New Jersey Beach Profile Network

Ocean County

Manasquan Inlet to Little Egg Inlet

NJBPN Profile #'s 156 - 234

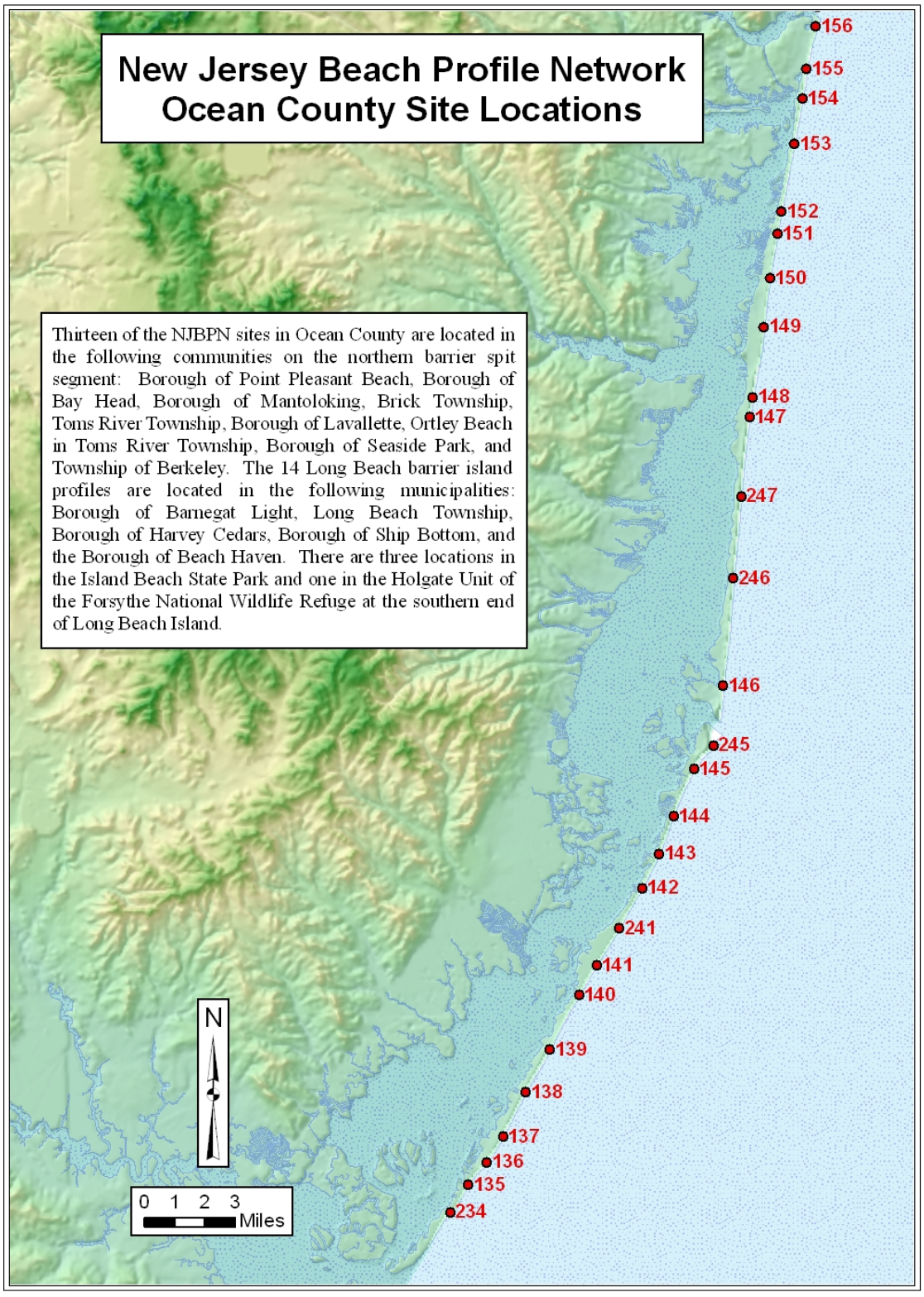

Figure 43. Locations of the 27 NJBPN profile stations in Ocean County, NJ.

The new sand pumped onto Surf City in 2007 was systematically searched for metal parts associated with military explosives hardware. The ACOE was forced to appropriate $15.7 million dollars to sweep the new beach for metal parts (Munitions and Explosives of Concern (MEC)) (fuses, detonators and other munitions hardware from WW I) then proceed to excavate the beach and sort the sand for buried ordinance. The lesson learned was that from henceforth both the dredge and the discharge pipe on the beach will be equipped with a screen or basket to catch any such material exceeding a 2" diameter. Unfortunately that size includes a host of shells that force basket emptying on the beach fairly frequently. No further sand pumping activity took place on Long Beach Island between the spring of 2008 and the fall of 2009. However, work commenced in Harvey Cedars moving north from the point where the 2007 project left off in the spring of 2010. This completes another section of the Long Beach Island project, but the real estate issues still plague more rapid progress elsewhere on Long Beach Island. Private ownership of the beach extending to the high water line produced the necessity for each lot owner to provide the State with an easement granting access and for the placement of sand on the property in "perpetuity". The word "in perpetuity" did not appeal to many owners who were further confused by persistent rumors that exaggerated the potential impacts on their property rights. The Borough of Harvey Cedars proceeded to outright condemnation of the access to the beach/dune portion of the affected properties and is currently very worried that the NJ courts may award large sums of money to each oceanfront owner whose easement was condemned for this project despite the overwhelming benefits to the community at large.

Northern Ocean County experienced few changes until the fall of 2009 commenced with increased storm frequency and higher levels of intensity of individual events in early September. The first storms expended the energy on the berm that accumulated during the preceding summer. The mid-October storm reached the toe of the dunes in many places where the beach was initially narrow. The game changer was the November 11 – 15, 2009 storm, which received a Presidential Disaster Declaration allowing the Federal Emergency Management Agency (FEMA) to step in to offer assistance. Since all Ocean County communities either had never conducted major local/State funded beach nourishment work, or in the case of Ship Bottom, which had been the recipient of a federally-funded project, which prohibited FEMA from spending its disaster funds on an US Army Corps federally-funded beach project, no significant beach repair assistance was available. FEMA covered repairs to public dune cross over walkways, debris removal from the beach and public works time or overtime to conduct emergency services or overtime to clean up.

Storm damage was limited to dune erosion to the point of the crest elevation, but no breaching occurred. The sand was moved seaward, generating large offshore bars which will migrate back to land at some point this year. The major impact was renewed fear on the part of many property owners as the waves were just seaward of their homes or in some cases washing directly under them at high tide. Restoration efforts commenced immediately with the placement of hundreds of truck loads of quarry sand to provide some measure of storm protection.

The storm season continued with two additional FEMA declarations covering a snow storm in February and another multi-day northeaster in mid-March. Once again the beaches in Ocean County were not eligible for "Category G" funding for public recreational and park areas. The decline in Federal funding for beach nourishment combined with this increased storm frequency and intensity is cause for concern for the immediate future. Ocean County continues to have many of the more vulnerable areas within the state because no concerted effort has materialized to generate an "issue-free" project along the county shoreline.

Northern Ocean County's shoreline starts at the Manasquan Inlet where the coastal bluff continues south into the Borough of Bay Head. From there south a long spit of sand extends to Barnegat Inlet. This segment of the shoreline was also subject to a US Army Corps of Engineers feasibility study of the value of conducting a

federally-funded shore protection project completed in 2003. The paragraphs below detail the status of the project as of 2010 expressed in the website of the US ACE Philadelphia District.

DESCRIPTION: *The study investigated flood and coastal storm damage effects with a view toward reducing impacts from coastal erosion and storms. The recommended plan calls for construction of a beachfill with a berm and dune along the study area oceanfront utilizing sand from an offshore borrow source and periodic nourishment for a period of 50 years. Initial fill requirements would be about 10 million cubic yards, with periodic nourishment at 4-year intervals with about 1 million cubic yards placed.*
STATUS*: The Chief of Engineers Report was completed in December 2003. This project was authorized in the 2007 Water Resources Development Act. No funding was received in FY 2010 to initiate initial construction. The initiation of initial construction is dependent on the establishment of an adequate funding stream. The next steps toward initial construction once adequate funding is received is to initiate and complete the Limited Reevaluation Report; develop, approve and execute the Project Partnership Agreement; acquire the necessary real estate; complete plans and specifications; and advertise and award the construction contract.*

http://www.nap.usace.army.mil/cenap-dp/projects/factsheets/NJ/4CG_NJShoreProtection_ManasquantoBarnegat.pdf

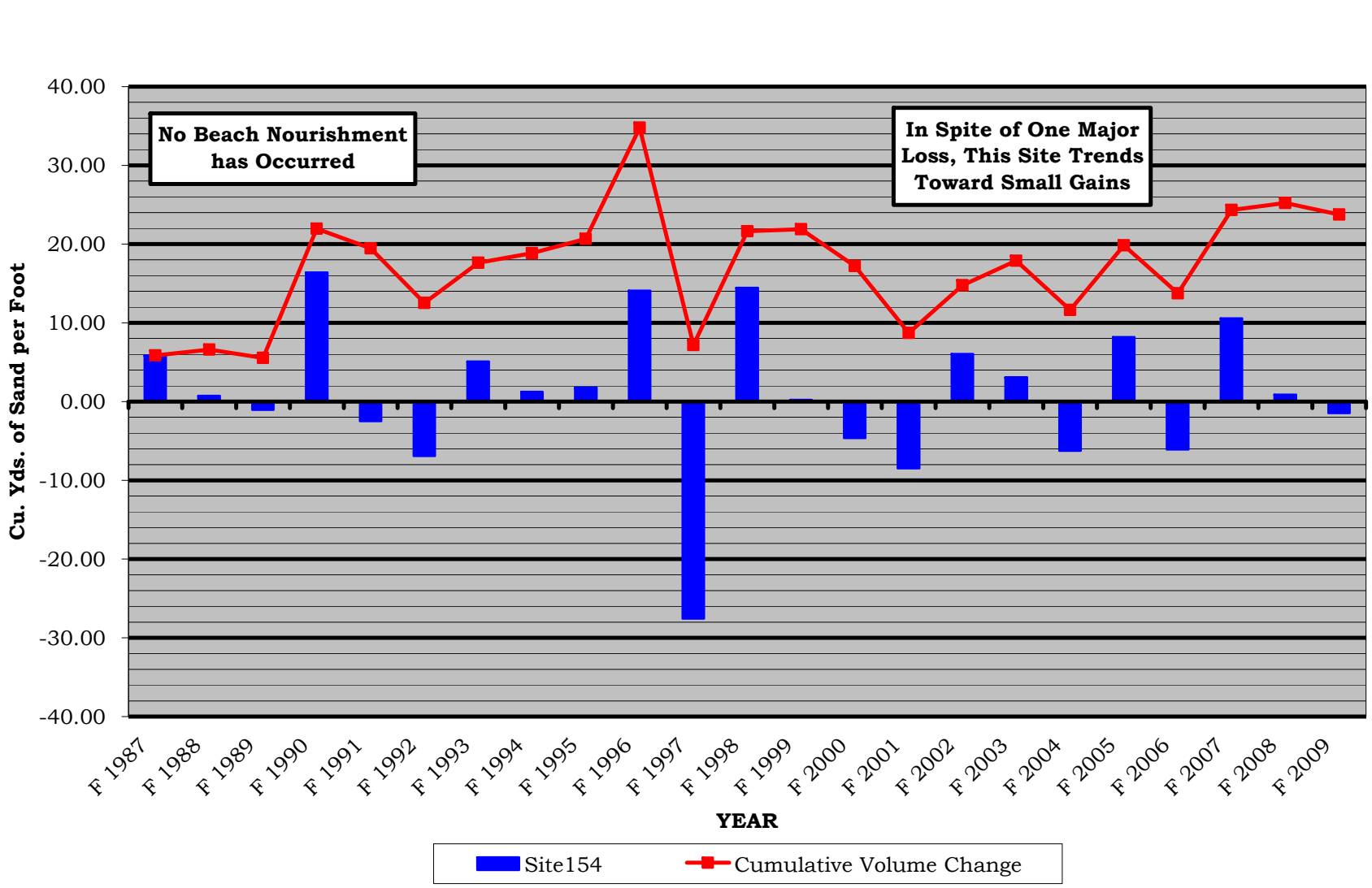

Figure 44. The Borough of Mantoloking has labored tirelessly toward gaining a Federally-sponsored shore protection project for Northern Ocean County, but funding difficulties, real estate issues, and organizing uniform northern Ocean County enthusiasm for the project produced limited progress. The site, centrally located in the Borough, varied in sand volume without much of a pattern in spite of two significant storms in 1991 and late 1992 (both negative above). The 1997 loss is unexplained by storm effects. In 23 years this site is about 25 cubic yards of sand per foot of shoreline ahead of the 1986 situation.

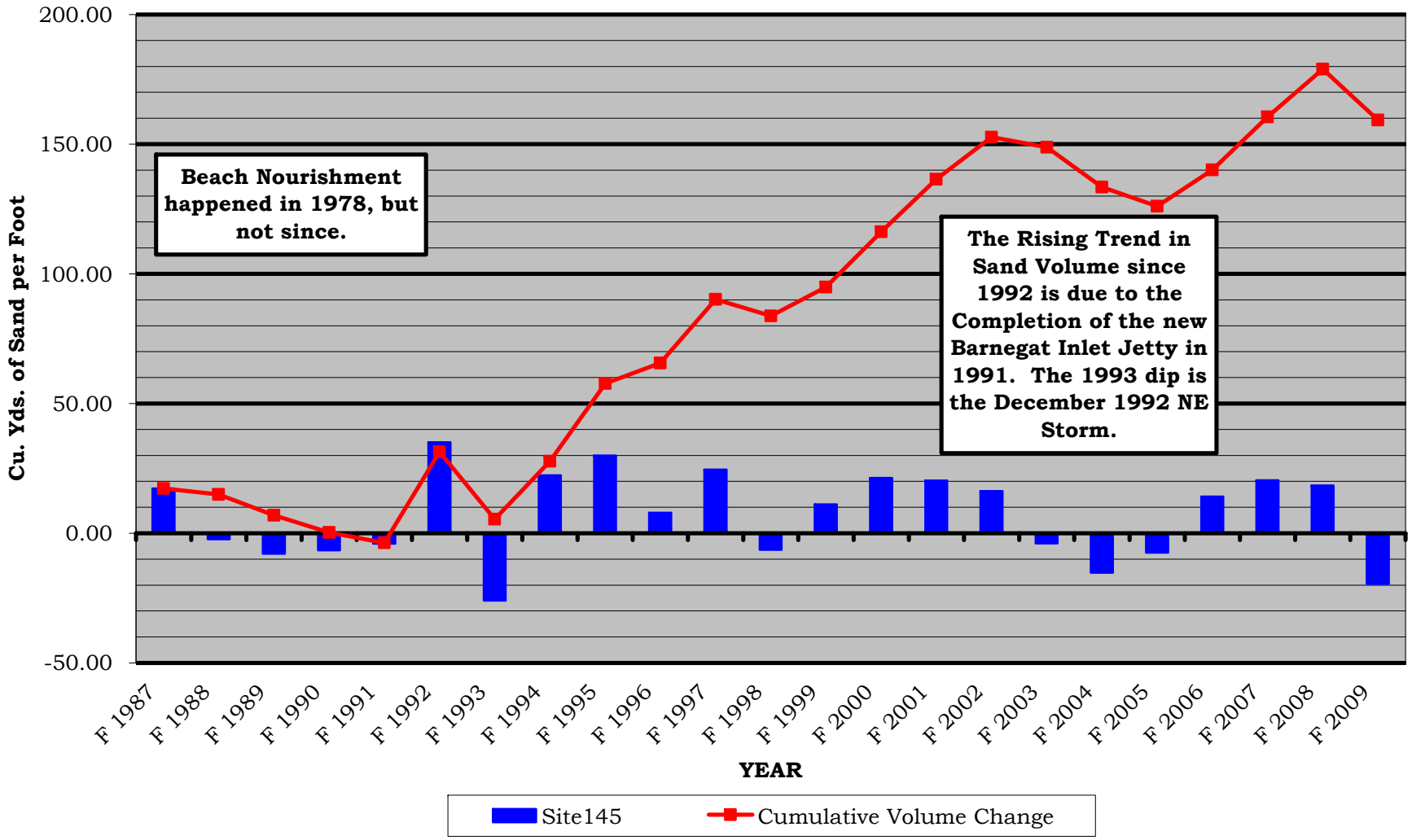

Figure 45. The new jetty at Barnegat Inlet produced a huge advance in the entire Borough shoreline since 1992. The amount declines slowly from 2,400 feet of advance at the jetty to about 60 feet at 26th Street. That advance added 160 cy/ft to the site's sand volume. The two locations either side of Barnegat Inlet had the highest values in shoreline advances in the county for 2009 (60 and 62 feet).

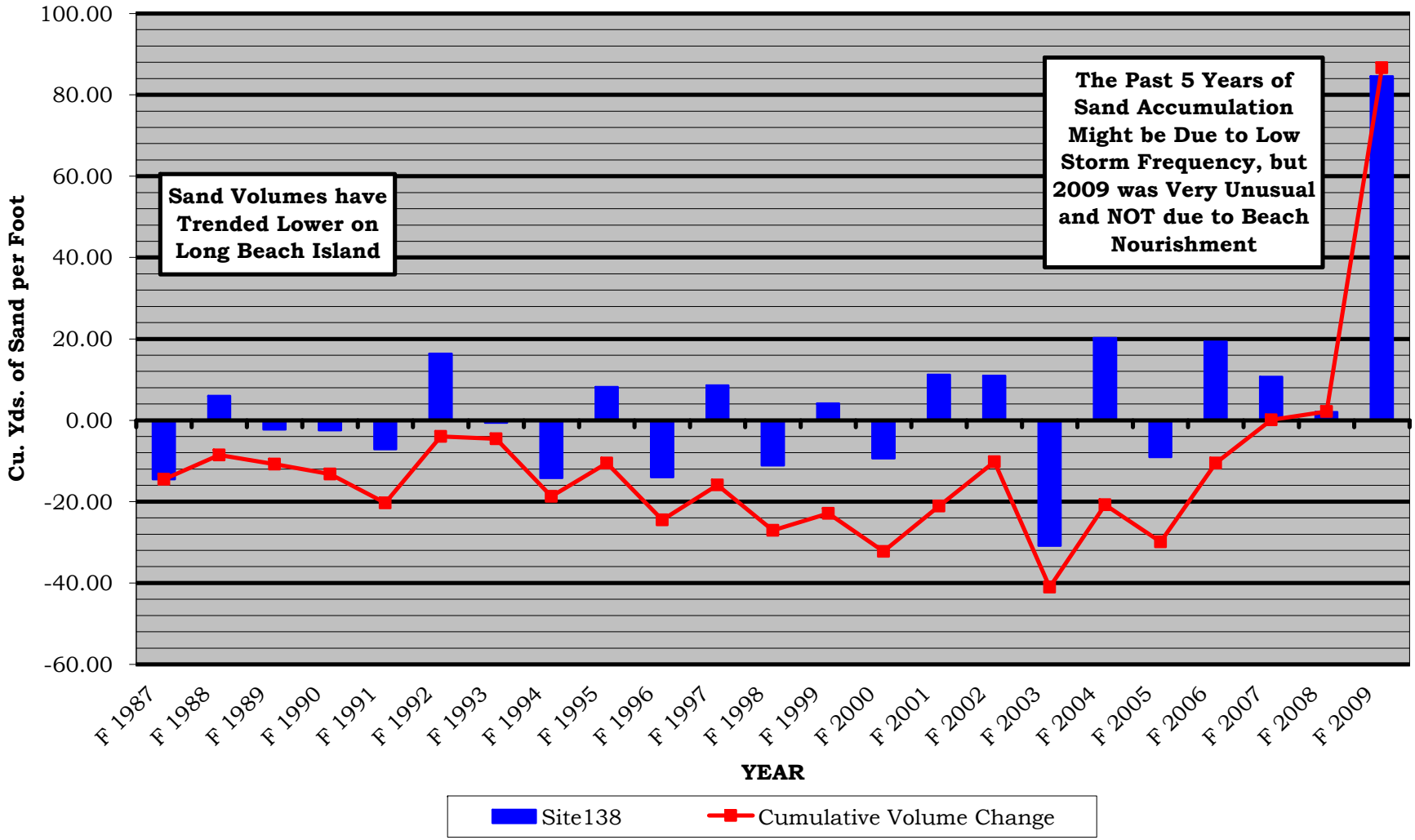

Figure 46. The Old Whaling Road site was selected to illustrate the degree of instability present along the Long Beach Island shoreline. The 1991 completion of the realignment of the Barnegat Inlet south jetty produced massive accumulation at the two northern sites surveyed (145 and 245). Here at the southern end of the island, the rate of loss was low, but easily magnified by storm activity. The 2003 minimum unraveled two years of modest gains that recovered by 2008. 2009's gain is not easily explained, but is certainly welcome.

