



New Jersey Beach Profile Network

Atlantic County

Little Egg Inlet
to Great Egg Harbor Inlet

NJBPN Profile #'s
134 - 126

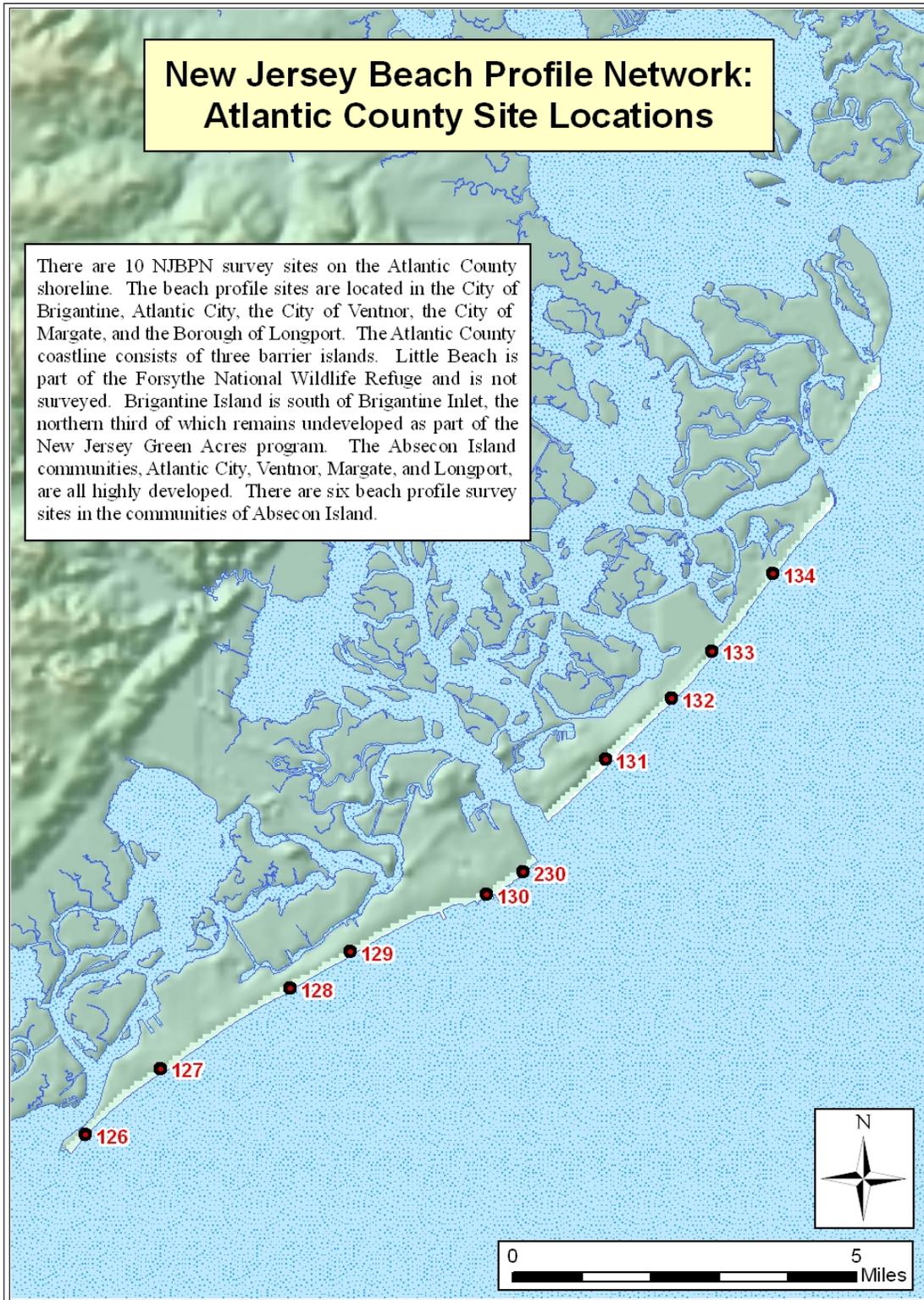


Figure 262. Location map for the 10 NJBPN profile sites in Atlantic County, NJ

ATLANTIC COUNTY – SUMMARY

The Atlantic County coastline consists of three barrier islands. The island of Little Beach belongs to the Forsythe National Wildlife Refuge and is located between Little Egg Inlet and Brigantine Inlet. Brigantine Island is divided into a northern third that is undeveloped and managed by NJ Green Acres Program. The City of Brigantine and its development occupies the remainder of the island. Absecon Island is home to Atlantic City, Ventnor City, Margate City, and the Borough of Longport. The Atlantic County communities have been the direct or indirect beneficiaries of federally-sponsored beach nourishment projects as well as having been the sites of multiple NJ State & locally sponsored projects in past years. Sand has been systematically harvested from Brigantine Inlet or Absecon Inlet to substantially add to the beach width, the sand volume on the beach and have enhanced the dune protection for landward properties. The Federal Absecon Island project was completed between fall 2003 and spring 2004 with sand derived from Absecon Inlet. The refusal of Margate City and Longport to participate in the project has resulted in a significant loss of sand from the southern third of Ventnor City beaches through end-effect erosion. Sand is transported south to the areas not initially replenished causing the fill to deteriorate on the southern Ventnor beach. The NJBPN surveys have documented substantial increases in sand volume at Benson Avenue in Margate and a minor increase all the way south at 17th Street in Longport. The Ventnor City profile is located in the middle of the municipal shoreline and has remained stable because it is well north of the project's termination at the border with Margate City. End-effect erosion from fill projects is a significant reason to have continuity of projects across an entire barrier island or between inlets.

As a result of rapid erosion along the northern Absecon Island shoreline, a new site was established at Rhode Island Avenue in the spring of 2010 to provide coverage in this zone of accelerated sand volume loss. Results from this site are included, but not in the trend analysis due to the extremely short record.

The situation at the northern beaches in Atlantic City deteriorated during the 2009 to 2010 storm series and was further exacerbated by Hurricane Irene in late August 2011. The Army Corps proceeded with an emergency fill in 2011 using Flood Control and Coastal Emergency funds to provide the necessary data to support the expenditure of \$10,326,000 to restore the beach to pre-storm conditions under Public Law 84-99. Funding is now in place for the initial maintenance effort of the 2003-4 project using sand from Absecon Inlet ebb-tidal shoals. Work is planned to start in 2012.

The Brigantine project was similarly evaluated and as a result an emergency fill of 96,000 cubic yards was performed using quarry sand trucked to the north end of the development on the island. Funding is in place to conduct the initial maintenance fill using Brigantine Inlet ebb-tidal shoals this calendar year.

The averages for Atlantic County were bolstered during the 18-month survey period between the spring of 2010 and the fall of 2011 by the multiple restoration efforts following Hurricane Irene and an October northeast event. The Atlantic County beach sites averaged a 38.26 yds³/ft. sand volume increase and a 30.6-foot shoreline advance seaward during this study interval. The largest volume of sand was placed between the spring 2011 and fall 2011 surveys. Atlantic City and Ventnor received the most sand with the concentration of placement between the Oriental Avenue jetty and Ocean One pier just north of North Carolina Avenue. The Revel Entertainment casino complex, under construction since 2009, opened in 2012 with a focus on the beach as a tourist attraction. The company funded an effort to build a submerged rock sill between groins in the cell south of Massachusetts Avenue parallel to the shoreline to retain the sand pumped into place for a greater time interval. The City has started an inlet shoreline restoration project to remove failed construction debris including the boardwalk (located over water) from the City inlet shoreline to the edge of the main tidal channel in Absecon Inlet.

Historically, the beach monitoring activity over 25 years of time has provided two significant results. The Brigantine shoreline responds to storm activity by shedding sand along the northern 40% of the island with the littoral current system transporting it south. The southern tip of the island was “stabilized” beginning in the 1940’s with a rock jetty that begins back near St. George’s Thorofare and extends over 1,100 feet southeast into the Atlantic. Aerial photography prior to 1940 shows a spit curving into Absecon Inlet in a tight spiral. In 1927 Absecon Inlet was restricted by the construction of a causeway road to access Absecon Island by vehicle. The only access had been by railroad coming across the salt marsh from the mainland. The new causeway completely cut off what was known as Grand Thorofare, essentially the main tidal channel leading to the bays landward of Brigantine. The smaller channel was crossed by a bridge on timber pilings. These changes also impacted the growth of the southern Brigantine Island shoreline.

The new inlet jetty acted as a non-porous barrier to sand movement into the inlet. The beach grew wider by thousands of feet causing the US Army Corps to extend the jetty in the 1970’s. By 1986 the southern third of the island had grown from 800 feet tapering to nothing added by 15th Street South 2 miles north of the jetty. The analysis shows that the 43rd Street South site (#131) advanced seaward by 507 feet since 1986. This involved the deposition of 358 yds³/ft. of transported sand on each linear foot of shoreline in this area. The next site to the north at 15th Street South saw a 120 yds³/ft. addition in sand volume with a 157-foot shoreline advance. Since these two sites are 7,174 feet apart, this means that with another mile to the Absecon Inlet jetty from 43rd Street, the Brigantine shoreline in this zone saw the deposition of 1,714,586 cubic yards of sand. Add another 2,311,248 cubic yards for the over 6,000-foot distance from the 43rd Street location to the jetty and the total becomes 4,025,834 cubic yards of deposition. Since 45% of the beach nourishment material resides within the project, this vast total consists of some beach nourishment sand, but also material spread all along the island’s shoreline. Beach nourishment totals 2,426,000 cubic yards of sand. Brigantine Island is trying to pivot seaward along the inlet jetty as the northern third to 40% moves landward under storm erosion. This island is slowly rotating trying to face the northeast.

The recent impact of the Federal Shore Protection project on Absecon Island demonstrates a positive change for Atlantic City south of North Carolina Avenue into Ventnor City. The failure of the two southern communities to participate has meant that sand from the southern third of Ventnor has moved south toward 11th Avenue in Longport, leaving a recognizable deposit at Benson Avenue in Margate as shown by that site’s survey data. The deposit thins toward Longport because, unlike Brigantine, the jetty at Great Egg Harbor is short and sand easily passes by it into the inlet.

Northern Absecon Island is very vulnerable to storm-induced erosion, especially at the Revel Entertainment site. This is nothing new since beach nourishment started in the 1960’s Absecon Inlet dredging was occasionally side-cast or deposited onto the beach, but vanished quickly. Fills in 1984, 1997 prior to the Federal work also saw rapid erosion from the northern beach. This occurs in spite of rock groins every block or every other block. The absence of all that sand trapped behind the jetty on the Brigantine side of the inlet is instrumental in producing a lack of cycling within the ebb-tidal shoals. An 1891 bathymetric map of Absecon Inlet prior to any inlet structures shows a much healthier system with wide, low-gradient beaches in the area.

