

## 13 Whananaki

### Description and geomorphology

Whananaki is located approximately 28 km north of Whangarei. The site is a barrier spit shoreline that includes an open coast and barrier enclosed estuary (Whananaki Estuary). The open coast shoreline is approximately 2.2 km long. The estuary shoreline is approximately 1.9 km long.

The site has a healthy dune system which is well vegetated with spinifex along the open coast. A low foredune is developing over the northern half of the open coast shoreline indicating recent accretion (refer to Site Photograph B). The dune elevation ranges from RL 2 to 7 m.

The beach comprises fine to medium sand. The beach has a high tide berm that increases from approximately 5 m in the south to approximately 15 m in the north.

The basal end of the spit is attached to Pitokuku Point and is relatively stable. The distal end of the spit has fluctuated over time with the shoreline likely to be connected to changes to volume and position of the ebb tide delta.

The estuary shoreline appears to be relatively stable in the north with areas of erosion over the southern shoreline close to the development.

### Local considerations

There are no erosion protection structures located along the open coast. A number of tipped rock structures exist on the estuary shoreline which are generally in poor condition.

The offshore ebb tide delta has a control on the shoreline position adjacent to the entrance to the Whananaki Estuary. Large variations in shoreline position have occurred over the last 60 years. Changes to the ebb tide delta may result in relatively rapid changes to shoreline position in this area, which may vary from historic trends

### Coastal Erosion Hazard Assessment

The site is split into five cells based on differences in geomorphology, dune height and shoreline movement trends.

Adopted component values are presented within Table 13-1. Short-term erosion values range



*Site Photograph A (south)*



*Site Photograph B (north - low foredune)*



*Site Photograph C (estuary)*

from 15 to 25 m on the open beach and 2 to 6 m within the estuary. Long-term trends range from

slightly accretional on the open coast to highly erosive at the distal tip of the sand spit.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 13-1 to Figure 13-5.

Coastal Erosion Hazard Zone widths are presented within Table 13-2 and Figure 13-6. CEHZ1 values range from 13 to 45 m and CEHZ2 values from 34 to 105 m with larger values on the open coastal and unstable distal spit tip.

CEHZ's have been mapped in agreement with the calculated values. Figure 13-7 shows the available historic shorelines for Sandy Bay.

Table 13-1 Component values for Erosion Hazard Assessment

| Site  |      | 13. Whananaki |           |           |           |           |
|---|------|---------------|-----------|-----------|-----------|-----------|
| Cell  |      | 13A           | 13B       | 13C       | 13D       | 13E       |
| Cell centre (NZTM)                            | E    | 1732597       | 1732925   | 1733137   | 1732635   | 1732401   |
|   | N    | 6068754       | 6069231   | 6068951   | 6068121   | 6067243   |
| Chainage, m (from N/W)                        |      | 0-1480        | 1480-1880 | 1880-2350 | 2350-3930 | 3930-4120 |
| Morphology                                    |      | Estuary Bank  | Inlet     | Dune      | Dune      | Dune      |
| Short-term (m)                                | Min  | 2             | 10        | 15        | 15        | 15        |
|   | Mode | 4             | 15        | 20        | 20        | 20        |
|   | Max  | 6             | 20        | 25        | 25        | 25        |
| Dune/Cliff elevation (m above toe or scarp)   | Min  | 2.7           | 1.8       | 2.4       | 3.1       | 2.1       |
|   | Mode | 4.2           | 3.4       | 4.0       | 4.8       | 3.7       |
|   | Max  | 7.0           | 5.6       | 6.5       | 6.7       | 5.9       |
| Stable angle (deg)                            | Min  | 30            | 30        | 30        | 30        | 30        |
|   | Mode | 32            | 32        | 32        | 32        | 32        |
|   | Max  | 34            | 34        | 34        | 34        | 34        |
| Long-term (m)<br>-ve erosion<br>+ve accretion | Min  | 0.1           | -0.2      | -0.1      | 0.2       | 0.1       |
|   | Mode | 0             | -0.4      | -0.2      | 0.1       | 0         |
|   | Max  | -0.1          | -0.8      | -0.3      | 0         | -0.1      |
| Closure slope (beaches)                       | Min  | 0.043         | 0.043     | 0.043     | 0.043     | 0.043     |
|   | Mode | 0.043         | 0.043     | 0.022     | 0.022     | 0.022     |
|   | Max  | 0.043         | 0.043     | 0.016     | 0.016     | 0.016     |
| SLR 2065 (m)                                  | Min  | 0.19          | 0.19      | 0.19      | 0.19      | 0.19      |
|   | Mode | 0.29          | 0.29      | 0.29      | 0.29      | 0.29      |
|   | Max  | 0.39          | 0.39      | 0.39      | 0.39      | 0.39      |
| SLR 2115 (m)                                  | Min  | 0.45          | 0.45      | 0.45      | 0.45      | 0.45      |
|   | Mode | 0.77          | 0.77      | 0.77      | 0.77      | 0.77      |
|   | Max  | 1.1           | 1.1       | 1.1       | 1.1       | 1.1       |