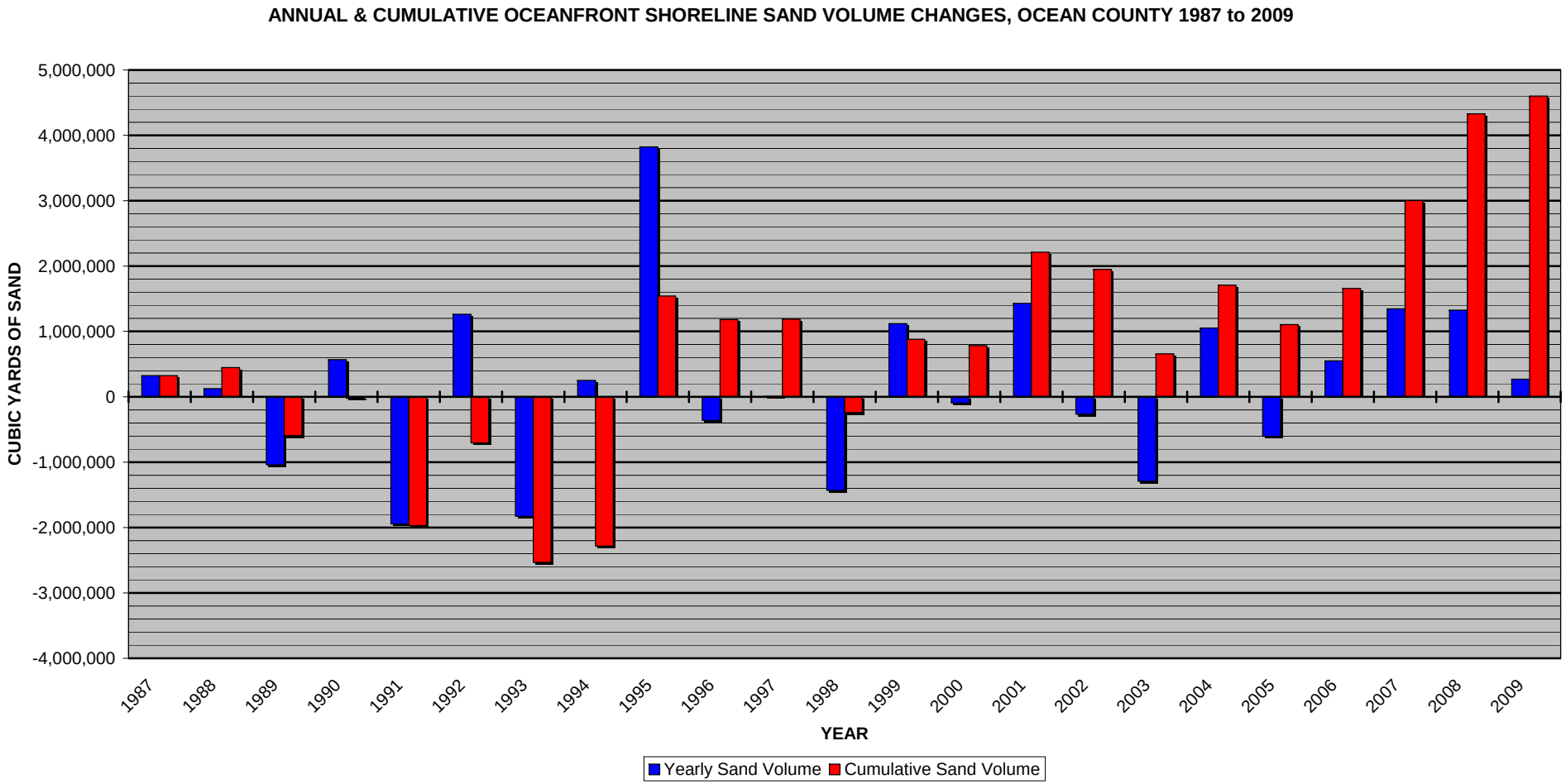

Figure 47. The 1995 Harvey Cedars beach fill project reversed the negative trend in Ocean County. Recently the trend has been upward driven in part by the impact of the ACOE Surf City project in 2007, continuing in 2010. This was the first Federal project in Ocean County. The net improvement has been 4.6 million cubic yards of sand averaged across the county shoreline. Although only a small fraction of the 14.3 million cy added to the Monmouth County coast, the prospect of an average loss in sand has diminished in the past 5 years in Ocean County.

The summary of Ocean County's shoreline would not be complete without mention of issues stemming from the Long Beach Island fill project. On Long Beach Island the arduous task of sieving the entire 2007 deposit of sand on Surf City and Ship Bottom was recently finished. In early 2010 the project continued with placement of sand on Harvey Cedars beach adding another mile or so of shore to the proposed $71 million beach restoration plan for the island. This time both the dredge and the discharge pipeline were fitted with catch baskets designed to intercept all objects greater than 2 inches in size.

Real estate issues and continuing appropriation shortfalls to the Army Corps remain major obstacles to finishing this project any time soon. While northern Ocean County has what is probably the most stable segment of the NJ coast, there are narrow beaches and low dunes that may not withstand a 10-year storm event. A 100-foot wider beach and a 20-foot dune system would go a long way in preventing substantial storm damages. The same issue applies to much of Long Beach Island in spite of work completed in Harvey Cedars and Ship Bottom plus a naturally wider beach in Barnegat Light Borough.

WATER STREET, POINT PLEASANT BEACH - SITE 156

Photo taken October 15, 2008. View to the south.

The Manasquan Inlet is located a short distance to the north of this site, therefore often reflects dominant littoral transport toward or away from the inlet jetties. This view to the south shows the wide beach with no dune that lies in front of the Point Pleasant Beach boardwalk.

Photo taken September 23, 2009. View to the south.

Comparing the profiles over the eleven month time period, the profile location gained volume (4.12 cu yd/ft) and the shoreline moved landward (-15.09 ft) as much of the sand was contained on the berm.

New Jersey Beach Profile Network

#156 - Water Street, Point Pleasant, Ocean County

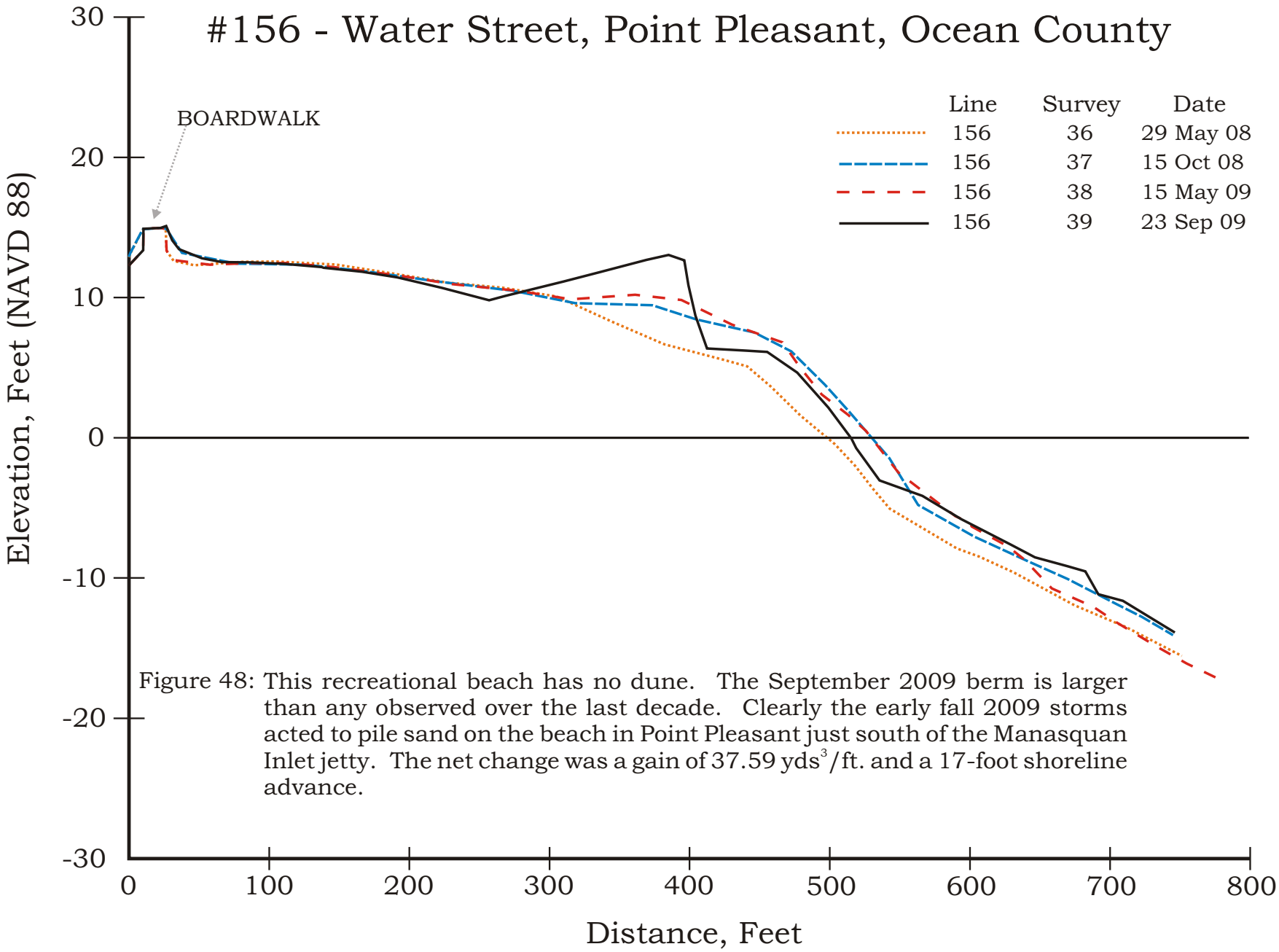

Figure 48: This recreational beach has no dune. The September 2009 berm is larger than any observed over the last decade. Clearly the early fall 2009 storms acted to pile sand on the beach in Point Pleasant just south of the Manasquan Inlet jetty. The net change was a gain of 37.59 yds^3/ft. and a 17-foot shoreline advance.

MARYLAND AVENUE, POINT PLEASANT BEACH - SITE 155

Photo taken October 15th 2008. View to the south.

This location has a substantial dune which has gained sand despite a relatively narrow beach.

Photo taken September 23, 2009. View to the south.

This cyclic nature of the groin offsets is most common in the Northern Ocean County coast because there is a near equal incidence of littoral sand transport in either direction. Northeast storms move sand south, followed by the southeast winds acting to move sand back to the north. The groin offset simply shows which direction is dominant at any one time. Comparing the profiles over the eleven month time period, the profile location gained volume (17.89 cu yd/ft) and the shoreline moved seaward (14.12 ft).

New Jersey Beach Profile Network

#155 -Maryland Avenue, Point Pleasant, Ocean County

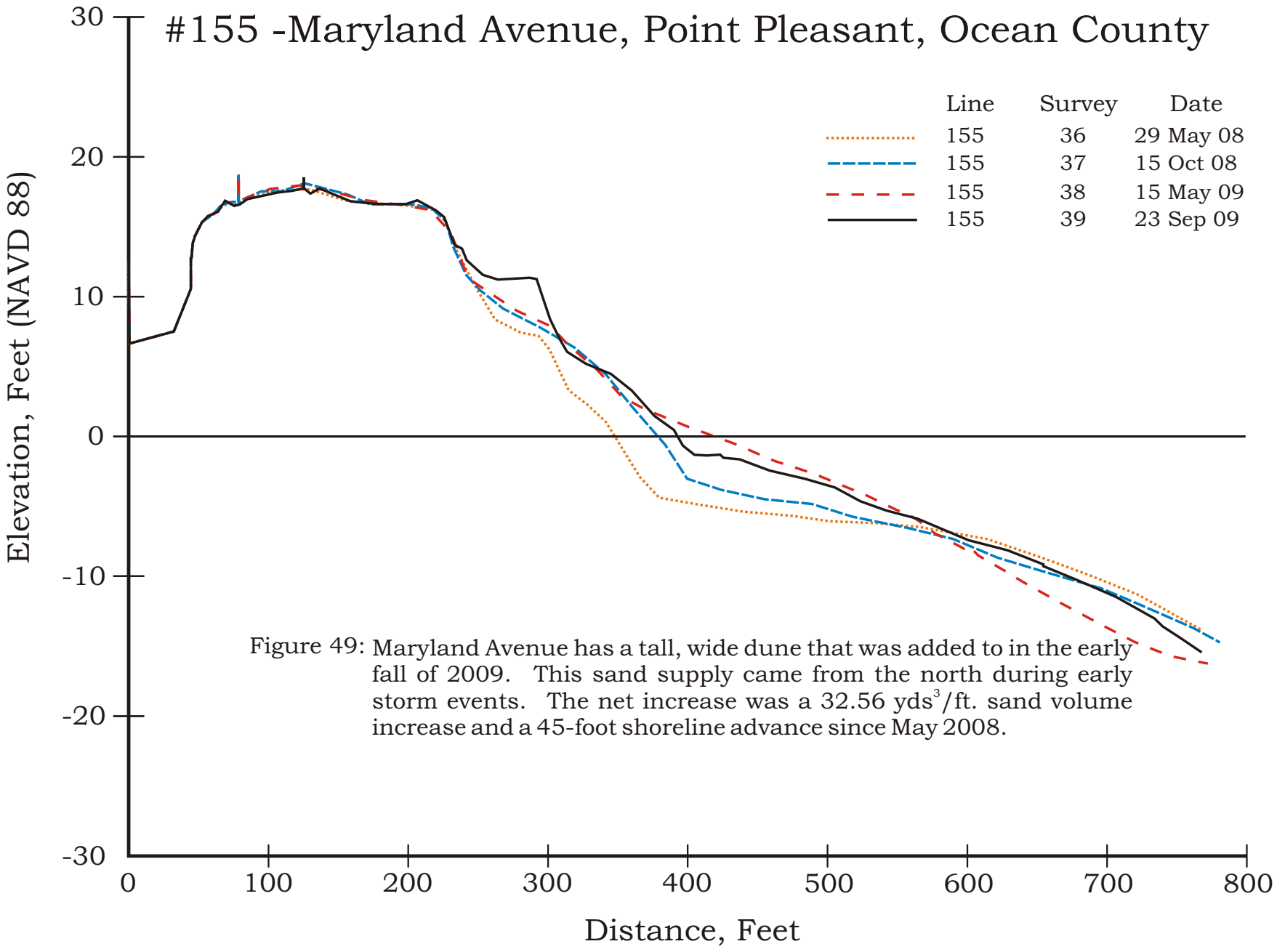

Figure 49: Maryland Avenue has a tall, wide dune that was added to in the early fall of 2009. This sand supply came from the north during early storm events. The net increase was a 32.56 yds^3/ft. sand volume increase and a 45-foot shoreline advance since May 2008.

JOHNSON AVENUE, BAY HEAD - SITE 154

Photo taken October 14, 2008. View to the south.

The Bay Head beach contains a rock revetment below the dune crest that has not been exposed since December 1992.

Photo taken September 23, 2009. View to the south.

Comparing the profiles over the eleven month time period, the profile location lost volume (-1.49 cu yd/ft) and the shoreline moved landward (-17.23 ft).

New Jersey Beach Profile Network

#154 - Johnson Avenue, Bay Head, Ocean County

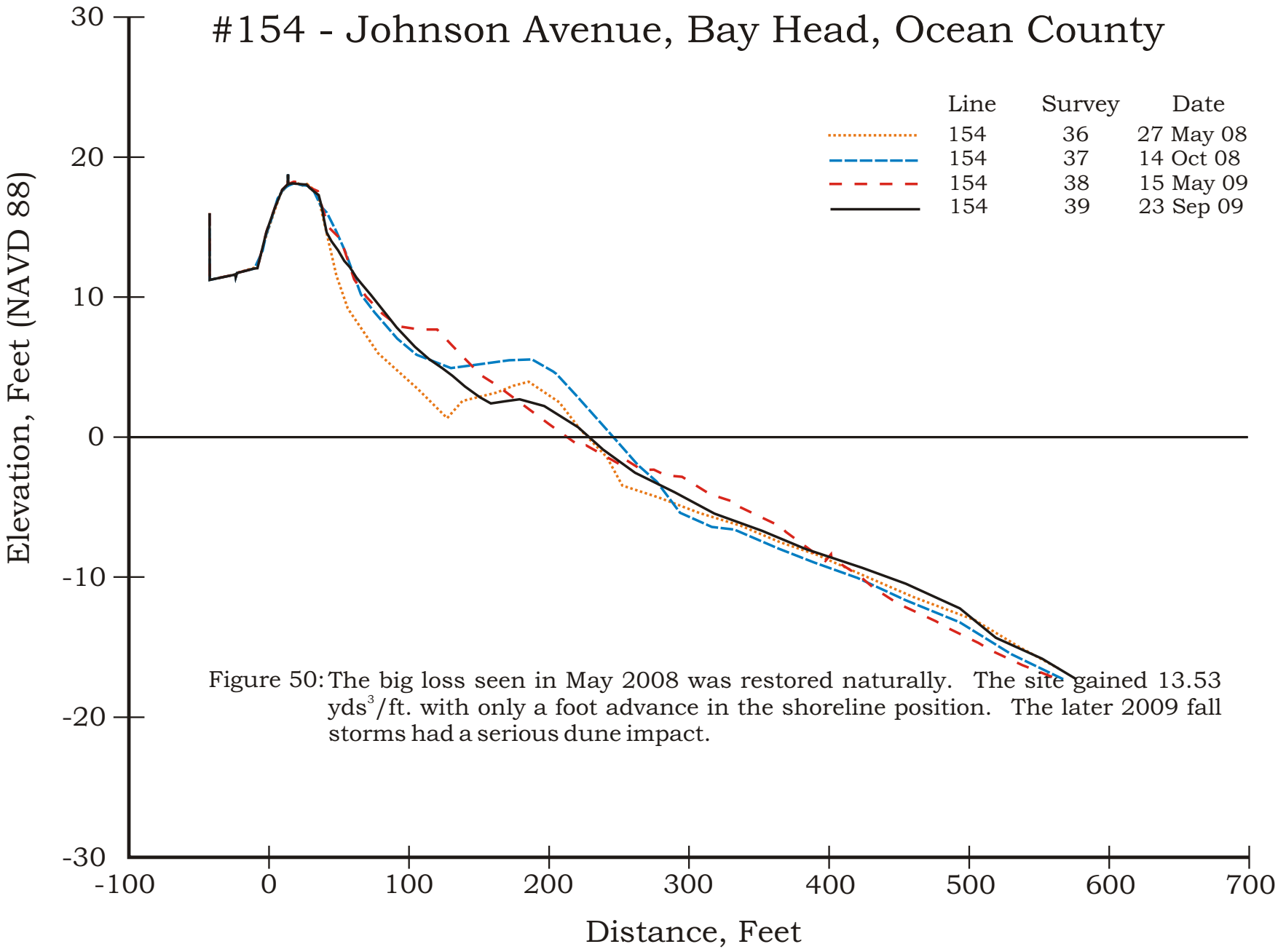

Figure 50: The big loss seen in May 2008 was restored naturally. The site gained 13.53 $yds^3/ft.$ with only a foot advance in the shoreline position. The later 2009 fall storms had a serious dune impact.

