Fire Island Inlet to Montauk Point, NY

Final General Reevaluation Report

APPENDIX A5

TRIGGERS FOR PROACTIVE BREACH RESPONSE

U.S. Army Corps of Engineers
New York District

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FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY – FINAL GRR

Appendix A5

Triggers for Proactive Breach Response

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1.0 INTRODUCTION

In May 2009, a Formulation Report (USACE-NAN, 2009) was provided to the key government partners and stakeholders that identified the problems, opportunities, objectives and constraints, analyzed Alternatives, and proposed several alternative plans for consideration. Based on the comments received and subsequent discussions among the stakeholders and the public, a Tentative Federally Supported Plan (TFSP) was jointly identified by the Corps of Engineers and the Department of Interior and submitted to the New York State Department of Environmental Conservation (NYSDEC), the non-Federal sponsor, in March 2011. The TFSP identified a plan that met the study objectives and the requirements of both the Corps and DOI.

Due to the significant changes brought about by Hurricane Sandy, a reanalysis of the TFSP was undertaken to consider these changes to the landform, development patterns, and risk. The post-Sandy TFSP plan was provided to New York State in May 2013, who agreed in concept with the plan. With sponsor support, the TFSP has been identified as the Tentatively Selected Plan (TSP), subject to refinement, based upon public and agency comment (USACE-NAN, 2016). The public and agency review process will also be the basis for finalizing a TSP that meets the requirement of being mutually acceptable to the Secretary of the Army and Secretary of the Interior.

The TSP includes inlet modifications to ensure natural longshore sediment transport along the barrier islands, nonstructural measures, primarily through building retrofits, with limited relocations and buy-outs, road raising in four mainland locations, beach fill along several sections of the barrier island, breach response, sediment management with feeder beaches at two locations (Montauk and Potato Road), groin modifications in Ocean Beach., coastal process features (CPFs), adaptive management, and integration of local land use regulations and management.

The breach response plan in the TSP includes three different scenarios:

- Proactive Breach Response is a plan where action is triggered when the breach and dune are lowered below a 25 year design level of risk reduction and provides for restoration to the design condition (+13 ft dune and 90 ft berm at +9.5 ft). This plan is included on Fire Island in vicinity of the FIIS Lighthouse Tract, in Smith Point County Park West, and along the barrier island fronting Shinnecock Bay.
- Reactive Breach Response is a plan where action is triggered when a breach has occurred, e.g. the condition where there is an exchange of ocean and bay water during normal tidal conditions. It will be utilized as needed when a breach occurs. Reactive breach response provides for a closure template matching the TSP design at each reach. Therefore, reaches where beach fill being proposed, the reactive breach response would be to build a dune at +15 ft and a 90 ft berm. In reaches where proactive breach closure is the proposed plan, the reactive breach response would be to build a +13 ft dune and a 90 ft berm. Reaches where no plan is being considered

other than reactive breach response (e.g., Talisman/Barrett Beach), the closure template would only include a berm with an elevation of +9.5 and a width matching adjacent areas.

- Conditional Breach Response is a plan that applies to the large, Federally-owned tracts within FIIS (except the Fire Island Lighthouse Tract and Talisman/Barrett Beach), where the breach response team determines if a breach is closing naturally or if mechanical closure is needed. Conditional Breach closure provides for a berm at elevation + 9.5 ft with no dune.

There are several elements of the TSP that the Corps, DOI, and New York State have agreed to continue to develop concurrent with the public and agency review process that may affect the final plan. These include 1) the scope and extent of the natural features that reestablish coastal processes, 2) refinement of breach response protocols, 3) refinement of adaptive management, and 4) refinement of land management. With respect to the breach response protocols, the involved agencies have agreed that refinement of the decision-making protocols to better specify how the decisions related to breach closure would be made, with further work continuing to occur in the design phase of the project. This memorandum addresses the protocol for Proactive Breach Response and proposes specific threshold conditions of the barrier island that would be regularly monitored, and if met would trigger a proactive breach response.

