DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

- Eroded Volume (m$^3$/m, above +3-m NGVD)
- Vertical Erosion of Dune Crest (m)

Return Period (yrs)

Reach EFII 15/9.5/120

Mean
+/- 1 SD
90% Confidence band
Landward Translation of Dune Crest (m)

Reach EFII 15/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)
Reach EFII 15/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Vertical Erosion of Dune Crest (m)

Return Period (yrs)
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)
Max NS Wave Height (m, at landside surf zone)

Active Profile Distance (m, from 0 NGVD)

Reach EFII 15/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band
3-m NGVD Contour Recession (m) vs Return Period (yrs)

Reach EFI 15/9.5/130
Mean
+/- 1 SD
90% Confidence band

4.6-m NGVD Contour Recession (m) vs Return Period (yrs)

Reach EFI 15/9.5/130
Mean
+/- 1 SD
90% Confidence band
Landward Translation of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Reach EFI 15/9.5/170
Mean
+/- 1 SD
90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach EFI 15/9.5/170
Mean
+/- 1 SD
90% Confidence band

Return Period (yrs)
Reach EFII 15/9.5/170

Mean
+/− 1 SD
90% Confidence band

0-m NGVD Contour Recession (m)

Return Period (yrs)

1.5-m NGVD Contour Recession (m)
Erosion Distance (m, from 0 NGVD)

Eroded Volume (m$^3$/m, above 0 NGVD)

Return Period (yrs)

Reach ERII 17/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

The graphs represent the erosional volume and vertical erosion of dune crest for Reach EFII 17/9.5/120. The plots show the mean erosion, standard deviation, and 90% confidence band over different return periods (in years). The erosional volume is measured in m$^3$/m, above +3-m NGVD, while the vertical erosion is measured in meters. The graphs illustrate the impact of storm-induced beach erosion on dune stability over varying return periods.
Landward Translation of Dune Crest (m)

Reach EFII 17/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

Maximum Runup Elevation (m, NGVD)

Reach EFII 17/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band
Reach EFII 17/9.5/120

Max NS Wave Height (m, at landside surf zone)

- Mean
- +/- 1 SD
- 90% Confidence band

Active Profile Distance (m, from 0 NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Return Period (yrs)

3-m NGVD Contour Recession (m)

Reach EFI 17/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

4.6-m NGVD Contour Recession (m)

Reach EFI 17/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band
Erosion Distance (m, from 0 NGVD)

Eroded Volume (m$^3$/m, above 0 NGVD)

Return Period (yrs)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

Vertical Erosion of Dune Crest (m) vs. Return Period (yrs)

Eroded Volume m$^3$/m, above +3-m NGVD

Reach EFII 17/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band
Reach EFII 17/9.5/150
Mean
+/− 1 SD
90% Confidence band

Return Period (yrs)

0-m NGVD Contour Recession (m)

1.5-m NGVD Contour Recession (m)
Erosion Distance (m, from 0 NGVD)

Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Max. Wave Setup Magnitude (m, above SWL)

Reach EFI 19/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

Max. NS Wave Crest Elevation (m, NGVD)

Reach EFI 19/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band
3-m NGVD Contour Recession (m)

Reach EFII 19/9.5/120
Mean
+/- 1 SD
90% Confidence band

Return Period (yrs)

4.6-m NGVD Contour Recession (m)

Reach EFII 19/9.5/120
Mean
+/- 1 SD
90% Confidence band
Vertical Erosion of Dune Crest (m)

Return Period (yrs)

Eroded Volume m$^3$/m, above +3-m NGVD

Reach EFII 19/9.5/130

- Mean
- +/- 1 SD
- 90% Confidence band
Landward Translation of Dune Crest (m)

Reach EFII 19/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

Return Period (yrs)
A2-79
### Max. Wave Setup Magnitude (m, above SWL)

#### Reach EFII 19/9.5/150
- **Mean**
- +/- 1 SD
- 90% Confidence band

### Max. NS Wave Crest Elevation (m, NGVD)

#### Reach EFII 19/9.5/150
- **Mean**
- +/- 1 SD
- 90% Confidence band

**Return Period (yrs)**
### Eroded Volume $m^3/m$, above +3-m NGVD

**Reach GSB 15/9.5/60**
- **Mean**
- $\pm 1\text{ SD}$
- **90% Confidence band**

### Vertical Erosion of Dune Crest (m)

**Reach GSB 15/9.5/60**
- **Mean**
- $\pm 1\text{ SD}$
- **90% Confidence band**

**Return Period (yrs)**
Vertical Erosion of Dune Crest (m) vs. Return Period (yrs)

Eroded Volume m$^3$/m, above +3-m NGVD

Reach GSB 15/9.5/90
Mean
+/− 1 SD
90% Confidence band

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

A2-106
Max. Wave Setup Magnitude (m, above SWL)