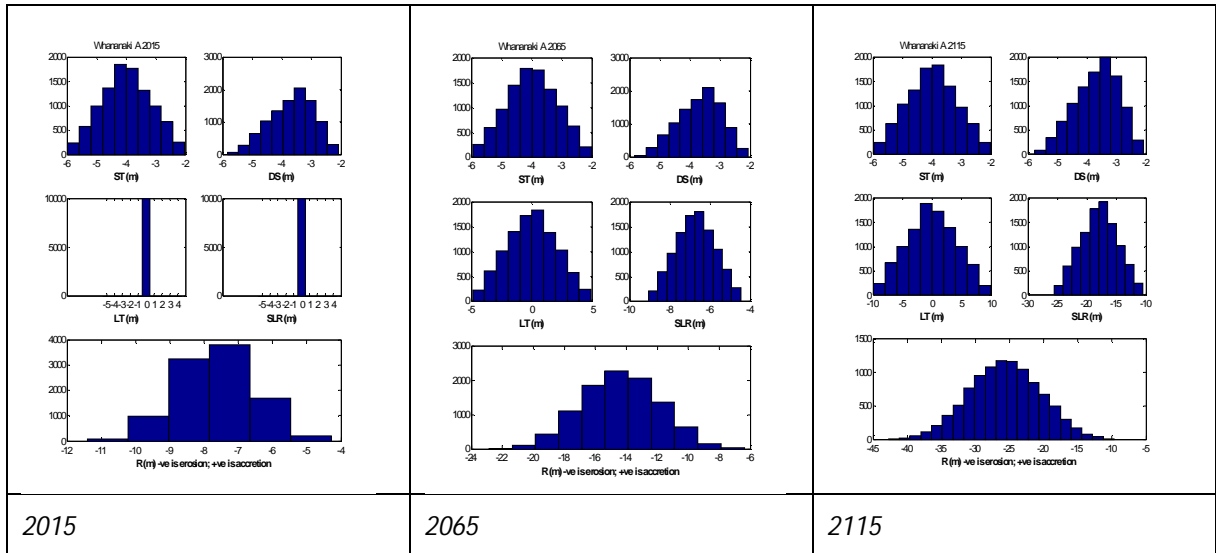


Figure 13-1 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 13A

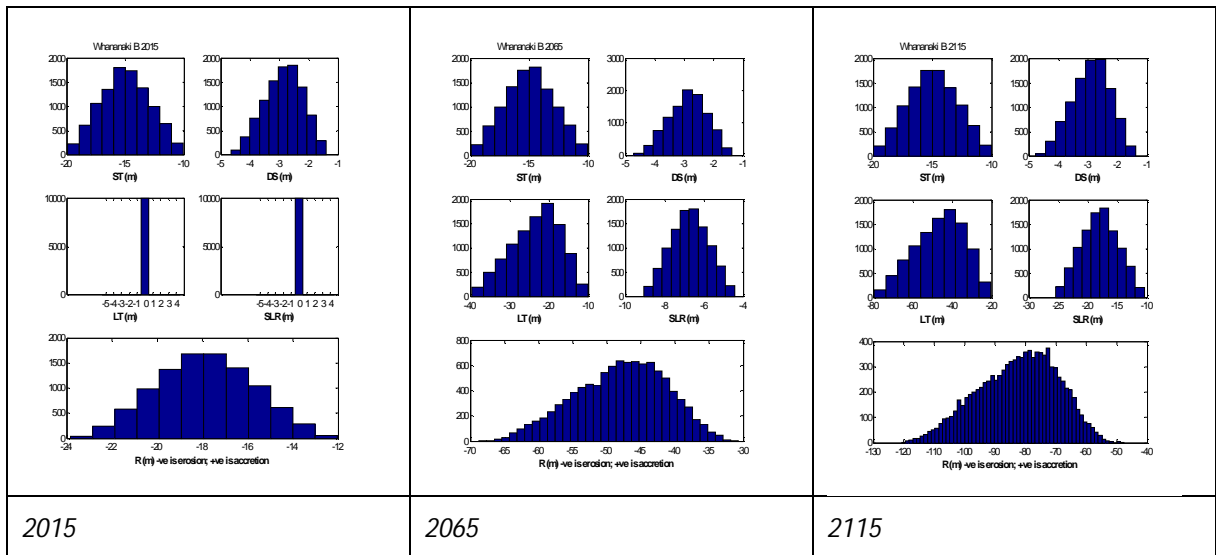


Figure 13-2 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 13B

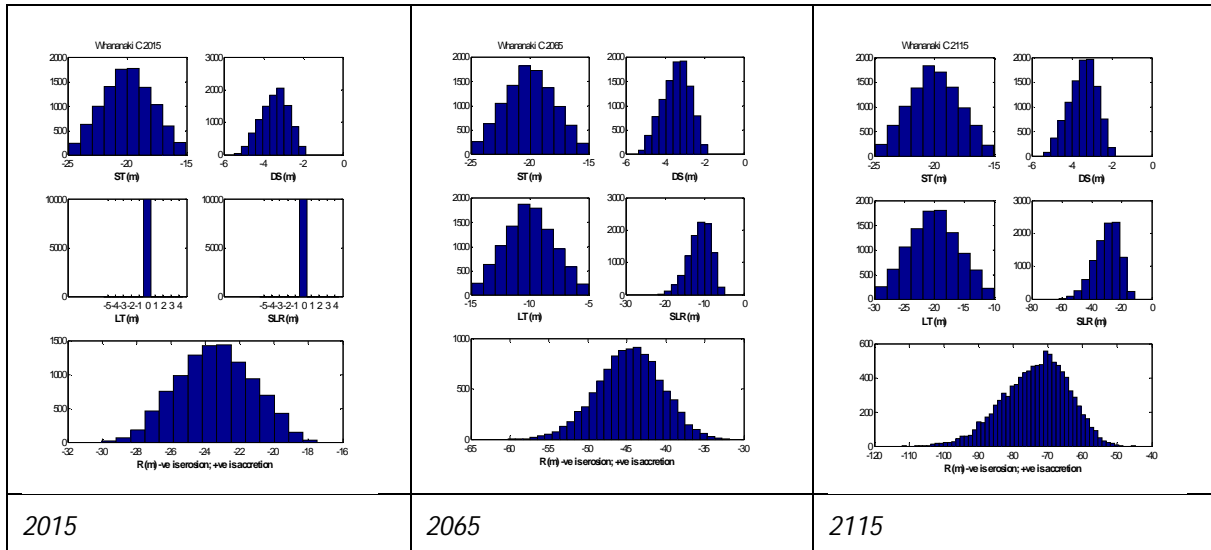


Figure 13-3 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 13C

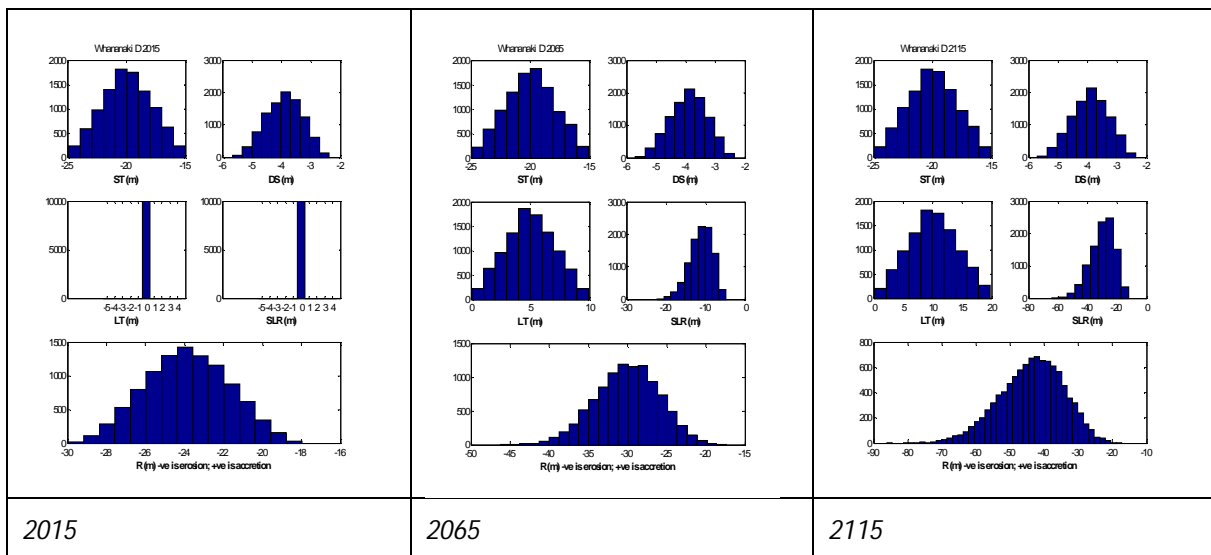


Figure 13-4 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 13D

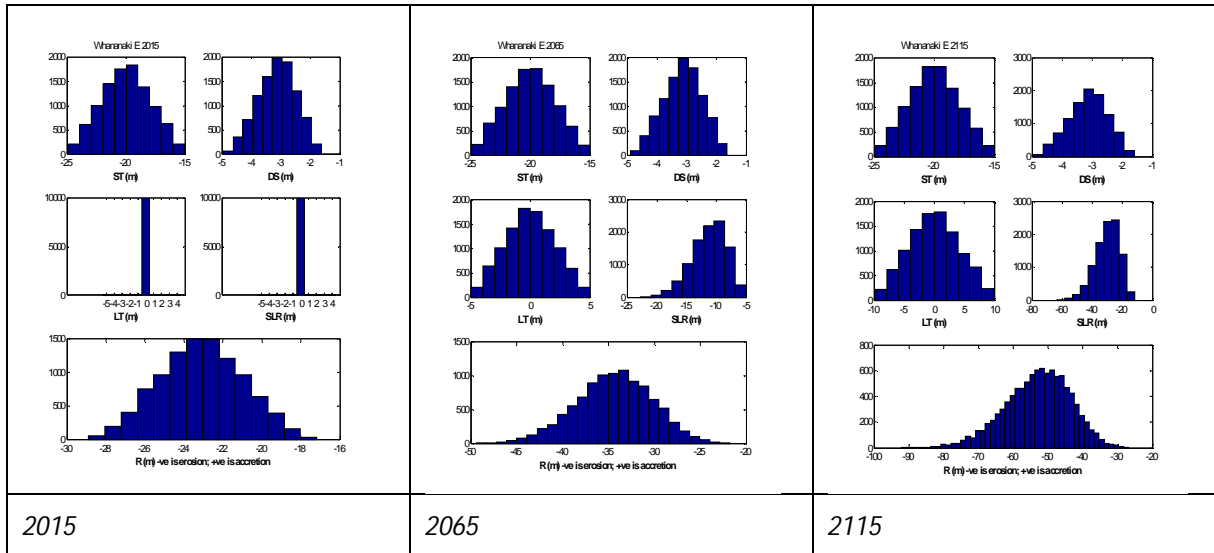


Figure 13-5 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 13E

Table 13-2 Coastal Erosion Hazard Zone Widths

| Site                               |       | 13. Whananaki |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------------------------|-------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cell                               |       | 13A           |      |      | 13B  |      |      | 13C  |      |      | 13D  |      |      | 13E  |      |      |
| Time                               |       | 2015          | 2065 | 2115 | 2015 | 2065 | 2115 | 2015 | 2065 | 2115 | 2015 | 2065 | 2115 | 2015 | 2065 | 2115 |
| Probability of CEHZ (m) Exceedance | Min   | -4            | -6   | -10  | -12  | -31  | -48  | -17  | -32  | -45  | -18  | -17  | -17  | -17  | -22  | -27  |
|                                    | 99%   | -5            | -9   | -14  | -13  | -35  | -57  | -19  | -36  | -55  | -19  | -21  | -25  | -19  | -26  | -34  |
|                                    | 95%   | -6            | -10  | -17  | -14  | -38  | -63  | -20  | -38  | -59  | -20  | -24  | -29  | -20  | -28  | -39  |
