



APPENDIX D SBEACH ANALYSIS

APPENDIX D

SBEACH ANALYSIS & RESULTS

1. Representative Transects
2. Calibration Results
 - a. Ophelia
 - b. Irene
3. Design Storm Results
 - a. Existing Conditions
 - i. 25 Year Storm
 - ii. 50 year Storm
 - iii. 100 Year Storm
 - b. 25 Year Protection
 - i. 25 Year Storm
 - ii. 50 year Storm
 - iii. 100 Year Storm
 - c. 50 Year Protection
 - i. 25 Year Storm
 - ii. 50 year Storm
 - iii. 100 Year Storm

1. Representative Transects

1.0 REPRESENTATIVE TRANSECTS

The representative transects for Bogue Banks were chosen based on the June 2011 profile survey data. For a majority of the reaches, multiple representative transects were chosen due to the varying beach profiles with that reach. Table 1-1 summarizes the breakdown of each reach into subreaches with their associated length and representative transect.

Table 1-1: Reach Description and Representative Profile Transects

Reach	Bogue Banks Transects	Length (feet)	Representative Transect
Bogue Inlet – Ocean (1-8)	1 through 8	7,432	6
Emerald Isle – West (9-25)	9 through 11	4,056	11
	12 through 22	14,283	17
	23 through 25	4,005	25
Emerald Isle – Central (26-36)	26 through 32	10,428	30
	33 through 36	5,374	35
Emerald Isle – East (37-48)	37 through 44	8,814	42
	45 through 48	4,406	46
Indian Beach – Salter Path (49-58)	49 through 52	5,275	50
	53 through 58	7,575	58
Pine Knoll Shores – West (59-65)	59 through 65	9,063	65
Pine Knoll Shores – East (66-76)	66 through 70	6,564	70
	71 through 76	8,251	75
Atlantic Beach (77-102)	77 through 81	5,388	79
	82 through 89 & 91 through 96	13,771	85
	90	1,006	90
	97 through 102	6,011	100
Fort Macon State Park (103-112)	103 through 112	6,691	105

1.1 Bogue Inlet – Ocean

This reach is highly variable due to the proximity to Bogue Inlet. Transect 6 was chosen as the representative profile within this reach. This transect captures the average primary frontal dune height of 15 feet NAVD88, as well as an average berm height of 6 feet NAVD88. The foreshore slope is also consistent with the other profiles in this reach. There is no other feature within this reach that would be necessary to represent when using SBEACH. These transects are shown below in Figure 1-1.

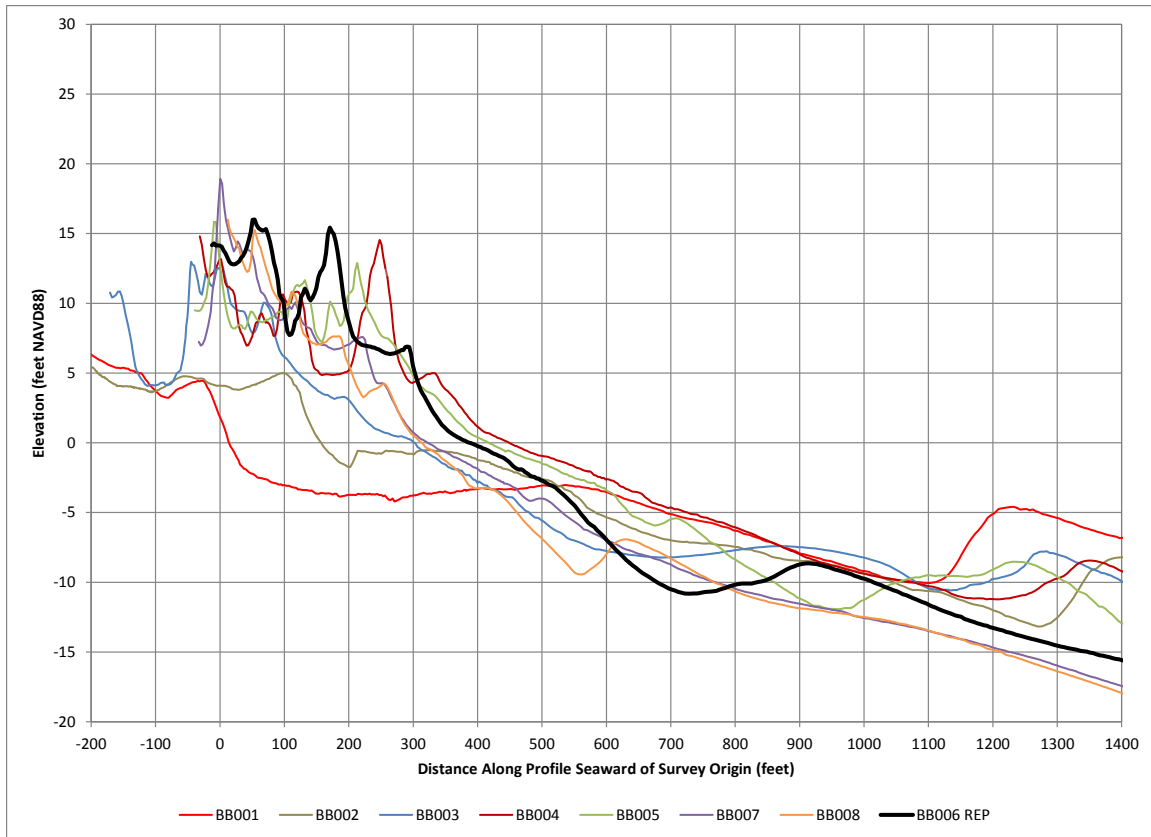


Figure 1-1: Bogue Inlet, Transects 1 – 8

1.2 Emerald Isle – West

It was necessary to split this reach in to three subreaches. The first subreach included transect 9 through 11. The second subreach included transects 12 through 22. The third subreach included transects 23 through 25.

1.2.1 Transects 9-11

Transect 11 was chosen as the representative transect in this subreach in the western end of Emerald Isle - West. These transects were characterized by a dune height of approximately 15 feet NAVD88 and a berm elevation of approximately 6 feet NAVD88. These transects are shown below in Figure 1-2.

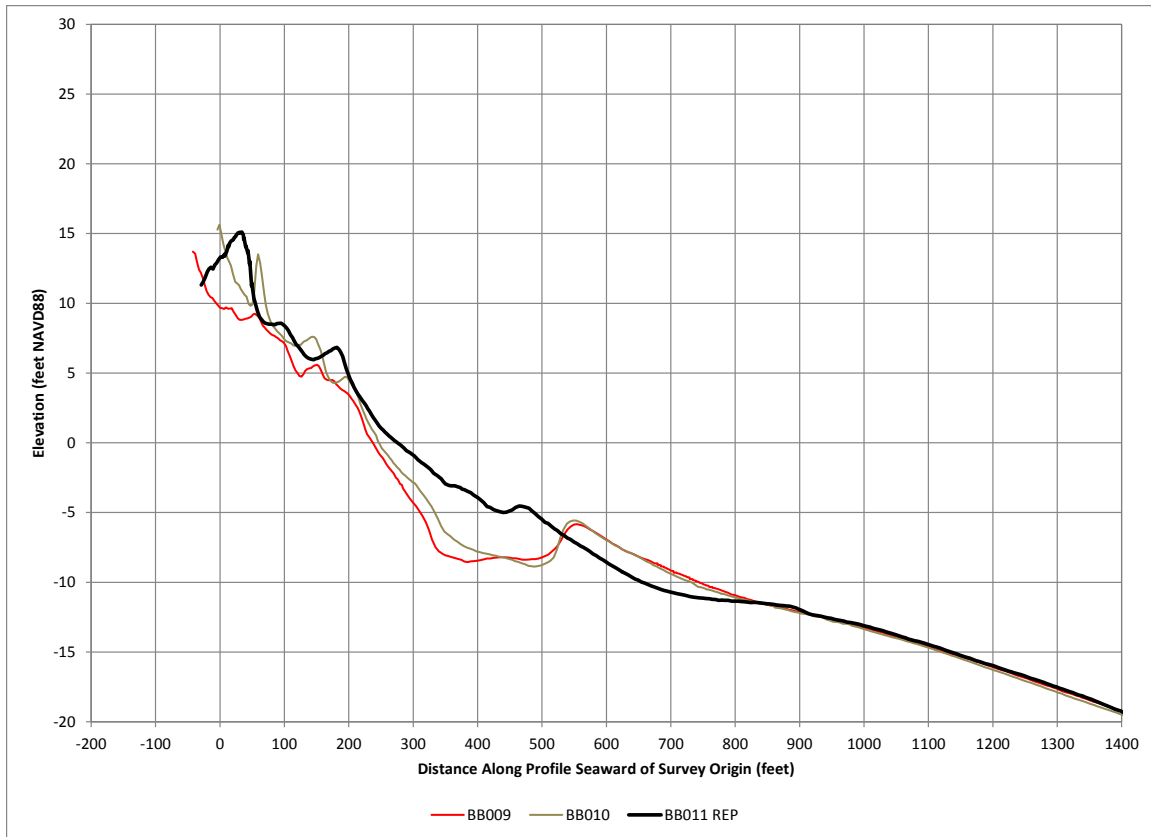


Figure 1-2: Emerald Isle – West, Subreach 1 Transects 9 – 11

1.2.2 Transects 12-22

Transects 17 was chosen as the representative transect in this subreach in the central section of Emerald Isle – West. The dune heights grow in this section of the reach to approximately 20 feet NAVD88 and the berm elevation remains at approximately 6 feet NAVD88. There were a few outliers with dune heights peaking over 25 feet NAVD88; however, this is not representative of this subreach. These transects are shown below in Figure 1-3

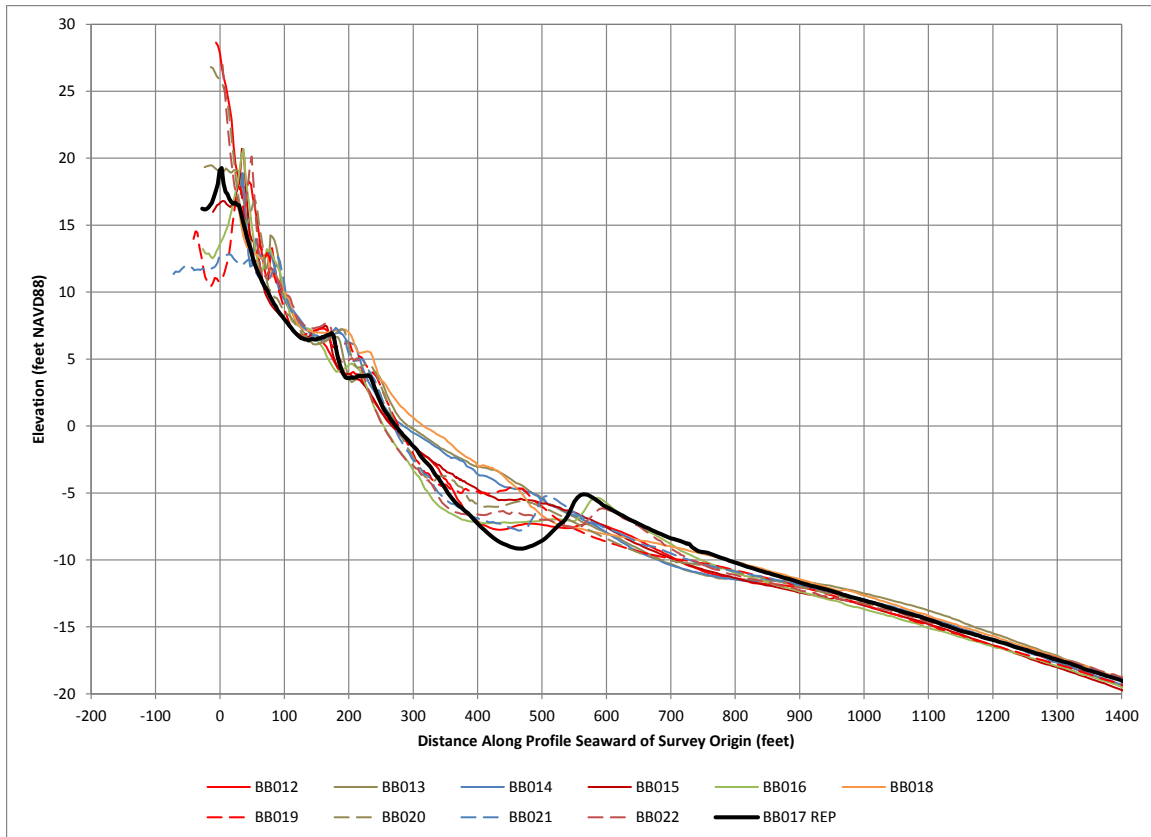


Figure 1-3: Emerald Isle – West, Subreach 2 Transects 12 – 22

1.2.3 Transects 23-25

Transects 25 was chosen as the representative transect in this subreach in the eastern section of Emerald Isle – West. The dune heights in this section reduced back to approximately 16 feet NAVD88 and the berm elevation increased to approximately 8 feet NAVD88. There was one outlier with dune heights peaking over 30 feet NAVD88; however, this is not representative of this subreach. These transects are shown below in Figure 1-4.

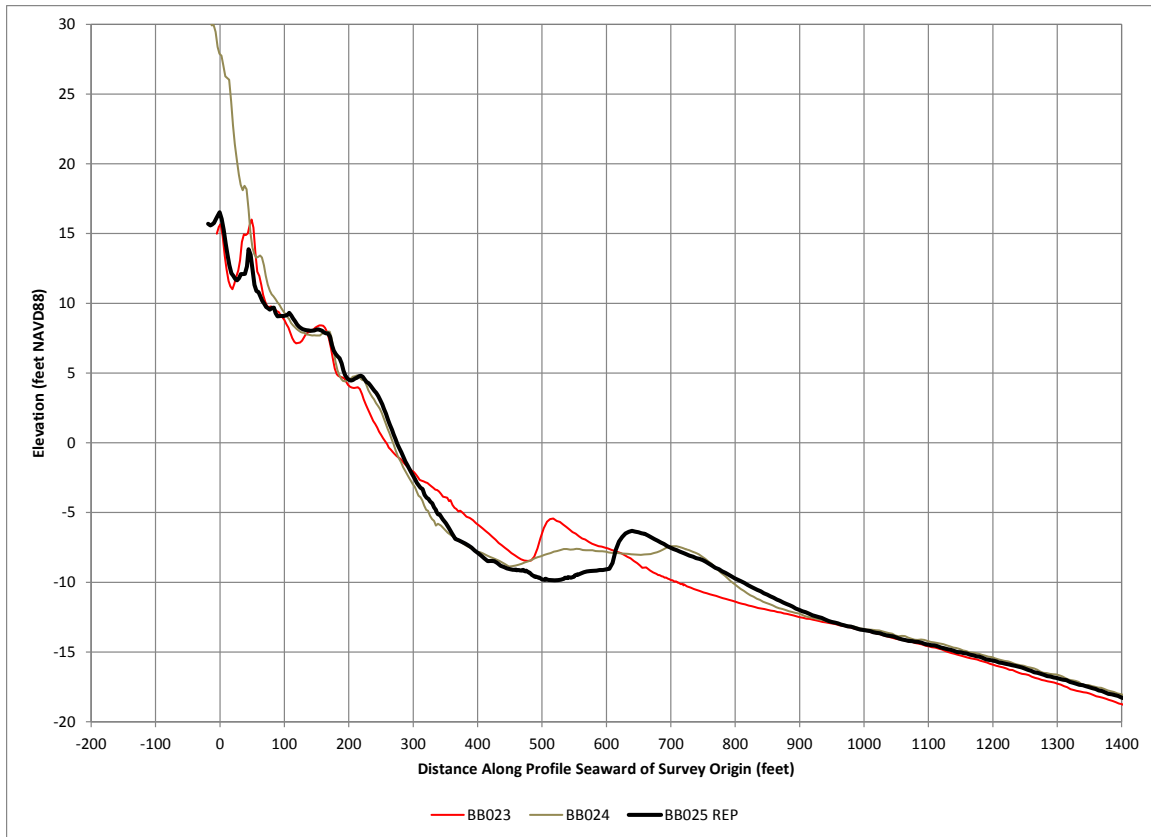


Figure 1-4: Emerald Isle – West, Subreach 3 Transects 23 – 25

1.3 Emerald Isle – Central

It was necessary to split this reach in to two subreaches. The first subreach included transect 26 through 32 and the second subreach included transects 33 through 36.

1.3.1 Transects 26-32

Transect 30 was chosen as the representative transect in this subreach in the eastern section of Emerald Isle – Central. These transects were characterized by a dune height of approximately 20 feet NAVD88 and a wide berm at an approximate elevation of 6 feet NAVD88. These transects are shown below in Figure 1-5.

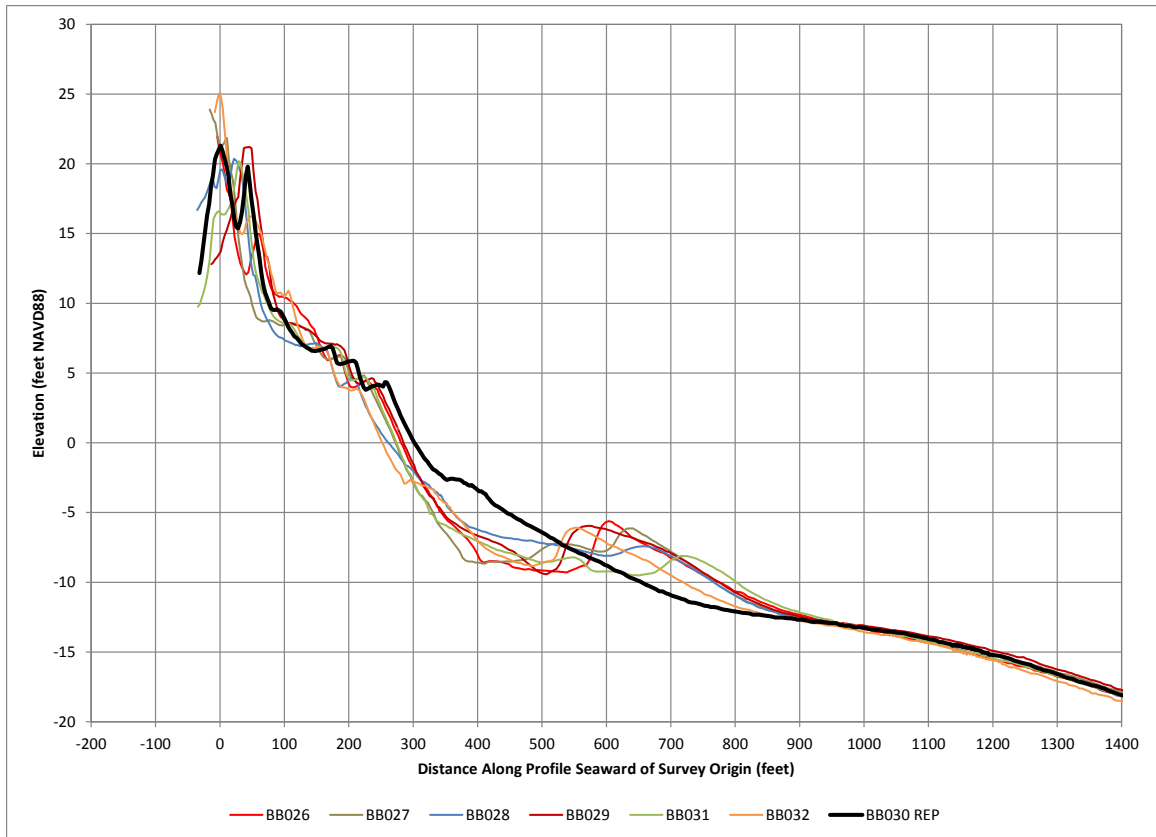


Figure 1-5: Emerald Isle – Central, Subreach 1 Transects 26 - 32

1.3.2 Transects 33-36

Transects 35 was chosen as the representative transect in this subreach in the western section of Emerald Isle – Central. The dune heights in this section reduce back to approximately 17 feet NAVD88 and the berm elevations are at approximately 8 feet NAVD88; however, they become much narrower. These transects are shown below in Figure 1-6.

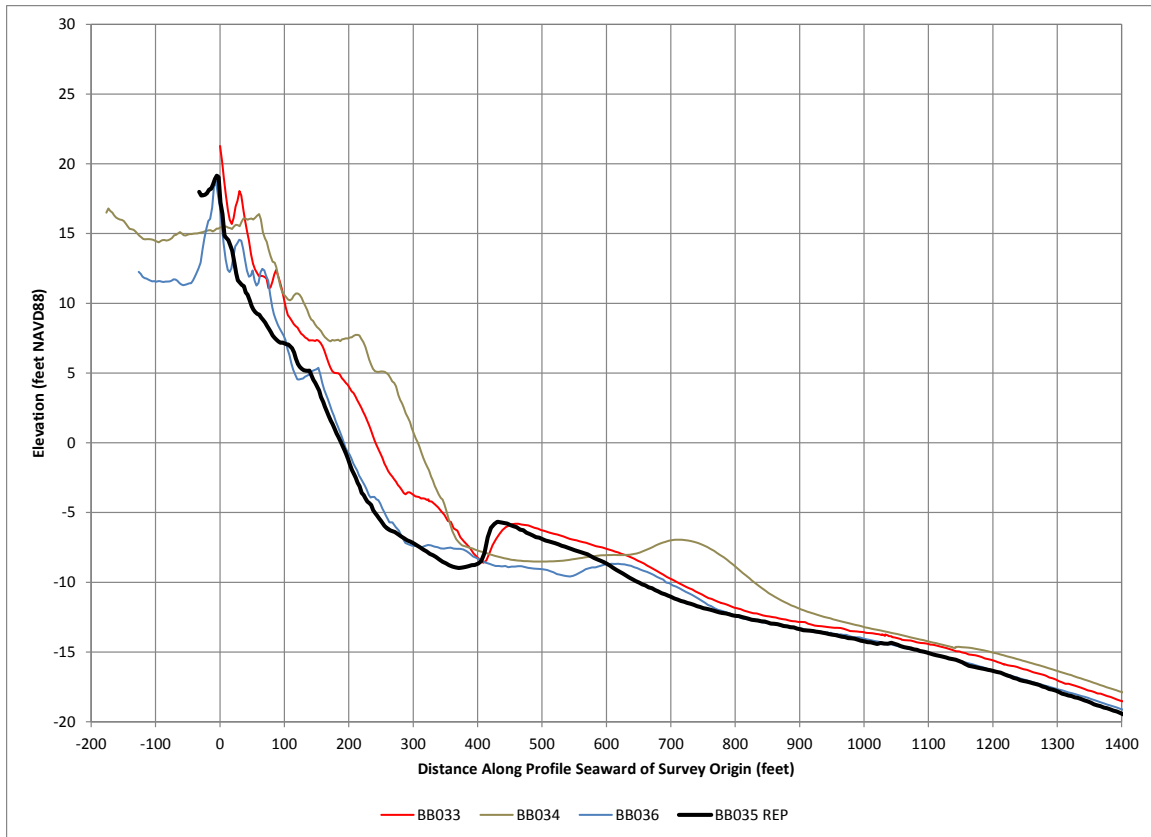


Figure 1-6: Emerald Isle – Central, Subreach 2 Transects 33 – 36

1.4 Emerald Isle – East

It was necessary to split this reach in to two subreaches. The first subreach included transects 37 through 44 and the second subreach included transects 45 through 48.

1.4.1 Transects 37-44

Transects 42 was chosen as the representative transect in this subreach in the western section of Emerald Isle – East. The selection of this transect was made primarily because this is the location of 12th St. hotspot as opposed to the physical beach properties. This profile should be included for future modeling purposes for this reach. These transects are shown below in Figure 1-7.

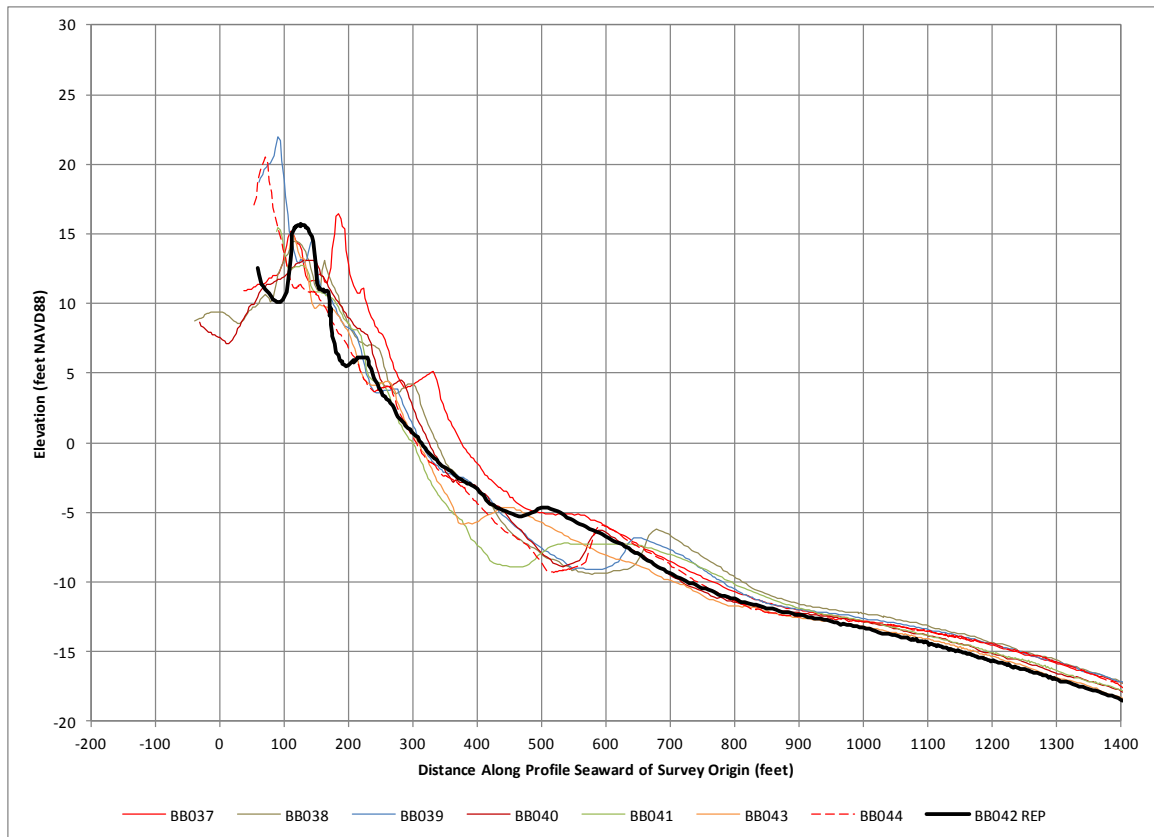


Figure 1-7: Emerald Isle – East, Subreach 1 Transects 37 – 44

1.4.2 Transects 45-48

Transects 46 was chosen as the representative transect in this subreach in the eastern section of Emerald Isle – East. The dune heights in this section increase to approximately 17 feet NAVD88 with a smaller frontal dune. The berm elevations reduce to approximately 5 feet NAVD88. These transects are shown below in Figure 1-8.

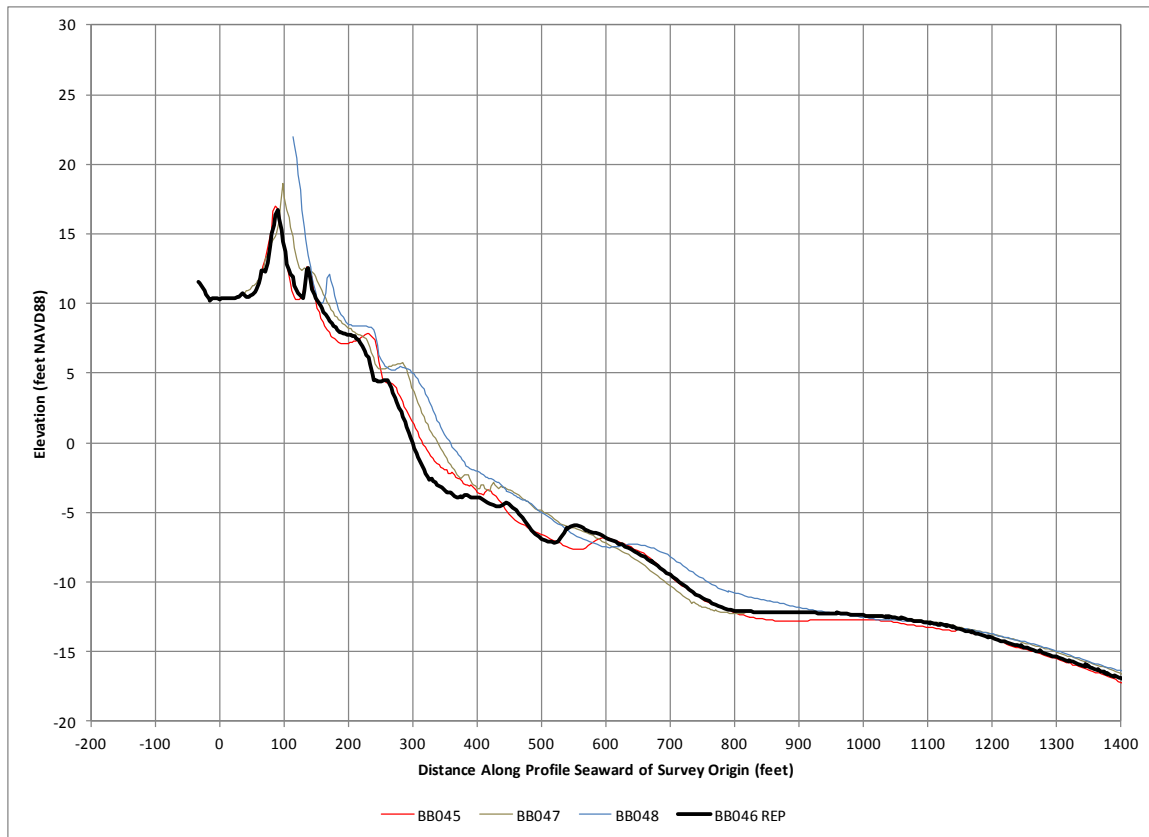


Figure 1-8: Emerald Isle – East, Subreach 2 Transects 45 – 48

1.5 Indian Beach – Salter Path

It was necessary to split this reach in to two subreaches. The first subreach included transect 49 through 52 and the second subreach included transects 53 through 58.

1.5.1 Transects 49 to 52

Transects 50 was chosen as the representative transect in this subreach in the western section of Indian Beach – Salter Path. The dune heights in this section increase to 25 feet NAVD88 on average with a smaller frontal dune. The berm elevations are approximately 5 feet NAVD88. These transects are shown below in Figure 1-9.

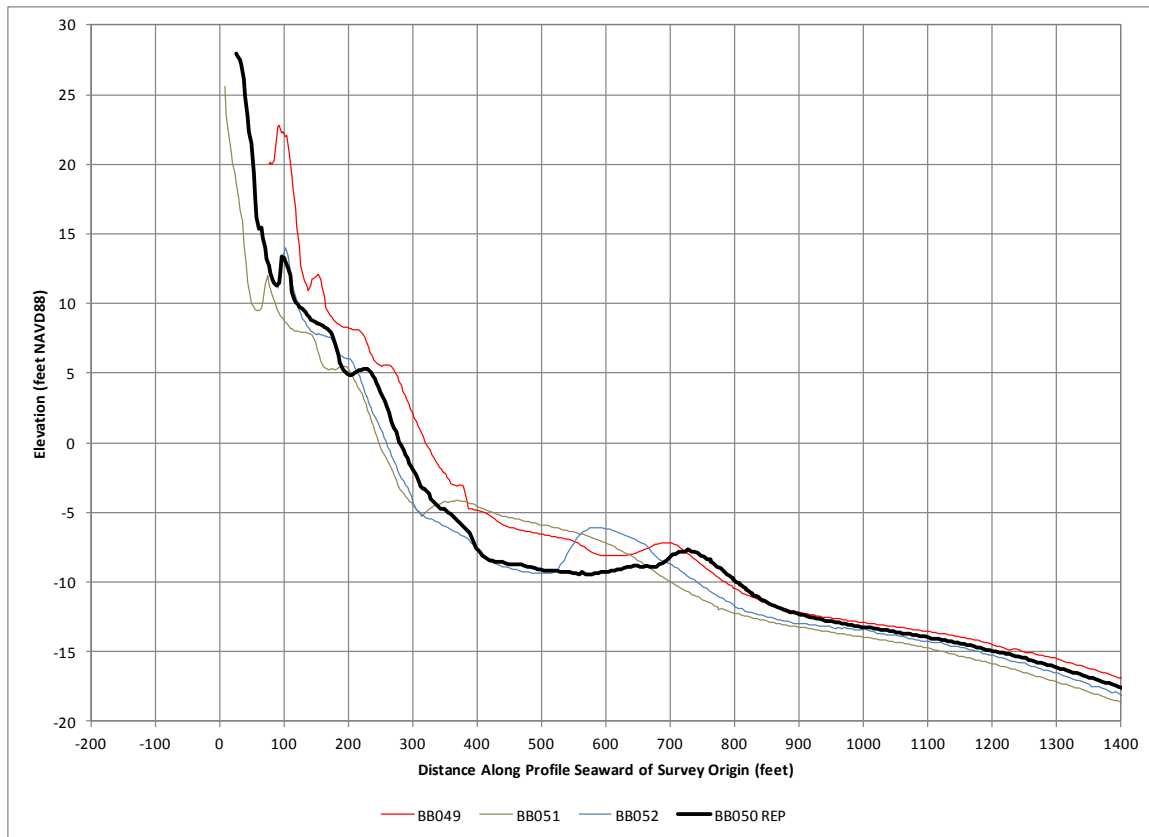


Figure 1-9: Indian Beach – Salter Path, Subreach 1 Transects 49 – 52

1.5.2 Transects 53-58

Transects 58 was chosen as the representative transect in this subreach in the eastern section of Indian Beach – Salter Path. The dune heights in this section reduce to approximately 22 feet NAVD88 with a smaller frontal dune still present; however, fading in some transects. The berm elevations remain at approximately 5 feet NAVD88. These transects are shown below in Figure 1-10.

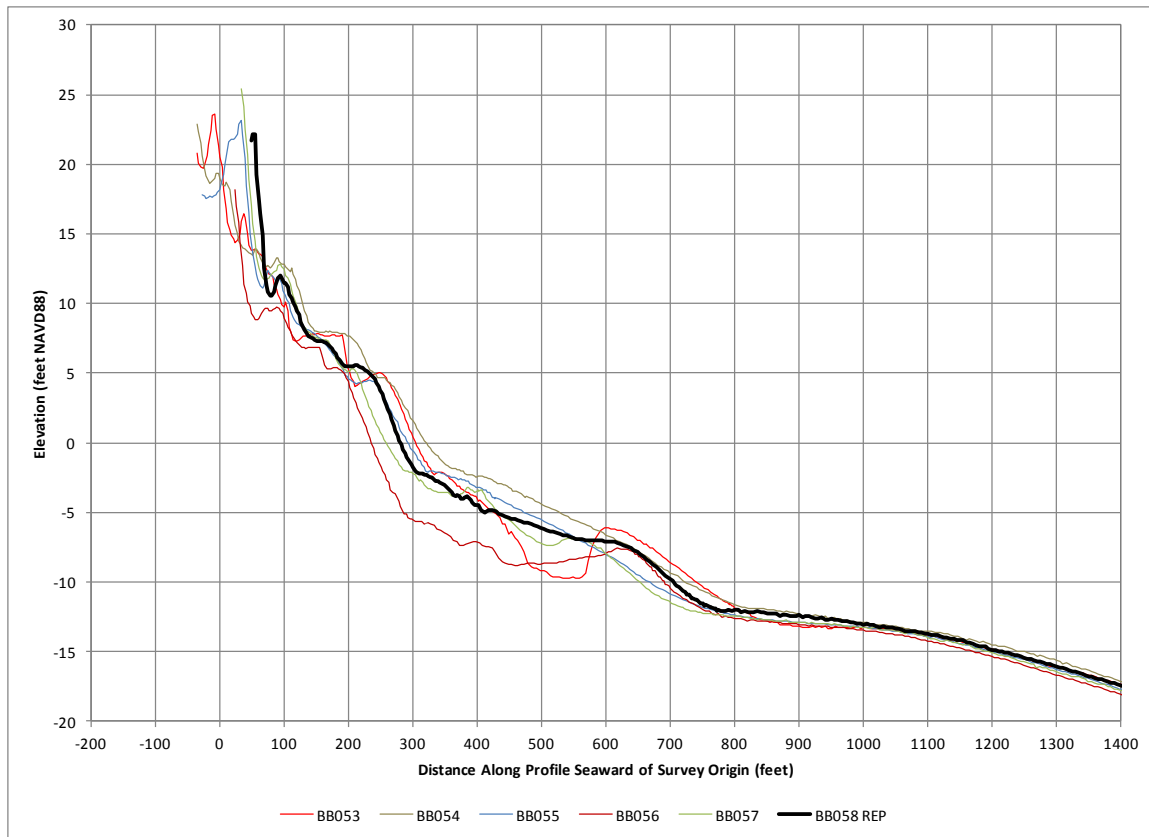


Figure 1-10: Indian Beach – Salter Path, Subreach 2 Transects 53 – 58

1.6 Pine Knoll Shores – West

Transects 65 was chosen as the representative transect in this reach Pine Knoll Shores - West. The dune heights in this reach are approximately 23 feet NAVD88 and berm elevations are approximately 7 feet NAVD88. There was one outlying transect with shorter dune elevation around 15 feet NAVD88; however, this was not representative of the entire reach. These transects are shown below in Figure 1-11.

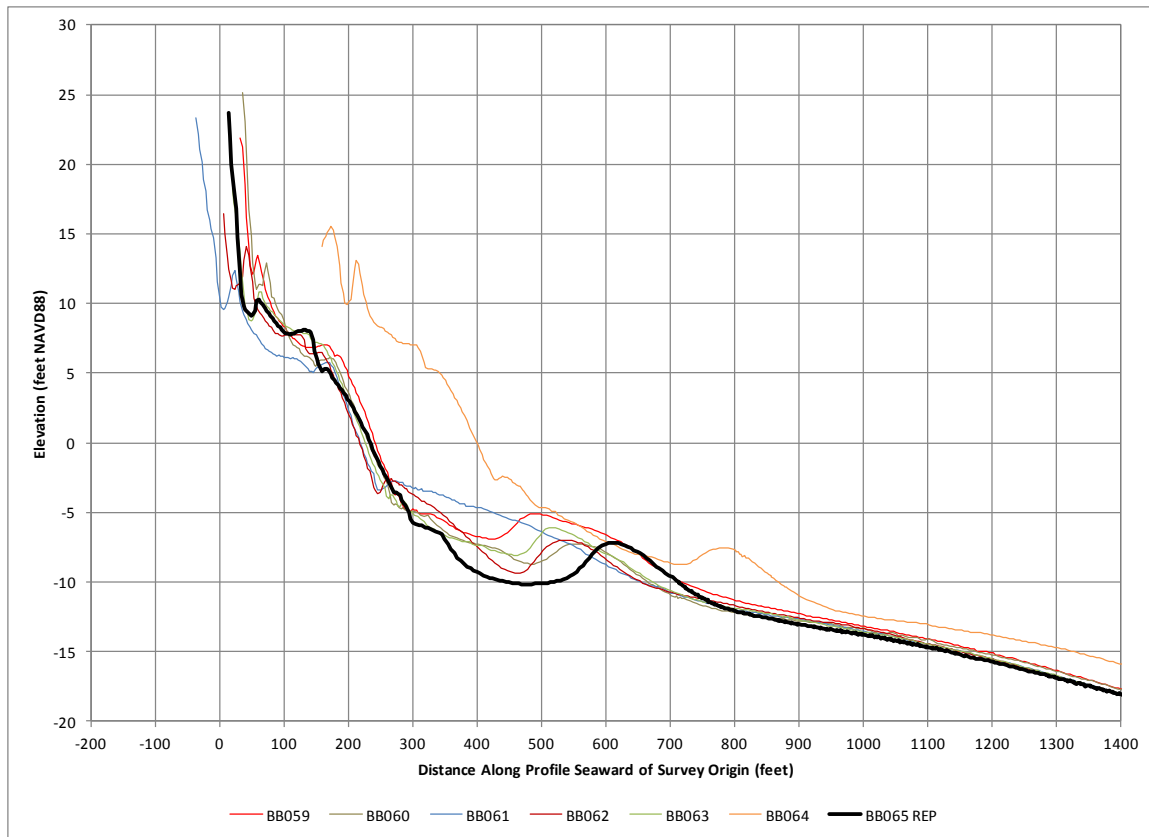


Figure 1-11: Pine Knoll Shores - West, Transects 59 – 65

1.7 Pine Knoll Shores – East

It was necessary to split this reach in to two subreaches. The first subreach included transect 66 through 70 and the second subreach included transects 71 through 76.

1.7.1 Transects 66-70

Transects 70 was chosen as the representative transect in this subreach in the western section of Pine Knoll Shores - East. These profiles were characterized by a dune height of approximately 17 feet NAVD88 and a wide berm at an approximate elevation of 8 feet NAVD88. These transects are shown below in Figure 1-12.

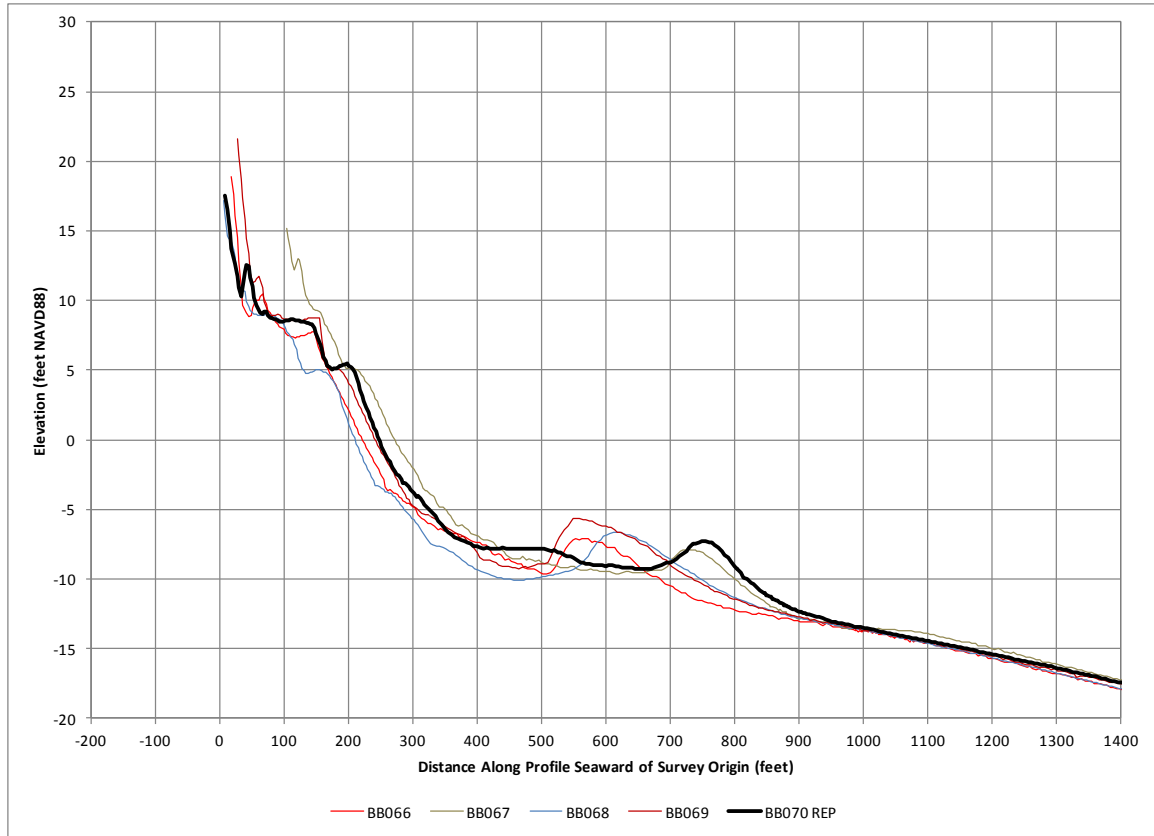


Figure 1-12: Pine Knoll Shores - East, Subreach 1 Transects 66 – 70

1.7.2 Transects 71-76

Transects 75 was chosen as the representative transect in this subreach in the eastern section of Pine Knoll Shores - East. These profiles were characterized by a primary dune height of approximately 17 feet NAVD88 and a smaller frontal dune feature. The berm decreases in width and is at an approximate elevation of 5 feet NAVD88. These transects are shown below in Figure 1-13.

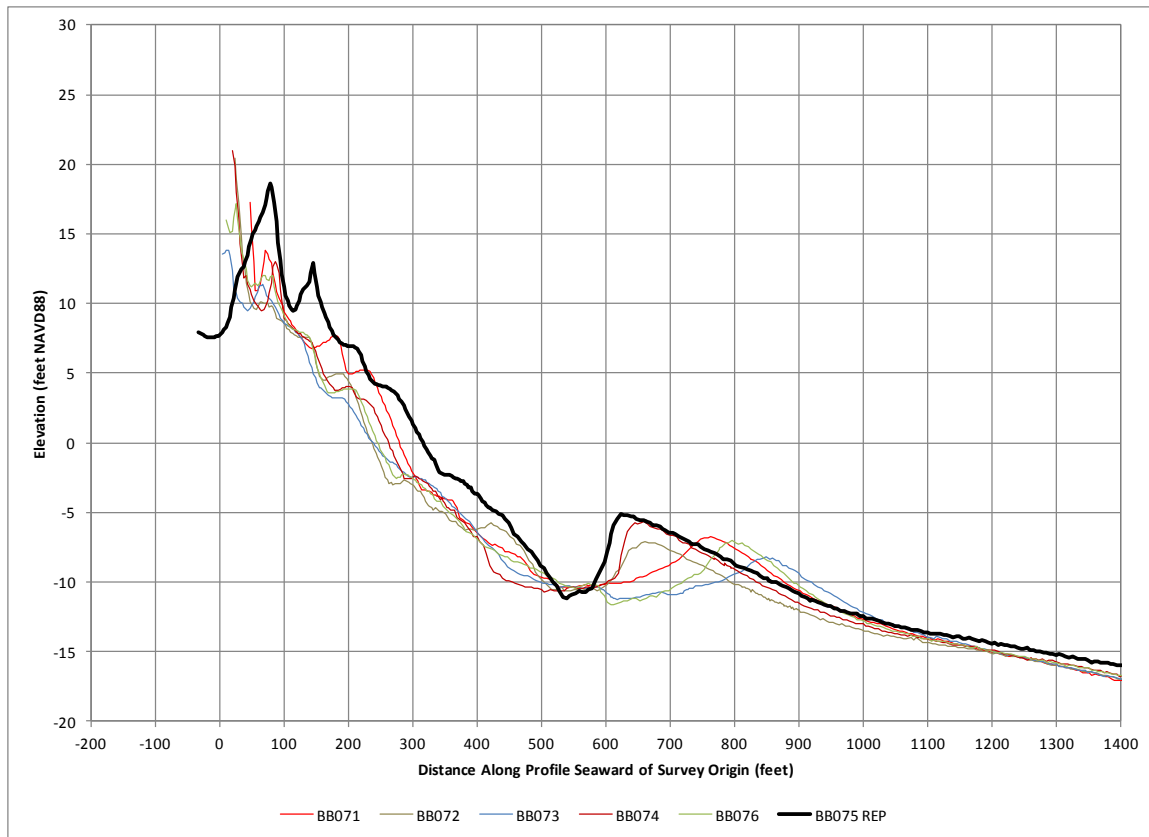


Figure 1-13: Pine Knoll Shores - East, Subreach 2 Transects 71 – 76

1.8 Atlantic Beach

It was necessary to split this reach in to four subreaches. The first subreach included transects 77 through 81. The second subreach included transects 82 through 89 and 91 through 96. The third subreach only included transect 90. The fourth subreach included transects 97 through 102.

1.8.1 Transects 77-81

Transects 79 was chosen as the representative transect in this subreach in the western section of Atlantic Beach. These profiles were characterized by a primary dune height of approximately 20 feet NAVD88 and a smaller frontal dune feature. The berm is very narrow and is at an approximate elevation of 7 feet NAVD88. These transects are shown below in Figure 1-14.

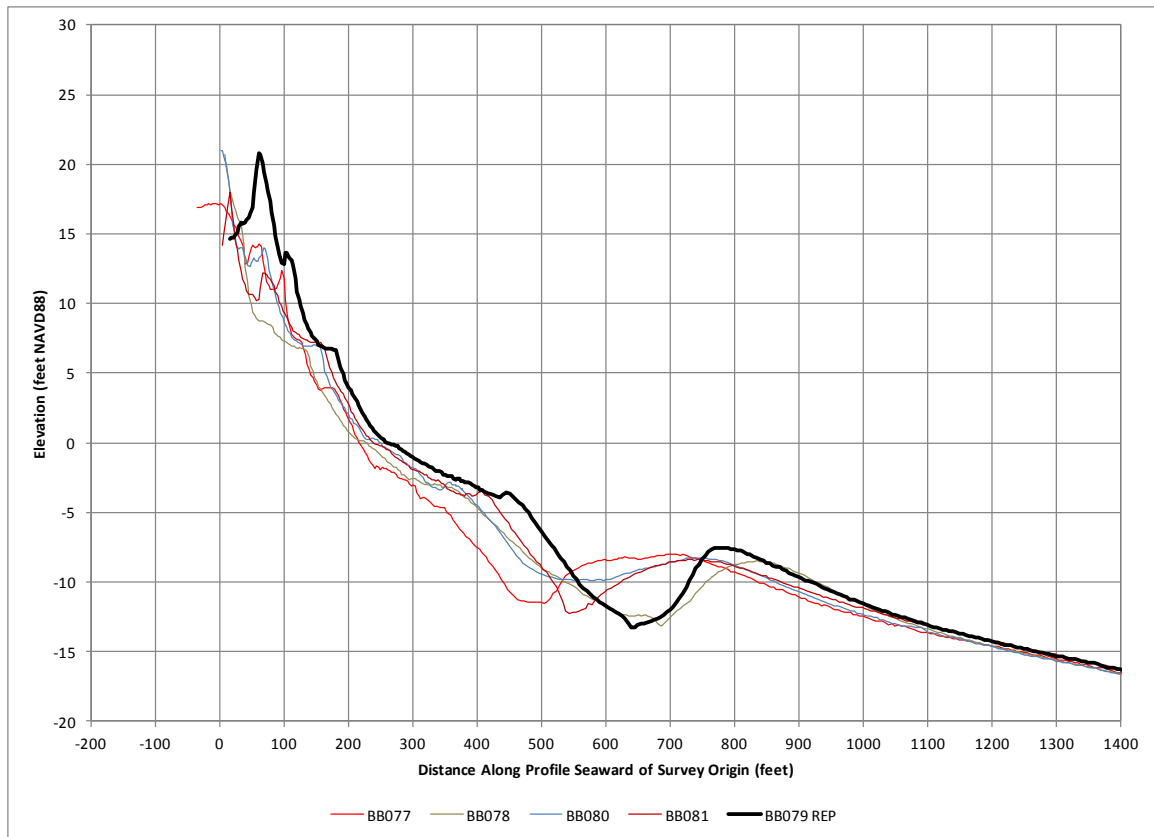


Figure 1-14: Atlantic Beach, Subreach 1 Transects 77 - 81

1.8.2 Transects 82-89 and 91-96

This subreach was highly variable with many different physical beach characteristics. Transect 85 was chosen as the representative transects in this subreach in the central section of Atlantic Beach. This transects was a conservative choice for this subreach. These transects are shown below in Figure 1-15.

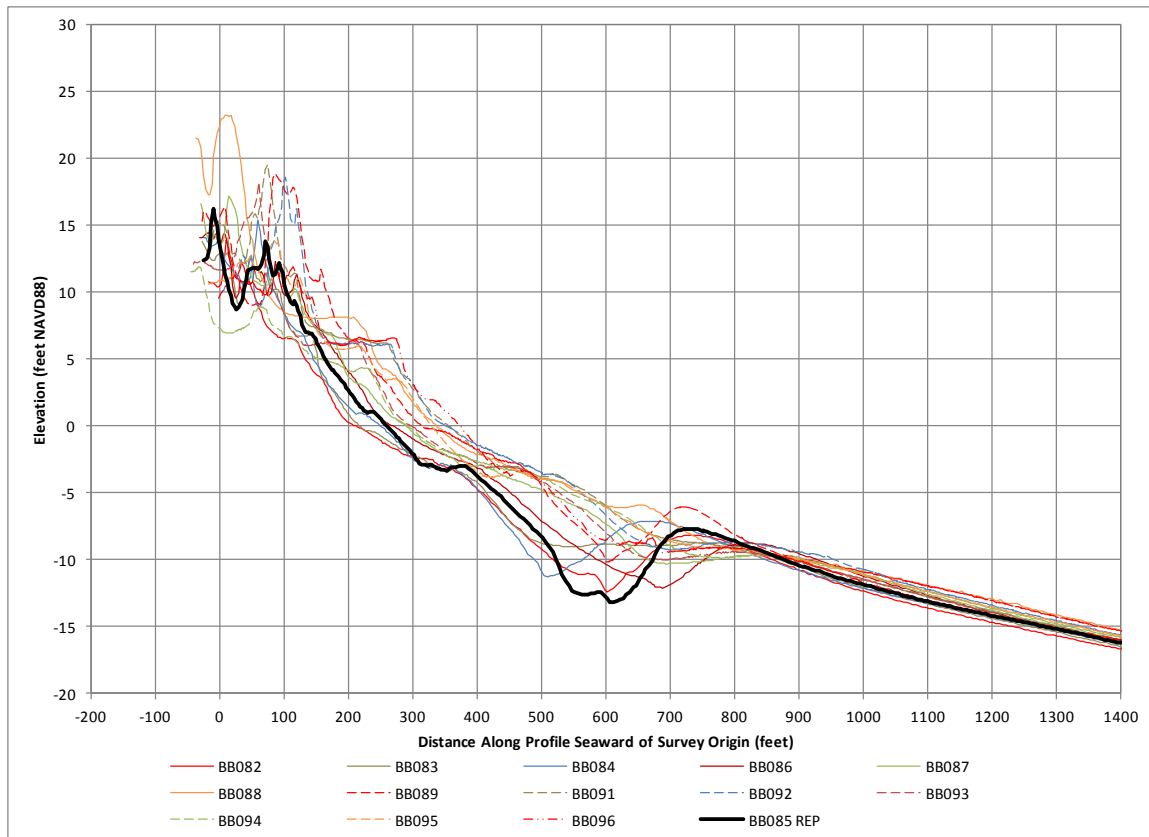


Figure 1-15: Atlantic Beach, Subreach 2 Transects 82 - 89 and 91 - 96

1.8.3 *Transect 90*

Transect 90 is located at the circle and should be considered on its own. There is no dune feature at this transect providing minimal protection. This transect is shown below in Figure 1-16.

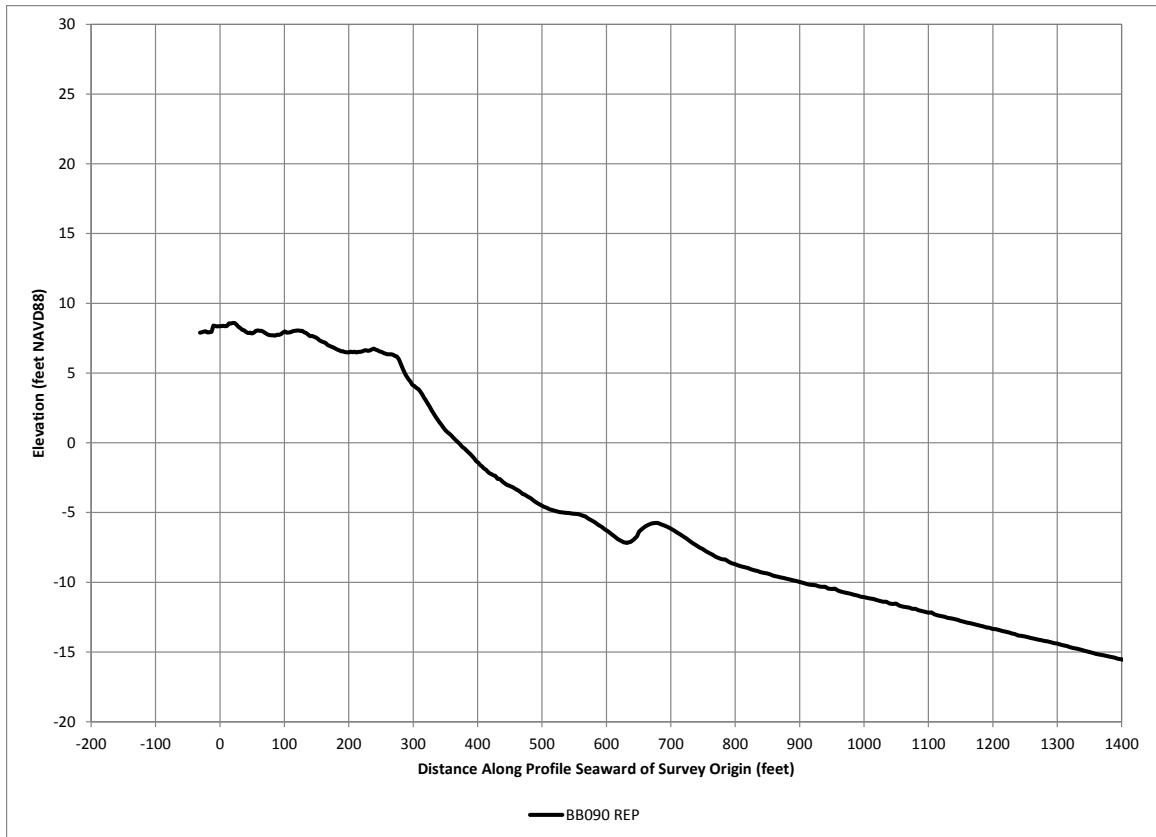


Figure 1-16: Atlantic Beach, Subreach 3 Transect 90

1.8.4 Transects 97-102

Transect 100 was chosen as the representative transect in this subreach in the eastern section of Atlantic Beach. These profiles were characterized by a primary dune height of approximately 15 feet NAVD88. The berm width grows to be over 300 feet wide and is at an approximate elevation of 6 feet NAVD88. These transects are shown below in Figure 1-17.

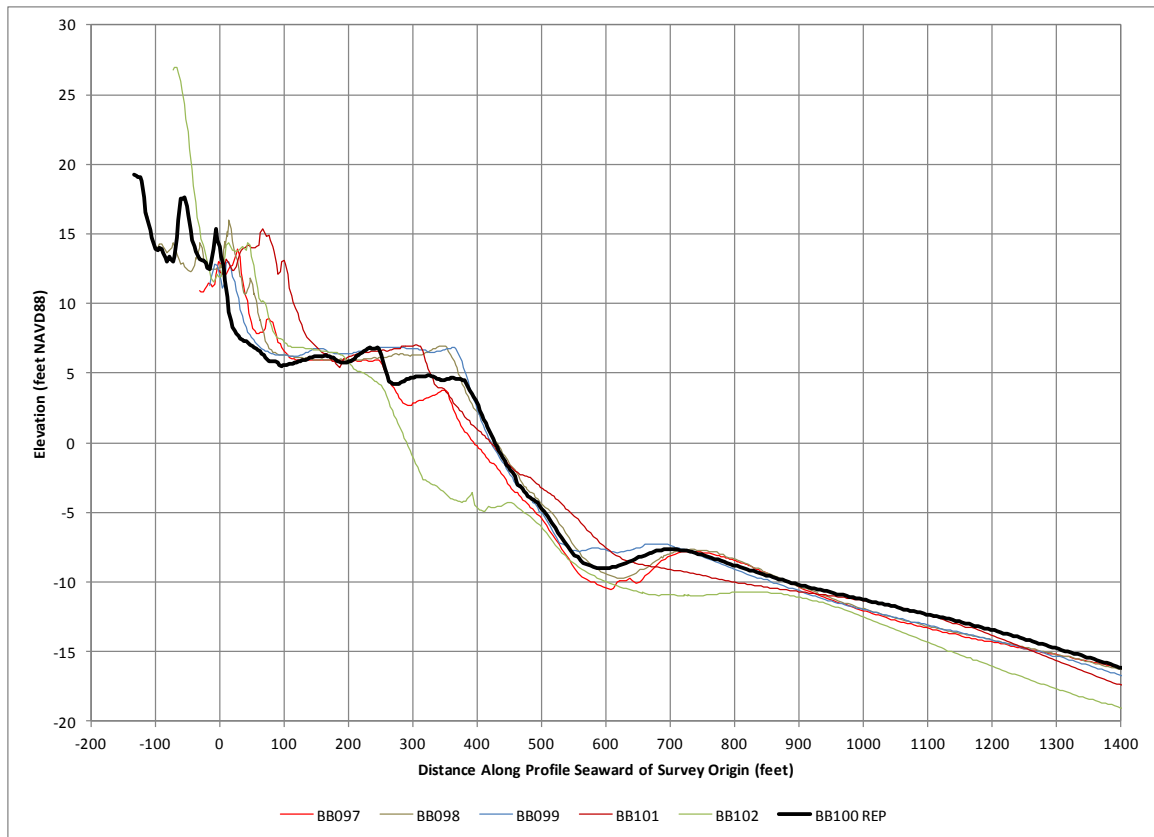


Figure 1-17: Atlantic Beach, Subreach 4 Transects 97 - 102

1.9 Fort Macon State Park

Transect 105 was chosen as the representative transect in this reach. These transects were characterized by a primary dune height of approximately 20 feet NAVD88. The berm width grows to be over 250 feet wide in areas and is at an approximate elevation of 6 feet NAVD88. These transects are shown below in Figure 1-18.