Atlantic County, Beach Volume & Shoreline Position Change Over 25 Years

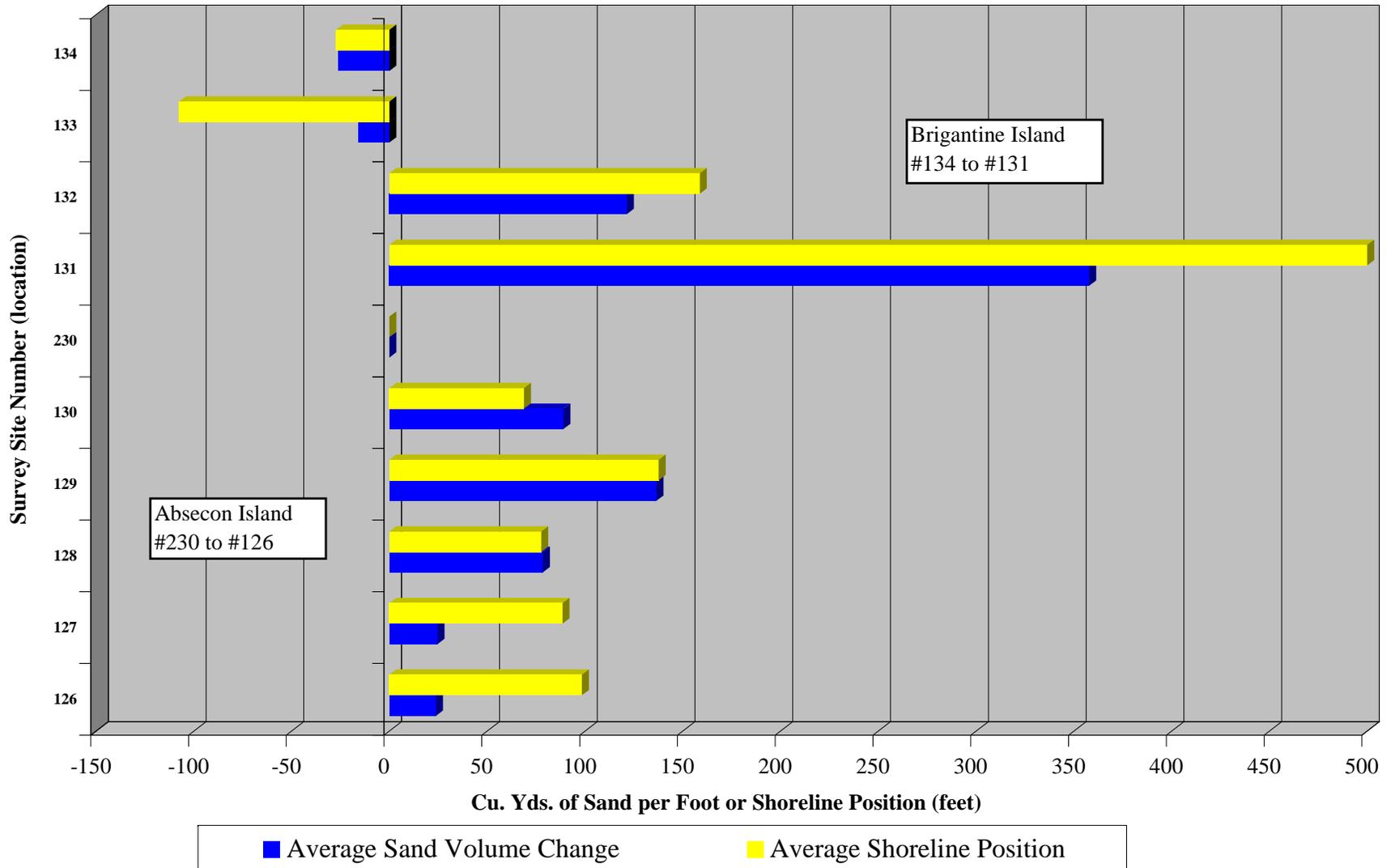


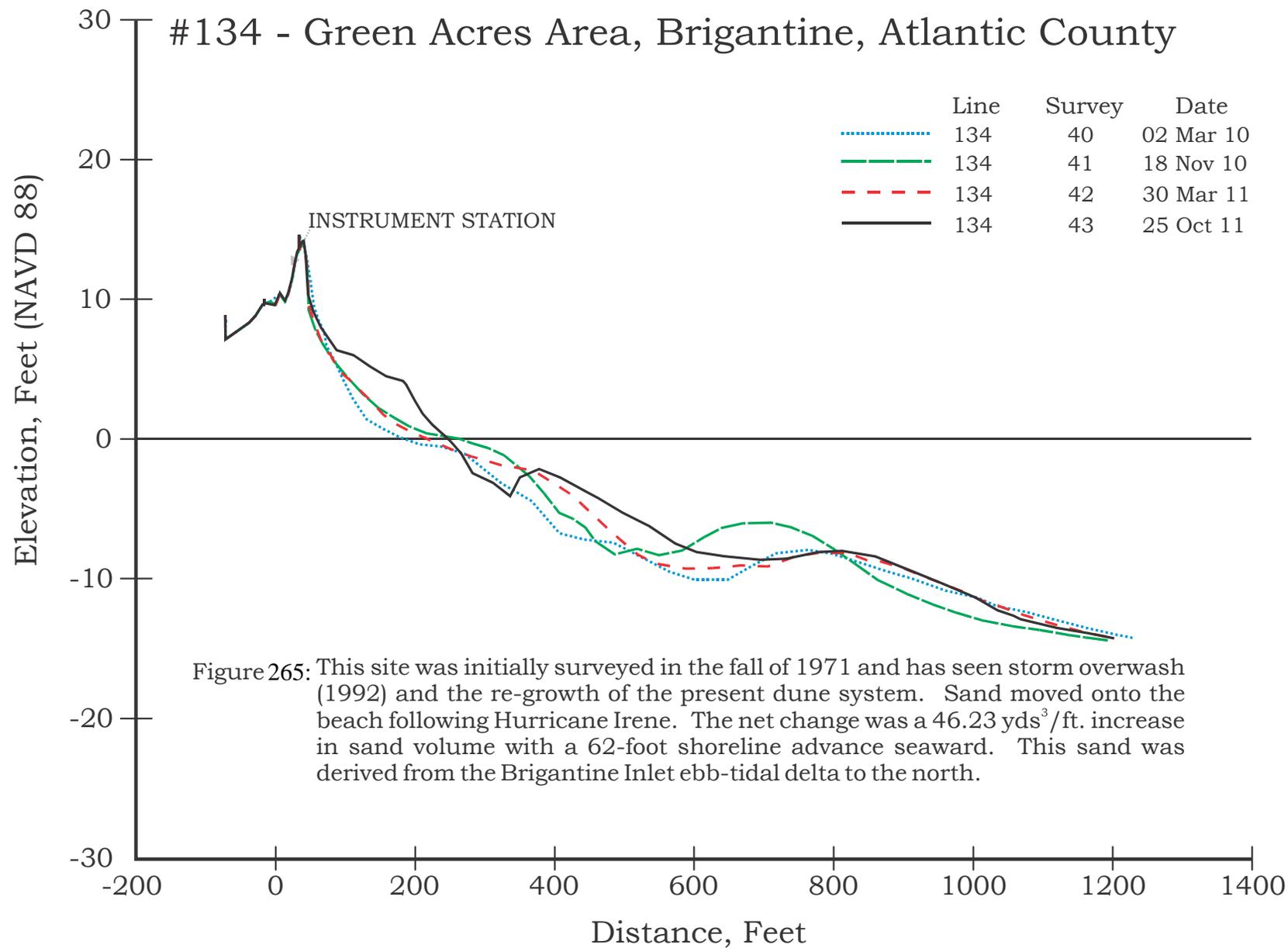
Figure 263. Summary of shoreline position changes and the cumulative change in sand volume present on each profile site. Note that the pattern of change on Brigantine Island is one of strong shifts in material from the north end of the island to the south impounded by the north jetty to Absecon Inlet. The recent Federal project on Absecon Island has produced positive changes over the past 8-9 years.

Site 134, Green Acres Area, Brigantine, NJ – October 25, 2011



Figure 264. View to the north along the dune crest and beach of the natural area of Northern Brigantine Island.

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GREEN ACRES SITE – SITE 134

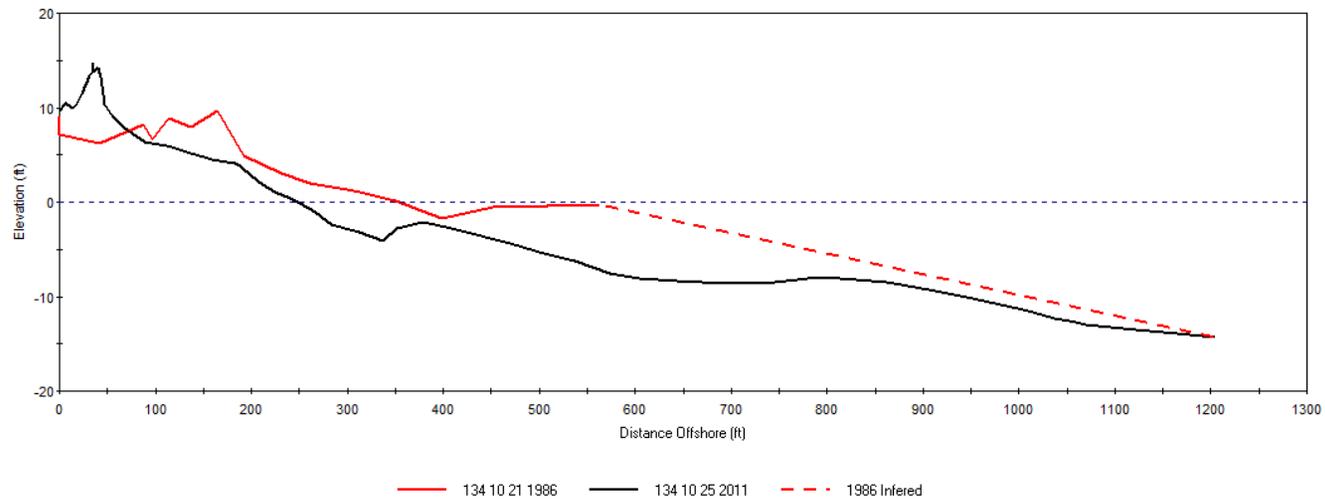


Figure 266. This site is located along an undeveloped segment of the shoreline where the dune has retreated 120 feet in 25 years. Sand is completely free to move around and complete overwash did occur December 1992. The left photograph was taken 12 days prior to the Halloween storm of 1991. Photo on left taken October 18, 1991. View to the north along the seaward dune toe slope. Photo on right taken October 25, 2011. View to the north.



25-Year Coastal Changes at Site 134, Green Acres Area, Brigantine, Atlantic Co.

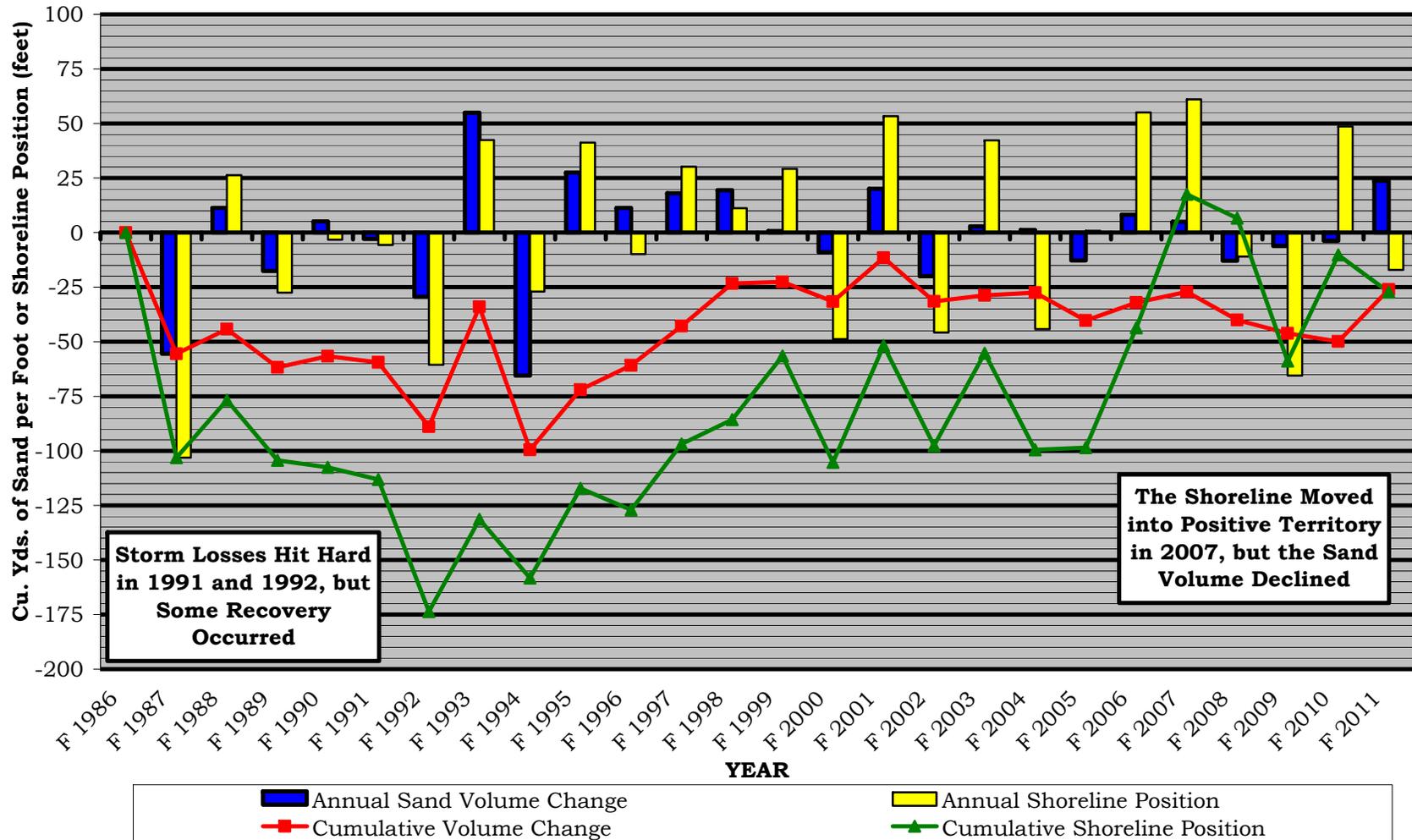


Figure 267. Brigantine Island is about two-thirds developed with the northern section preserved as public open space in the NJ Green Acres program. The site is approximately a half mile south of Brigantine Inlet, a small, natural coastal inlet between the Federal wildlife refuge and the Green Acres property. The site was established in 1971 as part of a study of coastal changes+ related to a proposed offshore nuclear power plant. Adopted as part of the NJBPN network in 1986, the site has a modest negative sand volume and a retreat in the shoreline position over the past 25 years.

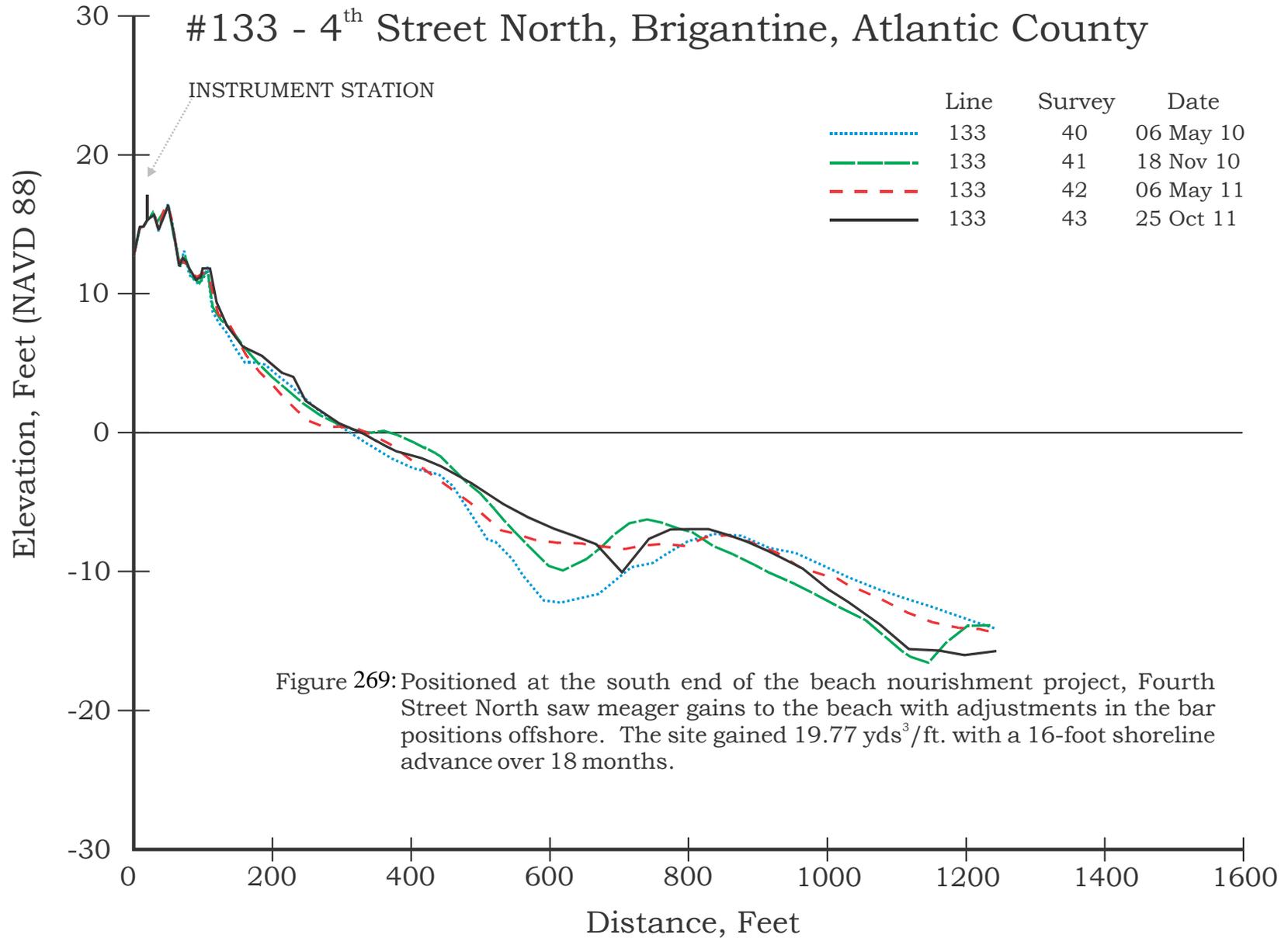
Site 133, 4th Street North, Brigantine, NJ – October 25, 2011



Figure 268. View to the south from 4th Street North in Brigantine City.