1117 OCEAN AVENUE, MANTOLOKING - SITE 153

Photo taken October 14th 2008. View to the south.

The Mantoloking site is surveyed quarterly for the specific interests of the municipal officials along with four other sites along the Borough oceanfront. By October 14, 2008 this site was once again being restored by transferring sand from the berm up the seaward dune slope to restore winter erosion into the dune.

Photo taken September 15, 2009. View to the south.

Comparing the profiles over the eleven month time period, the profile location gained volume (2.48 cu yd/ft) and the shoreline moved landward (-17.09 ft). Winter events in 2009 produced significant dune retreat and prompted another restoration effort with the bulldozer. The fall 2009 required a community-wide bulldozing effort to move between 7 and 10 cubic yards of sand back to the dune.

New Jersey Beach Profile Network

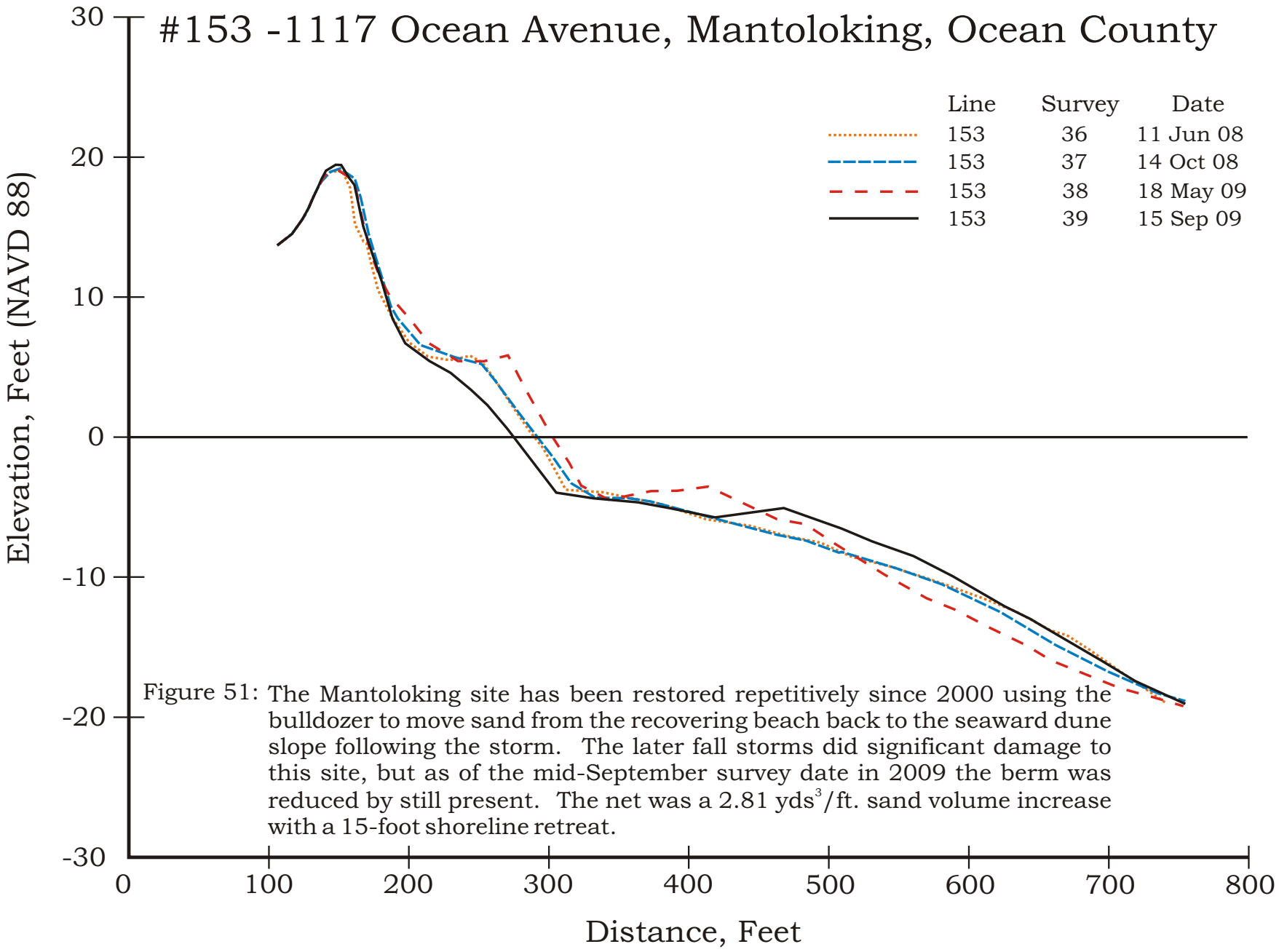

Figure 51: The Mantoloking site has been restored repetitively since 2000 using the bulldozer to move sand from the recovering beach back to the seaward dune slope following the storm. The later fall storms did significant damage to this site, but as of the mid-September survey date in 2009 the berm was reduced by still present. The net was a 2.81 yds^3/ft. sand volume increase with a 15-foot shoreline retreat.

PUBLIC BEACH #3, BRICK TOWNSHIP - SITE 152

Photo taken October 14, 2008. View to the north.

The public beach in Brick Township has developed a sizable dune between the beach and the recreational area parking lot and service building.

Photo taken September 24, 2009. View to the north.

Comparing the profiles over the eleven month time period, the profile location gained volume (10.66 cu yd/ft) and the shoreline moved landward (-9.81 ft). This site was surveyed prior to fall 2009 storms commencing.

New Jersey Beach Profile Network

#152 - Public Beach #3, Brick Township, Ocean County

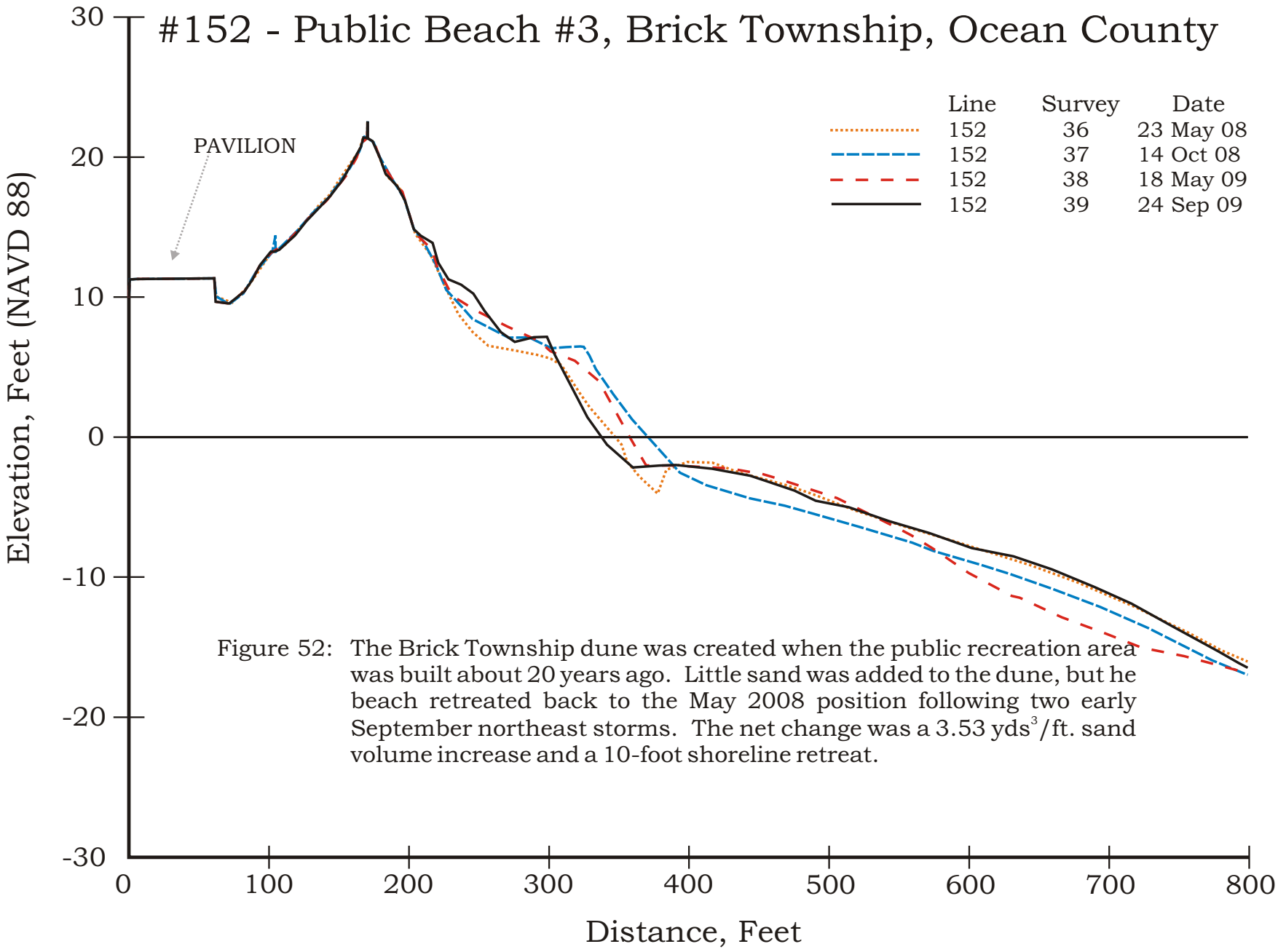

Figure 52: The Brick Township dune was created when the public recreation area was built about 20 years ago. Little sand was added to the dune, but he beach retreated back to the May 2008 position following two early September northeast storms. The net change was a 3.53 yds^3/ft. sand volume increase and a 10-foot shoreline retreat.

1st AVENUE, NORMANDY BEACH - SITE 151

Photo taken October 13, 2008. View to the south.

The dune toe is vulnerable to storm wave activity. No large-scale beach fills have been carried out at this location.

Photo taken September 24, 2009. View to the south.

Comparing the profiles over the eleven month time period, the profile location lost volume (-4.14 cu yd/ft) and the shoreline moved landward (-28.27 ft). The beach did manage a substantial expansion, followed by retreat to the May 2008 position prior to any storm activity.

New Jersey Beach Profile Network

#151 - 1st Avenue, Normandy Beach, Ocean County

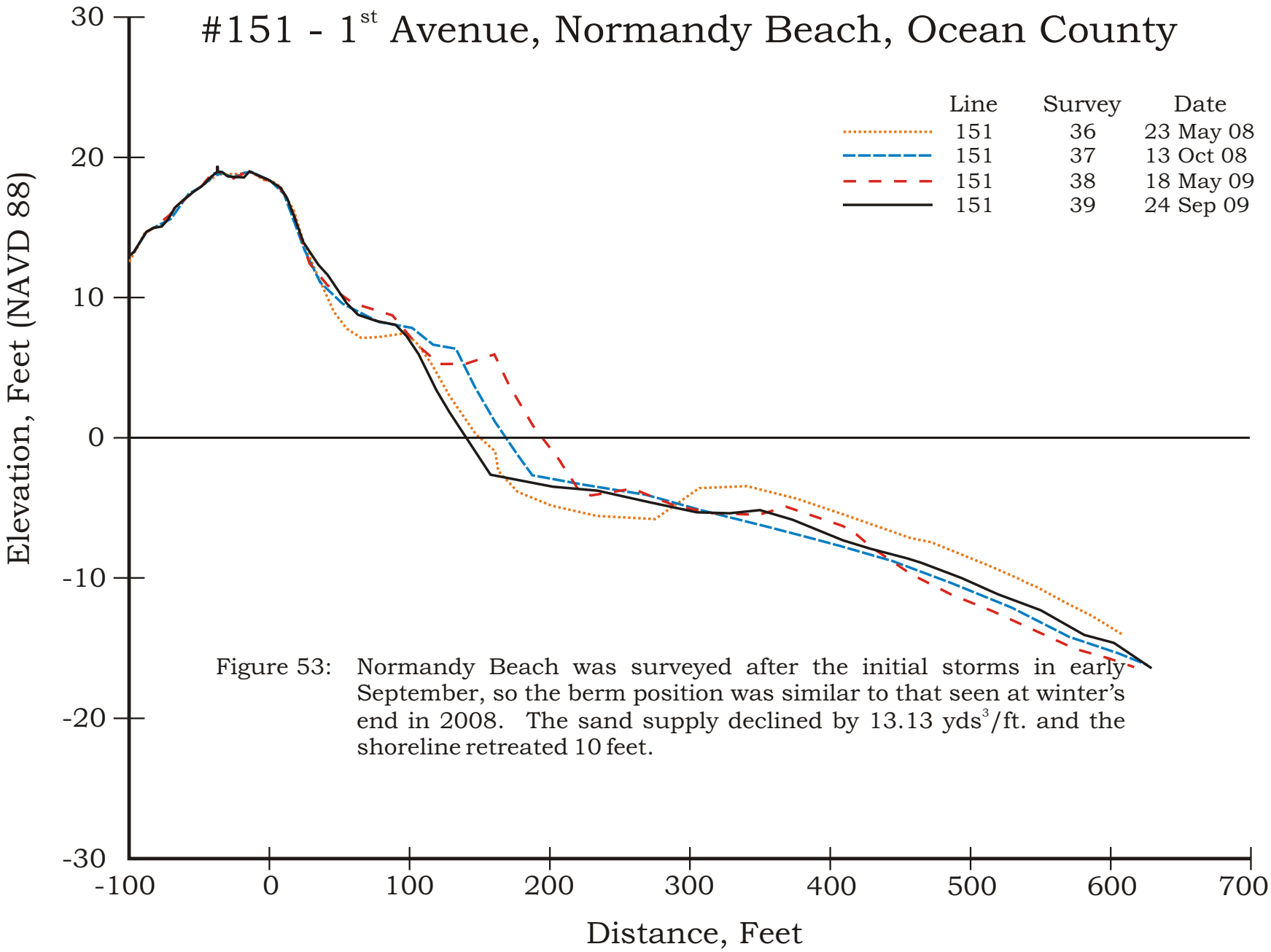

Figure 53: Normandy Beach was surveyed after the initial storms in early September, so the berm position was similar to that seen at winter's end in 2008. The sand supply declined by 13.13 yds^3/ft. and the shoreline retreated 10 feet.

WHITE AVENUE, LAVALLETTE - SITE 150

Photo taken October 13, 2008. View to the north.

The dry beach in Lavallette is relatively wide and stable.

Photo taken September 24, 2009. View to the north.

Comparing the profiles over the eleven month time period, the profile location lost volume (-16.17 cu yd/ft) and the shoreline moved landward (-2.34 ft) due to a change in the nearshore bar. Again, the survey for the fall 2009 preceded the northeast activity.

New Jersey Beach Profile Network

#150 - White Avenue, Lavallette, Ocean County

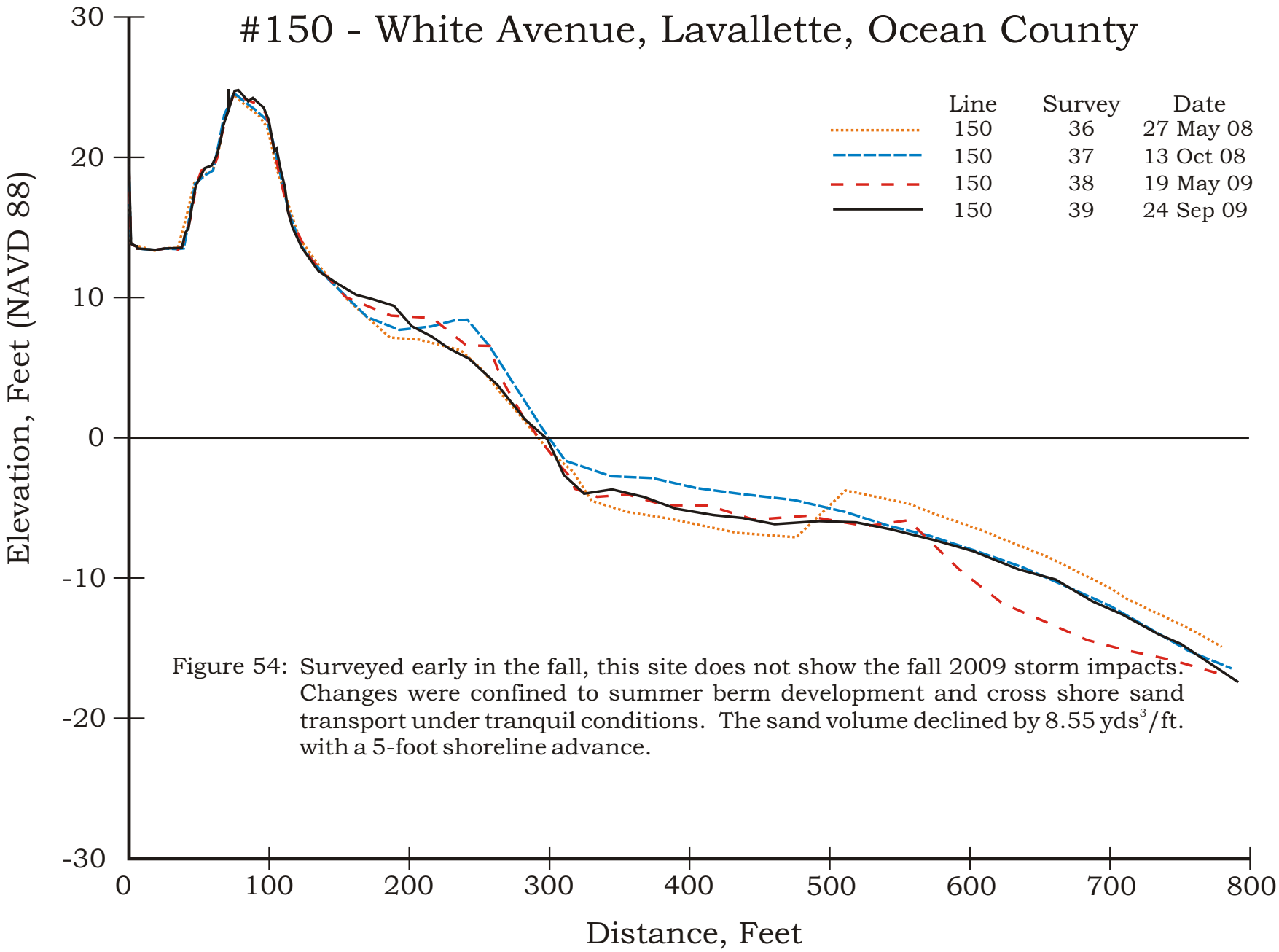

Figure 54: Surveyed early in the fall, this site does not show the fall 2009 storm impacts. Changes were confined to summer berm development and cross shore sand transport under tranquil conditions. The sand volume declined by 8.55 $yds^3/ft.$ with a 5-foot shoreline advance.