2.0 THRESHOLD FOR PROACTIVE BREACH RESPONSE

Available historic breaching information, including topography, waves, and water levels, and modeling results suggest that are there is more than one factor controlling the barrier island breaching risk. Modeling results show that depending on location and based on conditions prior to Hurricane Sandy, the partial breaching risk ranged from less than a 25 year return period at Old Inlet East to over 250 year return period at Sedge Island (Table 1). At Smith Point County Park (SPCP) the risk for breaching was approximately at the 26 year return period. Hurricane Sandy opened a 1,500-foot-wide breach just east of Moriches Inlet in Cupsogue County Park, a 500-foot-wide breach to the west of Moriches Inlet at Smith Point County Park, and a third breach at Old Inlet within the National Park Service's Fire Island Wilderness Area. Therefore, both the SPCP and Old Inlet breach locations coincided with areas previously identified as vulnerable to breaching by the 25 year storm, approximately.

Table 1. Baseline Overwash and Breaching Risk (Return Period) Potential

Location	Overwash	Partial Breaching	Full Breaching
FI Lighthouse Tract	14	184	> 500
Robins Rest.	9	141	> 500
Barrett Beach.	20	213	> 500
Davis Park	22	145	> 500
Old Inlet West	10	45	82
Old Inlet East	5	24	118

Smith Point CP	8	26	145
Sedge Island	25	251	> 500
Tiana Beach	7	72	336
West of Shinnecock	18	74	326

Note: based on Baseline (circa 2000) conditions

Many other areas along the barrier island were subject to significant overwash but did not breach. This is also consistent with pre-Sandy modeling results which as shown in Table 1 suggest overwash for a storm between a 5 and 25 year return period storm, depending on location.

Overall, the barrier island response appears to be most sensitive to elevation, width from ocean to bay, back bay bathymetry, and proximity to an existing inlet. Maximum barrier elevation, typically the dune crest, is important because it controls the overwash response. A high berm or dune, if combined with sufficient beach width, will prevent significant overwash, which is the precursor to beaching. However, elevation alone is not necessarily sufficient. Modeling results and data suggest that a high but relatively narrow dune with a narrow beach may be quickly eroded by surge and waves. Ultimately, whether the resulting overwash results in a breach will depend on the barrier island width at that location and the hydraulic gradient from ocean to bay. Locations farther away from an inlet (e.g., eastern Great South Bay prior to the Wilderness Area breach) have a tidal range significantly smaller than the adjacent ocean areas. The bayside storm surge hydrograph may also be significantly muted, particularly if the wind is pushing water away from the area. Therefore, if there is a significant overwash, and the ocean surge extends from ocean to bay, there is the potential for a difference in water levels that will be sufficient to drive the formation of a partial or even a full breach.

Barrier island sensitivity to breaching and the development of a response trigger is further complicated by the fact that the problem is not one-dimensional. A short narrow section of beach fronting an otherwise healthy dune may be result in localized overwash, but if the overwash is narrow relative to the barrier island width, it will not necessarily result in a breach. The same overwash over a longer section of the beach/barrier may allow for enough water discharge and scour to generate a breach. In the end, the likelihood of sufficient scour and a breach forming is a function of the hydraulic forcing (surge and waves) against the opposing “friction” generated by the cross-shore barrier island profile (height and width) and alongshore width of the flow path (a narrow “channel” will generate more resistance to flow than a wider one).

2.1 Effective Width Threshold

As part of the lifecycle modeling work, breach response triggers were defined based on the concept of “effective width”. The effective width is an abstract measurement of the vulnerability to breaching and indirectly accounts for the beach and dune width. In other words, although as explained above breaching response is a multidimensional problem, limitations in the lifecycle model approach do not allow for detailed simulation in time of each barrier island

metric (i.e., beach width, dune height and width, barrier island width, etc.) an its effects on barrier island breaching potential. Effective width is therefore an overall proxy that tries to incorporate the influence of all these parameters and can change over the lifecycle simulation in response to erosion. This effective width has generally been approximated as the width of the island above the berm elevation (9.5 ft NGVD), but this is a generalization that may not hold true at every breach vulnerable location. More importantly, because effective width is really an abstraction of actual barrier island dimensions, it is difficult to monitor or measure it in real field conditions.