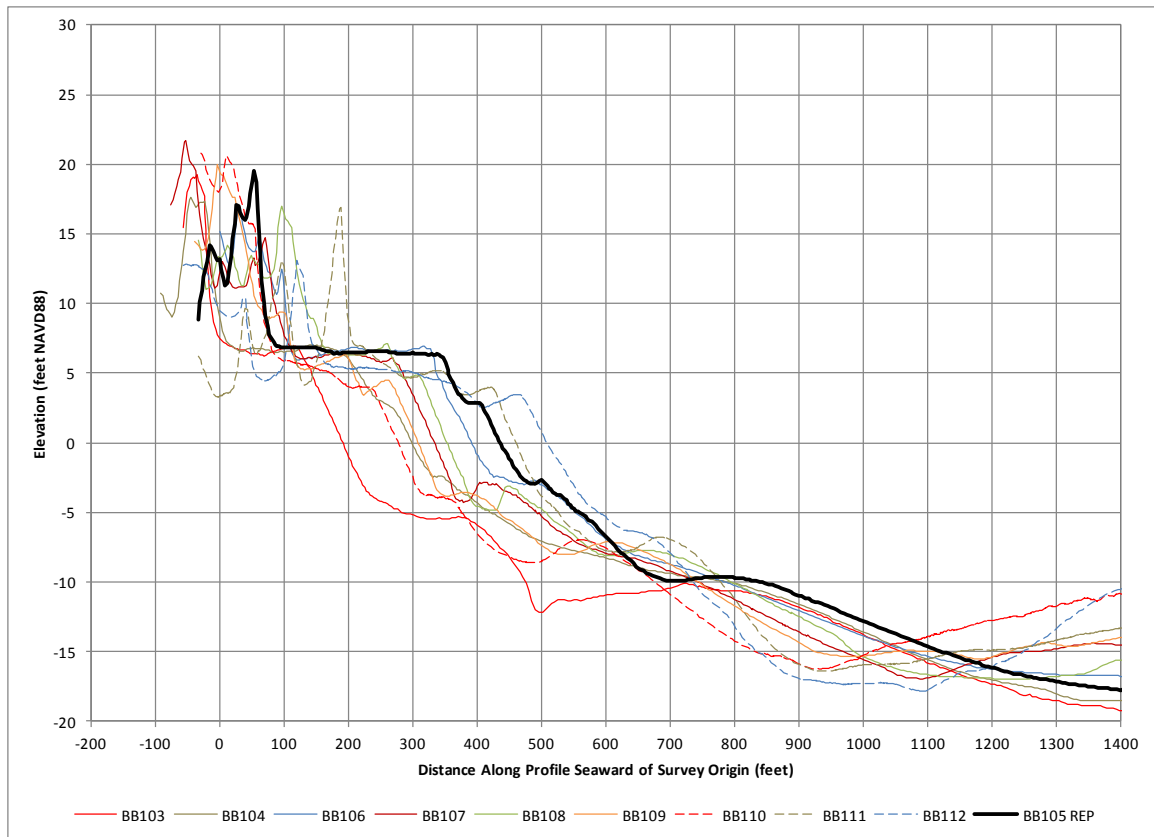


Figure 1-18: Fort Macon State Park, Transects 103 - 112

2. Calibration Results

2a.Ophelia Calibration

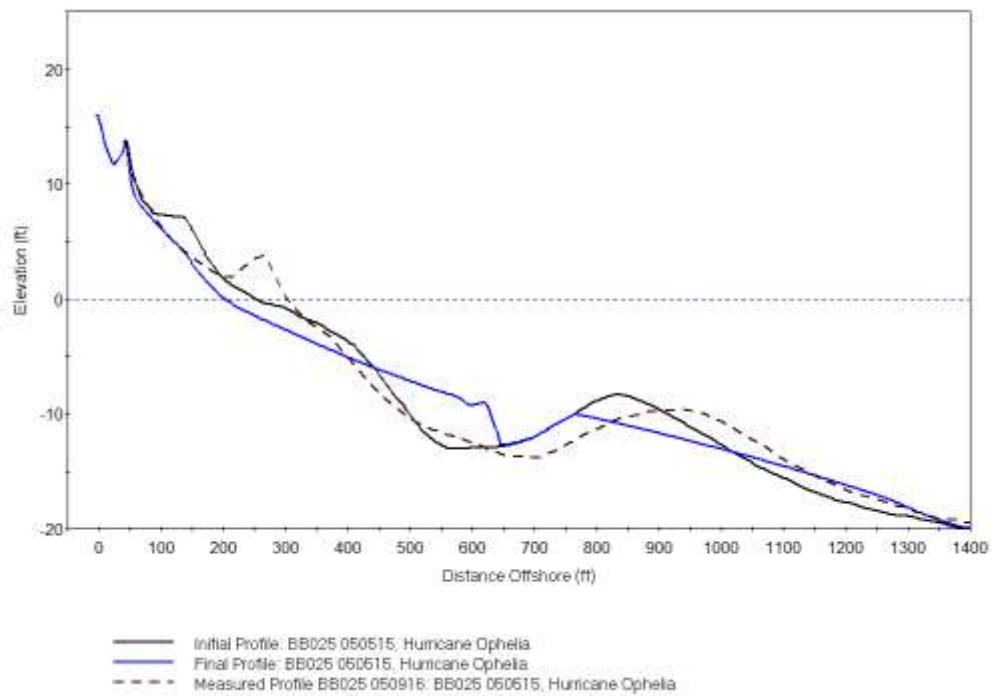


Figure 2-1: SBEACH calibration: Hurricane Ophelia at BB025

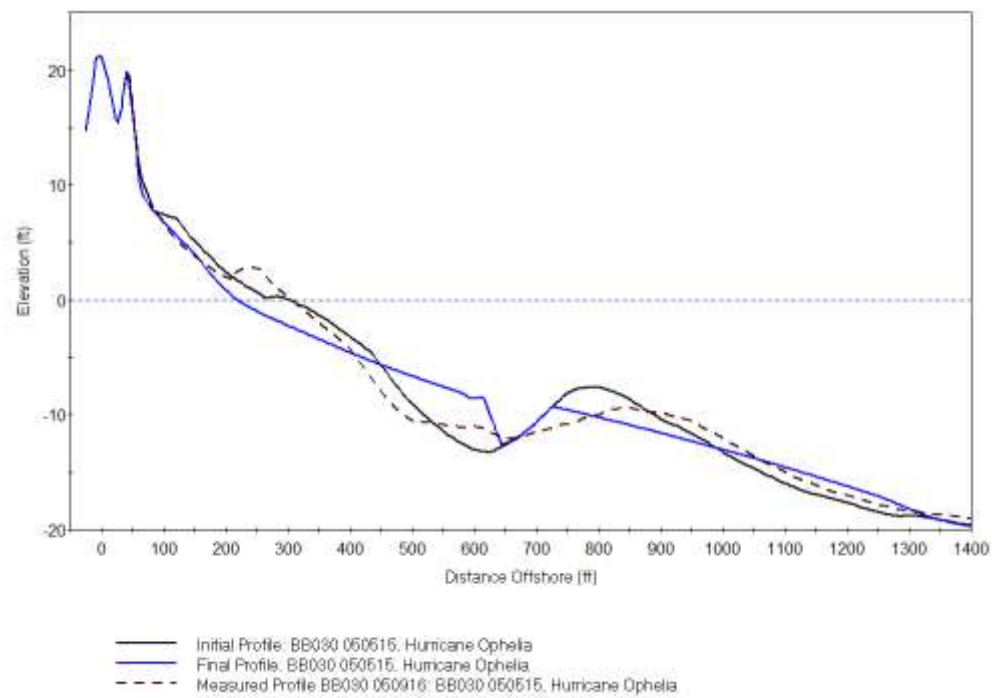


Figure 2-2: SBEACH calibration: Hurricane Ophelia at BB030

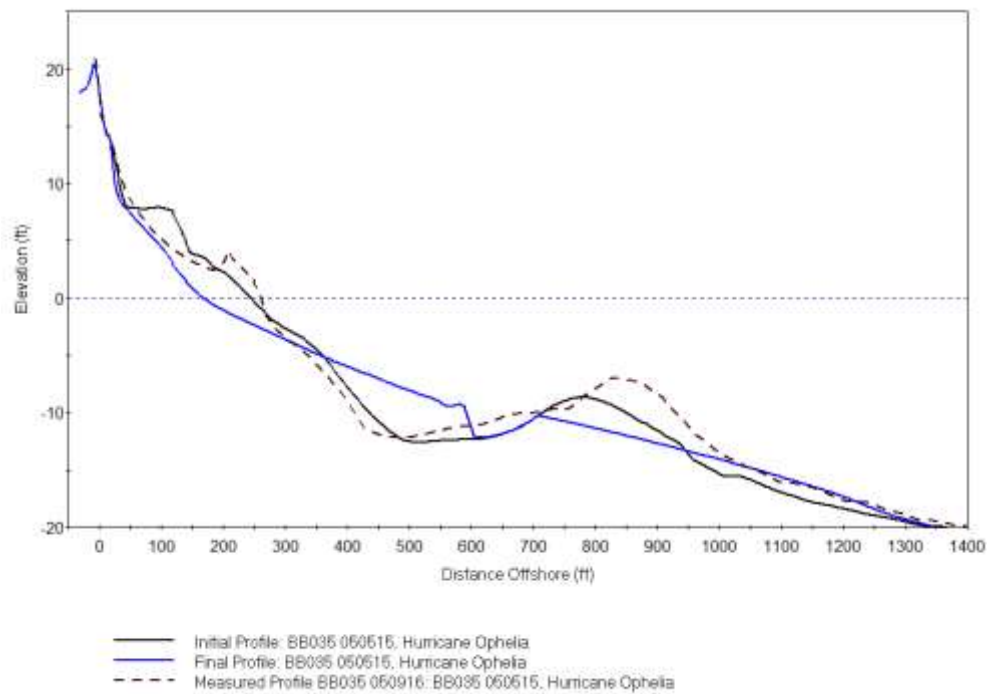


Figure 2-3: SBEACH calibration: Hurricane Ophelia at BB035

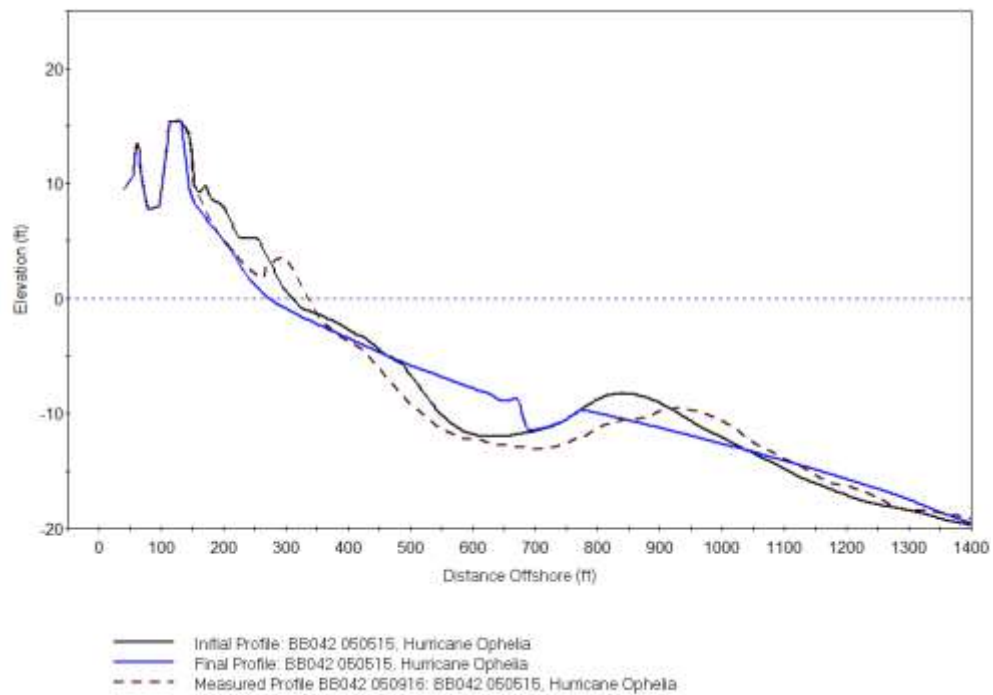


Figure 2-4: SBEACH calibration: Hurricane Ophelia at BB042

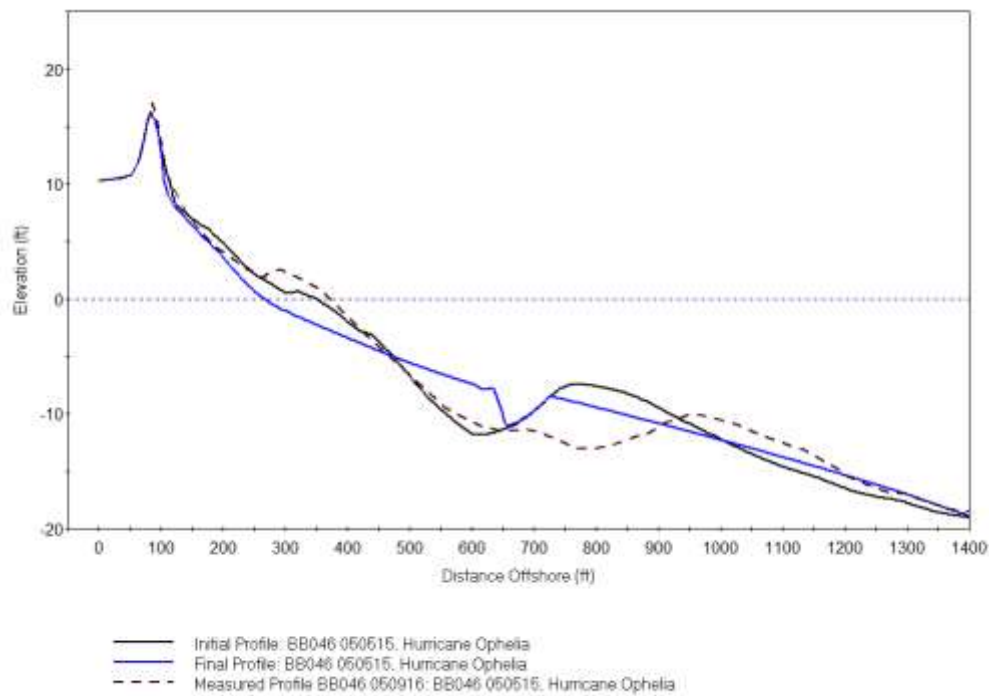


Figure 2-5: SBEACH calibration: Hurricane Ophelia at BB046

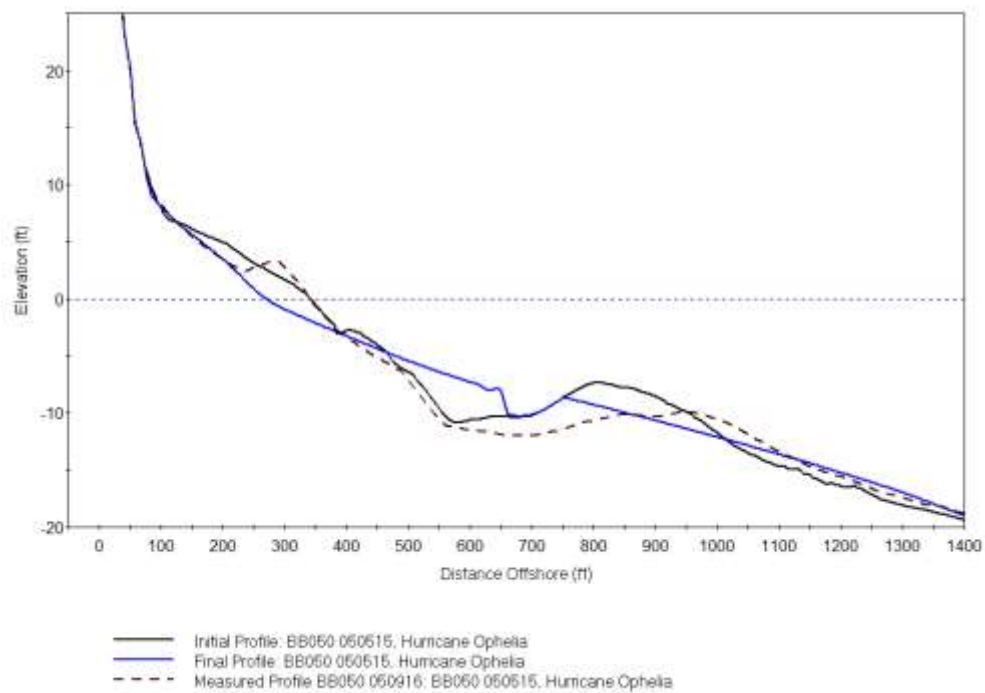


Figure 2-6: SBEACH calibration: Hurricane Ophelia at BB050

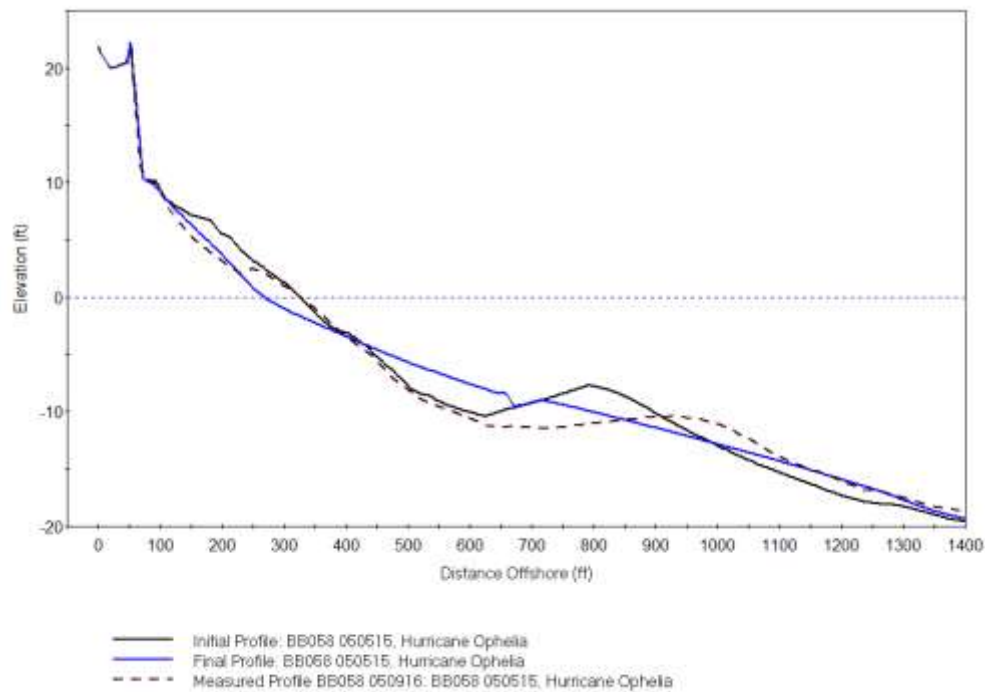


Figure 2-7: SBEACH calibration: Hurricane Ophelia at BB058

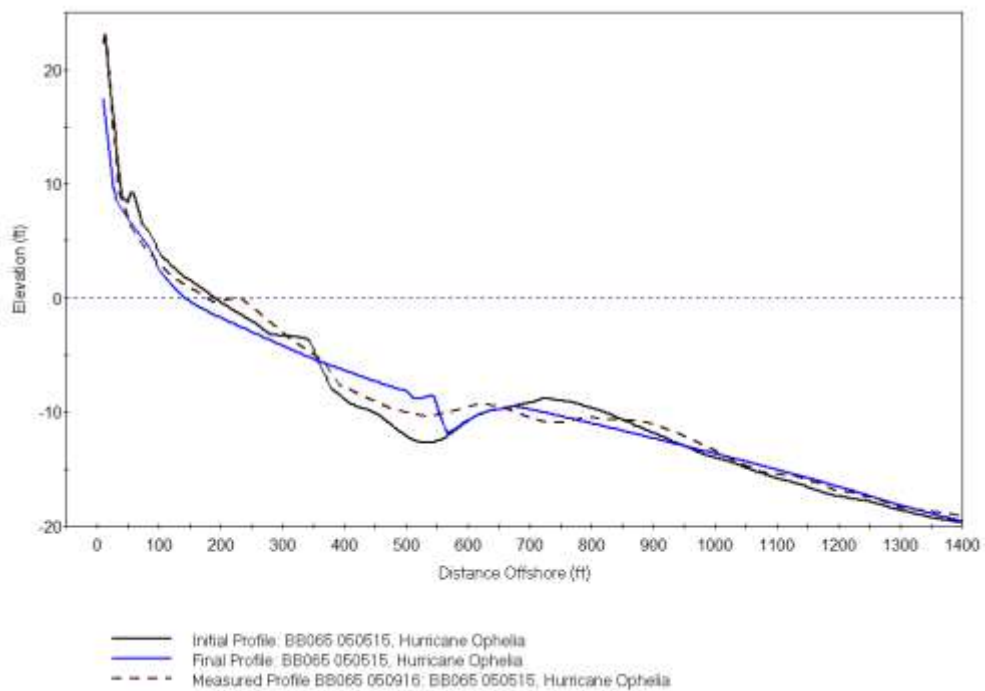


Figure 2-8: SBEACH calibration: Hurricane Ophelia at BB065

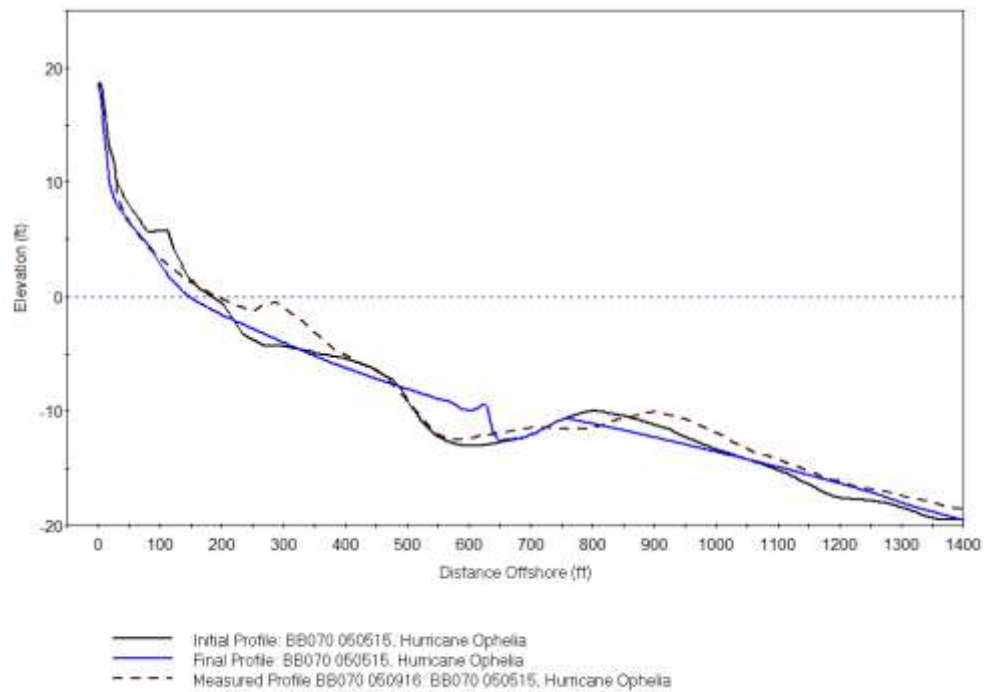


Figure 2-9: SBEACH calibration: Hurricane Ophelia at BB070

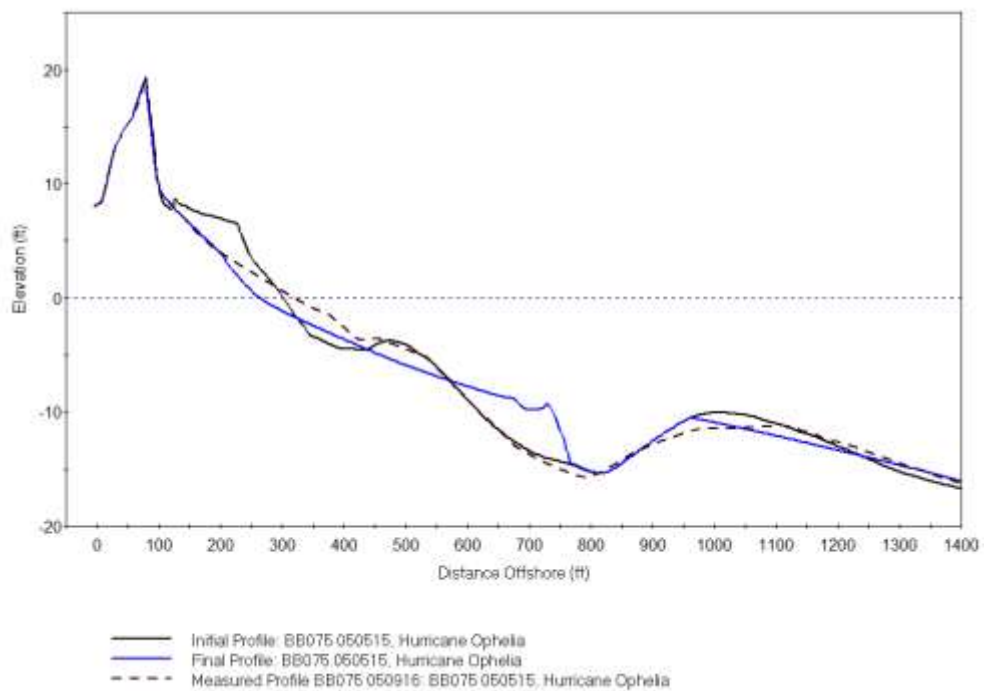


Figure 2-10: SBEACH calibration: Hurricane Ophelia at BB075

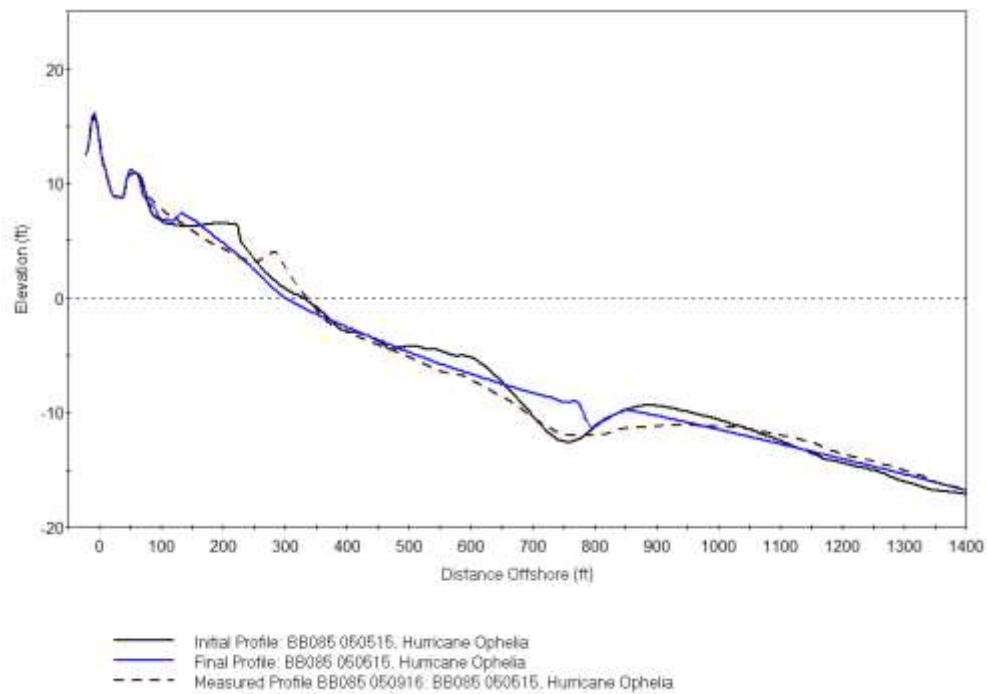


Figure 2-11: SBEACH calibration: Hurricane Ophelia at BB085

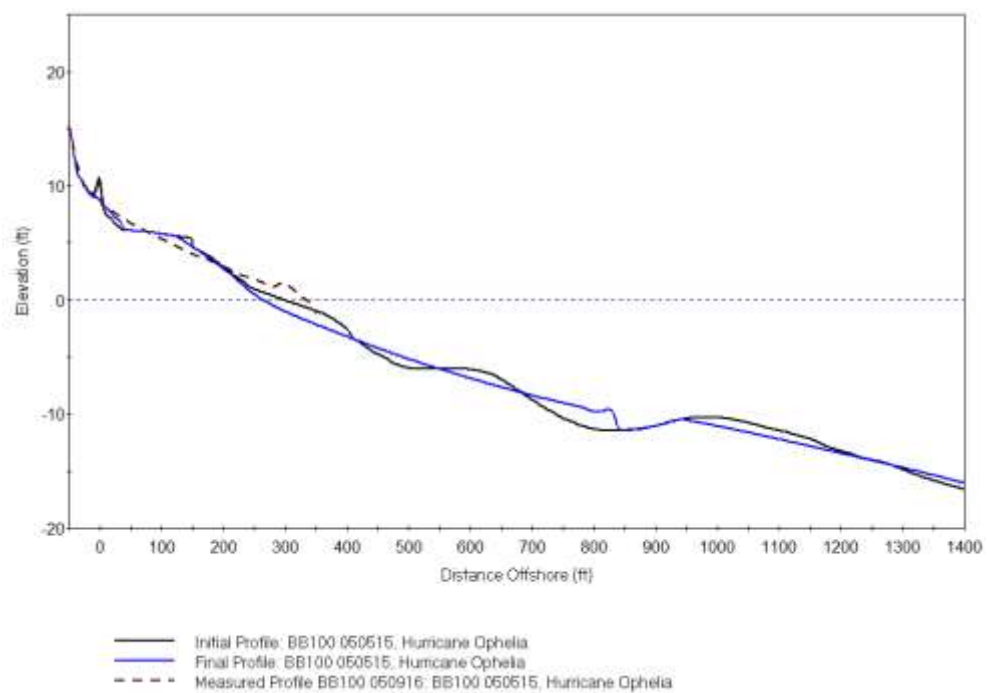


Figure 2-12: SBEACH calibration: Hurricane Ophelia at BB100

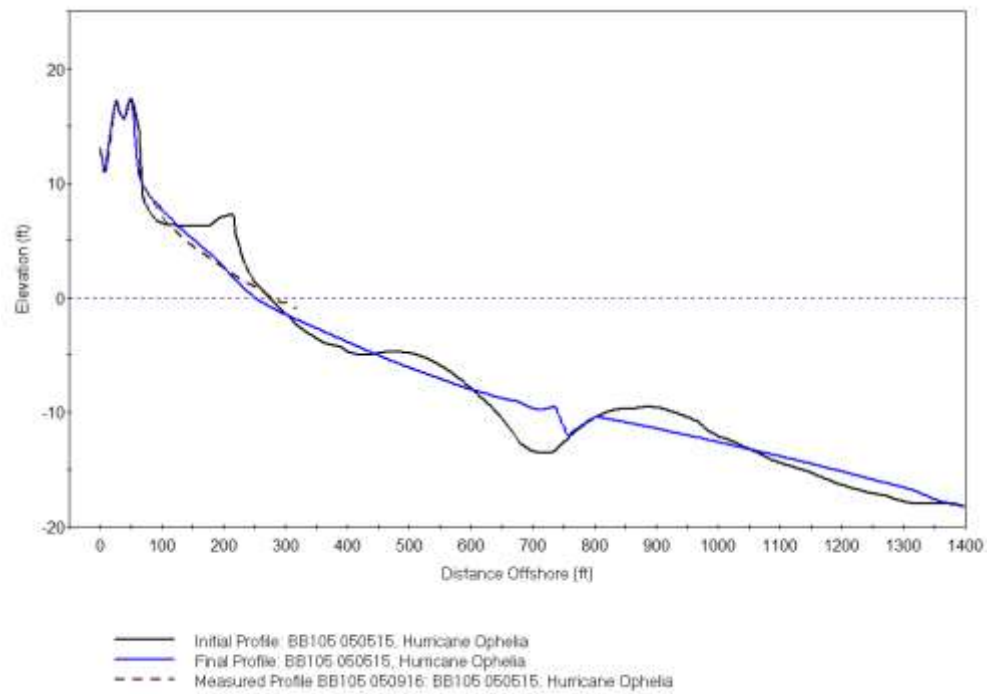


Figure 2-13: SBEACH calibration: Hurricane Ophelia at BB105

2b. Irene Calibration

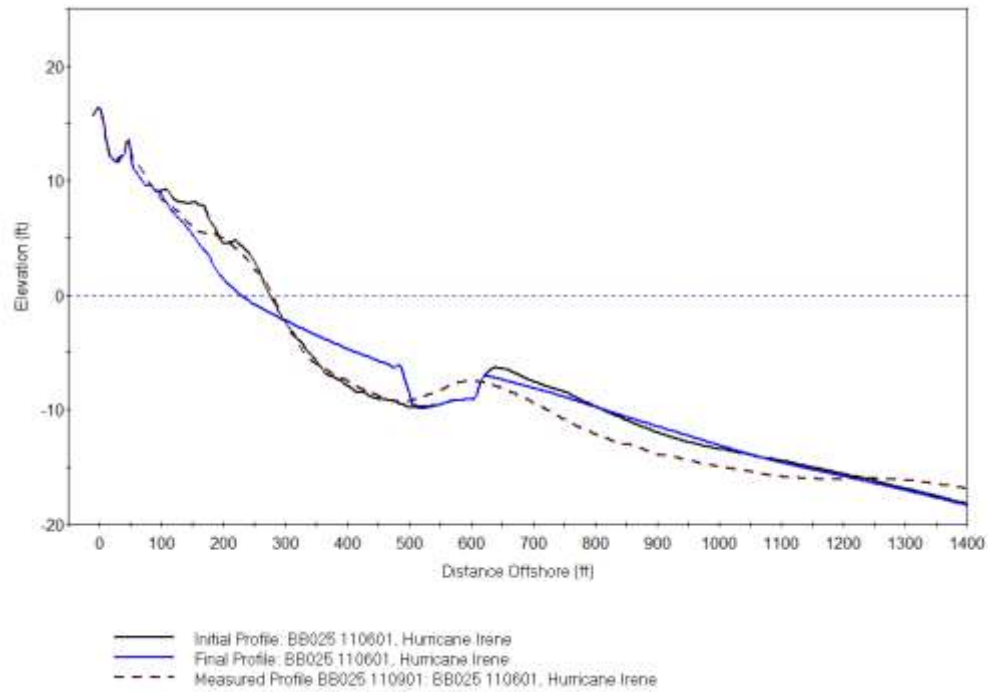


Figure 2-14: SBEACH calibration: Hurricane Irene at BB025

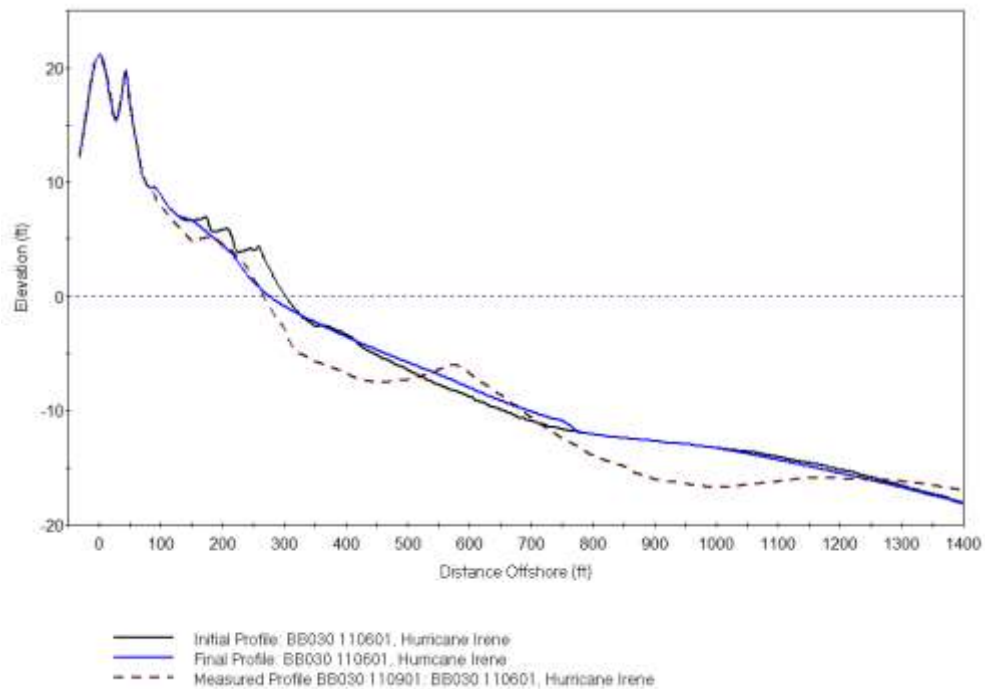


Figure 2-15: SBEACH calibration: Hurricane Irene at BB030

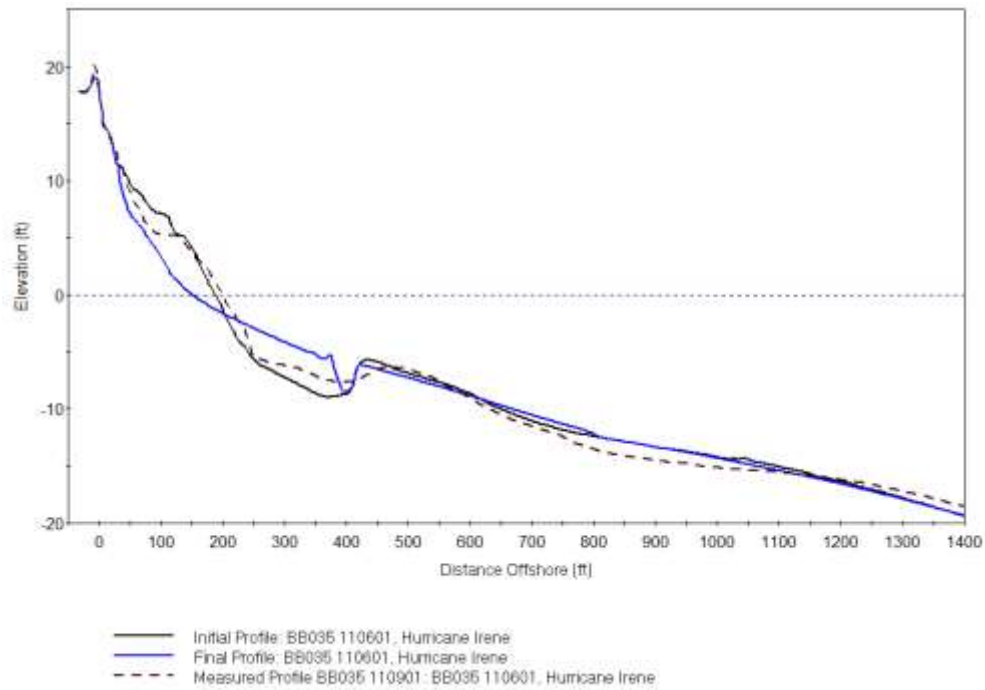


Figure 2-16: SBEACH calibration: Hurricane Irene at BB035

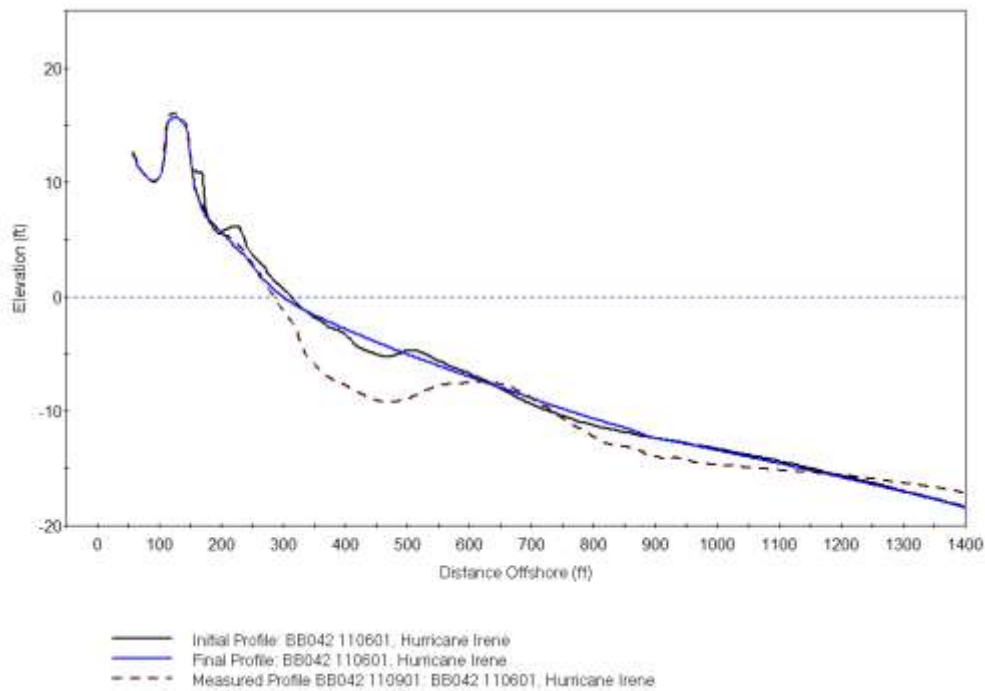


Figure 2-17: SBEACH calibration: Hurricane Irene at BB042

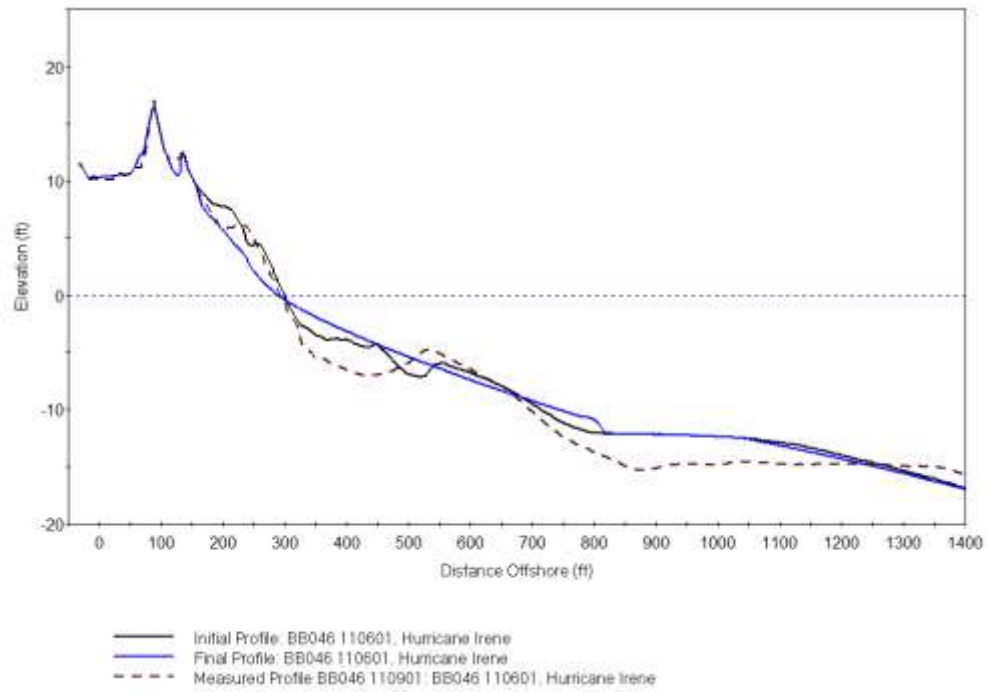


Figure 2-18: SBEACH calibration: Hurricane Irene at BB046

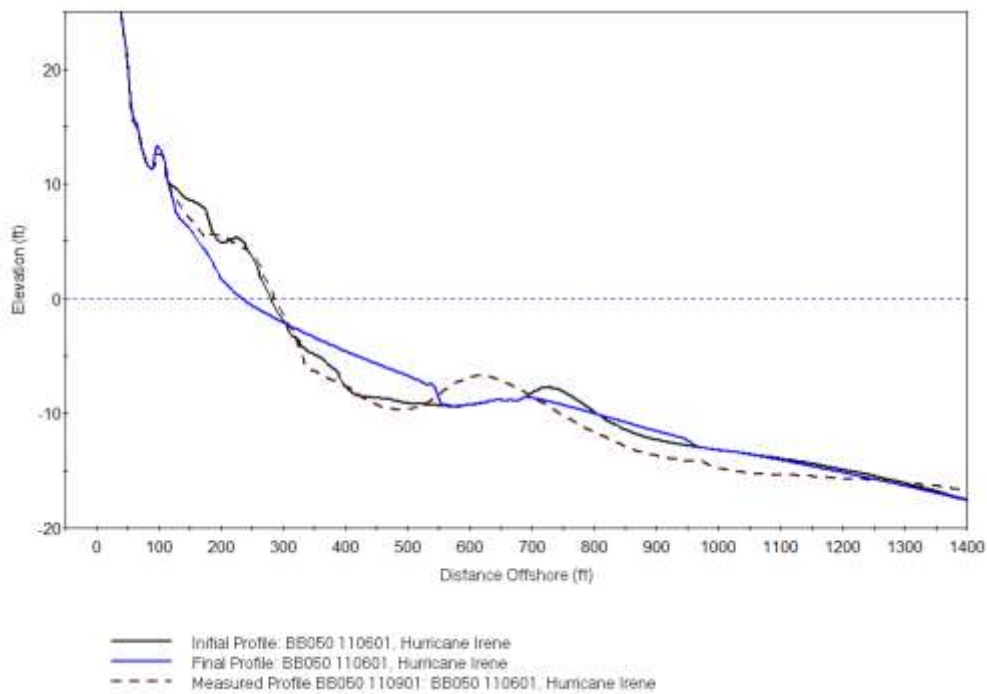


Figure 2-19: SBEACH calibration: Hurricane Irene at BB050

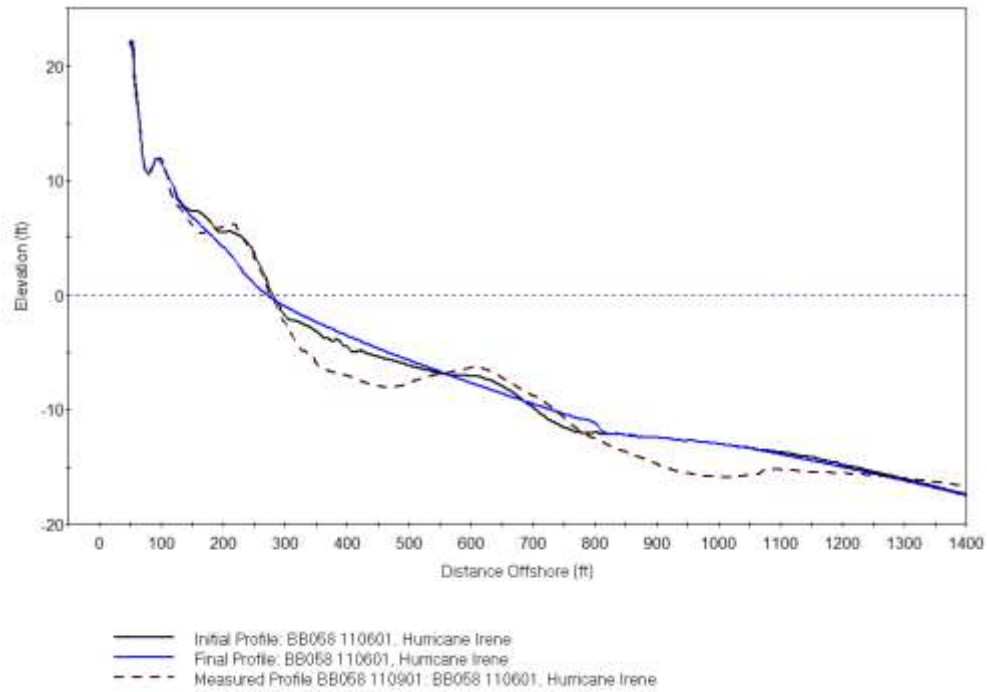


Figure 2-20: SBEACH calibration: Hurricane Irene at BB058

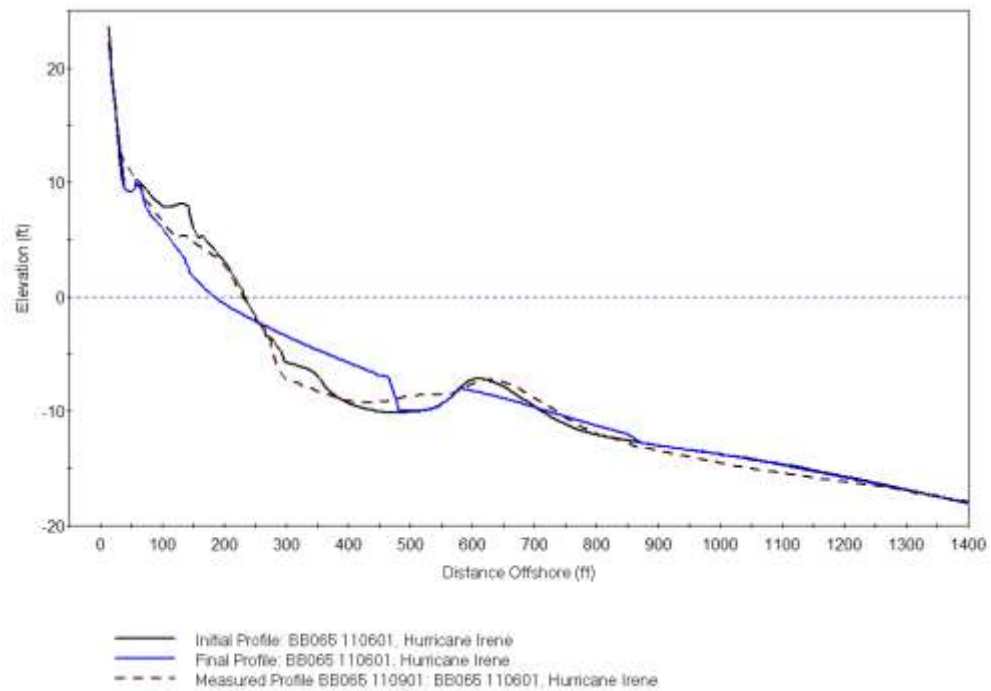


Figure 2-21: SBEACH calibration: Hurricane Irene at BB065

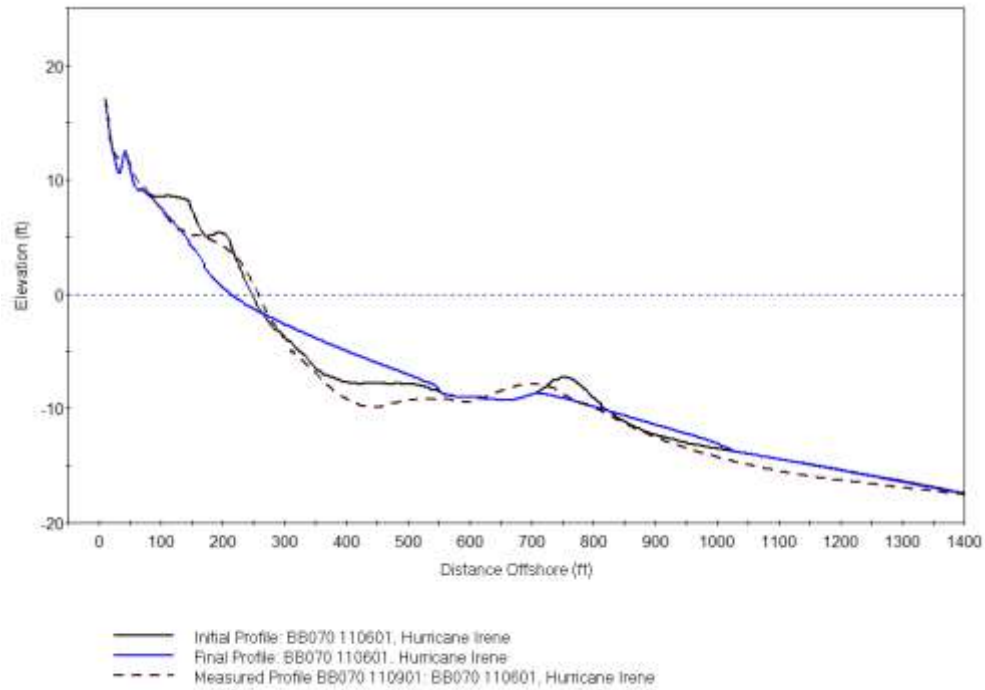


Figure 2-22: SBEACH calibration: Hurricane Irene at BB070

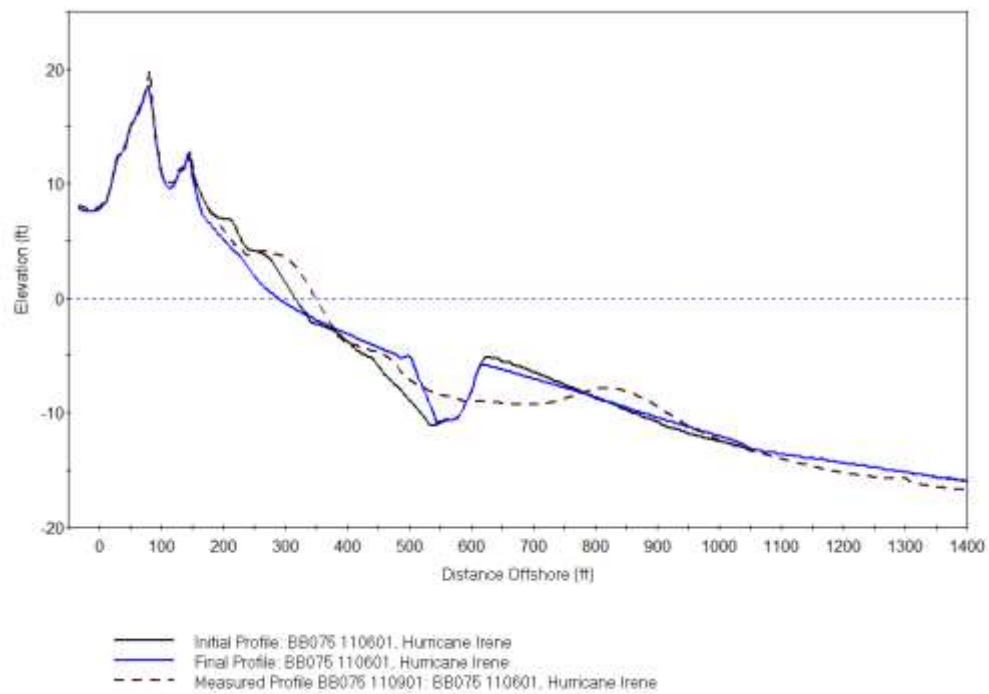


Figure 2-23: SBEACH calibration: Hurricane Irene at BB075

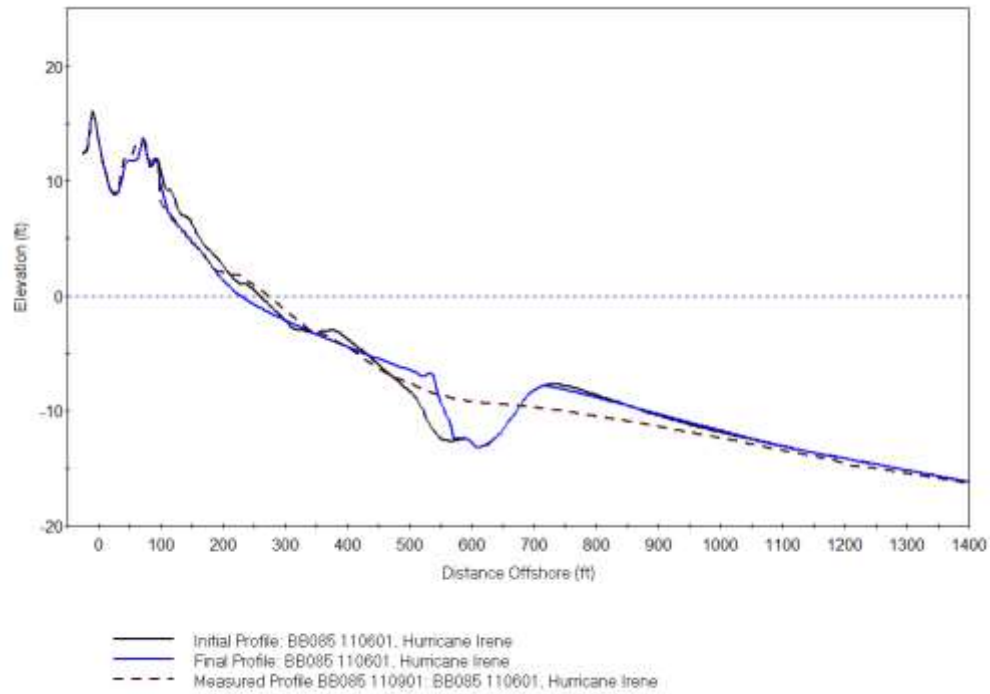


Figure 2-24: SBEACH calibration: Hurricane Irene at BB085

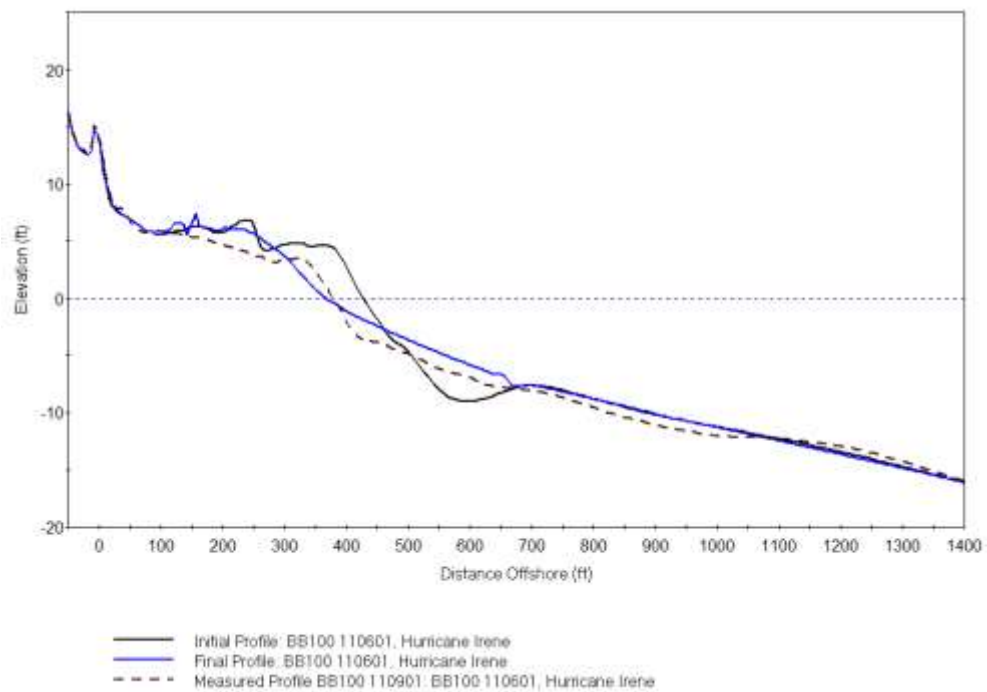


Figure 2-25: SBEACH calibration: Hurricane Irene at BB100

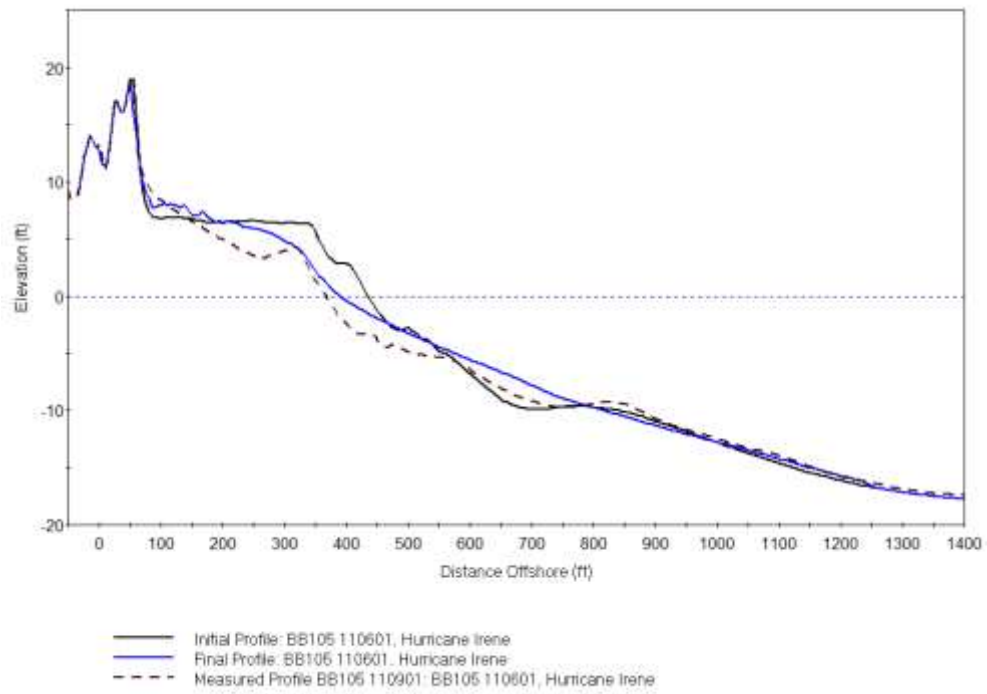


Figure 2-26: SBEACH calibration: Hurricane Irene at BB105

3. Design Storm Results

3a. Existing Conditions

i. 25 Year Storm

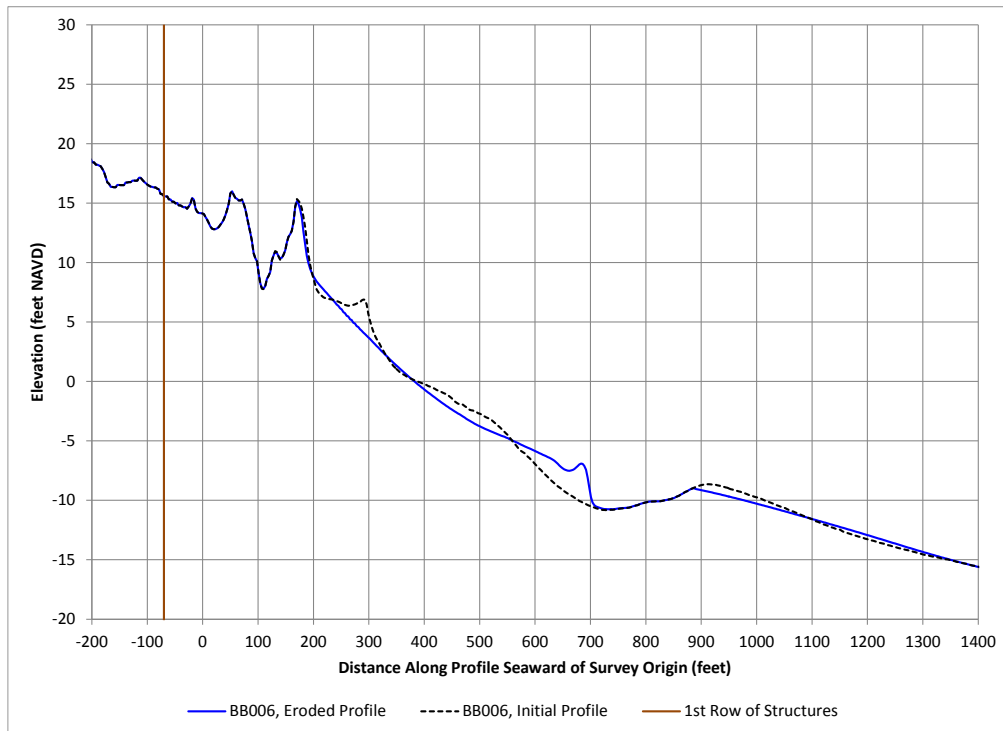