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



4th STREET NORTH, BRIGANTINE– SITE 133

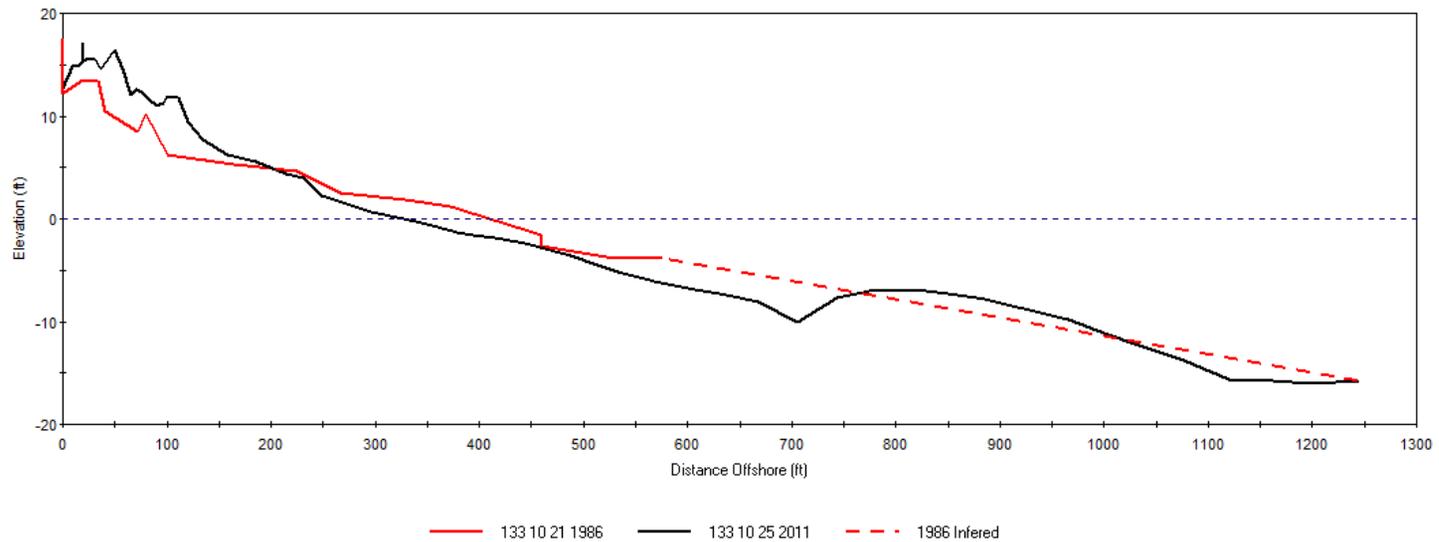


Figure 270. The growth in the dune volume and size is a result of the series of beach nourishment projects that started in 1997. Now a Federal project, this location is at the southern limit of major sand volume placement. The majority of the sand is placed north toward the limit of development on Brigantine. Photo on left taken October 18, 1991. View to the east. This photo was taken prior to the Halloween storm which caused extensive erosion on the island. Photo on right taken May 6, 2011. View to the east. Modest erosion dominates the long-term trend at this site.



25-Year Coastal Changes at Site 133, 4th Street North, Brigantine, Atlantic Co.

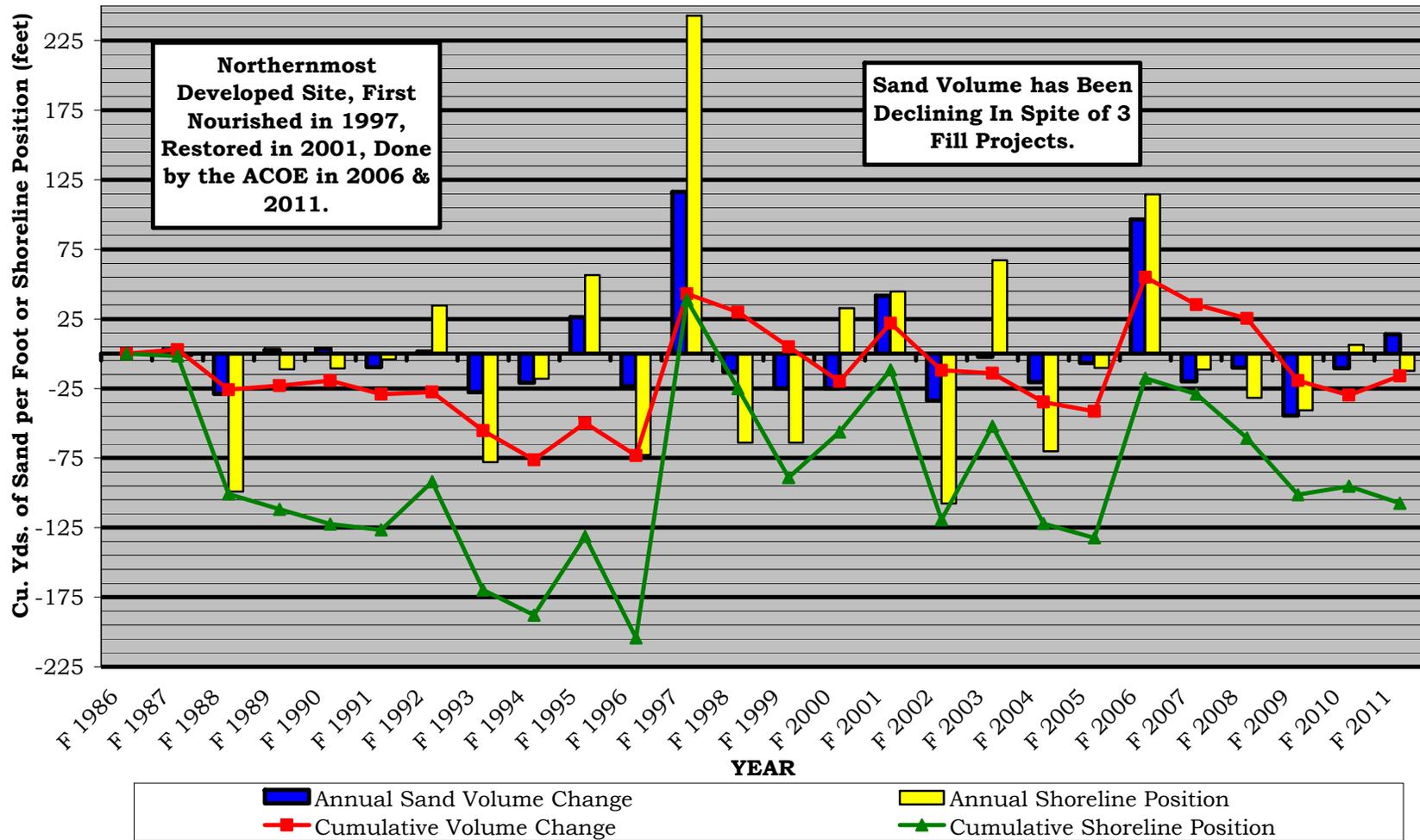


Figure 271. The northernmost site within the developed portion of Brigantine has been subject of two NJ State and local beach restorations (1997 and 2001) followed by a Federal project in 2006. Sand was trucked to the project in 2011 and will be augmented by a dredge pumped fill in 2012-13. The spikes in the sand volume and 240-foot shoreline advance in 1997 is the evidence for these efforts. In spite of the placement of over 2 million cubic yards of sand on this zone of beach since 1997, the site's sand volume is essentially unchanged since 1986 with a 85-foot retreat in the shoreline position. Looking at the 1996 data, the situation would have been far worse without the renourishment efforts.

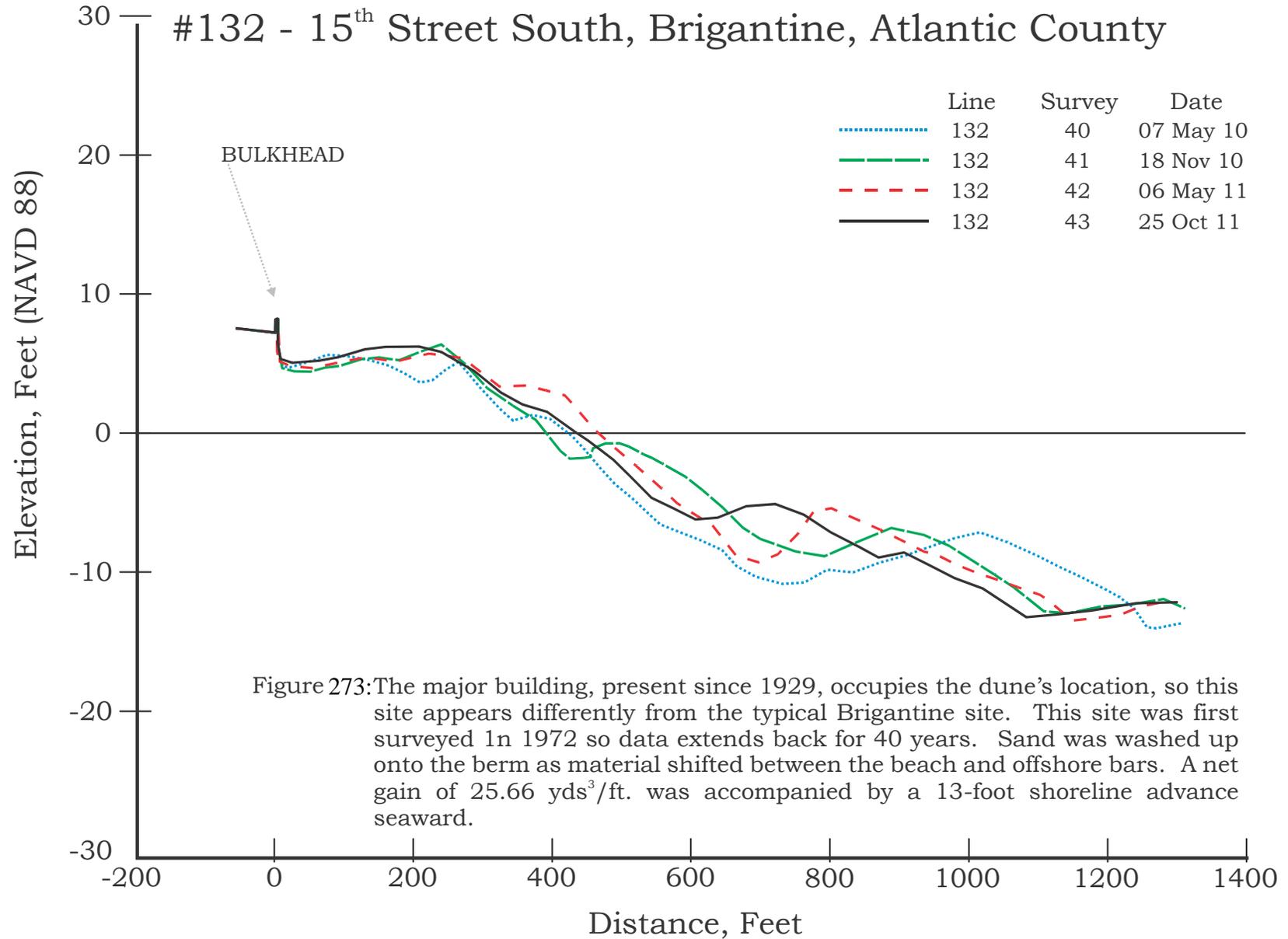
Site 132, 15th Street South, Brigantine, NJ – October 25, 2011



Figure 272. 15th Street North looking north across the berm with the resort's beach bar to the left.

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



15th STREET SOUTH, BRIGANTINE– SITE 132

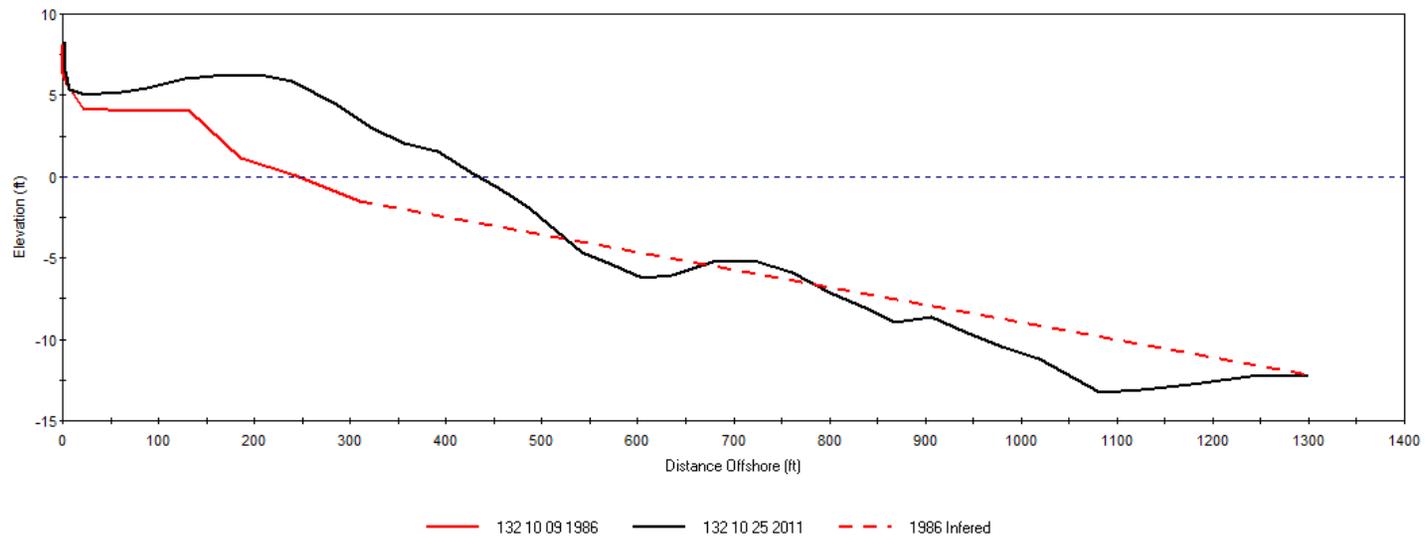


Figure 274. This site was never nourished, but littoral transport provided sand giving an increase in back-beach width and elevation since work in 1997, 2001, and 2006. Photo on left taken October 18, 1991. View to the east. This site is located in the middle of the developed segment of Brigantine. Photo on right taken October 25, 2011. View to the north.



25-Year Coastal Changes at Site 132, 15th Street South, Brigantine, Atlantic Co.