8th AVENUE, ORTLEY BEACH - SITE 149

Photo taken October 9, 2008. View to the north.

The Ortley Beach location has a dune, but the close proximity of the beach road limits the landward extent. This view from the dune toe slope north shows the recreational services pavillon that occupies the dune's natural position.

Photo taken October 6, 2009. View to the north.

Comparing the profiles over the one-year time period, the profile location gained volume (3.6 cu yd/ft) and the shoreline moved seaward (9.23 ft). This site was surveyed prior to the arrival of the northeast events during the fall of 2009.

New Jersey Beach Profile Network

#149 - 8th Avenue, Ortley Beach, Ocean County

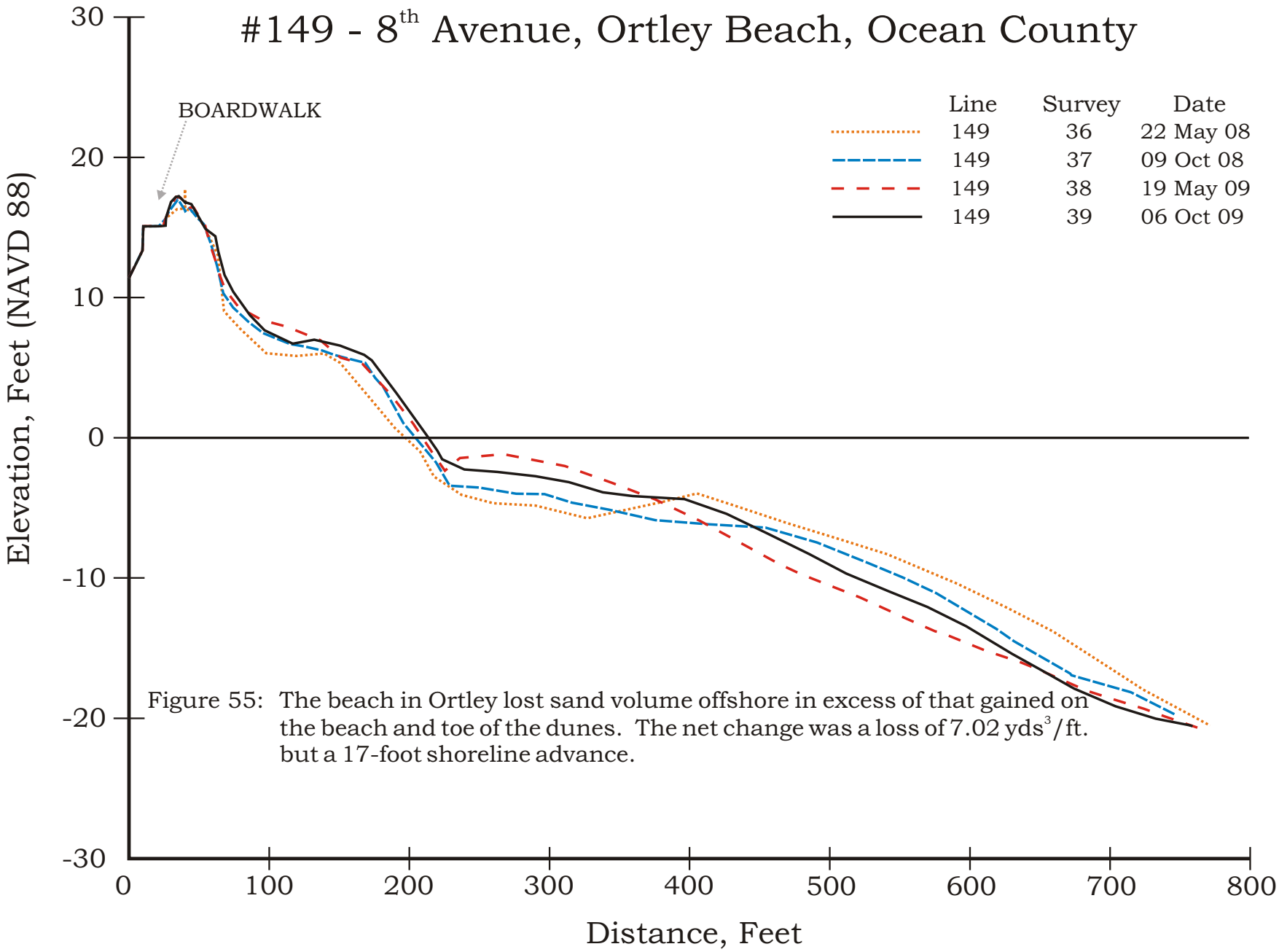

Figure 55: The beach in Ortley lost sand volume offshore in excess of that gained on the beach and toe of the dunes. The net change was a loss of 7.02 $yds^3/ft.$ but a 17-foot shoreline advance.

4th AVENUE, SEASIDE PARK - SITE 148

Photo taken October 9, 2008. View to the north.

The Fourth Avenue site in Seaside Park has a low relief, but wide dune protecting the property landward.

Photo taken October 8, 2009. View to the north.

Comparing the profiles over the one-year time period, the profile location lost volume (-16.73 cu yd/ft) and the shoreline moved landward (-18.65 ft).

New Jersey Beach Profile Network

#148 - 4th Avenue, Seaside Park, Ocean County

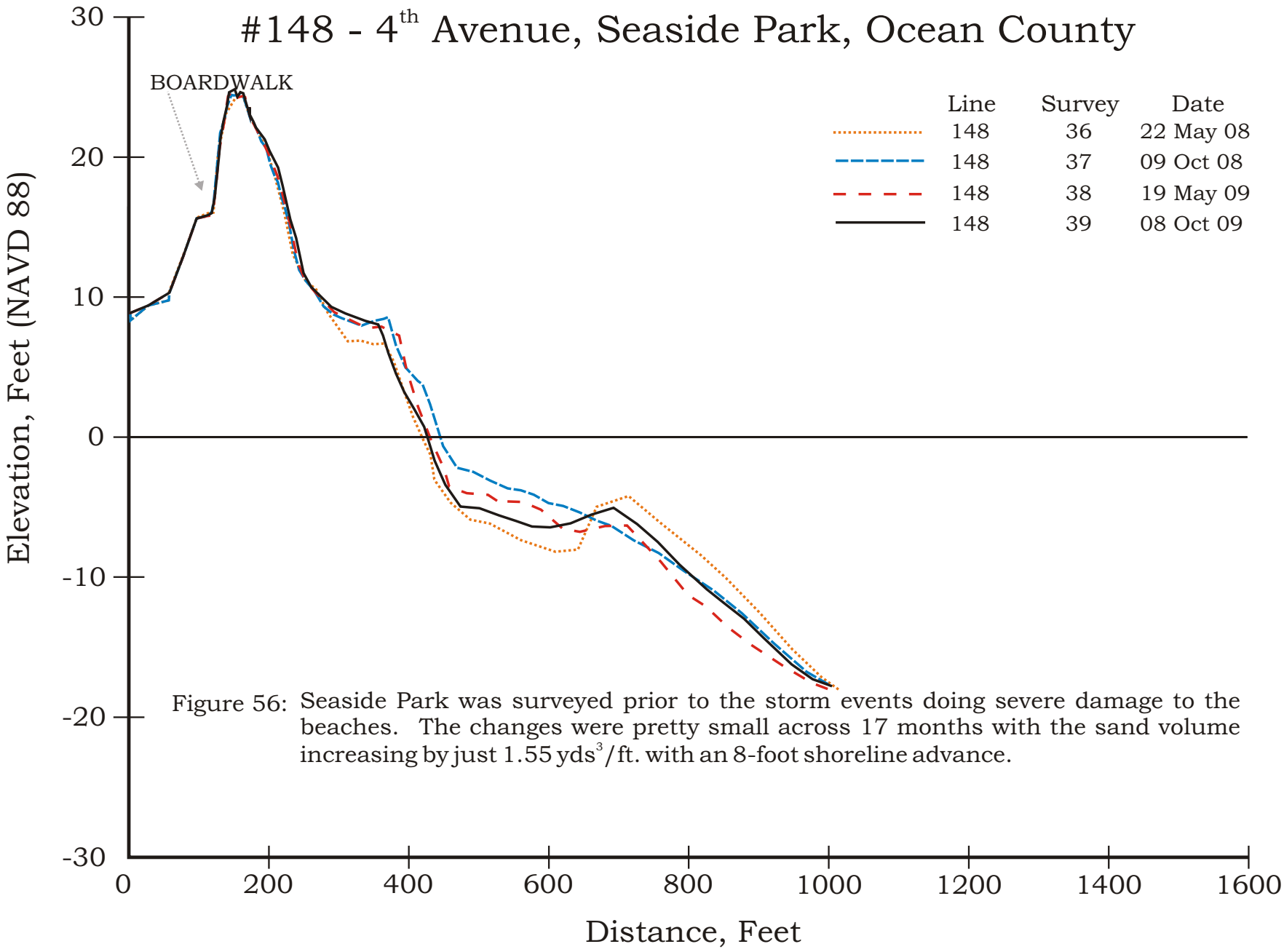

Figure 56: Seaside Park was surveyed prior to the storm events doing severe damage to the beaches. The changes were pretty small across 17 months with the sand volume increasing by just 1.55 $yds^3/ft.$ with an 8-foot shoreline advance.

6th LANE, MIDWAY BEACH - SITE 347

Photo taken October 9, 2008. View to the north.

This site was moved south off the pedestrian pathway in 2008 to monitor changes in the dune. When the site was established in 1986, there was no dune at all. However, the wind opened the pathway wider removing foredune seen on the earlier profile transects across the dune.

Photo taken October 8, 2009. View to the north.

Comparing the profiles over the one-year time period, the profile location lost volume (-2.38 cu yd/ft) and the shoreline moved landward (-20.29 ft).

New Jersey Beach Profile Network

#347 - 6th Lane, Midway Beach, Ocean County

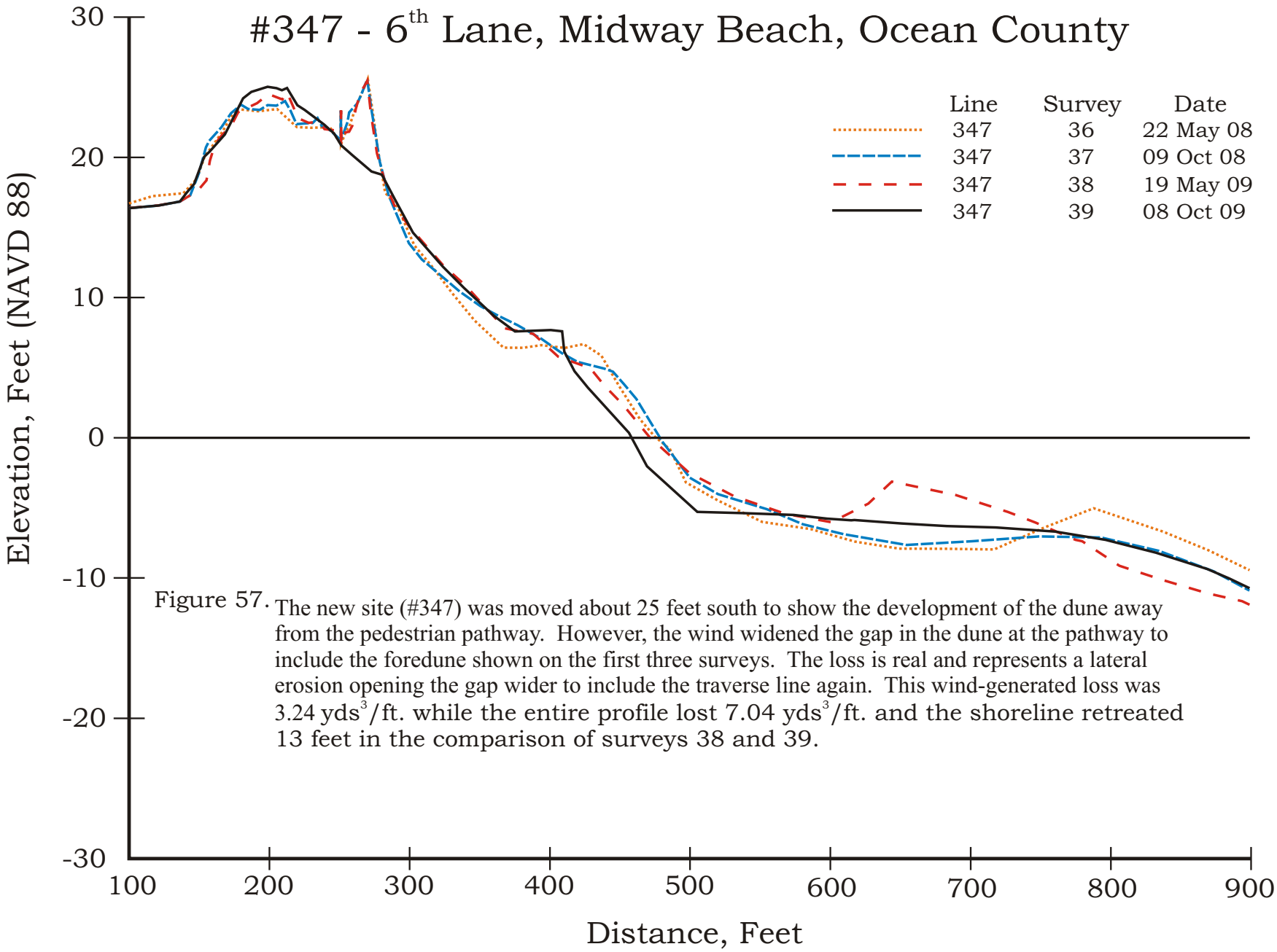

Figure 57. The new site (#347) was moved about 25 feet south to show the development of the dune away from the pedestrian pathway. However, the wind widened the gap in the dune at the pathway to include the foredune shown on the first three surveys. The loss is real and represents a lateral erosion opening the gap wider to include the traverse line again. This wind-generated loss was 3.24 $yds^3/ft.$ while the entire profile lost 7.04 $yds^3/ft.$ and the shoreline retreated 13 feet in the comparison of surveys 38 and 39.

NORTH END, ISLAND BEACH STATE PARK - SITE 247

Photo taken November 11, 2008. View to the south.

The dunes at this location contain a series of ridges and swales and support a variety of vegetation. Further landward the maritime forest grows on older segments of this shoreline.

Photo taken December 15, 2009. View to the south.

Comparing the profiles over the thirteen month time period, the profile location gained volume (13.76 cu yd/ft) and the shoreline moved landward (-9.08 ft) as sediment was moved to the nearshore bar. The loss was not as dramatic as that seen at site 246 just to the south.

New Jersey Beach Profile Network

#247 -North End, Island Beach State Park, Ocean County

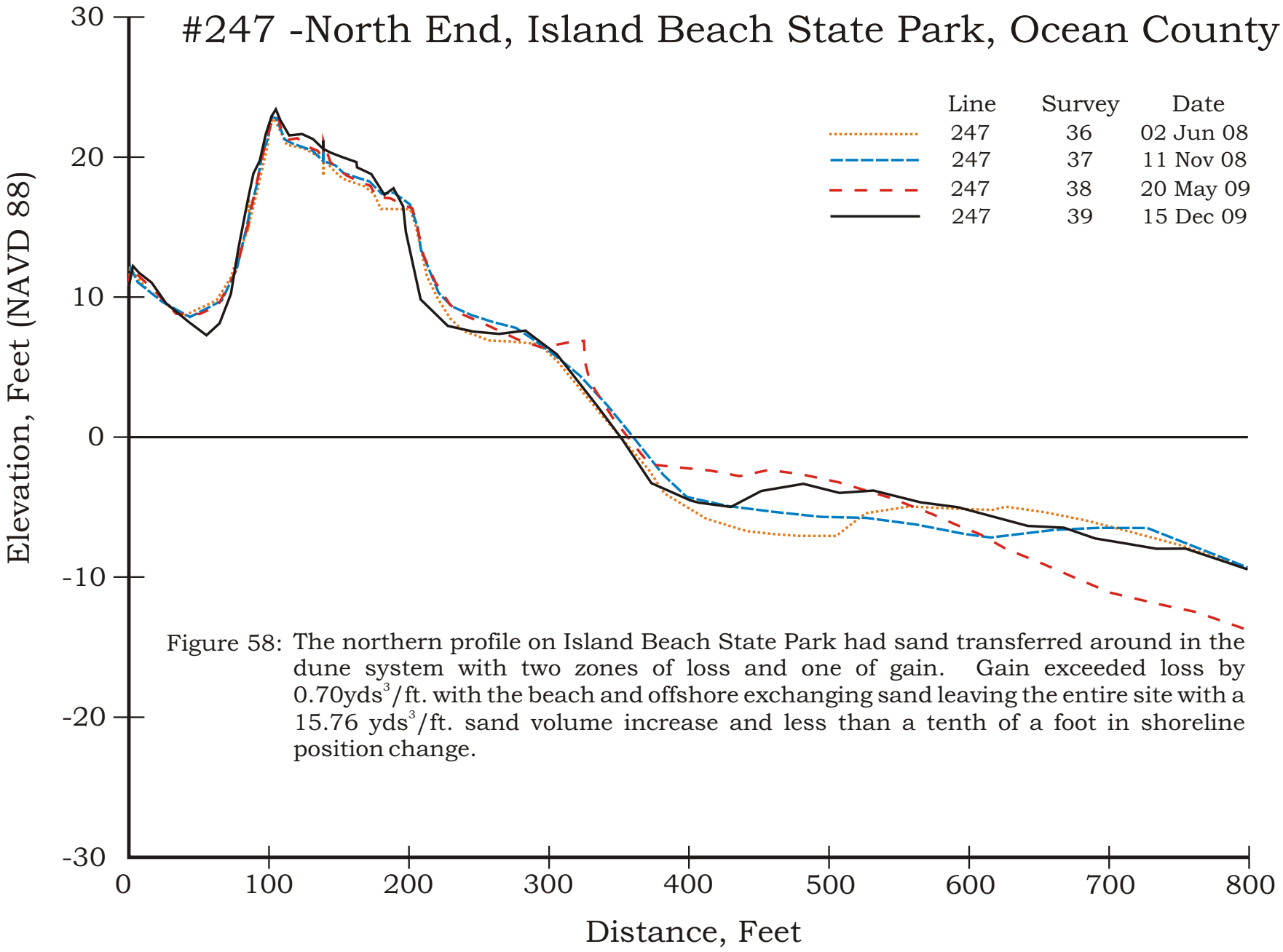

Figure 58: The northern profile on Island Beach State Park had sand transferred around in the dune system with two zones of loss and one of gain. Gain exceeded loss by 0.70yds^3/ft. with the beach and offshore exchanging sand leaving the entire site with a 15.76 yds^3/ft. sand volume increase and less than a tenth of a foot in shoreline position change.