3.0 PROPOSED PROACTIVE BREACH RESPONSE TRIGGERS

New proposed barrier island condition thresholds, or triggers, based on dimensions than can be easily measured and monitored as part of the FIMP project are proposed in the following sections. These triggers are also reach specific and consider historic breaching/overwash data, modeling results, and overall understanding of the hydraulic "conductivity" at each location. The triggers build on all of the engineering and modeling work that has been done in support of the FIMP Reformulation Study to date, including beach profile modeling (SBEACH), two-dimensional waves, storm surge, sediment transport and morphological modeling (ADCIRC, SWAM, and Delft3D), shoreline erosion modeling (GENESIS) and an engineering assessment of the potential future changes in the barrier island in response to continued erosion and storm impacts which was performed to define future barrier island conditions.

As explained above, breaching response is a multidimensional problem, so there is not one single measurement than can be monitored and used as threshold for action. Therefore, it is proposed that the following relevant dimensions be measured and considered instead:

1. Barrier island width: distance between bay and ocean MHW contours
2. Elevation: generally characterized by volume/area above +10 ft NGVD29
3. Beach width: distance between baseline (generally the natural dune alignment) and the MHW contour

Specific PBRP thresholds by reach are summarized in the following sections. When one or more of these proposed thresholds is exceeded, historic data and modeling results suggest that the risk of a partial breach is at the 25 year return period level and proactive action should be taken to rebuild the PBRP template and reduce the risk of breaching. Note that if one of these thresholds is met over a very small area but the barrier island is generally in good condition otherwise, the risk of breaching is significantly less than if the threshold is met over a large area. Therefore, the following sections recommend triggers based on both widespread but not necessarily contiguous weakness within a reach and smaller, localized, but potentially weaker spots.

3.1 (GSB-1B) Fire Island Lighthouse (FILT)

The Fire Island Lighthouse Tract reach is approximately 6,700 ft long and it is located in western Fire Island between the westernmost Fire Island community to east, Kismet, and

Robert Moses State Park to the west. In 2000, the dune along this tract is very low, with locations at approximately +10 ft NGVD. The dunes were also very narrow. This has resulted in relatively frequent overwash events, including Hurricane Sandy. On the other hand, the beach (from the baseline to the MHW line) has been relatively wide and the barrier island also wide in this reach, between 1,300 in 1,500 ft. In fact, none of the recent overwash impact areas, including during Hurricane Sandy, have extended north (landward) of Burma Road. Observed overwash and breaching response is consistent with modeling results (Table 2) which indicate that under baseline conditions a 14 year return period storm will overwash, but a 184 year storm is required to generate a partial breach. This relatively low risk of breaching owes mostly to the wide barrier island condition, and to a lesser extent to the proximity to Fire Island Inlet, which reduces the hydraulic gradient.

Table 2. Overwash and Breaching Risk (Return Period) Potential at FILT

	BLC	FVC	Breach Closed
Overwash	14	3	5
Partial Breaching	184	34	21
Full Breaching	> 500	> 106	> 43

The Future Vulnerable Condition (FVC) for this reach assumes even lower barrier elevations (8-10 ft NGVD) and a narrower beach width. Under those conditions, this reach is vulnerable to partial breaching under 34 year storm. Similarly, a breach closed condition (berm elevation of +9.5 ft and no dune) will experience a partial breach with a 21 year storm. In other words, the threshold for action (25 year return period) is somewhere between the FVC and breach closed condition.

3.1.1 Proposed PBRP Triggers

The following thresholds are proposed as representative of a breach vulnerable condition that would require a proactive breach response. If one or more of these triggers is met it is recommended that action be taken to restore the beach profile to the PBRP template (+13.5 ft NGVD dune and 90 ft wide berm at +9.5 ft NGVD) along this reach.

1. 200 ft (contiguous) of barrier island less than 1,000 ft wide between bay and ocean MHW contours
2. 2,000 ft (total) of barrier island with less than 50 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 50 ft across above a minimum elevation +10 ft and 100 ft of beach width measured from the baseline to MHW
4. 3,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 1,000 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

As explained above, the proposed thresholds account for the possibility of relatively small, localized, weak spot (triggers 1, 3 and 5) or more extensive weakening of the barrier island that could also lead to breaching (triggers 2 and 4).