Max. NS Wave Crest Elevation (m, NGVD)

Return Period (yrs)

Reach GSB 15/9.5/90
- Mean
- +/- 1 SD
- 90% Confidence band
Max NS Wave Height (m, at landside surf zone)

Active Profile Distance (m, from 0 NGVD)

Return Period (yrs)
Landward Translation of Dune Crest (m)

Maximum Runup Elevation (m, NGVD)

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SML)

Reach GSB 15/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach GSB 15/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band
Erosion Distance (m, from 0 NGVD)

Reach GSB 15/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band

Eroded Volume (m$^3$/m, above 0 NGVD)

Reach GSB 15/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band
Eroded Volume $m^3/m$, above +3-m NGVD

Vertical Erosion of Dune Crest (m)

Return Period (yrs)
Landward Translation of Dune Crest (m)

Reach GSB 15/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

Reach GSB 15/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Reach GSB 15/9.5/130
Mean
+/- 1 SD
90% Confidence band

Max NS Wave Height (m, at landside surf zone)

Return Period (yrs)

Active Profile Distance (m, from 0 NGVD)

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Reach GSB 15/9.5/150

Mean
-/+ 1 SD
90% Confidence band

Erosion Distance (m, from 0 NGVD)

Eroded Volume (m$^3$/m, above 0 NGVD)

Return Period (yrs)
Eroded Volume m\(^3\)/m, above +3-m NGVD

Mean

+/−1 SD

90% Confidence band

Vertical Erosion of Dune Crest (m)

Return Period (yrs)

Reach GSB 15/9.5/150

Mean

+/−1 SD

90% Confidence band
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Reach GSB 15/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach GSB 15/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Erosion Distance (m, from 0 NGVD)

Reach GSB 17/9.5/120

Mean

+/- 1 SD

90% Confidence band

Eroded Volume (m$^3$/m, above 0 NGVD)

Reach GSB 17/9.5/120

Mean

+/- 1 SD

90% Confidence band
Erosion Distance (m, from 0 NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Eroded Volume (m$^3$/m, above 0 NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Vertical Erosion of Dune Crest (m)

Reach GSB 17/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band

Eroded Volume m³/m, above +3-m NGVD

Return Period (yrs)
Vertical Erosion of Dune Crest (m)

Eroded Volume m³/m, above +3-m NGVD

Reach GSB 17/9.5/170

Mean
+/- 1 SD
90% Confidence band

Return Period (yrs)
Max NS Wave Height (m, at landside surf zone)

Reach GSB 17/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Active Profile Distance (m, from 0 NGVD)

Reach GSB 17/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band
Reach GSB 17/9.5/170

0-m NGVD Contour Recession (m)

Return Period (yrs)

Mean

+/- 1 SD

90% Confidence band

1.5-m NGVD Contour Recession (m)
Reach GSB 19/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

Erosion Distance (m, from 0 NGVD)
Eroded Volume (m$^3$/m, above 0 NGVD)

Return Period (yrs)
**Eroded Volume m$^3$/m, above +3-m NGVD**

Reach GSB 19/9.5/120

- **Mean**
- **+/- 1 SD**
- **90% Confidence band**

**Vertical Erosion of Dune Crest (m)**

Reach GSB 19/9.5/120

- **Mean**
- **+/- 1 SD**
- **90% Confidence band**
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

**Eroded Volume m$^3$/m, above +3-m NGVD**

- **Mean**
- **+/- 1 SD**
- **90% Confidence band**

**Vertical Erosion of Dune Crest (m)**

- **Mean**
- **+/- 1 SD**
- **90% Confidence band**

**Return Period (yrs)**
Reach GSB 19/9.5/130

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

0-m NGVD Contour Recession (m)

1.5-m NGVD Contour Recession (m)
Vertical Erosion of Dune Crest (m)

Eroded Volume m$^3$/m, above +3-m NGVD

Reach GSB 19/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Landward Translation of Dune Crest (m)

Maximum Runup Elevation (m, NGVD)

Return Period (yrs)