|                                    | 90%   | -6            | -11  | -19  | -15  | -40  | -66  | -21  | -39  | -62  | -21  | -25  | -32  | -20  | -29  | -42  |
|                                    | 80%   | -7            | -12  | -21  | -16  | -42  | -71  | -21  | -41  | -65  | -22  | -27  | -36  | -21  | -31  | -45  |
|                                    | 70%   | -7            | -13  | -23  | -17  | -44  | -74  | -22  | -42  | -68  | -23  | -28  | -38  | -22  | -32  | -48  |
|                                    | 66%   | -7            | -13  | -23  | -17  | -45  | -76  | -22  | -43  | -69  | -23  | -28  | -39  | -22  | -33  | -48  |
|                                    | 60%   | -7            | -14  | -24  | -17  | -46  | -78  | -23  | -44  | -70  | -23  | -29  | -41  | -23  | -33  | -50  |
|                                    | 50%   | -8            | -14  | -26  | -18  | -48  | -81  | -23  | -45  | -73  | -24  | -30  | -43  | -23  | -34  | -52  |
|                                    | 40%   | -8            | -15  | -27  | -18  | -49  | -85  | -24  | -46  | -75  | -24  | -31  | -46  | -24  | -35  | -55  |
|                                    | 33%   | -8            | -15  | -28  | -19  | -51  | -88  | -24  | -46  | -77  | -25  | -32  | -47  | -24  | -36  | -57  |
|                                    | 30%   | -8            | -16  | -29  | -19  | -51  | -89  | -25  | -47  | -78  | -25  | -32  | -48  | -24  | -37  | -58  |