3.2 (MB-1B) Smith Point County Park (SPCP) East

This reach extends approximately 13,500 feet within Smith Point County Park (SPCP) from the east campground area to New Made Island. The barrier island within this reach varies between 400 ft and 1,200 ft wide from ocean to bay shoreline and is generally undeveloped. Prior to Hurricane Sandy, several low (as low as +10 ft NGVD) and relatively narrow (approximately 400 ft at high water) barrier island sections existed in the center portion of this reach. Modeling results suggested frequent overwash in this area and partial breaching between a 9 and 26 year storm, depending on the condition of the barrier island (see Table 3).

Table 3. Overwash and Breaching Risk (Return Period) Potential at SPCP East

	BLC	FVC	Breach Closed
Overwash	8	4	5
Partial Breaching	26	9	20
Full Breaching	> 145	> 141	> 139

Hurricane Sandy impacts on this reach generally confirmed the modeling results. Approximately 75% of this reach (all the low areas) were overwashed with most the impacts extending all the way across the barrier and into the bay. Additionally, the storm resulted in a breach near New Made Island that was subsequently closed by USACE.

3.2.1 Proposed PBRP Triggers

The following thresholds are proposed as representative of a breach vulnerable condition that would require a proactive breach response. If one or more of these triggers is met it is recommended that action be taken to restore the beach profile to the PBRP template (+13.5 ft NGVD dune and 90 ft wide berm at +9.5 ft NGVD) along this reach.

1. 200 ft (contiguous) of barrier island less than 400 ft wide between MHW lines
2. 2,000 ft (total) of barrier island with less than 100 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 100 ft across above a minimum elevation +10 ft and less than 150 ft of beach width measured from the baseline to MHW
4. 6,000 ft (total) of barrier island with less than 150 ft of beach width measured from the baseline to MHW
5. 500 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

Note that a relatively narrow barrier island (less than 500 ft) and the distance to Moriches Inlet contribute to higher breaching risks and generally result in more conservative thresholds for proactive breach response compared to FILT.

3.3 (MB-2A) Great Gun

The Great Gun reach extends 7,600 ft or slightly more than half the remaining distance between New Made Island and Moriches Inlet. The barrier island within this reach is relatively wide and prior to Hurricane Sandy had a relatively healthy dune with elevations between 15 a 20 ft. Therefore, this reach was not considered a breach vulnerable location as part of the modeling work and overwash/breaching risks have not been specifically quantified in this area. Although Hurricane Sandy caused significant overwash in an area approximately 2,500 ft long across New Made Island, breaching did not occur and the dunes along the rest of this reach appeared to largely survive the storm.

3.3.1 Proposed PBRP Triggers

The following PBRP triggers are proposed although for the Great Gun reach:

1. 200 ft (contiguous) of barrier island less than 400 ft wide between MHW lines
2. 2,000 ft (total) of barrier island with less than 100 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 100 ft across above a minimum elevation +10 ft and less than 150 ft of beach width measured from the baseline to MHW
4. 4,000 ft (total) of barrier island with less than 150 ft of beach width measured from the baseline to MHW
5. 500 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.4 (MB-2B) Moriches Inlet -West

This reach extends 6,200 ft for the remainder of Smith Point County Park to Moriches Inlet and it is characterized by a relatively wide and high dune system. The barrier island is also relatively wide, between 1,500 and 1,700 ft. Although this reach is immediately downdrift of Moriches Inlet, the configuration of the jetties and the ebb shoal appears to have contributed to the stability of this reach. Therefore, this reach was not considered a breach vulnerable location as part of the modeling work and overwash/breaching risks have not been specifically quantified in this area. In fact, Hurricane Sandy did not result in any overwash in this area. Even beach erosion during the storm was relatively small in this reach compared to others.

3.4.1 Proposed PBRP Triggers

As explained above, this reach has been particularly robust in recent history and would not be expected to breach under existing conditions. A need for proactive breach response does not

appear likely either. Therefore, the following PBRP triggers are proposed although it is not necessarily expected these threshold conditions will be met.

1. 200 ft (contiguous) of barrier island less than 1,200 ft wide between bay and ocean MHW contours
2. 2,000 ft (total) of barrier island with less than 50 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 50 ft across above a minimum elevation +10 ft and 100 ft of beach width measured from the baseline to MHW
4. 3,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 1,000 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

It should also be noted that Moriches Inlet West is one of the sites identified for construction of a Coastal Process Feature (CPF) which includes a low berm (from +6 to +8 ft, approximately) and high dune (at +25 ft NGVD). Therefore, it is assumed that if any of the trigger conditions above is met, proactive breach response would consist of restoring the CPF template as opposed to the standard PBCP template.

