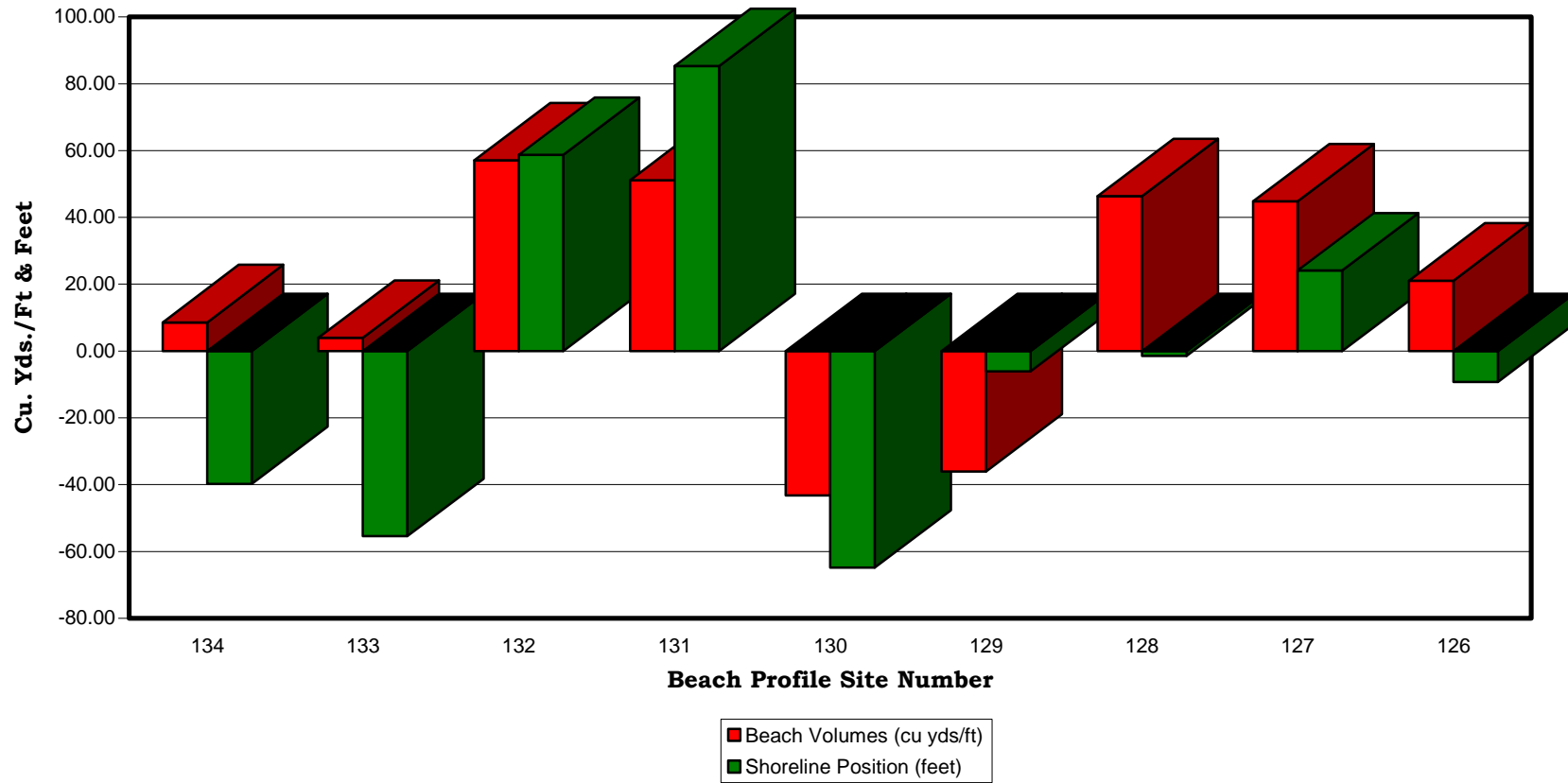


Figure 71e. For the 18-month interval, this pattern of sand migration with accompanying shoreline retreat persists across the interval of time such that it supercedes the impact of seasonal changes due to summer versus winter wave climate conditions. The northern two sites on each island show shoreline retreat and lose material (or just show little gain) and the southern sites gain sand and had an advance to the shoreline position.

SUMMARY OF INDIVIDUAL SURVEY STATIONS LOCATED IN ATLANTIC COUNTY

- **Profile #134 - Green Acres, Brigantine, Atlantic County** (fig. 72)

The northern-most beach surveyed on Brigantine Island is located approximately 1 mile north of the north end of Brigantine Blvd. in the New Jersey Natural Area Preserve that comprises the northern 2 miles of the island. Since 1992, no storm activity has crossed over the dunes into Widgeon Bay, but following that event 14 years ago the sand extended from the swash to Widgeon Bay. Dune grass mixed with sea rocket and goldenrod has colonized the seaward slope and dune crest aiding in the stabilization of the foredune slope. On the landward slope the dune grass is mixed with poison ivy. Phragmites inhabits the landward toe and continues west into the salt marsh.

The northernmost half-mile of the beach is a flat sand plain subject to overwash at any elevated tide level and is strongly influenced by the tidal currents associated with Brigantine Inlet. This inlet has narrowed dramatically since the 1940's when it was two separate inlets separated by a sand shoal attached to the salt marsh. Today there is a narrow, deep tidal channel flanked by the wide sand plain on the Brigantine side and a narrow spit on the Little Beach side. Variations in the location of the main tidal channel are frequent and on the order of 1,000 feet horizontally along the shoreline. Large-scale changes in the inlet channel position have had an influence on Profile #134's sand volume last observed during the late 1990's.

The dunes have gained small volumes of sand during this time interval, with substantial variation in the height of the beach berm. Offshore the bar system has gone through a cycle with a deep trough directly offshore, followed by the migration of the bar into this trough (Survey 28 to 29), then the return of the bar to its normal offshore position. The last survey (Survey 31) shows the bar moving back into the trough once again.

- **Profile #133 - 4th Street North, Brigantine, Atlantic County** (fig. 73)

Profile #133 is located at the seaward end of 4th Street North near the northern end of the developed oceanfront in Brigantine. The profile begins at a monument located on the landward dune toe. The dune width is about 60 feet wide at the base and has a crest elevation of approximately 17 feet NGVD. The dune at this site continued to be stable with little addition to the crest or seaward slope.