Reach GSB 19/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

### Max. Wave Setup Magnitude (m, above SWL)

- **Reach GSB 19/9.5/150**
  - Mean
  - +/- 1 SD
  - 90% Confidence band

### Max. NS Wave Crest Elevation (m, NGVD)

- **Reach GSB 19/9.5/150**
  - Mean
  - +/- 1 SD
  - 90% Confidence band

Return Period (yrs)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Return Period (yrs)

Erosion Distance (m, from 0 NGVD)

Eroded Volume (m$^3$/m, above 0 NGVD)

Reach GSB 19/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Maximum Runup Height (m, above SWL)

Reach GSB 19/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

Maximum Wave Setup Elevation (m, NGVD)

Reach GSB 19/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Reach GSB-44BW

- Mean
- +/- 1 SD
- 90% Confidence band

Erosion Distance (m, from 0 NGVD)

- Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)
Eroded Volume $m^3/m$, above +3.5-m NGVD

Reach GSB-44BW

Mean

$\pm$ 1 SD

90% Confidence band

Vertical Erosion of Dune Crest (m)

Return Period (yrs)
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)

Return Period (yrs)
Reach GSB-73BW

Mean

+/− 1 SD

90% Confidence band

Eroded Volume $m^3/m$, above +3.5-m NGVD

Return Period (yrs)

Vertical Erosion of Dune Crest (m)

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Landward Translation of Dune Crest (m)

Reach GSB-73BW
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Reach GSB-73BW
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach GSB-73BW
- Mean
- +/- 1 SD
- 90% Confidence band
Return Period (yrs)

Eroded Volume $m^3/m^2$, above +3.5-m NGVD

Reach GSB-150BW
- Mean
- +/- 1 SD
- 90% Confidence band

Vertical Erosion of Dune Crest (m)

Return Period (yrs)
Erosion Distance (m, from 0 NGVD)

Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

Reach GSB 15/11/120
- Mean
- +/- 1 SD
- 90% Confidence band

Eroded Volume m$^3$/m, above +3.5-m NGVD

Return Period (yrs)

Reach GSB 15/11/120
- Mean
- +/- 1 SD
- 90% Confidence band

Vertical Erosion of Dune Crest (m)

Return Period (yrs)
Return Period (yrs)

0-m NGVD Contour Recession (m)

Reach GSB 15/11/120
Mean
+/- 1 SD
90% Confidence band

1.5-m NGVD Contour Recession (m)

Reach GSB 15/11/120
Mean
+/- 1 SD
90% Confidence band
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

- Eroded Volume $m^3/m$, above $+3.5\text{-m NGVD}$
- Vertical Erosion of Dune Crest (m)

Reach GSB 17/11/120
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Maximum Runup Height (m, above SWL)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

Maximum Wave Setup Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band
Erosion Distance (m, from 0 NGVD)

Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)

Reach WMI 159.5/120

- Mean
- +/- 1 SD
- 90% Confidence band
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

### Eroded Volume m³/m², above +3-m NGVD

- **Reach WMI 15/9.5/120**
  - Mean
  - +/- 1 SD
  - 90% Confidence band

### Vertical Erosion of Dune Crest (m)

- **Reach WMI 15/9.5/120**
  - Mean
  - +/- 1 SD
  - 90% Confidence band
Max. Wave Setup Magnitude (m, above SWL)

Reach WMI 15/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Return Period (yrs)
Reach WMI 15/9.5/130

- Mean
- +/- 1 SD
- 90% Confidence band

0-m NGVD Contour Recession (m)

Return Period (yrs)

Reach WMI 15/9.5/130

- Mean
- +/- 1 SD
- 90% Confidence band

1.5-m NGVD Contour Recession (m)
Landward Translation of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationshps

Max NS Wave Height (m, at landside surf zone)

Active Profile Distance (m, from 0 NGVD)

Return Period (yrs)
3-m NGVD Contour Recession (m)

Reach WMI 15/9.5/150

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

4.6-m NGVD Contour Recession (m)

Reach WMI 15/9.5/150

- Mean
- +/- 1 SD
- 90% Confidence band
Return Period (yrs)

Erosion Distance (m, from 0 NGVD)

2 10 100 500

Eroded Volume (m$^3$/m, above 0 NGVD)

2 10 100 500

Reach WMI 15/9.5/170

- Mean
- +/- 1 SD
- 90% Confidence band
Landward Translation of Dune Crest (m)

Reach WMI 15/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

Reach WMI 15/9.5/170
- Mean
- +/- 1 SD
- 90% Confidence band
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationship
Landward Translation of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Max. Wave Setup Magnitude (m, above SWL)