3.5 (SB-1A) Hampton Beach

Hampton Beach extends nearly 3 miles (16,800 ft) from just west of Sedge Island to Quantuck Bay. The beach and dunes along this reach are relatively stable and robust, particularly along the western half of this reach. The dunes are generally high (over 20 ft) and wide (150 to 200 ft at the base and 100 ft at the +18 ft contour). Minimum barrier island width is approximately 700 ft. This stability is at least partly due to the positive influence of the Westhampton groin field (the easternmost groin is located approximately 1 mile downdrift from Hampton Beach). Similarly to the Great Gun and Moriches Inlet West reaches, Hampton Beach was not considered a breach vulnerable location as part of the modeling work and overwash/breaching risks have not been specifically quantified in this area. Hurricane Sandy only resulted in some limited overwash at the western end of this reach, closer to Sedge Island.

3.5.1 Proposed PBRP Triggers

The following PBRP triggers are proposed for this reach although, as explained above it is not necessarily expected these threshold conditions will be met.

1. 200 ft (contiguous) of barrier island less than 600 ft wide between bay and ocean MHW contours
2. 2,000 ft (total) of barrier island with less than 50 ft across above a minimum elevation +10 ft

3. 100 ft (contiguous) of barrier island with less than 50 ft across above a minimum elevation +10 ft and 100 ft of beach width measured from the baseline to MHW
4. 8,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 1,000 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.6 (SB-1B) Sedge Island

This reach extends approximately 10,200 ft from the eastern end of Hampton Beach (Village of Quogue) to Tiana Beach. Barrier island width in this reach ranges from 700 to over 2,000 ft and although the beach and dunes are for the most part relatively robust (no significant overwash or breaching was observed during Hurricane Sandy) modeling analysis had been previously performed in this area to investigate breaching vulnerability. The results are summarized in Table 4 and, as expected based on the barrier island condition, show that the risk of breaching and even overwash is relatively low.

Table 4. Overwash and Breaching Risk (Return Period) Potential at Sedge Island

	BLC	FVC	Breach Closed
Overwash	25	4	4
Partial Breaching	251	48	66
Full Breaching	> 500	> 291	> 291

3.6.1 Proposed PBRP Triggers

The following PBRP triggers are proposed for the Sedge Island reach:

1. 200 ft (contiguous) of barrier island less than 500 ft wide between MHW lines
2. 2,000 ft (total) of barrier island with less than 100 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 100 ft across above a minimum elevation +10 ft and less than 150 ft of beach width measured from the baseline to MHW
4. 6,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 500 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.7 (SB-1C) Tiana Beach

The Tiana Beach reach extends approximately 3,400 ft from the western end of the Sedge Island reach to the Town of Southampton's Tiana Bayside recreation facilities. The barrier

island is between 500 and 1,000 wide. This reach has suffered significant erosion in recent history and as a result it has been vulnerable to overwash as evidenced by the impacts of Hurricane Sandy in this area. Modeling results suggested frequent overwash in this area (4 to 7 year storm) and partial breaching between a 44 and a 72 year storm, depending on the condition of the barrier island (Table 5).

Table 5. Overwash and Breaching Risk (Return Period) Potential at Tiana Beach

	BLC	FVC	Breach Closed
Overwash	7	4	4
Partial Breaching	72	30	44
Full Breaching	> 336	> 266	> 264

3.7.1 Proposed PBRP Triggers

Similarly, to the approach at SPCP East and Sedge Island, also relatively vulnerable reaches, and based on the modeling results, the following thresholds are proposed as representative of a breach vulnerable condition that would require a proactive breach response.