Figure 3-1: SBEACH Results, Existing Conditions, 25-year, Transect 6

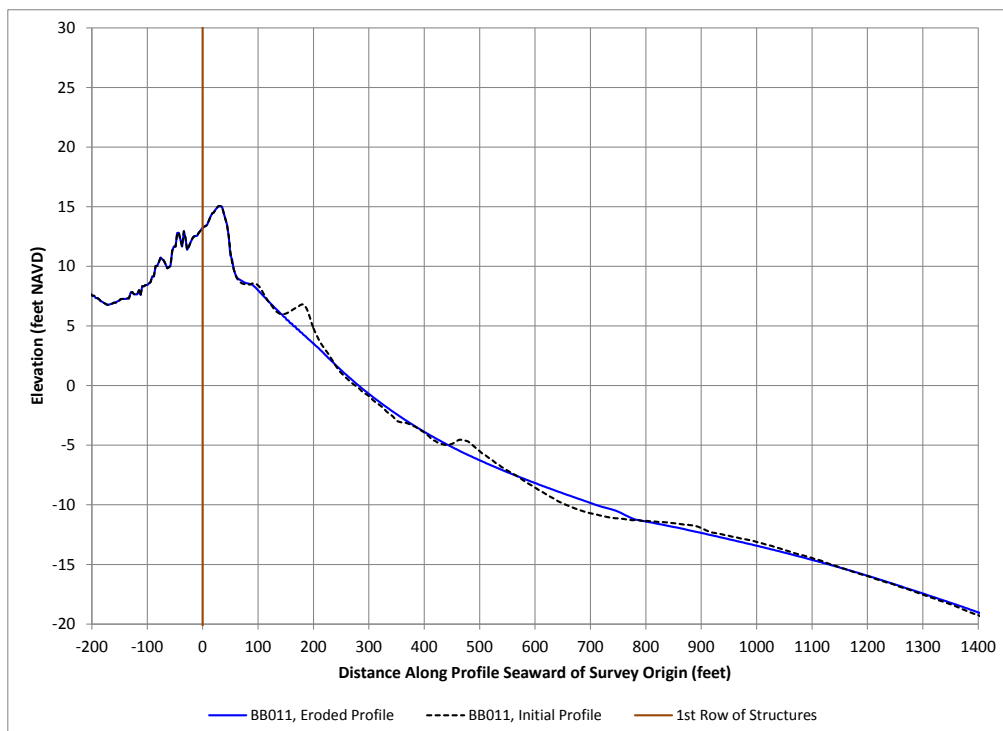


Figure 3-2: SBEACH Results, Existing Conditions, 25-year, Transect 11

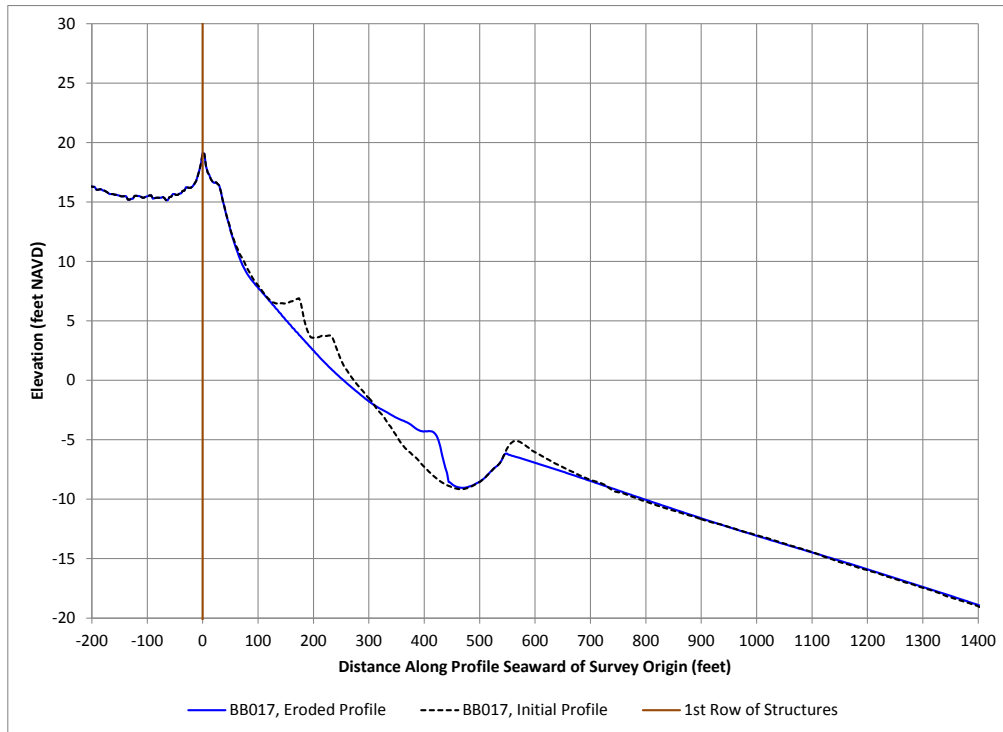


Figure 3-3: SBEACH Results, Existing Conditions, 25-year, Transect 17

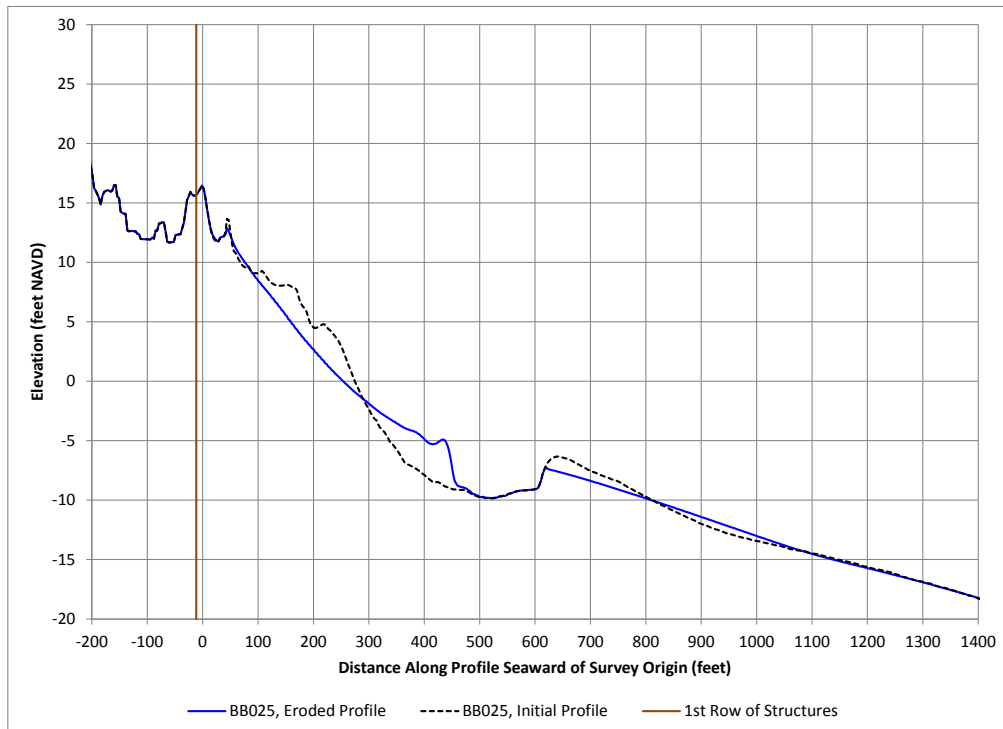


Figure 3-4: SBEACH Results, Existing Conditions, 25-year, Transect 25

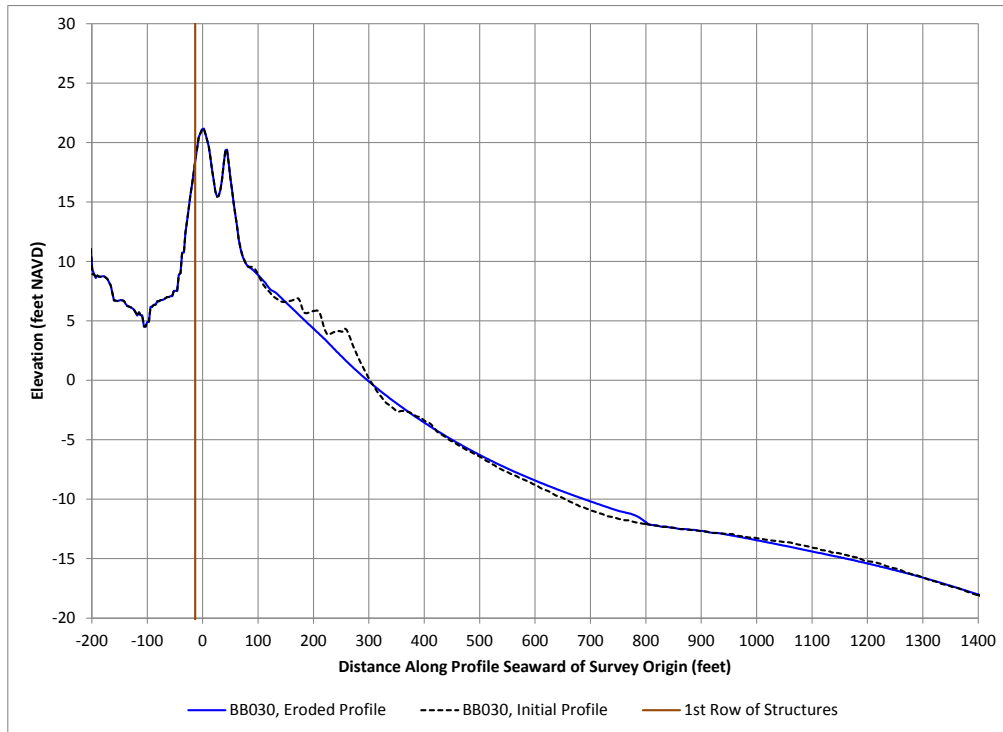


Figure 3-5: SBEACH Results, Existing Conditions, 25-year, Transect 30

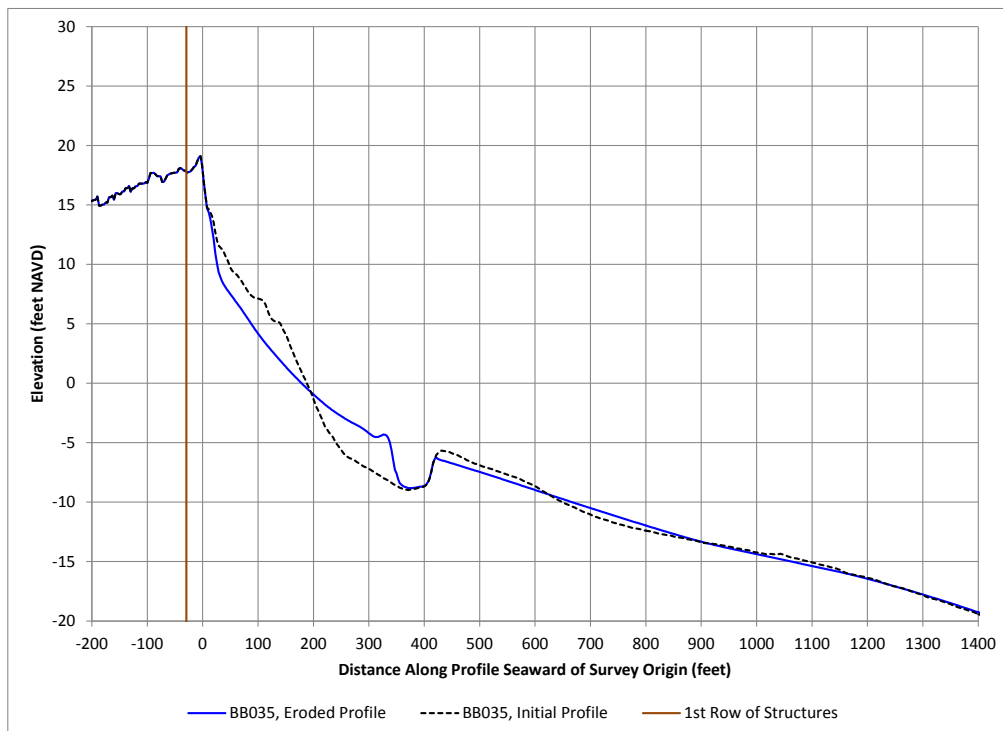


Figure 3-6: SBEACH Results, Existing Conditions, 25-year, Transect 35

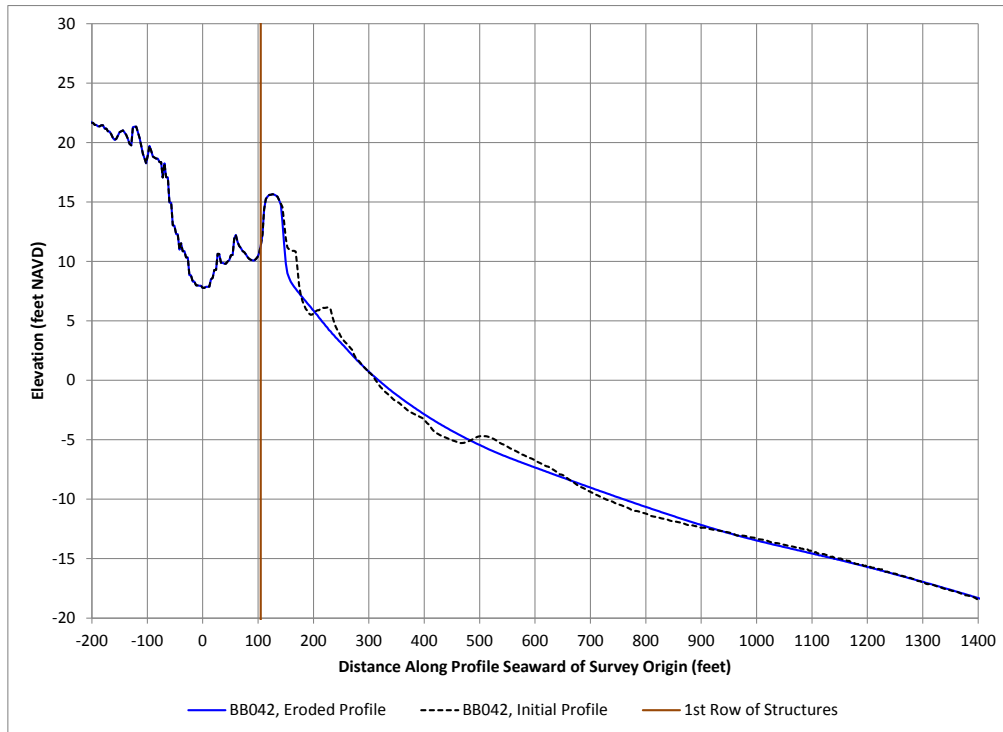


Figure 3-7: SBEACH Results, Existing Conditions, 25-year, Transect 42

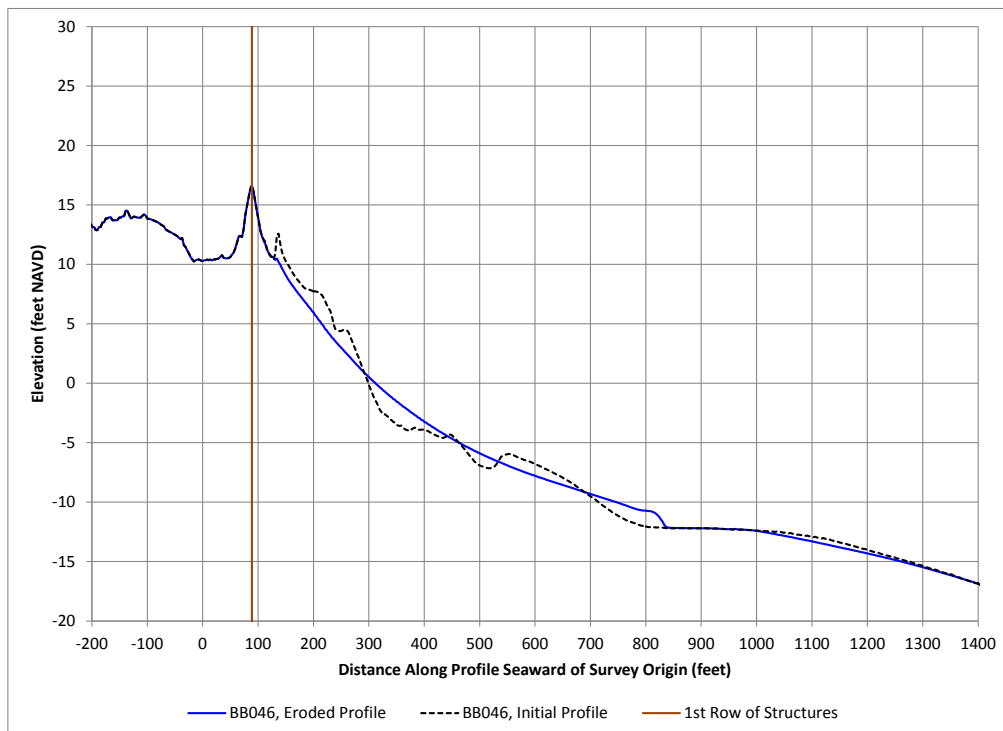


Figure 3-8: SBEACH Results, Existing Conditions, 25-year, Transect 46

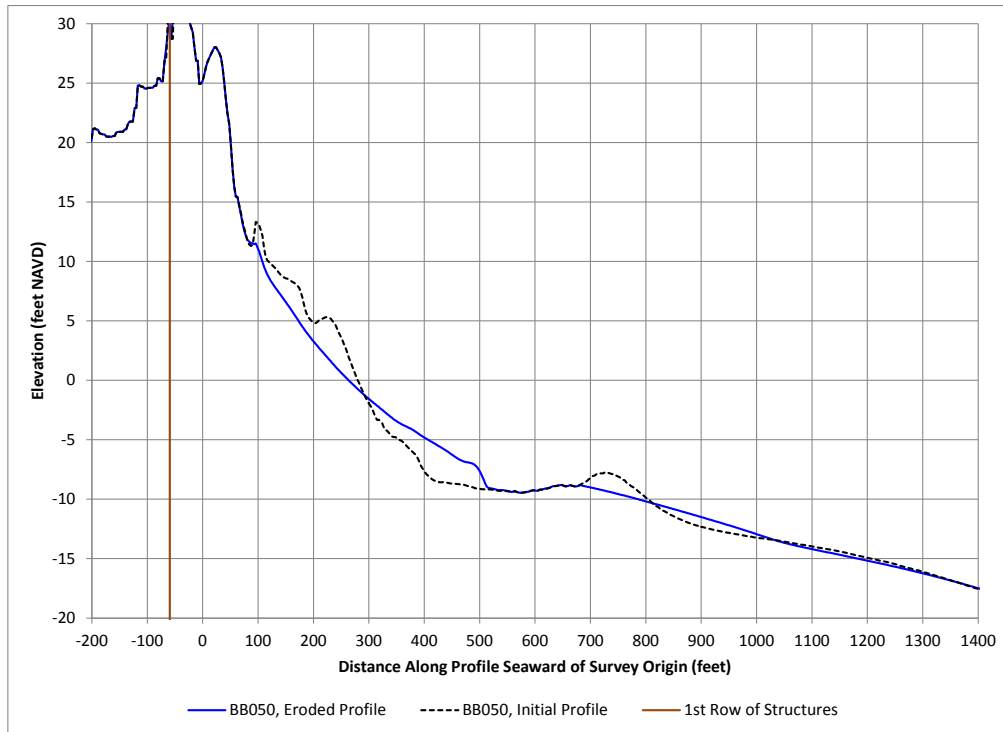


Figure 3-9: SBEACH Results, Existing Conditions, 25-year, Transect 50

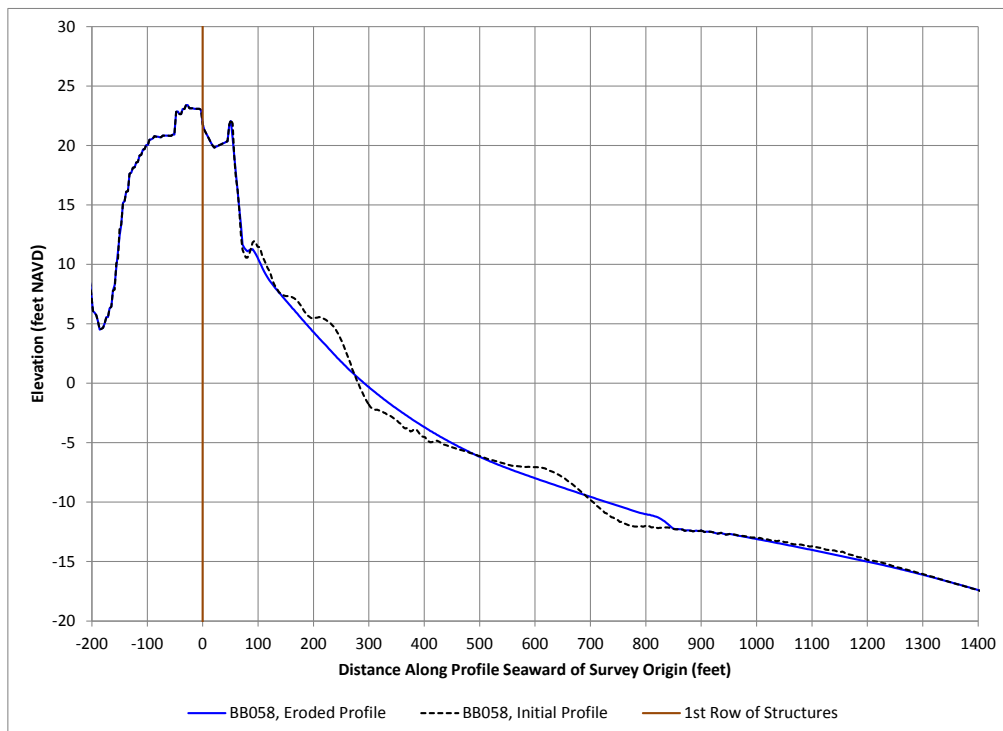


Figure 3-10: SBEACH Results, Existing Conditions, 25-year, Transect 58

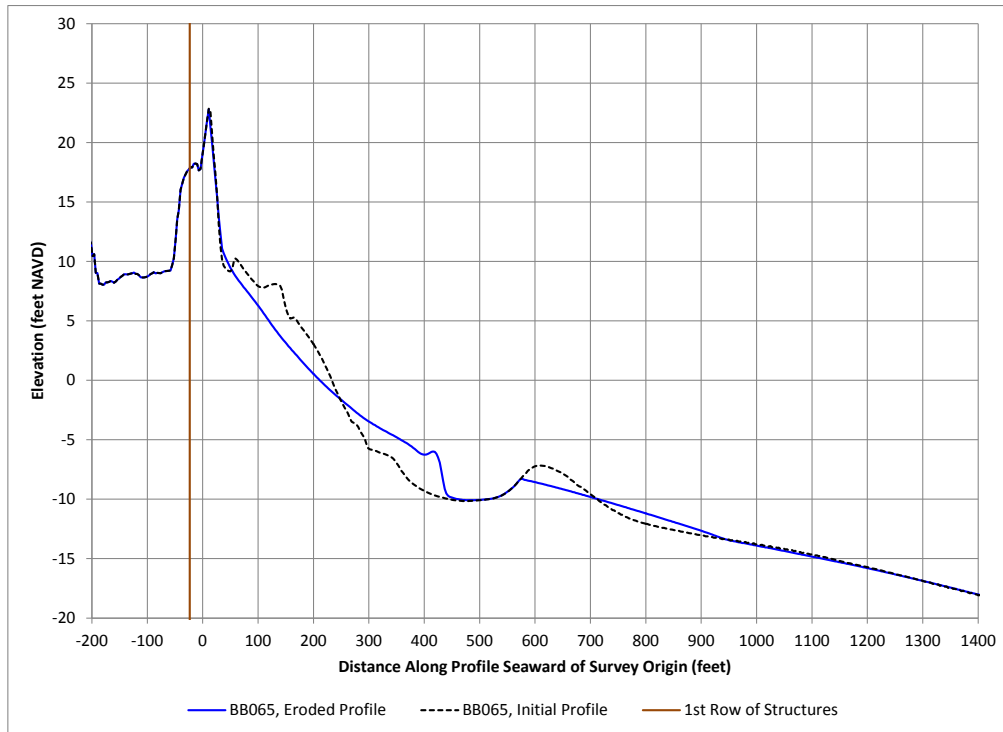


Figure 3-11: SBEACH Results, Existing Conditions, 25-year, Transect 65

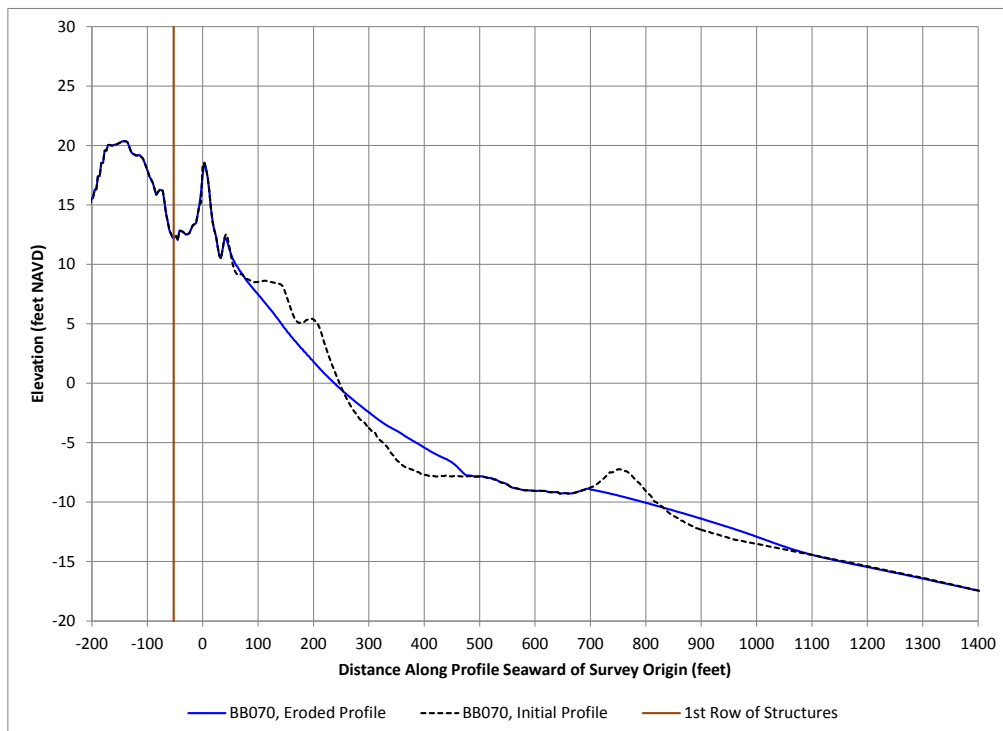


Figure 3-12: SBEACH Results, Existing Conditions, 25-year, Transect 70

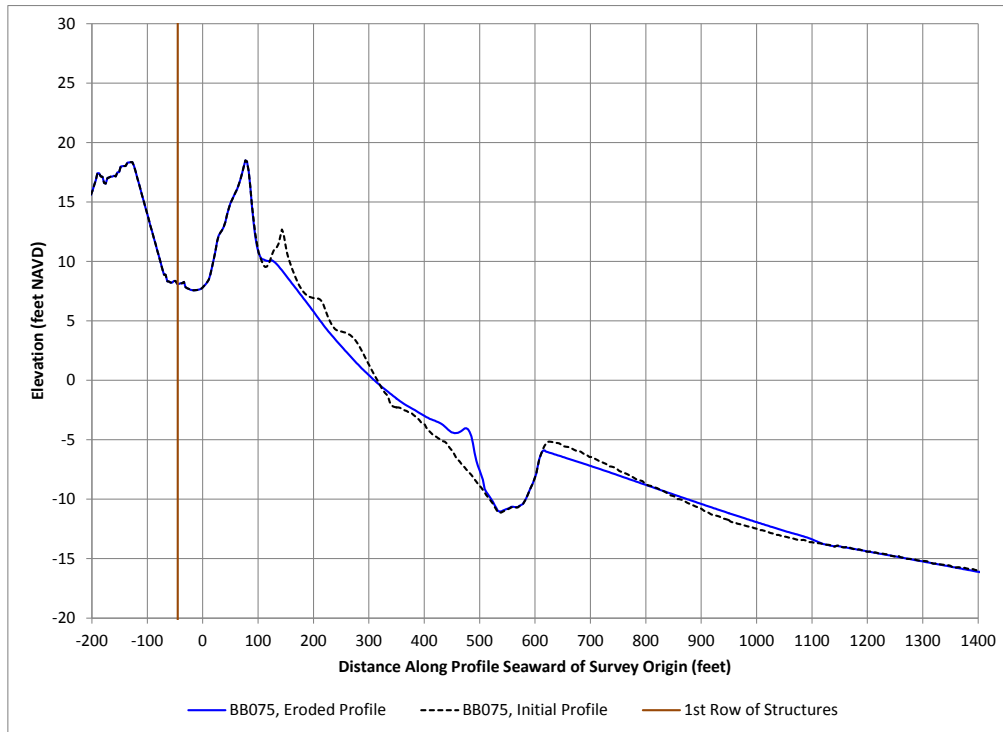


Figure 3-13: SBEACH Results, Existing Conditions, 25-year, Transect 75

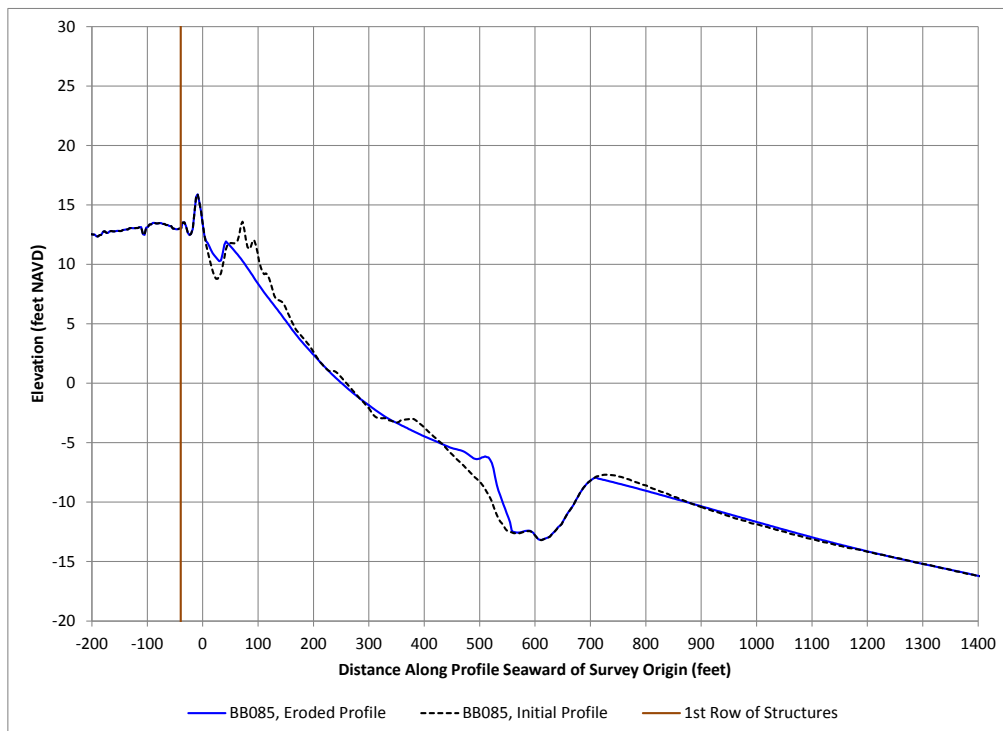


Figure 3-14: SBEACH Results, Existing Conditions, 25-year, Transect 85

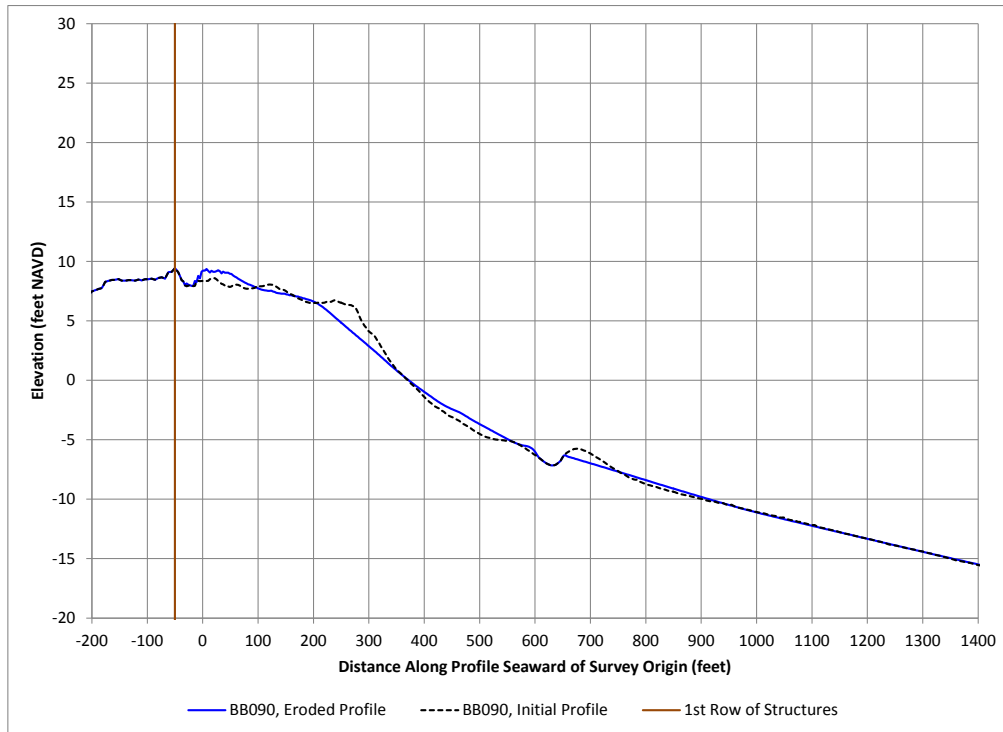


Figure 3-15: SBEACH Results, Existing Conditions, 25-year, Transect 90

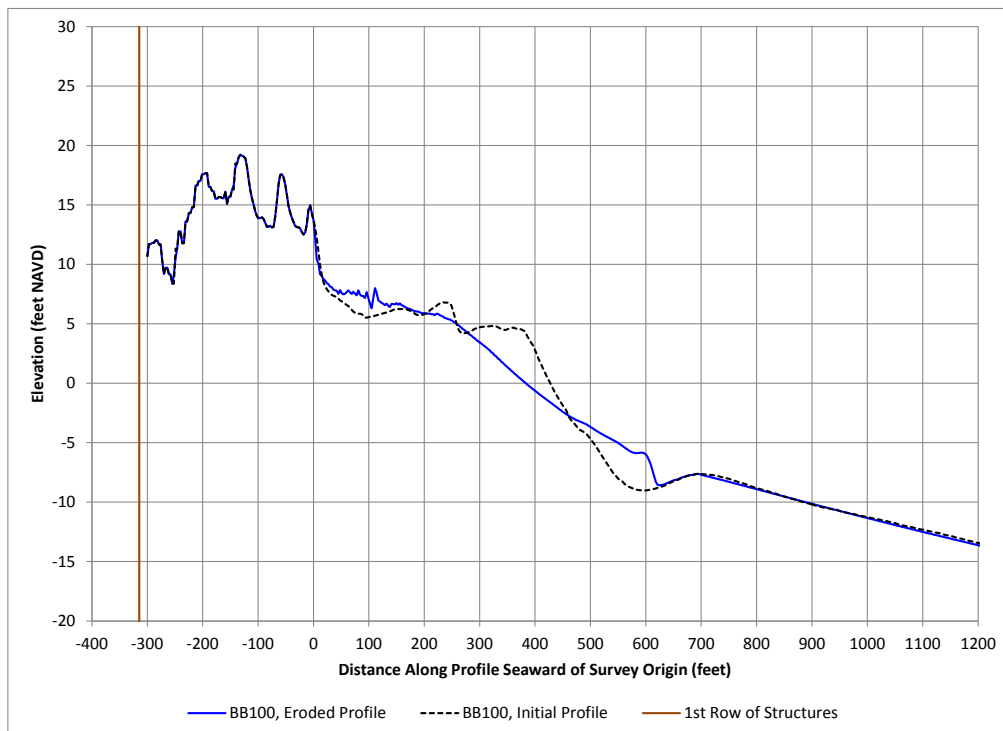


Figure 3-16: SBEACH Results, Existing Conditions, 25-year, Transect 100

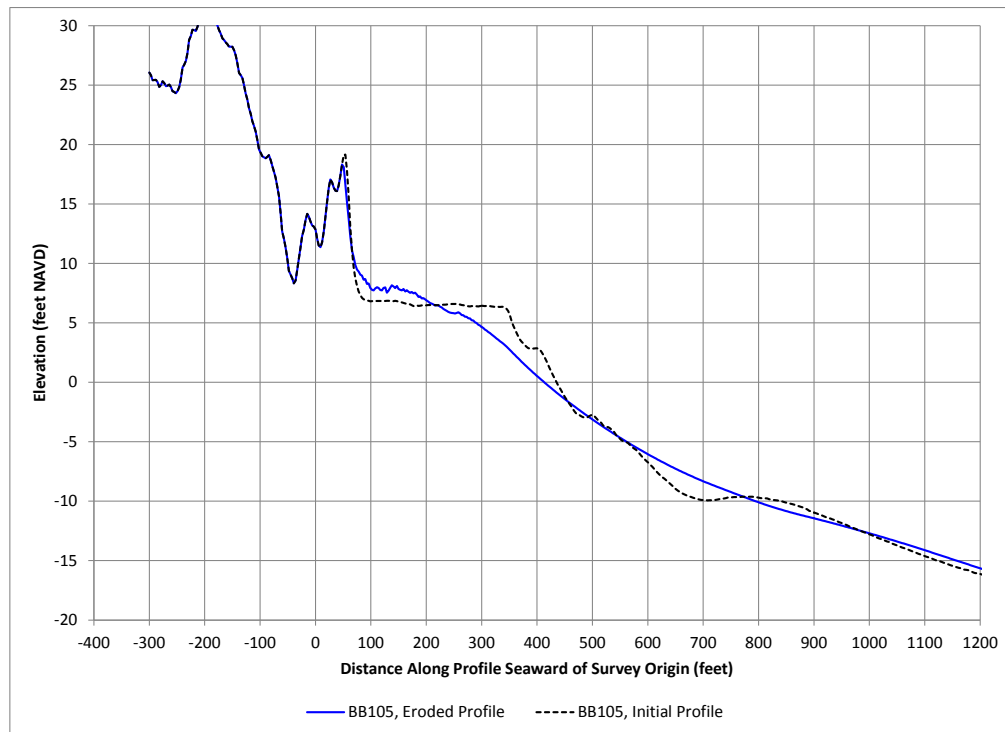


Figure 3-17: SBEACH Results, Existing Conditions, 25-year, Transect 105

ii. 50 Year Storm

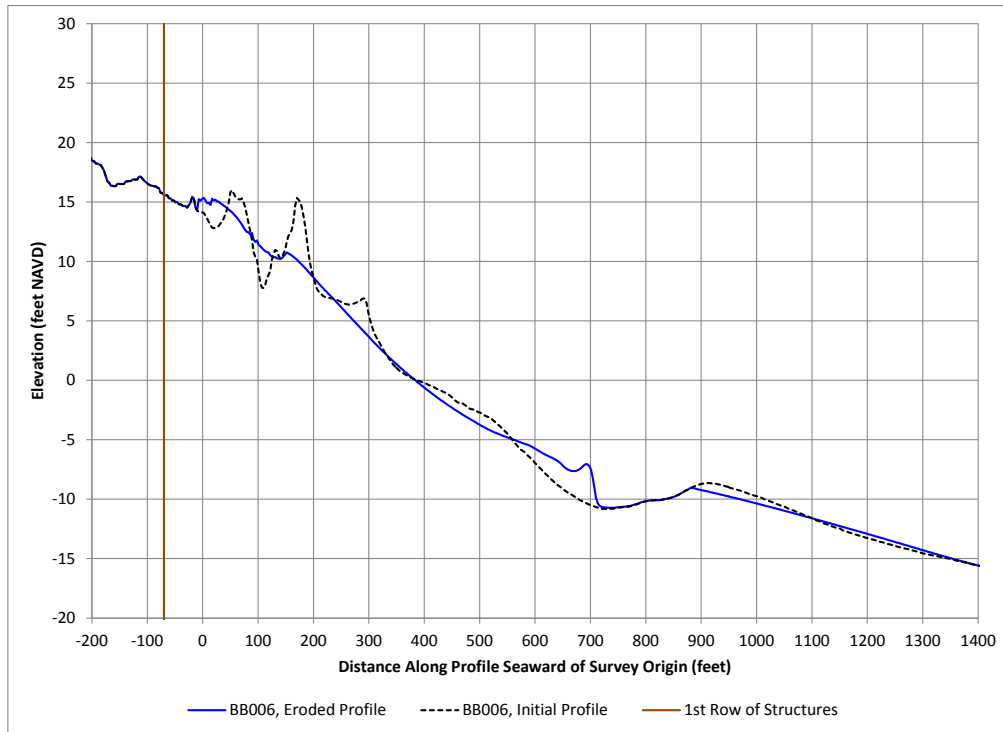


Figure 3-18: SBEACH Results, Existing Conditions, 50-year, Transect 6

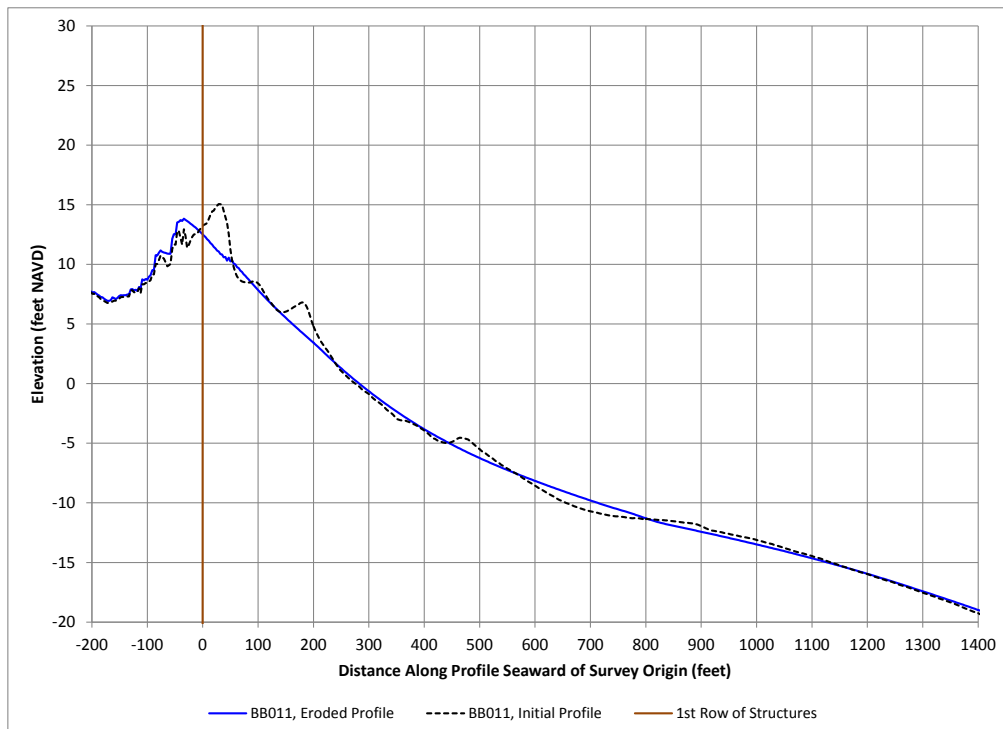


Figure 3-19: SBEACH Results, Existing Conditions, 50-year, Transect 11

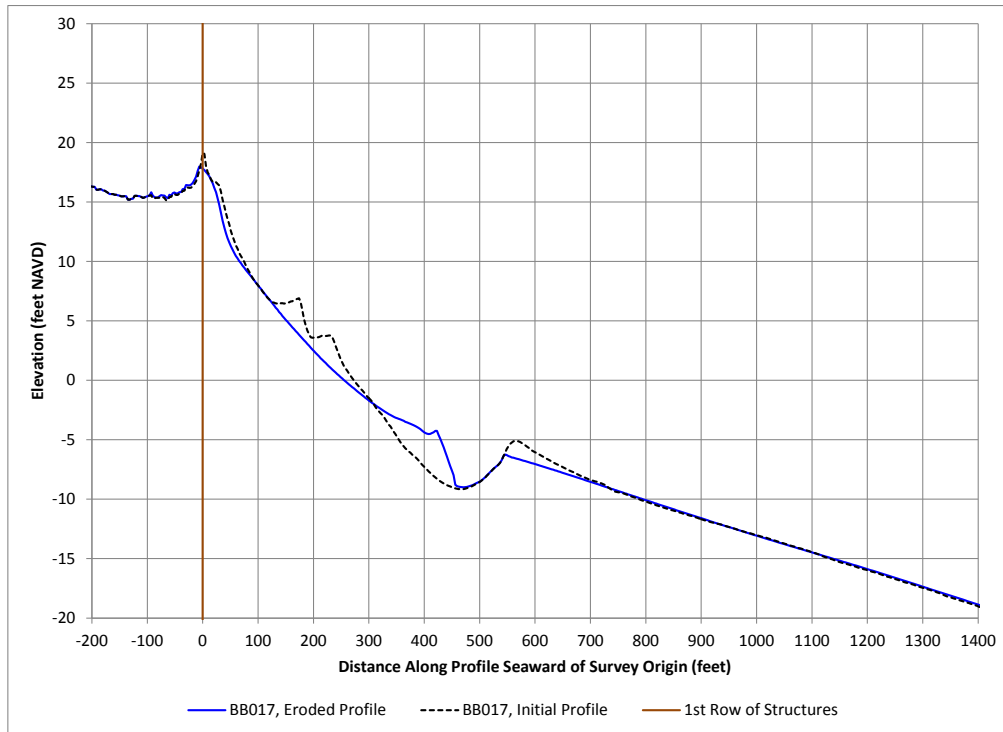


Figure 3-20: SBEACH Results, Existing Conditions, 50-year, Transect 17

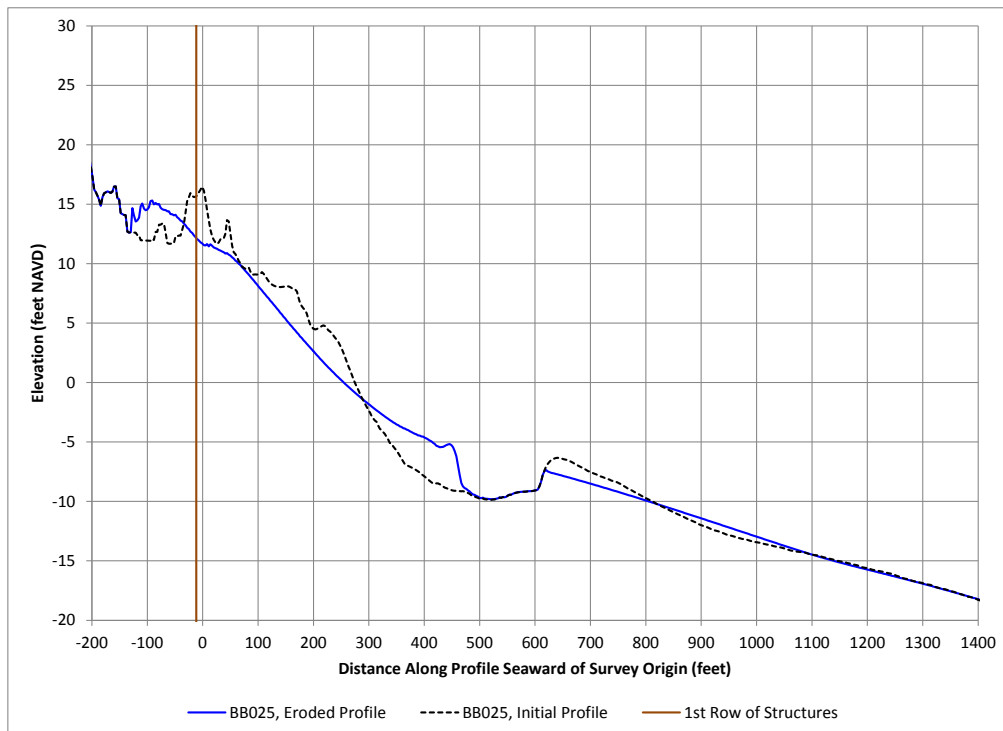


Figure 3-21: SBEACH Results, Existing Conditions, 50-year, Transect 25

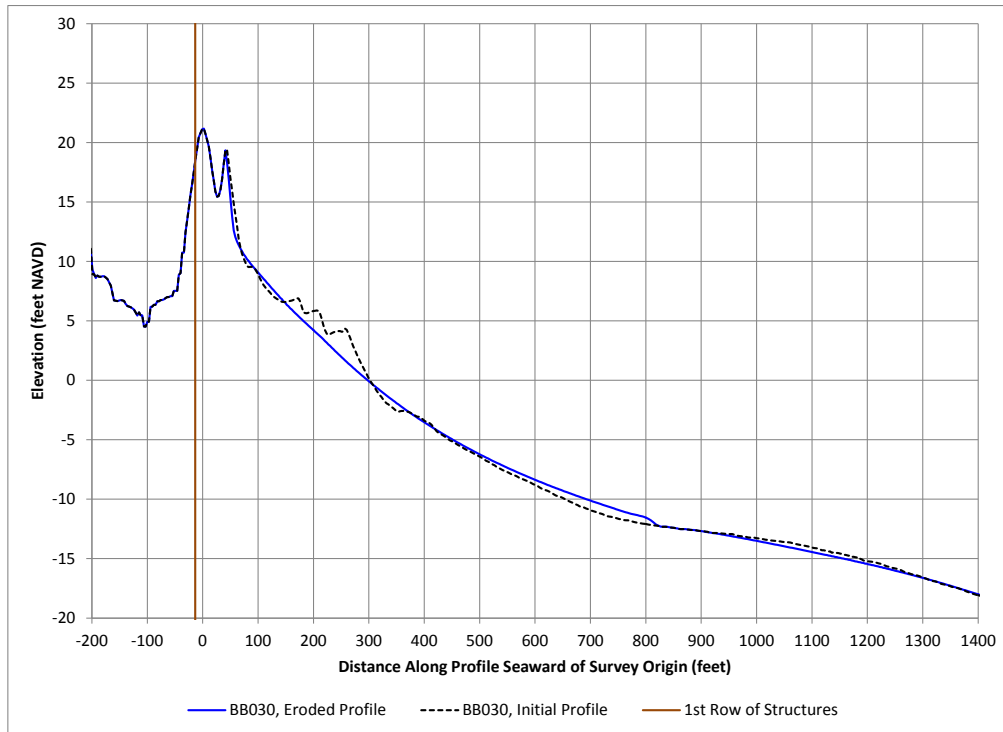


Figure 3-22: SBEACH Results, Existing Conditions, 50-year, Transect 30

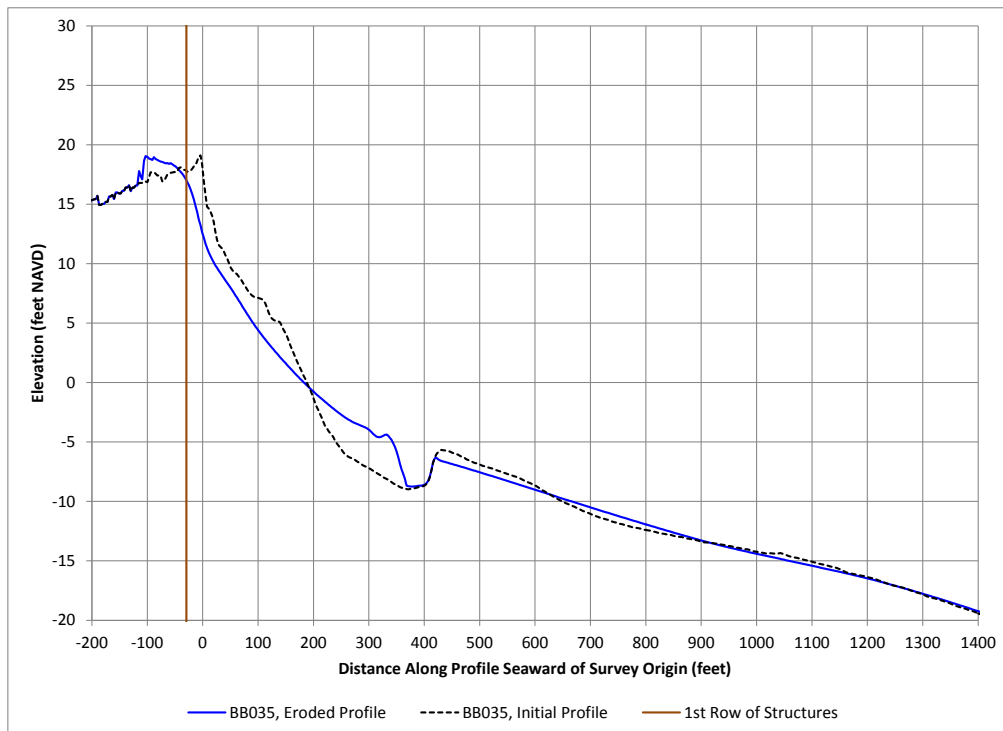


Figure 3-23: SBEACH Results, Existing Conditions, 50-year, Transect 35

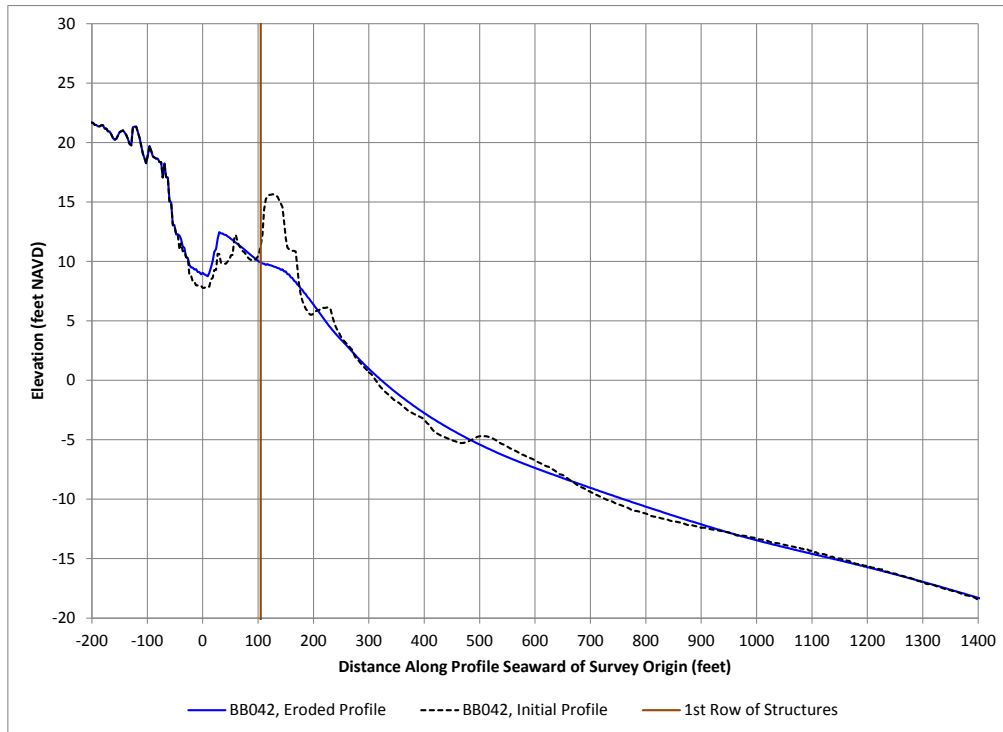


Figure 3-24: SBEACH Results, Existing Conditions, 50-year, Transect 42

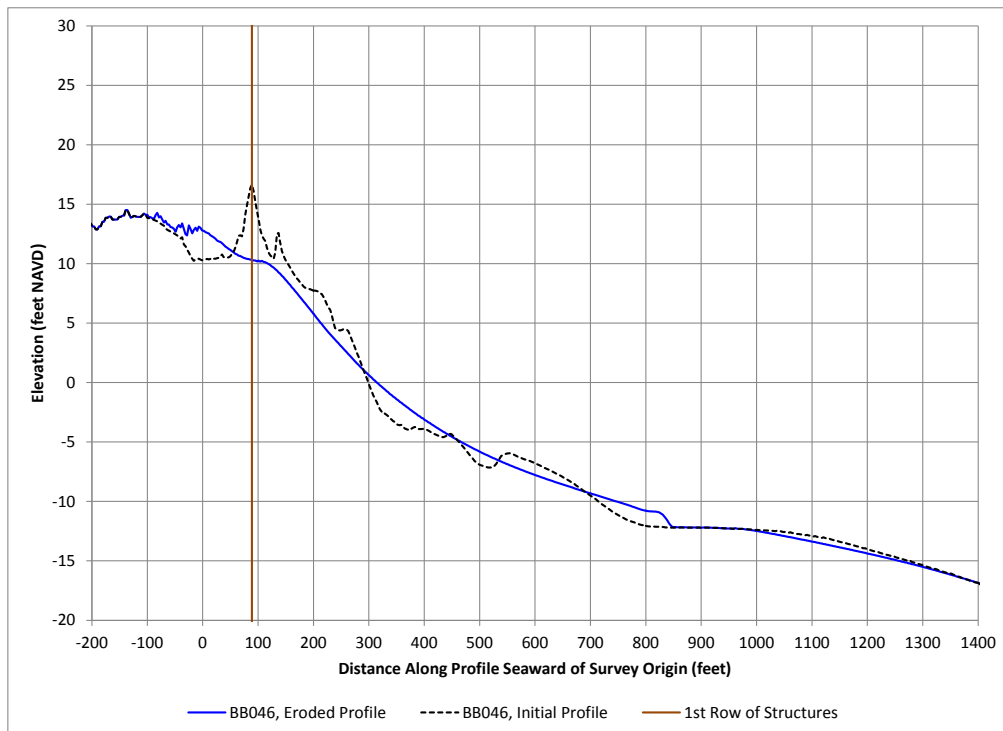


Figure 3-25: SBEACH Results, Existing Conditions, 50-year, Transect 46

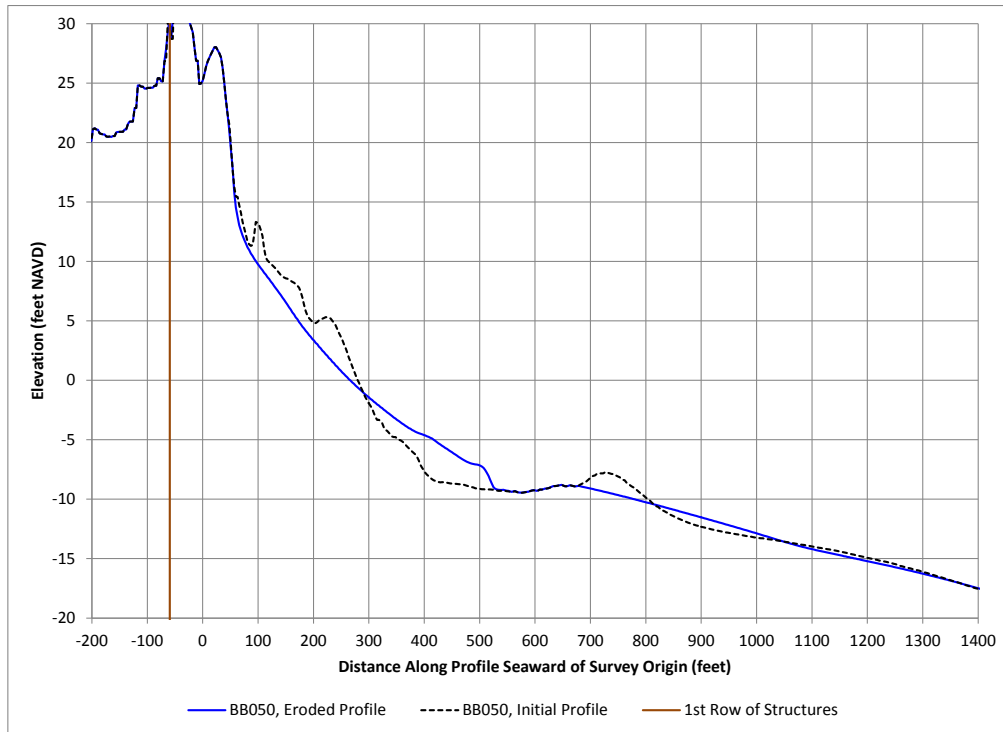


Figure 3-26: SBEACH Results, Existing Conditions, 50-year, Transect 50