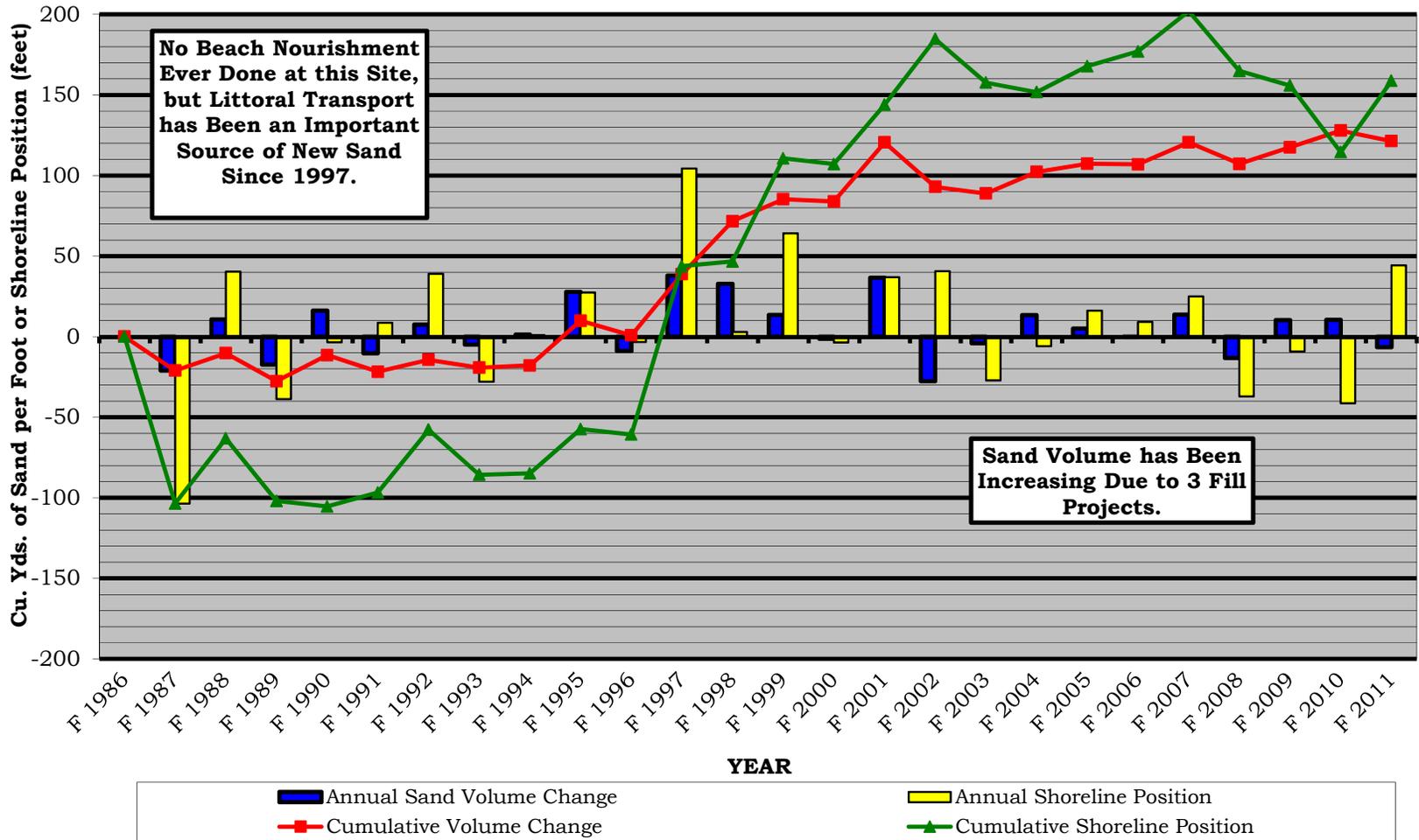


Figure 275. Site #132 lies in the center of development and about a mile south of the end of sand placement by the ACOE. The negative sand volume between 1987 and 1996 reflected sediment supply conditions at this location. Sand was pumped onto the northern third of Brigantine three times (1997, 2001 & 2006) and southerly transport transferred over a 120 yds³/ft. to this location since 1997. The Absecon Inlet jetty traps the majority of the sand with some bleeding into the inlet channel margin, but the depositional wedge extends across half the developed part of Brigantine.

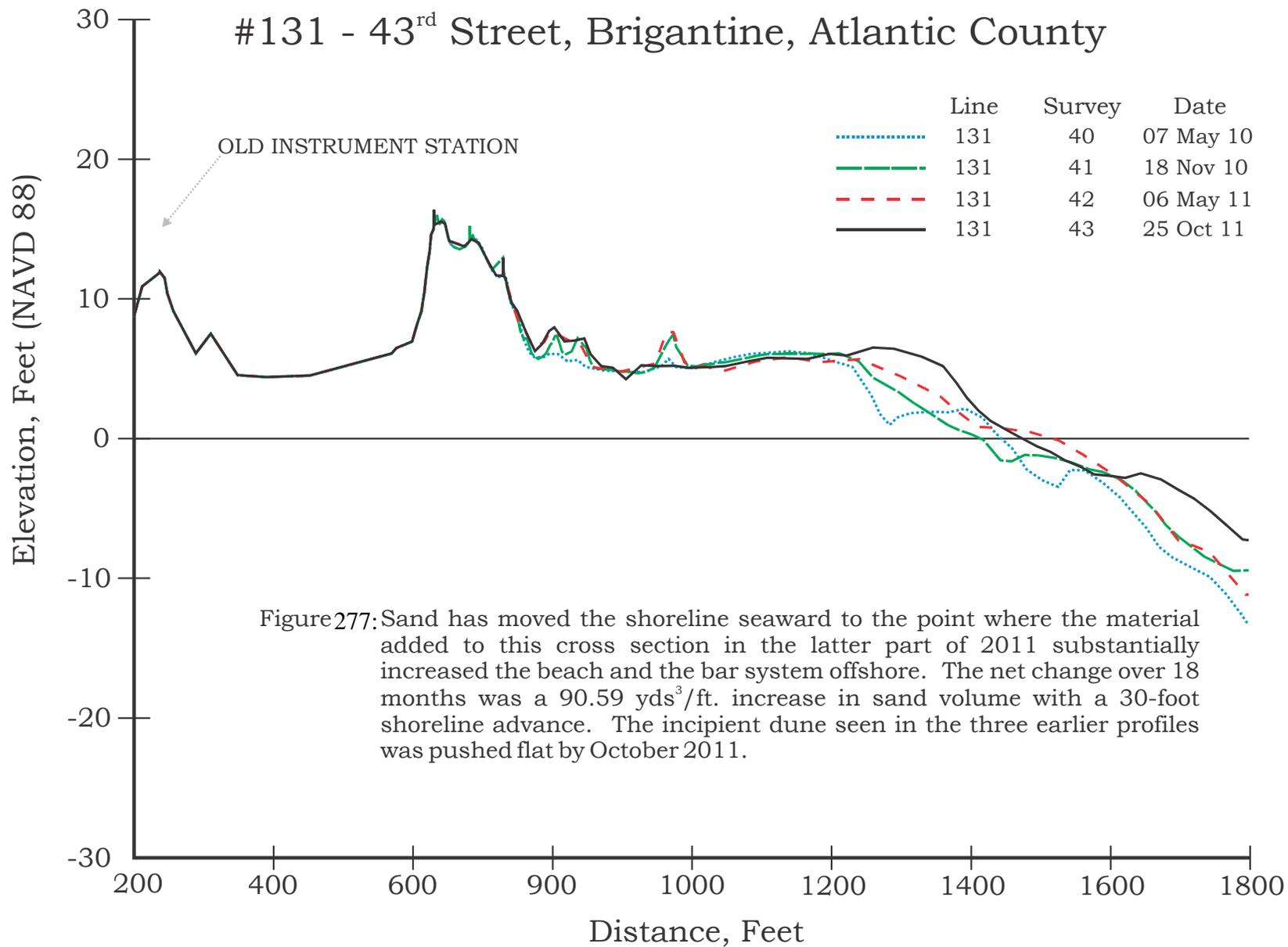
Site 131, 43rd Street South, Brigantine, NJ – October 25, 2011



Figure 276. Looking north from the IP toward the vast expanse of dunes and beach in southern Brigantine.

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#131 - 43rd Street, Brigantine, Atlantic County



43rd STREET SOUTH, BRIGANTINE – SITE 131

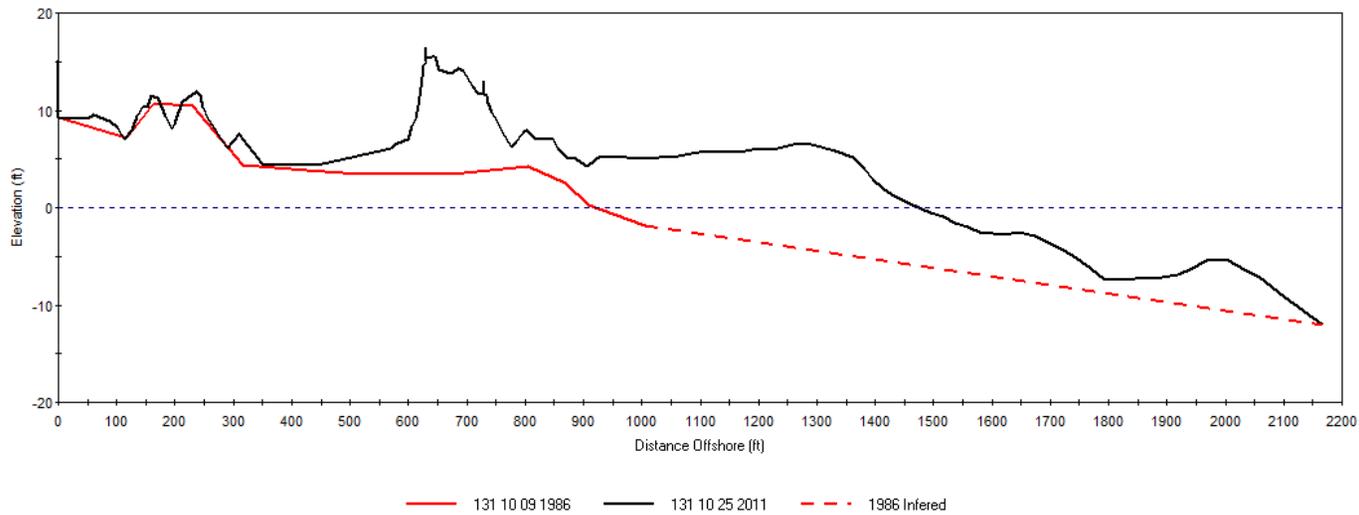


Figure 278. Over the past twenty-five years, this site has continued to grow, fueled since 1997 by sediment transport from the beach replenishment projects that occurred well north of this site. Growth began as the jetty was built in the 1940's, so about a ¼ mile of accretion has occurred over time. Photo on left taken October 18, 1991. View to the northeast. This site is located at the southern end of Brigantine Island and approximately a mile north of the Absecon Inlet (north) jetty. Photo on right taken October 25, 2011. View to the north. This primary dune is located on the beach berm in 1986.



25-Year Coastal Changes at Site 131, 43rd Street South, Brigantine, Atlantic Co.

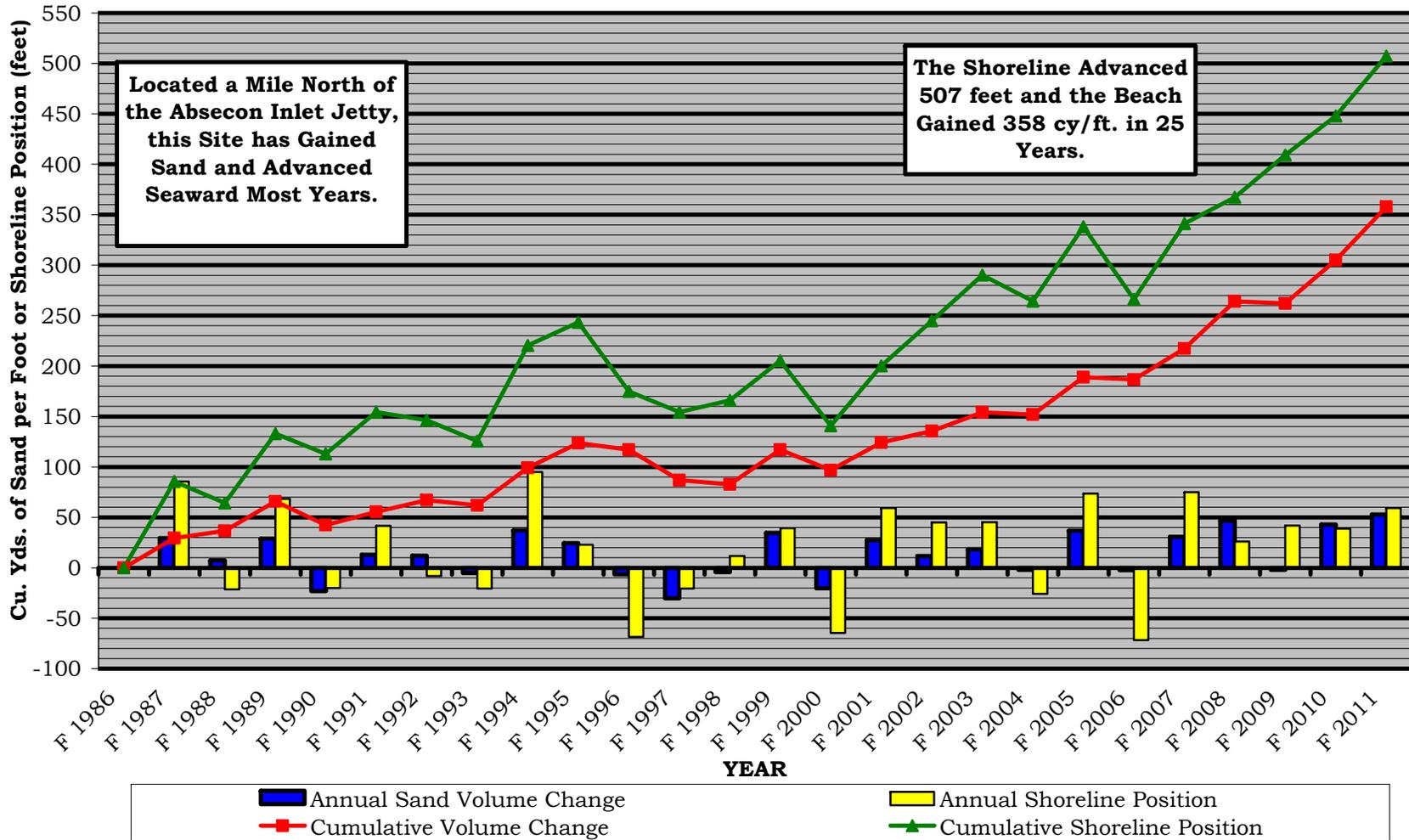


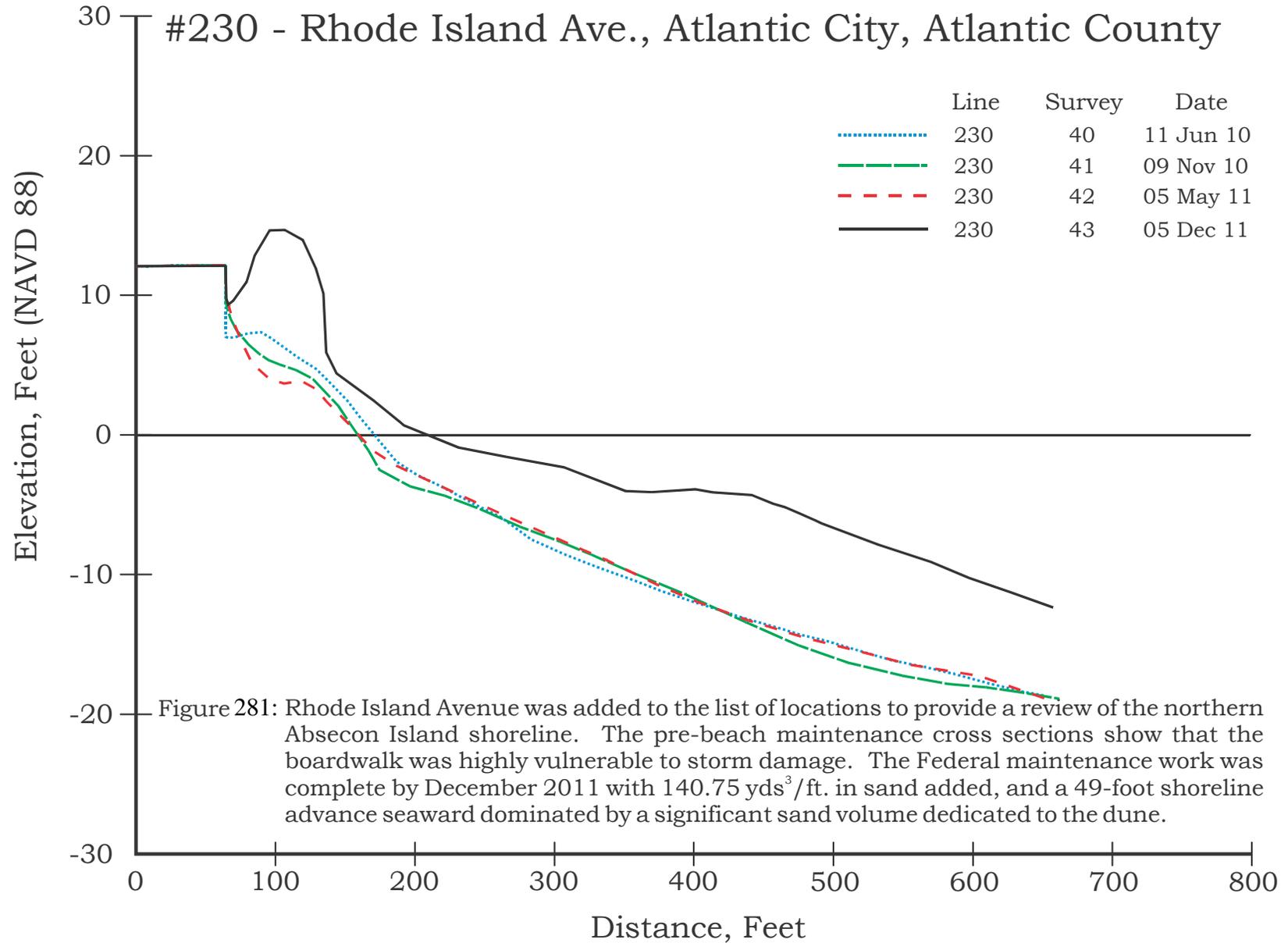
Figure 279. This site is located about a mile north of Absecon Inlet. The inlet jetty on the Brigantine side has produced a 60-year accretion when compared to the pre-construction shoreline in the 1940's. The surveying since 1986 demonstrates the immense sand volume accumulating this far up-drift of the jetty. A shoreline advance of over 500 feet with a sand volume increase of 358 yds³/ft. Taking the sand volumes for this site and #132 one can see that if one adds the two sand volume increases, divides by two and multiplies by the distance between the two sites (7,204 feet) an approximation of the increase in sand volume is 1,725,358 cubic yards. The three beach nourishment projects pumped 2,300,000 cy onto the north end developed beachfront. About 65% of the increase is likely due to the fill activity, the rest is naturally contributed to the littoral transport.