ISLAND BEACH STATE PARK - SITE 246

Photo taken November 11, 2008. View to the south.

The middle profile on Island Beach State Park also traverses a massive dune field to a wide beach. The gap just south is natural and typifies a "blow-out" gap in the dunes. This photograph shows an accretional beach that protects the dune toe from minor storm erosion.

Photo taken December 15, 2009. View to the south.

Comparing the profiles over the thirteen month time period, the profile location lost volume (-24.6 cu yd/ft) and the shoreline moved landward (-43.91 ft). Storm impacts were severe to the dune and beach. The scarp retreat exposed the dune fence posts on the beach, not in the seaward dune toe. The beach followed this retreat landward.

New Jersey Beach Profile Network

#246 - Island Beach State Park, Ocean County

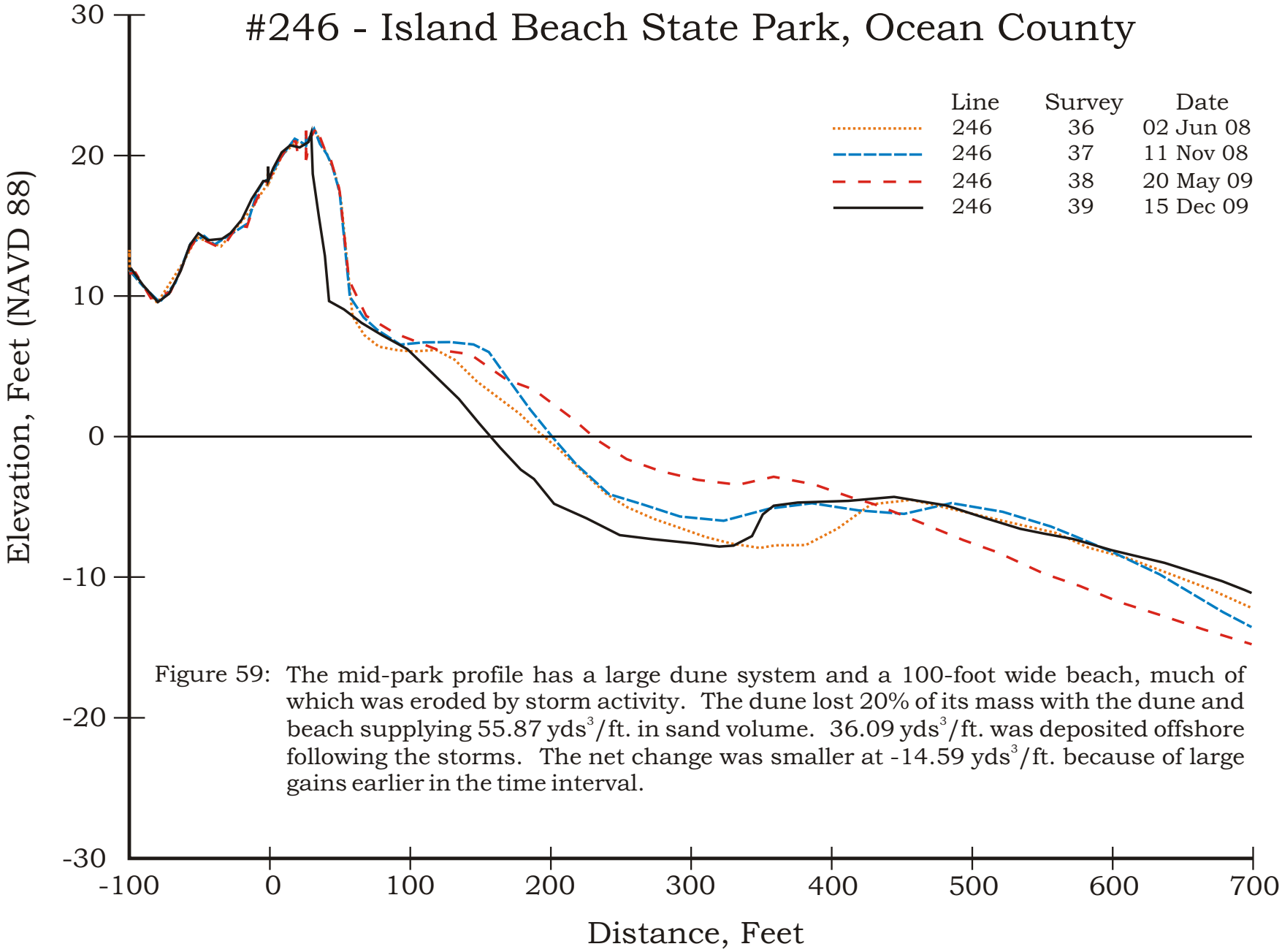

Figure 59: The mid-park profile has a large dune system and a 100-foot wide beach, much of which was eroded by storm activity. The dune lost 20% of its mass with the dune and beach supplying 55.87 yds^3/ft. in sand volume. 36.09 yds^3/ft. was deposited offshore following the storms. The net change was smaller at -14.59 yds^3/ft. because of large gains earlier in the time interval.

SOUTH END, ISLAND BEACH STATE PARK - SITE 146

Photo taken November 11, 2008. View to the north.

The southern end of the Island Beach State Park has no human modification. The site can only be accessed from the beach.

Photo taken December 15, 2009. View to the north.

The north jetty of Barnegat Inlet is located immediately to the south and traps sand moving south and produces this expanding beach that has grown wider almost every year since 1986. The jetties at Barnegat Inlet acted to trap sand producing the expansion seen. Comparing the profiles over the thirteen month time period, the profile location gained volume (15.05 cu yd/ft) and the shoreline moved seaward (25.32 ft).

New Jersey Beach Profile Network

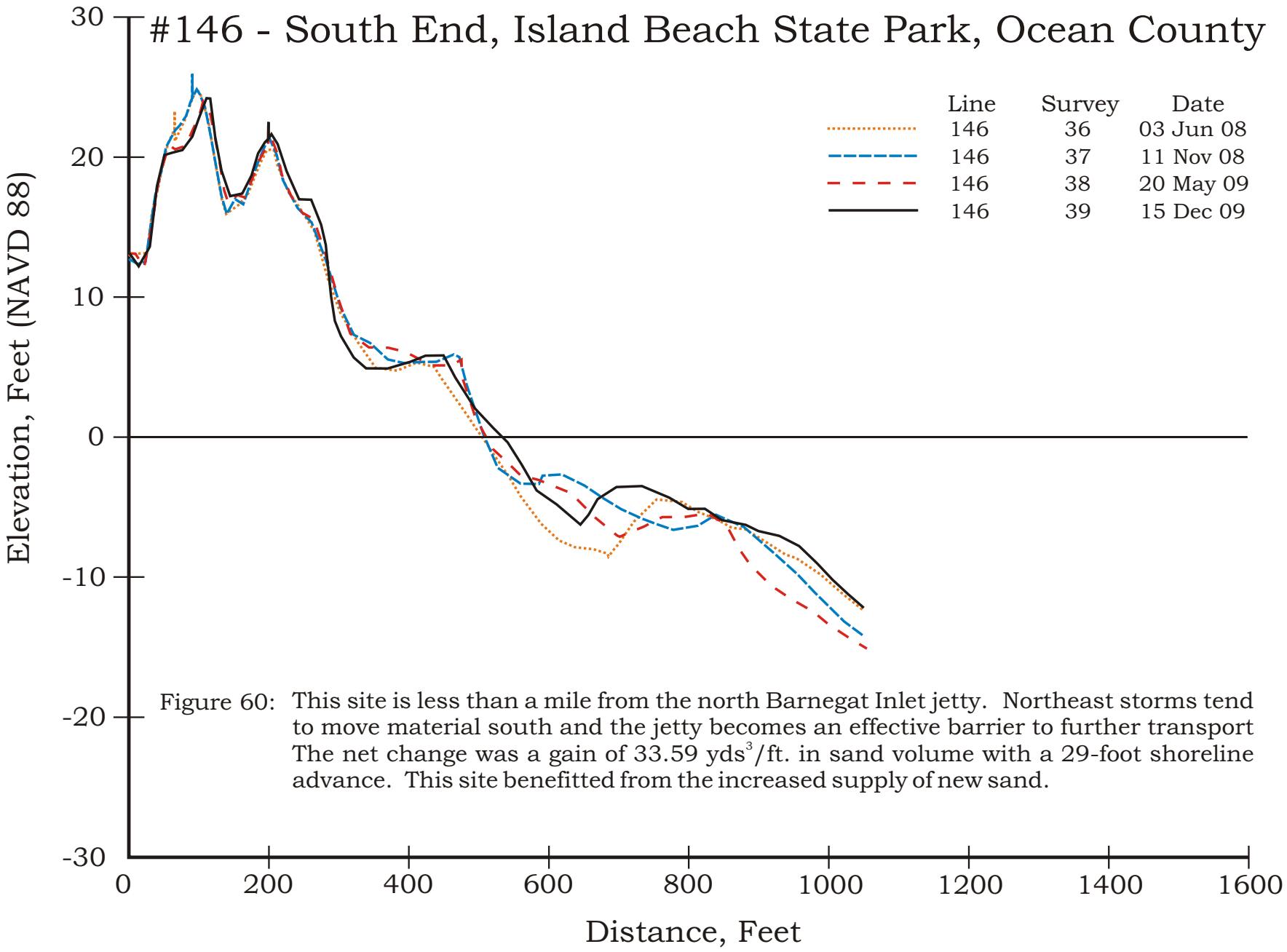

Figure 60: This site is less than a mile from the north Barnegat Inlet jetty. Northeast storms tend to move material south and the jetty becomes an effective barrier to further transport The net change was a gain of 33.59 yds^3/ft. in sand volume with a 29-foot shoreline advance. This site benefitted from the increased supply of new sand.

10th STREET, BARNEGAT LIGHT - SITE 245

Photo taken October 1, 2008. View to the north.

In the northern segment of the Barnegat Light Borough shoreline lies in what will become a major maritime forest eventually. This site is positioned just south of the old "arrowhead jetty" configuration. There was a wide beach here previously due to the rock jetty making its attachment to the land nearby, but the new structure makes landfall at the Barnegat Light tower. The intervening distance was converted from tidal sand flats extending away from the main channel to a dry sand beach with a complex of dune ridges extending nearly to the seaward end of the new jetty.

Photo taken December 29, 2009. View to the north.

To the southwest of this location a steel ship's mast extends out of the dune (about 300 feet landward of the beach) attached to a fishing vessel that sank in the inlet channel prior to the new jetty construction. This sunken vessel is now further landward of the dune crest than most of the homes built on Long Beach Island. This site was established in 1994 several years following the massive accumulation of sand that immediately followed the completion of the jetty. The northeast storm effects contributed sand to the site widening the beach at the expense of the offshore region. Comparing the profiles over the fourteen month time period, the profile location gained volume (8.56 cu yd/ft) and the shoreline moved seaward (70.22 ft).

New Jersey Beach Profile Network

#245 - 10th Street, Barnegat Light, Ocean County

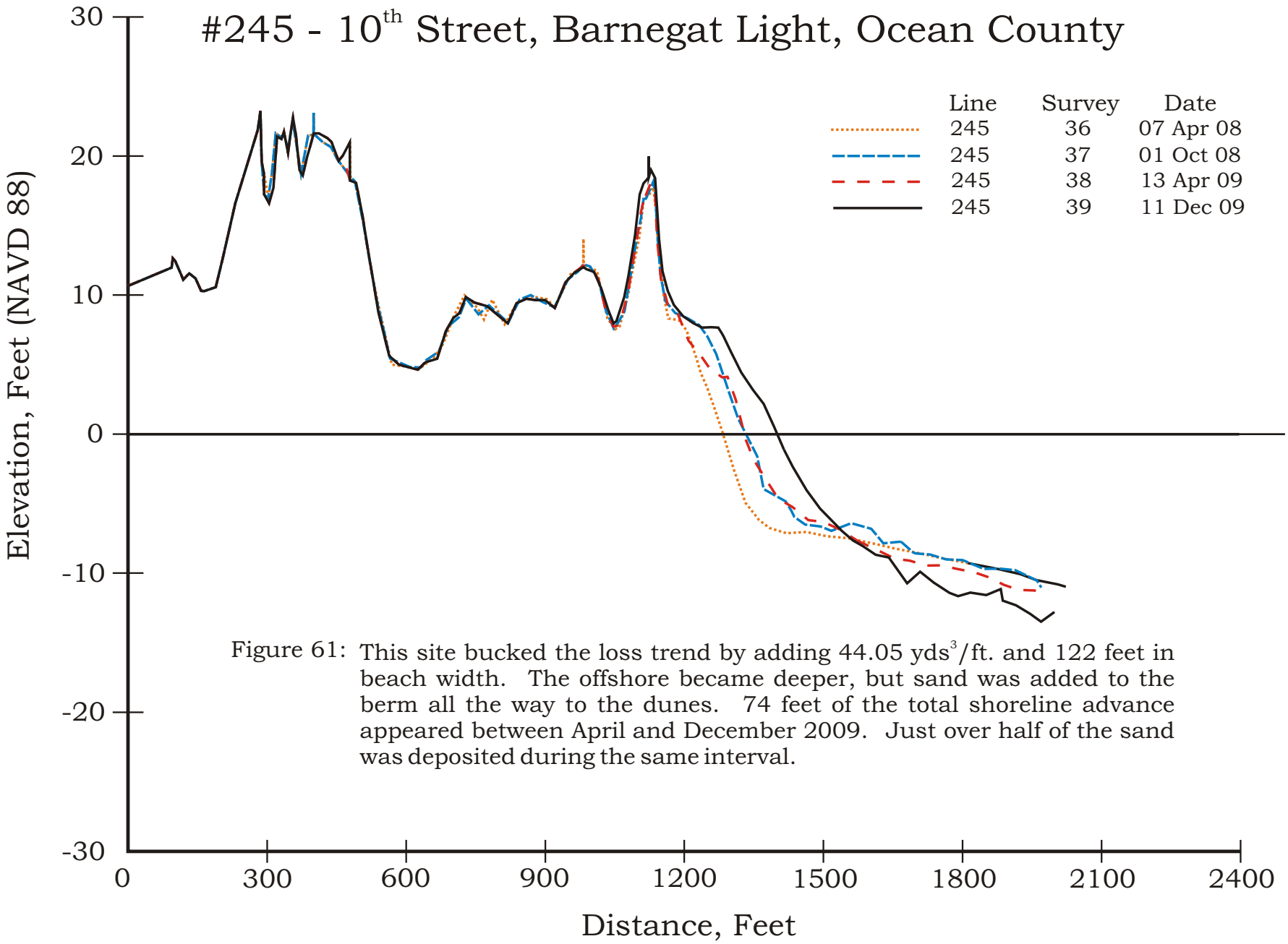

Figure 61: This site bucked the loss trend by adding 44.05 yds^3/ft. and 122 feet in beach width. The offshore became deeper, but sand was added to the berm all the way to the dunes. 74 feet of the total shoreline advance appeared between April and December 2009. Just over half of the sand was deposited during the same interval.

26th STREET, BARNEGAT LIGHT - SITE 145

Photo taken October 1, 2008. View to the north.

This site in southern Barnegat Light lies within the accretional wedge of shoreline extending from nearly to the La Baia Street site to the Barnegat Inlet jetty that was re-constructed in a new location beginning in 1988.

Photo taken December 11, 2009. View to the north.

Since the jetty was completed in 1990 the shoreline advanced as sand moved onto the beach from the old ebb-tidal delta position offshore. This expansion grows wider to the north, reaching a maximum at the jetty. During the fall of 2009 the trend reversed with the berm getting hit with erosion and a deep trough appearing just offshore. Comparing the profiles over the fourteen month time period, the profile location lost volume (-19.57 cu yd/ft) and the shoreline moved landward (-30.81 ft).

New Jersey Beach Profile Network

#145 - 26th Street, Barnegat Light, Ocean County

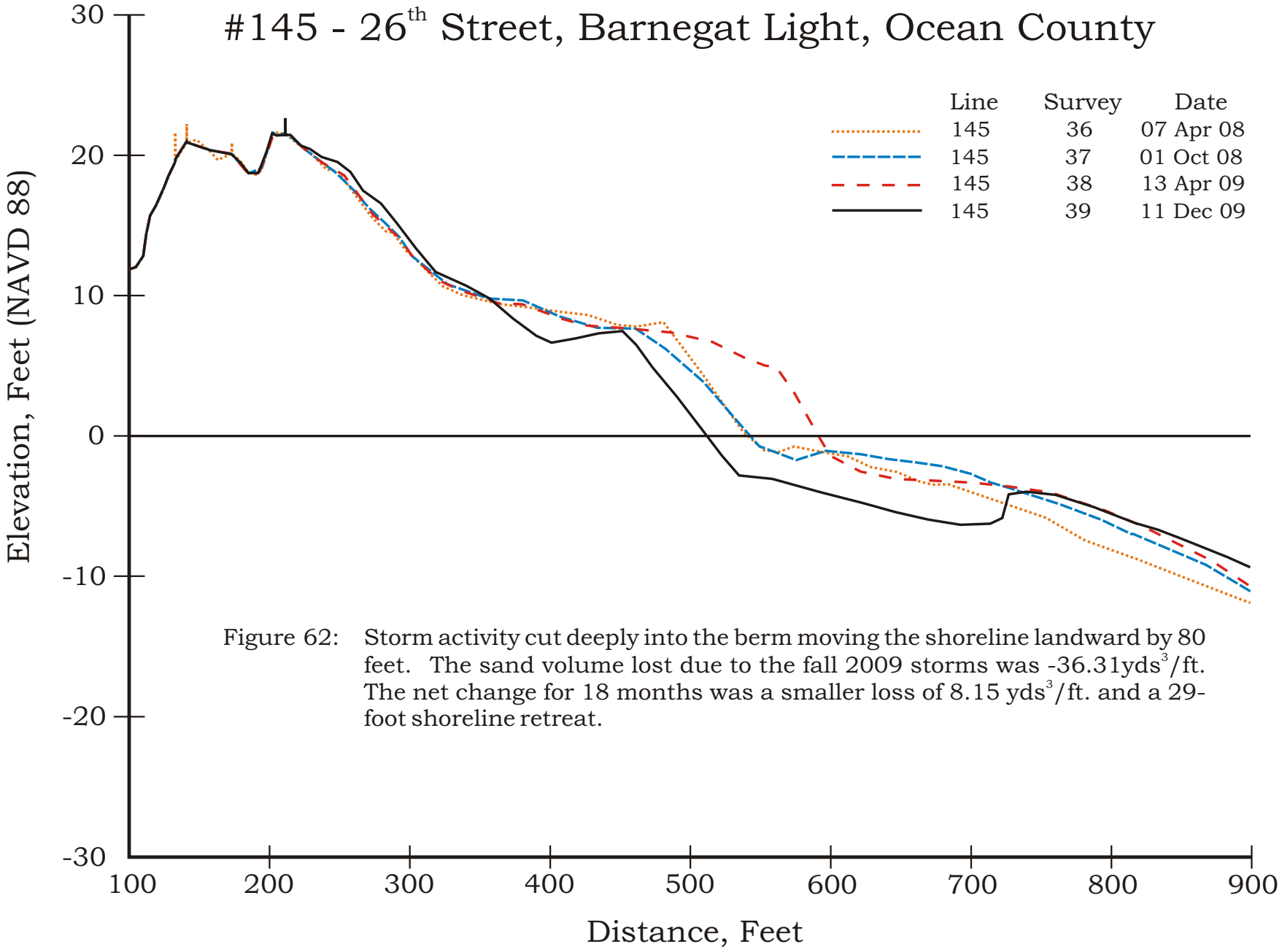

Figure 62: Storm activity cut deeply into the berm moving the shoreline landward by 80 feet. The sand volume lost due to the fall 2009 storms was -36.31yds^3/ft. The net change for 18 months was a smaller loss of 8.15 yds^3/ft. and a 29-foot shoreline retreat.