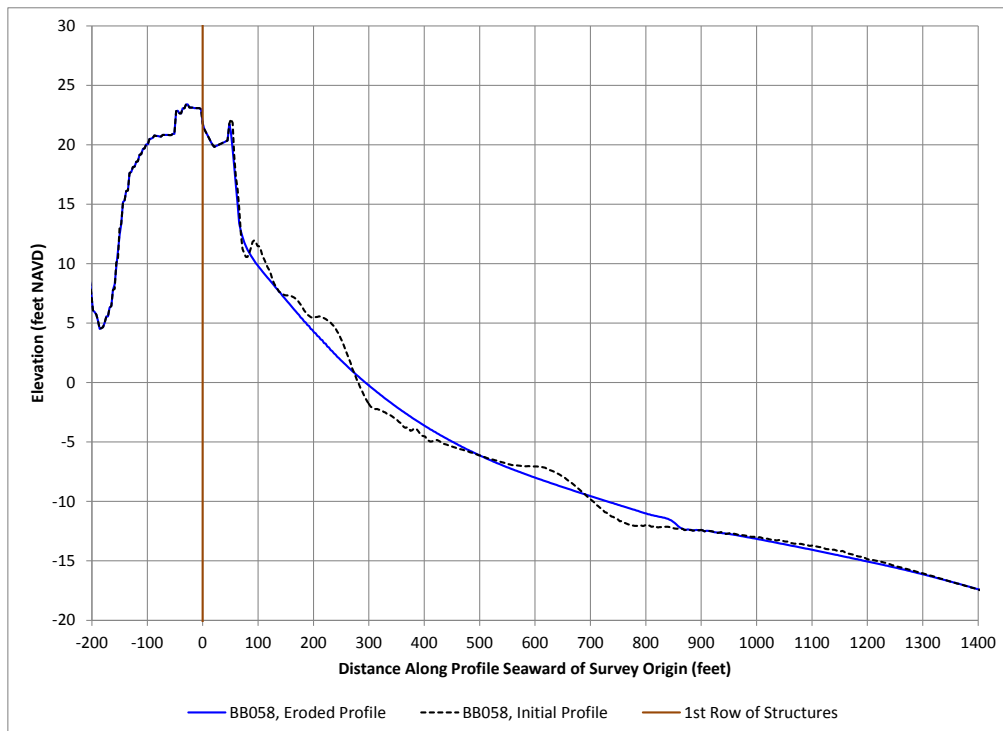


Figure 3-27: SBEACH Results, Existing Conditions, 50-year, Transect 58

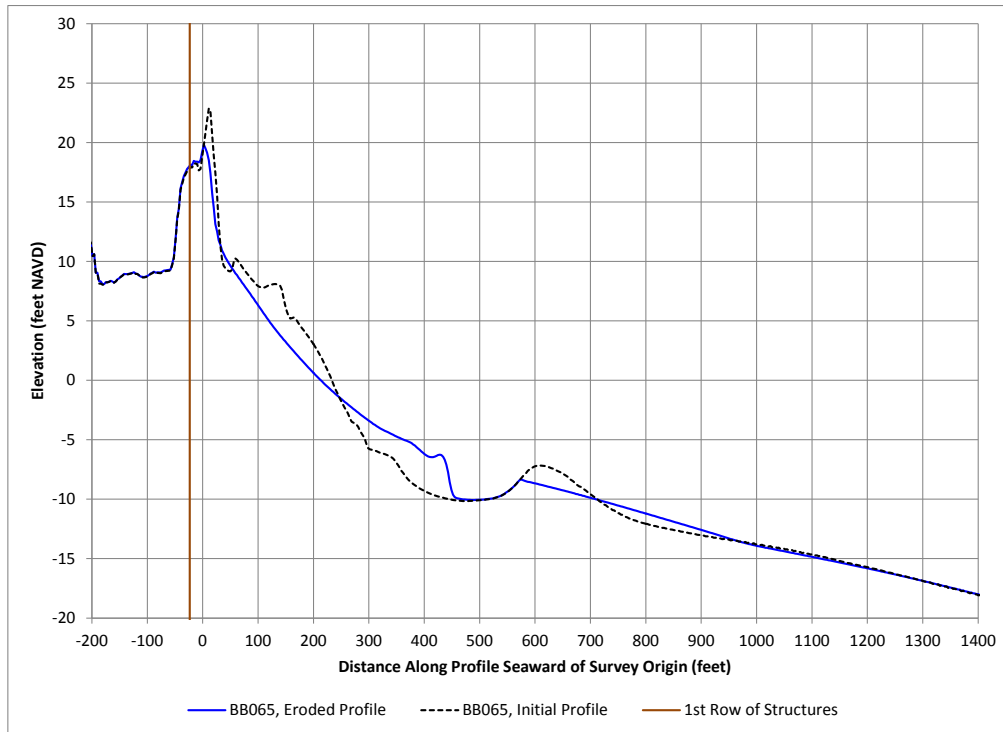


Figure 3-28: SBEACH Results, Existing Conditions, 50-year, Transect 65

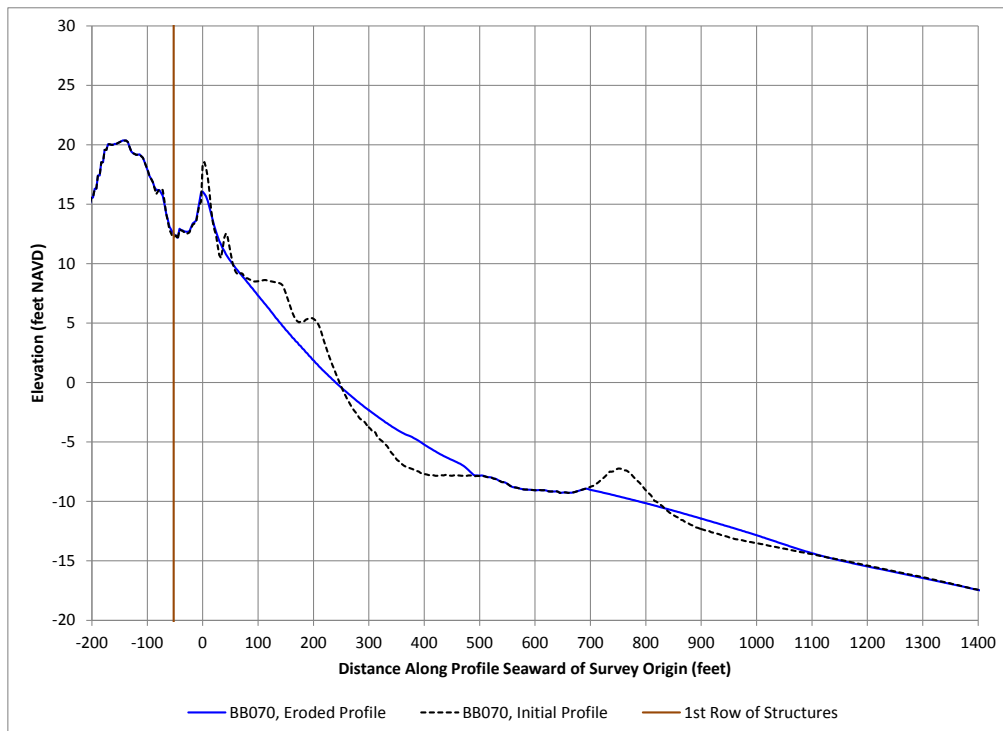


Figure 3-29: SBEACH Results, Existing Conditions, 50-year, Transect 70

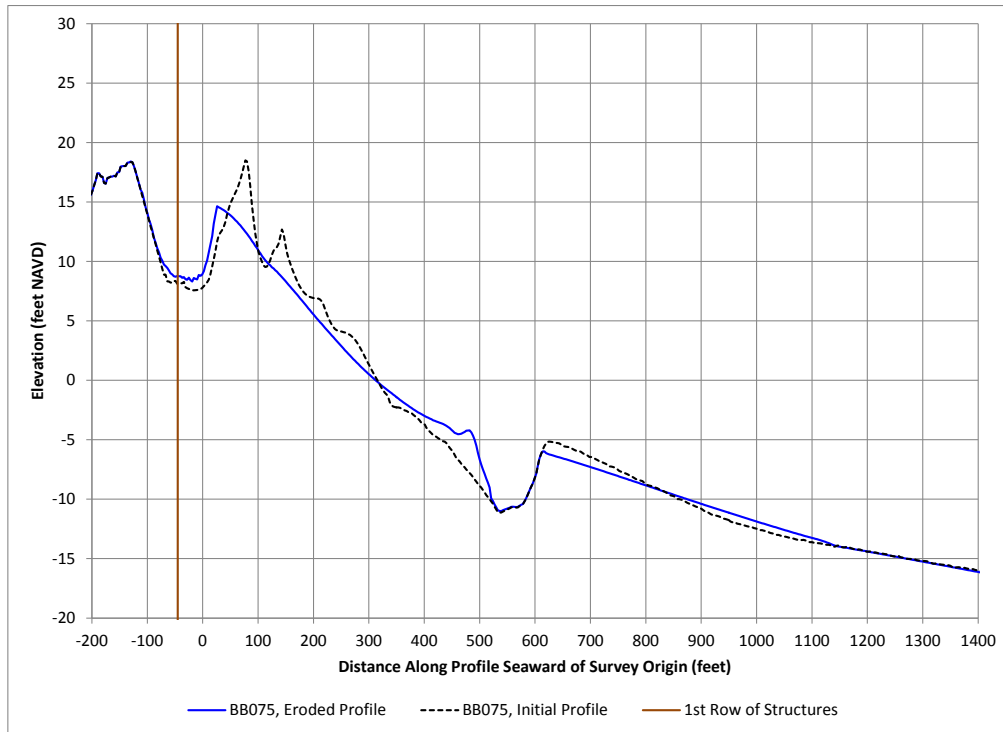


Figure 3-30: SBEACH Results, Existing Conditions, 50-year, Transect 75

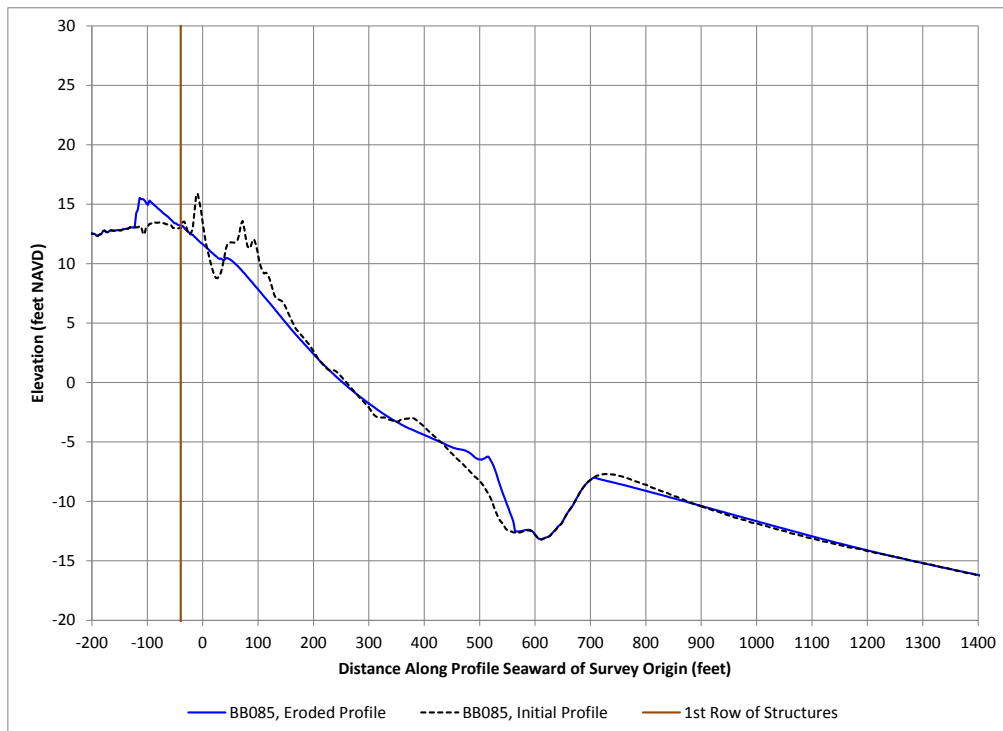


Figure 3-31: SBEACH Results, Existing Conditions, 50-year, Transect 85

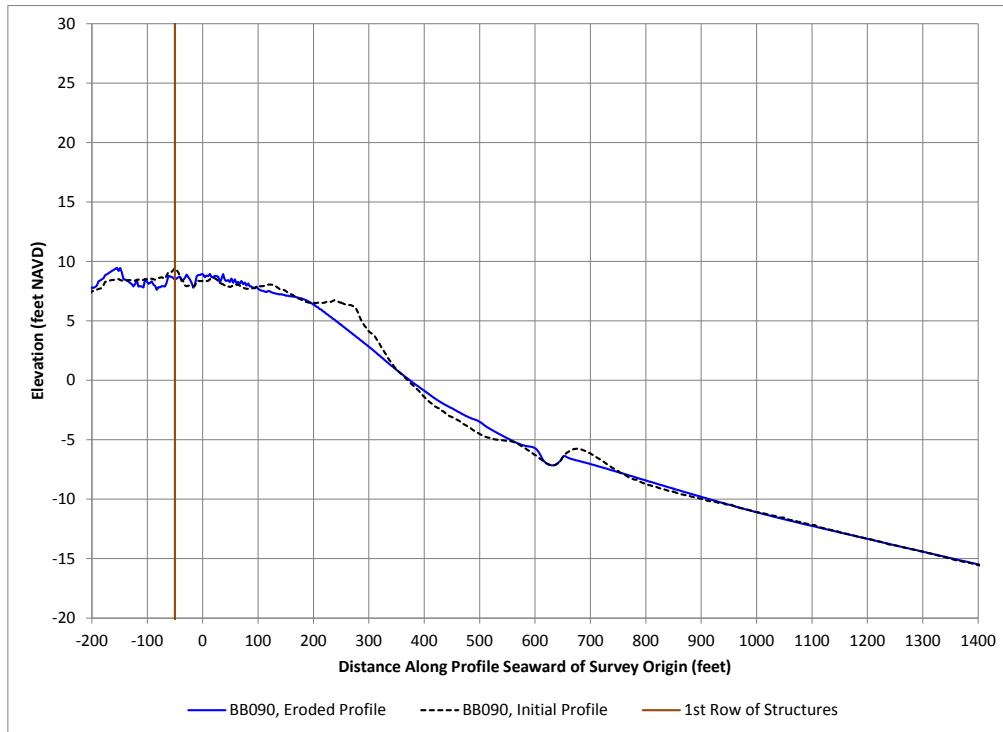


Figure 3-32: SBEACH Results, Existing Conditions, 50-year, Transect 90

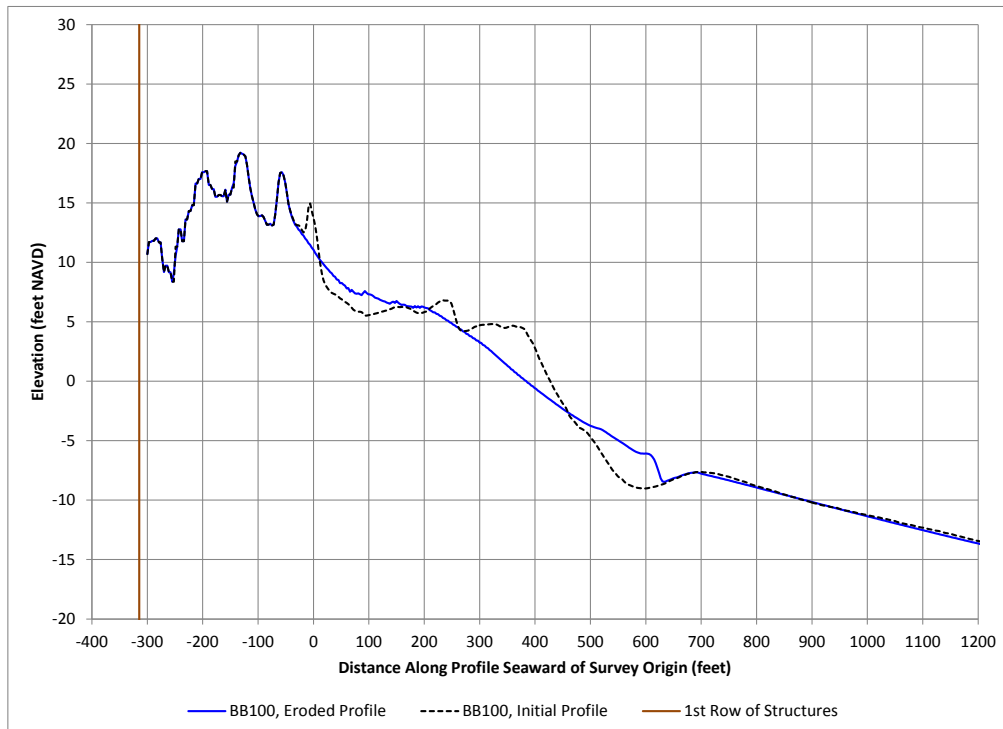


Figure 3-33: SBEACH Results, Existing Conditions, 50-year, Transect 100

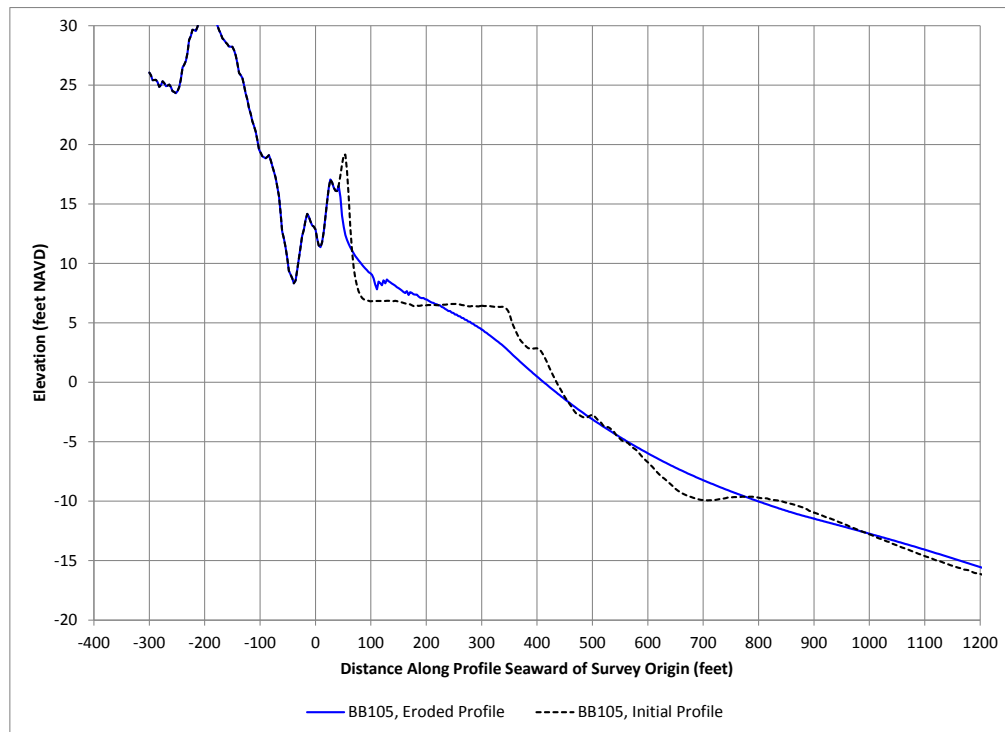


Figure 3-34: SBEACH Results, Existing Conditions, 50-year, Transect 105

iii. 100 Year Storm

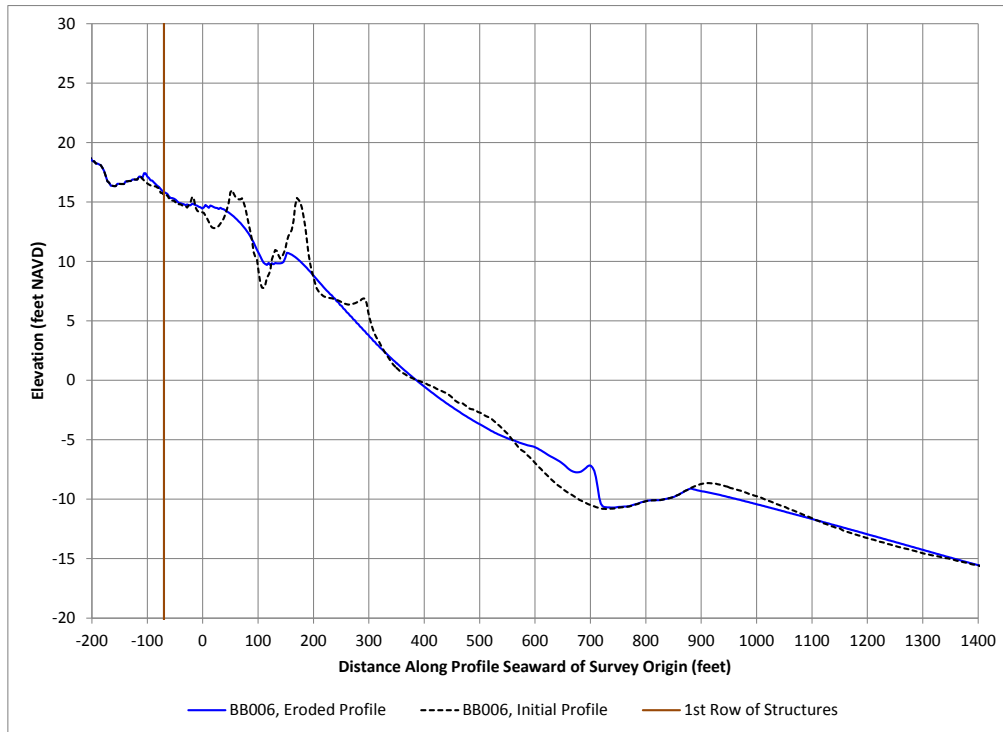


Figure 3-35: SBEACH Results, Existing Conditions, 100-year, Transect 6

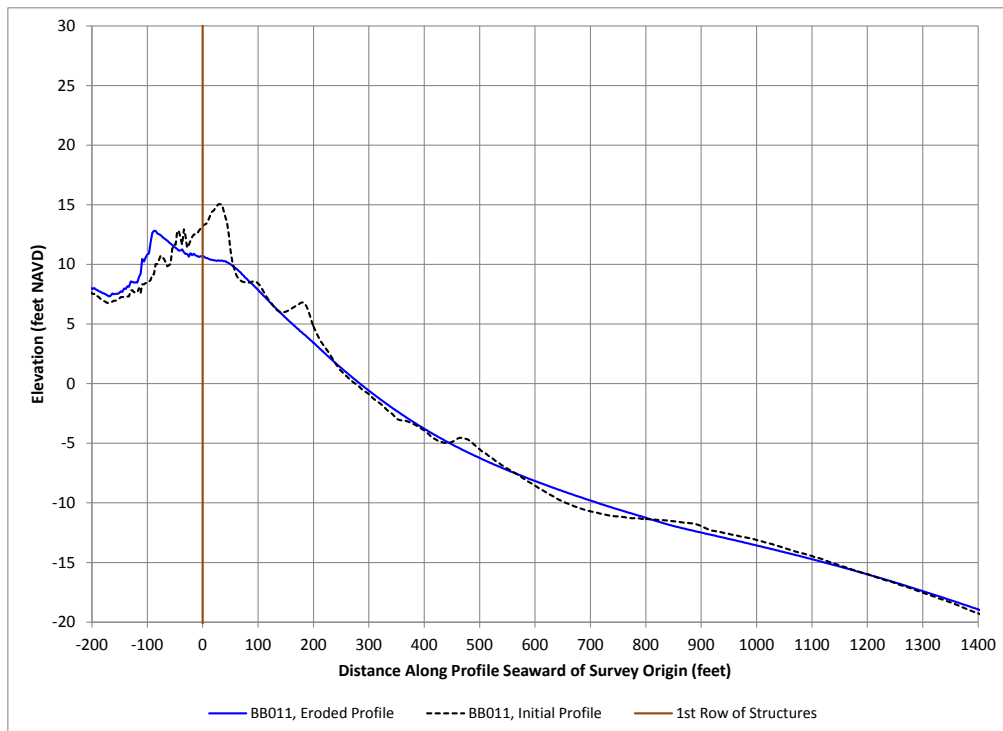


Figure 3-36: SBEACH Results, Existing Conditions, 100-year, Transect 11

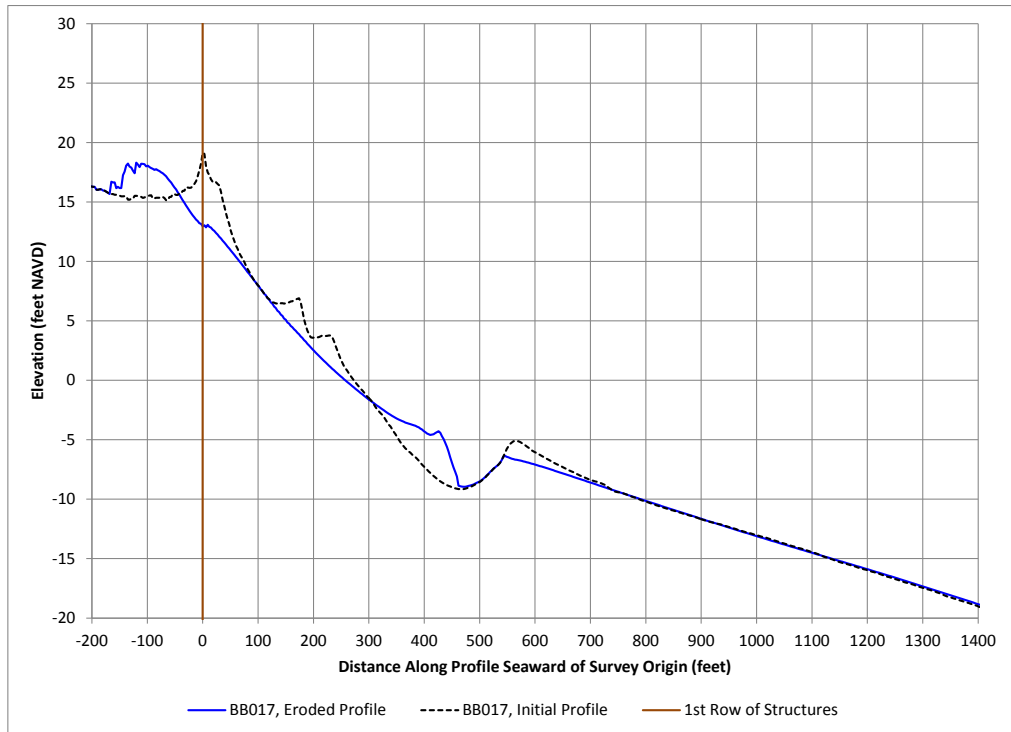


Figure 3-37: SBEACH Results, Existing Conditions, 100-year, Transect 17

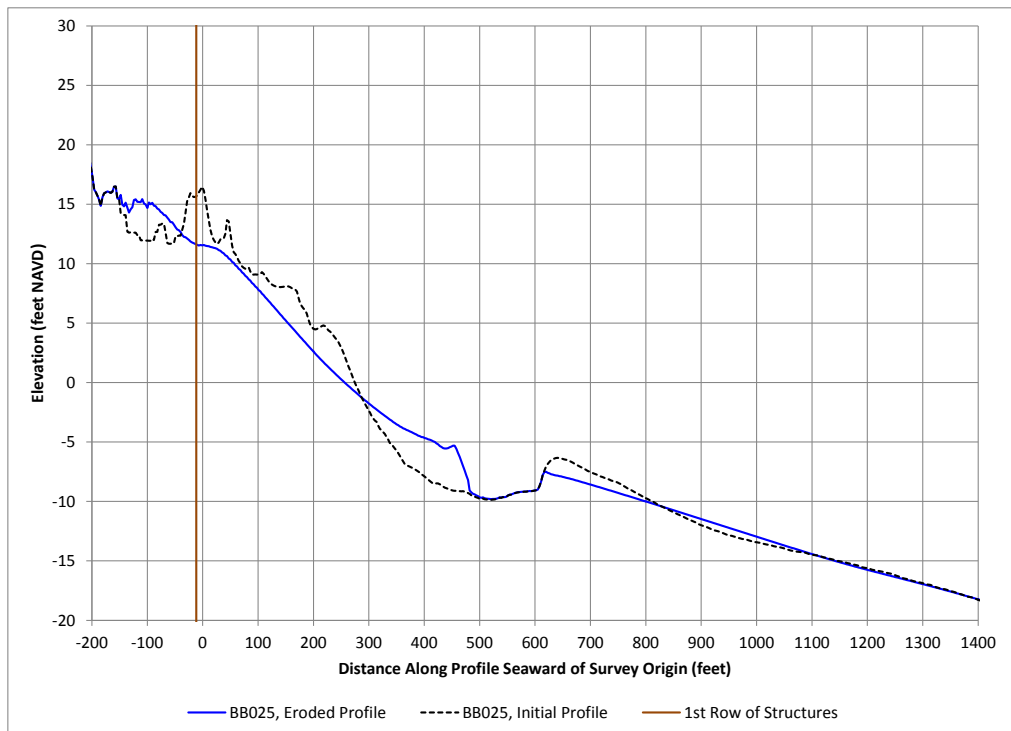


Figure 3-38: SBEACH Results, Existing Conditions, 100-year, Transect 25

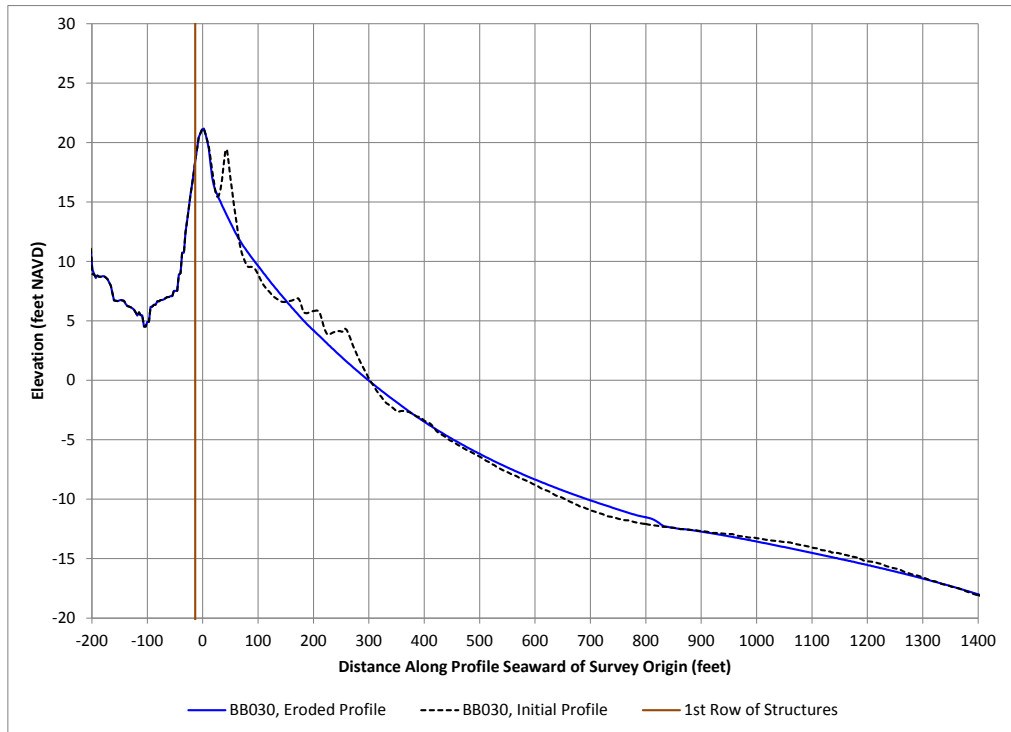


Figure 3-39: SBEACH Results, Existing Conditions, 100-year, Transect 30

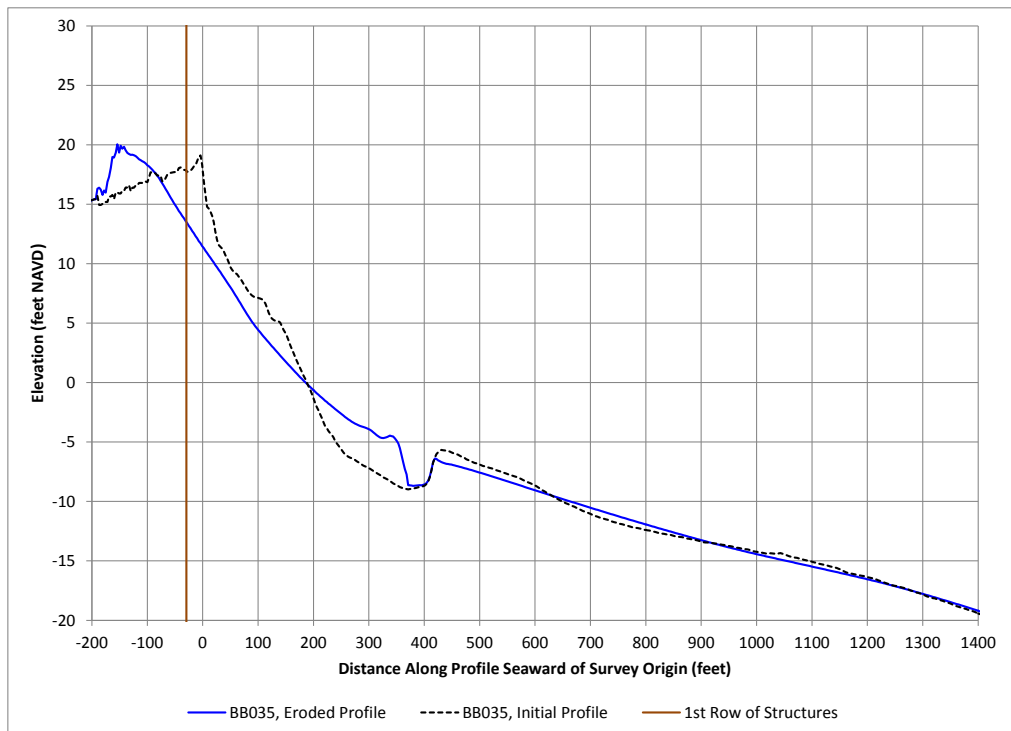


Figure 3-40: SBEACH Results, Existing Conditions, 100-year, Transect 35

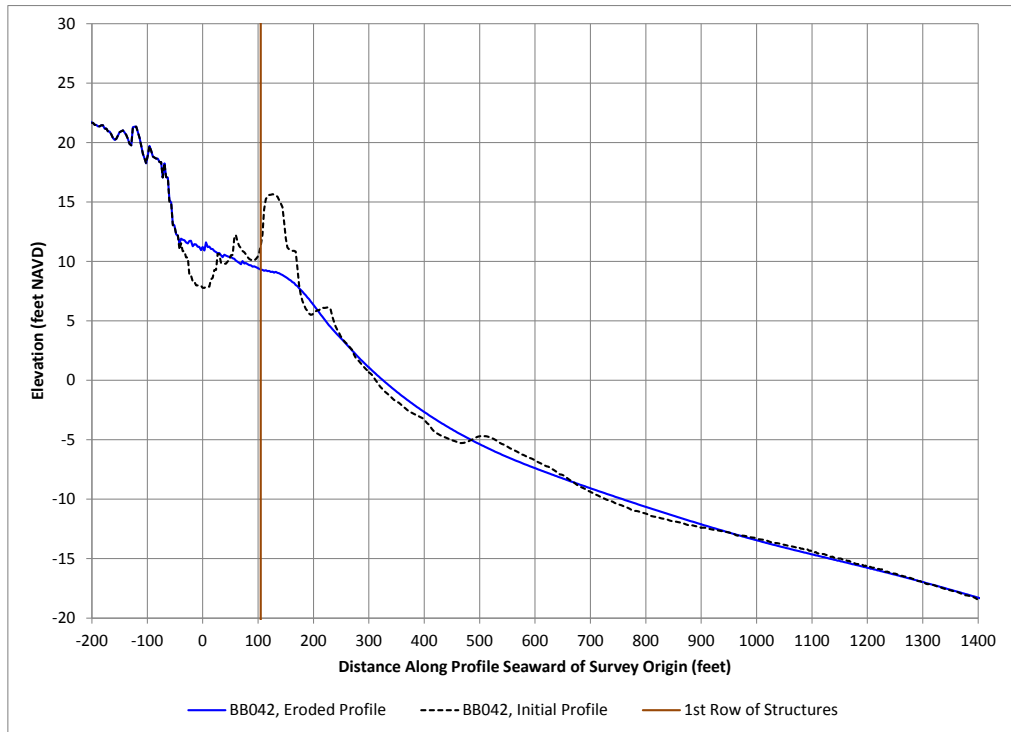


Figure 3-41: SBEACH Results, Existing Conditions, 100-year, Transect 42

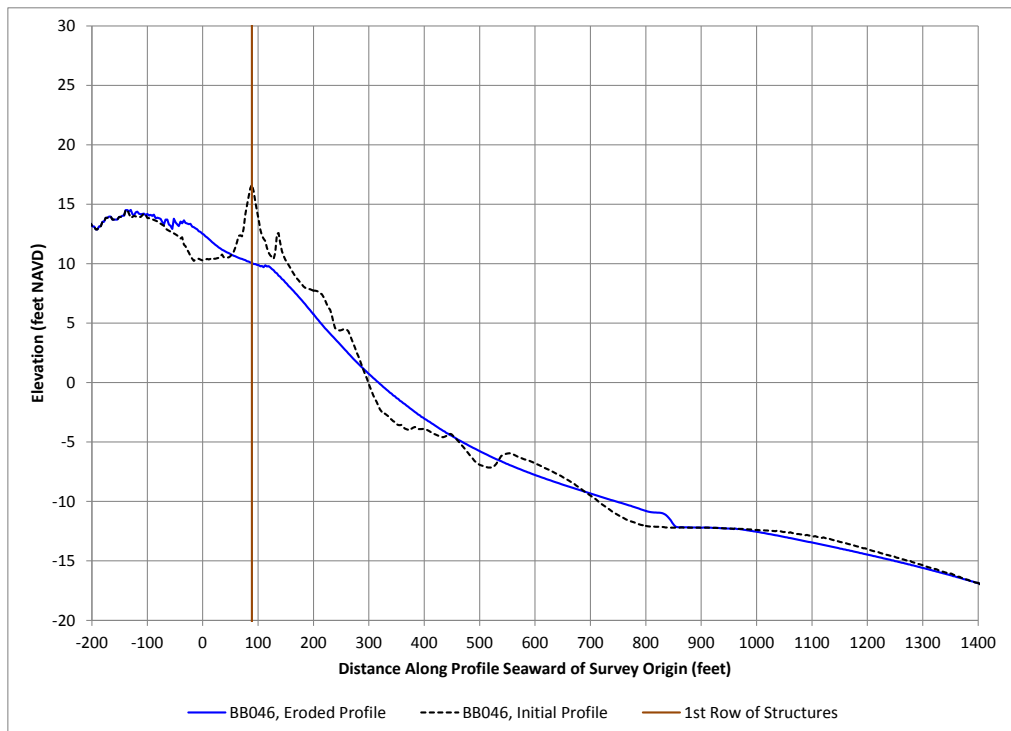


Figure 3-42: SBEACH Results, Existing Conditions, 100-year, Transect 46

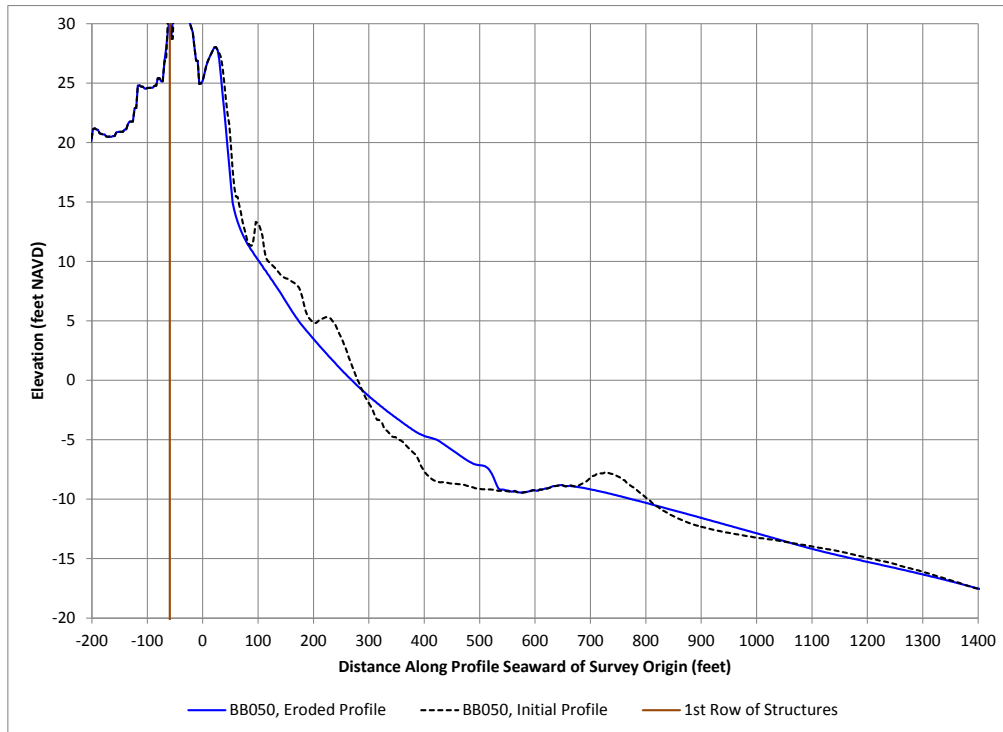


Figure 3-43: SBEACH Results, Existing Conditions, 100-year, Transect 50

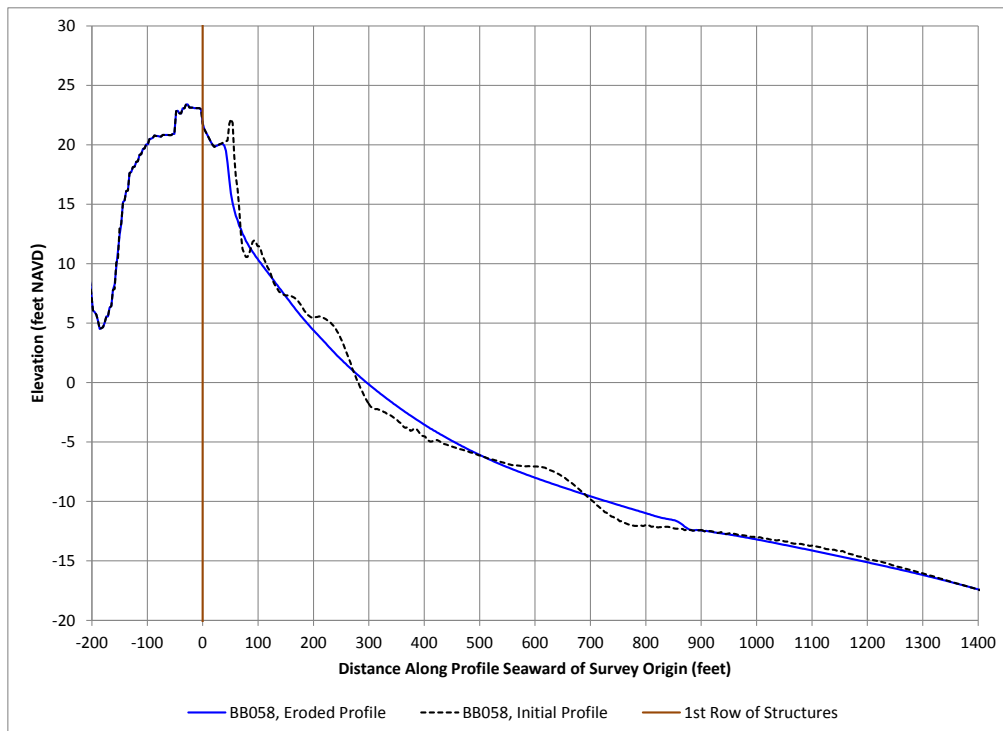


Figure 3-44 SBEACH Results, Existing Conditions, 100-year, Transect 58

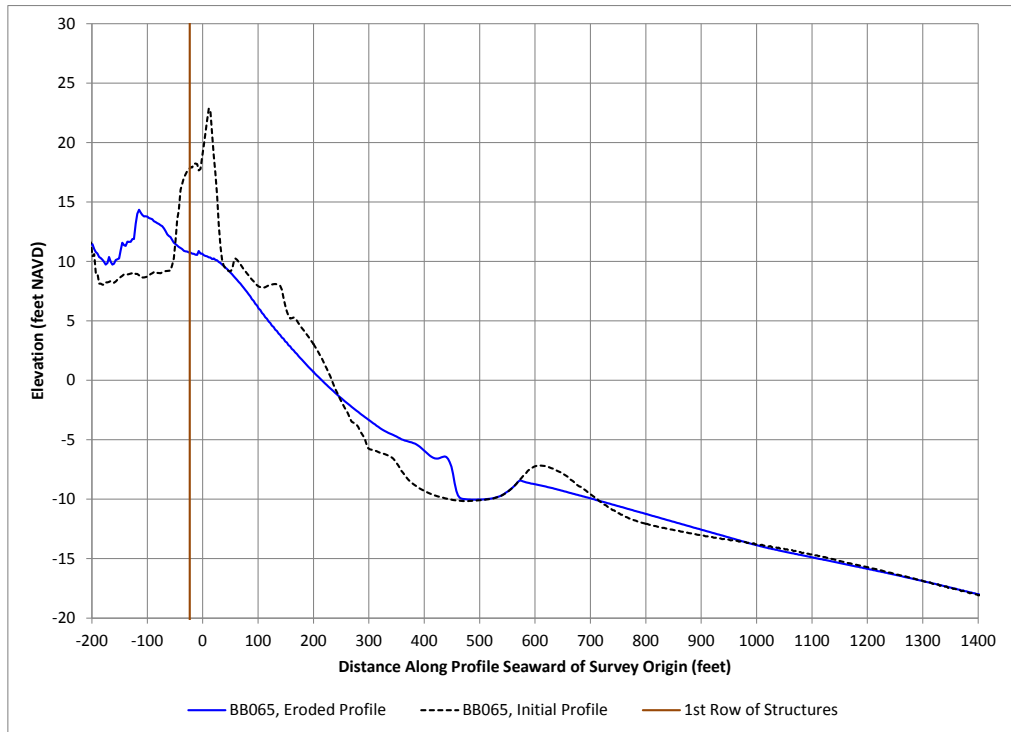


Figure 3-45: SBEACH Results, Existing Conditions, 100-year, Transect 65

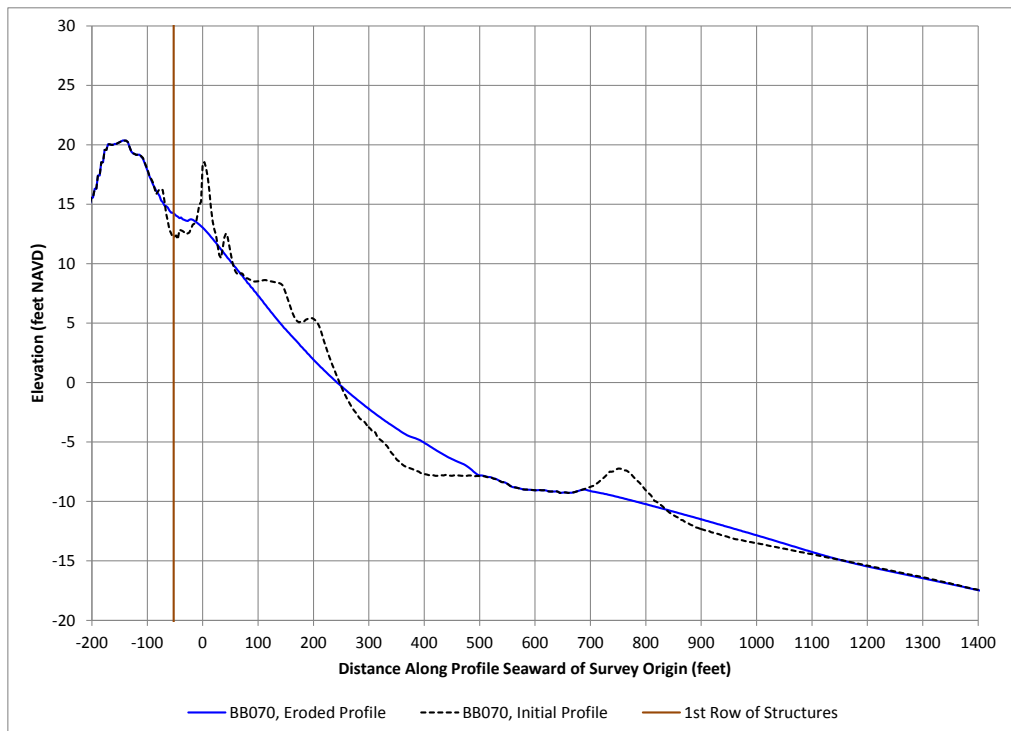


Figure 3-46: SBEACH Results, Existing Conditions, 100-year, Transect 70

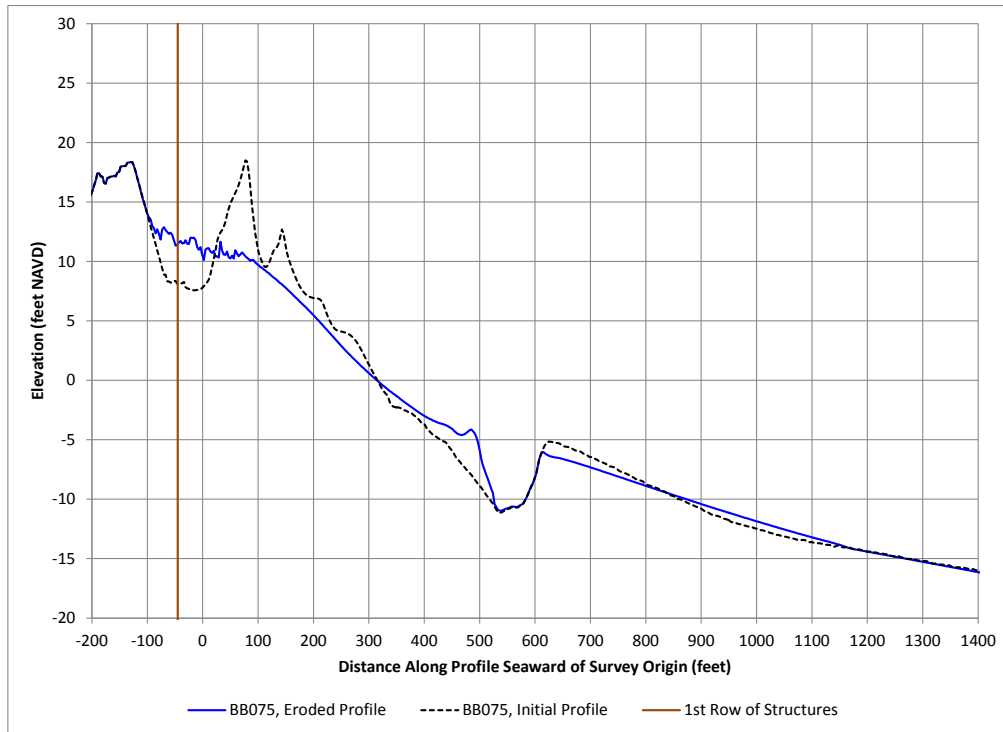


Figure 3-47: SBEACH Results, Existing Conditions, 100-year, Transect 75

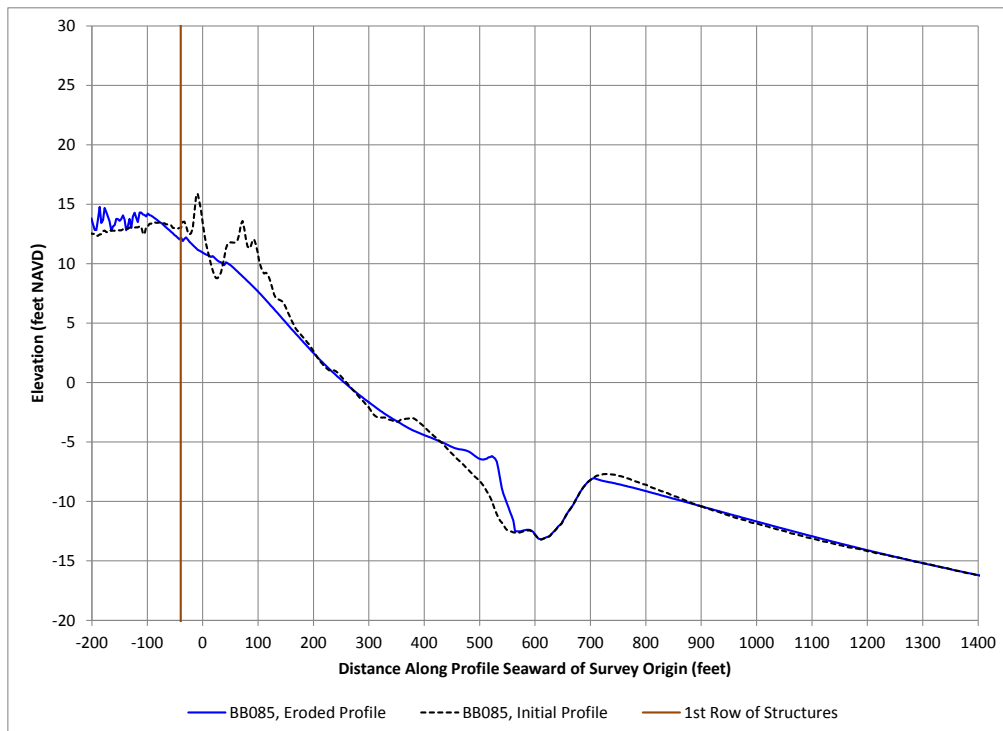


Figure 3-48: SBEACH Results, Existing Conditions, 100-year, Transect 85

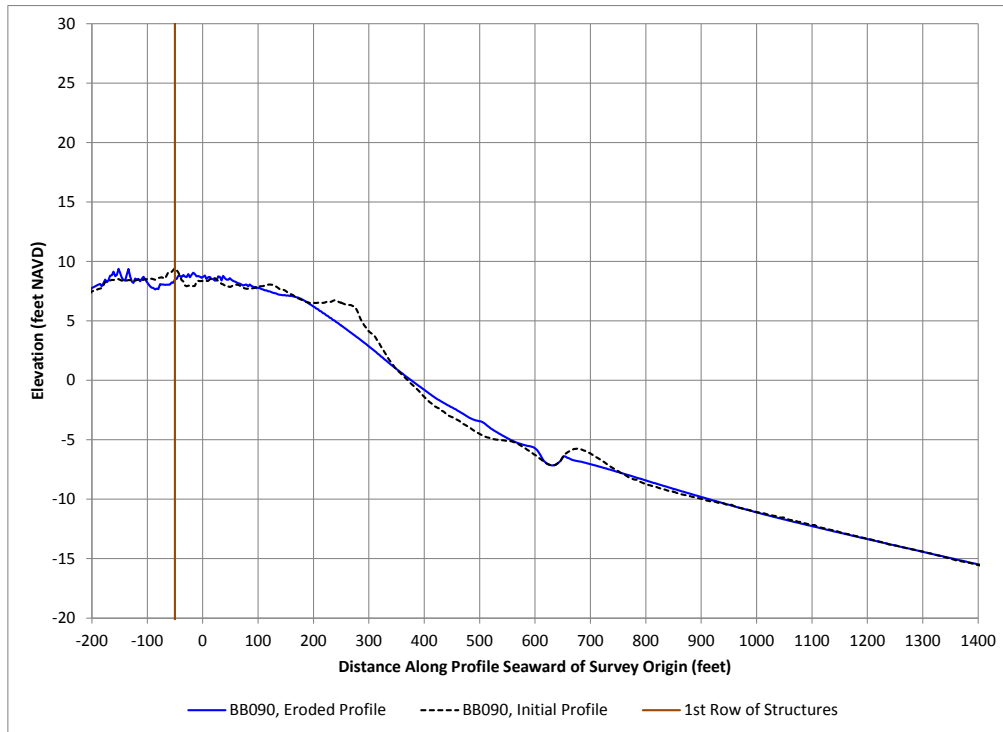


Figure 3-49: SBEACH Results, Existing Conditions, 100-year, Transect 90

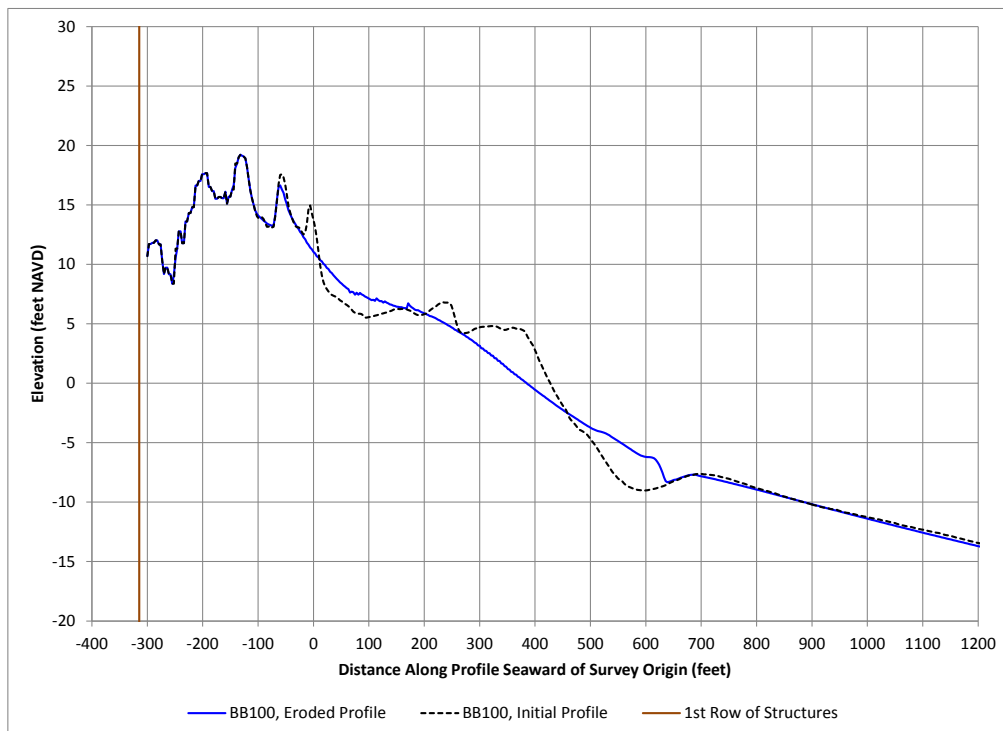


Figure 3-50: SBEACH Results, Existing Conditions, 100-year, Transect 100

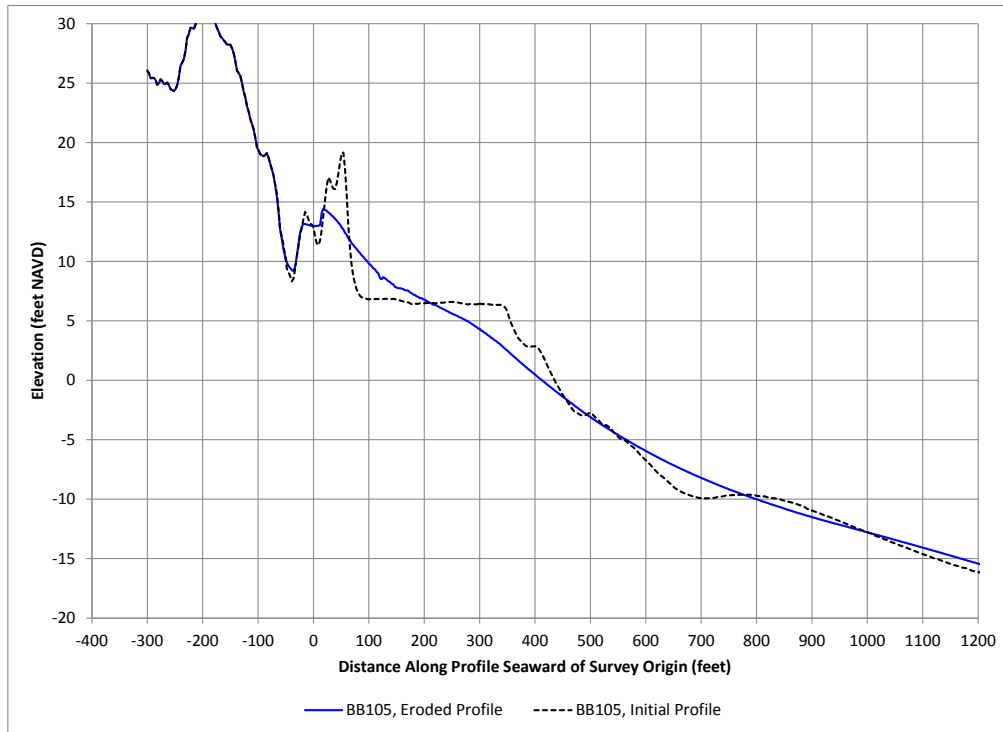


Figure 3-51: SBEACH Results, Existing Conditions, 100-year, Transect 105

3b. 25 Year Protection

i. 25 Year Storm