1. 200 ft (contiguous) of barrier island less than 400 ft wide between MHW lines
2. 2,000 ft (total) of barrier island with less than 100 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 100 ft across above a minimum elevation +10 ft and less than 150 ft of beach width measured from the baseline to MHW
4. 2,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 500 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.8 (SB-1D) Shinnecock Park West (SPW)

This reach and extends approximately 6,300 ft from the Town of Southampton's Tiana Bayside recreation facilities to the east toward Shinnecock Inlet along Shinnecock County Park West. The barrier island is between 700 and 2,000 ft wide. This reach is undeveloped and, similarly to Tiana Beach, has suffered significant erosion since the opening of Shinnecock Inlet in 1938. LIDAR 2000 data shows that the dune was low and relatively weak in the western half of this reach, between the area in front of Lanes Island and the Tiana Bayside recreation facilities. Post-storm aerial photography and LIDAR elevation data show that this area was heavily impacted by overwash during Hurricane Sandy. Although no breach was formed, overwash sand deposits extended across the barrier and into Shinnecock Bay. Overwash was also observed through a narrow gap in the dune system at Road L near the eastern end of this reach.

3.8.1 Proposed PBRP Triggers

SPW was not specifically considered a breach vulnerable location as part of the modeling work and overwash/breaching risks have not been specifically quantified in this area. However, these risks are expected to be lower under similar beach/dune conditions than at Tiana Beach based on the generally wider barrier island and the presence of Lanes Island, which effectively increases the total width of the barrier in this reach. The following PBRP triggers are proposed for the SPW reach:

1. 200 ft (contiguous) of barrier island less than 600 ft wide between MHW lines
2. 2,000 ft (total) of barrier island with less than 50 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 50 ft across above a minimum elevation +10 ft and less than 100 ft of beach width measured from the baseline to MHW
4. 3,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 500 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.9 (SB-2A) Ponquogue

This reach extends approximately 5,300 feet along the most stable section of the barrier island within Shinnecock County Park West. In fact, shoreline position data shows that this area, after a few decades of erosion following the opening of Shinnecock Inlet, has been relatively stable and even accretional since the 1970's. This stability has led to the formation of relatively robust beach and dune system that largely prevented any significant overwash impacts during Hurricane Sandy, except for a small overwash through the narrow gap on the dune at Road K, which did not extend north of Dune Road. Similarly to other relatively robust sections of barrier island in the Study area, this reach was not considered a breach vulnerable location as part of the modeling work and overwash/breaching risks have not been specifically quantified in this area.

3.9.1 Proposed PBRP Triggers

As explained above, this reach has been particularly robust in recent history and would not be expected to breach under existing conditions. A need for proactive breach response does not appear likely either. Therefore, the following PBRP triggers are proposed although it is not necessarily expected these threshold conditions will be met.

1. 200 ft (contiguous) of barrier island less than 600 ft wide between bay and ocean MHW contours
2. 2,000 ft (total) of barrier island with less than 50 ft across above a minimum elevation +10 ft

3. 100 ft (contiguous) of barrier island with less than 50 ft across above a minimum elevation +10 ft and 100 ft of beach width measured from the baseline to MHW
4. 3,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 1,000 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.10 SB-2B: West of Shinnecock (WOSI)

This reach extends approximately 3,900 ft from Ponquogue Beach to Shinnecock Inlet. The presence and historic evolution of the inlet since it was opened by the 1938 Hurricane has strongly influenced adjacent shoreline conditions, particularly in this reach. The net erosion rate (i.e., after accounting for fill placement) in this area is approximately 25 ft/yr. The barrier island is also very narrow, less than 400 during eroded beach conditions. Therefore, this was an area of special concern during the assessment of areas vulnerable to breaching as part of the FIMP Study and although it did not breach during Hurricane Sandy, there was significant overwash extending all the way to Shinnecock Bay. Overwash and breaching risks for various barrier island conditions are summarized in Table 6 below. The analysis shows that under Future Vulnerable Conditions, with a low dune (less than +12 ft NGVD) and a narrow beach and barrier island cross-section (less than 300 ft) WOSI would be extremely vulnerable to breaching.

Table 6. Overwash and Breaching Risk (Return Period) Potential at WOSI

	BLC	FVC	Breach Closed
Overwash	18	4	5 - 18
Partial Breaching	74	8	18 - 60
Full Breaching	> 326	> 25	> 60

3.10.1 Proposed PBRP Triggers

Proposed proactive response threshold conditions at WOSI consider the relatively high sensitivity of breaching risk to barrier island width at this location.

