

9 Whangaumu Bay

Description and geomorphology

Whangaumu Bay is located on the east coast of Northland, approximately 20 km north-east of Whangarei.

The south facing shoreline forms a pocket beach embayment which is approximately 800 m long.

The site has a sandy beach comprising fine to medium sand. The beach has a minimal berm width of approximately 5 m above the high tide line. The beach is situated between two rock headlands comprising weathered Greywacke.

The native dune vegetation is sparse over the site and ice plant is the dominant species. The dune height varies from RL 2 to 14 m. The dune system is in a re-building phase with wind-blown sand accumulating at the toe of the dune, covering beach access stair rails in some places. Onshore wind-blown sand is also evident at the central beach access point, where significant volumes of sand has migrated up the access point and formed a mound on the reserve that is approximately 2 m above the adjacent ground level.

A stream enters the site approximately 200 m from the southern end of the site. The predominant sediment transport direction is in an easterly direction forcing the stream channel east. The shoreline in this area is effected by the meandering channel and some backshore erosion is evident. The backshore is relatively low lying in this area ranging from RL 2 to 5 m.

Local considerations

A 100 m long rock revetment has been constructed at either end of the site. There is also a boat ramp and storm water outlet located at the eastern end of the site which have a minimal effect on shoreline position.

The stream located near the eastern end of the site has an influence on the shoreline position. There is a greater level of uncertainty in this area because fluvial processes also effect shoreline movement. The resulting hazard zones are dashed in this area to reflect this uncertainty.



Site Photograph A (west)



Site Photograph B (centre)



Site Photograph C (east)

Coastal Erosion Hazard Assessment

The site is split into three cells based on differences in dune height and geomorphology. All cells are characterised as nonconsolidated beach type and adopted component values are presented within Table 9-1.

The beach is relatively sheltered from NE to E waves with short-term erosion values of 5 to 10 m. The beach is relatively stable with long-term rates varying between -0.2 and +0.1 m/year.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 9-1 to figure 9-3.

Coastal Erosion Hazard Zone widths are presented within Table 9-2 and Figure 9-4. CEHZ1 values range from 15 to 19 m and CEHZ2 values between 35 and 36 m. CEHZ's have been mapped in agreement with the calculated values.

The CEHZ1 and CEHZ2 for cell 9A at Whangaumu have been modified to better represent the

increase in dune height at the western end of the coastal cell. The dune elevation is approximately 5 m higher at the western end of cell 9A with respect to remaining shoreline of cell 9A. Table 9-2 has been updated accordingly to show the maximum measured CEHZ width from the coastal edge within cell 9A for both the CEHZ1 and CEHZ2. These maximum values are indicative only and do not supersede the mapped CEHZ1 and CEHZ2 lines. The updated CEHZ1 and CEHZ2 with the maximum value have been indicated with an asterisk.

Figure 9-5 shows the available historic shorelines for Whangaumu Bay.

Table 9-1 Component values for Erosion Hazard Assessment

Site		9. Whangaumu		
Cell		9A ^{2,3}	9B	9C
Cell centre (NZTM)	E	1738141	1738394	1738615
	N	6055482	6055506	6055354
Chainage, m (from N/W)		0-175	175-525	525-800
Morphology		Dune	Dune	Dune
Short-term (m)	Min	5	5	5
	Mode	7	7	7
	Max	10	10	10
Dune/Cliff elevation (m above toe or scarp)	Min	7.5	4.2	2.3
	Mode	10.6	5.3	3.1
	Max	13.5	6.5	4.8
Stable angle (deg)	Min	30	30	30
	Mode	32	32	32
	Max	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	0.1	0.1	0.1
	Mode	-0.05	0	0
	Max	-0.15	-0.1	-0.2
Closure slope (beaches)	Min	0.127	0.127	0.127
	Mode	0.084	0.084	0.084
	Max	0.079	0.079	0.079
SLR 2065 (m)	Min	0.19	0.19	0.19
	Mode	0.29	0.29	0.29
	Max	0.39	0.39	0.39

Site		9. Whangau		
Cell		9A ^{2,3}	9B	9C
SLR 2115 (m)	Min	0.45	0.45	0.45
	Mode	0.77	0.77	0.77
	Max	1.1	1.1	1.1