LA BAIA STREET, LOVELADIES - SITE 144

Photo taken October 1, 2008. View to the south.

The dune in Loveladies is much narrower with the homes built into the landward toe so that any breach means that wave energy will accelerate landward into the buildings. As it turned out the dune did not suffer damage, but sand moved offshore in quantity.

Photo taken December 11, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location gained volume (18.47 cu yd/ft) and the shoreline moved landward (-2.0 ft).

New Jersey Beach Profile Network

#144 - La Baia Street, Loveladies, Ocean County

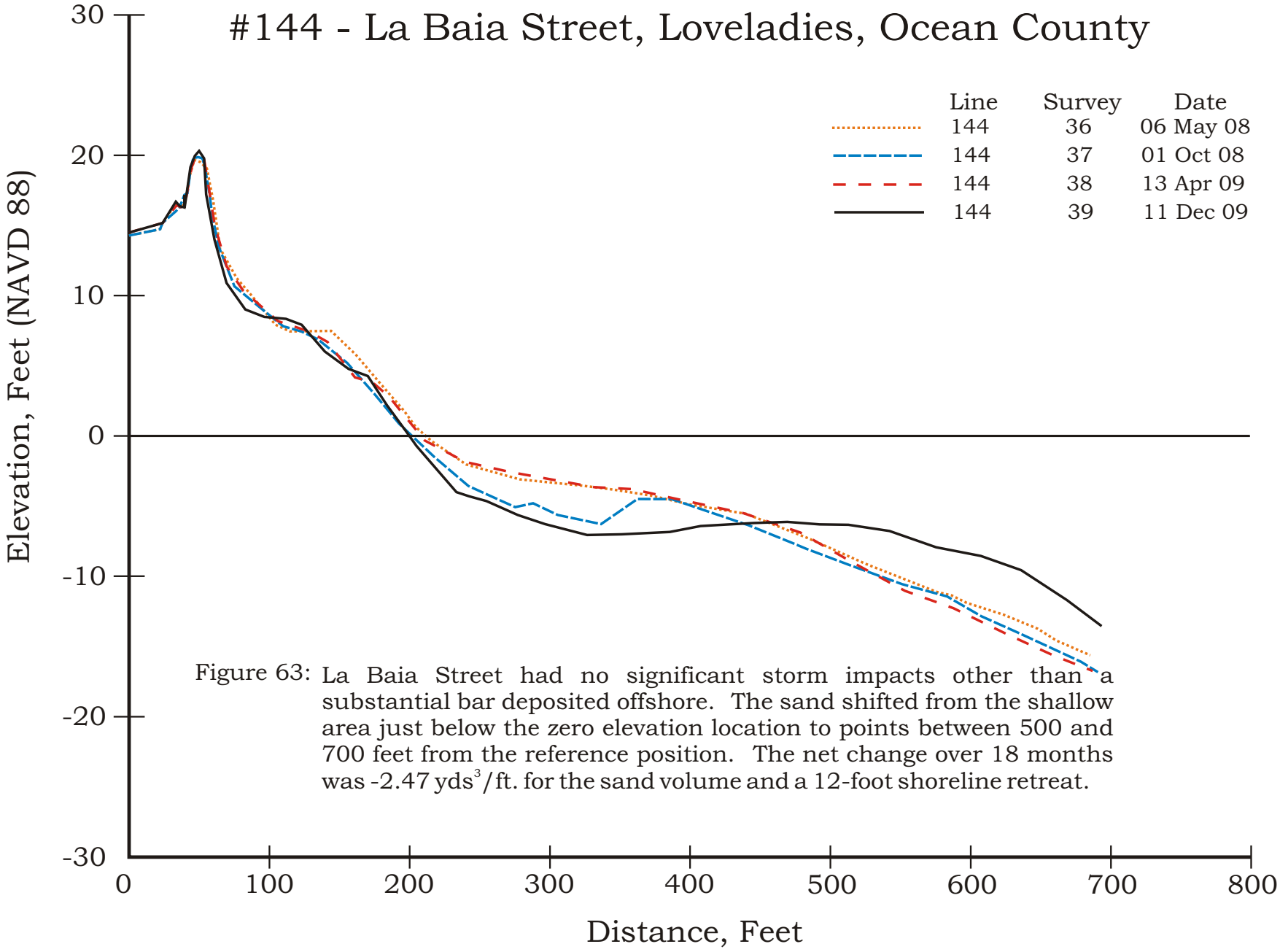

Figure 63: La Baia Street had no significant storm impacts other than a substantial bar deposited offshore. The sand shifted from the shallow area just below the zero elevation location to points between 500 and 700 feet from the reference position. The net change over 18 months was -2.47 $yds^3/ft.$ for the sand volume and a 12-foot shoreline retreat.

73rd STREET, HARVEY CEDARS - SITE 143

Photo taken September 29, 2008. View to the south.

The narrow beach exposes the dune to potential wave run up. A beach fill project planned for Spring 2010 will add considerable beach width and will protect the dune.

Photo taken December 11, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location lost volume (-27.98 cu yd/ft) and the shoreline moved landward (-27.41 ft). The loss here was significant with over half of the dune gone, the beach severely diminished and not much sand deposited offshore.

New Jersey Beach Profile Network

#143 - 73rd Street, Harvey Cedars, Ocean County

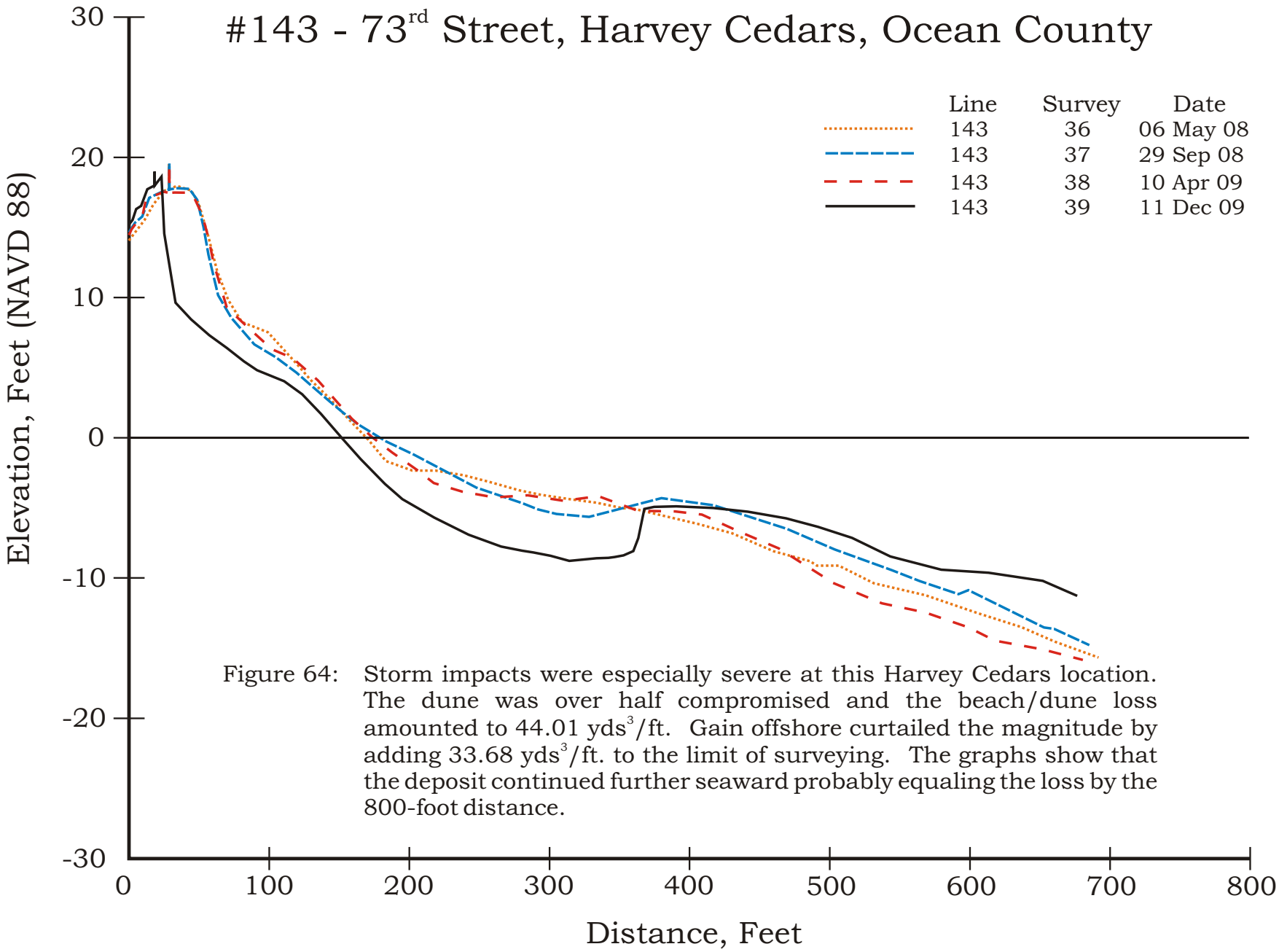

Figure 64: Storm impacts were especially severe at this Harvey Cedars location. The dune was over half compromised and the beach/dune loss amounted to 44.01 yds^3/ft. Gain offshore curtailed the magnitude by adding 33.68 yds^3/ft. to the limit of surveying. The graphs show that the deposit continued further seaward probably equaling the loss by the 800-foot distance.

TRANQUILITY DRIVE, HARVEY CEDARS - SITE 142

Photo taken September 29, 2008. View to the north. The dune was cut by a scarp to the crest and abundant sand appeared far offshore.

Photo taken December 11, 2009. View to the north.

Comparing the profiles over the fourteen month time period, the profile location gained volume (18.98 cu yd/ft) and the shoreline moved seaward (0.68 ft).

New Jersey Beach Profile Network

#142 - Tranquility Drive, Harvey Cedars, Ocean County

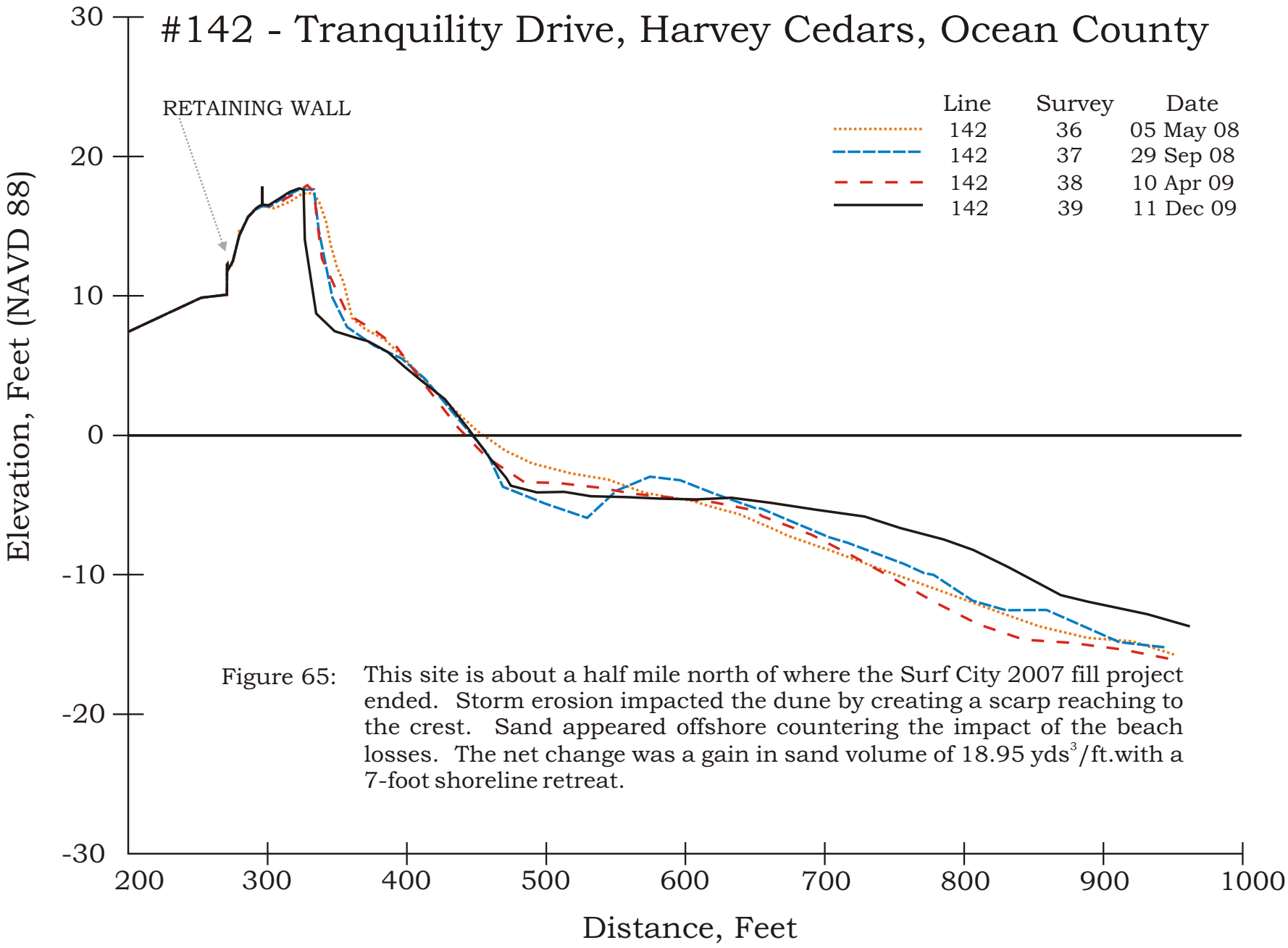

Figure 65: This site is about a half mile north of where the Surf City 2007 fill project ended. Storm erosion impacted the dune by creating a scarp reaching to the crest. Sand appeared offshore countering the impact of the beach losses. The net change was a gain in sand volume of 18.95 yds^3/ft.with a 7-foot shoreline retreat.

20th STREET, SURF CITY - SITE 241

Photo taken September 29, 2008. View to the south.

Site of a beach fill in 2007 with erosion and shoreline retreat following the loss of the placed sand. The fall of 2009 had a profound effect on the berm width removing nearly all of it as opposed to minor losses seen between surveys 36 and 38. The sand volume remaining is still substantially more than what was present before the project.

Photo taken December 11, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location lost volume (-41.98 cu yd/ft) and the shoreline moved landward (-87.47 ft).

New Jersey Beach Profile Network

#241 -20th Street, Surf City, Ocean County

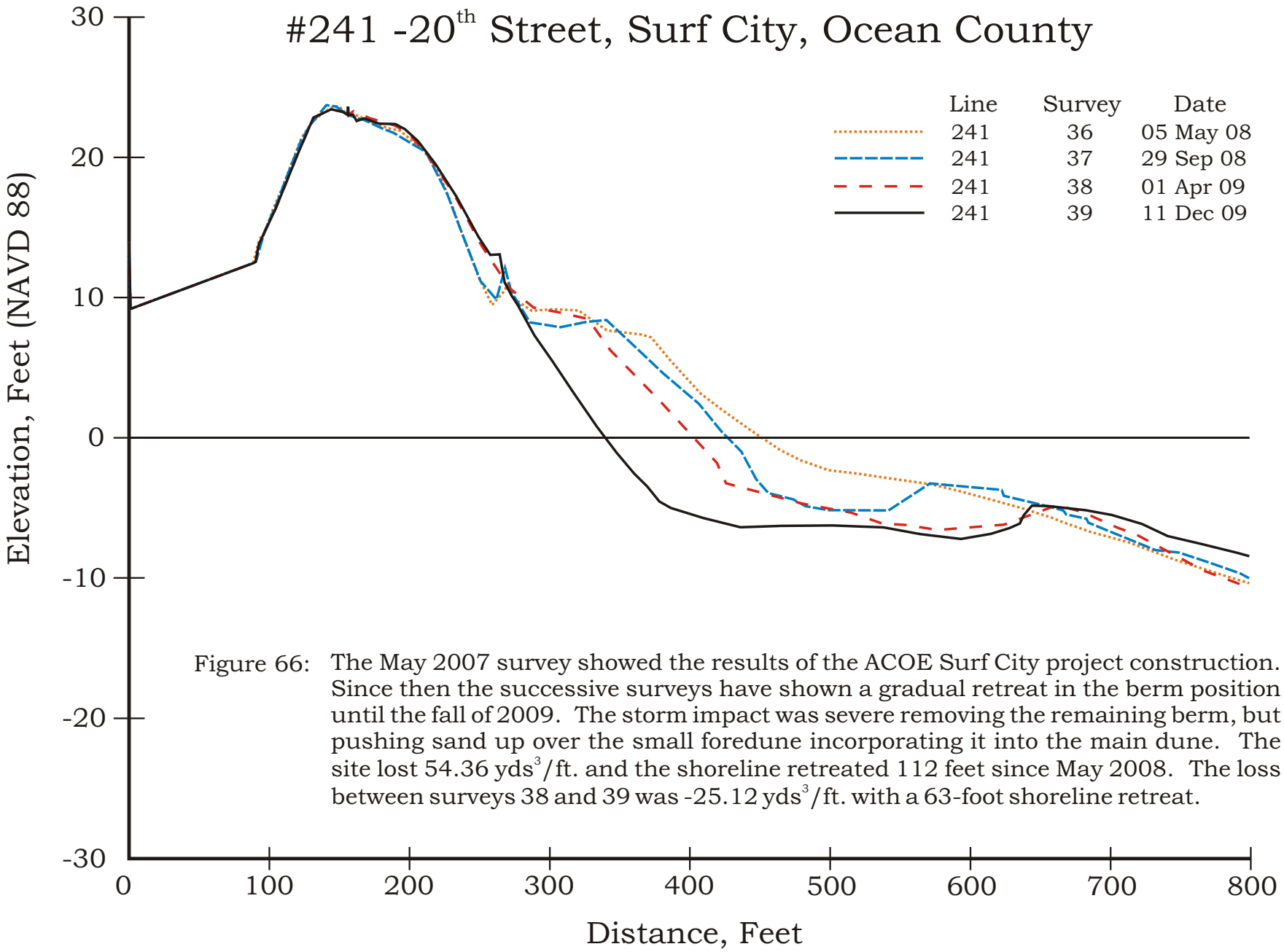

Figure 66: The May 2007 survey showed the results of the ACOE Surf City project construction. Since then the successive surveys have shown a gradual retreat in the berm position until the fall of 2009. The storm impact was severe removing the remaining berm, but pushing sand up over the small foredune incorporating it into the main dune. The site lost 54.36 yds^3/ft. and the shoreline retreated 112 feet since May 2008. The loss between surveys 38 and 39 was -25.12 yds^3/ft. with a 63-foot shoreline retreat.