This beach is located near the southern limit of the April 1997 Brigantine beach nourishment project placement zone. An additional 614,000 cubic yards of sand was placed on the project beaches during the winter and early spring of 2001. No sand was placed directly on the beach at 4th Street North since the placement zone for the project maintenance ended several hundred feet north of 4th Street. In 2006 the US Army Corps of Engineers (ACOE) completed its planned project between the northern feeder beach and just south of 5th Street South in Brigantine. The effects of this project will not appear until the results of Survey 32 (April 2006) are published.

Changes were modest and seasonal in nature. The site benefits from sand transported south from the beach nourishment project spreading along the shoreline. Net long-term transport is from north to south between this site and the Absecon Inlet jetty.

- **Profile #132 - 15th Street South, Brigantine, Atlantic County** (fig. 74)

There are no dunes at this site because of the seaward position of the Ramada Inn (formerly the Brigantine Hotel) that occupies the footprint of an extensive dune system present both north and south of this structure. The profile begins along the sidewalk south of the Inn and includes the street end bulkhead that provides storm protection for the street end and Inn. The bulkhead elevation is 10 feet NGVD, consequently, this street end is vulnerable to overwash and wave over-top flooding during an event with a significant storm surge. This site has 33 years of continuous

beach survey data because Stockton College students selected it as the southern profile location for a proposed offshore nuclear power plant coastal study in 1973 to 1975, with surveys continued until the commencement of this program. Today, the sand budget is tipped in favor of accretion due to long shore transport of the 1997 and 2001 beach nourishment sediment south along the shoreline.

Since there is no dune, the beach begins at a low elevation (6.3 feet NGVD) and actually rises seaward to the berm crest (7.54 feet) 174 feet seaward of the bulkhead reference location. Sand removed from the 1997 beach project has migrated to this site adding up to 125 feet to the berm width since 1999. The stability remains excellent and will soon experience new material moving into the area from the 2006 renourishment of the northern beaches. The seasonal variability produced changes in the position and elevation of the offshore bar system that shows two cycles of advancement of the bar toward the beachface. 57.08 yds³/ft. of sand were added to this cross section supporting a 59-foot shoreline advance between June 2004 and September 2005.

- **Profile #131 – 43rd Street South, Brigantine, Atlantic County** (fig. 75)

Profile #131 begins at the seaward end of 43rd Street with the original instrument station for surveying back on the landward dune ridge near the end of 43rd Street. That starting point was moved seaward about 390 feet to the top of the high, 100-foot wide dune at the landward edge of a 300-foot wide dry beach. The first 600 feet of the profile is now a template from the winter survey of 1997.

Following a period of shoreline recession between 2003 and late 2004, this beach has advanced 74 feet seaward and gained 37.02 yds³/ft. in sand volume between June 2004 and September 2005. The zero elevation position lies near the end of the Absecon Inlet jetty, but about 6,000 feet north of the structure. Sand has been impounded at the jetty nearly to its seaward end. Therefore the shoreline will become more susceptible to variations in wave approach direction that either forces sand around the end of the jetty (northeast waves producing retreat) or pushes material back to the north (southeast wave direction promoting accretion at this site).

- **Profile #130 – North Carolina Avenue, Atlantic City, Atlantic County** (fig. 76)

Profile #130 is located on the boardwalk at the seaward end of North Carolina Avenue in the commercial area of Atlantic City next to Resort's casino and hotel. The profile formerly included the boardwalk then continued through a swale between the boardwalk and a small dune feature.

The Absecon Island Shoreline Protection project completed by the US Army Corps of Engineers (ACOE) by early 2004 added 131.86 yds³/ft. to the shoreline's sand volume advancing the shoreline by 180 feet. The most extensive change took place during the winter of 2004 – 2005 when the beachface retreated 71 feet at the zero elevation position and lost 25.28 yds³/ft. in sand volume. The following summer saw an advance of 14 feet in the shoreline position with only 4.19 yds³/ft. in sand volume gain. The loss volume amounts to 19.2 % of the placement fill at this site.

- **Profile #129 – Raleigh Avenue, Atlantic City, Atlantic County** (fig. 77)

The Raleigh Avenue site is located south of the casino and commercially developed region of the Atlantic City boardwalk. Atlantic City initiated dune development with dune fence installation on a relatively flat beach during the spring and summer of 1987. A reconfiguration of the primary dune by county maintenance workers by May 2002 resulted in a narrower, lower primary dune that was augmented by the US Army Corps of Engineers (ACOE) project (adding 12.75 yds³/ft. just to the dune). The beach and berm retreated slightly over the winter interval (30 feet of shoreline retreat and a loss of 37.76 yds³/ft. in sand volume). The majority of the volume loss was seen offshore as the bar trough deepened and the bar accumulated farther seaward. The following summer saw a 7.91 yds³/ft. in sand volume gain and a 76-foot shoreline advance. This was largely due to the deposition of sand just above the zero elevation position creating a proportionally larger advance for so small a sand volume gain.

- **Profile #128 – Dorset Avenue, Ventnor, Atlantic County** (fig. 78)

This profile begins at the seaward end of Dorset Avenue and includes the street end, a concrete sea wall and the boardwalk. The US Army Corps of Engineers (ACOE) project replaced the dune removed by the City for its lifeguard shack at Dorset Avenue and added 141.89 yds³/ft. of sand volume with a shoreline advance of 219 feet. Since the fill the shoreline has remained stable (1.5-foot retreat) with a substantial gain in sand volume of 46.34 yds³/ft. accumulated entirely offshore between 4 and 11 feet of water depth. Located well north of the ACOE project ending point at the Margate City/Ventnor City boundary, this site does not display the loss rate seen in the southern third of the Ventnor City beach. Right at the municipal boundary the entire fill volume has been removed from the Ventnor beach and redistributed south into Margate.

- **Profile #127 – Benson Avenue, Margate, Atlantic County** (fig. 79)

Profile #127 is located at the seaward end of Benson Avenue set along the north curb sidewalk and includes the sidewalk and street end wooden bulkhead. The profile continues over the upper beach located in a wide break in the dune system. This open area is wider than the average Margate beach because the upland bulkhead line shifts landward at this street end. To the north a continuous dune ridge has developed seaward of the oceanfront properties and bulkhead position. The dunes continue to exist north and south of this site, but no effort has been made to develop dunes along the beach in a consistent fashion.