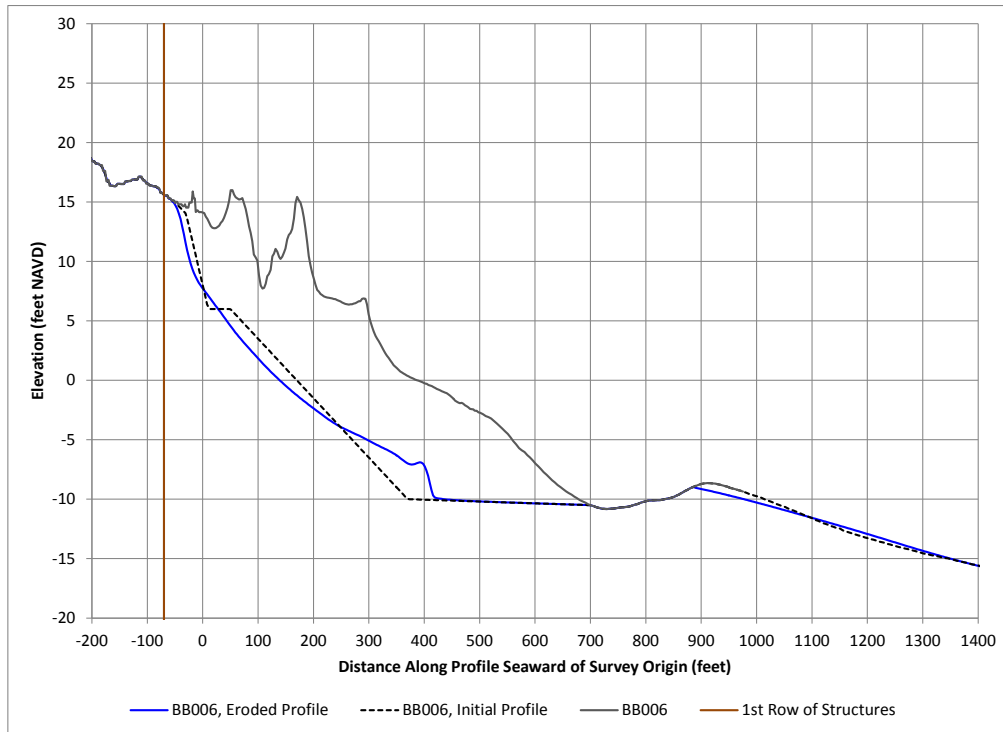


Figure 3-52: SBEACH Results, 25-Year Protection, 25-year, Transect 6

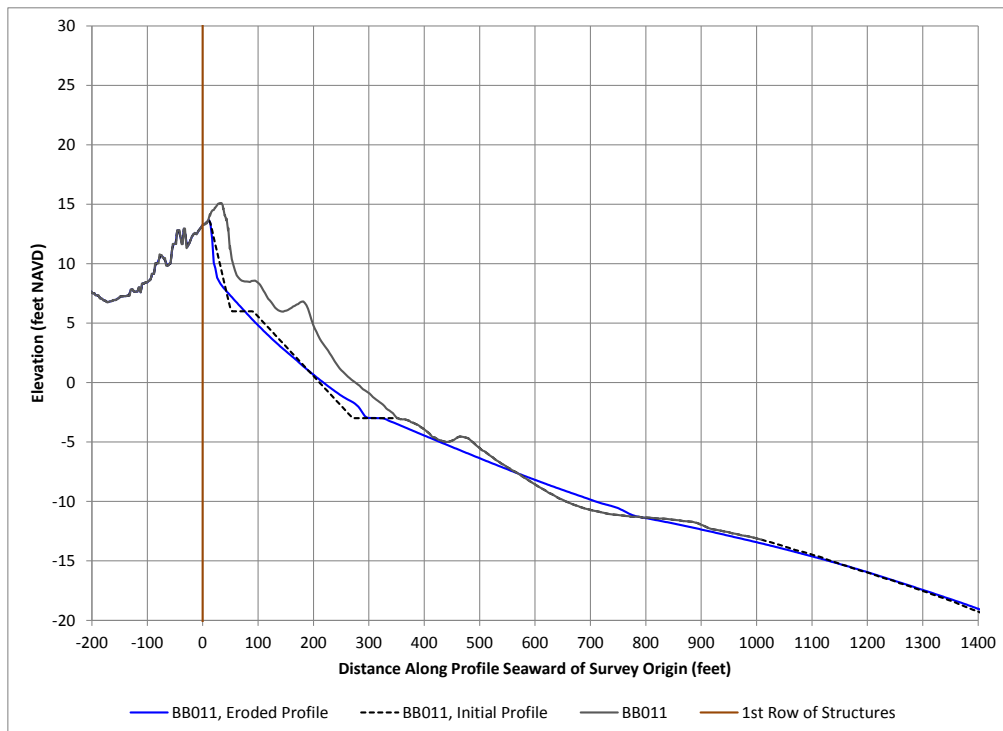


Figure 3-53: SBEACH Results, 25-Year Protection, 25-year, Transect 11

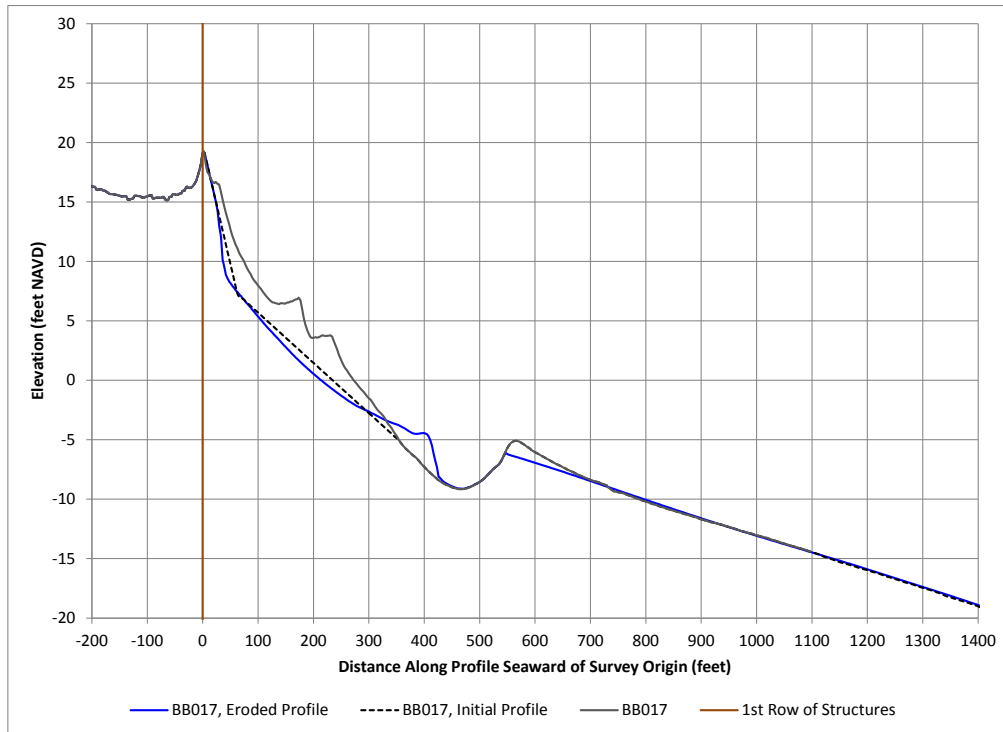


Figure 3-54: SBEACH Results, 25-Year Protection, 25-year, Transect 17

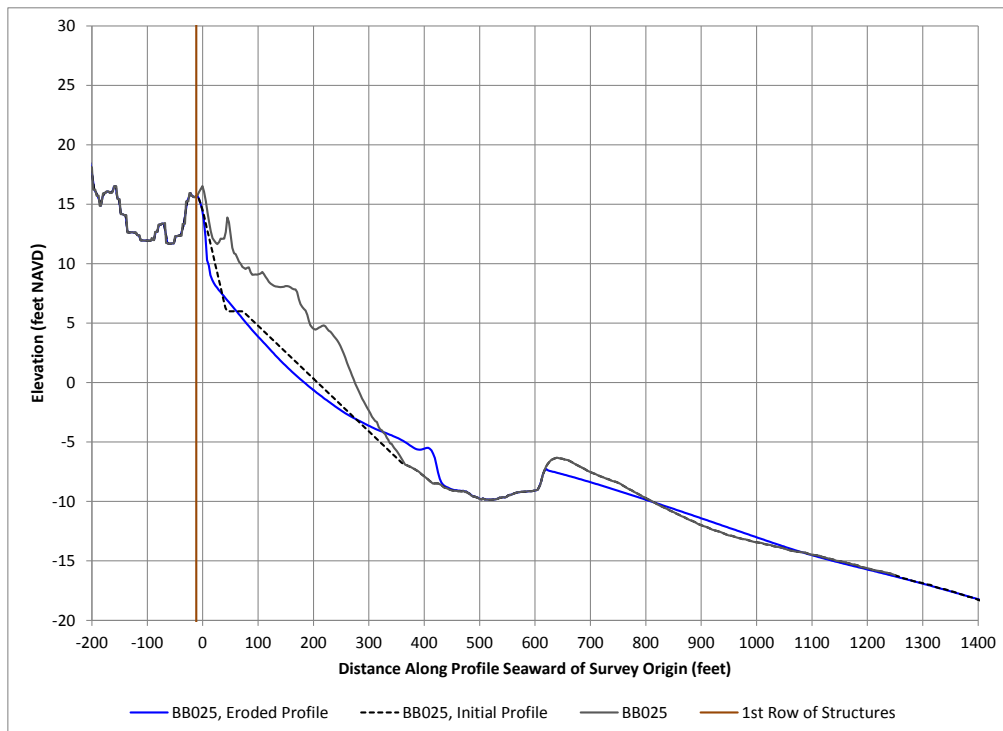


Figure 3-55: SBEACH Results, 25-Year Protection, 25-year, Transect 25

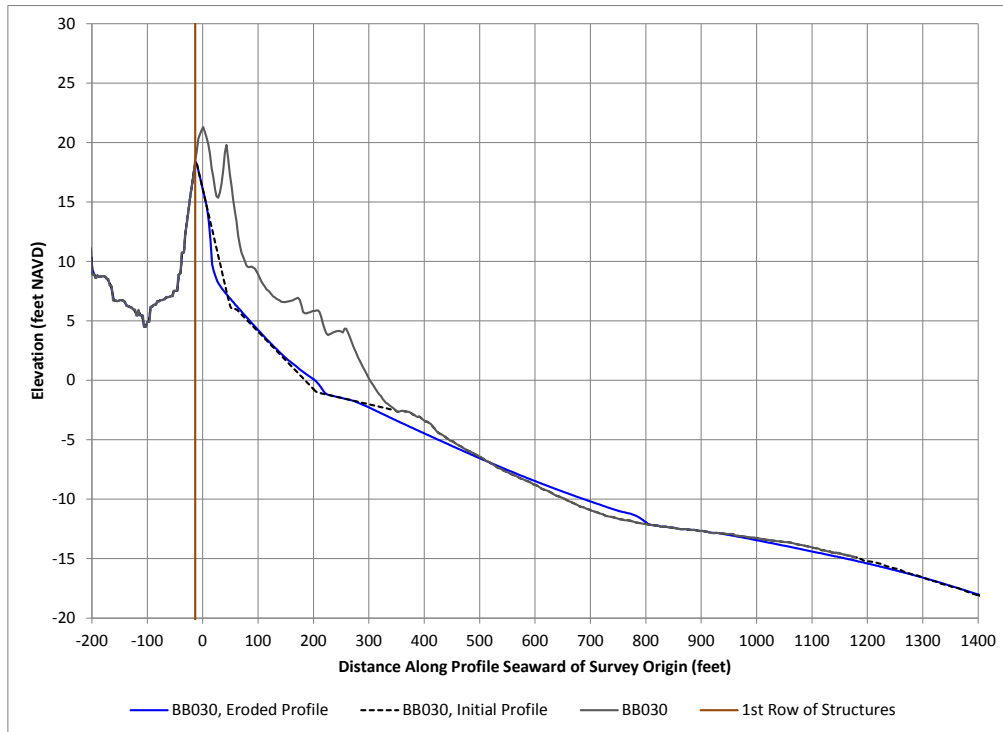


Figure 3-56: SBEACH Results, 25-Year Protection, 25-year, Transect 30

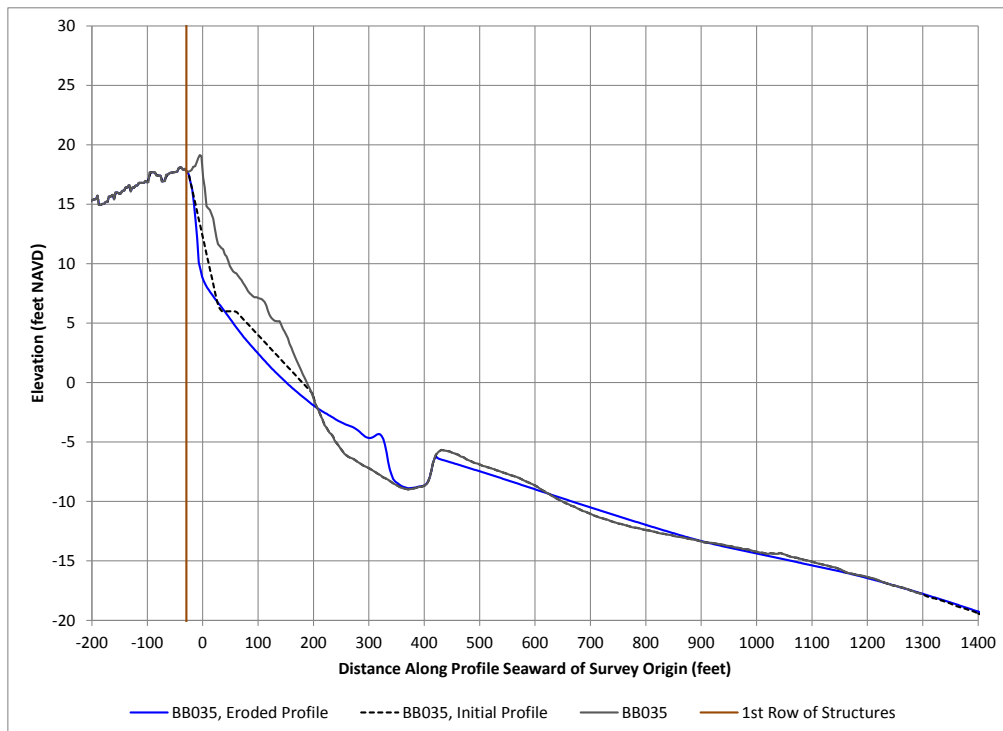


Figure 3-57: SBEACH Results, 25-Year Protection, 25-year, Transect 35

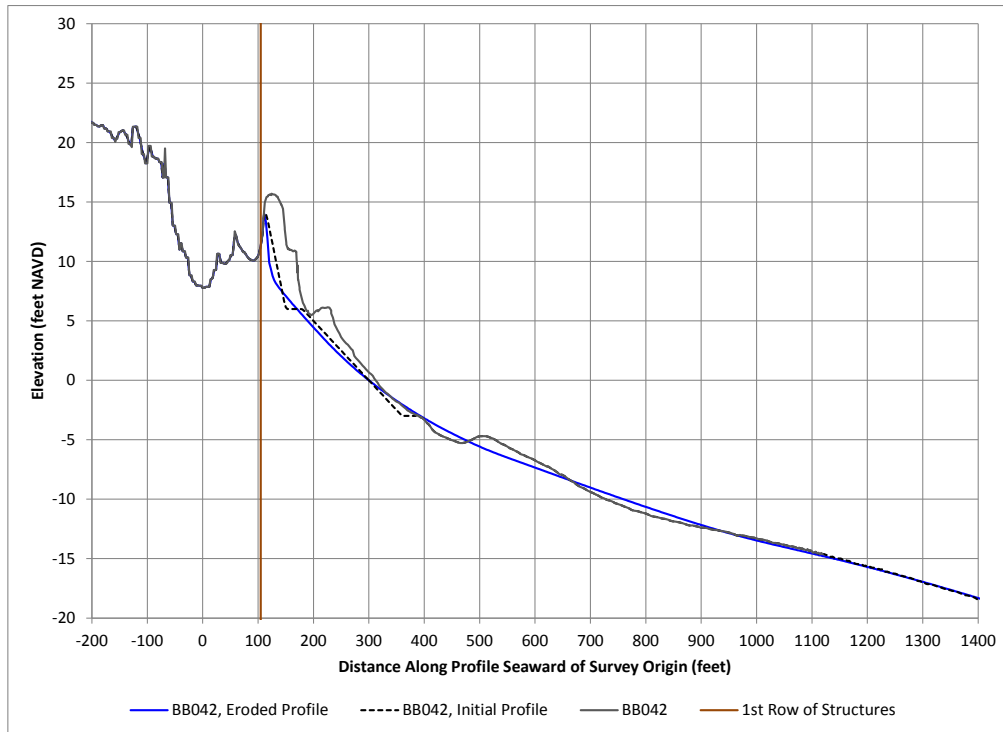


Figure 3-58: SBEACH Results, 25-Year Protection, 25-year, Transect 42

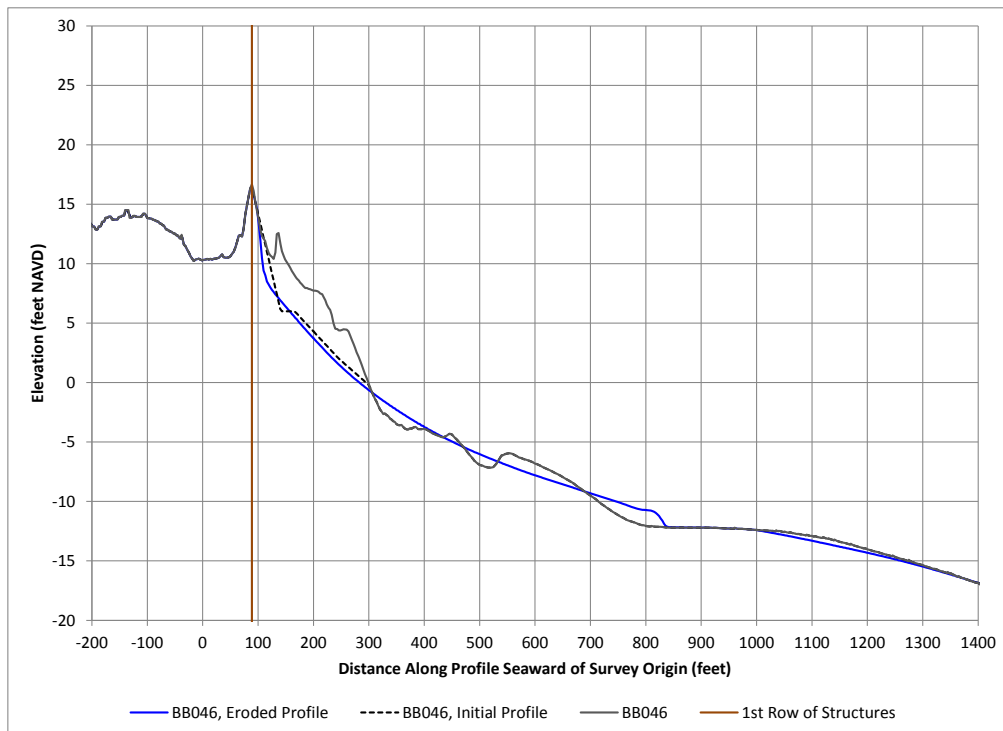


Figure 3-59: SBEACH Results, 25-Year Protection, 25-year, Transect 46

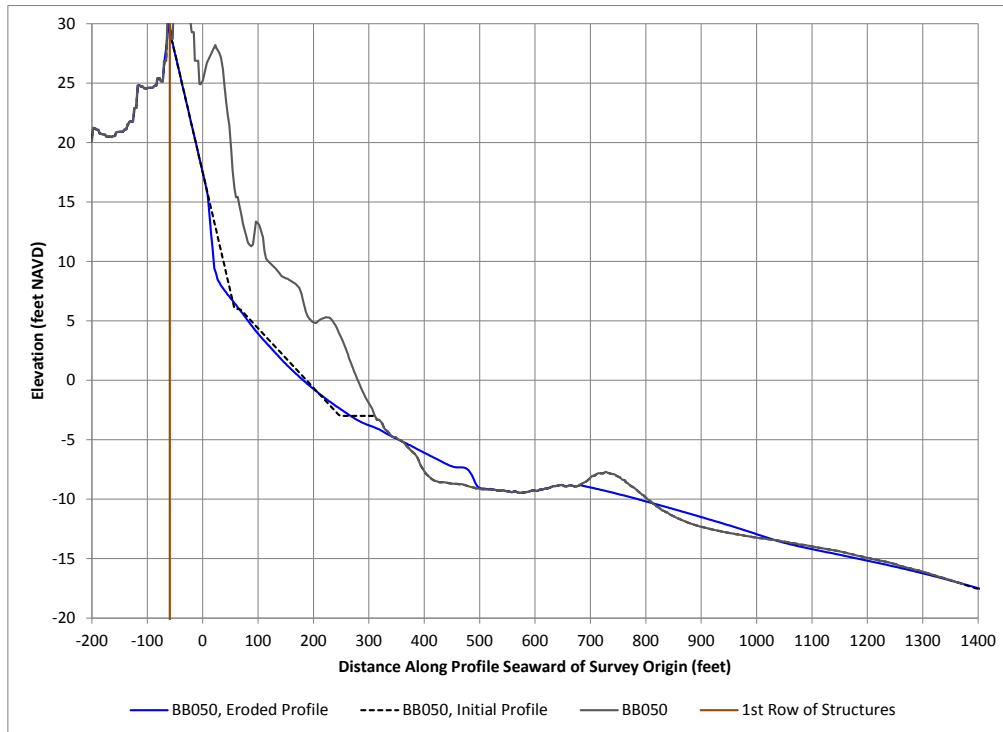


Figure 3-60: SBEACH Results, 25-Year Protection, 25-year, Transect 50

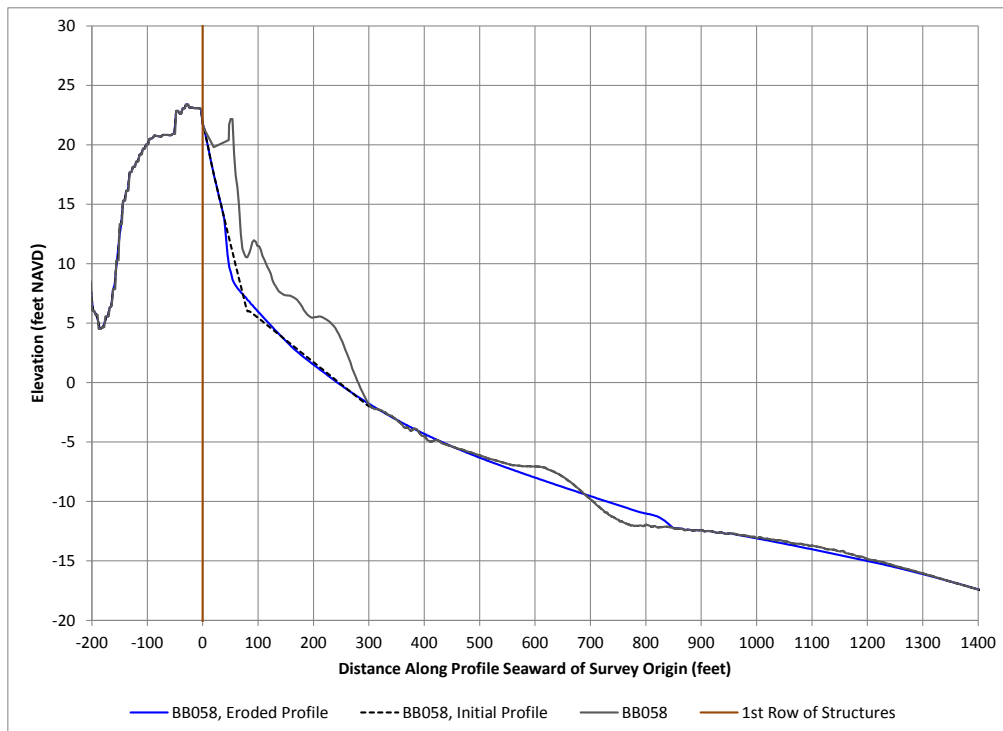


Figure 3-61: SBEACH Results, 25-Year Protection, 25-year, Transect 58

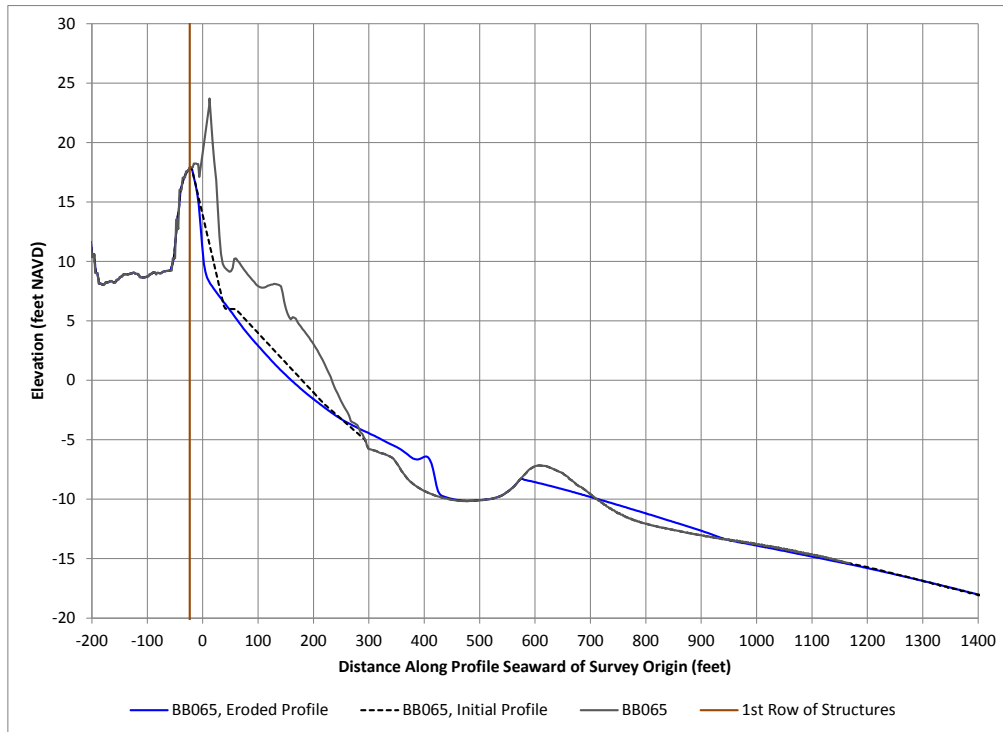


Figure 3-62: SBEACH Results, 25-Year Protection, 25-year, Transect 65

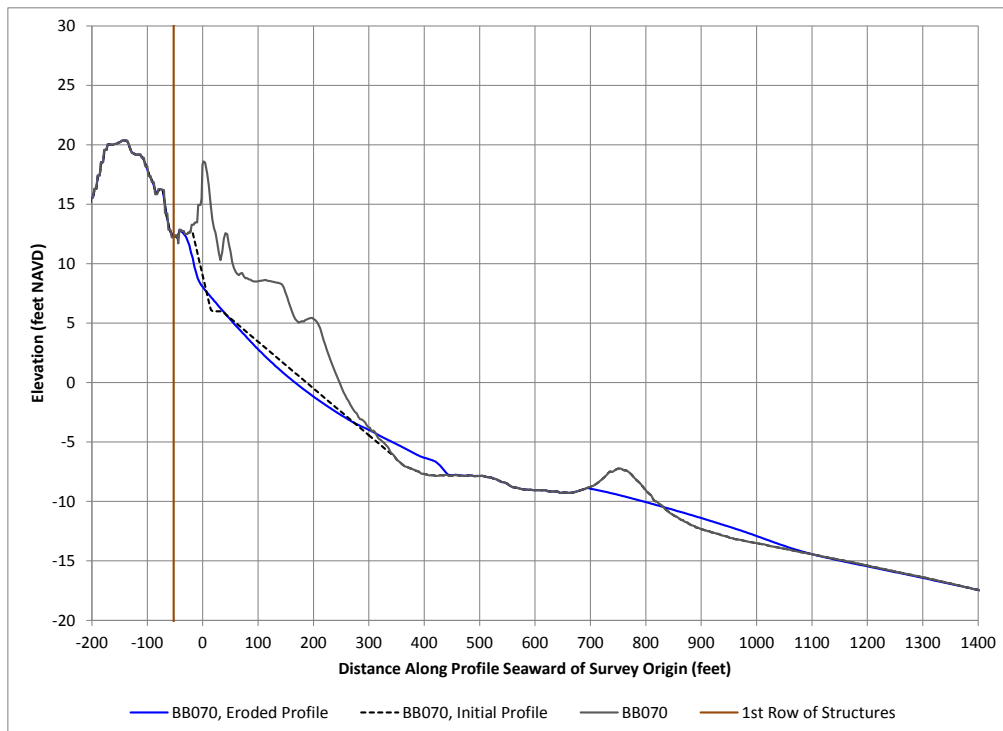


Figure 3-63: SBEACH Results, 25-Year Protection, 25-year, Transect 70

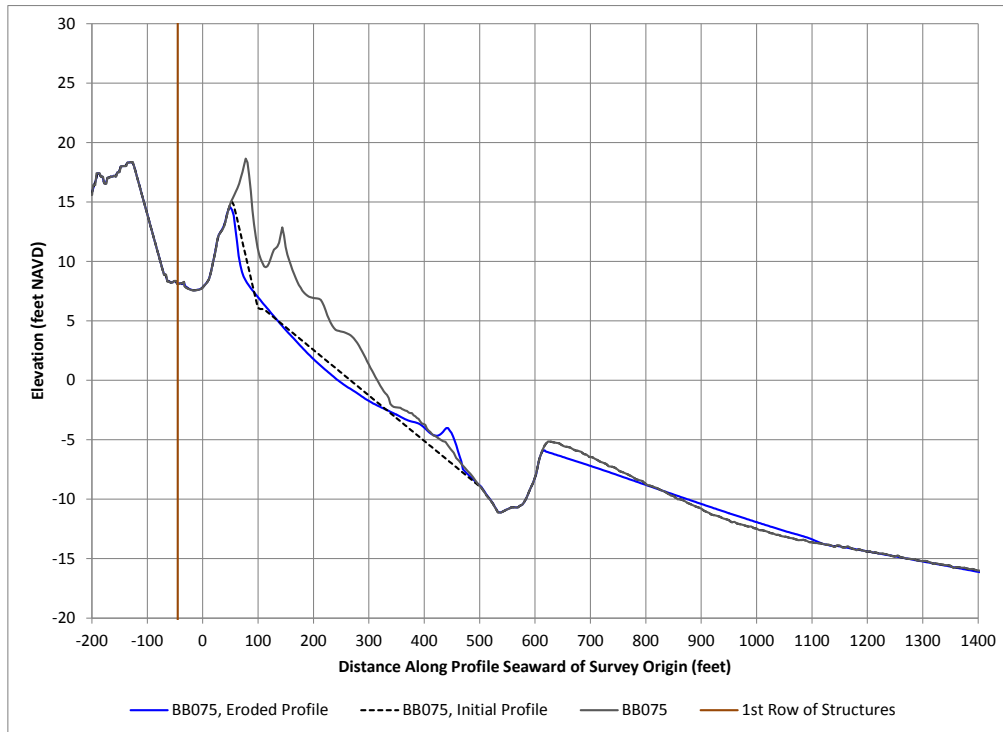


Figure 3-64: SBEACH Results, 25-Year Protection, 25-year, Transect 75

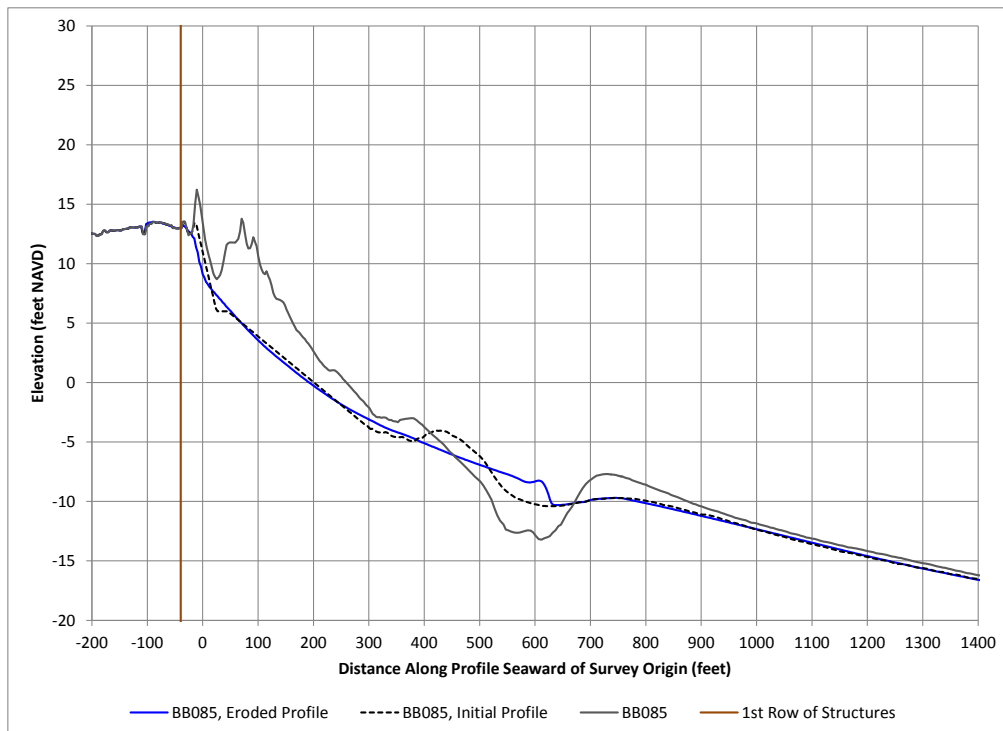


Figure 3-65: SBEACH Results, 25-Year Protection, 25-year, Transect 85

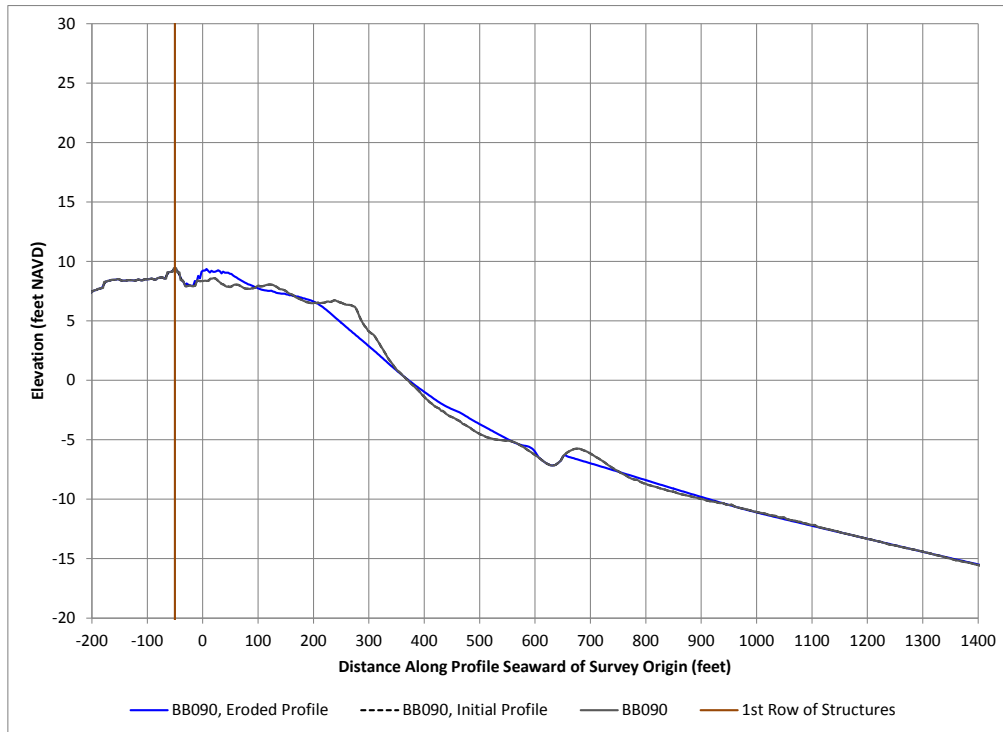


Figure 3-66: SBEACH Results, 25-Year Protection, 25-year, Transect 90

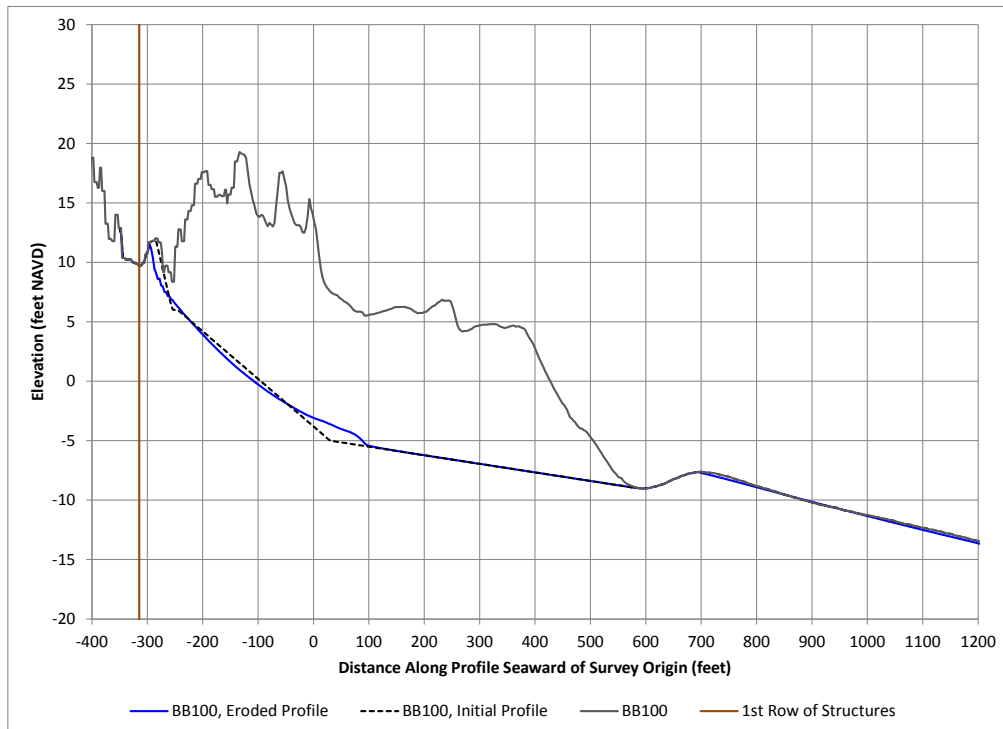


Figure 3-67: SBEACH Results, 25-Year Protection, 25-year, Transect 100

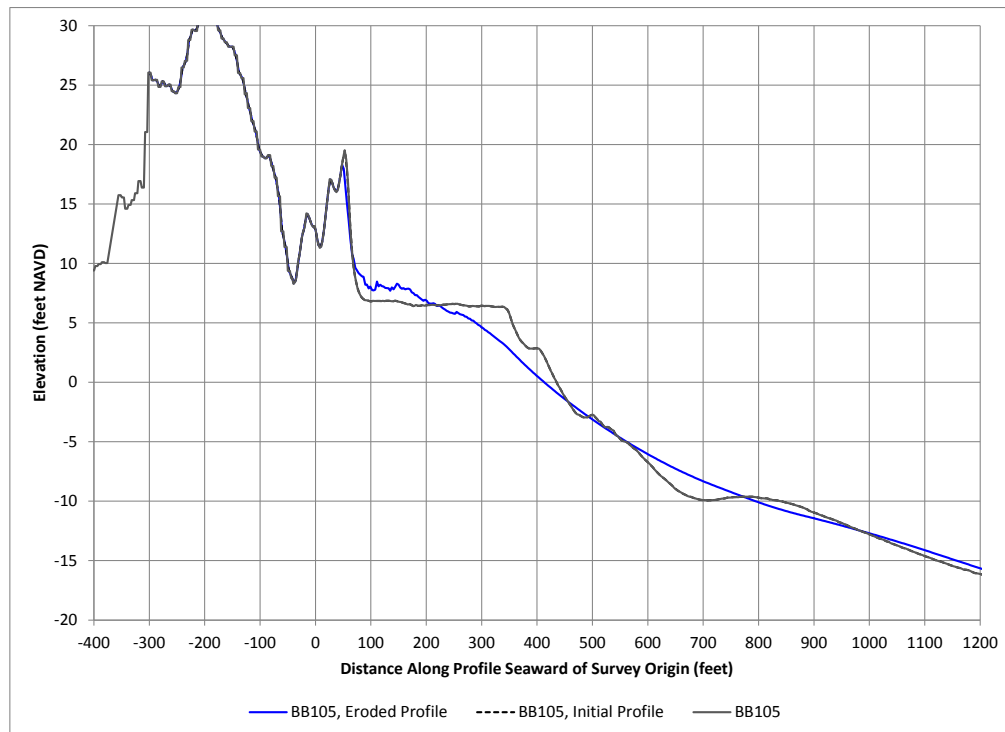


Figure 3-68: SBEACH Results, 25-Year Protection, 25-year, Transect 105

ii. 50 Year Storm

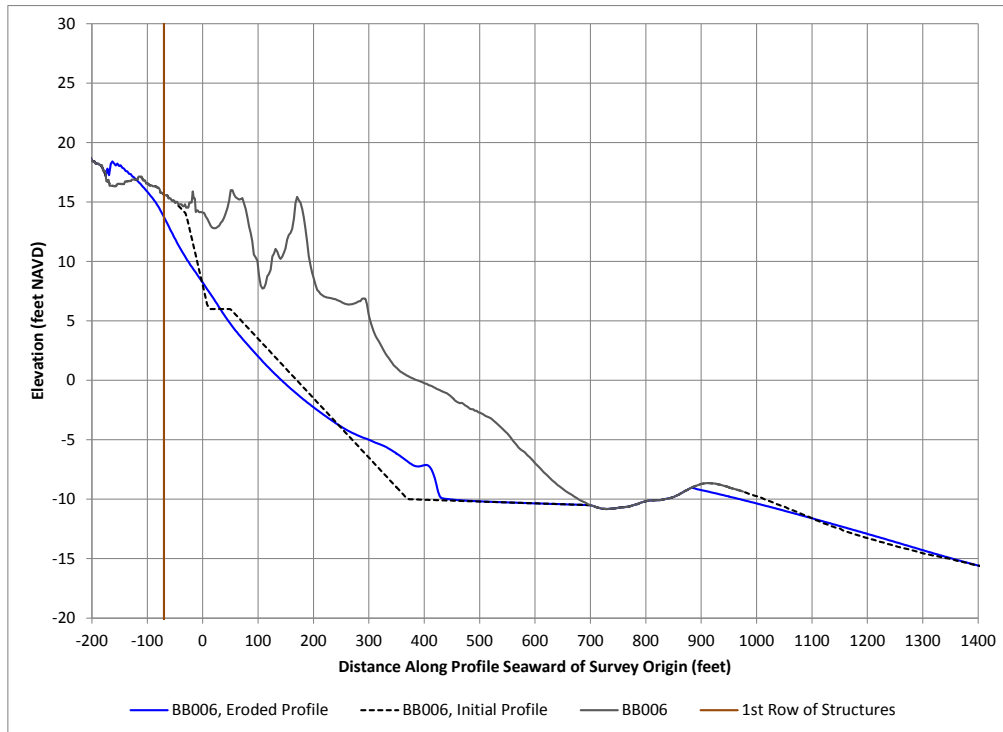


Figure 3-69: SBEACH Results, 25-Year Protection, 50-year, Transect 6

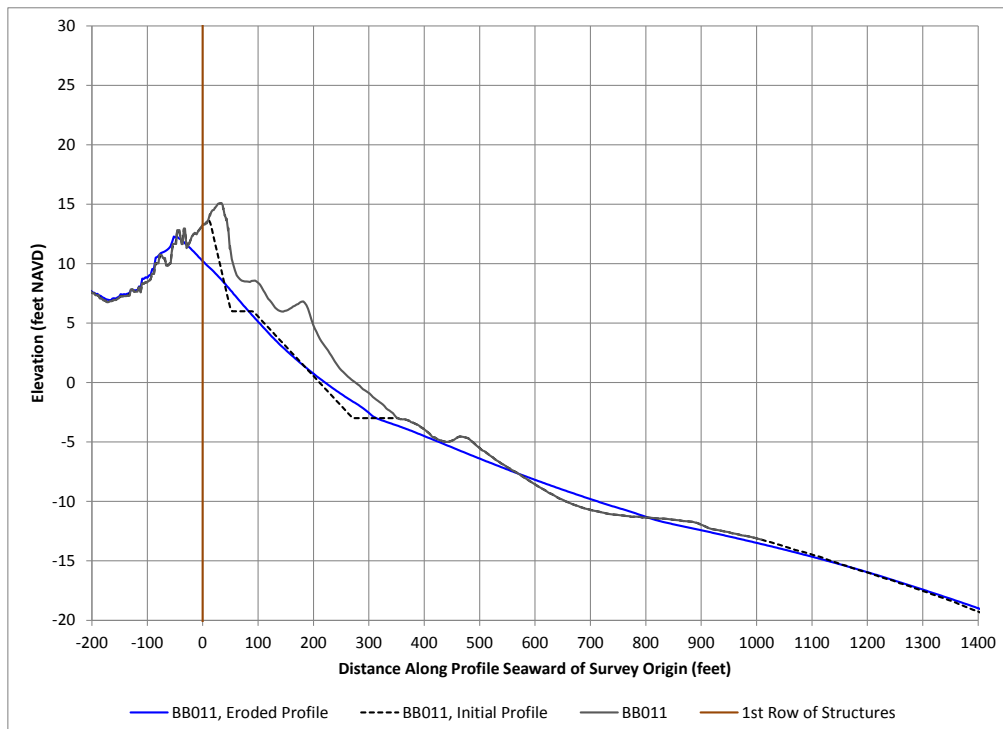


Figure 3-70: SBEACH Results, 25-Year Protection, 50-year, Transect 11

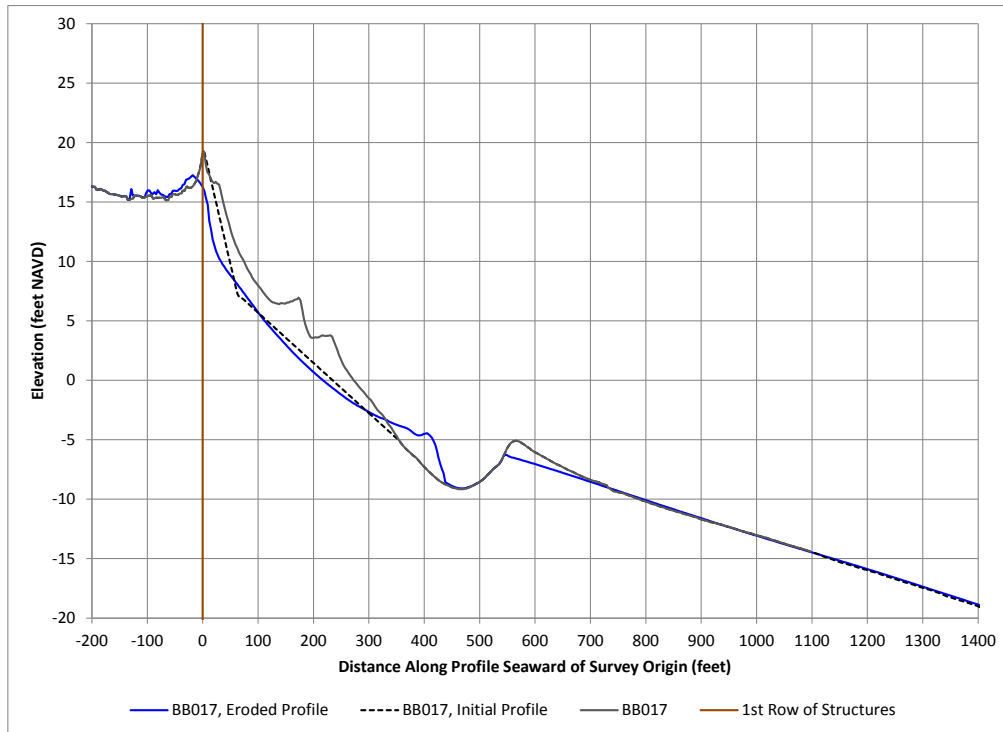


Figure 3-71: SBEACH Results, 25-Year Protection, 50-year, Transect 17

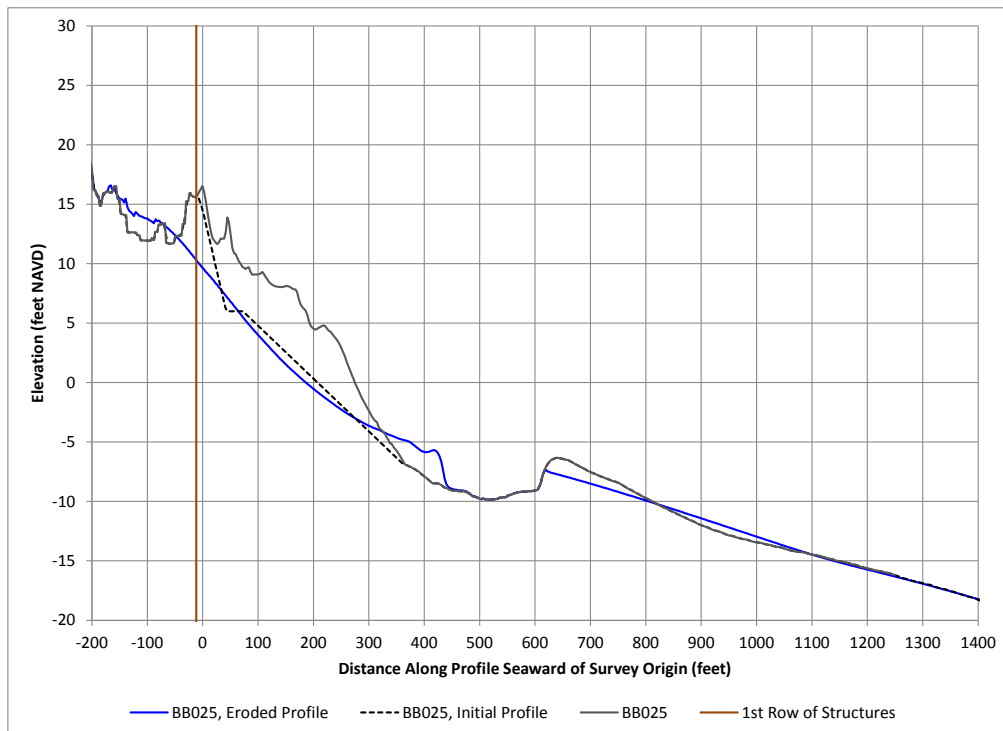


Figure 3-72: SBEACH Results, 25-Year Protection, 50-year, Transect 25

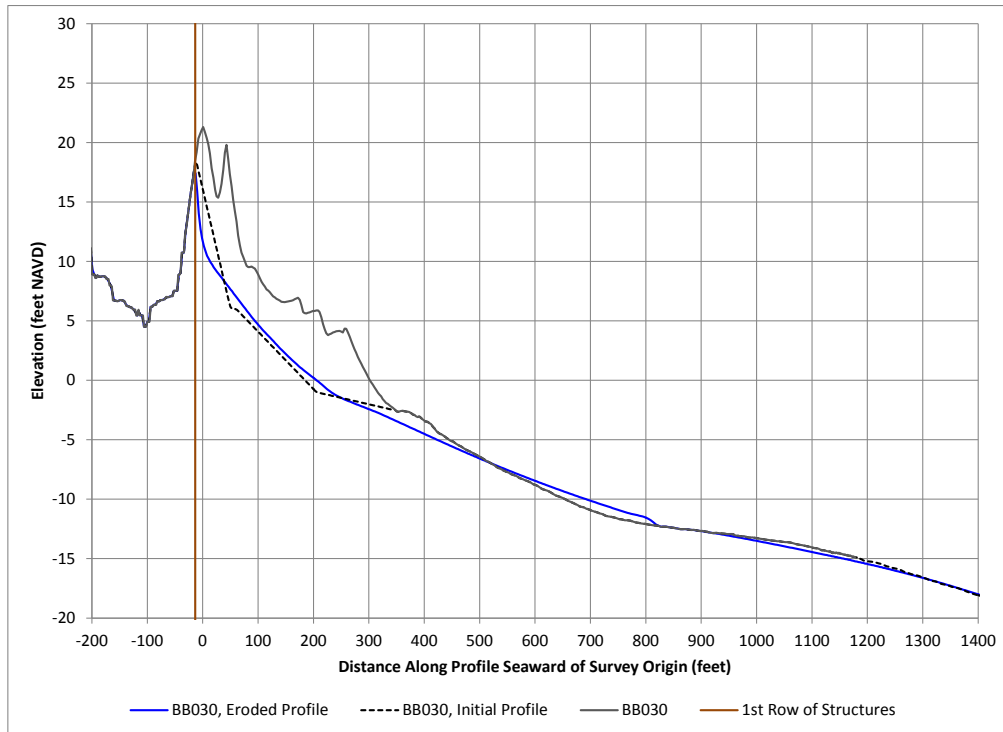


Figure 3-73: SBEACH Results, 25-Year Protection, 50-year, Transect 30

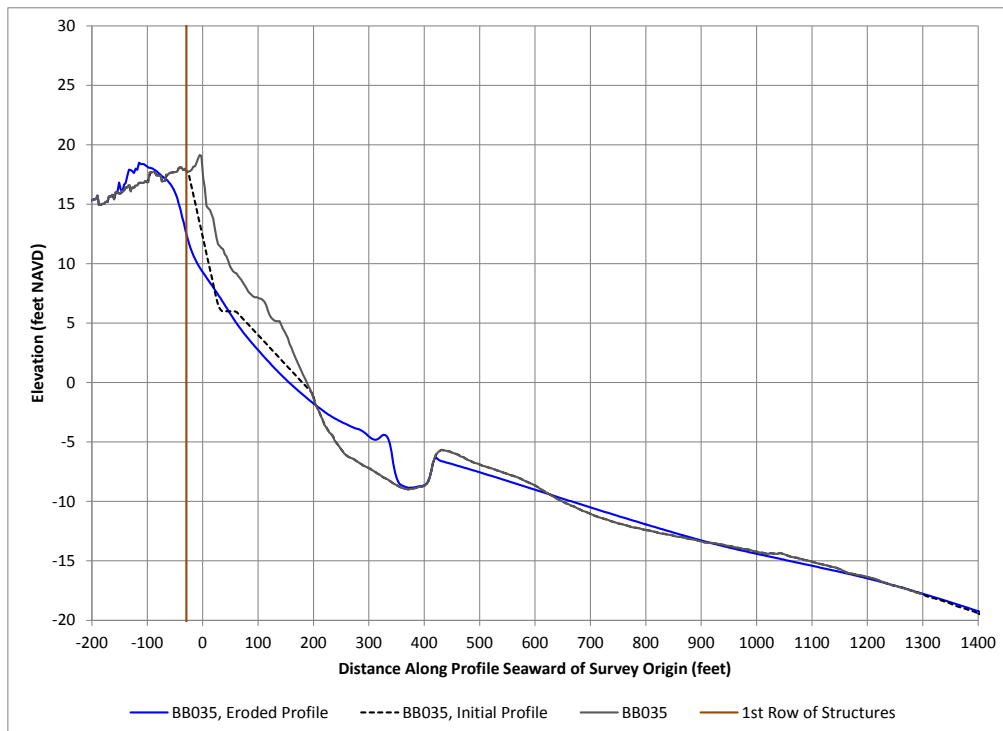


Figure 3-74: SBEACH Results, 25-Year Protection, 50-year, Transect 35

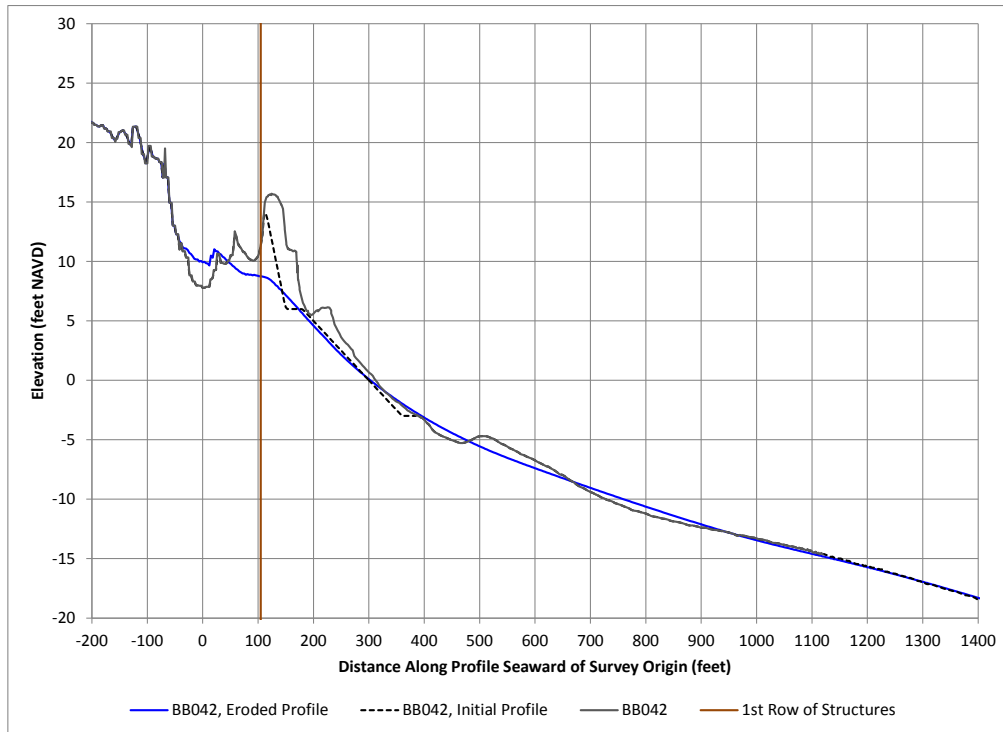


Figure 3-75: SBEACH Results, 25-Year Protection, 50-year, Transect 42

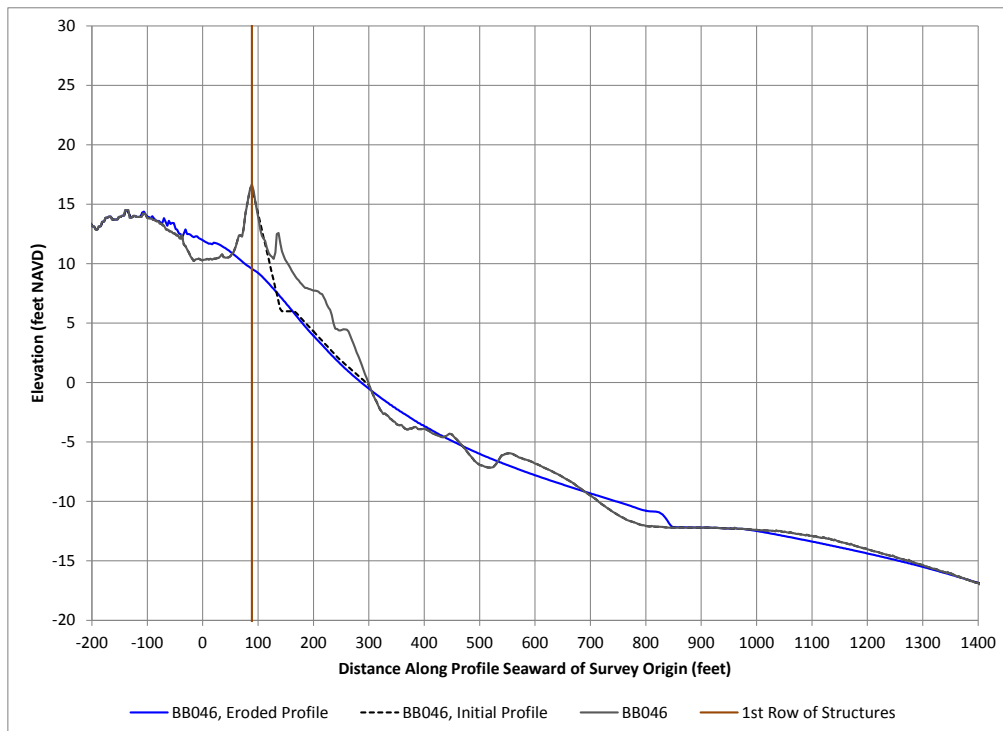


Figure 3-76: SBEACH Results, 25-Year Protection, 50-year, Transect 46

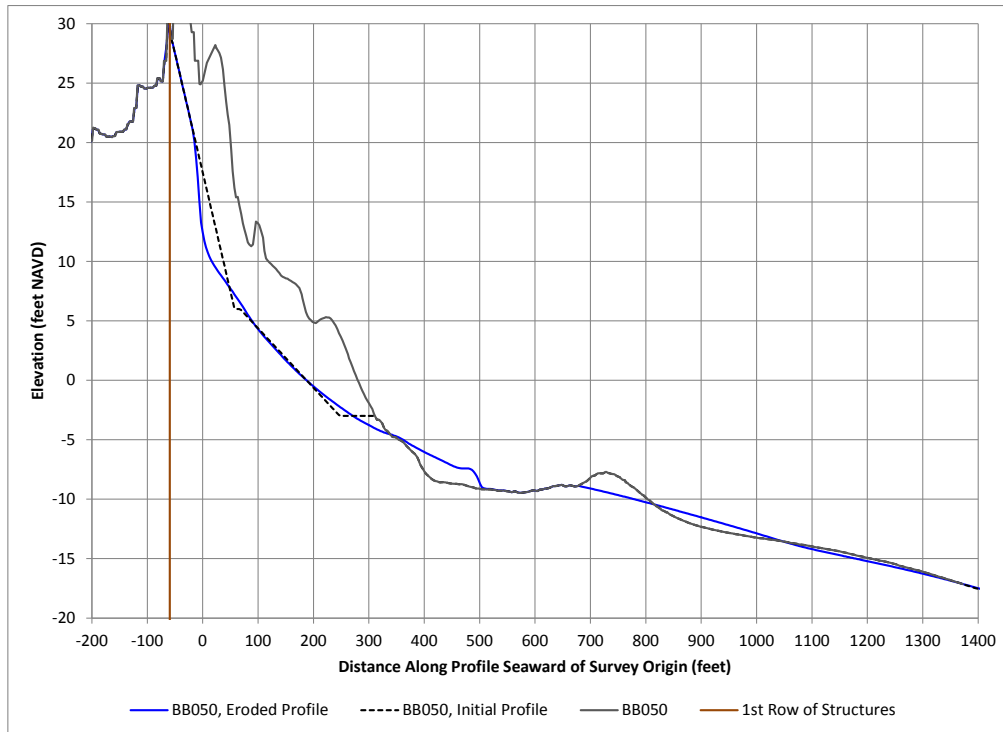


Figure 3-77: SBEACH Results, 25-Year Protection, 50-year, Transect 50