1. 100 ft (contiguous) of barrier island less than 350 ft wide between MHW lines
2. 2,000 ft (total) of barrier island with less than 100 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 100 ft across above a minimum elevation +10 ft and less than 150 ft of beach width measured from the baseline to MHW
4. 2,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW

5. 300 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

3.11 (SB-2C) Shinnecock Inlet – East & (SB-3A) Southampton Beach

These two reaches are located east of Shinnecock Inlet and extend approximately 9,800 ft and 9,200 ft, respectively from the eastern jetty at Shinnecock Inlet. Barrier island width from shoreline to shoreline varies between 800 ft and over 1,800 ft. They are the easternmost section of barrier island along the south shore of Long Island. Historic accretion has made this reach one of the most stable segments of barrier island in the FIMP study area. Specifically, the east jetty at Shinnecock Inlet has impounded a significant amount of sediment to the east. In 2001, the shoreline was over 600 feet seaward of the 1933 shoreline having accreted at rate of close to 10 ft/yr. This accretion fillet is approximately 2 miles long, or about 55% of the total length of these two reaches combined.

Sediment budget analysis indicates relative stability and although erosion waves may impact this reach, the existing dune system is very robust and the barrier is relatively wide, so weakening sufficient to make this reach vulnerable to breaching and to have an effect on water levels seems very unlikely.

3.11.1 Proposed PBRP Triggers

The following PBRP triggers are proposed for this reach although, as explained above it is not expected these threshold conditions will be met.

1. 200 ft (contiguous) of barrier island less than 600 ft wide between bay and ocean MHW contours
2. 2,000 ft (total) of barrier island with less than 50 ft across above a minimum elevation +10 ft
3. 100 ft (contiguous) of barrier island with less than 50 ft across above a minimum elevation +10 ft and 100 ft of beach width measured from the baseline to MHW
4. 10,000 ft (total) of barrier island with less than 100 ft of beach width measured from the baseline to MHW
5. 1,000 ft (contiguous) of barrier island with less than 100 ft of beach width measured from the baseline to MHW.

4.0 SUMMARY OF PROACTIVE BREACH RESPONSE TRIGGERS

Summarizes the PBRP triggers recommended above for all the reaches where a Proactive Breach Response is being considered.

Table 7. Summary of Proposed Proactive Breach Response Triggers

Reach			Barrier Island Width		Area Above +10 ft NGVD					Beach Width			
			Contiguous		Total		Contiguous			Total		Contiguous	
ID	Name	Length (ft)	Length	Width	Length	Width	Length	Width	Beach Width	Length	Width	Length	Width
GSB-1B	Fire Island Lighthouse (FILT)	6,700	200	1,000	2,000	50	100	50	100	3,000	100	1,000	100
MB-1B	Smith Point County Park (SPCP) East	13,500	200	400	2,000	100	100	100	150	6,000	150	500	100
MB-2A	Great Gun	7,600	200	400	2,000	100	100	100	150	4,000	150	500	100
MB-2B	Moriches Inlet - West	6,200	200	1,200	2,000	50	100	50	100	3,000	100	1,000	100
SB-1A	Hampton Beach	16,800	200	600	2,000	50	100	50	100	8,000	100	1,000	100
SB-1B	Sedge Island	12,200	200	500	2,000	100	100	100	150	6,000	100	500	100
SB-1C	Tiana Beach	3,400	200	400	2,000	100	100	100	150	2,000	100	500	100
SB-1D	Shinnecock Park West (SPW)	6,300	200	600	2,000	50	100	50	100	3,000	100	500	100
SB-2A	Ponquogue	5,300	200	600	2,000	50	100	50	100	3,000	100	1,000	100
SB-2B	West of Shinnecock (WOSI)	3,900	100	350	2,000	100	100	100	150	2,000	100	300	100
SB-2C	Shinnecock Inlet - East	9,800	200	800	2,000	50	100	50	100	5,000	100	1,000	100
SB-3A	Southampton Beach	9,200	200	600	2,000	50	100	50	100	5,000	100	1,000	100

5.0 REFERENCES

U.S. Army Corps of Engineers, New York District (USACE-NAN), 2009. “Draft Formulation Report”, U.S. Army Corps of Engineers, New York District.

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