This site is about a mile south of Ventnor City and the comparison plots show a rapid accretion between the May 2004 survey (done after the fill, but prior to any arrival of sand to this beach) and the cross section done a year later. The net change between May 2004 and September 2005 was a shoreline advance of 24 feet and a sand volume gain of 44.77 yds³/ft. The gain on just the beach was 56.95 yds³/ft. indicating transport south relatively near the shoreline. The gains would not be very evident to a casual observer standing on the beach because most of the material appeared offshore.

- **Profile #126 – 17th Street, Longport, Atlantic County** (fig. 80)

The profile begins along 17th Street and includes the south sidewalk and the concrete sea wall, built along most of this community's shoreline. A dune system has never existed on this beach since the site was established in 1986. Instead, a concrete seawall provides property owners with shore protection. There are large rocks buried along the seaward base of the sea wall, but are all currently buried.

Sand ramped up the seaward face of the seawall adding 9.92 yds³/ft. of sand to the upper beach. Offshore large-scale bars migrated toward the shoreline, repeating the process more rapidly than the intervals between the four surveys. The most impressive bar was surveyed in early November 2005. The net sand volume gain was 21.06 yds³/ft., but the shoreline retreated 9 feet. There is no compelling evidence that the erosion from the ACOE project has reached this location by the fall of 2005. Low storm intensity has meant that southerly transport has been slow and periodic, not impacting the southern tip of the Borough of Longport.

SUMMARY OF ATLANTIC COUNTY:

Beach nourishment has been a factor in Atlantic County for decades. The majority of the projects were done in Atlantic City since 1936 where 7,085,000 cubic yards of sand had been placed up to 1986 (Pilkey and Clayton 1989). In 1991 the State provided about 190,000 cubic yards of sand to the southern beaches in Longport derived from the Little Egg Inlet borrow zone used for Ocean City by the Federal project. Atlantic City conducted its own beach nourishment program in the summer of 1997 adding 640,000 cubic yards of sand between Illinois and Iowa Avenues. More recently, beach restoration activity in Brigantine produced a spring 2001 maintenance project completed with 615,000 cubic yards of sand placed on the majority of the initial project's north

end shoreline. The initial phase of this project was modeled after the design plan for Brigantine selected by the US Army Corps of Engineers. This local and State effort placed 999,827 cubic yards of sand on the north end beach in spring 1997 and has made a major difference to storm damage exposure along the northern developed municipal shoreline. In both cases sand movement to the south was seen with positive results along the entire Brigantine shoreline. The ACOE completed its Federal project for Brigantine in 2006 adding about 638,000 cubic yards to the northern beach restoring its position to that established in 1997.

The commencement of the Philadelphia District Army Corps of Engineers Absecon Island Beach Restoration Project began in 2004. Below is the Philadelphia District's website description of the Atlantic County projects.

Atlantic City: Construct a 200-foot wide beach with a dune (2-3 feet above boardwalk). Initial beachfill volume is approximately 3.2 million cubic yards. Construct outfall extensions and at Absecon Inlet replace 2 bulkheads with revetment (total 1600 ft.)

Ventnor: Construct a 100-foot wide beach with dune (1 foot above boardwalk). Initial beachfill volume is approximately 1.3 million cubic yards.

Margate: Construct a 100-foot wide beach with dune (2-2.5 feet above bulkheads). Initial sand volume will be determined just prior to construction. **PROJECT NOT DONE IN MARGATE.**

Longport: Construct a 100-foot wide beach with dune (2-2.5 feet above bulkheads). **NOT DONE.**

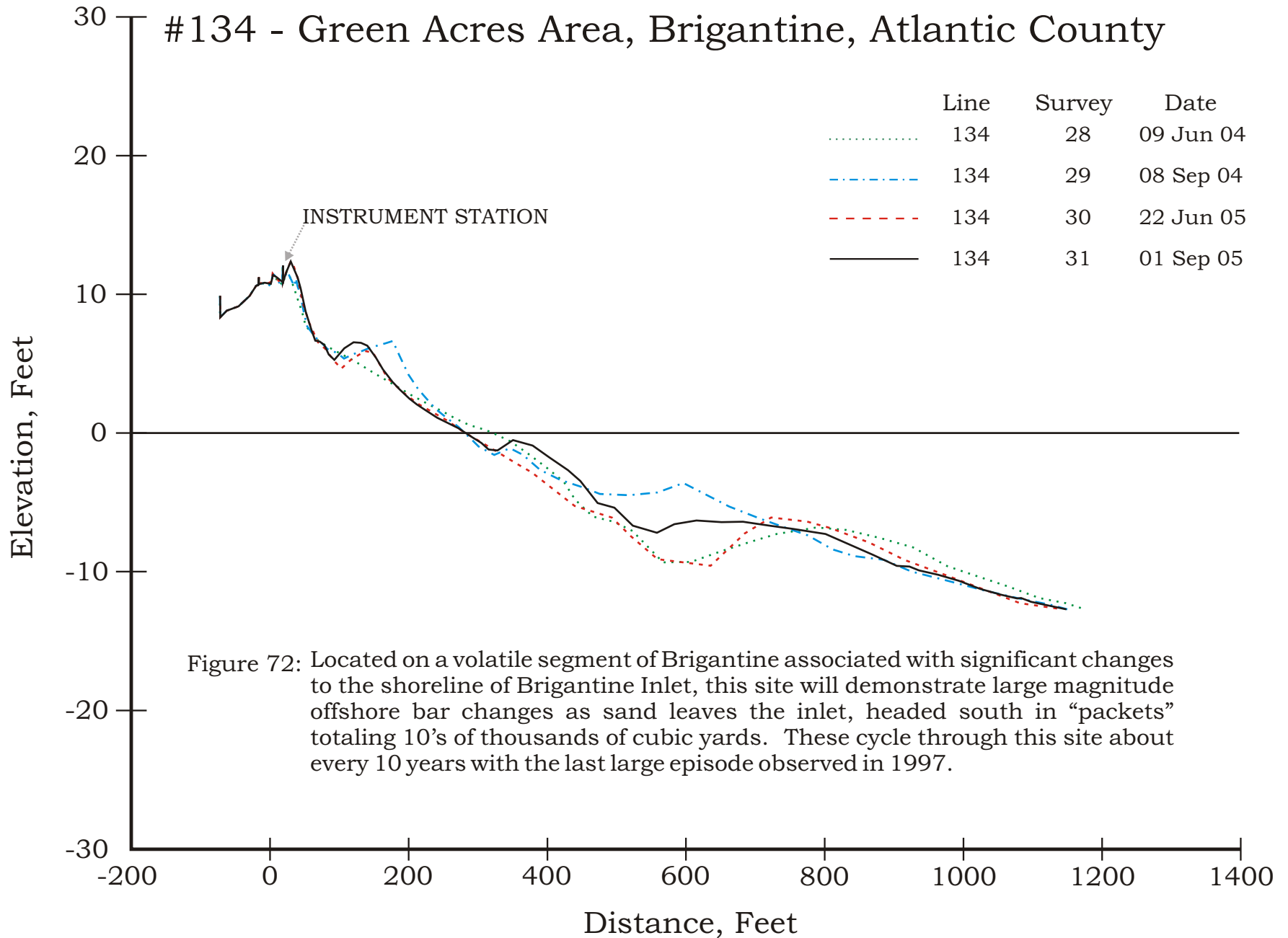
1.7 million cubic yards of sand will be utilized for periodic nourishment every 3 years for the 50-year project life. Sand source is a borrow area in Absecon Inlet.