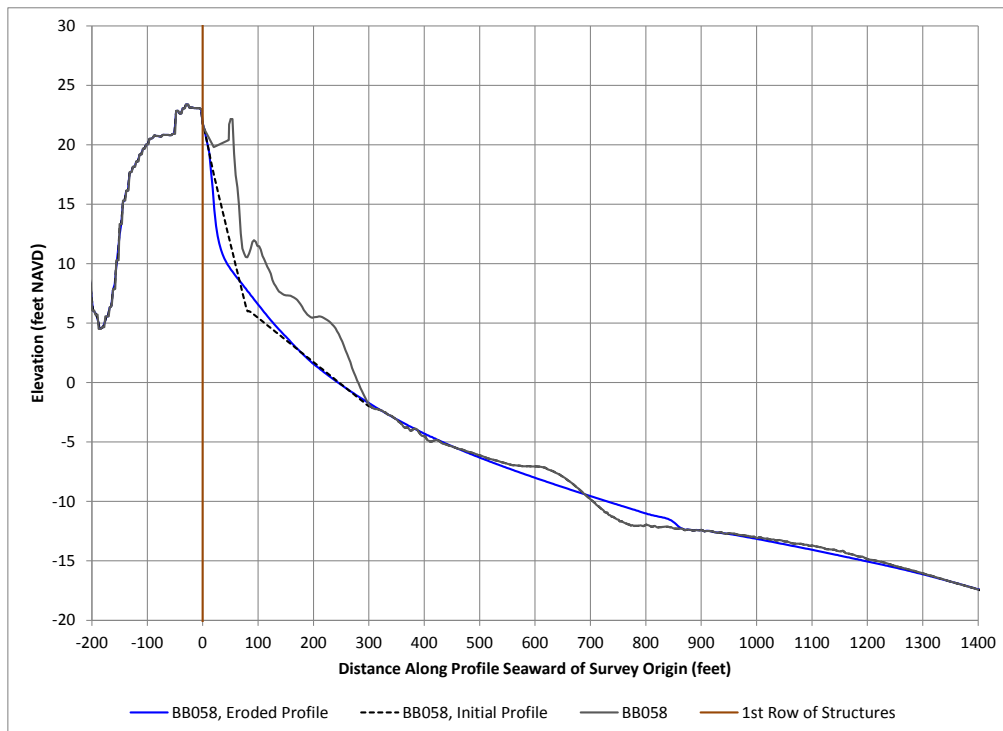


Figure 3-78: SBEACH Results, 25-Year Protection, 50-year, Transect 58

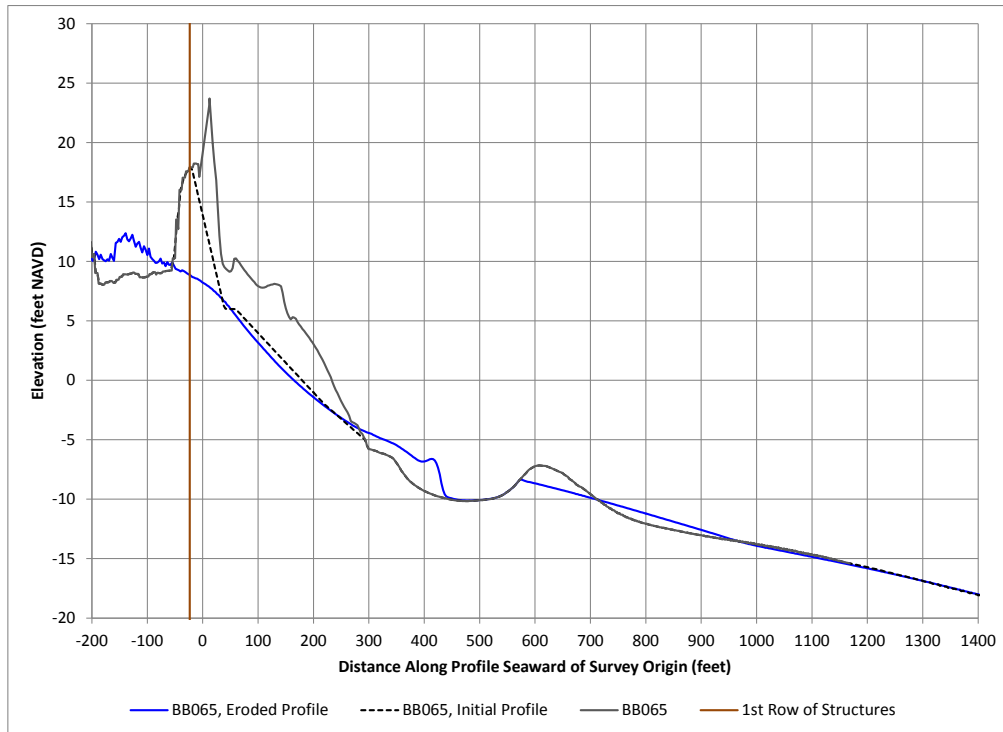


Figure 3-79: SBEACH Results, 25-Year Protection, 50-year, Transect 65

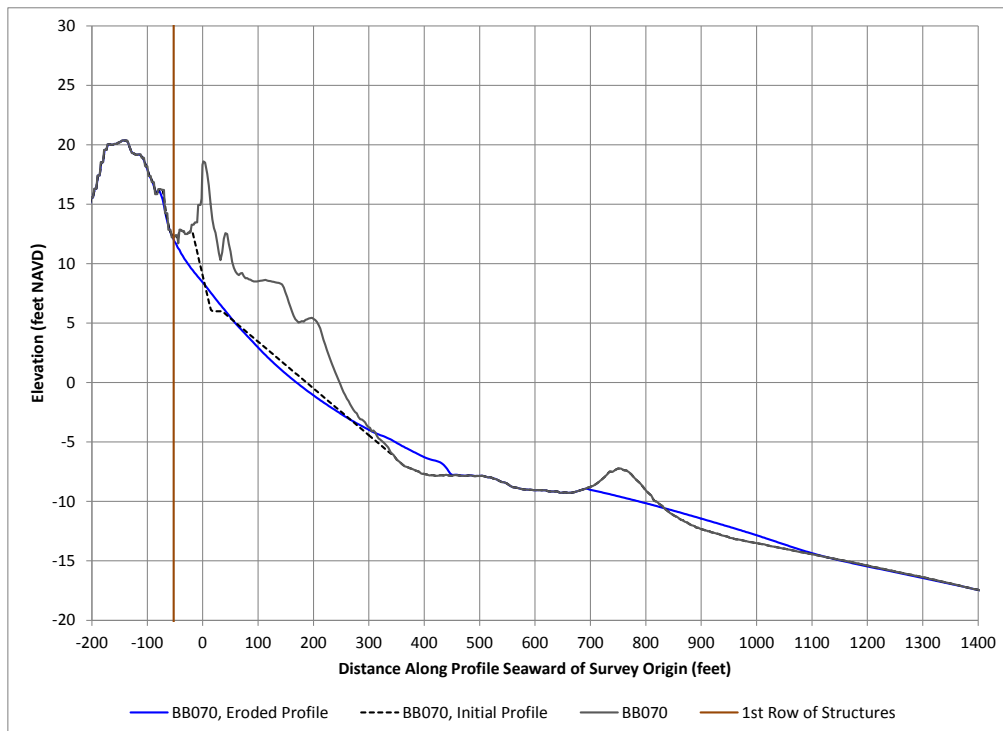


Figure 3-80: SBEACH Results, 25-Year Protection, 50-year, Transect 70

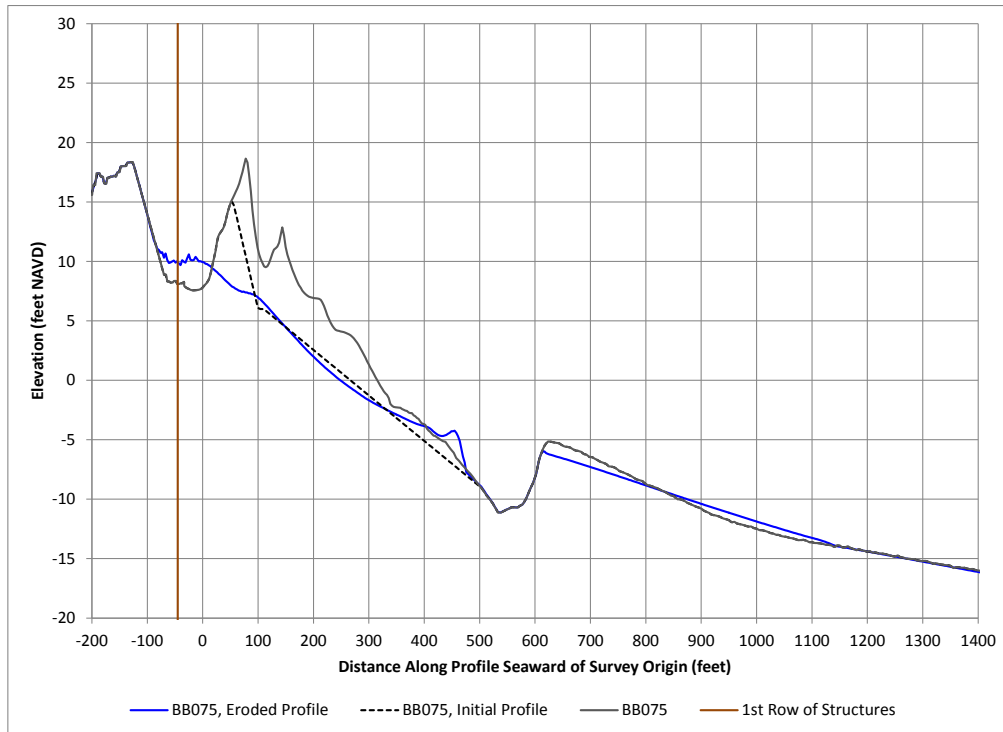


Figure 3-81: SBEACH Results, 25-Year Protection, 50-year, Transect 75

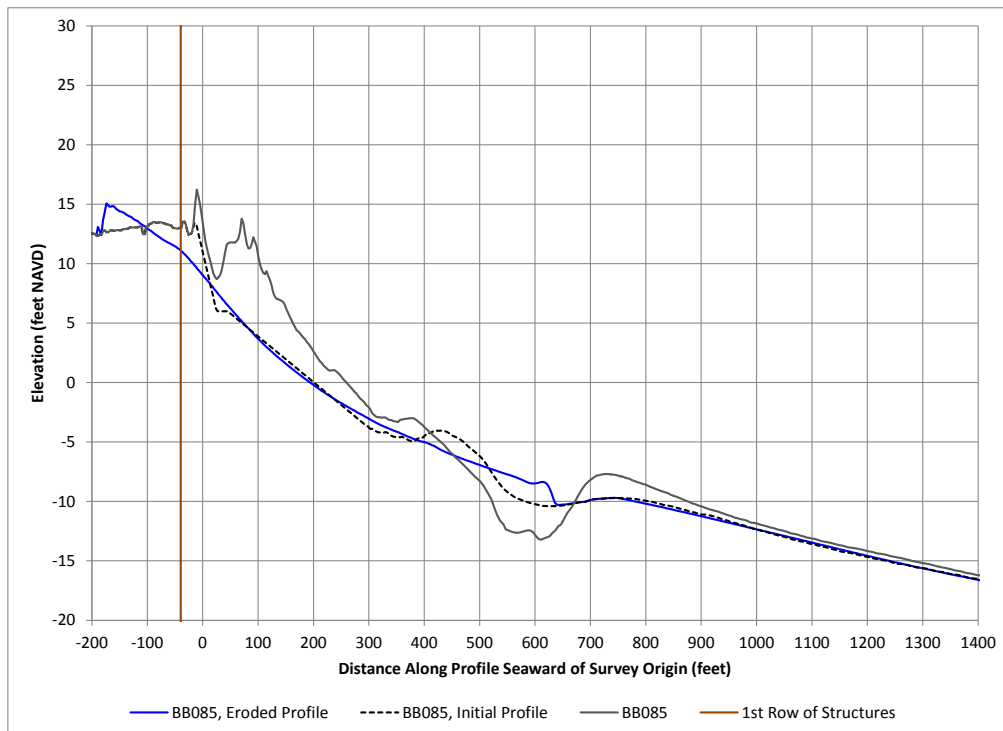


Figure 3-82: SBEACH Results, 25-Year Protection, 50-year, Transect 85

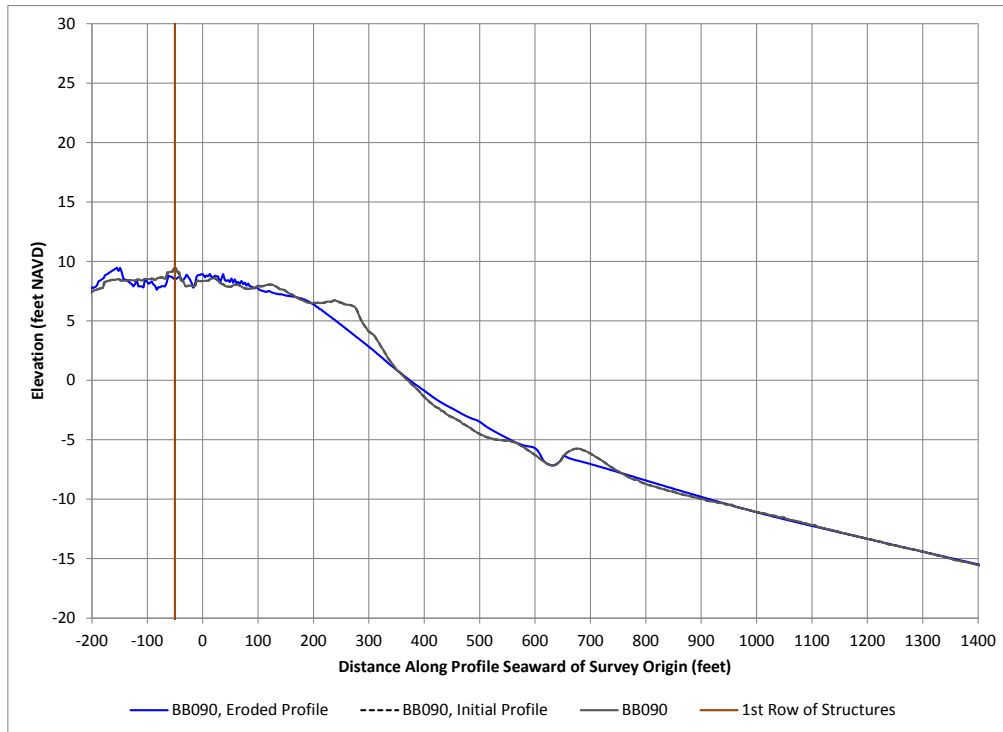


Figure 3-83: SBEACH Results, 25-Year Protection, 50-year, Transect 90

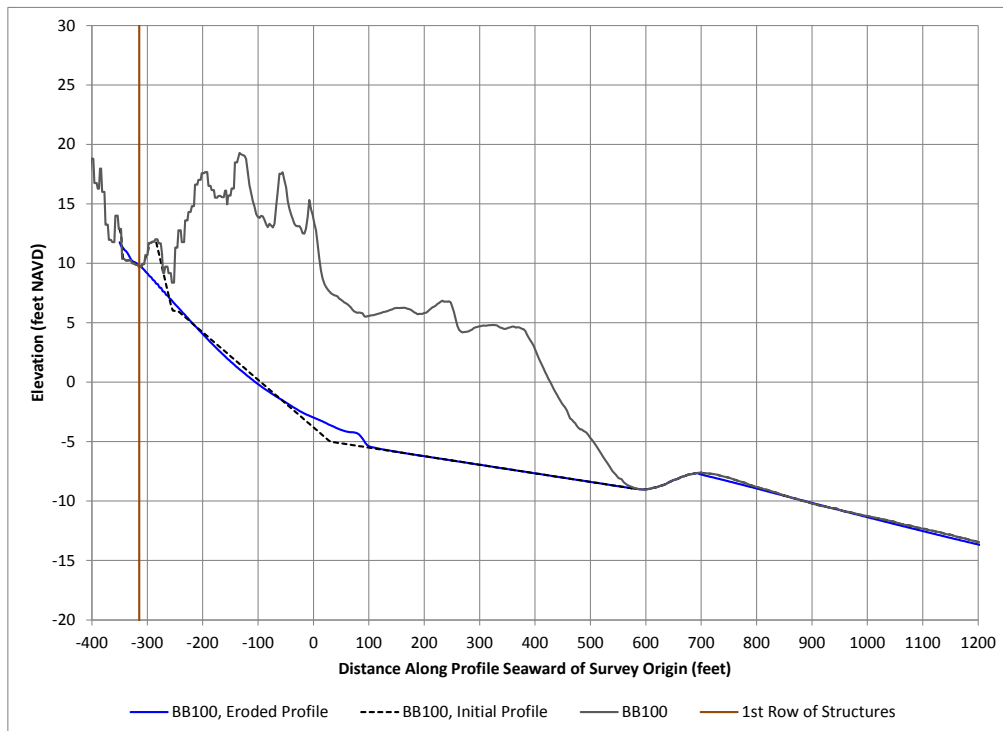


Figure 3-84: SBEACH Results, 25-Year Protection, 50-year, Transect 100

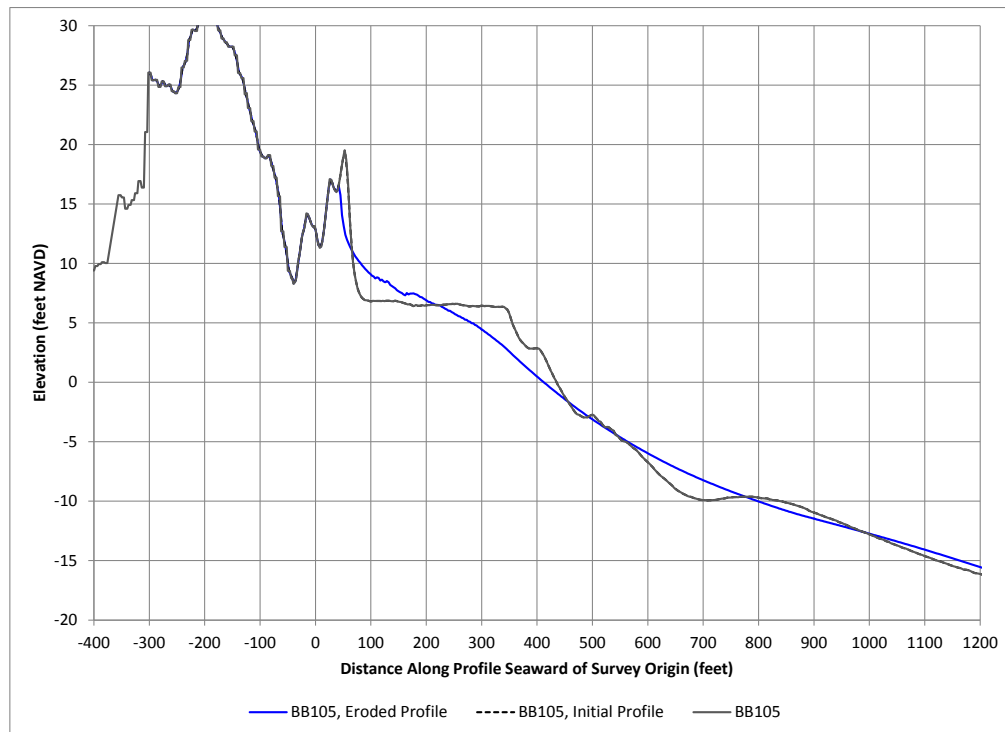


Figure 3-85: SBEACH Results, 25-Year Protection, 50-year, Transect 105

iii. 100 Year Storm

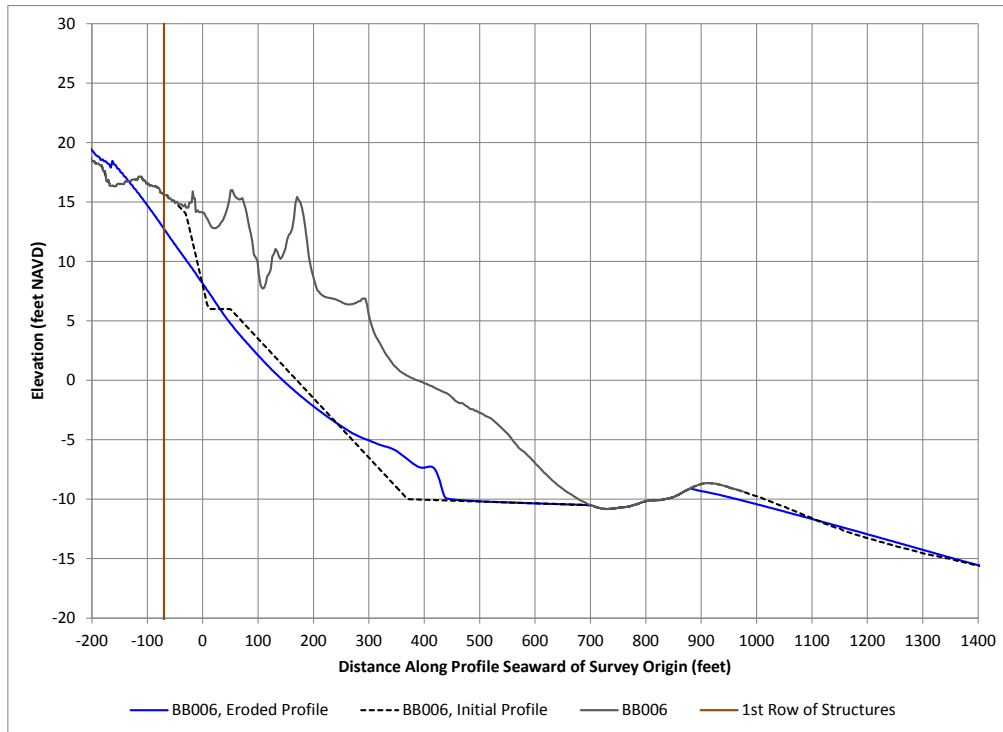


Figure 3-86: SBEACH Results, 25-Year Protection, 100-year, Transect 6

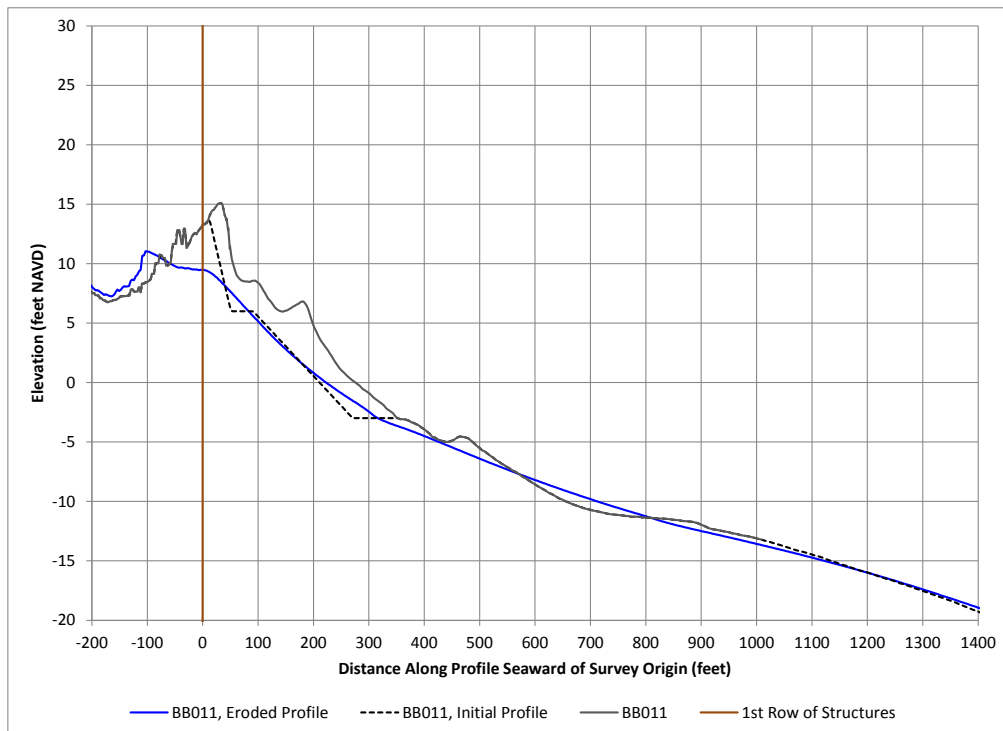


Figure 3-87: SBEACH Results, 25-Year Protection, 100-year, Transect 11

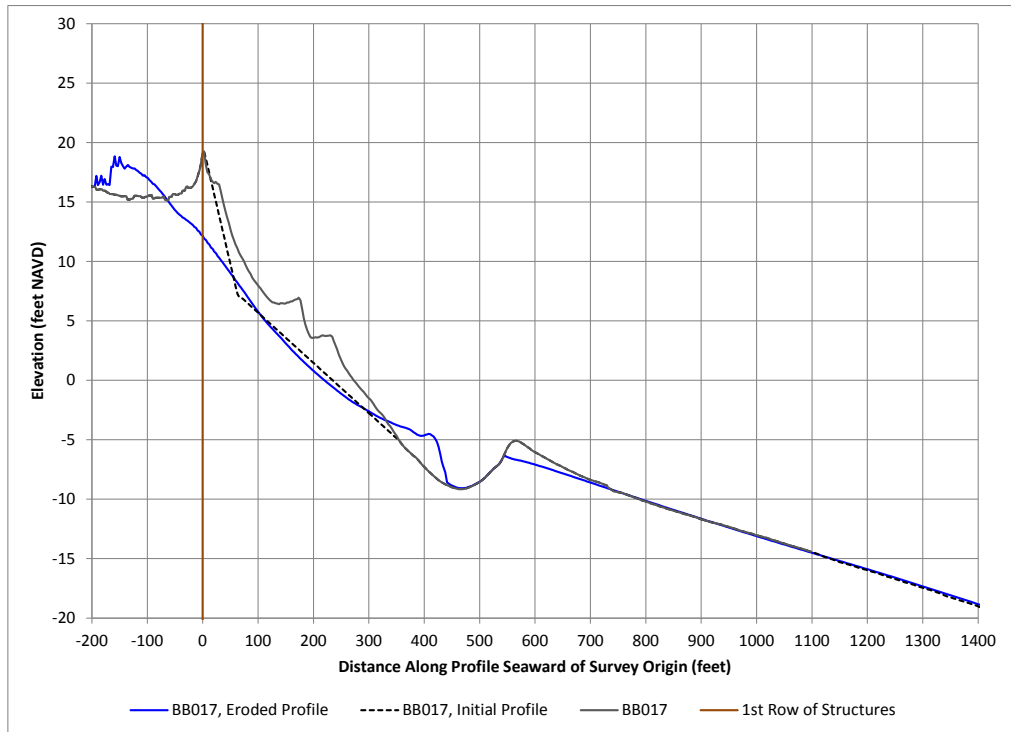


Figure 3-88: SBEACH Results, 25-Year Protection, 100-year, Transect 17

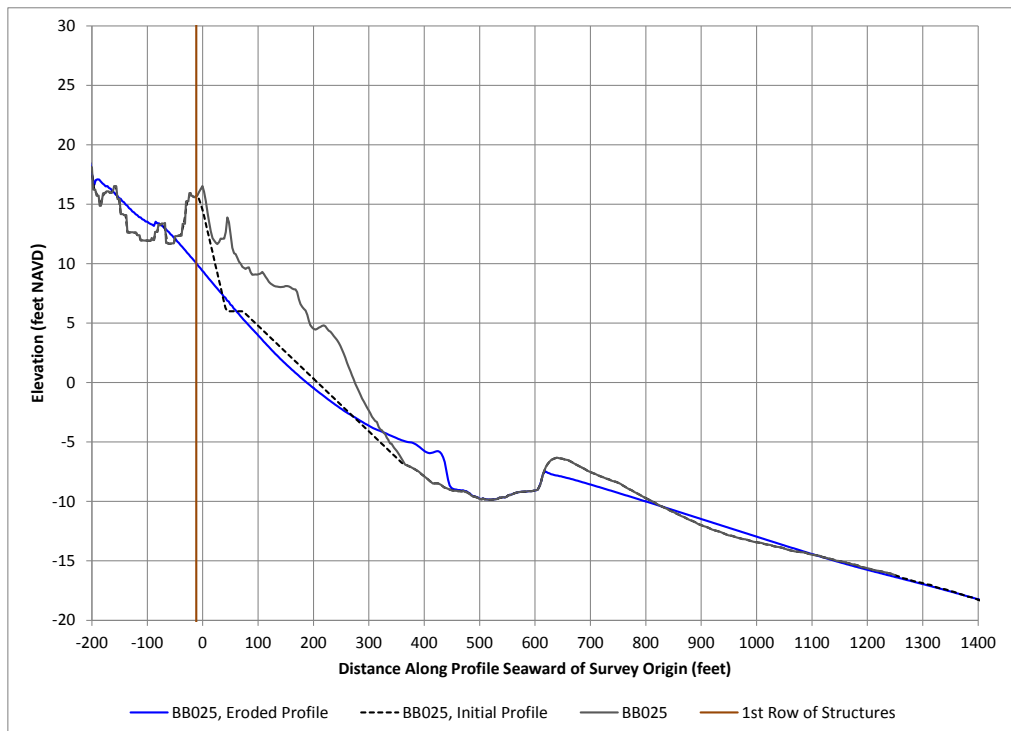


Figure 3-89: SBEACH Results, 25-Year Protection, 100-year, Transect 25

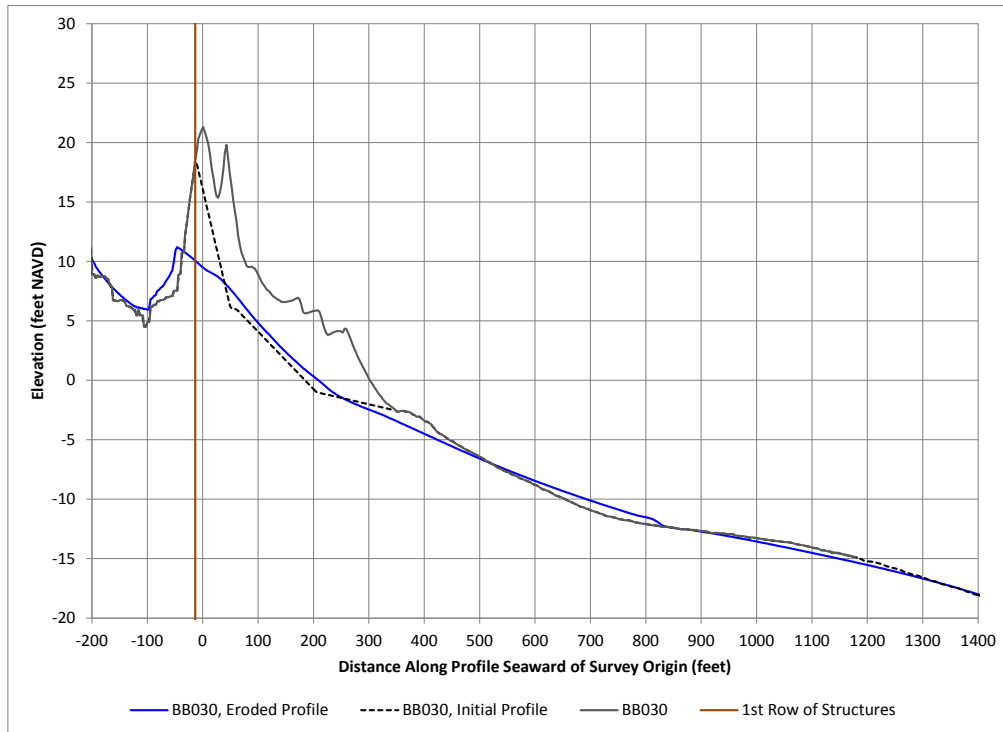


Figure 3-90: SBEACH Results, 25-Year Protection, 100-year, Transect 30

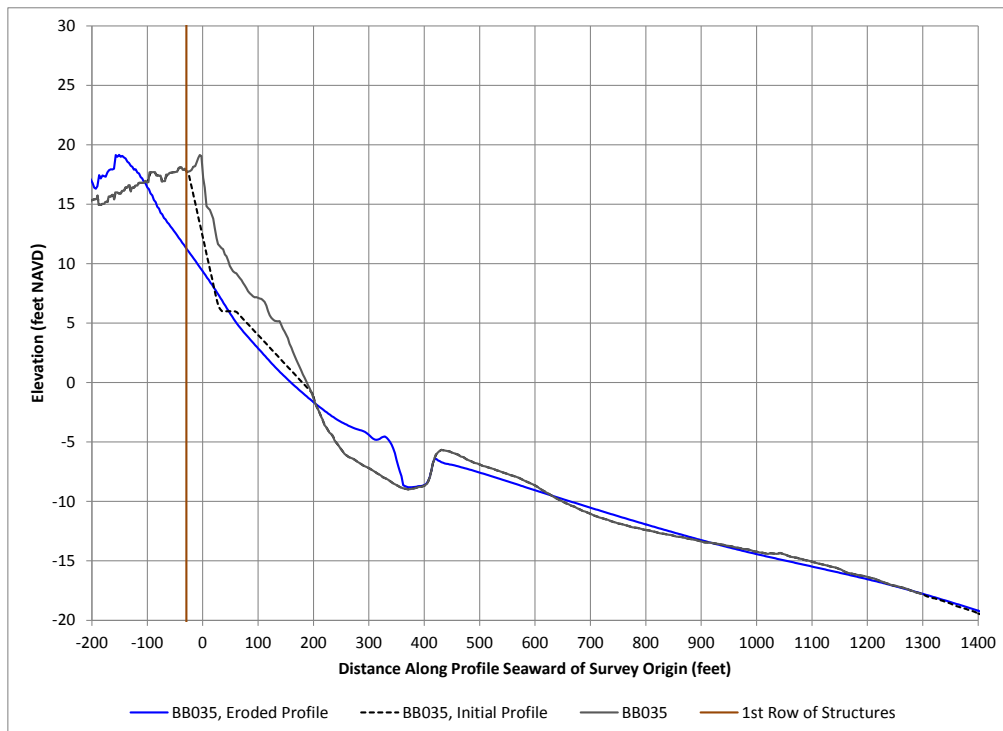


Figure 3-91: SBEACH Results, 25-Year Protection, 100-year, Transect 35

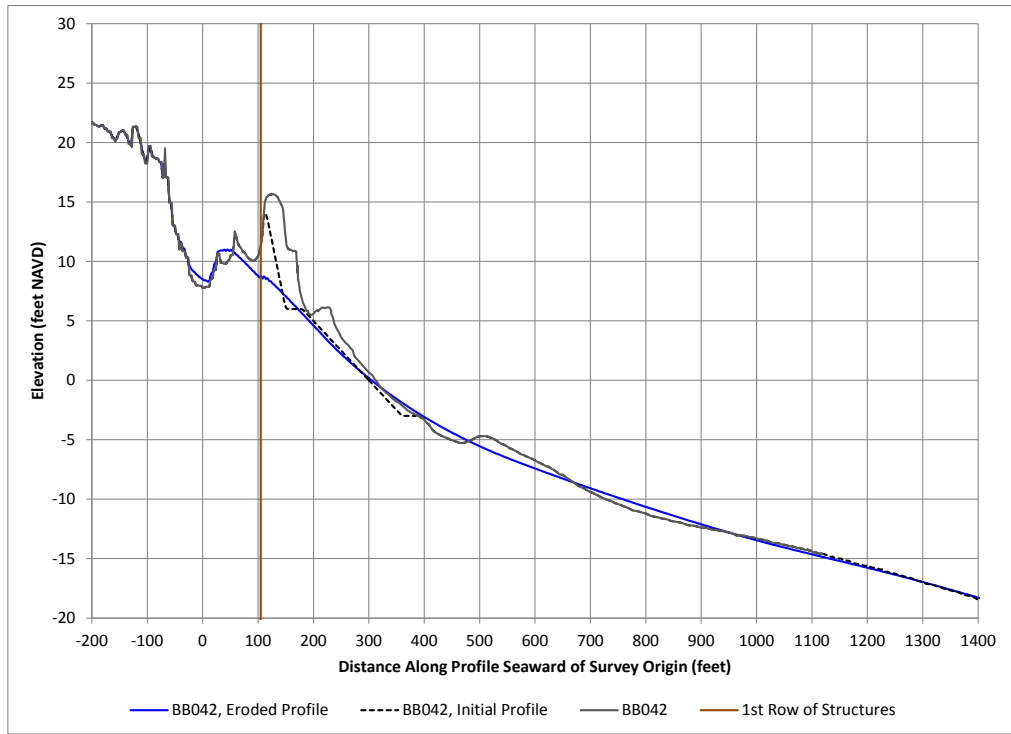


Figure 3-92: SBEACH Results, 25-Year Protection, 100-year, Transect 42

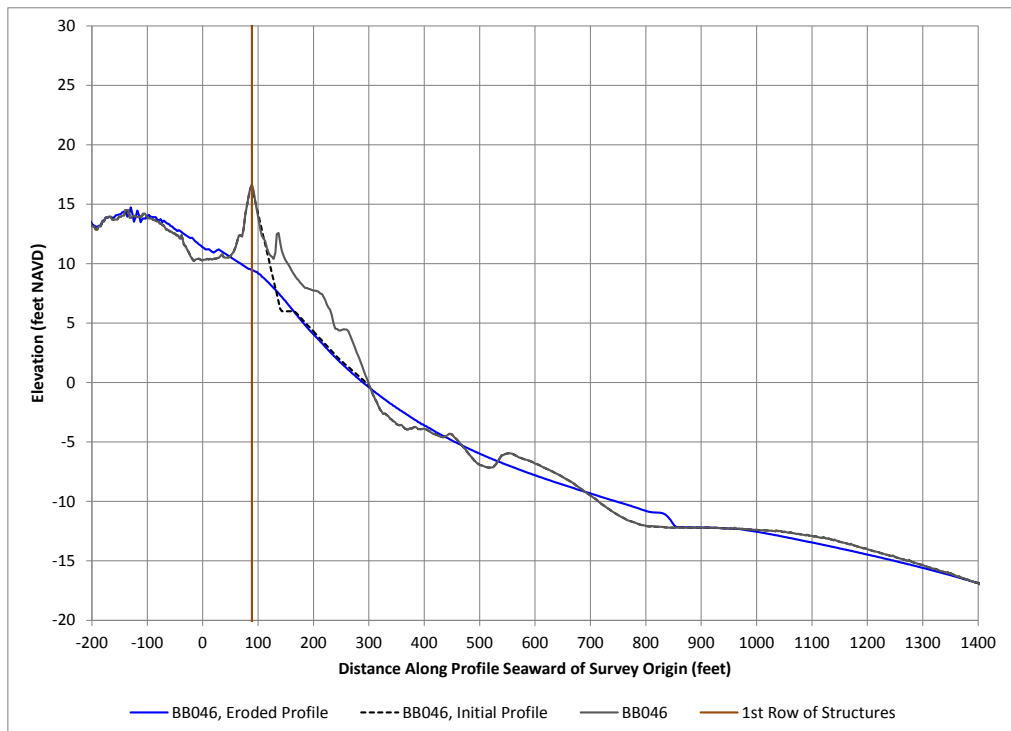


Figure 3-93: SBEACH Results, 25-Year Protection, 100-year, Transect 46

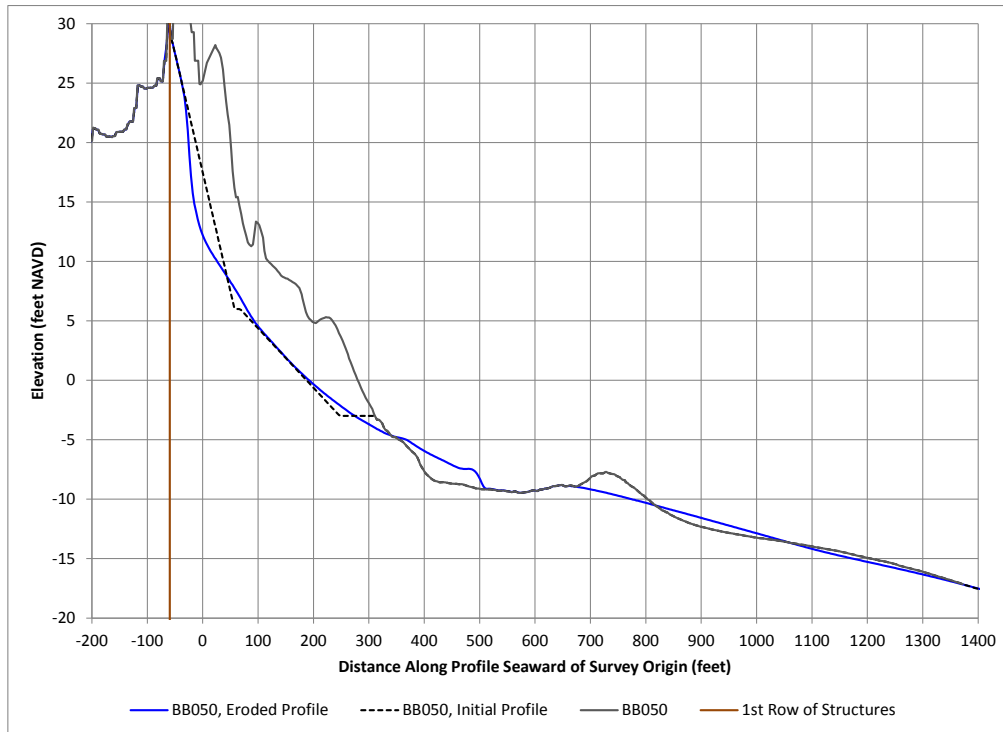


Figure 3-94: SBEACH Results, 25-Year Protection, 100-year, Transect 50

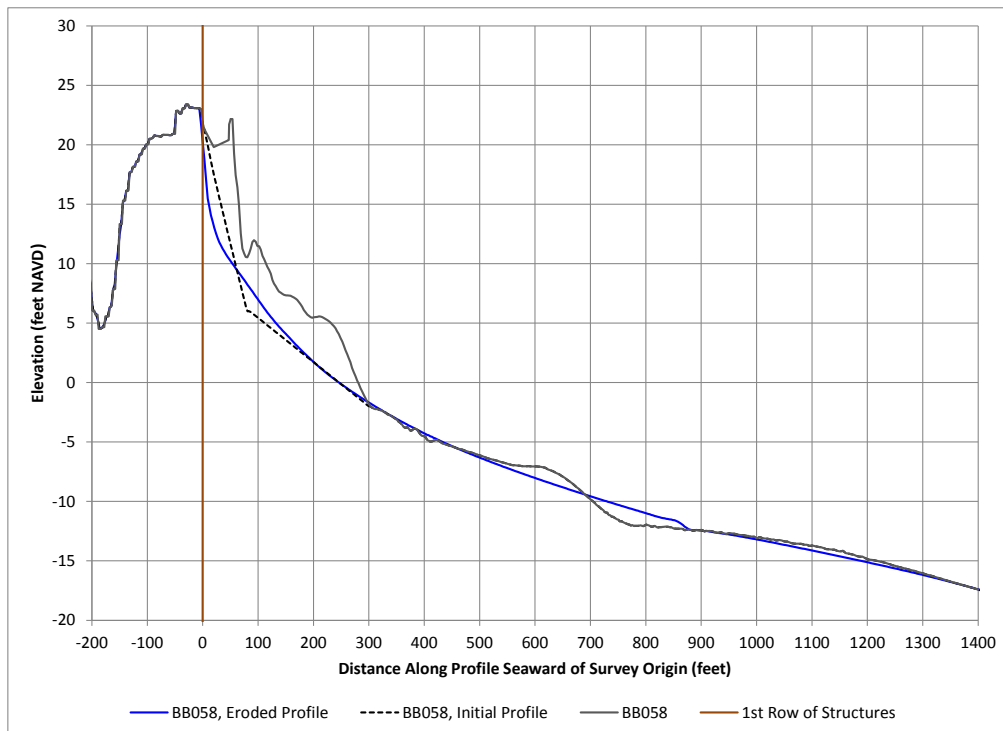


Figure 3-95: SBEACH Results, 25-Year Protection, 100-year, Transect 58

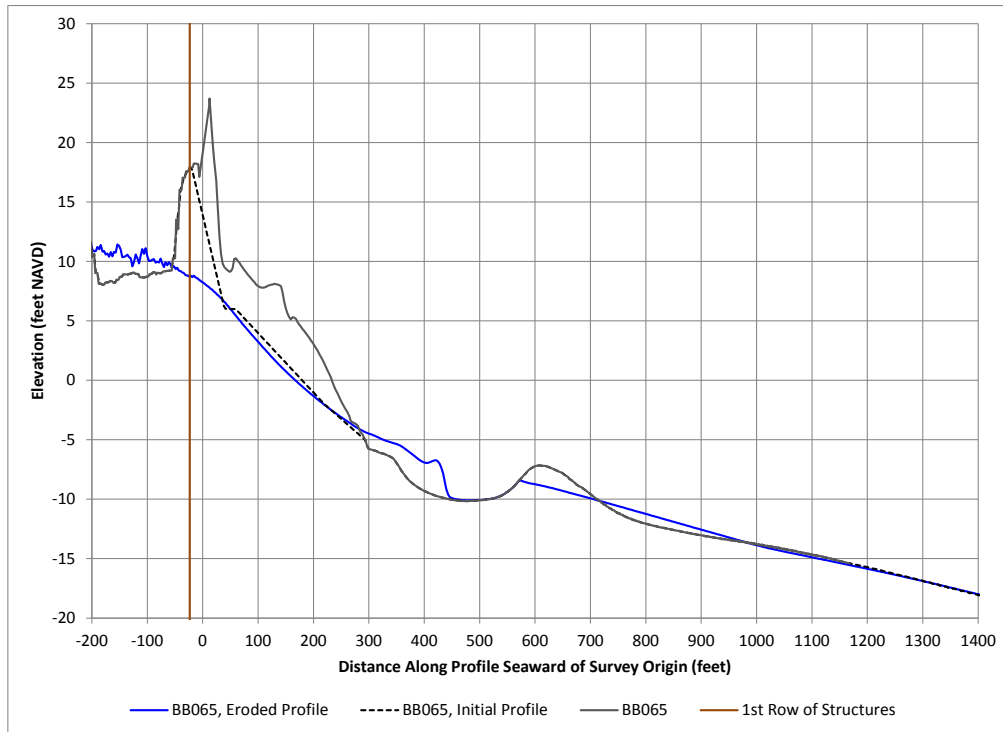


Figure 3-96: SBEACH Results, 25-Year Protection, 100-year, Transect 65

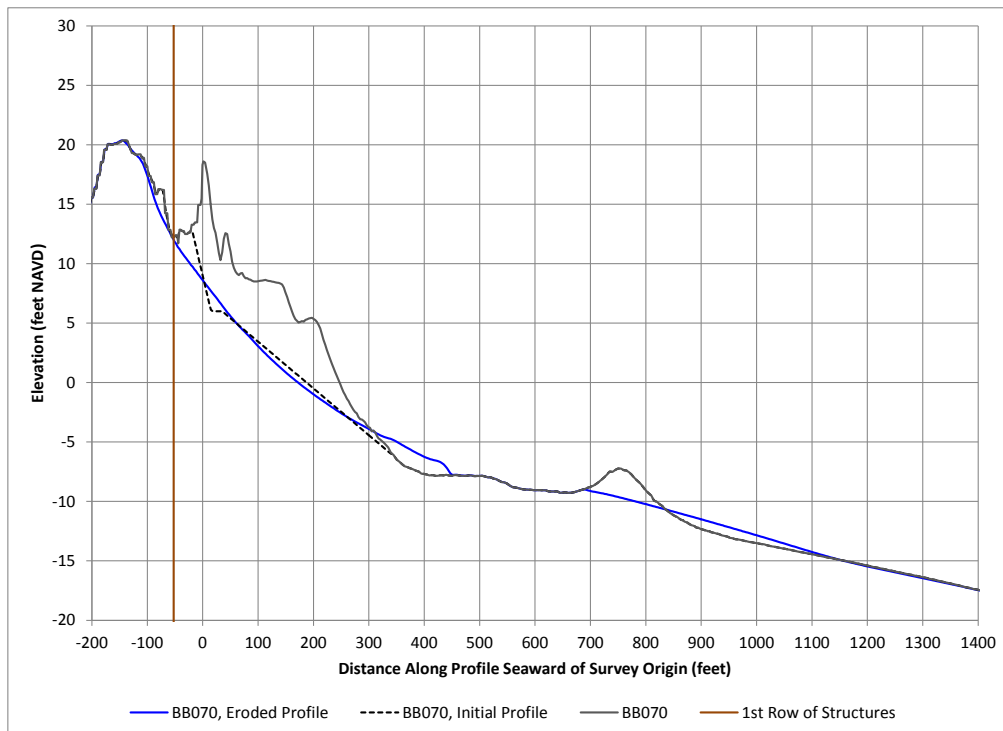


Figure 3-97: SBEACH Results, 25-Year Protection, 100-year, Transect 70

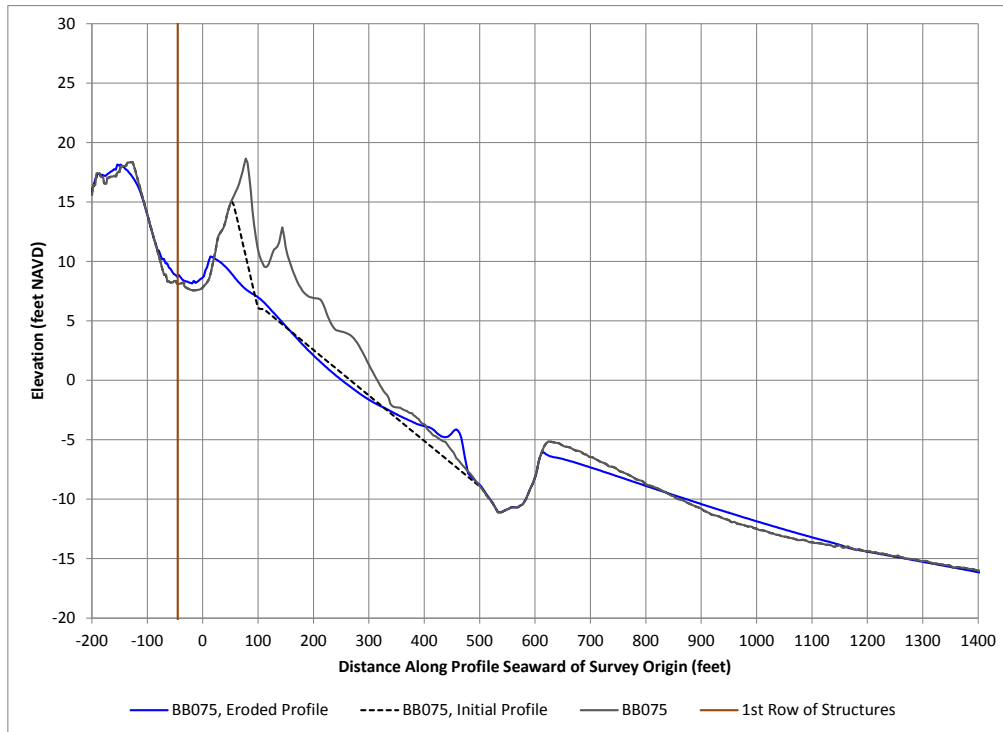


Figure 3-98: SBEACH Results, 25-Year Protection, 100-year, Transect 75

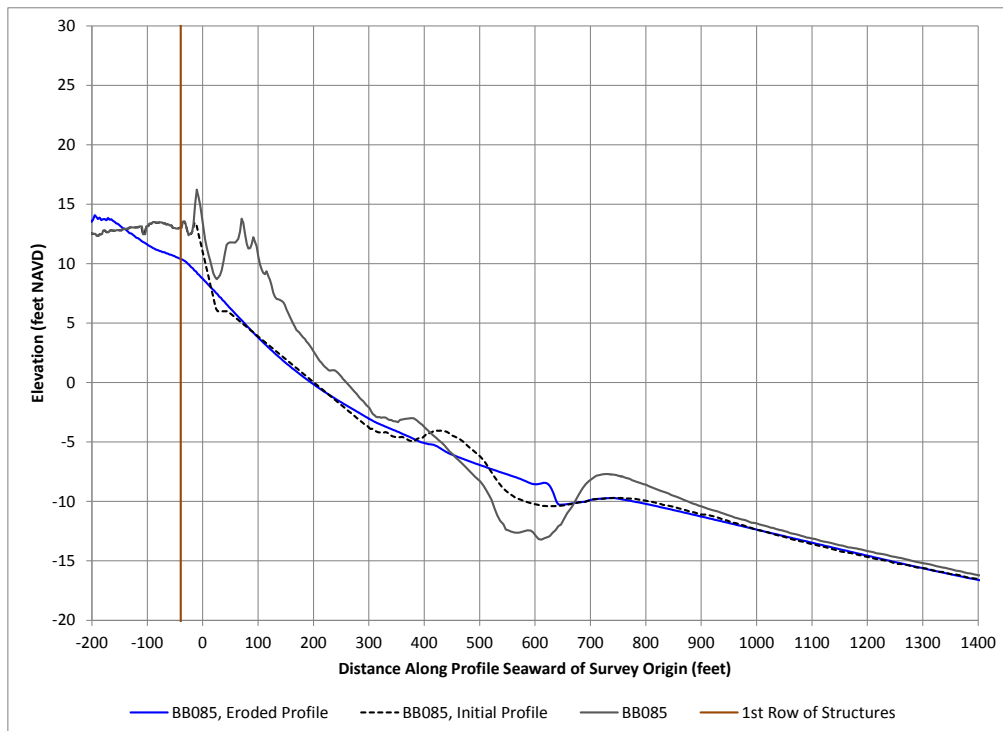


Figure 3-99: SBEACH Results, 25-Year Protection, 100-year, Transect 85

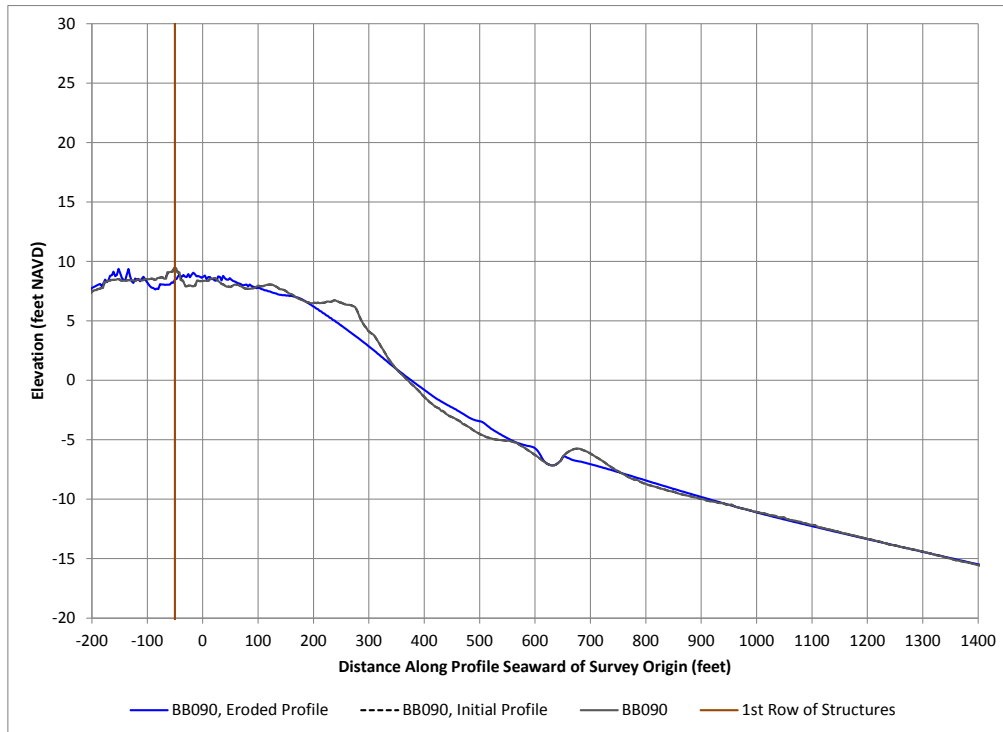


Figure 3-100: SBEACH Results, 25-Year Protection, 100-year, Transect 90

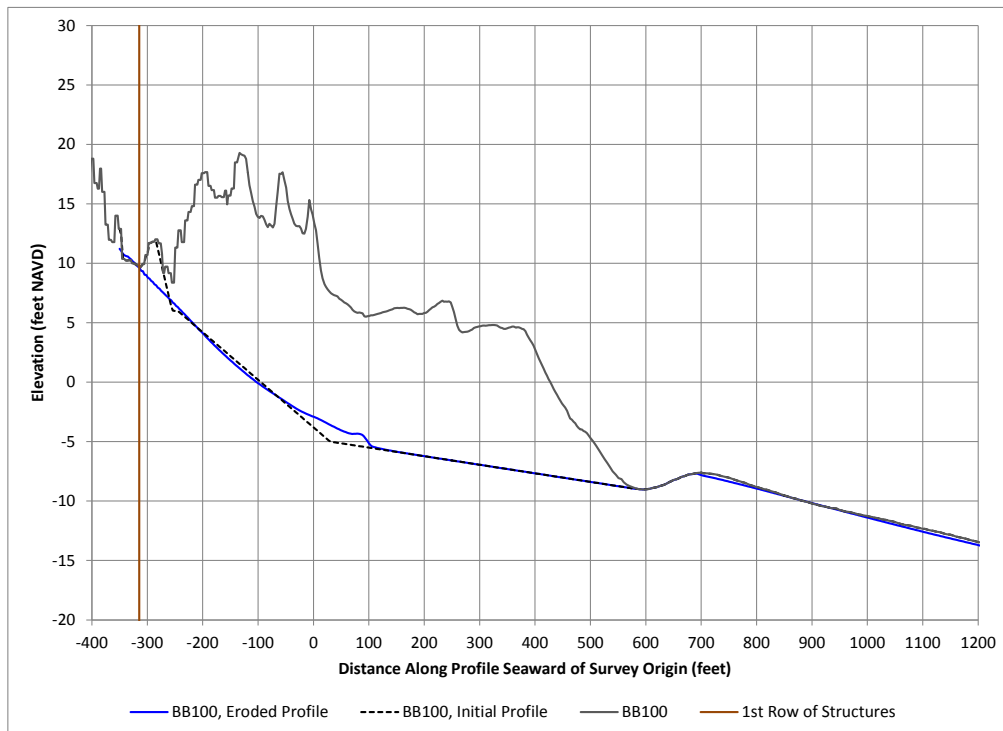


Figure 3-101: SBEACH Results, 25-Year Protection, 100-year, Transect 100

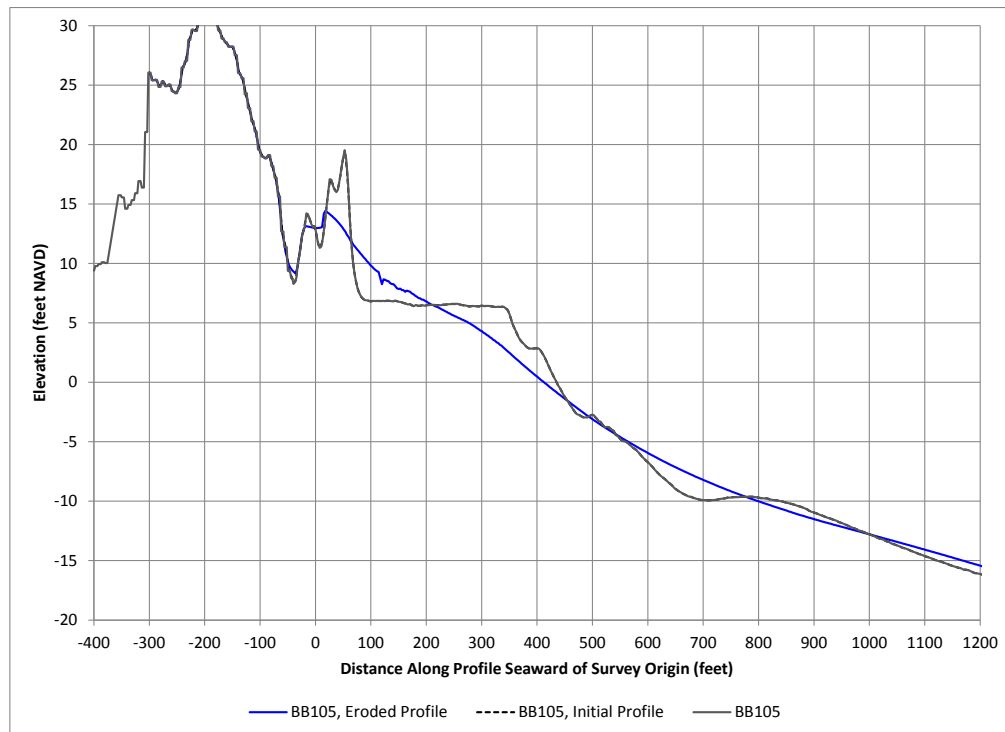


Figure 3-102: SBEACH Results, 25-Year Protection, 100-year, Transect 105

3c. 50 Year Protection

i. 25 Year Storm