Reach WMI 17/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach WMI 17/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band
Max NS Wave Height (m, at landside surf zone)

Return Period (yrs)

Active Profile Distance (m, from 0 NGVD)

Reach WMI 17/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Reach WMI 17/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach WMI 17/9.5/130
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Reach WMI 17/9.5/130

Mean
+/− 1 SD
90% Confidence band
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Eroded Volume $m^3$/m, above +3-m NGVD

Return Period (yrs)

- Mean
- +/- 1 SD
- 90% Confidence band

Vertical Erosion of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band
Reach WMI 17/9.5/170

Max NS Wave Height (m, at landside surf zone)

- Mean
- +/- 1 SD
- 90% Confidence band

Active Profile Distance (m, from 0 NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Vertical Erosion of Dune Crest (m)

Return Period (yrs)

Eroded Volume m$^3$/m, above +3-m NGVD

Reach WMI 19/9.5/120

Mean
+/- 1 SD
90% Confidence band

Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

Appendix A – Engineering & Design

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY

A2-330
Max. Wave Setup Magnitude (m, above SWL)

- Mean
- +/- 1 SD
- 90% Confidence band

Reach WMI 19/9.5/120

Max. NS Wave Crest Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Reach WMI 19/9.5/120

Mean
+/- 1 SD
90% Confidence band

Return Period (yrs)

0-m NGVD Contour Recession (m)

1.5-m NGVD Contour Recession (m)
Maximum Runup Height (m, above SWL)

Return Period (yrs)

Maximum Wave Setup Elevation (m, NGVD)

Reach WMI 19/9.5/130

- Mean
- +/- 1 SD
- 90% Confidence band
Roach WMI 19/9.5/130

- Mean
- +/- 1 SD
- 90% Confidence band
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

![Graph showing erosion distance and volume vs. return period.](image)

**Erosion Distance (m, from 0 NGVD)**

**Eroded Volume (m$^3$/m, above 0 NGVD)**
Landward Translation of Dune Crest (m)

Maximum Runup Elevation (m, NGVD)

Return Period (yrs)

Reach WMI 19/9.5/150

Mean

+/− 1 SD

90% Confidence band
Return Period (yrs)

Reach WMI 19/9.5/150

- Mean
- +/- 1 SD
- 90% Confidence band

0-m NGVD Contour Recession (m)

0 2 4 6 8 10 12 14 16

1.5-m NGVD Contour Recession (m)

0 2 4 6 8 10 12 14 16

Return Period (yrs)
Return Period (yrs)

Max. Wave Setup Magnitude (m, above SWL)

Reach M&SB 15/9.5/100
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach M&SB 15/9.5/100
- Mean
- +/- 1 SD
- 90% Confidence band

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Max NS Wave Height (m, at landside surf zone)

- Mean
- +/- 1 SD
- 90% Confidence band

Active Profile Distance (m, from 0 NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationshps

**Max NS Wave Height (m, at landside surf zone)**

- **Mean**
- **+/− 1 SD**
- **90% Confidence band**

**Active Profile Distance (m, from 0 NGVD)**

- **Mean**
- **+/− 1 SD**
- **90% Confidence band**

**Return Period (yrs)**
3-m NGVD Contour Recession (m)

Return Period (yrs)

4.6-m NGVD Contour Recession (m)

Return Period (yrs)
Reach M&SB 15/9.5/150

- Mean
- +/- 1 SD
- 90% Confidence band
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
Return Period (yrs)

Erosion Distance (m, from 0 NGVD)

Eroded Volume (m$^3$/m, above 0 NGVD)

Reach M&SB 17/9.5/90

Mean

+- 1 SD

90% Confidence band

Mean

+- 1 SD

90% Confidence band
Landward Translation of Dune Crest (m)

Maximum Runup Elevation (m, NGVD)

Return Period (yrs)
Maximum Runup Height (m, above SWL)

Reach M&SB 17/9.5/100
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Wave Setup Elevation (m, NGVD)

Reach M&SB 17/9.5/100
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Max. NS Wave Crest Elevation (m, NGVD)

Reach M&SB 179.5/100
- Mean
- +/- 1 SD
- 90% Confidence band
Erosion Distance (m, from 0 NGVD)

Reach M&SB 17/9.5/120

Mean
+- 1 SD
90% Confidence band

Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)

Reach M&SB 17/9.5/120
Mean
+- 1 SD
90% Confidence band
Eroded Volume m³/m, above +3-m NGVD