Phase I officially began October 22, 2003 when the Notice to Proceed was issued to Great Lakes. Sand placement in Atlantic City began December 25, 2003 and is scheduled to conclude in March 2004. Crossovers, sand fencing, planting of dune grass and outfall extensions will be completed in May 2004 in Atlantic City. Construction will proceed from the northeast end of Atlantic City southwest through Ventnor. Sand placement in Ventnor is scheduled to begin in March 2004 and conclude in May 2004. Construction of crossovers and sand fencing will be completed in June 2004 in Ventnor. Dune grass planting will be completed by December 2004 due to November-April planting "window". The District considers Phase II to consist of the communities of Margate City and Longport that did not agree to participate in the initial project construction.

The Brigantine Island feasibility study was completed in August 1998, and the nourishment of this island is scheduled to start prior to October 2005 to be able to utilize the last funds available in the expiring Water Resources Development Act of 2002. Congress has acted to add \$500,000 to FY 04 for construction despite no presidential request. This funding is to be used to start construction in the spring of 2005. On October 12, 2004 the ACOE sponsored a public signing ceremony in Brigantine to inaugurate the construction phase of this project. This project actually began in late January 2006, finishing up in March 2006.

New Jersey Beach Profile Network

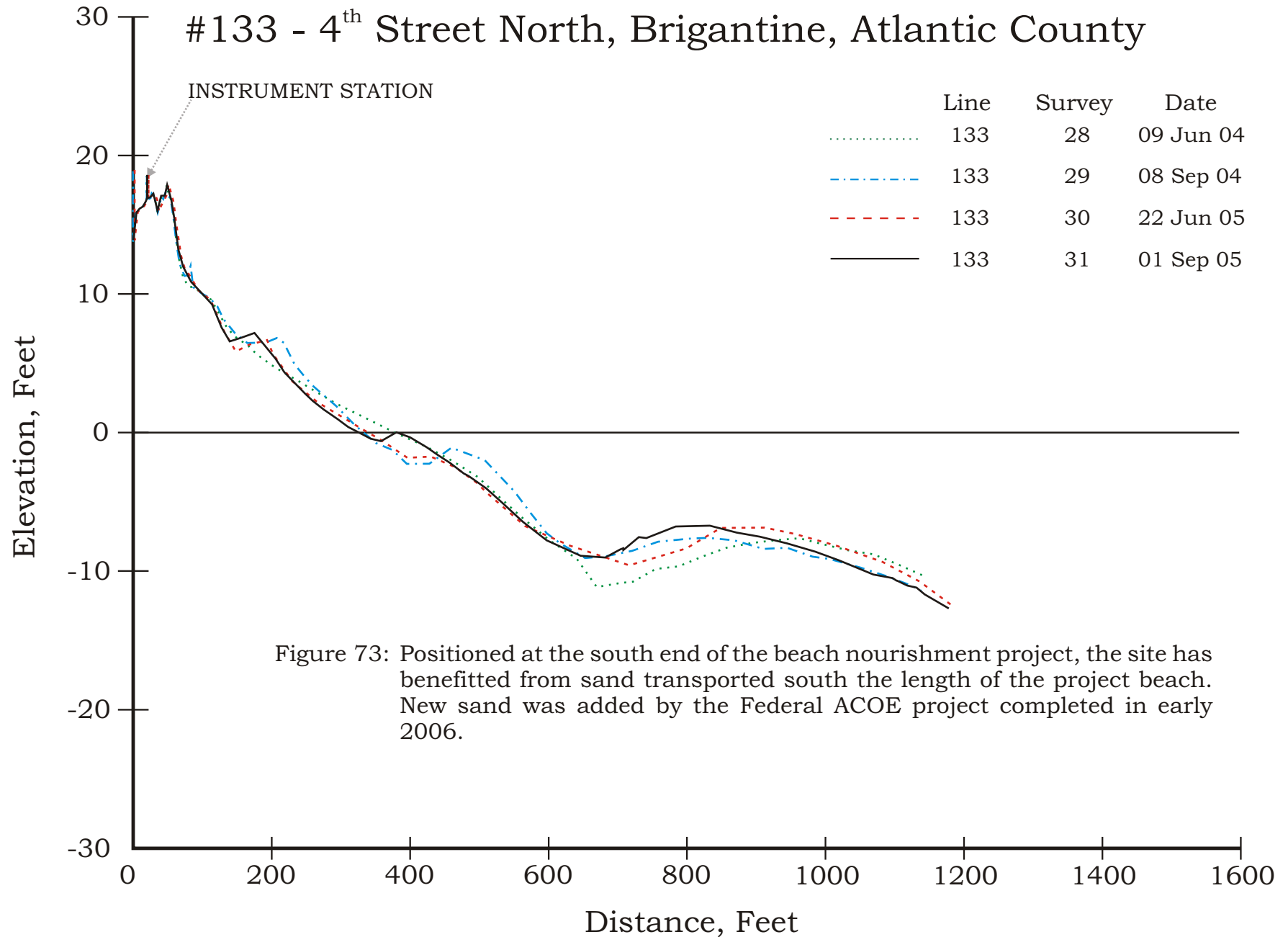
#134 - Green Acres Area, Brigantine, Atlantic County