Site 230, Rhode Island Ave., Atlantic City, NJ – December 5, 2011



Figure 280. Looking south toward Ocean One pier and the casinos following a fill by the ACOE under FCCE funding following the 2009 disaster declaration.

New Jersey Beach Profile Network



RHODE ISLAND AVENUE, ATLANTIC CITY – SITE 230

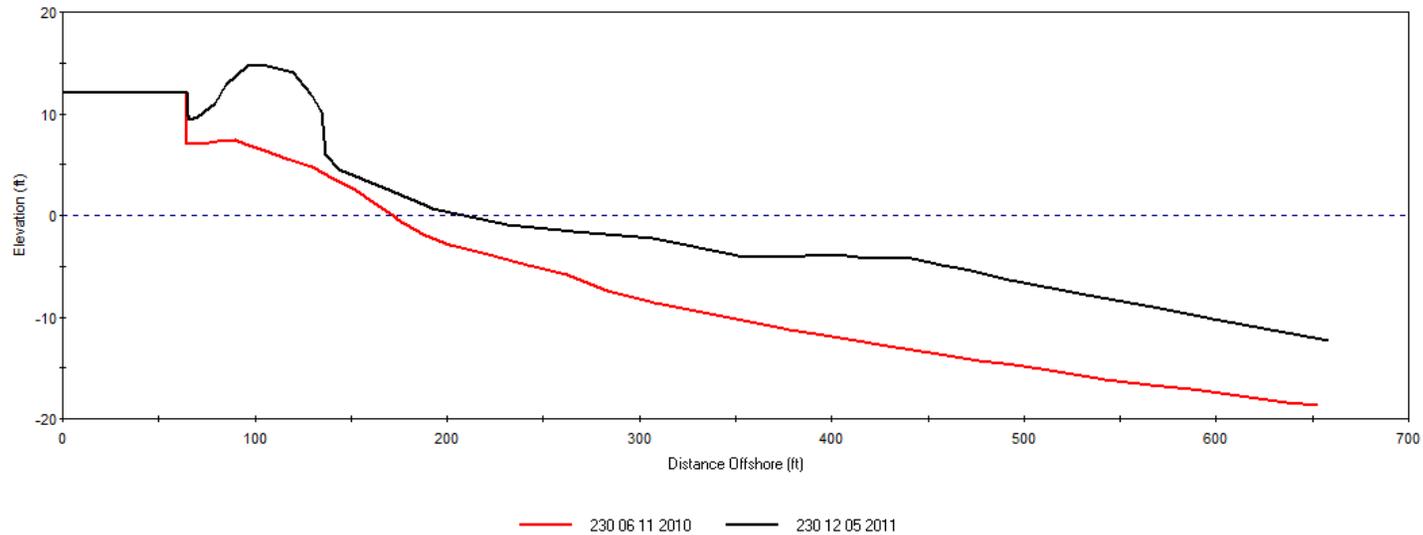


Figure 282. THIS SITE WAS ESTABLISHED IN SPRING 2010. This site is located on the north end of Absecon Island and was added to the NJBPN to measure changes adjacent to the inlet.
Photo on left taken November 9, 2010. View to the north
Photo on right taken December 5, 2011. View to the north. Beach replenishment in the late spring of 2011 created a wider beach and dune.

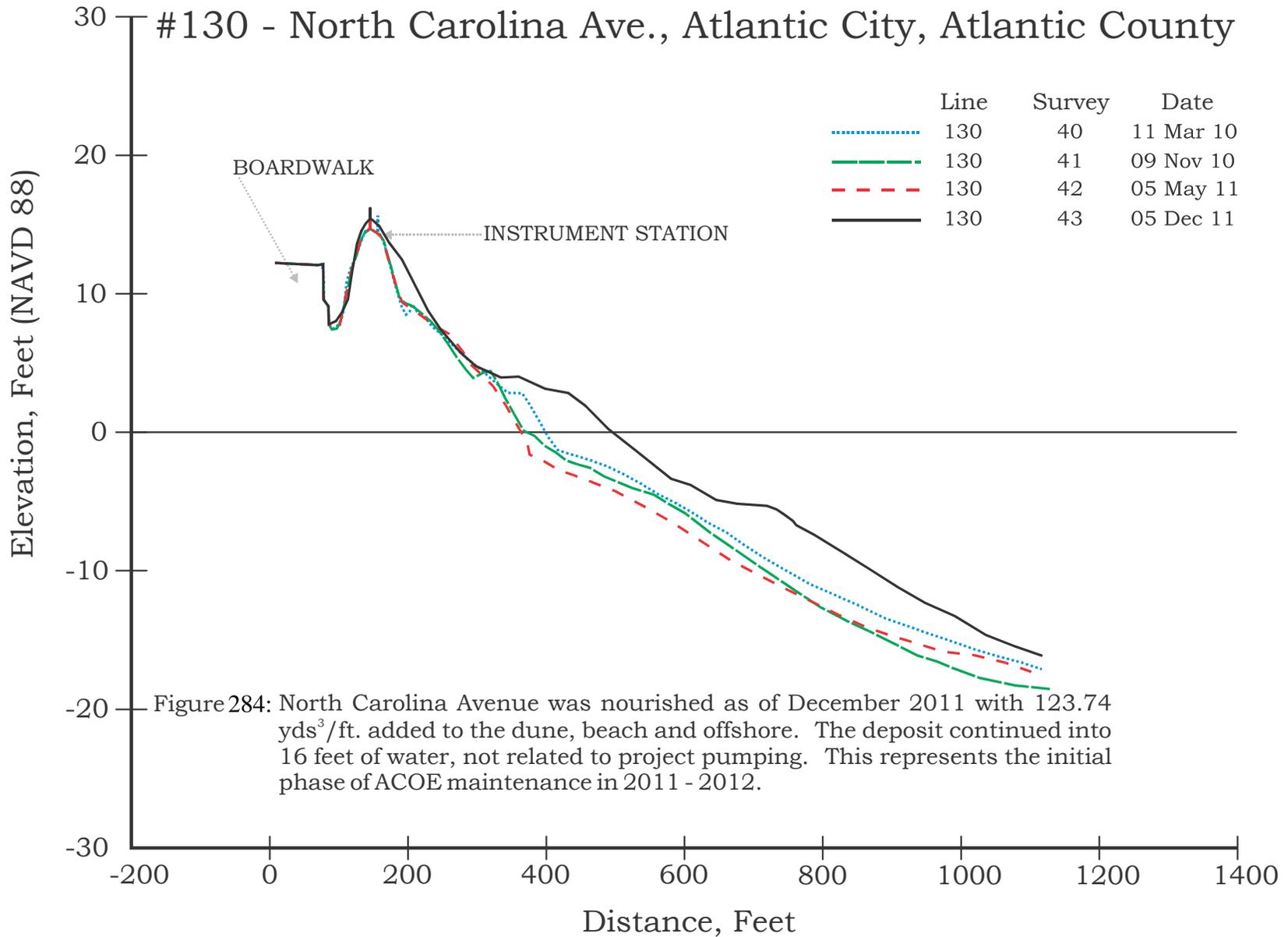




Site 130, North Carolina Ave., NJ - December 5, 2011

Figure 283. View to the north along the beach and dune at North Carolina Avenue north to Steel Pier.

New Jersey Beach Profile Network



NORTH CAROLINA AVENUE, ATLANTIC CITY – SITE 130

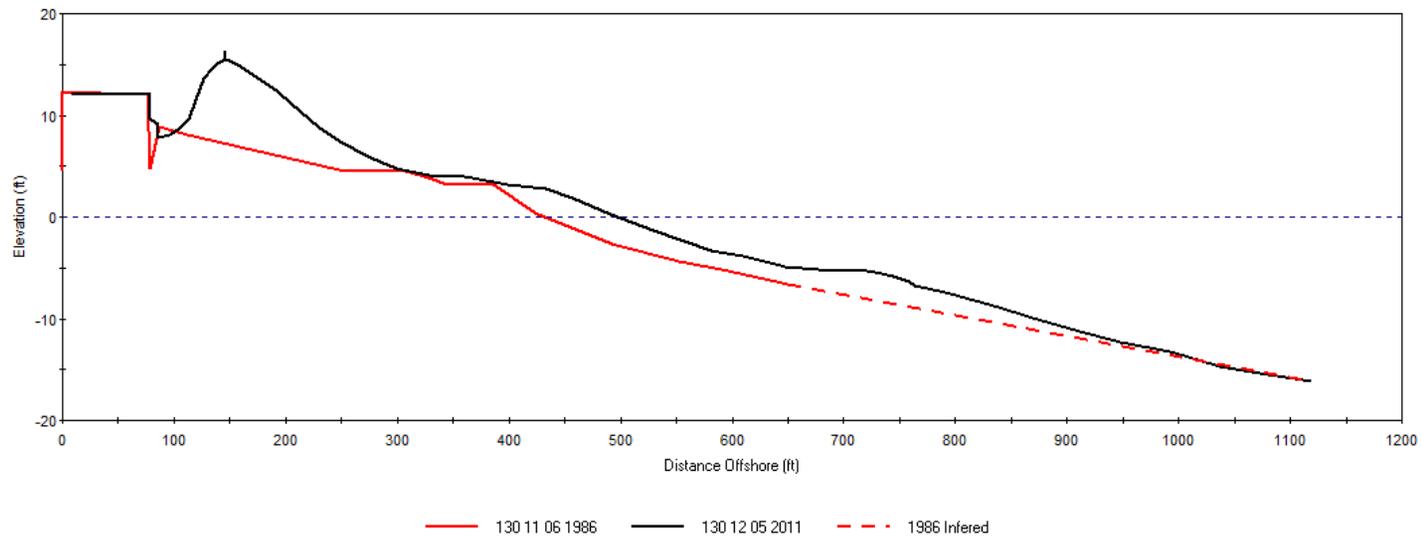


Figure 285. This site received sand from the 2003 Federal beach nourishment project which included the construction of a protective dune. Photo on left taken November 18, 1991. View to the east. At the time of this survey, the dry beach extended to the boardwalk. Photo on right taken December 5, 2011. View to the south.



25-Year Coastal Changes at Site 130, North Carolina Ave., Atlantic City, Atlantic Co.