8th STREET, SHIP BOTTOM - SITE 141

Photo taken October 2, 2008. View to the south.

This site has remained relatively stable over the past 20 years with dune volume increasing and minimal changes in the shoreline position.

Photo taken December 10, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location gained volume (12.04 cu yd/ft) and the shoreline moved seaward (11.32 ft).

New Jersey Beach Profile Network

#141 - 8th Street, Ship Bottom, Ocean County

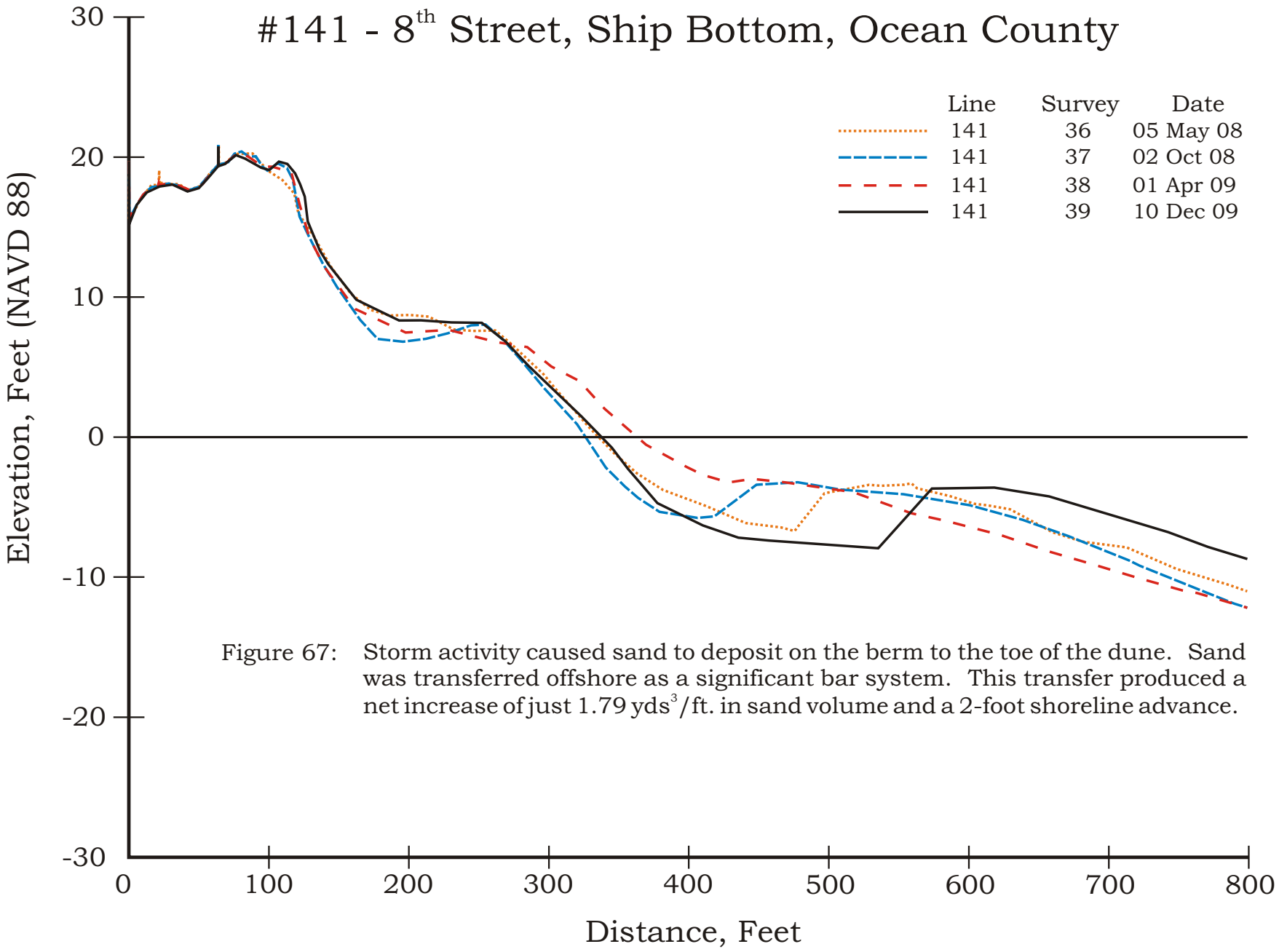

Figure 67: Storm activity caused sand to deposit on the berm to the toe of the dune. Sand was transferred offshore as a significant bar system. This transfer produced a net increase of just 1.79 yds^3/ft. in sand volume and a 2-foot shoreline advance.

32nd STREET, LONG BEACH TOWNSHIP - SITE 140

Photo taken October 2, 2008. View to the north. Sand was added to the beach and assembled into a bar far offshore.

Photo taken December 10, 2009. View to the north.

Comparing the profiles over the fourteen month time period, the profile location lost volume (-7.05cu yd/ft) and the shoreline moved seaward (15.73 ft).

New Jersey Beach Profile Network

#140 - 32nd Street, Long Beach Township, Ocean County

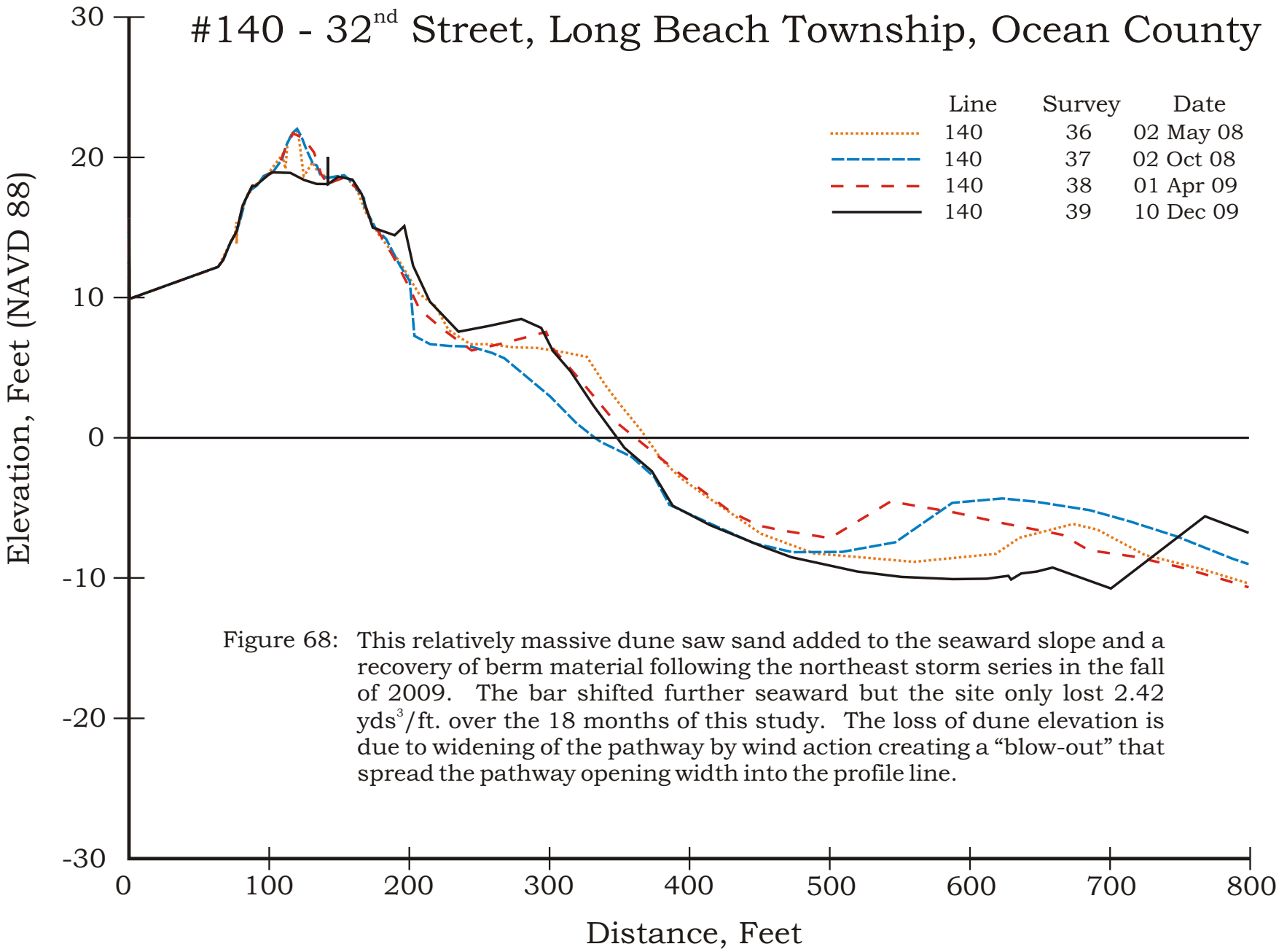

Figure 68: This relatively massive dune saw sand added to the seaward slope and a recovery of berm material following the northeast storm series in the fall of 2009. The bar shifted further seaward but the site only lost 2.42 $yds^3/ft.$ over the 18 months of this study. The loss of dune elevation is due to widening of the pathway by wind action creating a "blow-out" that spread the pathway opening width into the profile line.

81st STREET, LONG BEACH TOWNSHIP - SITE 139

Photo taken October 2, 2008. View to the north.

The site has a minimal dune landward of a narrow beach. The beach was eroded back, but the dune was not damaged. Sand volume was added offshore.

Photo taken December 10, 2009. View to the north.

Comparing the profiles over the fourteen month time period, the profile location lost volume (-4.58cu yd/ft) and the shoreline moved landward (-21.86 ft).

New Jersey Beach Profile Network

#139 - 81st Street, Long Beach Township, Ocean County

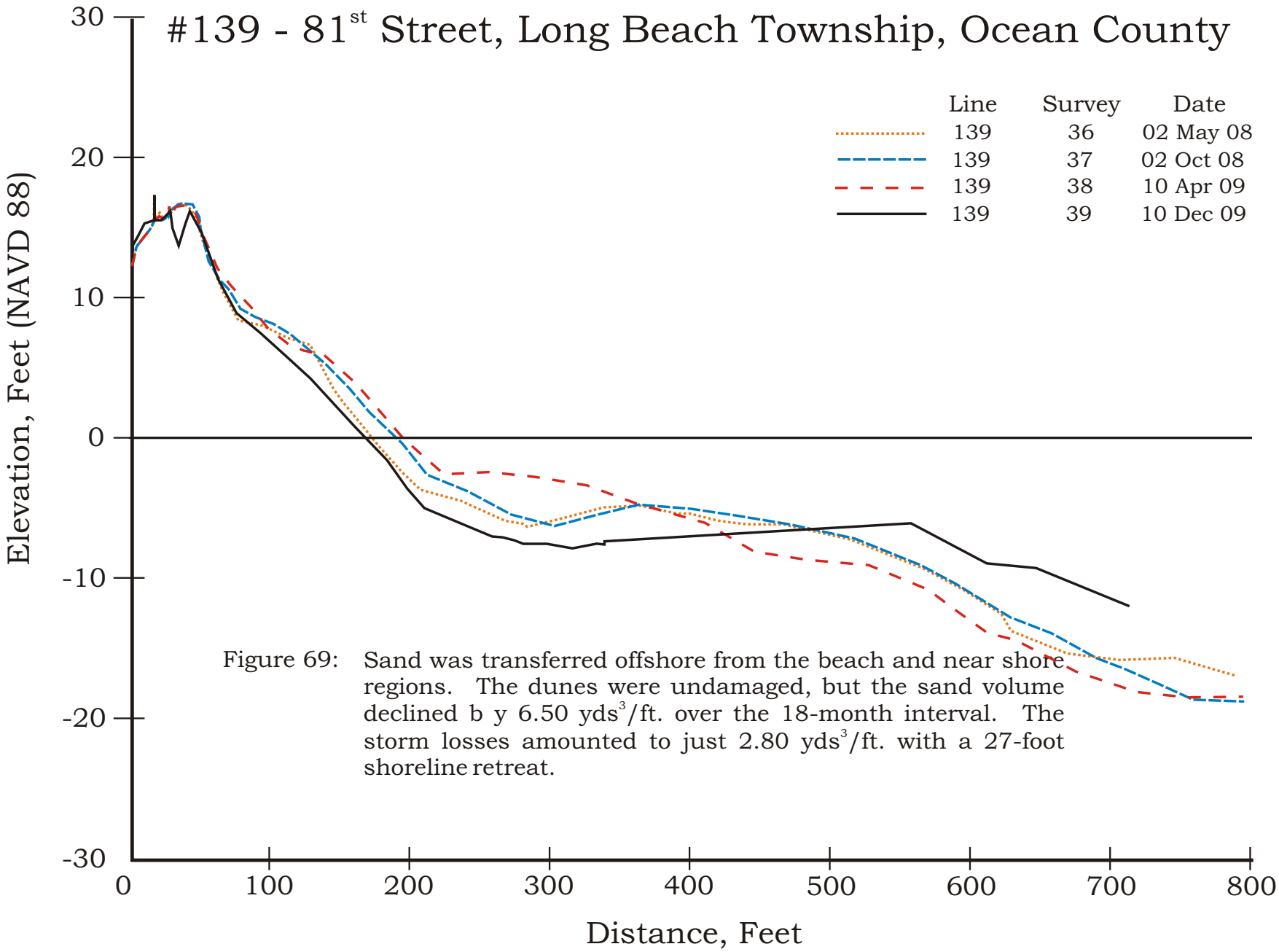

Figure 69: Sand was transferred offshore from the beach and near shore regions. The dunes were undamaged, but the sand volume declined b y 6.50 yds^3/ft. over the 18-month interval. The storm losses amounted to just 2.80 yds^3/ft. with a 27-foot shoreline retreat.

OLD WHALING ROAD, LONG BEACH TOWNSHIP - SITE 138

Photo taken October 6, 2008. View to the south. This location was another to receive sand due to storm activity rather than suffer erosion. Sand was added to the berm and offshore, the effect was quite impressive.

Photo taken December 10, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location gained volume (84.56 cu yd/ft) and the shoreline moved seaward (61.54 ft).

New Jersey Beach Profile Network

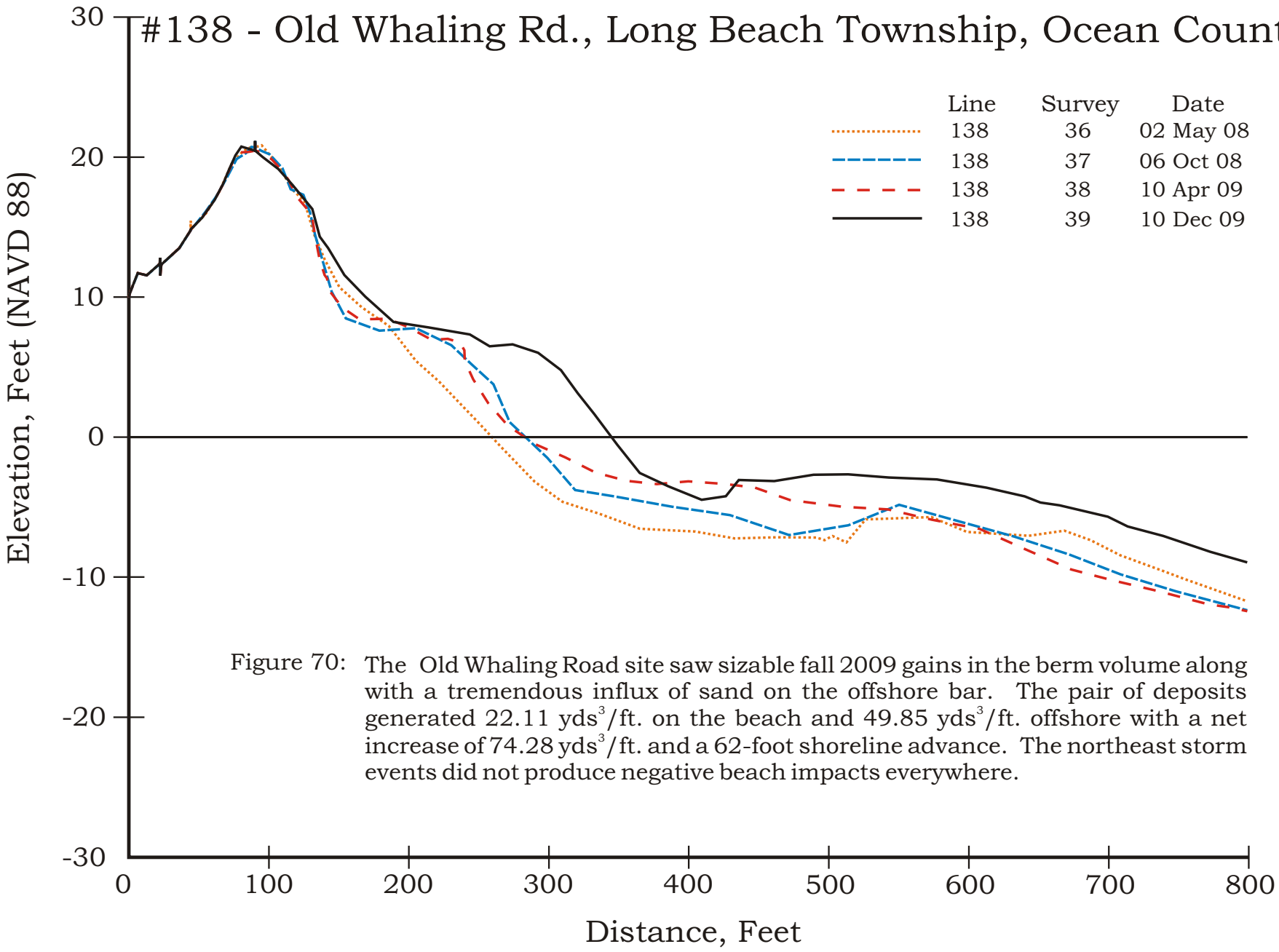

Figure 70: The Old Whaling Road site saw sizable fall 2009 gains in the berm volume along with a tremendous influx of sand on the offshore bar. The pair of deposits generated 22.11 yds^3/ft. on the beach and 49.85 yds^3/ft. offshore with a net increase of 74.28 yds^3/ft. and a 62-foot shoreline advance. The northeast storm events did not produce negative beach impacts everywhere.