New Jersey Beach Profile Network

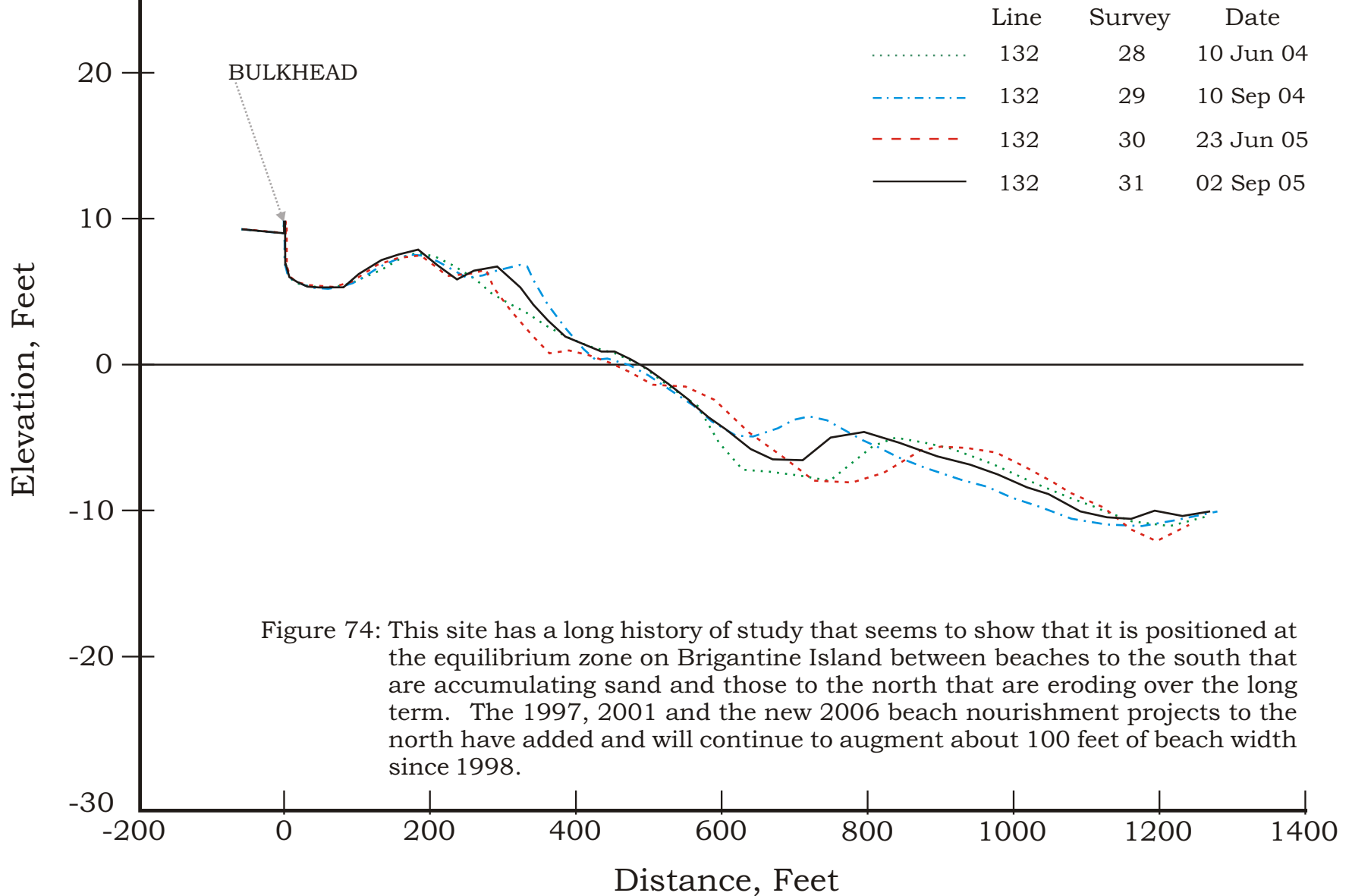
#133 - 4th Street North, Brigantine, Atlantic County