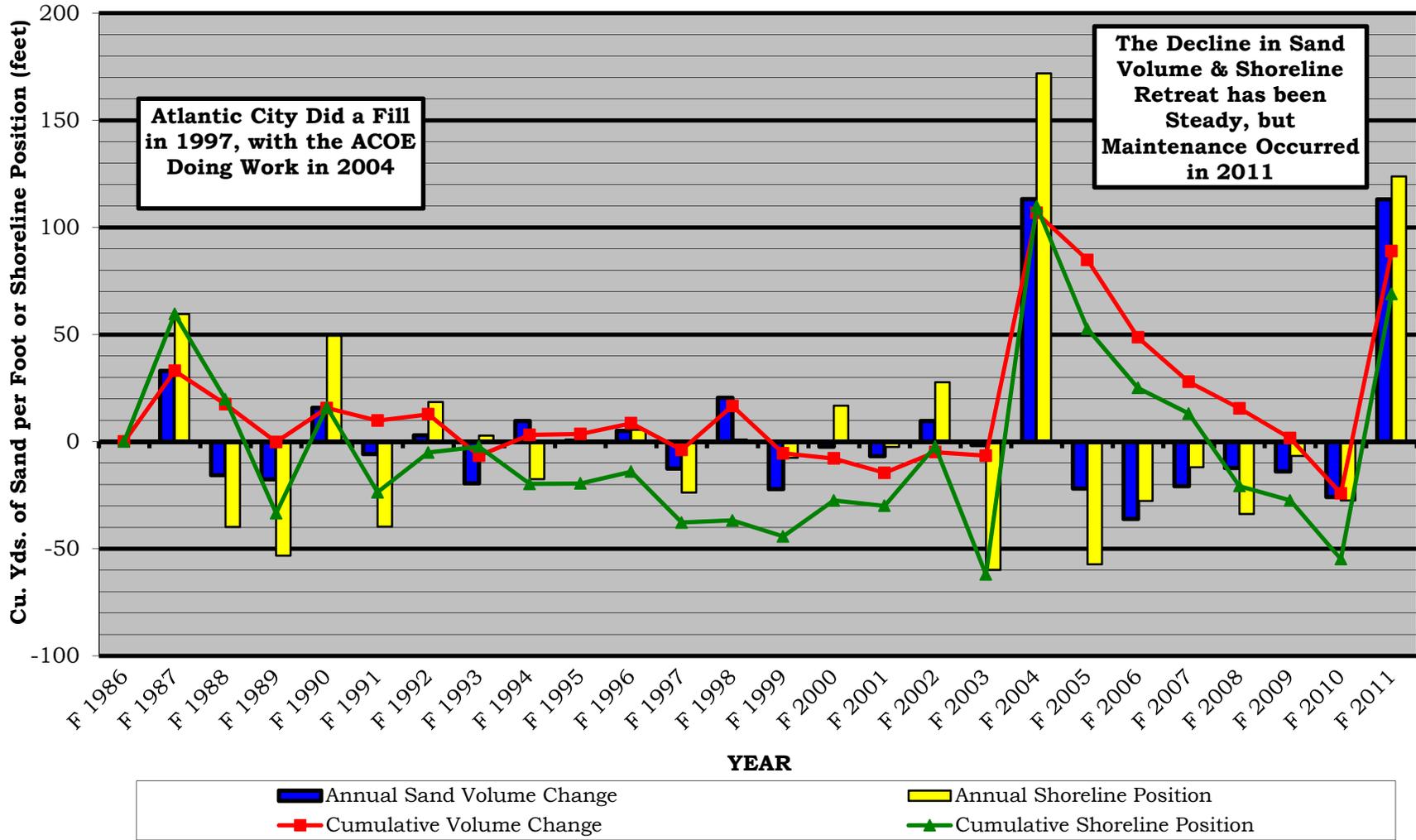


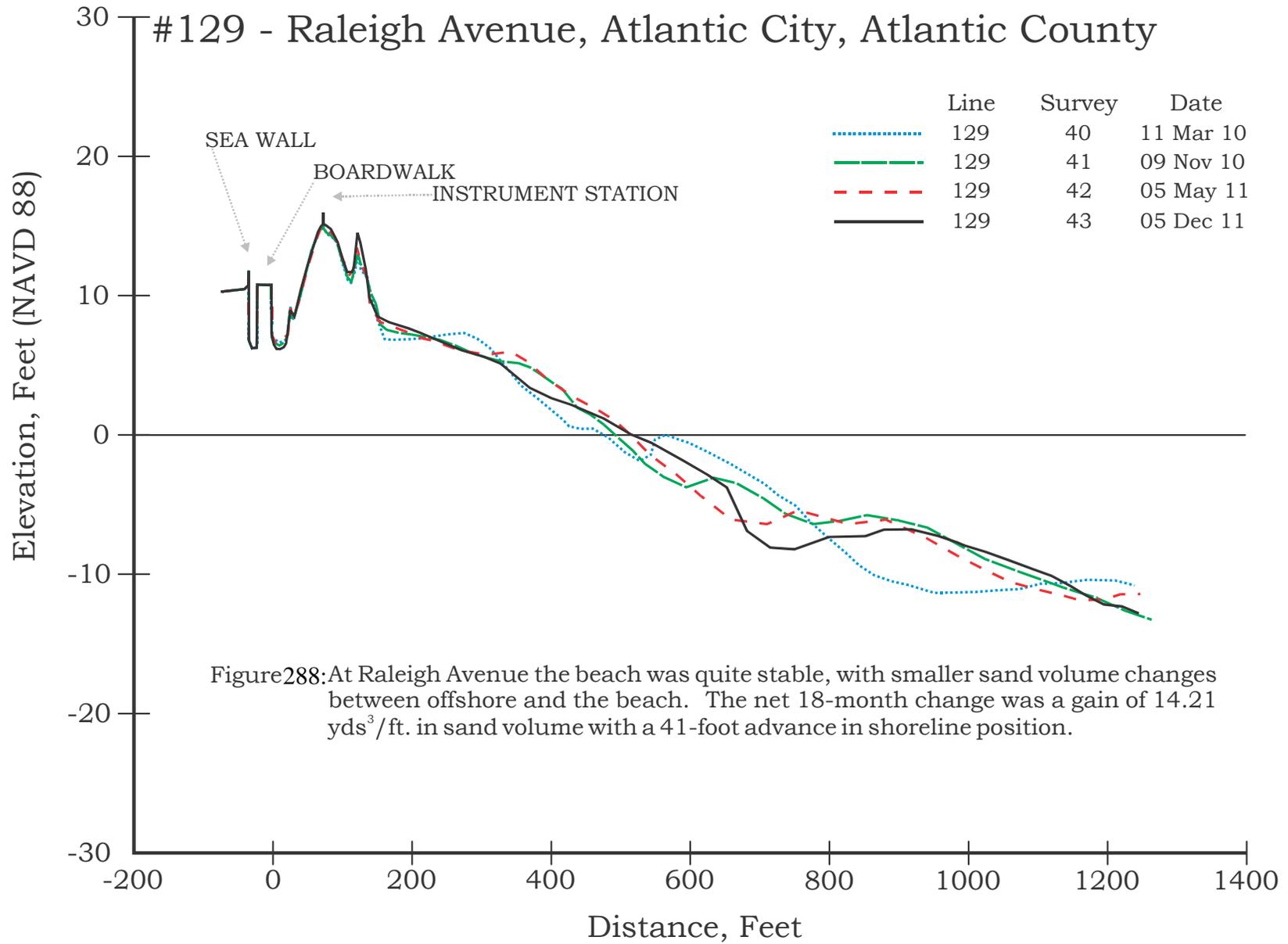
Figure 286. Comparison of the sites (130 & 129) at opposite ends of Atlantic City shows the difference in shoreline stability with regard to beach nourishment projects. The placement volume was nearly 120 yds³/ft., but loss rates removed all that material by 2009. The 2010 losses continued, leaving the site with less sand than it had on the beach in 1986. The ACOE conducted an emergency fill in 2011 and has commenced pumping inlet sand onto this section of the Atlantic City shoreline in 2012.

Site 129, Raleigh Ave., Atlantic City, NJ – December 5, 2011



Figure 287. View of the mid-berm beach looking north along the Ventnor City beach.

New Jersey Beach Profile Network



RALEIGH AVENUE, ATLANTIC CITY – SITE 129

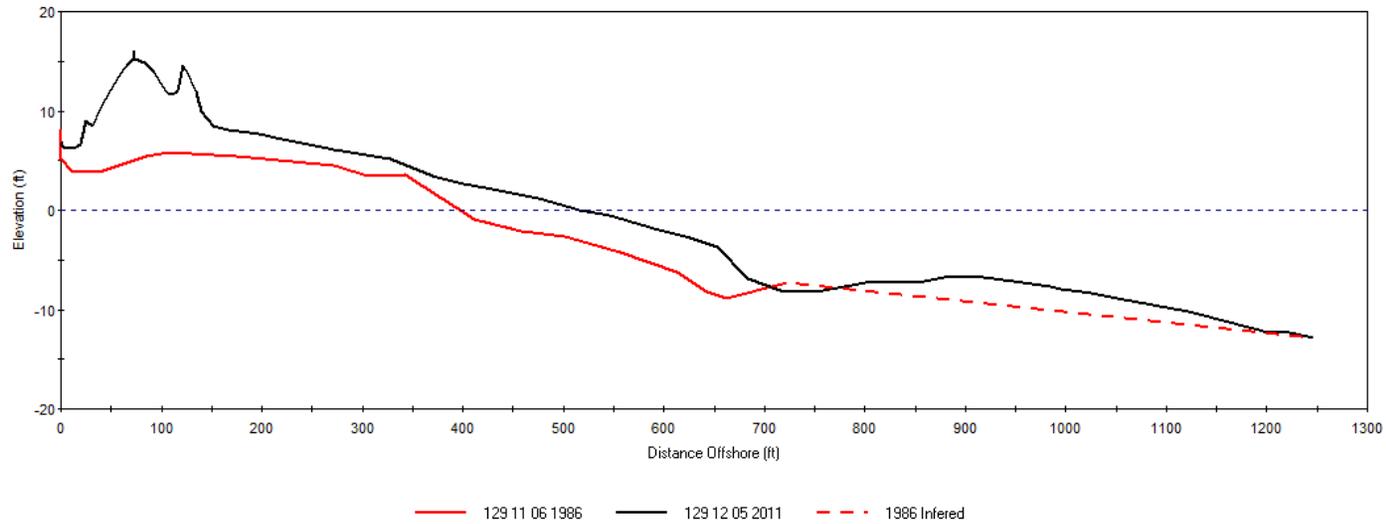


Figure 289. Between 1986 & 1991 a dune developed in an irregular pattern between the boardwalk and the mid-beach. The 1992 northeast storm impacted this site significantly and the site lost sand in the two years that followed. A new dune was created following the 1997 beach nourishment project and was relocated in 2003. Photo on left taken November 18, 1991. View to the east. Photo on right taken December 5, 2011. View to the northeast.



25-Year Coastal Changes at Site 129, Raleigh Ave., Atlantic City, Atlantic Co.

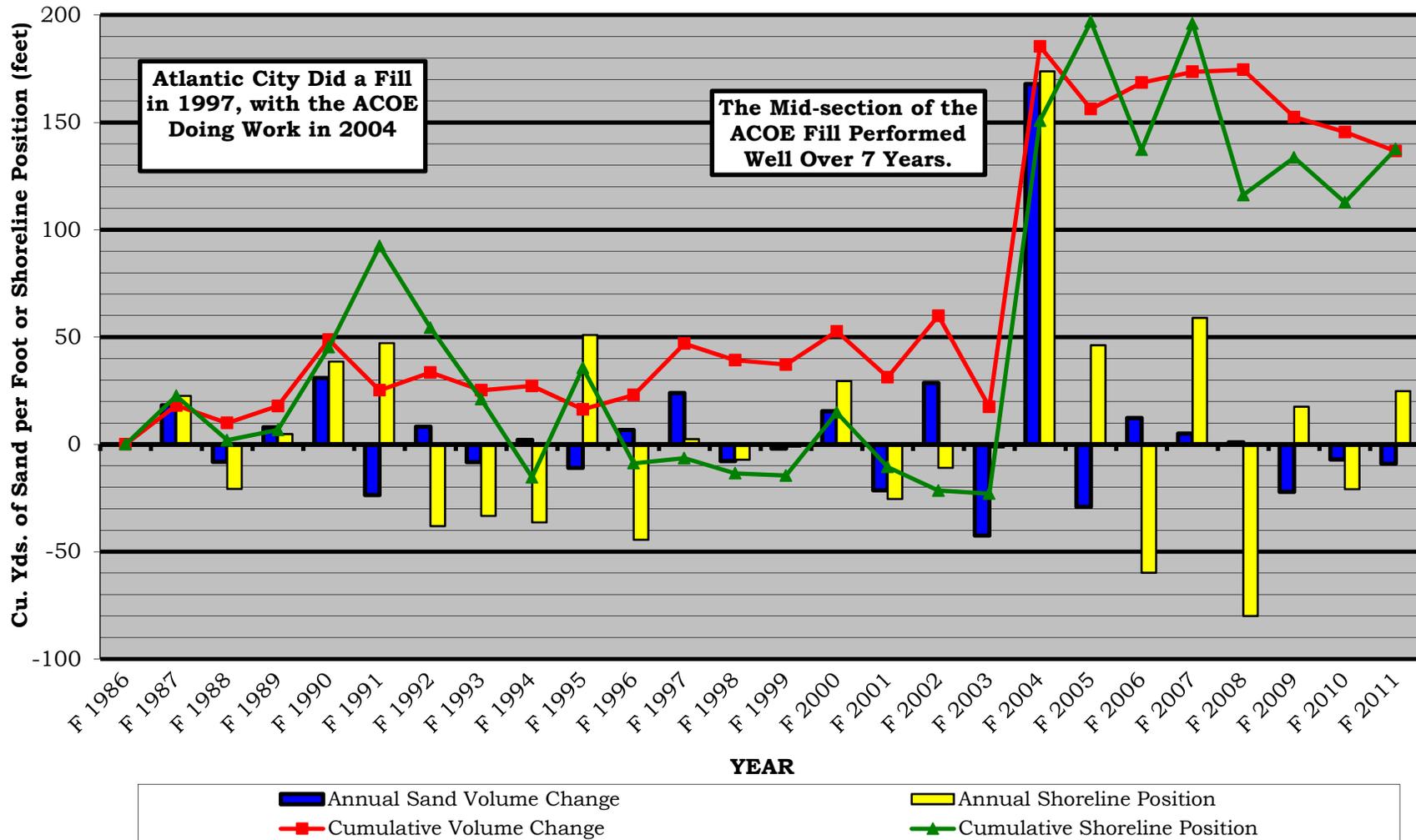


Figure 290. The Raleigh Avenue site is located near the Ventnor boundary with Atlantic City. Atlantic City pumped sand onto its shoreline in 1984 and again in 1997 prior to the 2003-2004 Federal project. The dramatic gain shows in the 2004 fall survey as a 167 yds³/ft. sand volume placement. Losses since have been minimal at this location near the project's center. The two communities at the southern end of the island elected not to participate in the project. Six years following the Federal work, this beach has maintained 78.5% of the deposited sand.

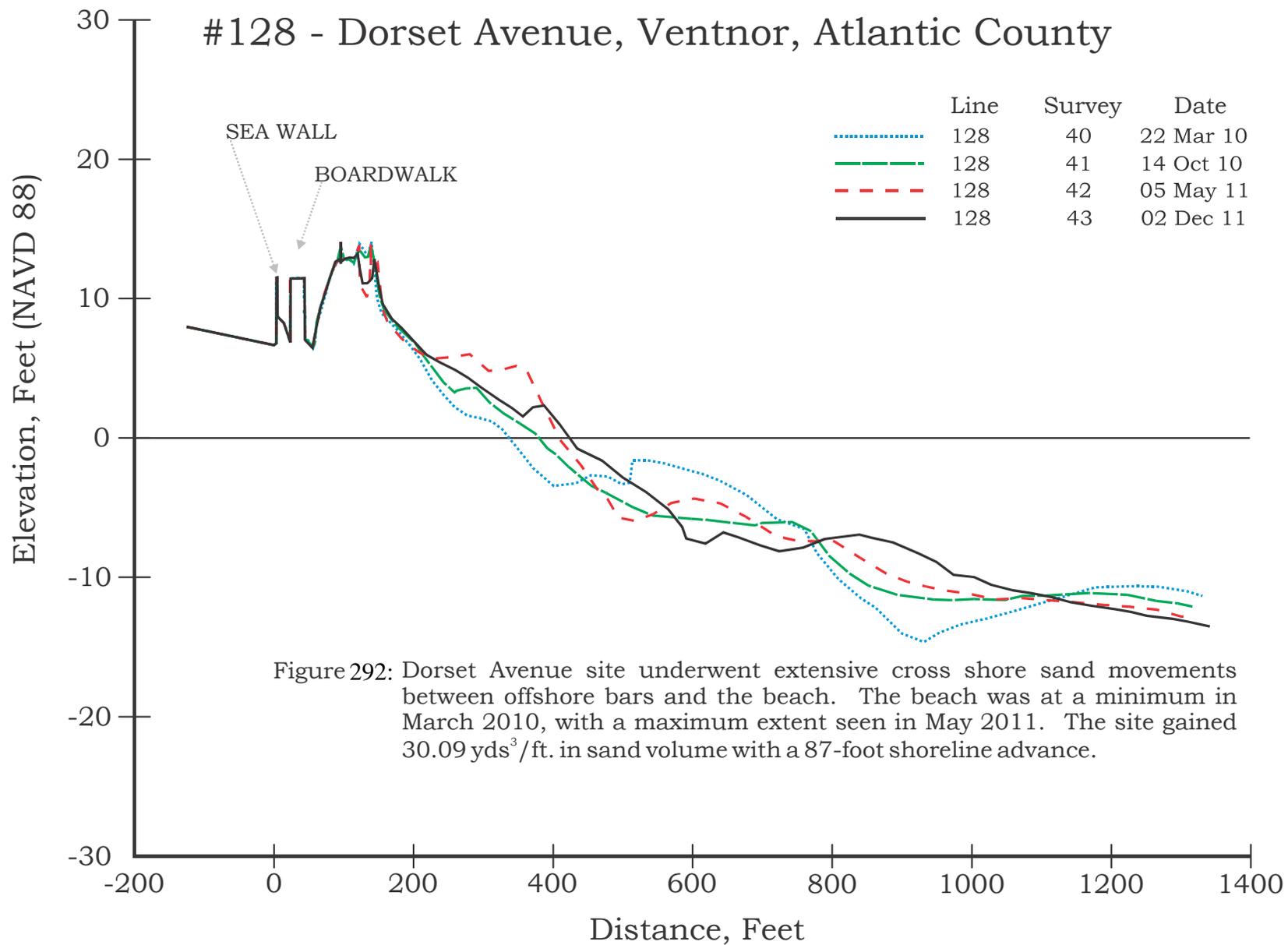
Site 128, Dorset Ave., Ventnor City, NJ December 5, 2011



Figure 291. Looking south from Dorset Avenue in Ventnor at the fishing pier. Here the Federal project has remained in decent condition.