- Mean
- +/- 1 SD
- 90% Confidence band

Vertical Erosion of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Maximum Runup Height (m, above SWL)

Mean

+/− 1 SD

90% Confidence band

Maximum Wave Setup Elevation (m, NGVD)

Mean

+/− 1 SD

90% Confidence band

Return Period (yrs)
Reach M&SB 17/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

3-m NGVD Contour Recession (m) vs. Return Period (yrs)

4.6-m NGVD Contour Recession (m) vs. Return Period (yrs)
Eroded Volume $m^3$/m, above +3-m NGVD

Vertical Erosion of Dune Crest (m)

Return Period (yrs)

Reach M&SB 17/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band
Maximum Runup Height (m, above SWL)

Reach M&SB 17/9.5/150

Mean

 +/- 1 SD

90% Confidence band

Return Period (yrs)

Maximum Wave Setup Elevation (m, NGVD)

Reach M&SB 17/9.5/150

Mean

 +/- 1 SD

90% Confidence band
Max. Wave Setup Magnitude (m, above SWL)

Reach M&SB 17/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach M&SB 17/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Eroded Volume $m^3/m$, above $+3\text{m NGVD}$

Return Period (yrs)

Vertical Erosion of Dune Crest (m)

Reach M&SB 19/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band
Landward Translation of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Reach M&SB 19/9.5/120

0-m NGVD Contour Recession (m)

Return Period (yrs)

Mean
+/- 1 SD
90% Confidence band

1.5-m NGVD Contour Recession (m)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

![Graphs showing storm-induced beach erosion response-frequency relationships for Reach M&SB 199.5/120. The graphs display the mean, +/- 1 SD, and 90% confidence band for 3-m NGVD contour recession and 4.6-m NGVD contour recession as a function of return period (yrs).]
Maximum Runup Height (m, above SWL)

Reach M&SB 19/9.5/90
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Wave Setup Elevation (m, NGVD)

Reach M&SB 19/9.5/90
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Max NS Wave Height (m, at landside surf zone)

Active Profile Distance (m, from 0 NGVD)

Return Period (yrs)
**Erosion Distance (m, from 0 NGVD)**

- **Reach M&SB 19/9.5/100**
  - Mean
  - +/- 1 SD
  - 90% Confidence band

**Eroded Volume (m$^3$/m, above 0 NGVD)**

- **Reach M&SB 19/9.5/100**
  - Mean
  - +/- 1 SD
  - 90% Confidence band
Vertical Erosion of Dune Crest (m)

Return Period (yrs)

Eroded Volume m³/m, above +3-m NGVD

Return Period (yrs)

Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships
A2-438
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

Return Period (yrs)

0-m NGVD Contour Recession (m)

Reach M&SB 19/9.5/100

Mean

+/- 1 SD

90% Confidence band

1.5-m NGVD Contour Recession (m)

Reach M&SB 19/9.5/100

Mean

+/- 1 SD

90% Confidence band

A2-439
Max. Wave Setup Magnitude (m, above SWL)

Reach M&SB 19/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach M&SB 19/9.5/150
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Max NS Wave Height (m, at landside surf zone)

Active Profile Distance (m, from 0 NGVD)

Return Period (yrs)
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationshps
Reach M&SB 17/11/90
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

3.5-m NGVD Contour Recession (m)

4.6-m NGVD Contour Recession (m)
Maximum Runup Height (m, above SWL)

Reach M&SB 17/11/120

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

Maximum Wave Setup Elevation (m, NGVD)

Reach M&SB 17/11/120

- Mean
- +/- 1 SD
- 90% Confidence band
Reach M&SB 17/11/120

Max NS Wave Height (m, at landside surf zone)

Active Profile Distance (m, from 0 NGVD)

Return Period (yrs)
Eroded Volume $m^3/m$, above +3.5-m NGVD

Return Period (yrs)

Vertical Erosion of Dune Crest (m)

Reach M&SB 19/11/120
- Mean
- +/- 1 SD
- 90% Confidence band
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)

Reach M&SB 19/11/120

Mean

+/- 1 SD

90% Confidence band

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Max. NS Wave Crest Elevation (m, NGVD)

Return Period (yrs)
### Vertical Erosion of Dune Crest (m)

**Reach WSI 15/9.9/90**
- **Mean**
- **+/- 1 SD**
- **90% Confidence band**

**Return Period (yrs)**

**Eroded Volume m$^3$/m, above +3-m NGVD**
- **Mean**
- **+/- 1 SD**
- **90% Confidence band**

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

A2-482
Max. Wave Setup Magnitude (m, above SWL)