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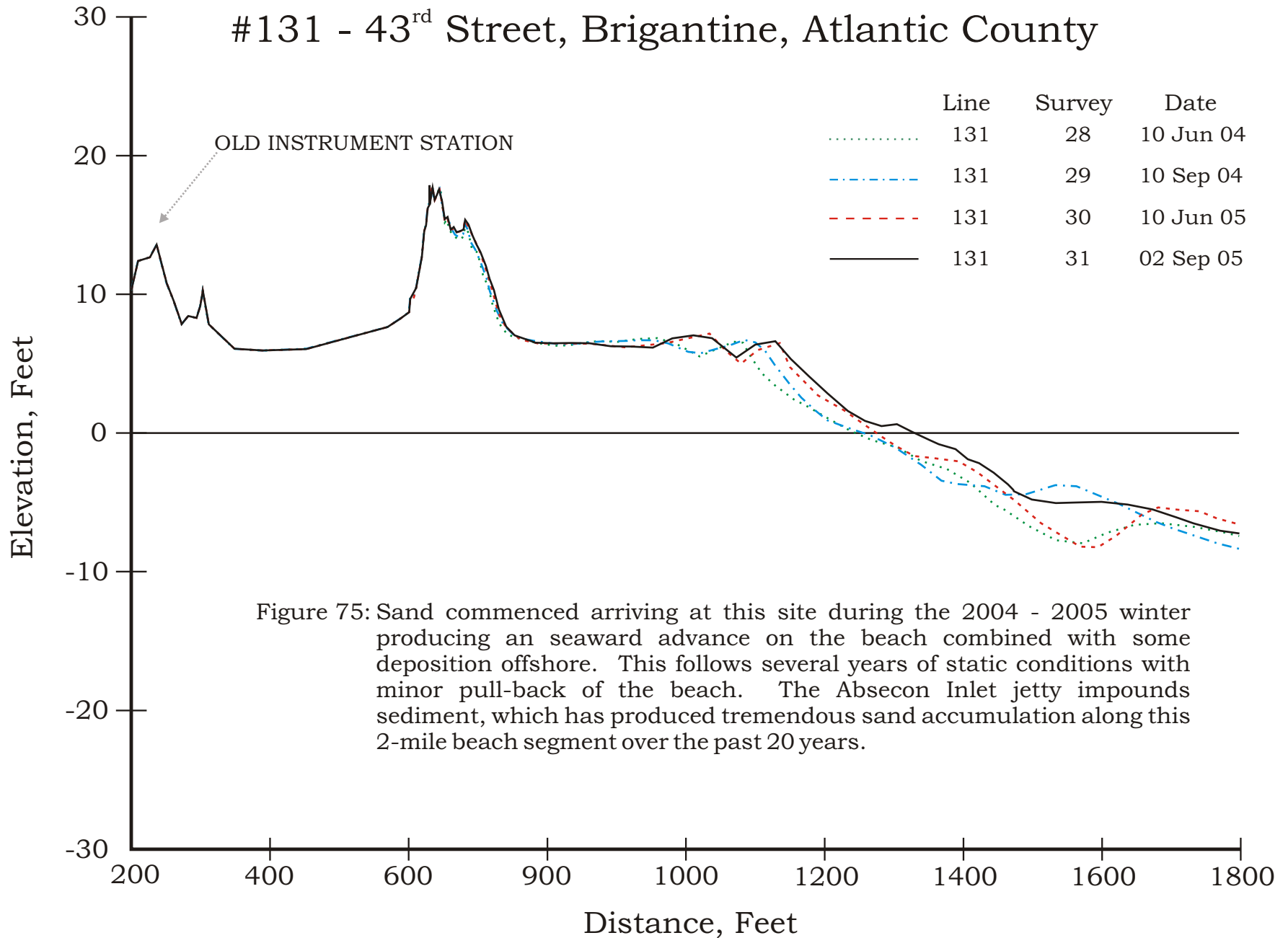
New Jersey Beach Profile Network

#132 - 15th Street South, Brigantine, Atlantic County



New Jersey Beach Profile Network

#131 - 43rd Street, Brigantine, Atlantic County



New Jersey Beach Profile Network

#130 - North Carolina Ave., Atlantic City, Atlantic County

| Line | Survey | Date | |
|---------|--------|------|-----------|
| | 130 | 28 | 12 May 04 |
| -.-.-.- | 130 | 29 | 24 Aug 04 |
| - - - - | 130 | 30 | 16 May 05 |
| ———— | 130 | 31 | 09 Nov 05 |