TAYLOR AVENUE, BEACH HAVEN - SITE 137

Photo taken October 5, 2008. View to the south.

The shoreline is relatively narrow at this site with a slightly wider dune between the dry beach and the residences. The 2008 “Mother’s Day” northeast storm cut a scarp in the dunes that was not repaired. The fall of 2009 did relatively little damage to the dunes or the beach. Sand was added offshore.

Photo taken December 11, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location gained volume (13.42 cu yd/ft) and the shoreline moved landward (-7.34 ft).

New Jersey Beach Profile Network

#137 - Taylor Avenue, Beach Haven, Ocean County

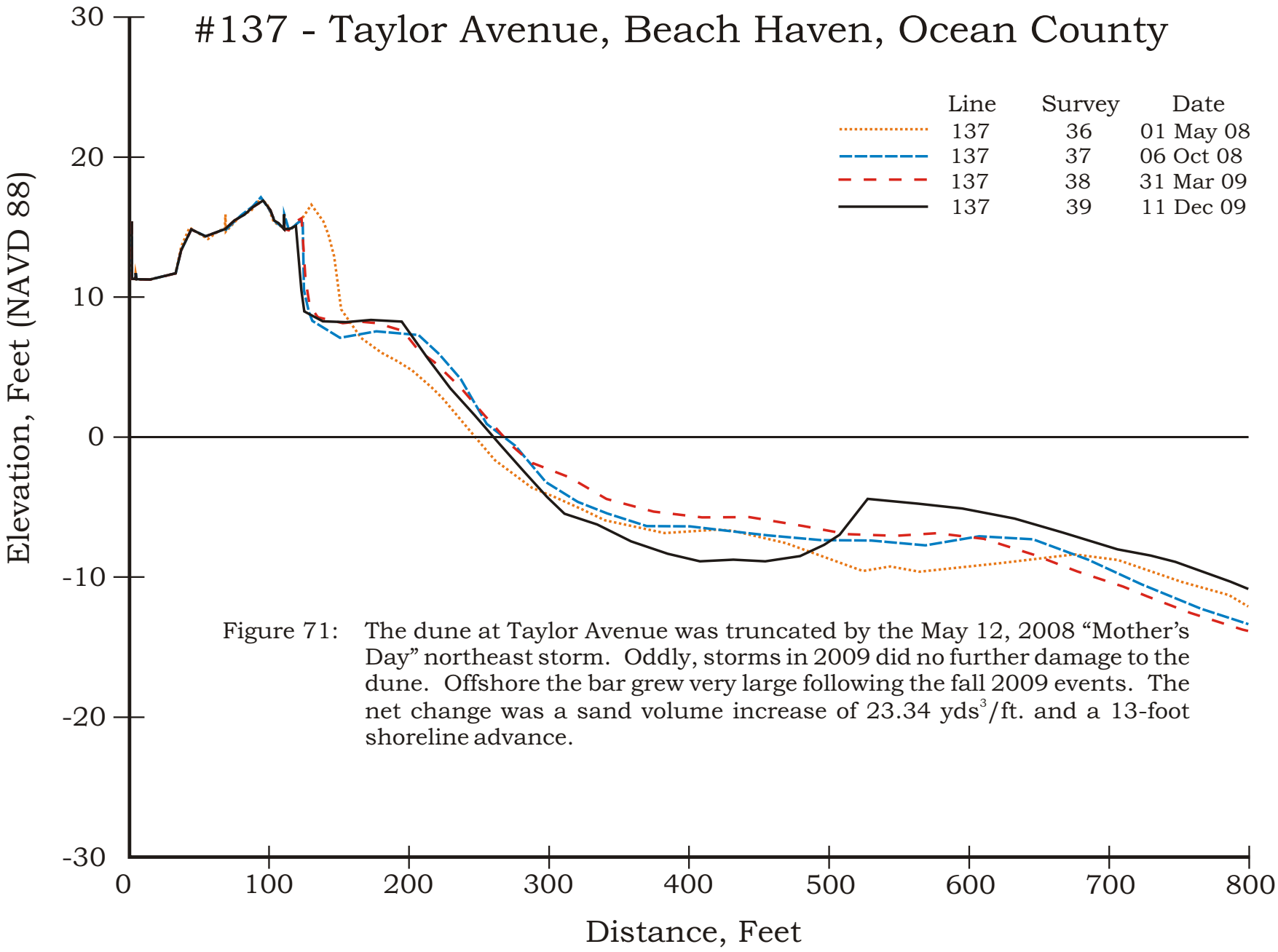

Figure 71: The dune at Taylor Avenue was truncated by the May 12, 2008 "Mother's Day" northeast storm. Oddly, storms in 2009 did no further damage to the dune. Offshore the bar grew very large following the fall 2009 events. The net change was a sand volume increase of 23.34 yds^3/ft. and a 13-foot shoreline advance.

DOLPHIN AVENUE, BEACH HAVEN - SITE 136

Photo taken October 6, 2008. View to the north. There was a deposit of sand on the beachface with more sand added offshore on the seaward slope of the offshore bar.

Photo taken December 11, 2009. View to the north.

Comparing the profiles over the fourteen month time period, the profile location gained volume (26.01 cu yd/ft) and the shoreline moved seaward (22.21 ft).

New Jersey Beach Profile Network

#136 - Dolphin Avenue, Beach Haven, Ocean County

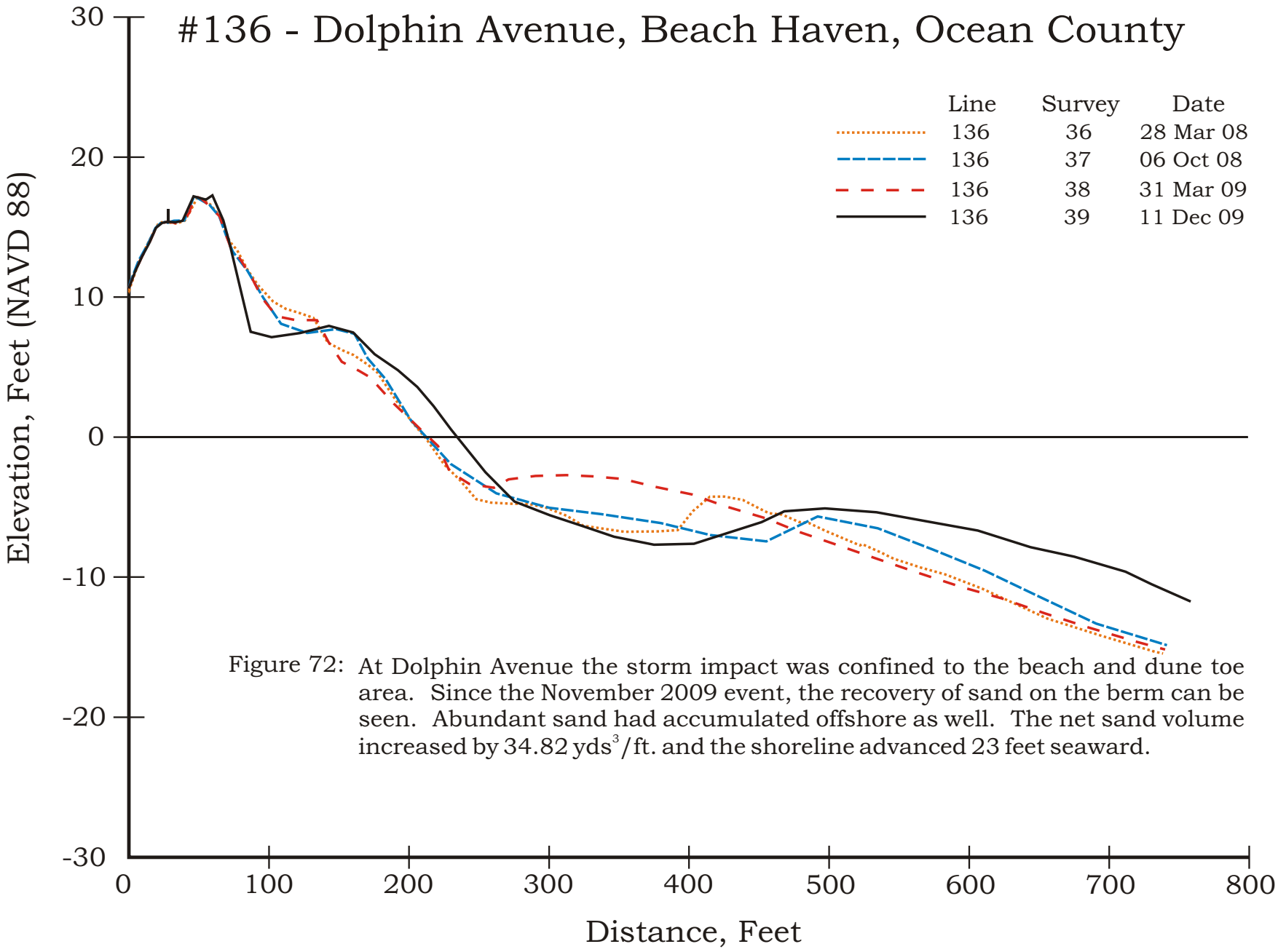

Figure 72: At Dolphin Avenue the storm impact was confined to the beach and dune toe area. Since the November 2009 event, the recovery of sand on the berm can be seen. Abundant sand had accumulated offshore as well. The net sand volume increased by 34.82 yds^3/ft. and the shoreline advanced 23 feet seaward.

WEBSTER AVENUE, LONG BEACH TOWNSHIP - SITE 135

Photo taken Octobert 7, 2008. View to the south.

The Webster Avenue site has a tall, but narrow dune with a beach that slopes seaward from the dune toe. Bar migration is important to building a summer berm.

Photo taken December 11, 2009. View to the south.

Comparing the profiles over the fourteen month time period, the profile location lost volume (-63.70 cu yd/ft) and the shoreline moved landward (-93.95 ft). Particularly hard hit by the series of northeasters during the fall of 2009, this site lost much of the beach and the seaward toe of the dunes.

New Jersey Beach Profile Network

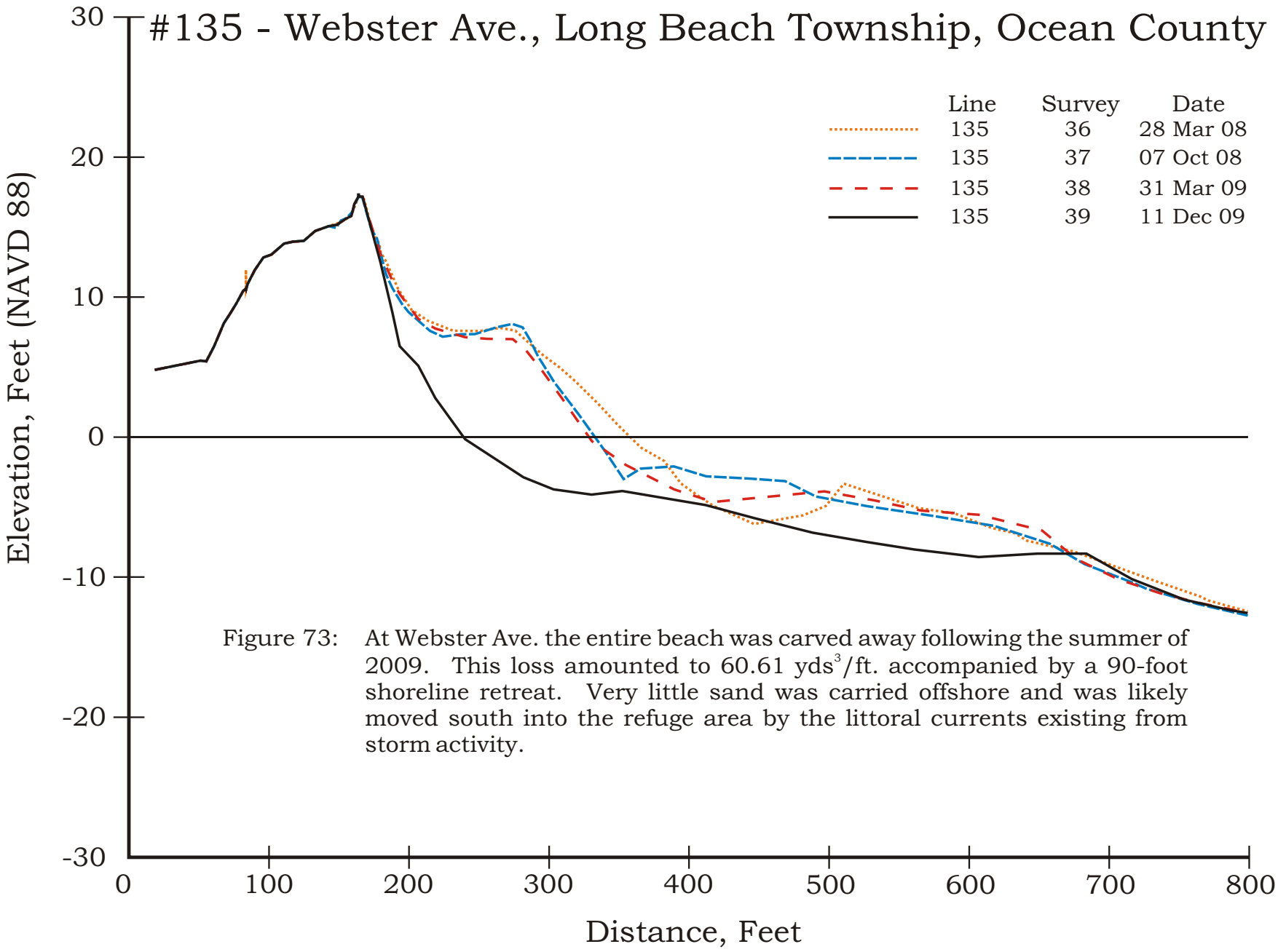

Figure 73: At Webster Ave. the entire beach was carved away following the summer of 2009. This loss amounted to 60.61 yds^3/ft. accompanied by a 90-foot shoreline retreat. Very little sand was carried offshore and was likely moved south into the refuge area by the littoral currents existing from storm activity.

NATURAL AREA, LONG BEACH TOWNSHIP - SITE 234

Photo taken October 7, 2008. View to the north.

This view toward the terminal groin shows a narrow beach with considerable exposure of the rocks. Northeast storms act to move sand around this groin where post-storm waves move it onto the beach after the storm. In the absence of northeasters sand will move up the beach from the south if southeast wave conditions prevail for extended periods of time.

Photo taken December 11, 2009. View to the north.

Comparing the profiles over the fourteen month time period, the profile location gained volume (13.88 cu yd/ft) and the shoreline moved landward (-26.65 ft). The sand volume increase was dominantly found offshore.

New Jersey Beach Profile Network

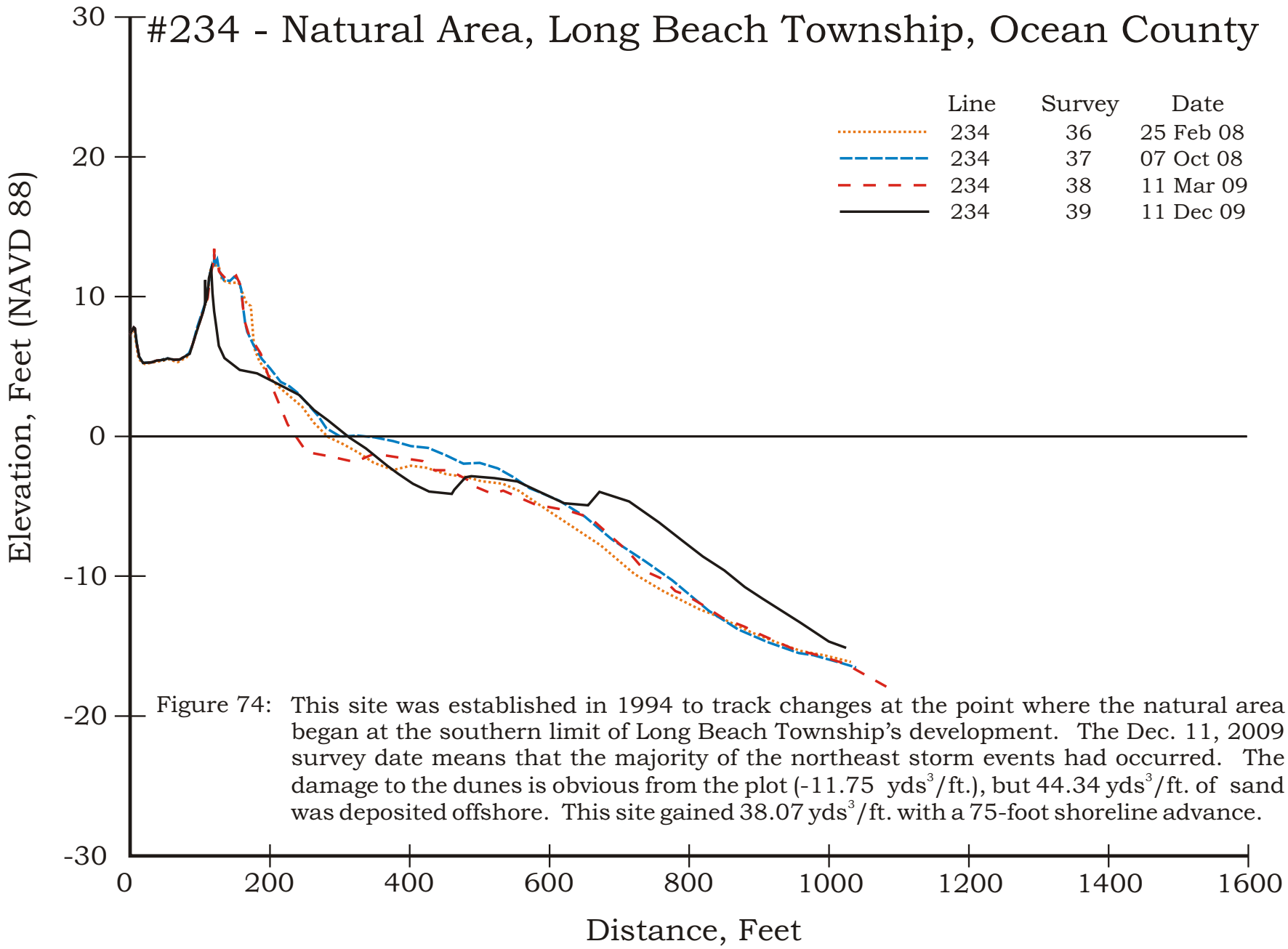

Figure 74: This site was established in 1994 to track changes at the point where the natural area began at the southern limit of Long Beach Township's development. The Dec. 11, 2009 survey date means that the majority of the northeast storm events had occurred. The damage to the dunes is obvious from the plot (-11.75 yds^3/ft.), but 44.34 yds^3/ft. of sand was deposited offshore. This site gained 38.07 yds^3/ft. with a 75-foot shoreline advance.