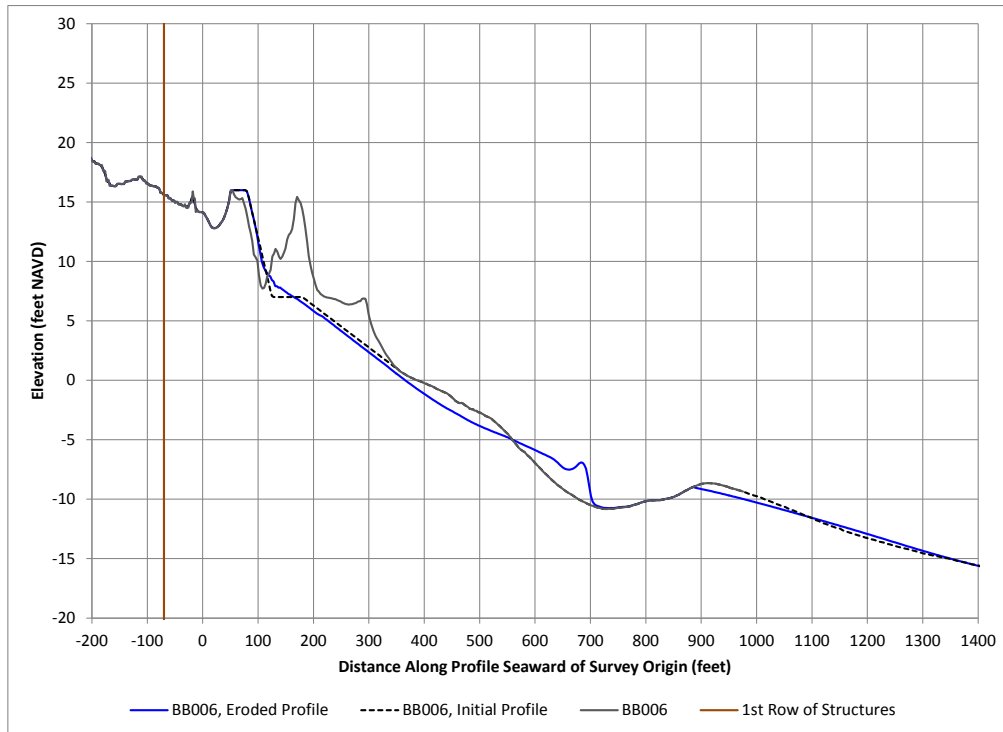


Figure 3-103: SBEACH Results, 50-Year Protection, 25-year, Transect 6

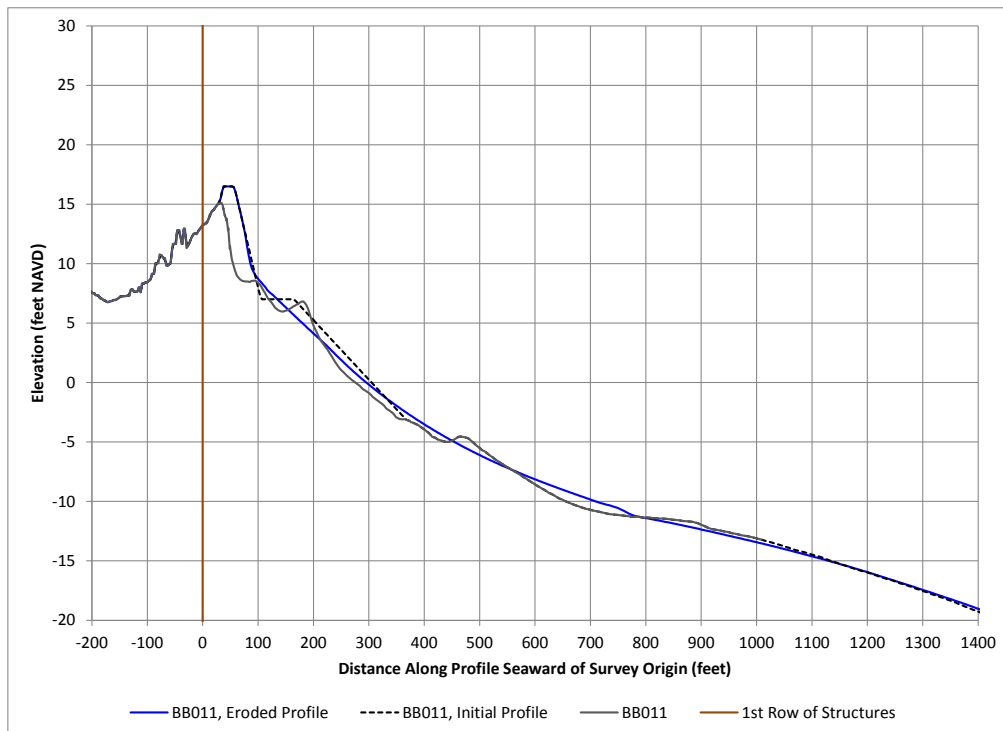


Figure 3-104: SBEACH Results, 50-Year Protection, 25-year, Transect 11

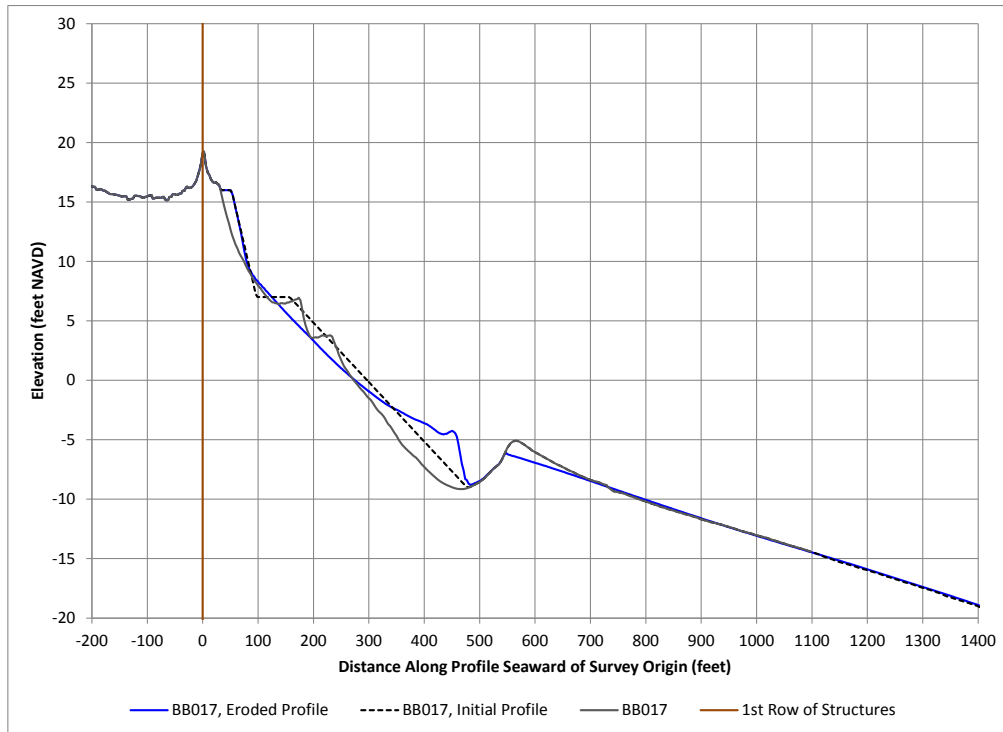


Figure 3-105: SBEACH Results, 50-Year Protection, 25-year, Transect 17

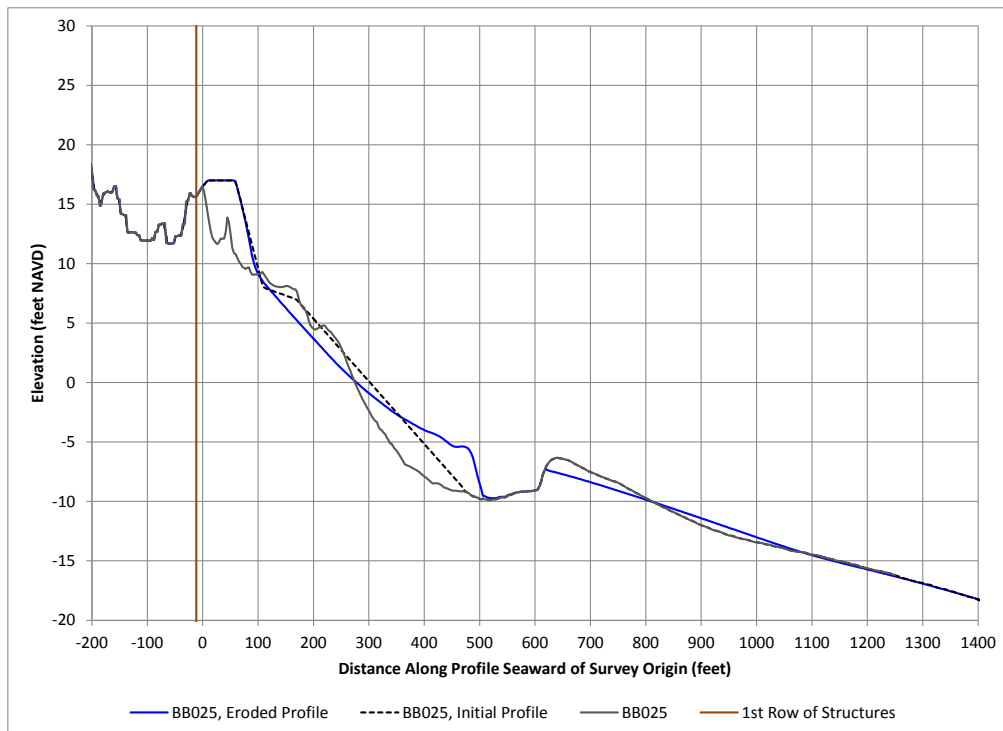


Figure 3-106: SBEACH Results, 50-Year Protection, 25-year, Transect 25

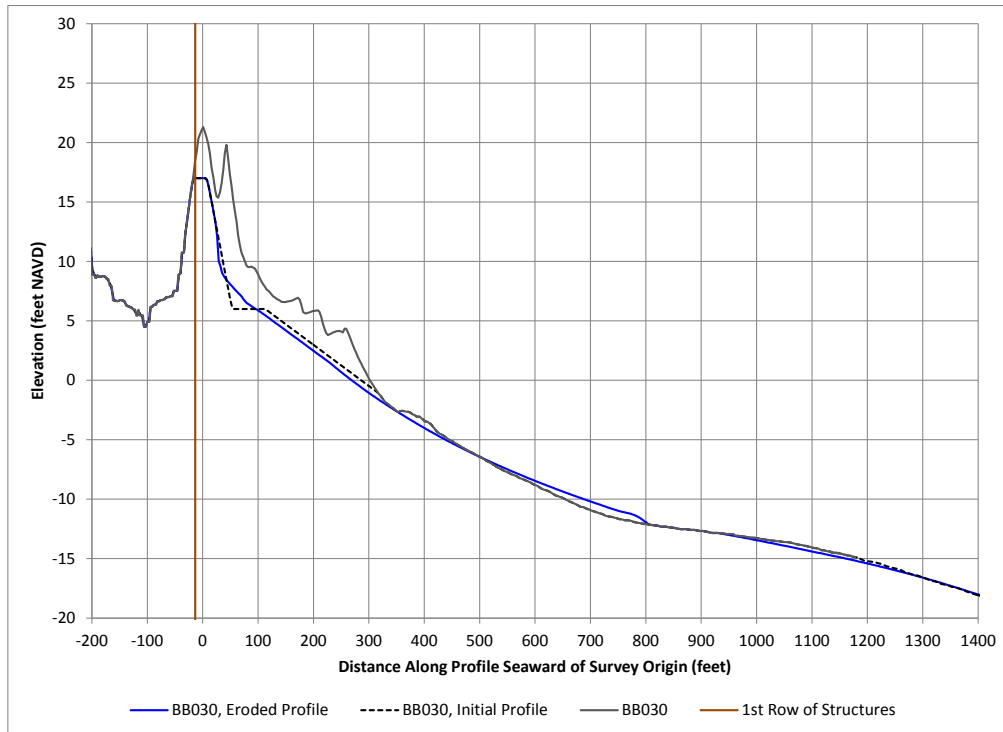


Figure 3-107: SBEACH Results, 50-Year Protection, 25-year, Transect 30

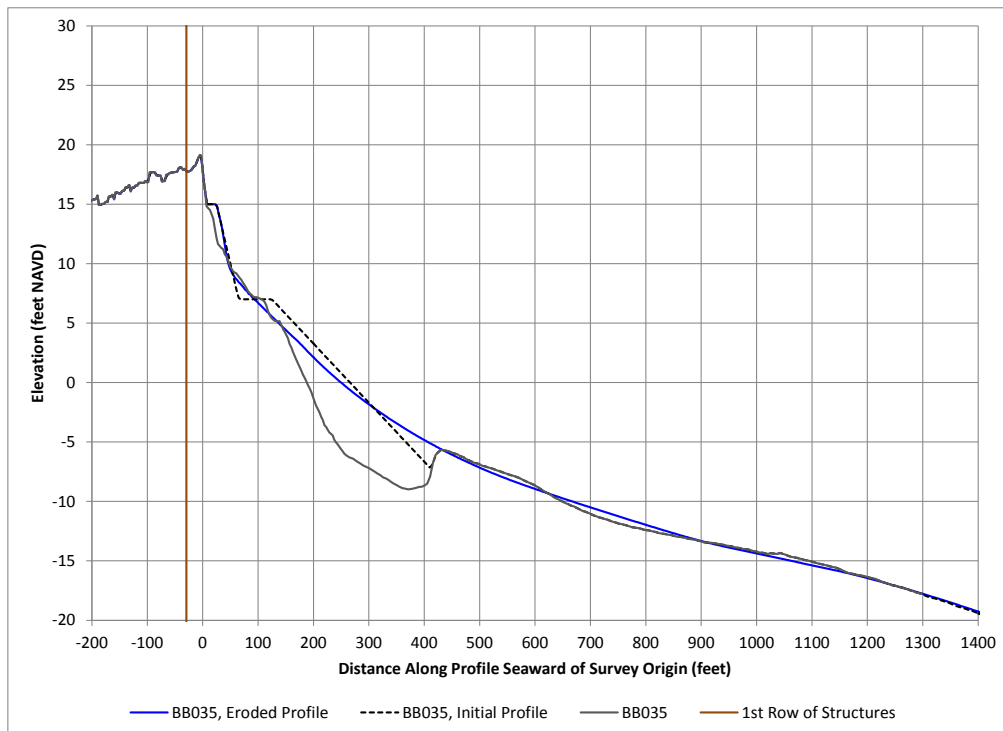


Figure 3-108: SBEACH Results, 50-Year Protection, 25-year, Transect 35

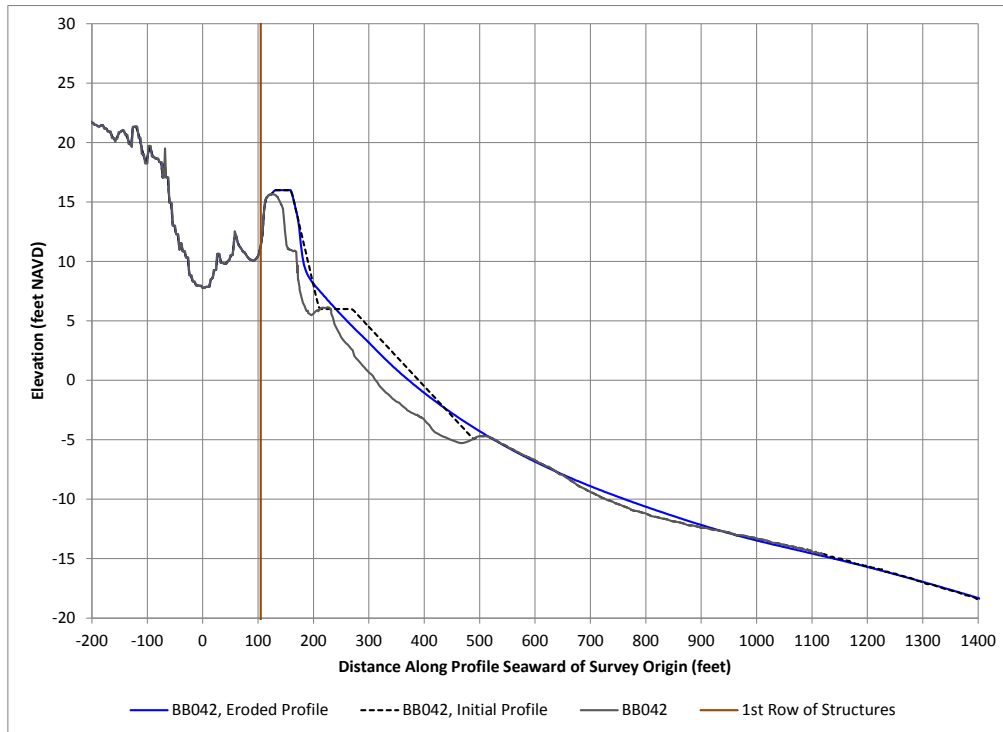


Figure 3-109: SBEACH Results, 50-Year Protection, 25-year, Transect 42

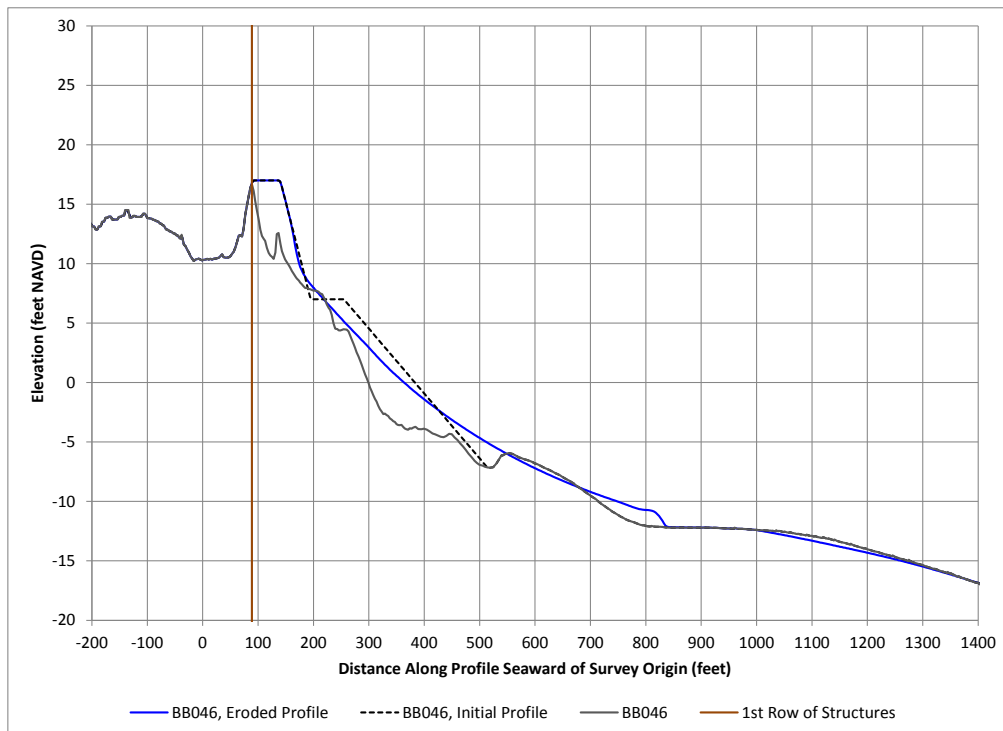


Figure 3-110: SBEACH Results, 50-Year Protection, 25-year, Transect 46

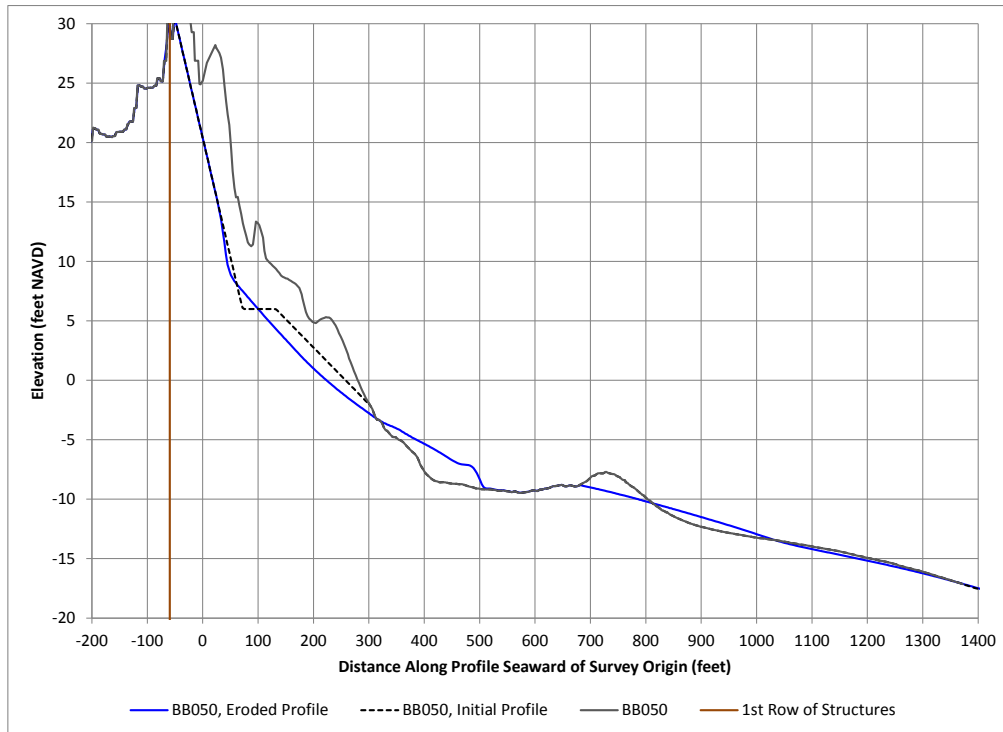


Figure 3-111: SBEACH Results, 50-Year Protection, 25-year, Transect 50

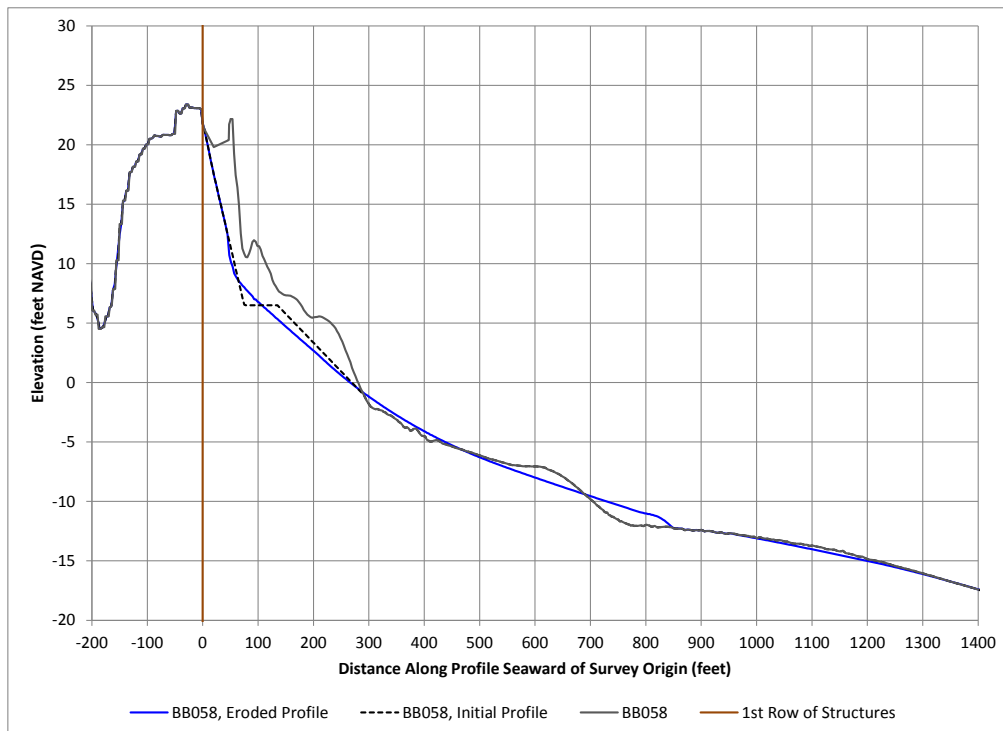


Figure 3-112: SBEACH Results, 50-Year Protection, 25-year, Transect 58

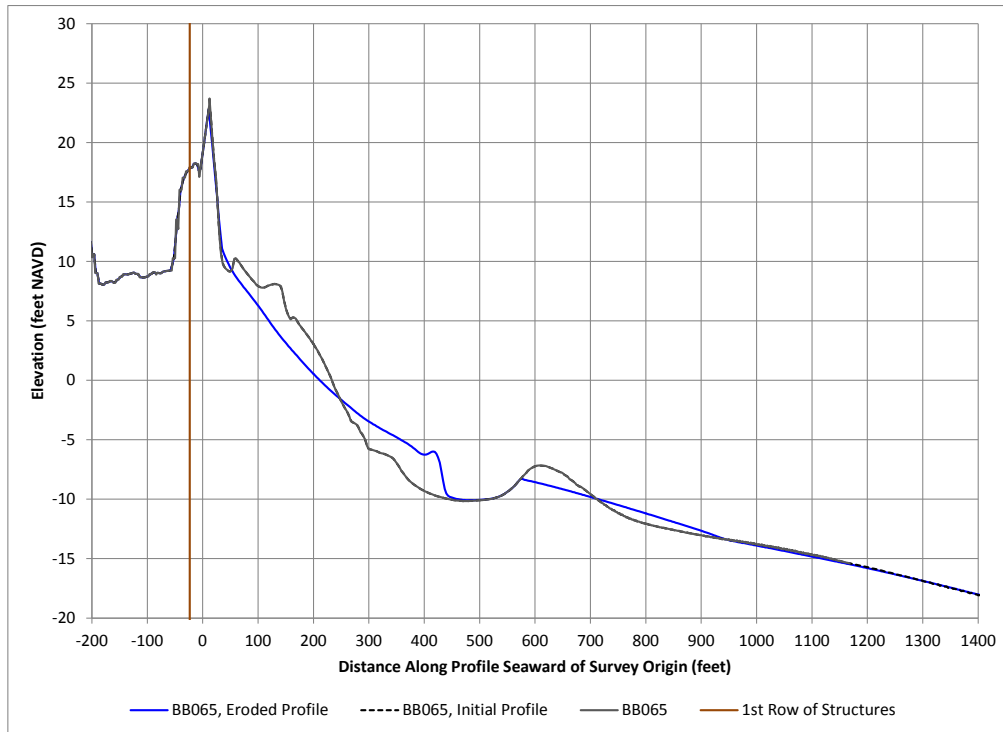


Figure 3-113: SBEACH Results, 50-Year Protection, 25-year, Transect 65

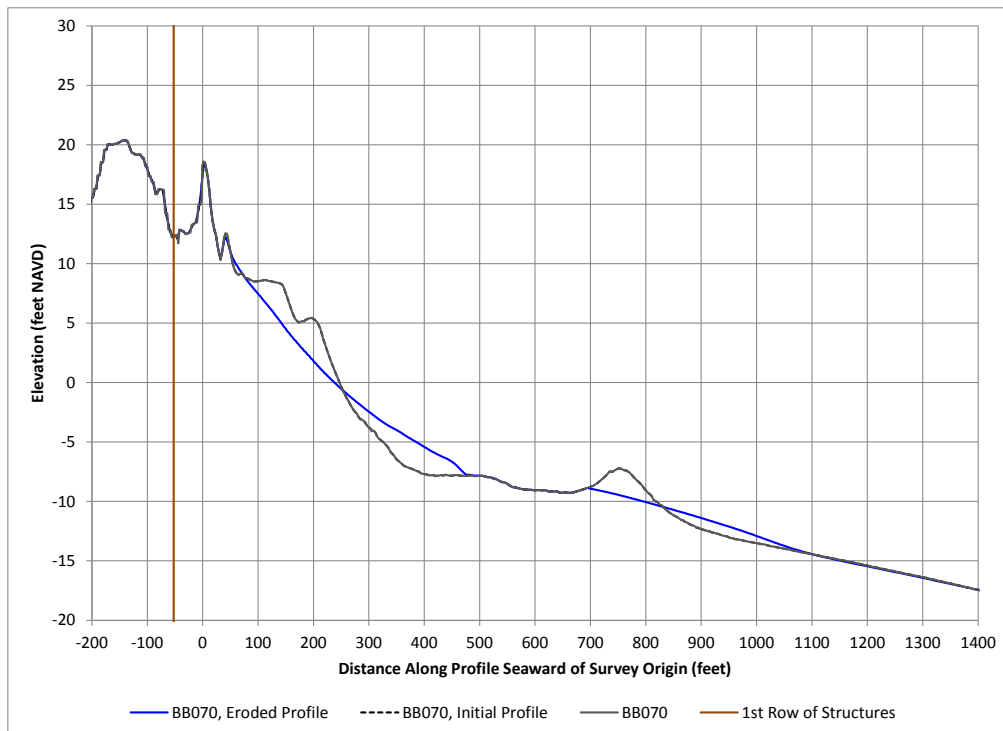


Figure 3-114: SBEACH Results, 50-Year Protection, 25-year, Transect 70

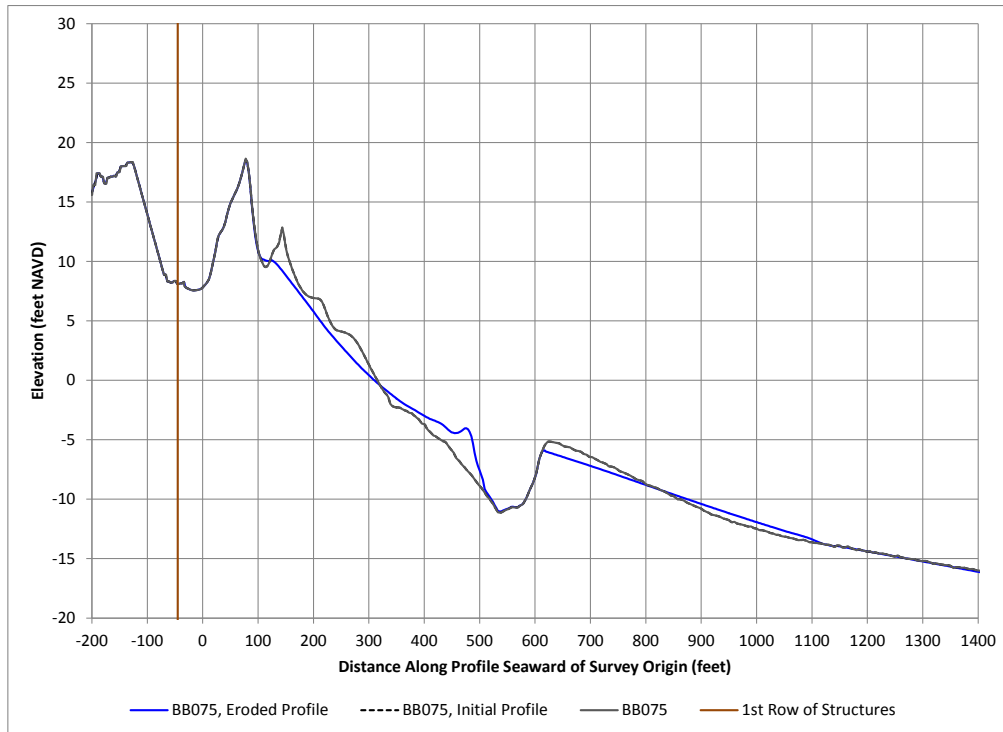


Figure 3-115: SBEACH Results, 50-Year Protection, 25-year, Transect 75

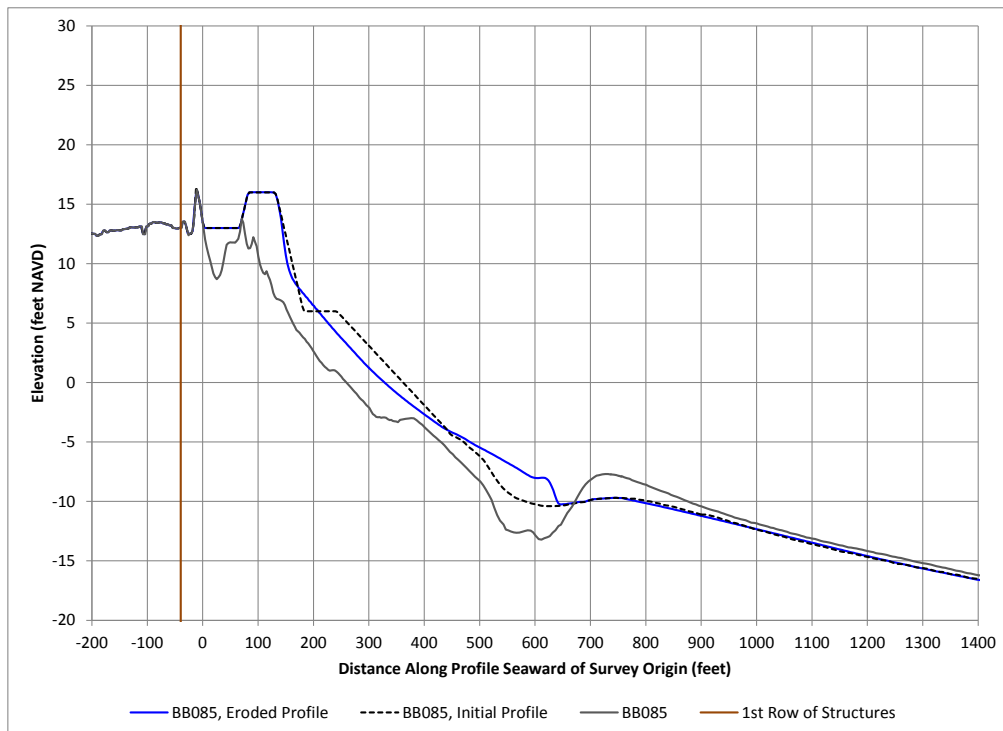


Figure 3-116: SBEACH Results, 50-Year Protection, 25-year, Transect 85

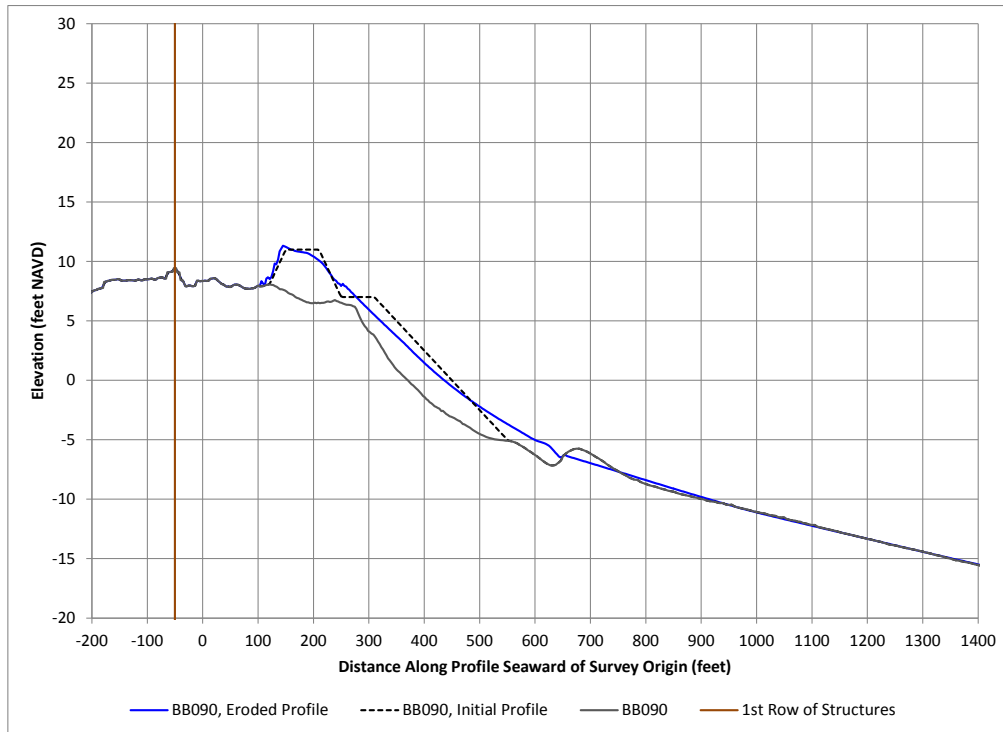


Figure 3-117: SBEACH Results, 50-Year Protection, 25-year, Transect 90

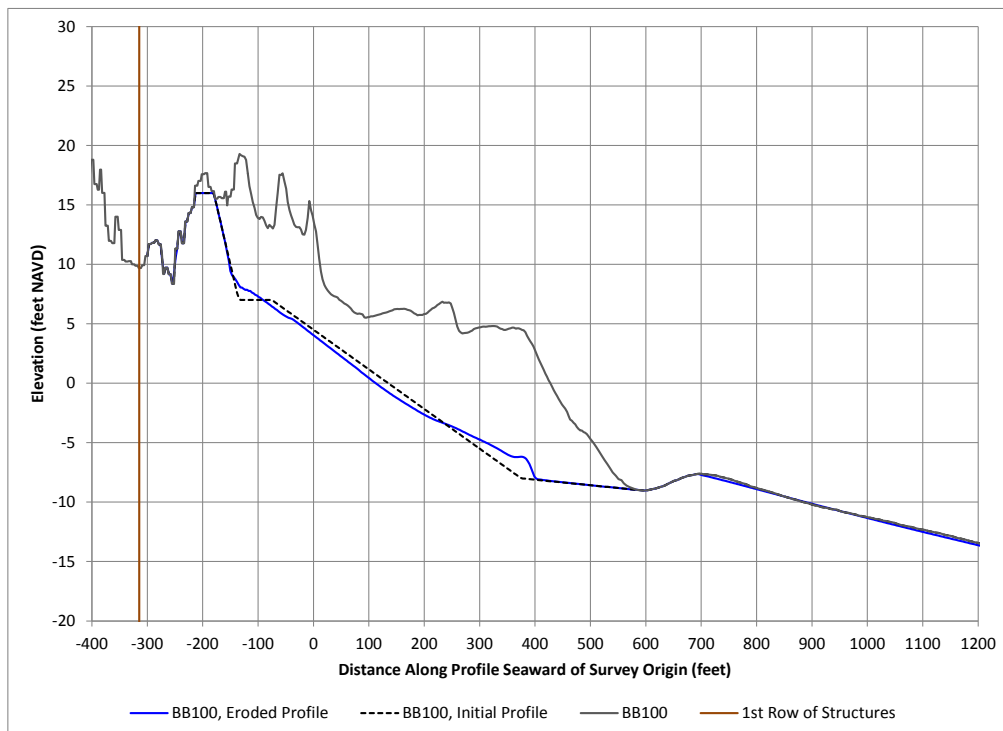


Figure 3-118: SBEACH Results, 50-Year Protection, 25-year, Transect 100

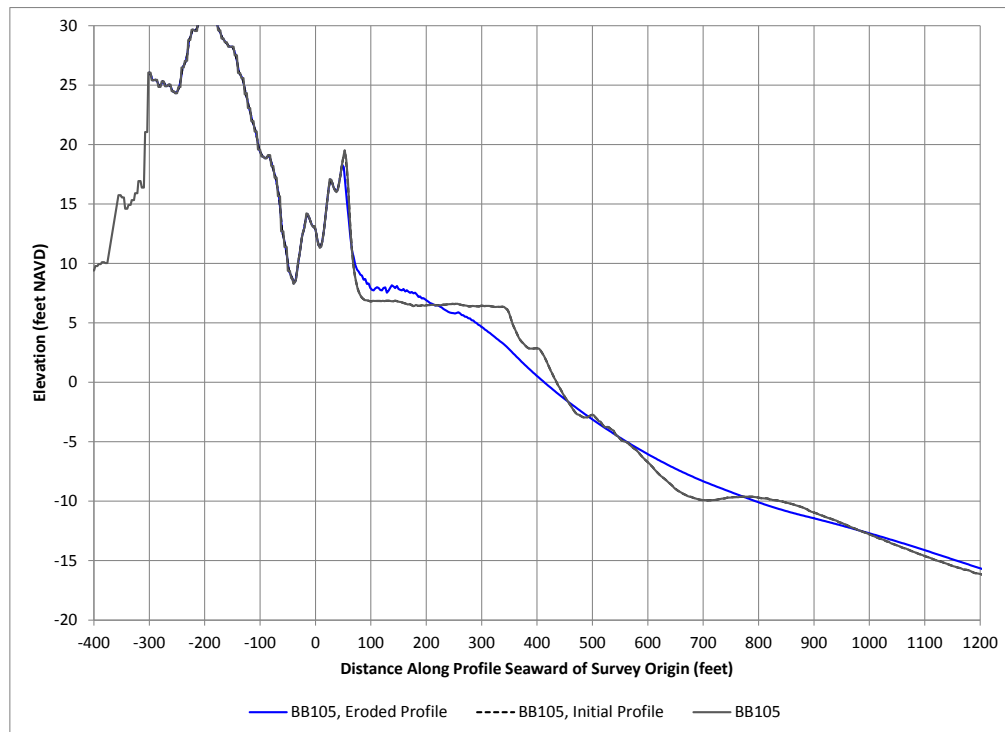


Figure 3-119: SBEACH Results, 50-Year Protection, 25-year, Transect 105

ii. 50 Year Storm

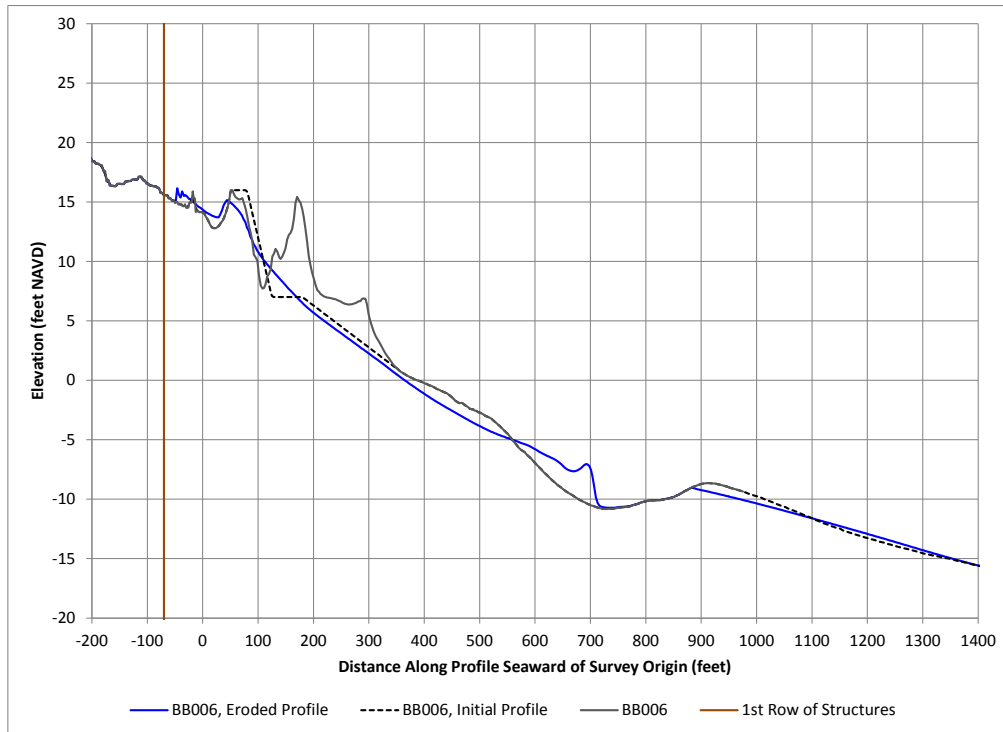


Figure 3-120: SBEACH Results, 50-Year Protection, 50-year, Transect 6

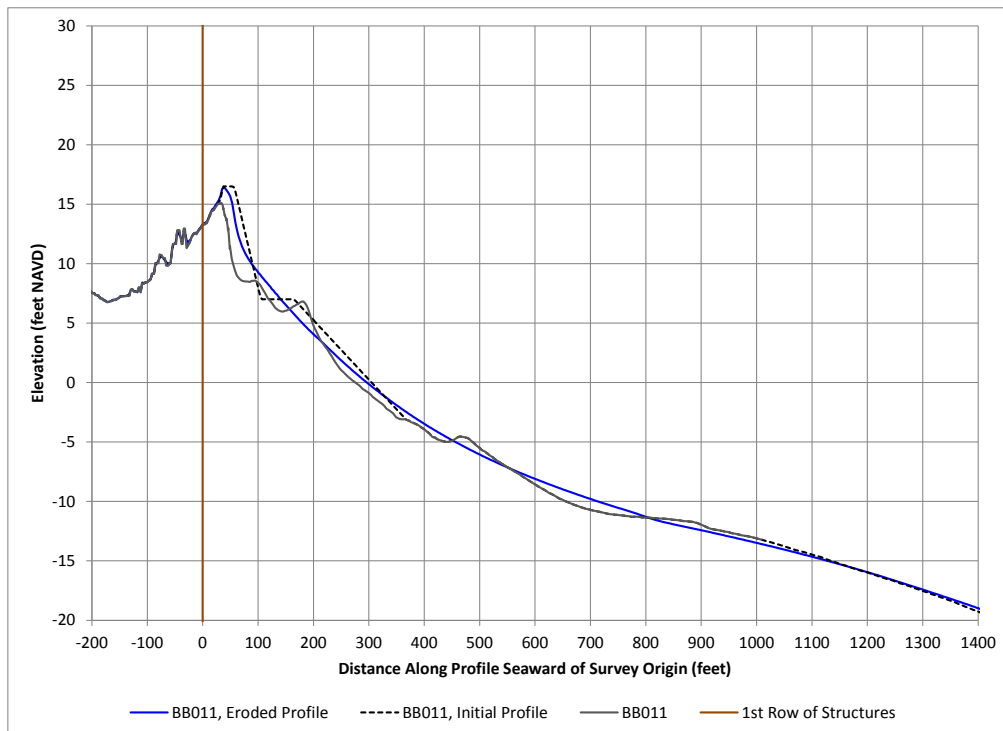


Figure 3-121: SBEACH Results, 50-Year Protection, 50-year, Transect 11

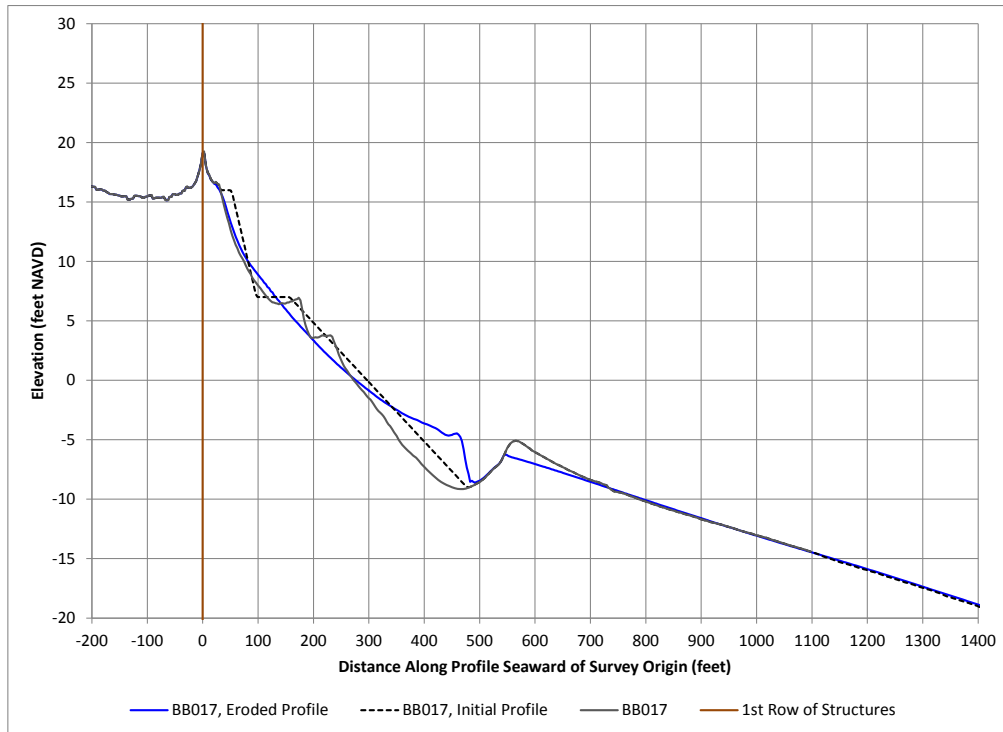


Figure 3-122: SBEACH Results, 50-Year Protection, 50-year, Transect 17

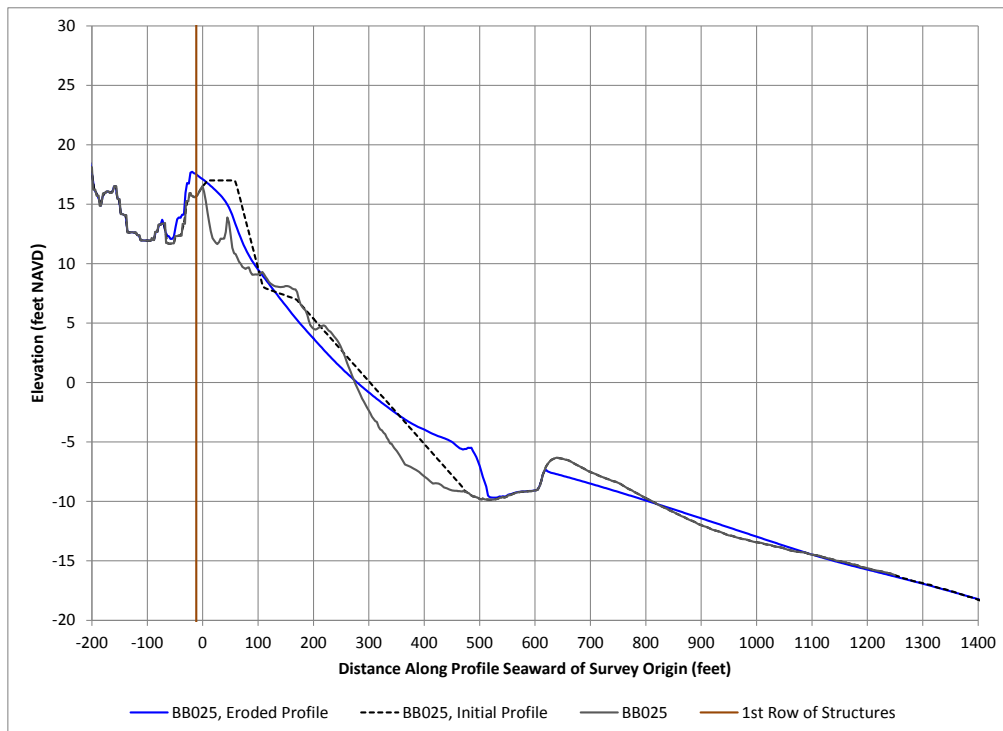


Figure 3-123: SBEACH Results, 50-Year Protection, 50-year, Transect 25

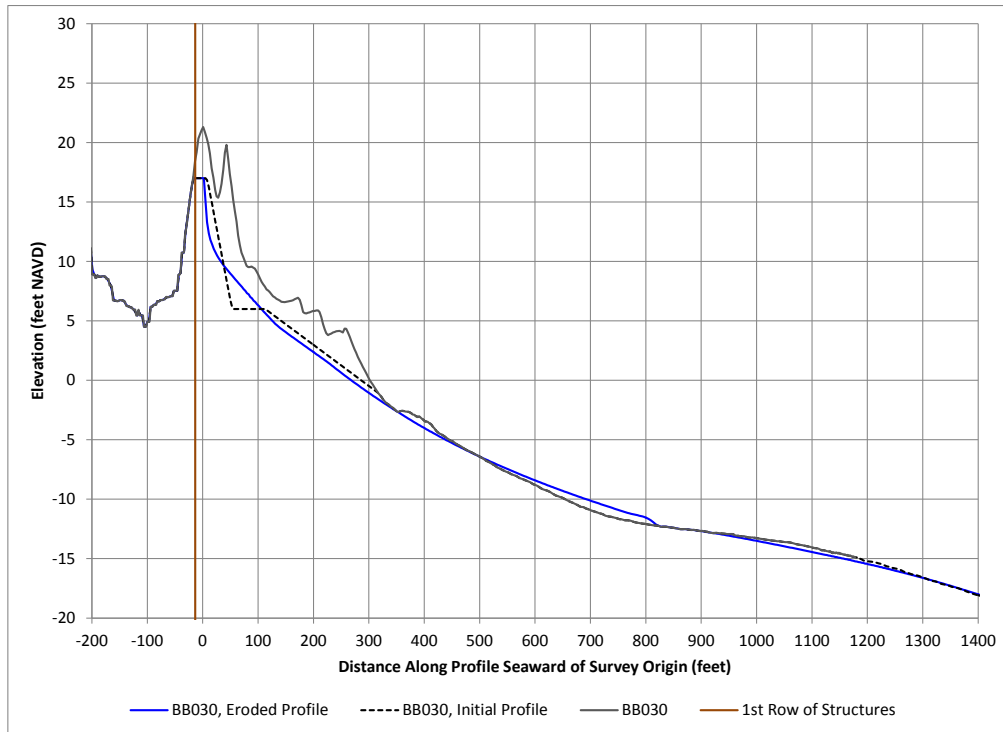


Figure 3-124: SBEACH Results, 50-Year Protection, 50-year, Transect 30

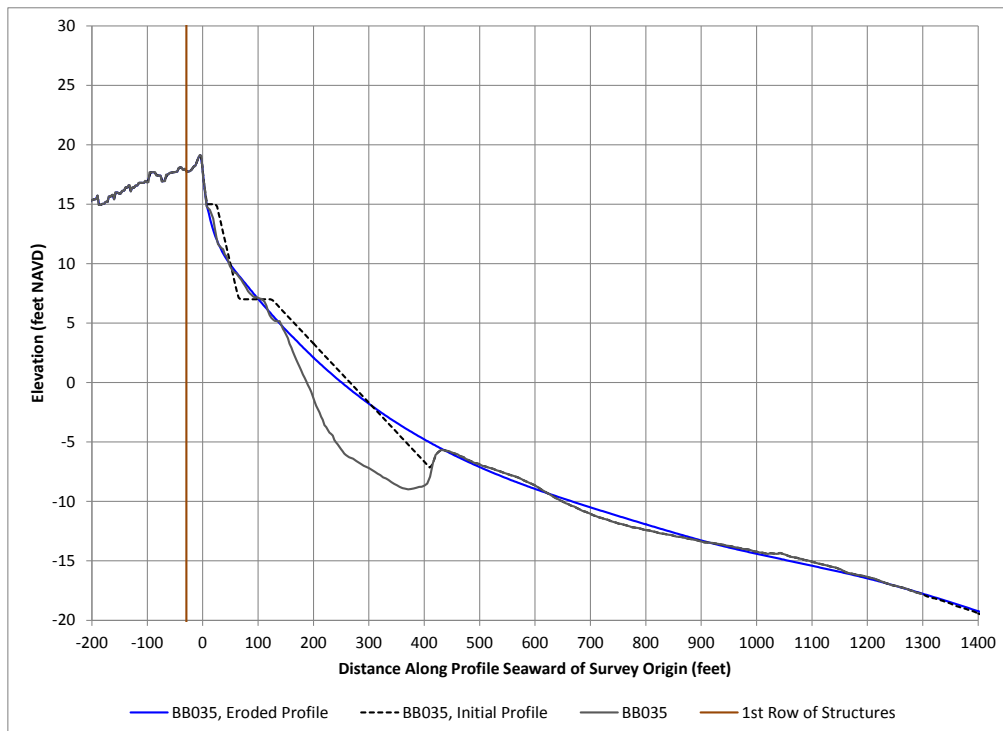


Figure 3-125: SBEACH Results, 50-Year Protection, 50-year, Transect 35

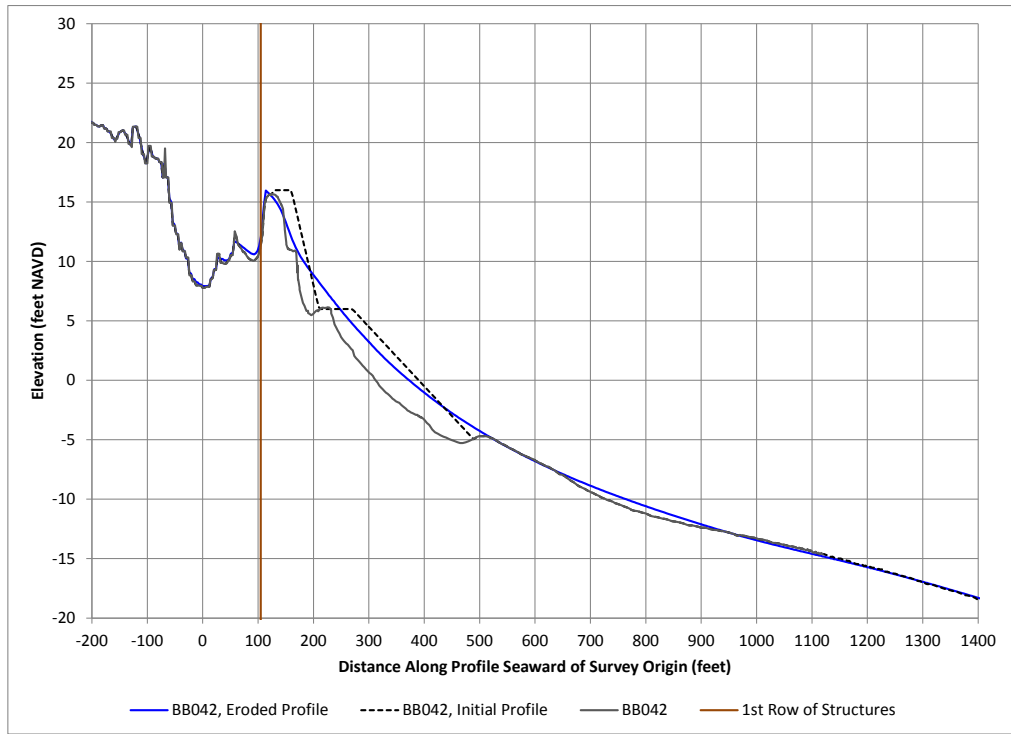


Figure 3-126: SBEACH Results, 50-Year Protection, 50-year, Transect 42

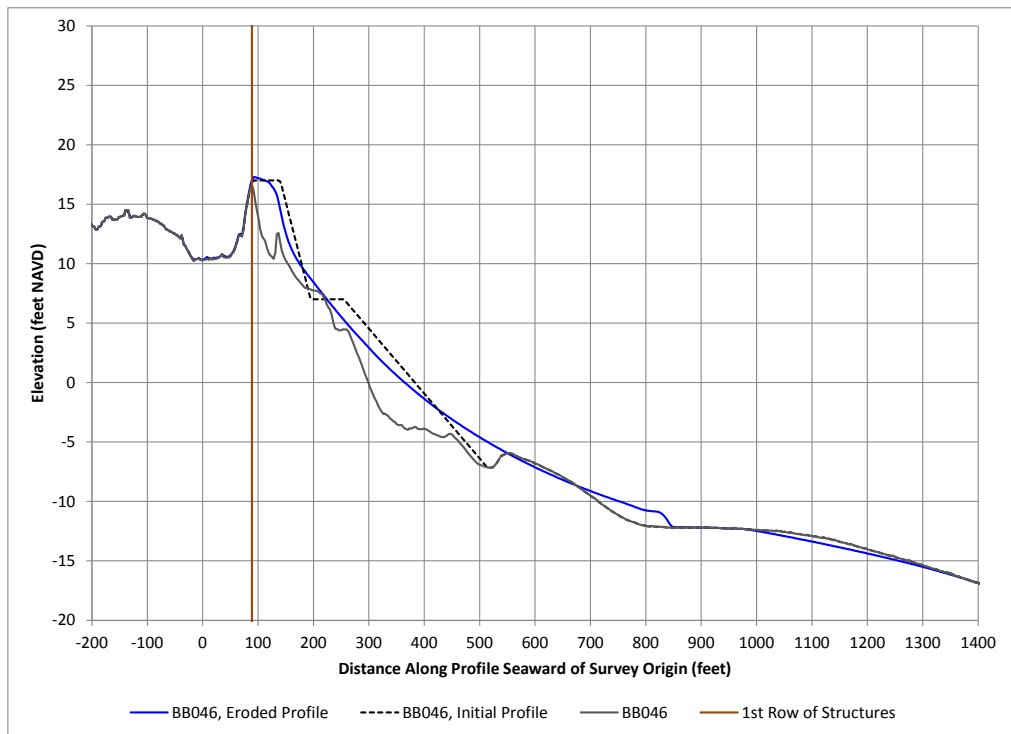


Figure 3-127: SBEACH Results, 50-Year Protection, 50-year, Transect 46

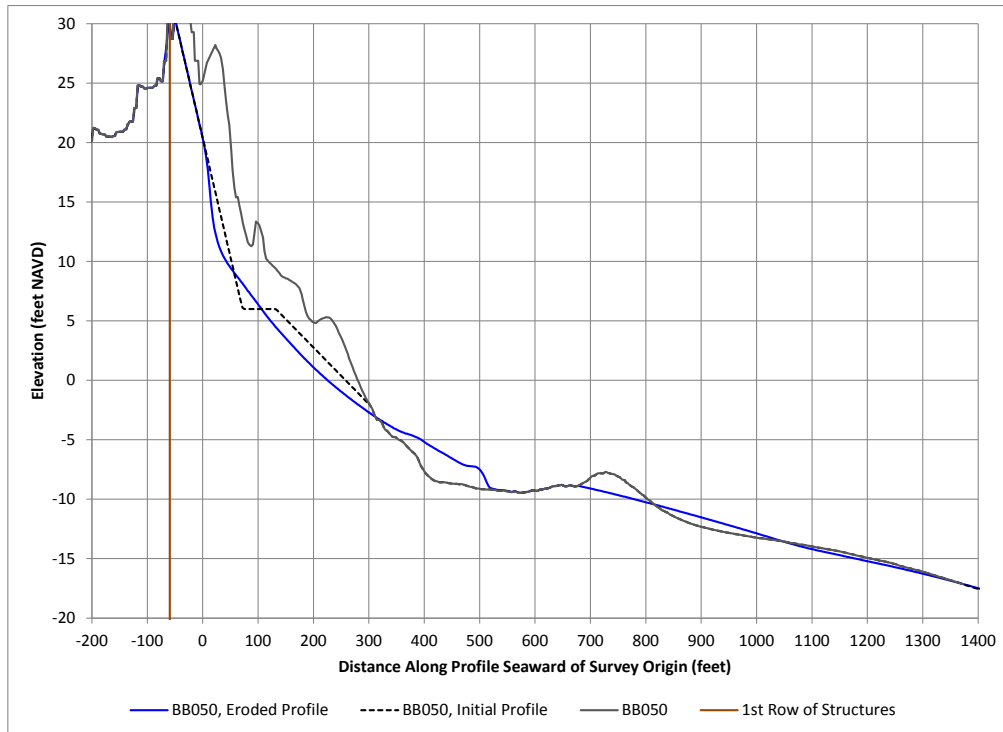