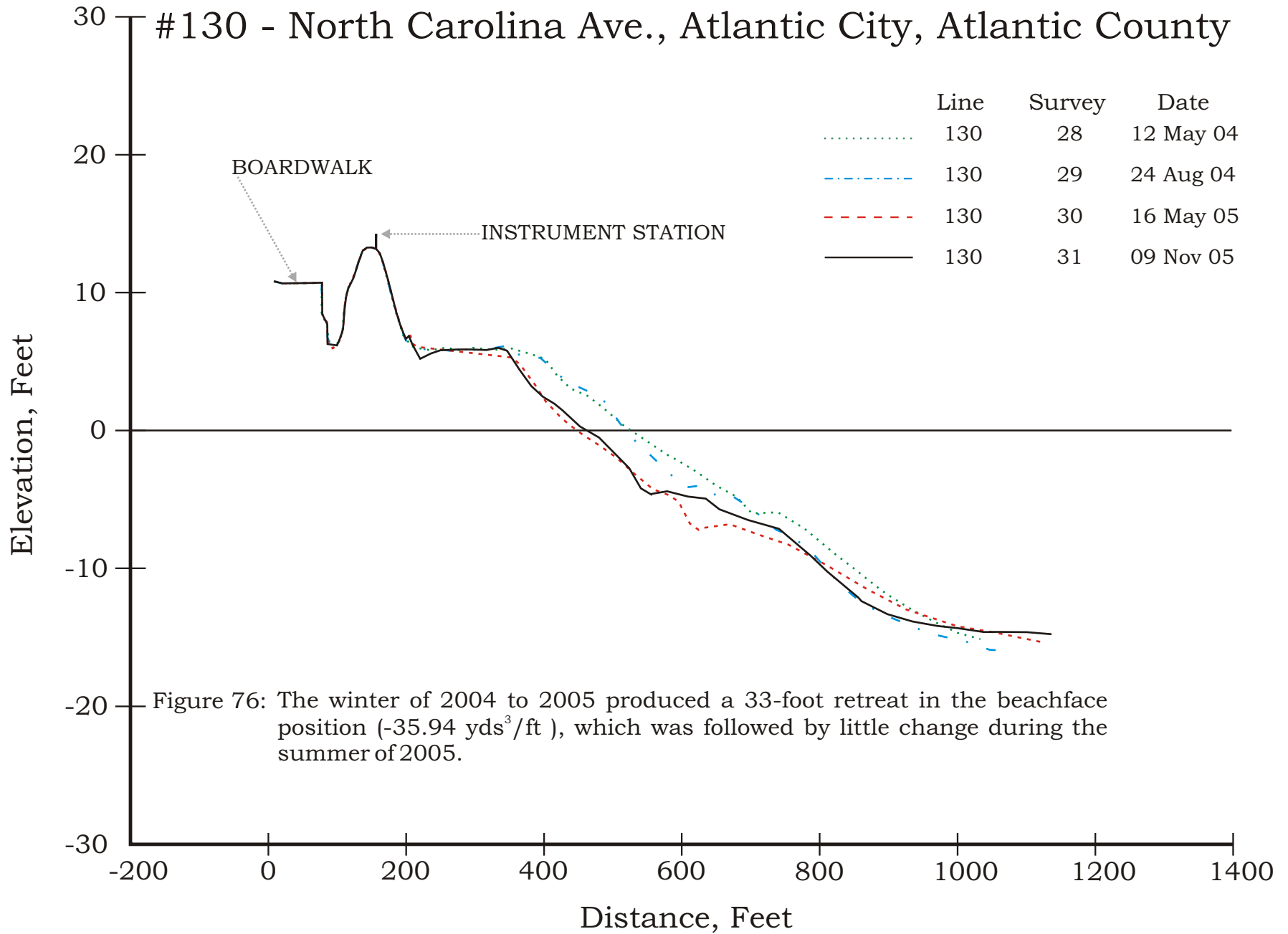
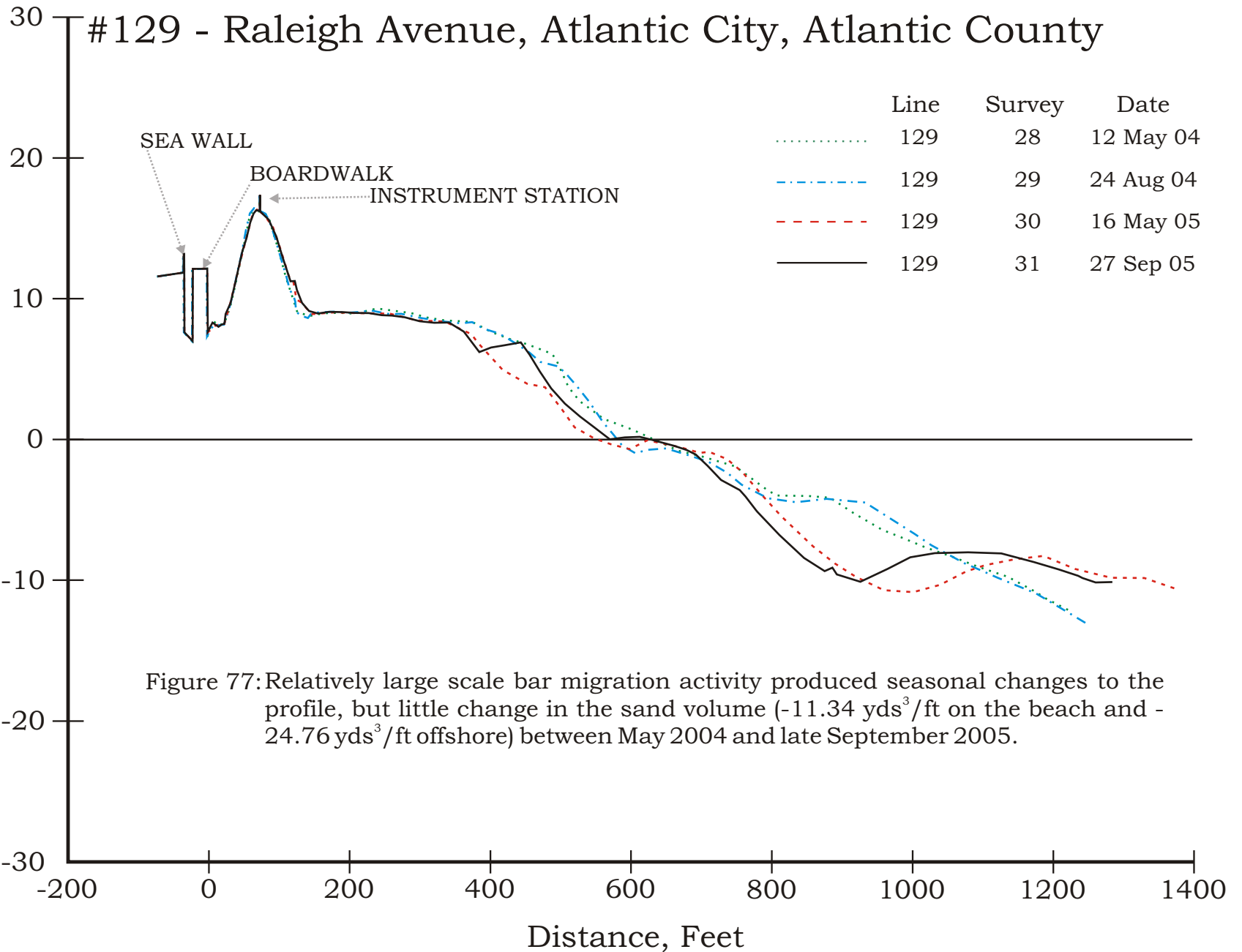