<table>
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<tr>
<th>Return Period (yrs)</th>
<th>Mean</th>
<th>+/- 1 SD</th>
<th>90% Confidence band</th>
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Max. NS Wave Crest Elevation (m, NGVD)

<table>
<thead>
<tr>
<th>Return Period (yrs)</th>
<th>Mean</th>
<th>+/- 1 SD</th>
<th>90% Confidence band</th>
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<td>2</td>
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<td>500</td>
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</tbody>
</table>
DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relationships

Return Period (yrs)

Erosion Distance (m, from 0 NGVD)

Eroded Volume (m$^3$/m, above 0 NGVD)
Maximum Runup Height (m, above SWL)

Reach WSI 17/9,5/90
Mean
+/− 1 SD
90% Confidence band

Maximum Wave Setup Elevation (m, NGVD)

Reach WSI 17/9,5/90
Mean
+/− 1 SD
90% Confidence band

Return Period (yrs)
Max NS Wave Height (m, at landside surf zone)

Return Period (yrs)

Active Profile Distance (m, from 0 NGVD)
Reach WSI 17/9.5/120

Erosion Distance (m, from 0 NGVD)

Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)
Eroded Volume m$^3$/m, above +3-m NGVD

Vertical Erosion of Dune Crest (m)

Return Period (yrs)
Maximum Runup Height (m, above SWL)

- Reach WSI 17/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Wave Setup Elevation (m, NGVD)

- Reach WSI 17/9.5/120
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Reach WSI 19/9.5/120
Mean
+/- 1 SD
90% Confidence band

Erosion Distance (m, from 0 NGVD)

Return Period (yrs)

Eroded Volume (m$^3$/m, above 0 NGVD)
Reach ESI 15/9.5/90

- Mean
- +/- 1 SD
- 90% Confidence band

**Eroded Volume** $m^3/m$, above +3-m NGVD

**Vertical Erosion of Dune Crest (m)**

**Return Period (yrs)**
Landward Translation of Dune Crest (m)

Mean
+/- 1 SD
90% Confidence band

Maximum Runup Elevation (m, NGVD)

Mean
+/- 1 SD
90% Confidence band

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Maximum Runup Height (m, above SWL)

Reach ESI 17/9.5/120

Mean
+/- 1 SD
90% Confidence band

Return Period (yrs)

Maximum Wave Setup Elevation (m, NGVD)

Reach ESI 17/9.5/120

Mean
+/- 1 SD
90% Confidence band
Reach ESI 19/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

Eroded Volume m³/m² above +3-m NGVD

Return Period (yrs)

Vertical Erosion of Dune Crest (m)

DRAFT FIRE ISLAND TO MONTAUK POINT REFORMULATION STUDY
Appendix A – Engineering & Design
Sub Appendix A2: Storm-Induced Beach Erosion Response-Frequency Relations.
Max. Wave Setup Magnitude (m, above SWL)

Max. NS Wave Crest Elevation (m, NGVD)

Return Period (yrs)
Reach ESI 19/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)

0-m NGVD Contour Recession (m)

1.5-m NGVD Contour Recession (m)
Max. Wave Setup Magnitude (m, above SWL)

Reach MP 15/9.5/90
- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Reach MP 15/9.5/90
- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Landward Translation of Dune Crest (m)

Reach MP 17/9.5/90

- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

Reach MP 17/9.5/90

- Mean
- +/- 1 SD
- 90% Confidence band
2 10 100 500
0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75
3-m NGVD Contour Recession (m)

Reach MP 17/9.5/90
Mean
+/− 1 SD
90% Confidence band

Return Period (yrs)

2 10 100 500
0 5 10 15 20 25
4.6-m NGVD Contour Recession (m)

Reach MP 17/9.5/90
Mean
+/− 1 SD
90% Confidence band
Maximum Runup Height (m, above SWL)

Maximum Wave Setup Elevation (m, NGVD)

Return Period (yrs)
Landward Translation of Dune Crest (m)

- Mean
- +/- 1 SD
- 90% Confidence band

Maximum Runup Elevation (m, NGVD)

- Mean
- +/- 1 SD
- 90% Confidence band

Return Period (yrs)
Max. Wave Setup Magnitude (m, above SWL)

Reach MP 19/9.5/120

- Mean
- +/- 1 SD
- 90% Confidence band

Max. NS Wave Crest Elevation (m, NGVD)

Return Period (yrs)