|                                    | 20%   | -9            | -17  | -30  | -20  | -54  | -94  | -25  | -48  | -82  | -26  | -34  | -52  | -25  | -38  | -61  |
|                                    | 10%   | -9            | -18  | -32  | -21  | -57  | -101 | -26  | -50  | -86  | -27  | -35  | -56  | -26  | -40  | -66  |
|                                    | 5%    | -10           | -18  | -34  | -21  | -60  | -105 | -27  | -52  | -90  | -27  | -37  | -60  | -27  | -42  | -70  |
|                                    | 1%    | -10           | -20  | -37  | -22  | -63  | -113 | -28  | -55  | -97  | -29  | -40  | -68  | -28  | -45  | -77  |
|                                    | Max   | -11           | -23  | -43  | -24  | -69  | -121 | -30  | -60  | -112 | -30  | -46  | -86  | -29  | -49  | -92  |
|                                    | CEHZ1 |               | -13  |      |      | -45  |      |      | -43  |      |      | -28  |      |      | -33  |      |
| CEHZ2                              |       | -34           |      |      | -105 |      |      | -90  |      |      | -60  |      |      | -70  |      |      |



**LEGEND**

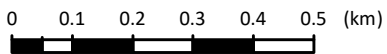
- 2013 - 2014 shoreline
- Erosion Protection Structures
- ↔ Cell Extent

**Coastal Erosion Hazard Zone**

- CEHZ0 (protected by structure)
- CEHZ1 (2065 CEHZ)
- CEHZ2 (2115 CEHZ)

Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography. Northland 0.1m Rural Aerial Photos (2014-2015).

A4 SCALE 1:12,500



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|                         |     |        |
|-------------------------|-----|--------|