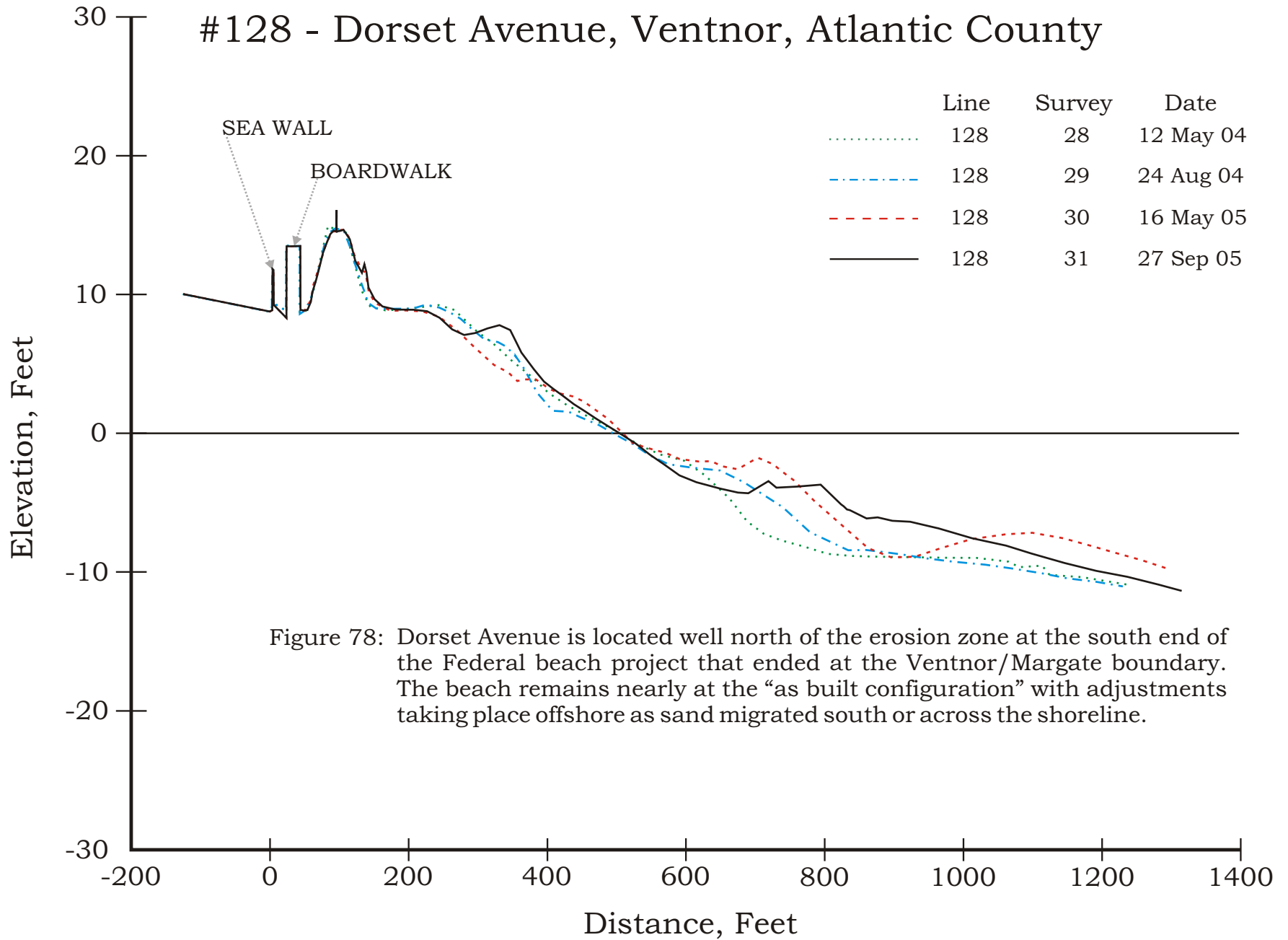
Figure 76: The winter of 2004 to 2005 produced a 33-foot retreat in the beachface position (-35.94 yds³/ft), which was followed by little change during the summer of 2005.

New Jersey Beach Profile Network



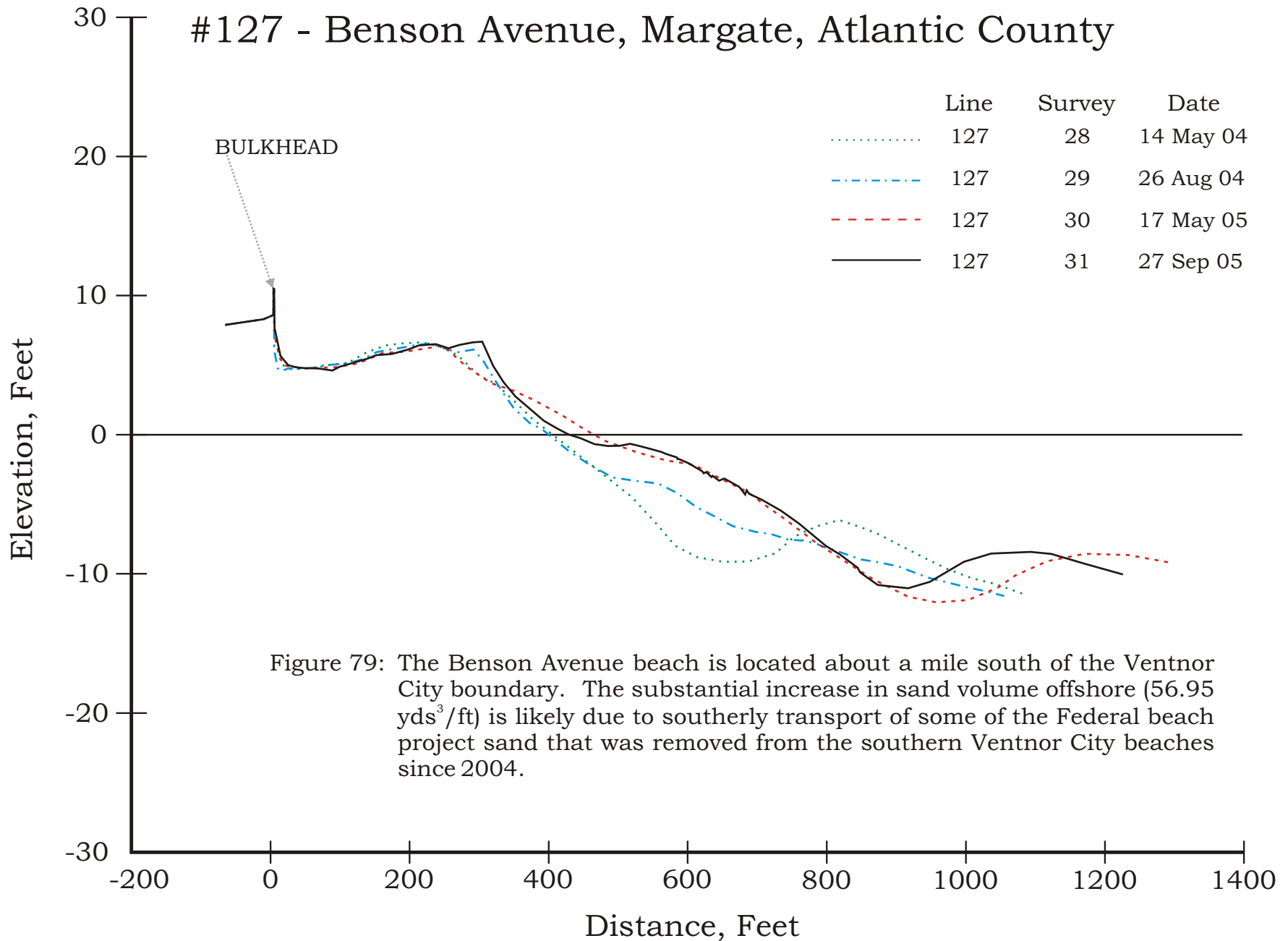
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#128 - Dorset Avenue, Ventnor, Atlantic County



New Jersey Beach Profile Network

#127 - Benson Avenue, Margate, Atlantic County



New Jersey Beach Profile Network

#126 - 17th Street, Longport, Atlantic County

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