New Jersey Beach Profile Network

#128 - Dorset Avenue, Ventnor, Atlantic County



DORSET AVENUE, VENTNOR – SITE 128

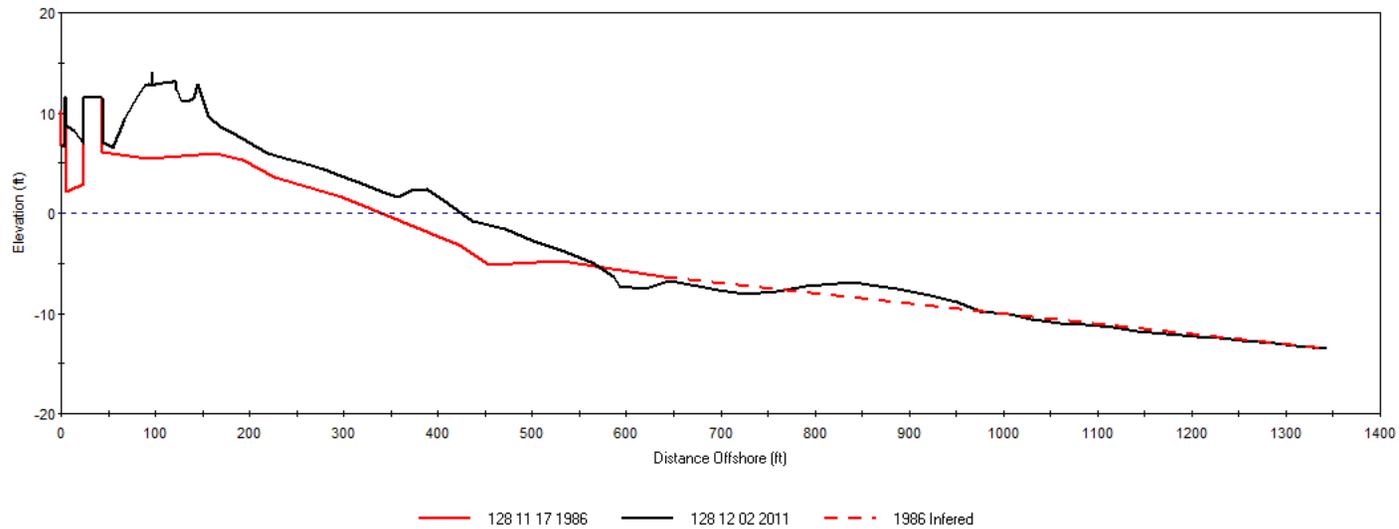


Figure 293. The dry beach extended to the boardwalk at the time of the early photo. The Federal beach nourishment project in 2004 created a wide berm and resulted in a system of dunes at this site.

Photo on left taken November 18, 1991. View to the east from the boardwalk.

Photo on right taken December 2, 2011. View to the north on the berm seaward of the dunes.



25-Year Coastal Changes at Site 128, Dorset Ave., Ventnor City, Atlantic Co.

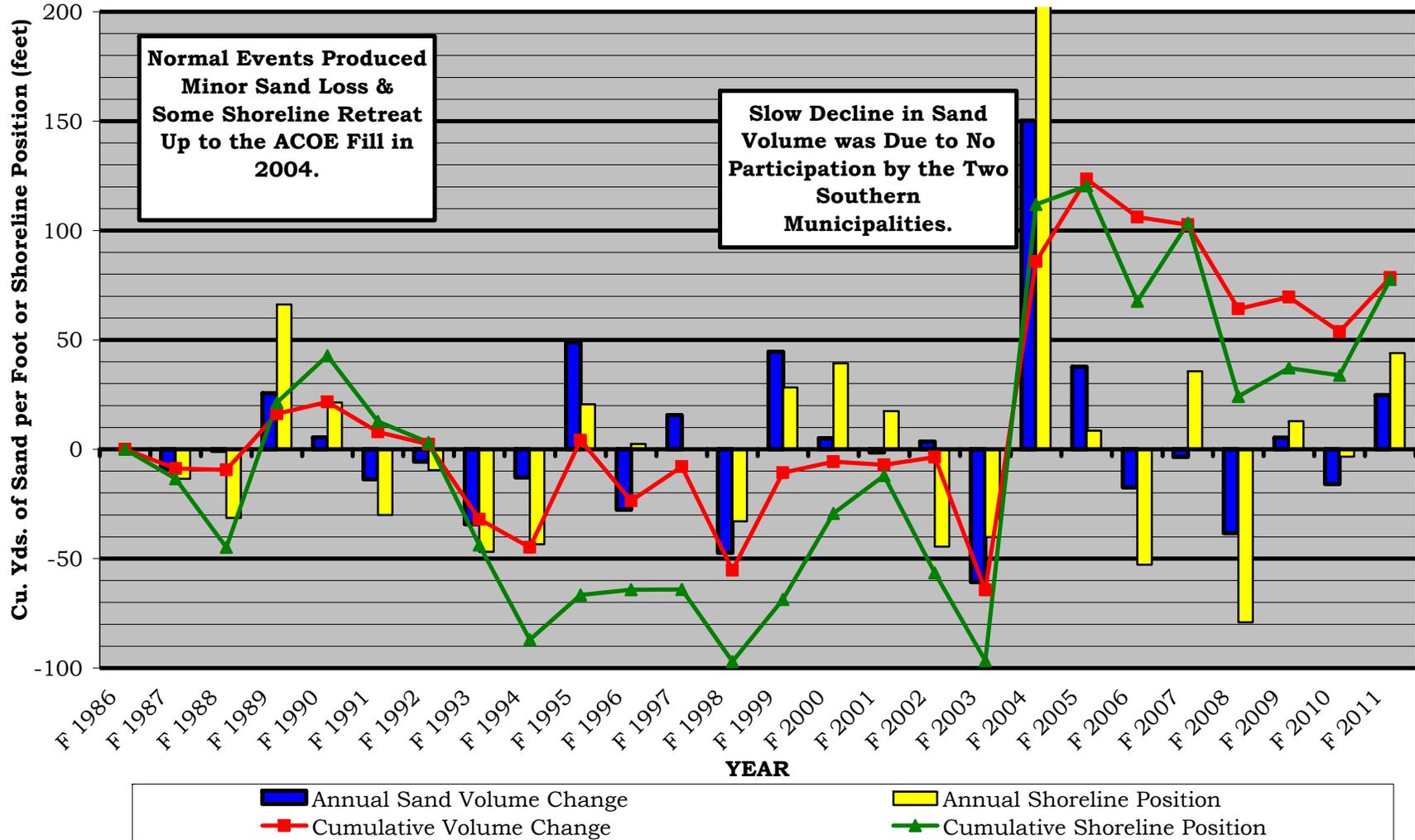


Figure 294. The 2004 Federal project included the City of Ventnor, demonstrated by the 150 yds³/ft. added in that year. Since then, the sand volume has declined substantially in three of seven years and recovered in 2011 as an 18-month storm interval ended. About half (52.3%) of the Federal project sand is still present at this site. Beach nourishment clearly reversed a negative trend that commenced in 1992.

Site 127, Benson Ave., Margate City, NJ – December 5, 2011



Figure 295. View to the south along the Margate City oceanfront.

New Jersey Beach Profile Network

#127 - Benson Avenue, Margate, Atlantic County

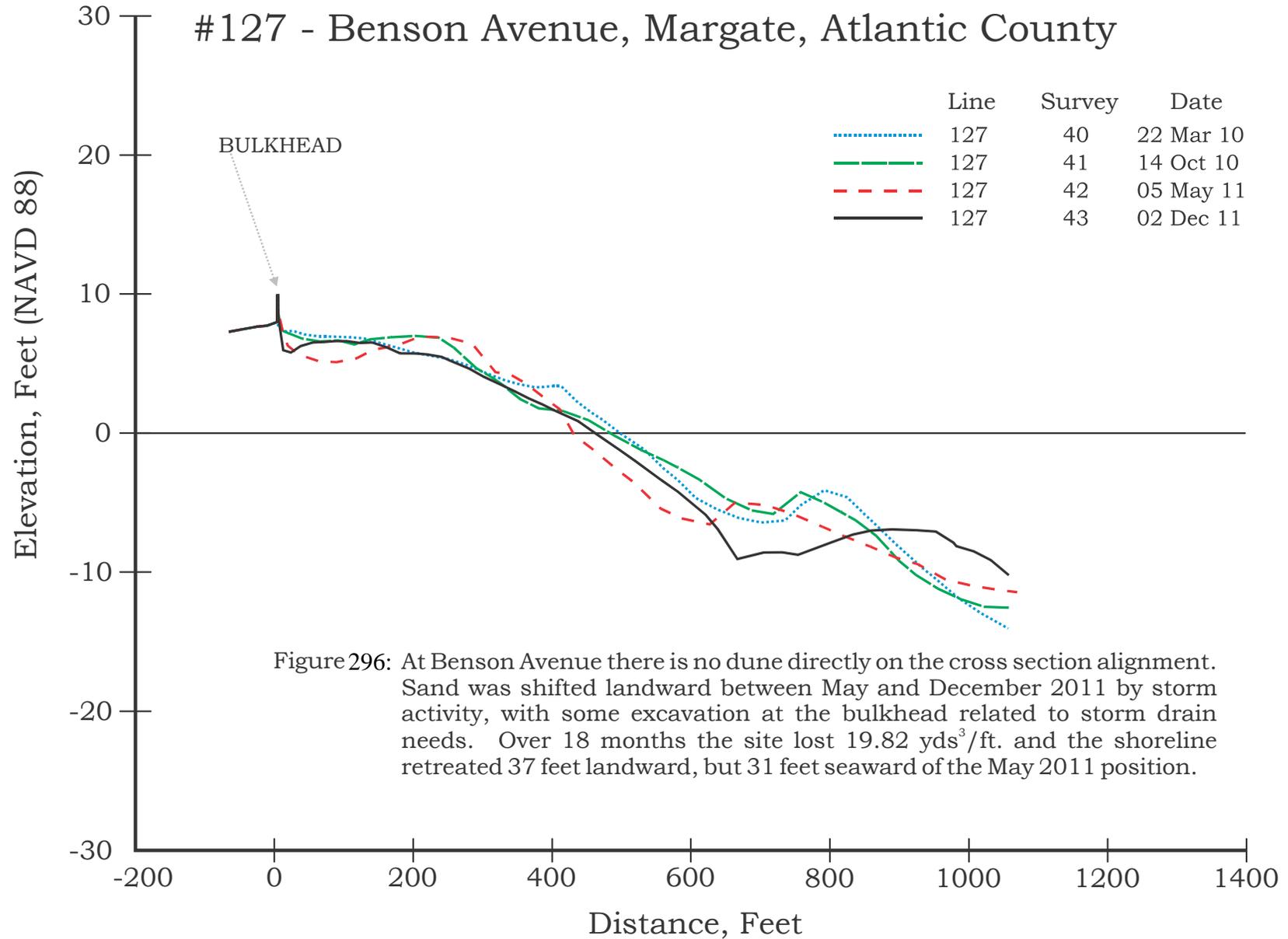


Figure 296: At Benson Avenue there is no dune directly on the cross section alignment. Sand was shifted landward between May and December 2011 by storm activity, with some excavation at the bulkhead related to storm drain needs. Over 18 months the site lost 19.82 yds³/ft. and the shoreline retreated 37 feet landward, but 31 feet seaward of the May 2011 position.

BENSON AVENUE, MARGATE – SITE 127

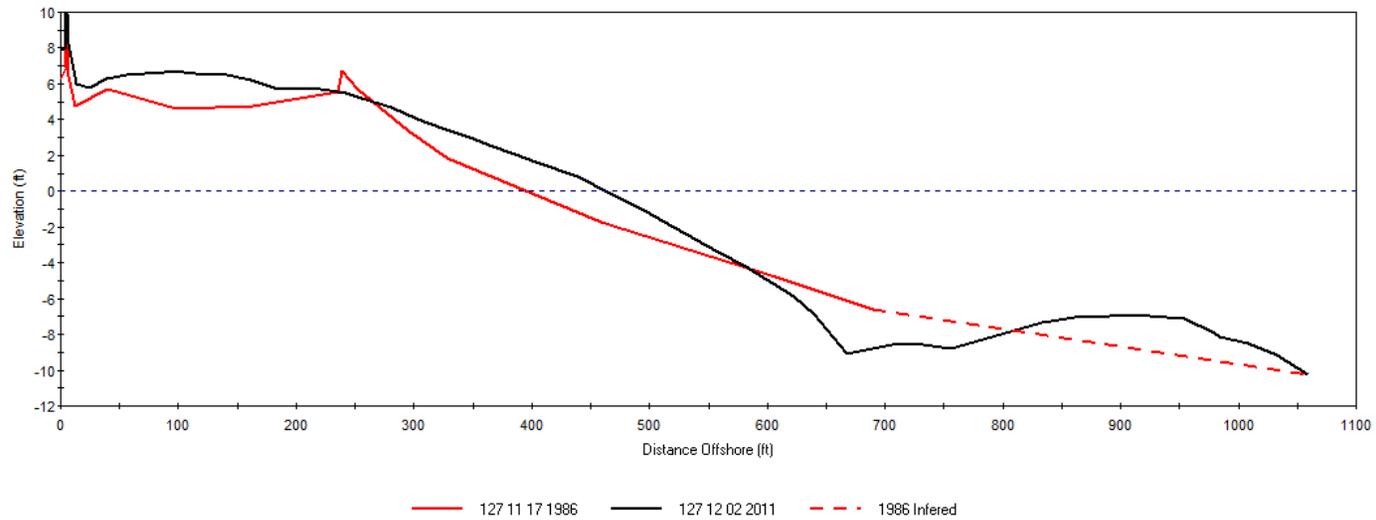


Figure 297. Though Margate City opted out of the beach nourishment project that was conducted in Atlantic City and Ventnor City, this beach has benefited from the work as sand has been transported south and deposited here. Photo on left taken November 18, 1991. View to the east. This photo shows the profile site after the Halloween storm with no dunes seaward of the bulkhead. Photo on right taken December 2, 2011. View to the north on the berm looking at an irregularly developed dune system.



25-Year Coastal Changes at Site 127, Benson Ave., Margate City, Atlantic Co.