| DRAWN                   | PPK | Dec.17 |
| CHECKED                 | TDS | Dec.17 |
| APPROVED                | RRH | Dec.17 |
| ARCFILE                 |     |        |
| 1001049-000-CEHZ001.mxd |     |        |
| SCALE (AT A4 SIZE)      |     |        |
| 1:12,500                |     |        |
| PROJECT No.             |     |        |
| 1001049                 |     |        |

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Coastal Erosion Hazard Assessment

Whananaki

Site: 13

FIGURE No. Figure 13-6

Rev. 2



**Legend**

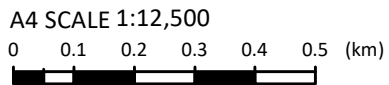
←→ Cell Extent

**Shorelines**

- 2014 baseline
- 14/01/2014
- 13/05/2008
- 06/05/1998
- 13/12/1985
- 02/05/1966
- 03/02/1959
- 30/04/1942

Source: Esri, DigitalGlobe, GeoEye, Earth  
IGN, and the GIS User Community

Notes: Dashed CEZ indicates greater uncertainty around stream mouths and backshore topography. Northland 0.1m Rural Aerial Photos (2014-2015).



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|                                   |     |        |
|-----------------------------------|-----|--------|
| DRAWN                             | PPK | Dec.17 |
| CHECKED                           | TDS | Dec.17 |
| APPROVED                          | RRH | Dec.17 |
| ARCFILE<br>HistoricShorelines.mxd |     |        |
| SCALE (AT A4 SIZE)<br>1:12,500    |     |        |
| PROJECT No.<br>1001049            |     |        |

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Historic shorelines  
Whananaki  
Site: 13

FIGURE No. Figure 13-7

Rev. 2