Figure 3-128: SBEACH Results, 50-Year Protection, 50-year, Transect 50

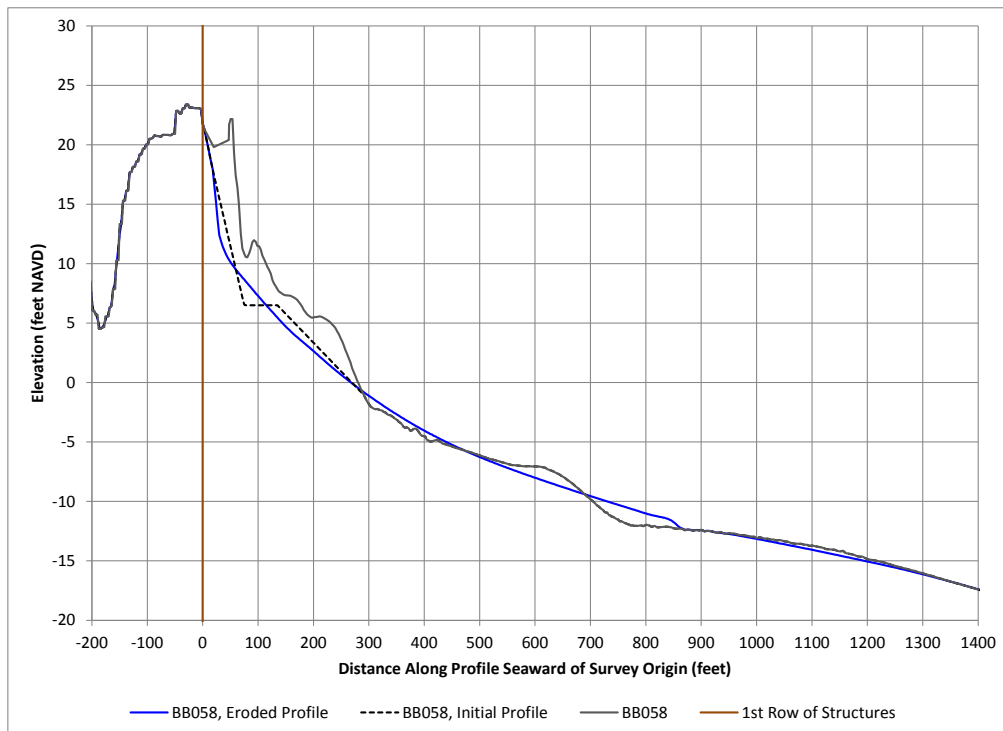


Figure 3-129: SBEACH Results, 50-Year Protection, 50-year, Transect 58

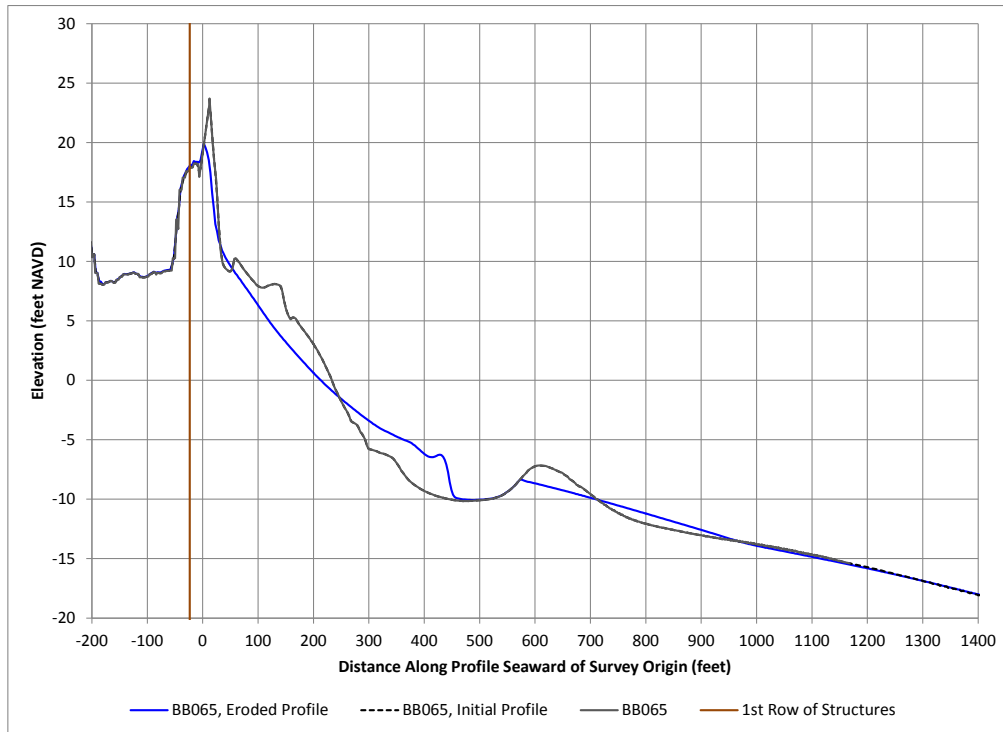


Figure 3-130: SBEACH Results, 50-Year Protection, 50-year, Transect 65

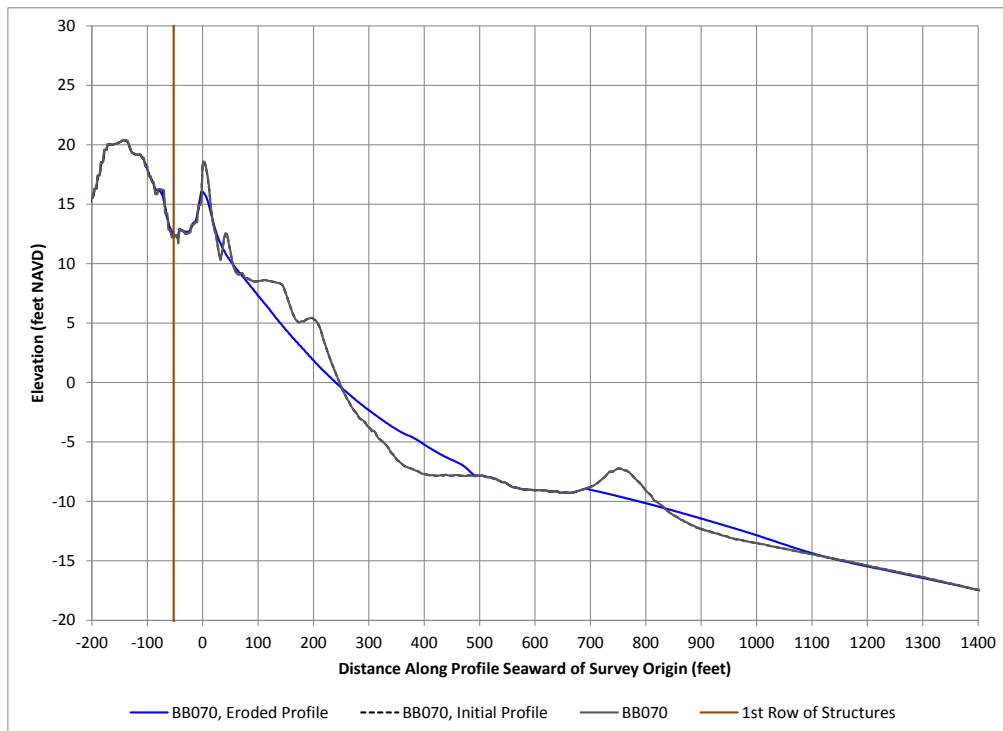


Figure 3-131: SBEACH Results, 50-Year Protection, 50-year, Transect 70

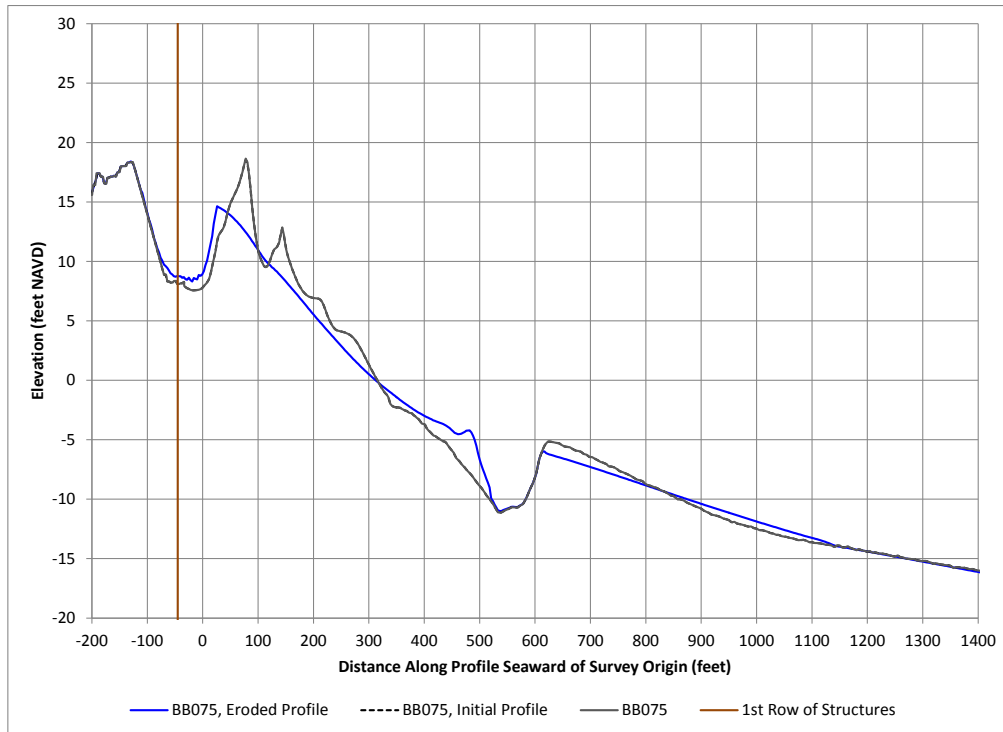


Figure 3-132: SBEACH Results, 50-Year Protection, 50-year, Transect 75

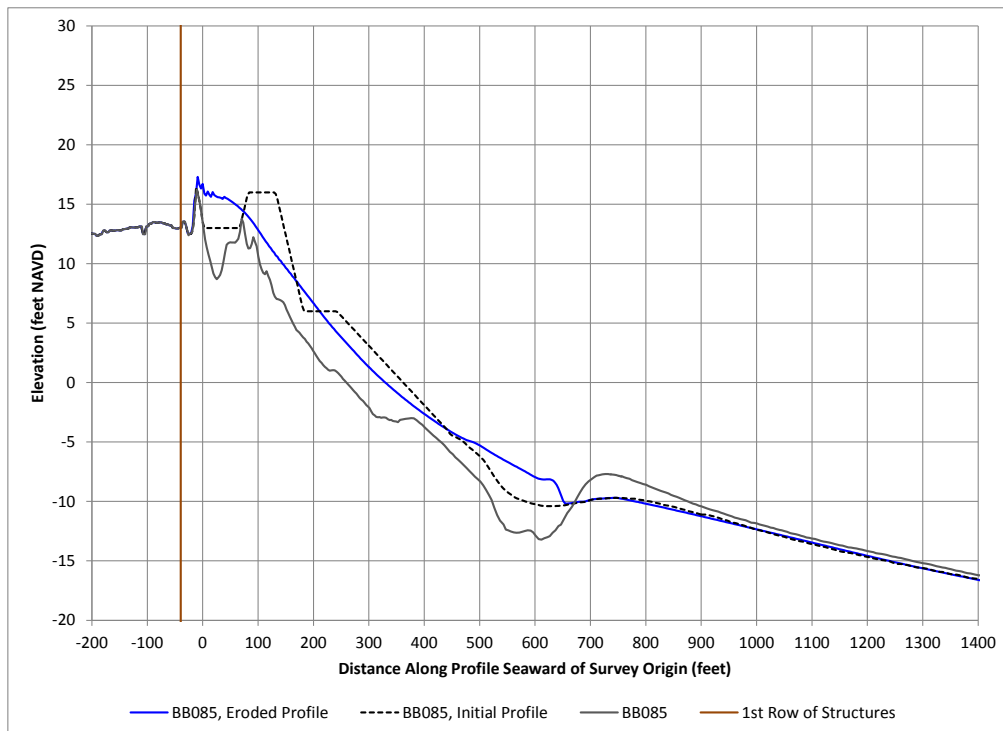


Figure 3-133: SBEACH Results, 50-Year Protection, 50-year, Transect 85

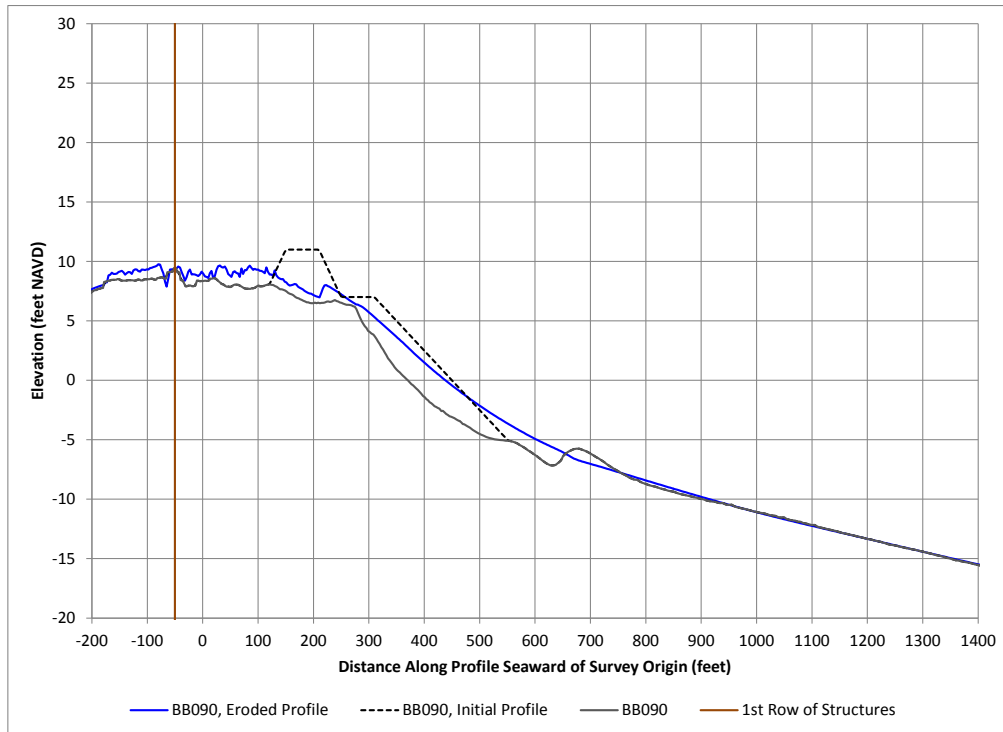


Figure 3-134: SBEACH Results, 50-Year Protection, 50-year, Transect 90

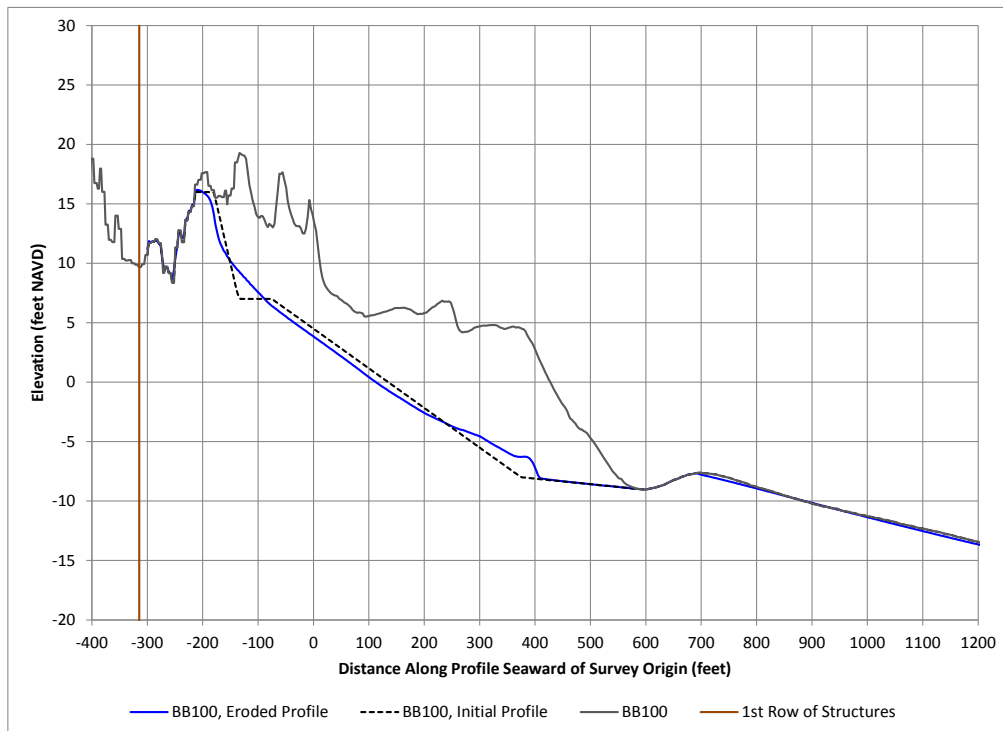


Figure 3-135: SBEACH Results, 50-Year Protection, 50-year, Transect 100

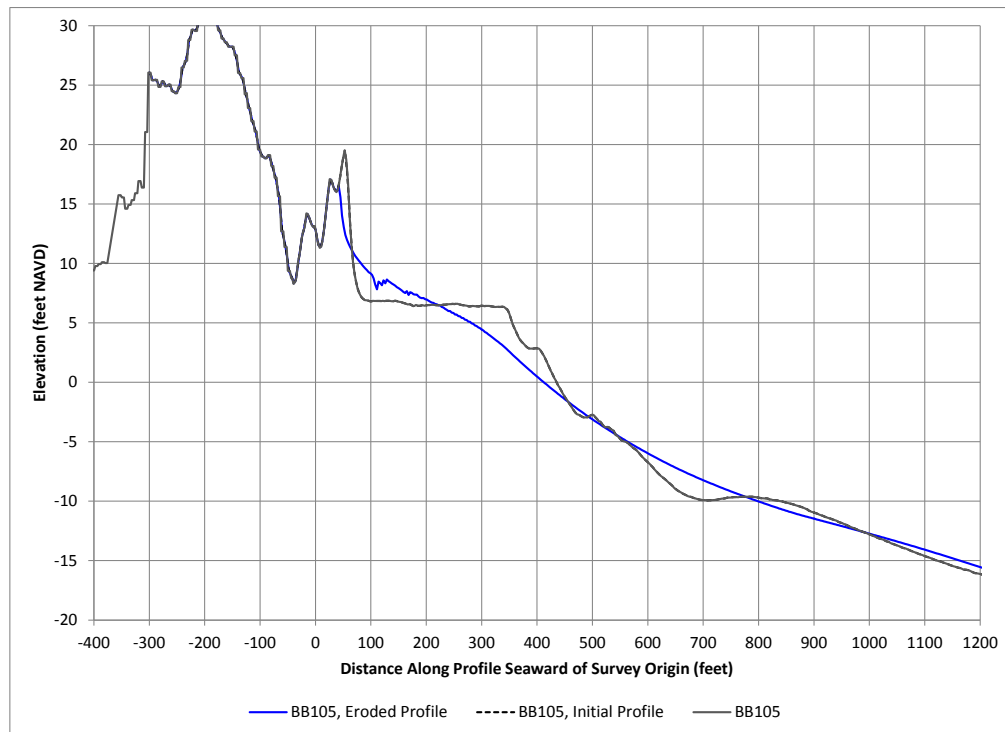


Figure 3-136: SBEACH Results, 50-Year Protection, 50-year, Transect 105

iii. 100 Year Storm

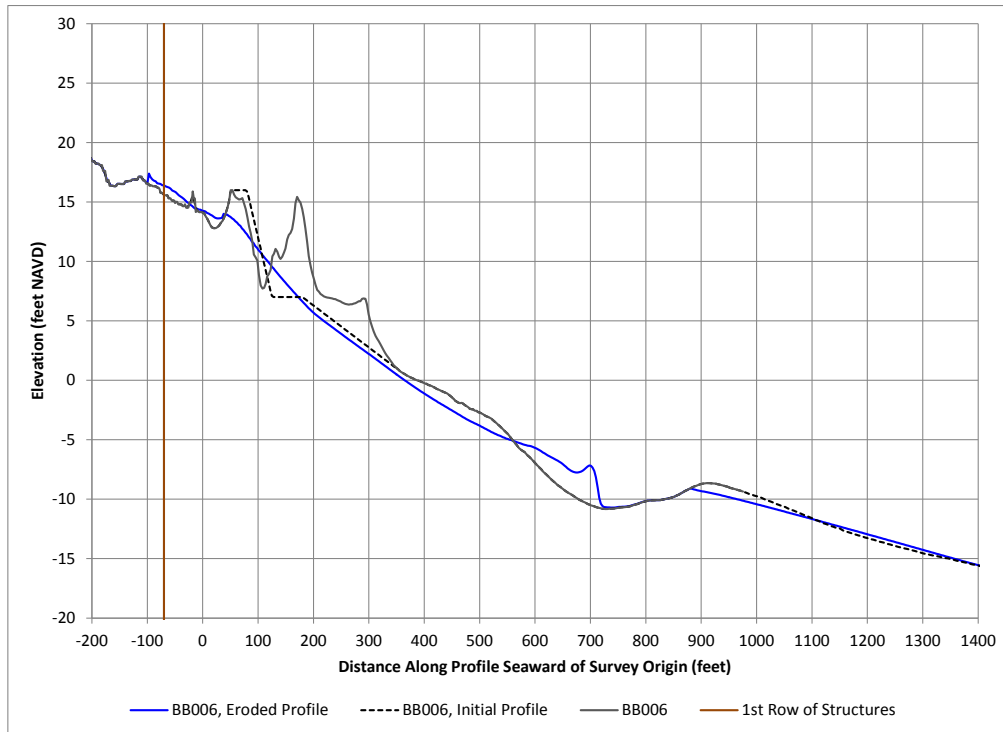


Figure 3-137: SBEACH Results, 50-Year Protection, 100-year, Transect 6

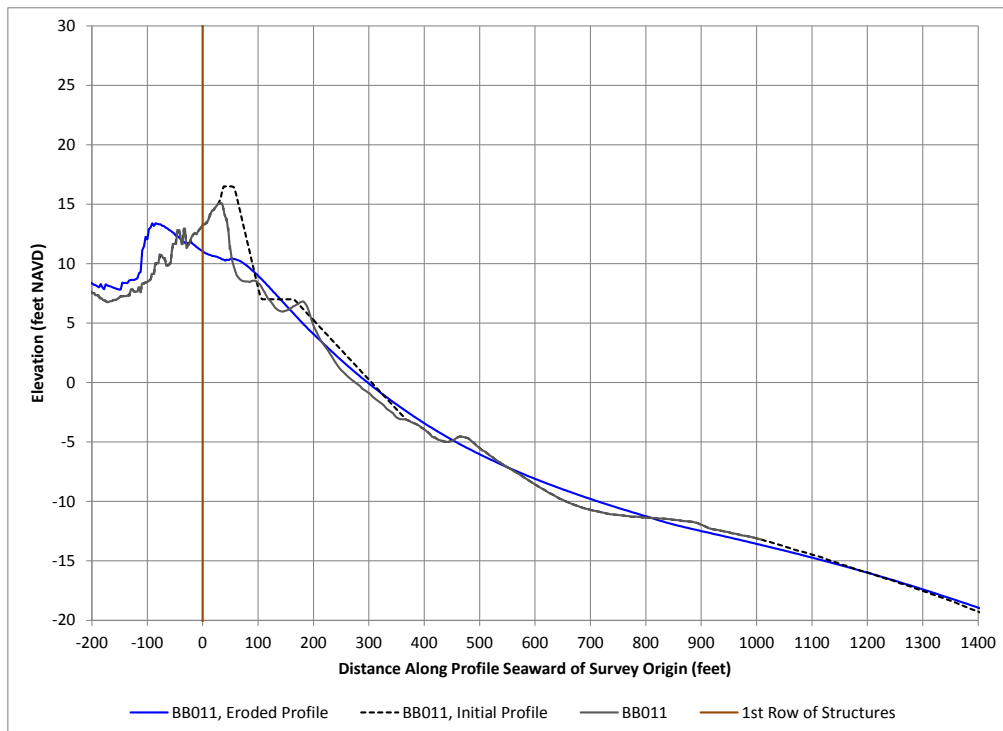


Figure 3-138: SBEACH Results, 50-Year Protection, 100-year, Transect 11

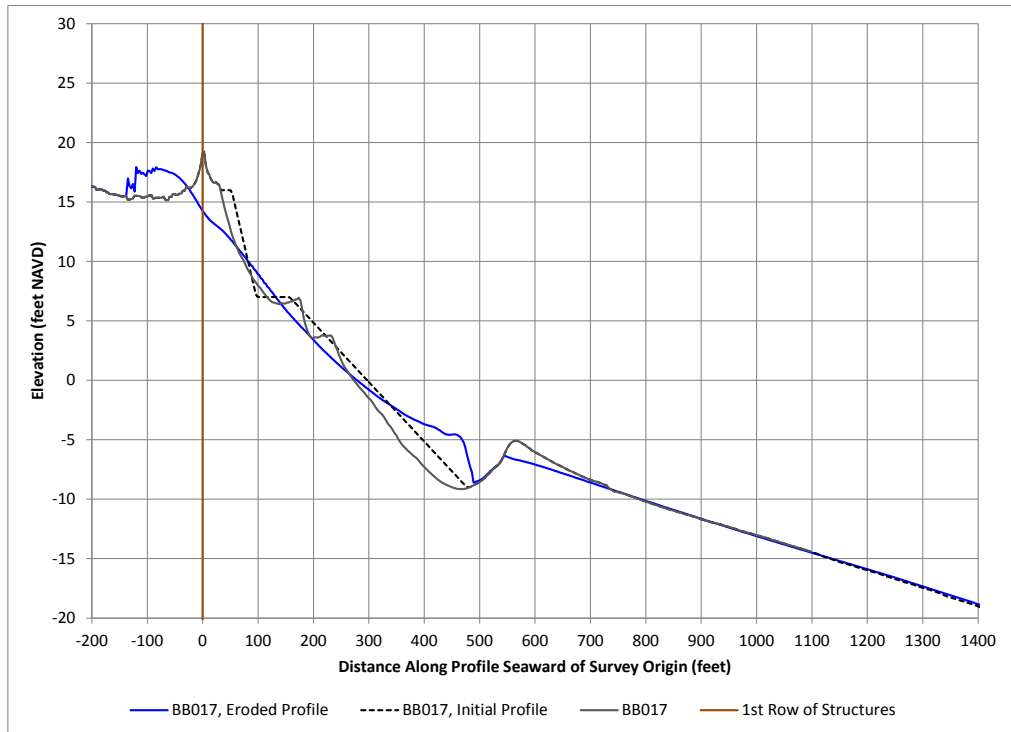


Figure 3-139: SBEACH Results, 50-Year Protection, 100-year, Transect 17

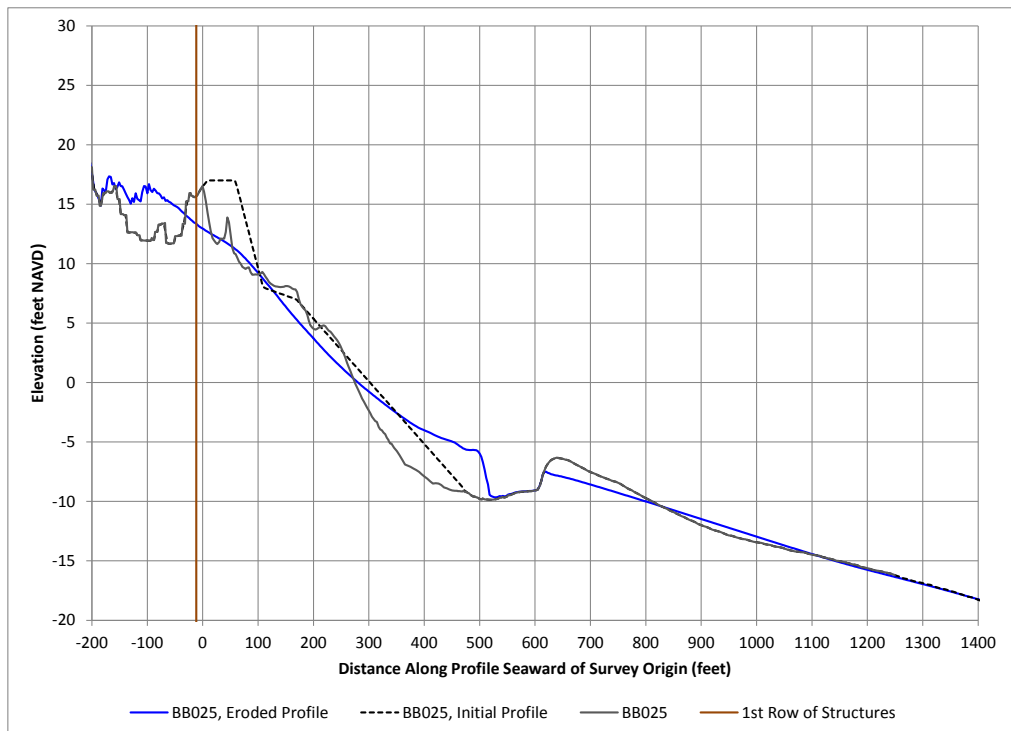


Figure 3-140: SBEACH Results, 50-Year Protection, 100-year, Transect 25

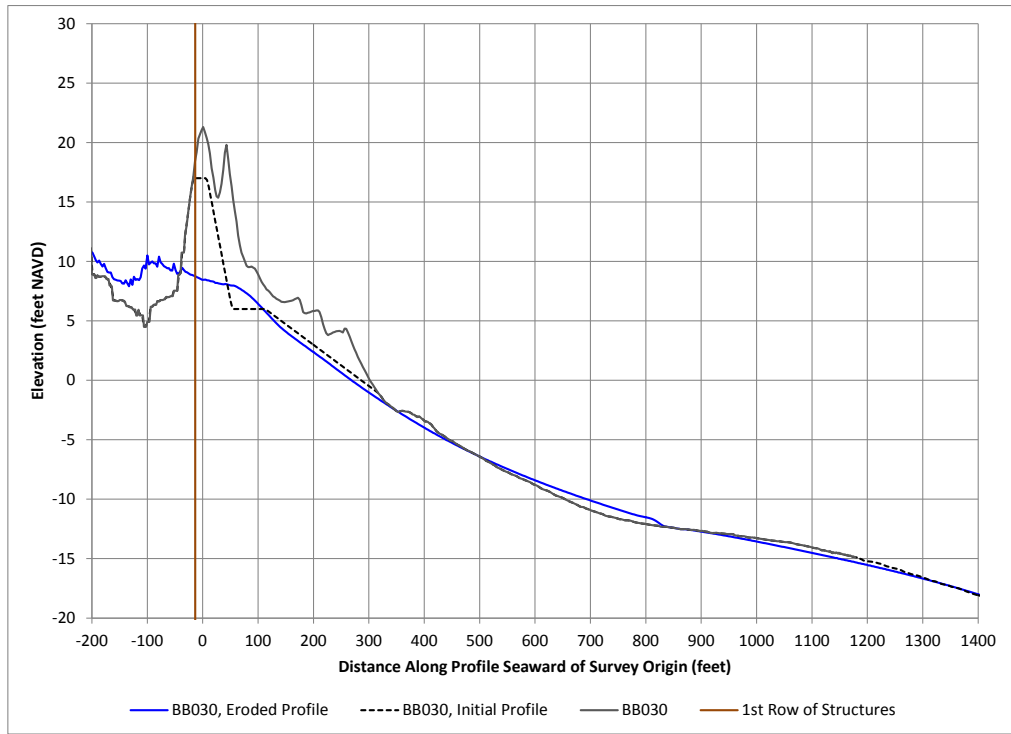


Figure 3-141: SBEACH Results, 50-Year Protection, 100-year, Transect 30

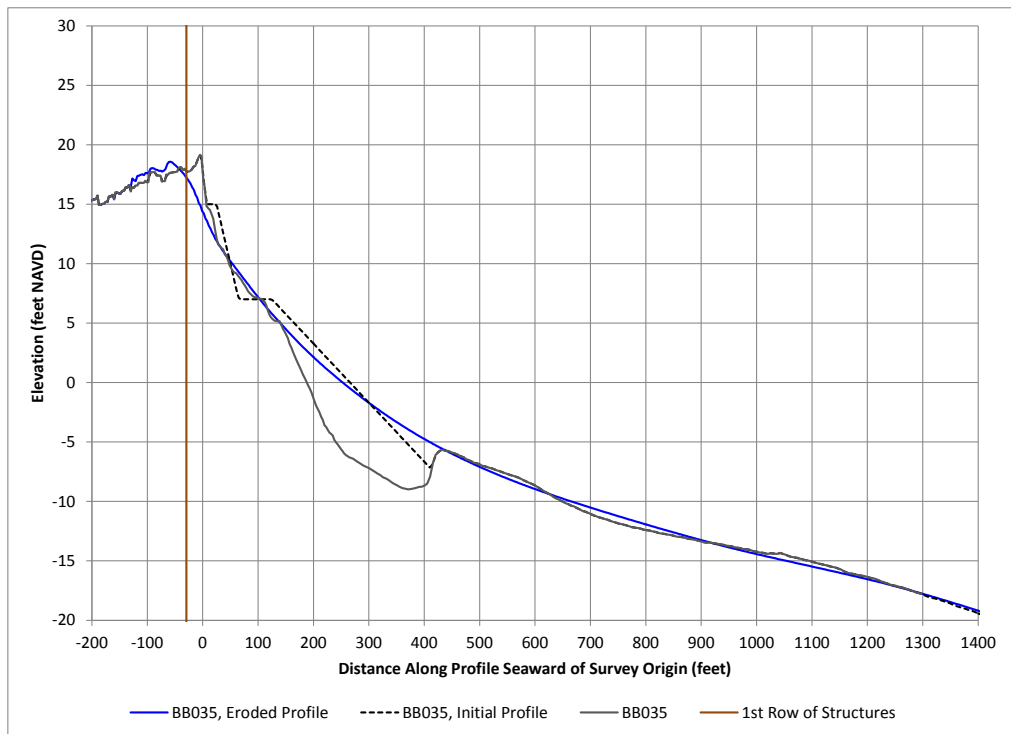


Figure 3-142: SBEACH Results, 50-Year Protection, 100-year, Transect 35

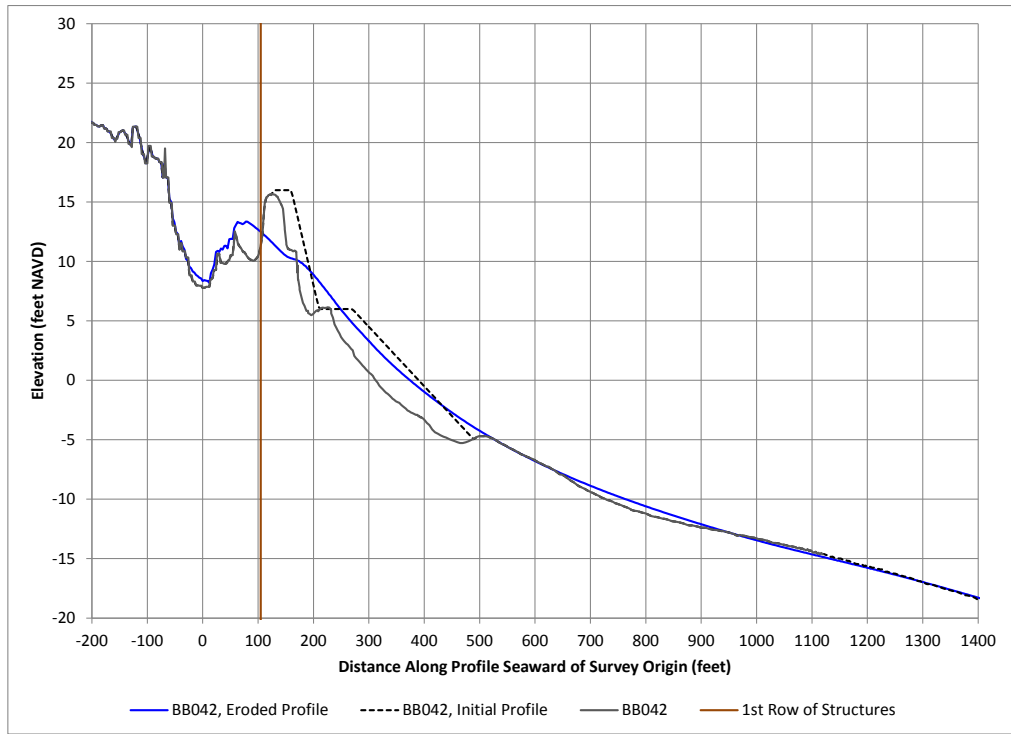


Figure 3-143: SBEACH Results, 50-Year Protection, 100-year, Transect 42

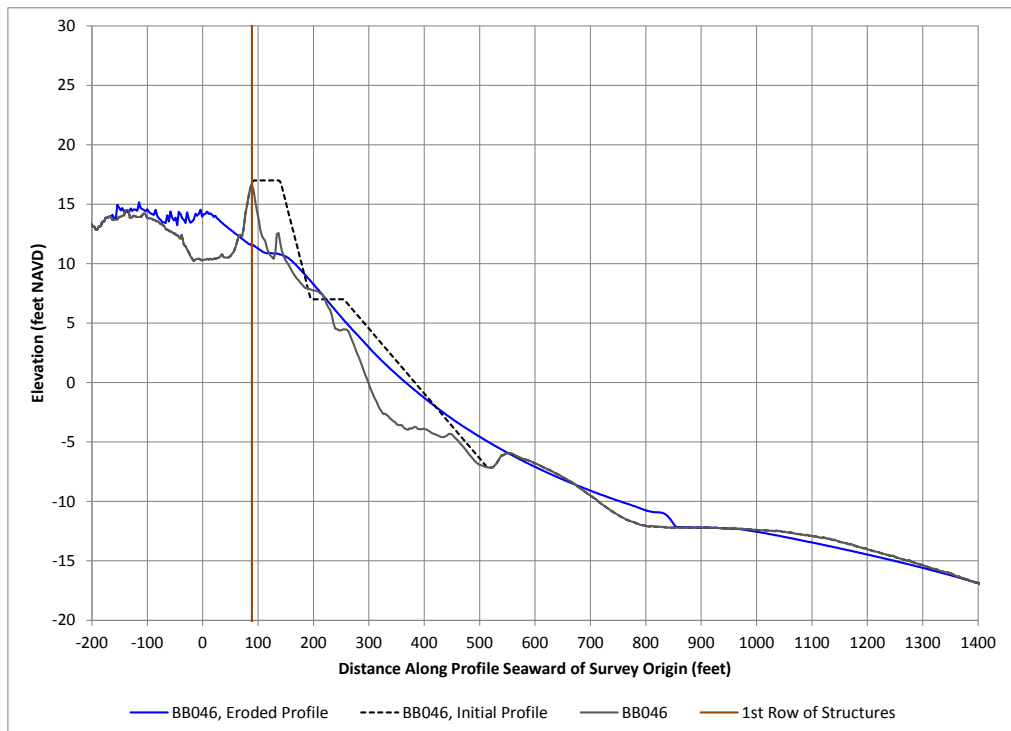


Figure 3-144: SBEACH Results, 50-Year Protection, 100-year, Transect 46

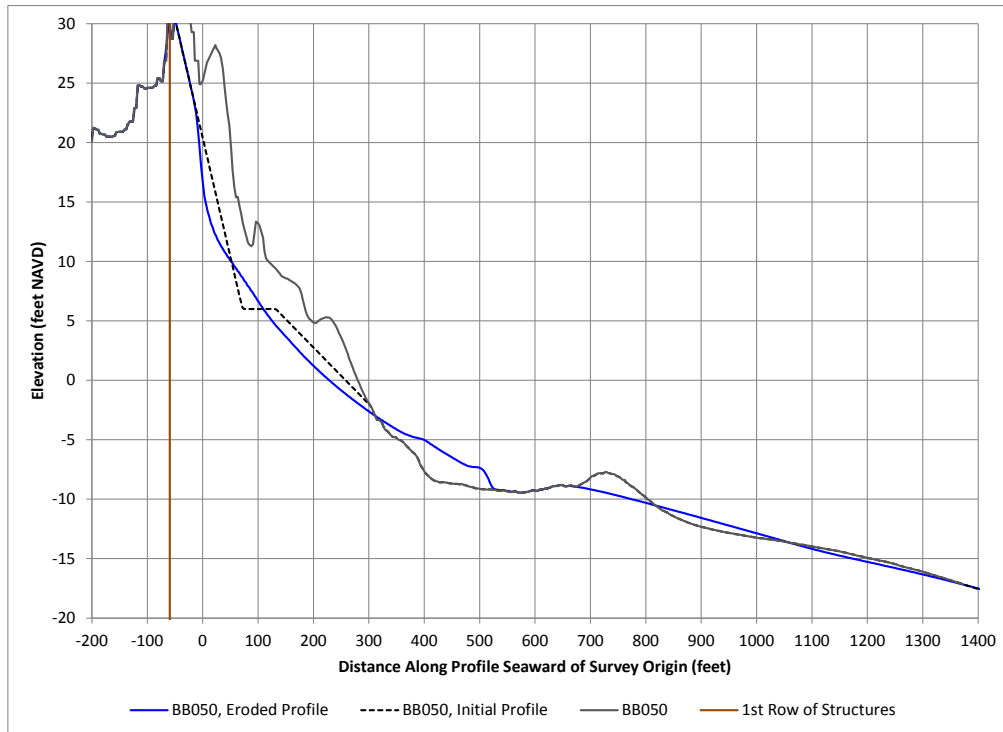


Figure 3-145: SBEACH Results, 50-Year Protection, 100-year, Transect 50

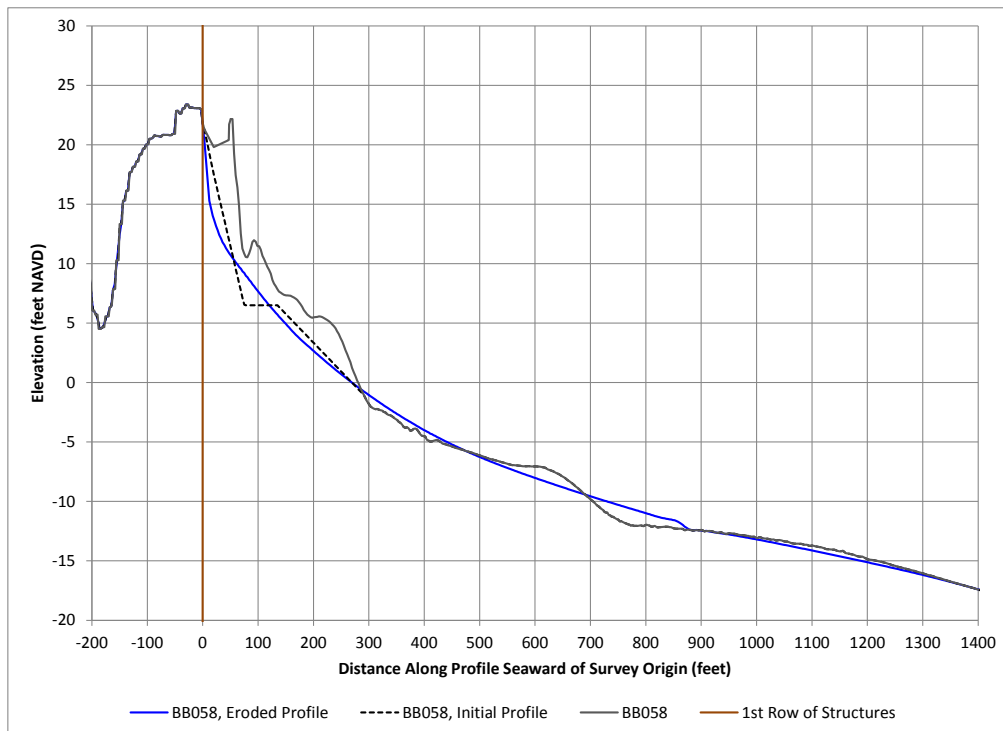


Figure 3-146: SBEACH Results, 50-Year Protection, 100-year, Transect 58

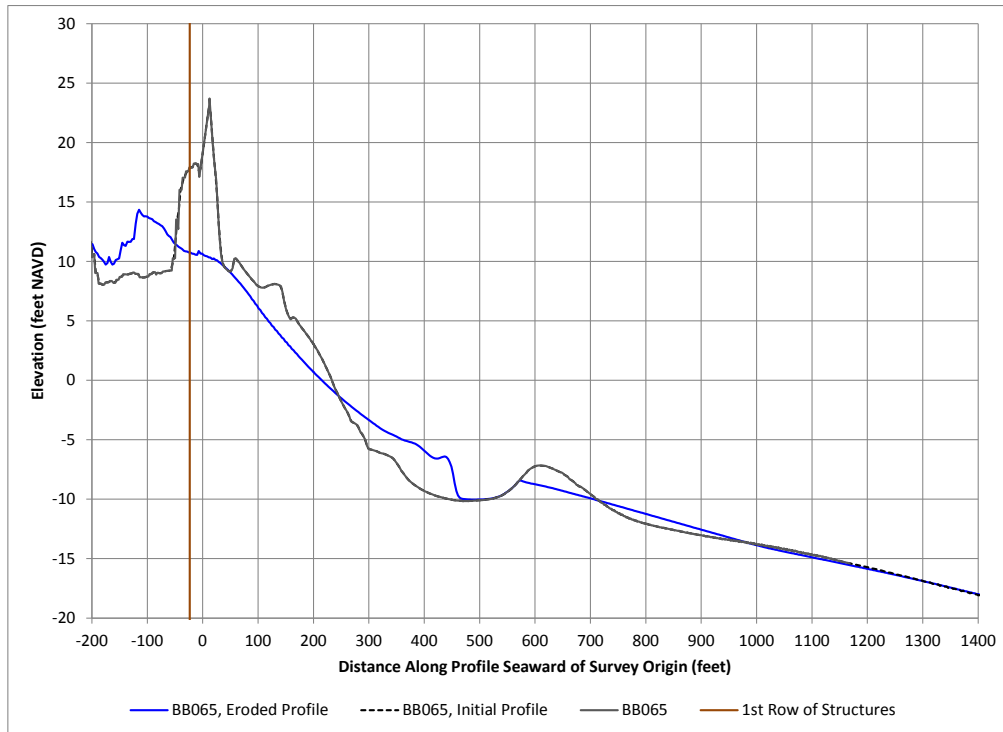


Figure 3-147: SBEACH Results, 50-Year Protection, 100-year, Transect 65

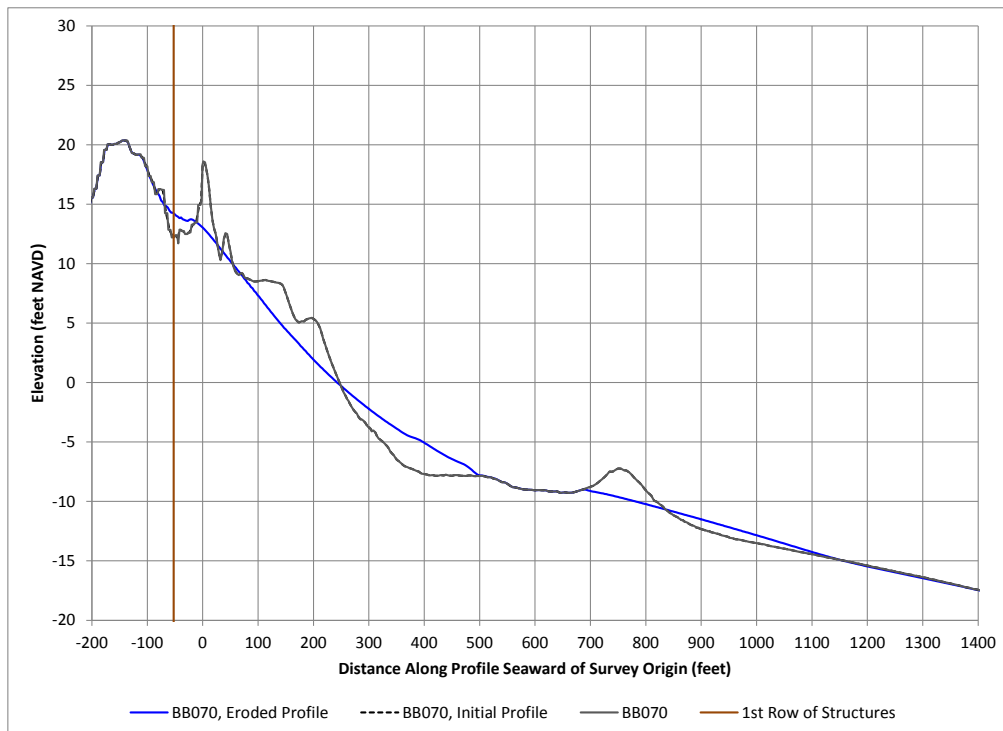


Figure 3-148: SBEACH Results, 50-Year Protection, 100-year, Transect 70

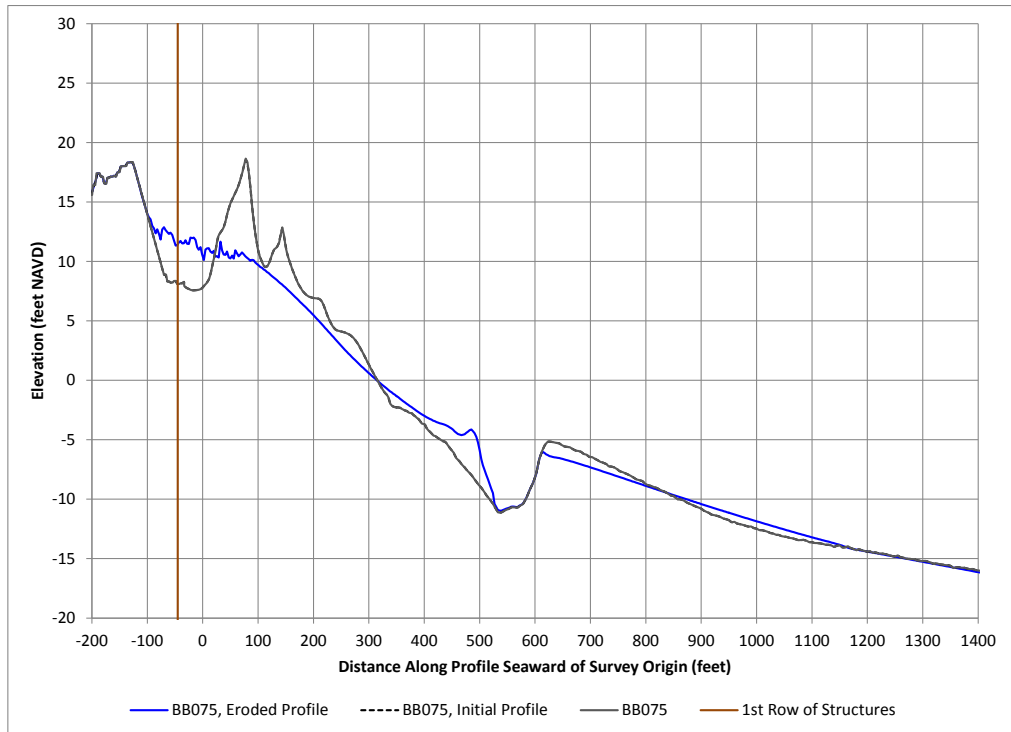


Figure 3-149: SBEACH Results, 50-Year Protection, 100-year, Transect 75

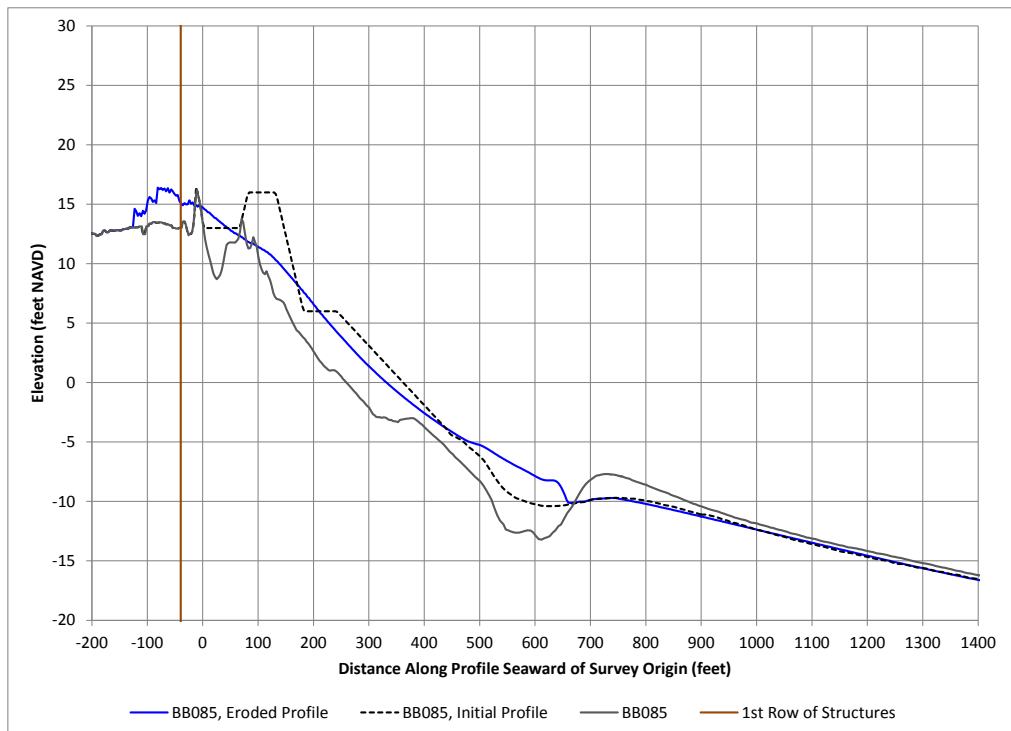


Figure 3-150: SBEACH Results, 50-Year Protection, 100-year, Transect 85

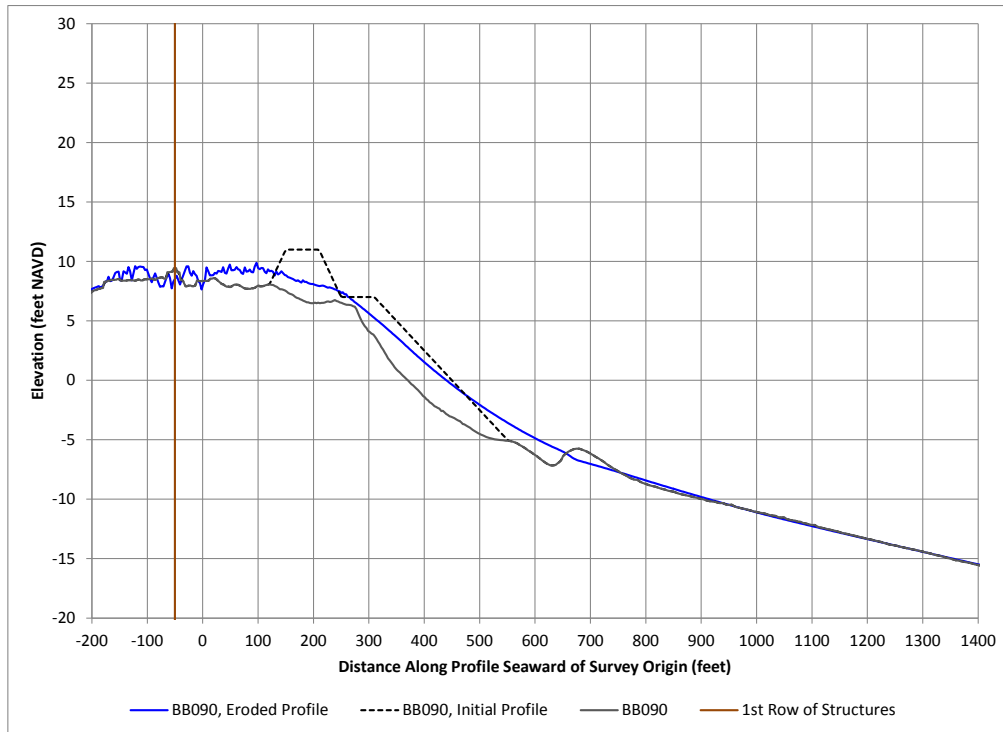


Figure 3-151: SBEACH Results, 50-Year Protection, 100-year, Transect 90

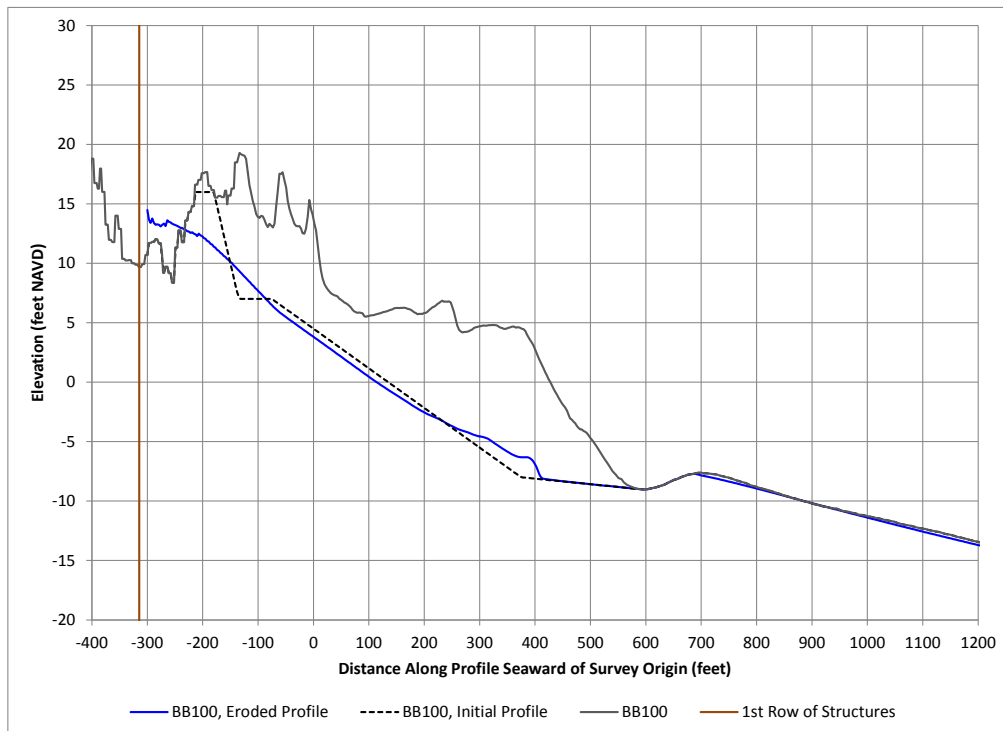


Figure 3-152: SBEACH Results, 50-Year Protection, 100-year, Transect 100

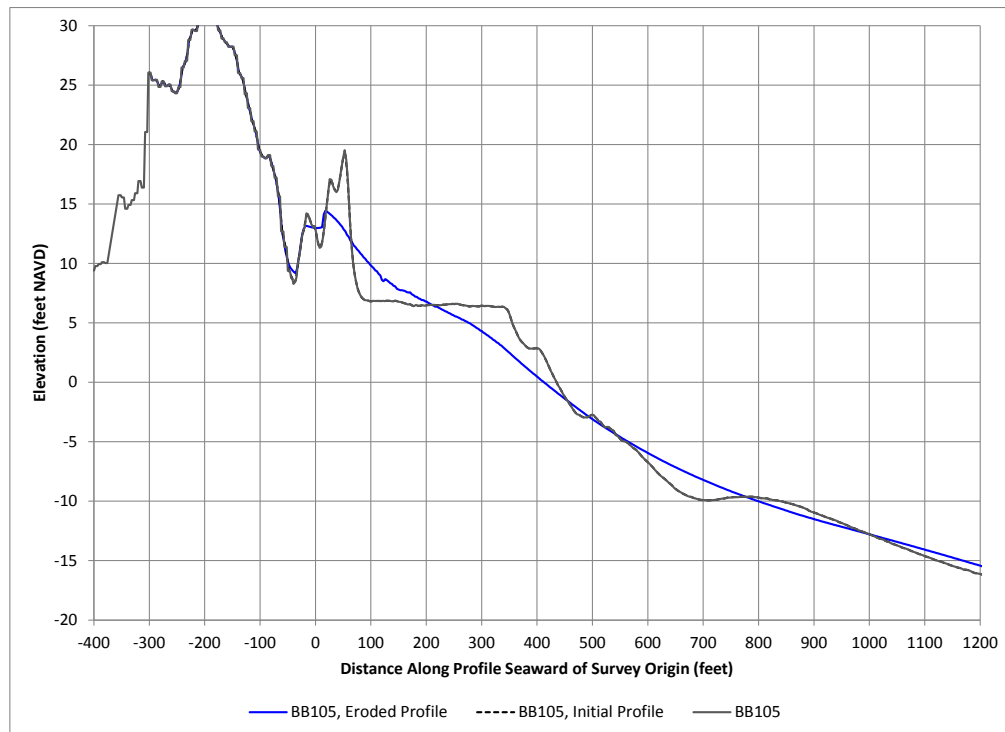


Figure 3-153: SBEACH Results, 50-Year Protection, 100-year, Transect 105