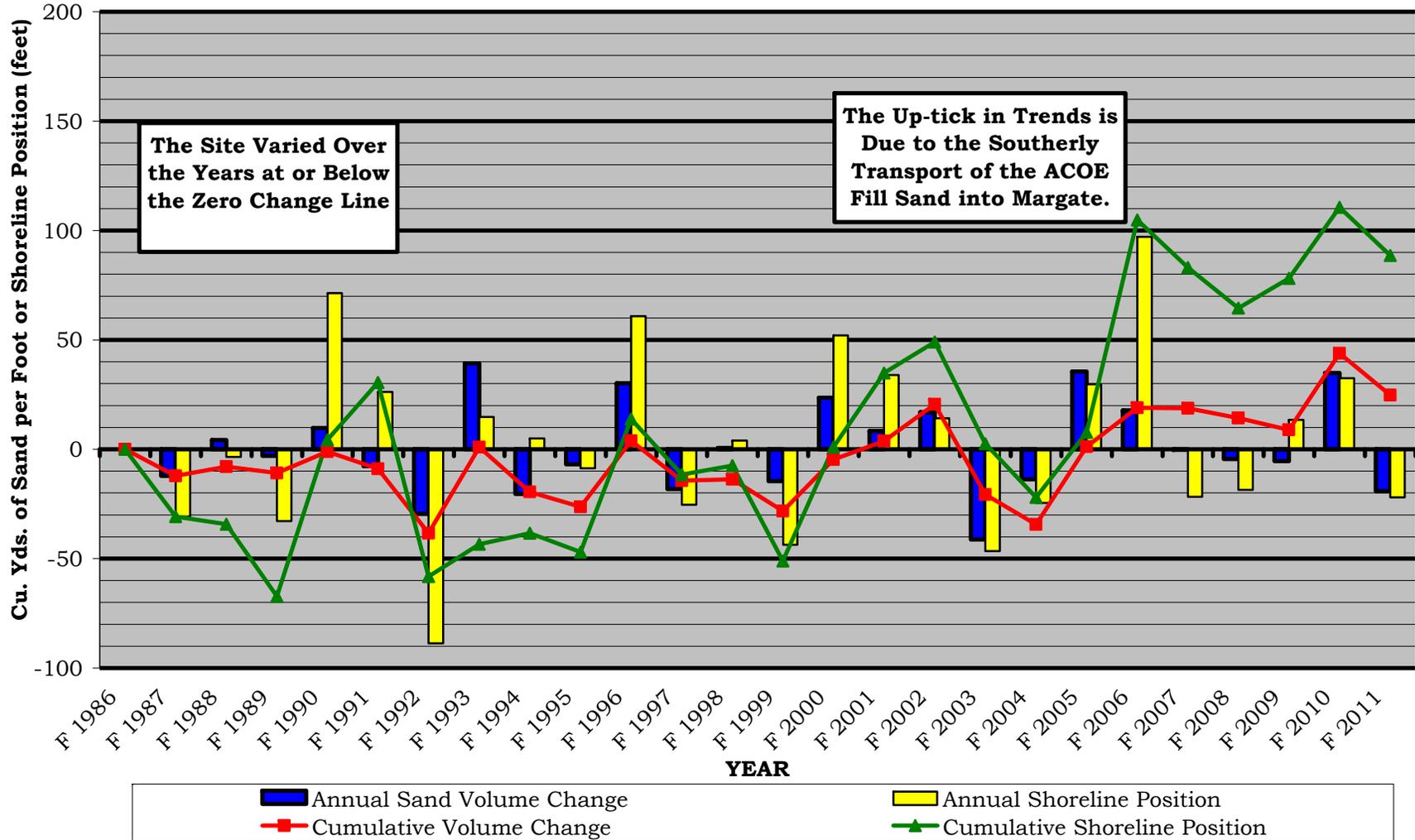


Figure 298. Benson Avenue shows the beneficial impact of sand nourishment in Atlantic City and Ventnor in spite of the reluctance of the southern two communities to participate in the Federal project. By 2006 modest amounts of sand had moved the red trend line into positive territory along with a 100-foot advance in the zero elevation shoreline position. Littoral transport supplied the material mostly derived from the southern end of the project in Ventnor.

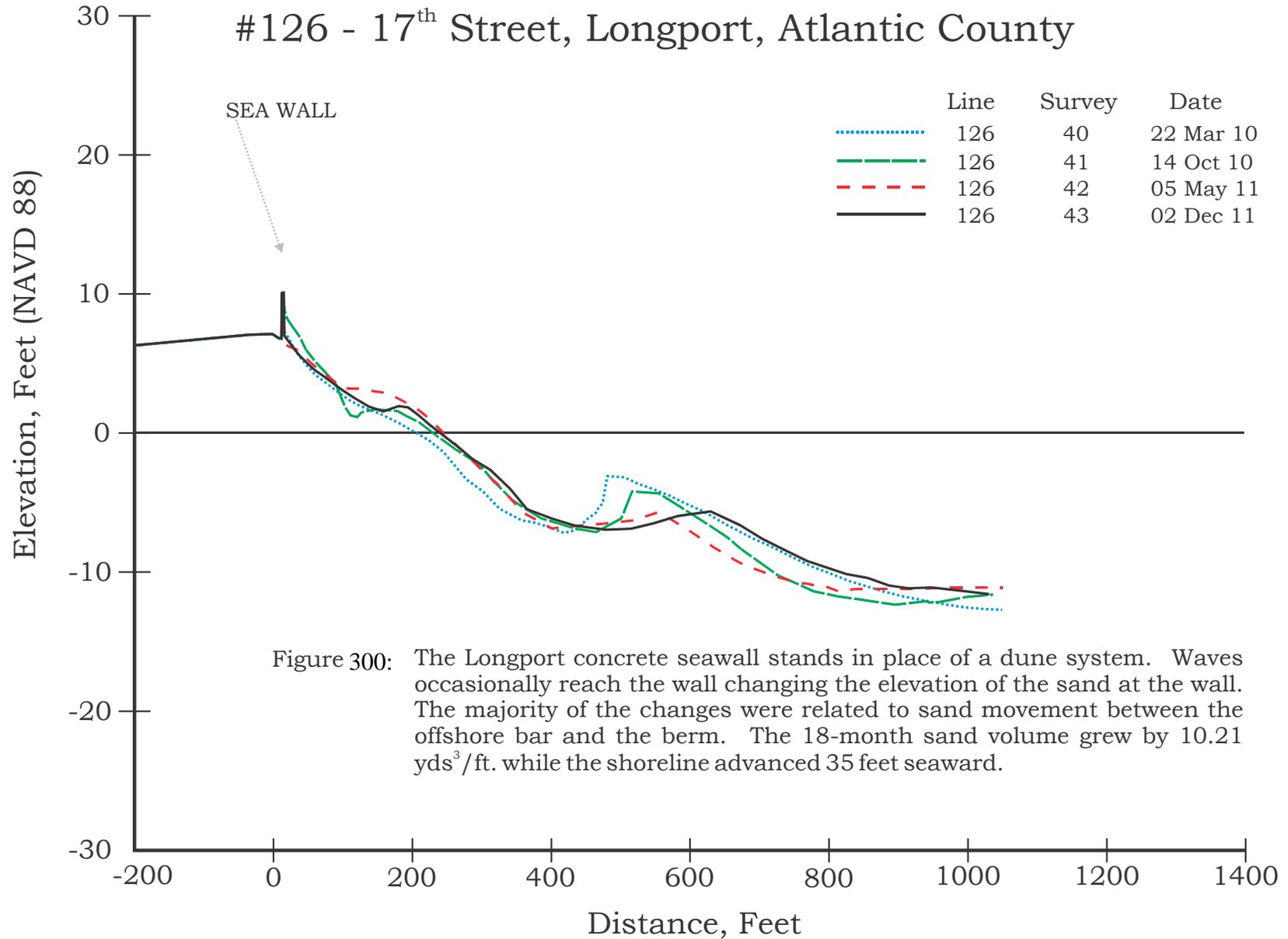
Site 126, 17th Street, Longport, NJ – December 5, 2011



Figure 299. View to the north taken from the top of the concrete seawall protecting the Borough of Longport.

New Jersey Beach Profile Network

#126 - 17th Street, Longport, Atlantic County



17th STREET, LONGPORT – SITE 126

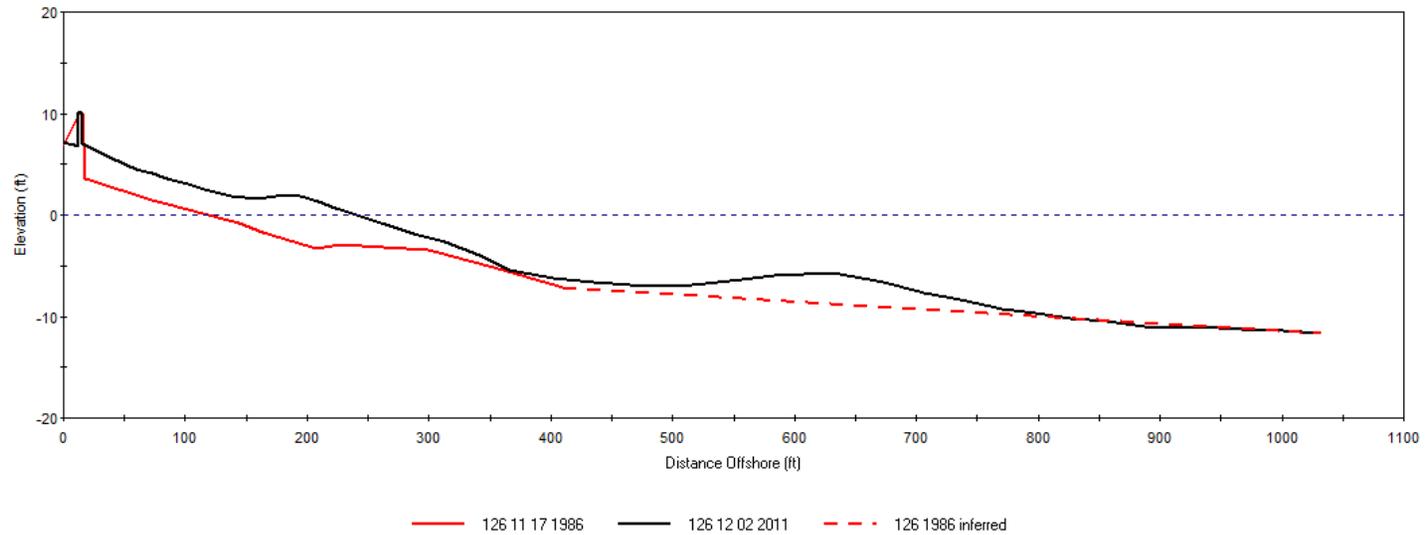


Figure 301. The Borough of Longport also did not participate in the Federal beach nourishment project, but did receive sand in 1990 due to a State effort. Photo on left taken November 18, 1991. View to the north. This photo shows the profile after the Halloween storm with no dunes seaward of the bulkhead. Photo on right taken December 2, 2011. View to the north. The beach is wider, but no dune system has room to develop.



25-Year Coastal Changes at Site 126, 17th Street, Longport, Atlantic Co.

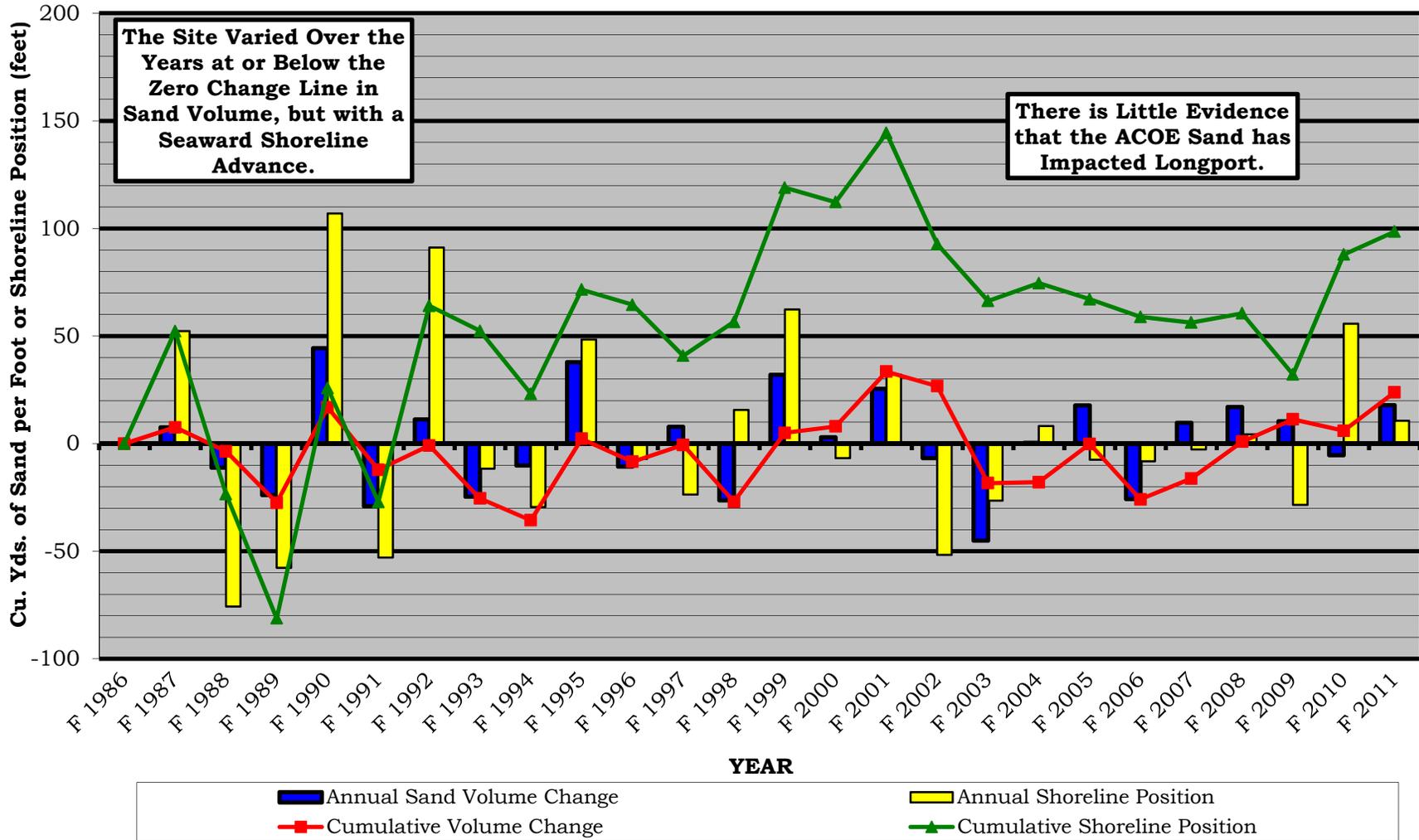


Figure 302. The situation at Longport shows the volatility of the southern end of a barrier beach with groins, a terminal jetty and a concrete seawall. The 1990 spike was a modest sand placement by the State of NJ; the 1993 loss was the December 1992 storm. The 2003 loss is unexplained, but the three years of modest gains from 2007 to 2009 may be the result of Federal project sand reaching the southern end of the island. This trend reversed in 2010 for one year leaving this site with 23.8 cubic yards of sand per foot of shoreline above 1986. This is far less dramatic an increase than seen on the Brigantine beaches, because the inlet jetty is short.