²CEHZO included behind coastal protection structure

³Modified from the original T+T (2014) assessment to better represent topography

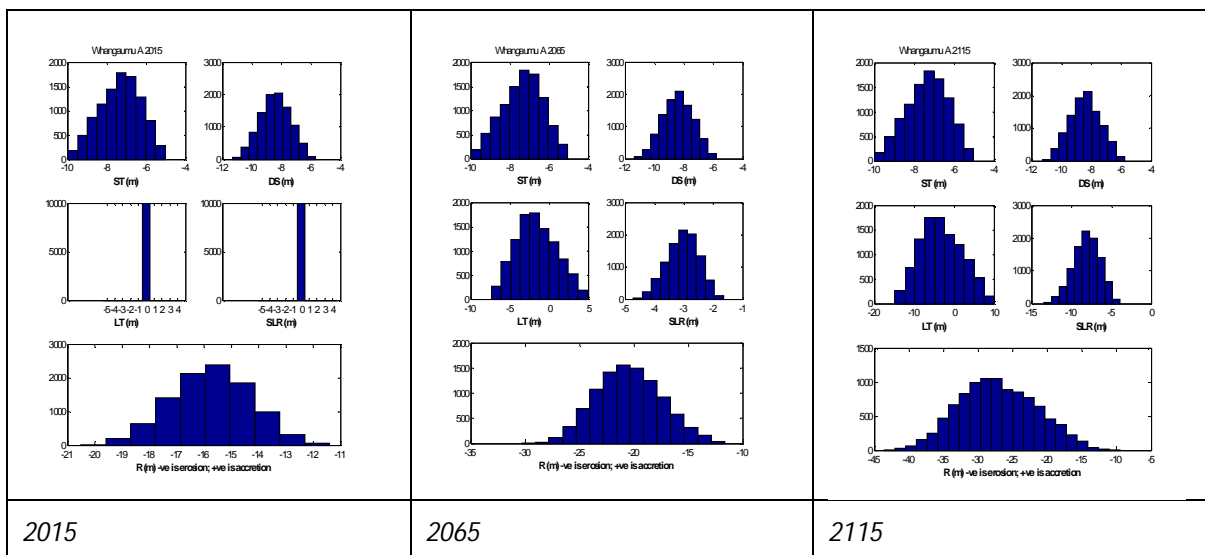


Figure 9-1 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 9A

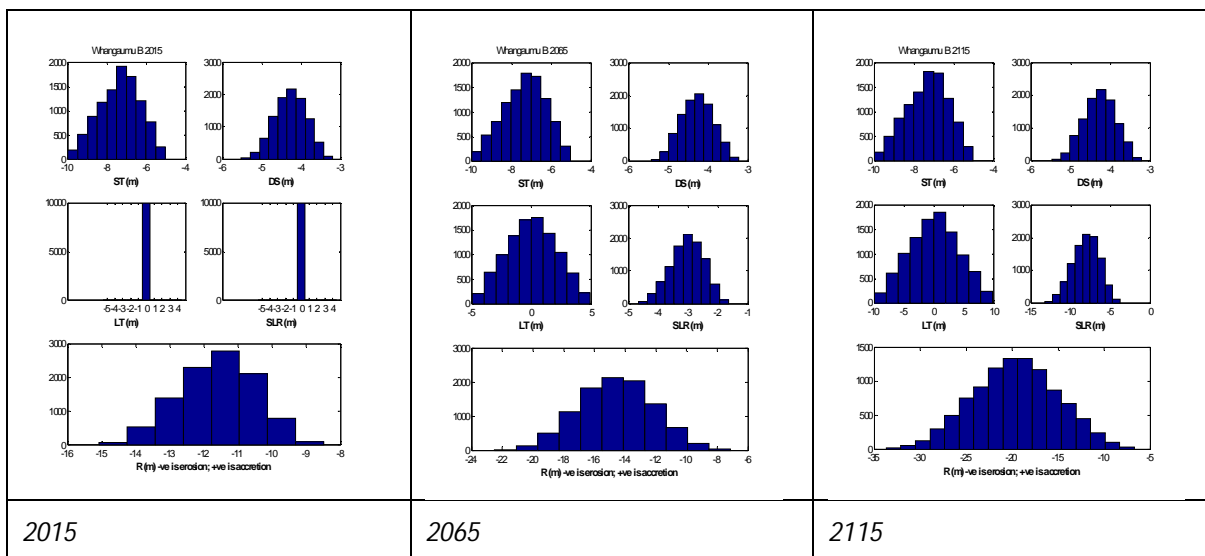


Figure 9-2 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 9B

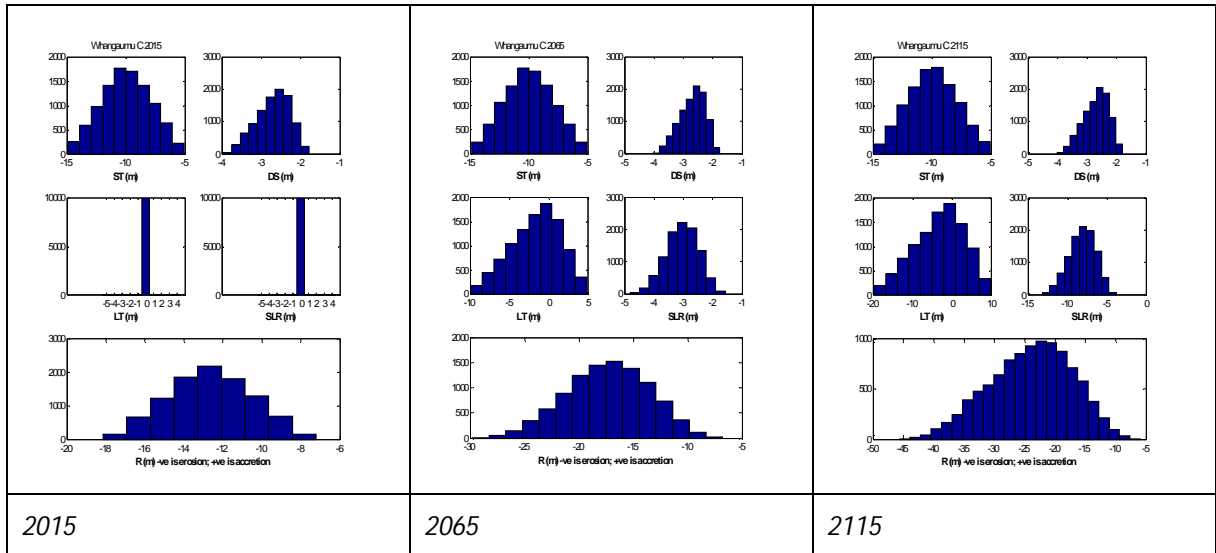


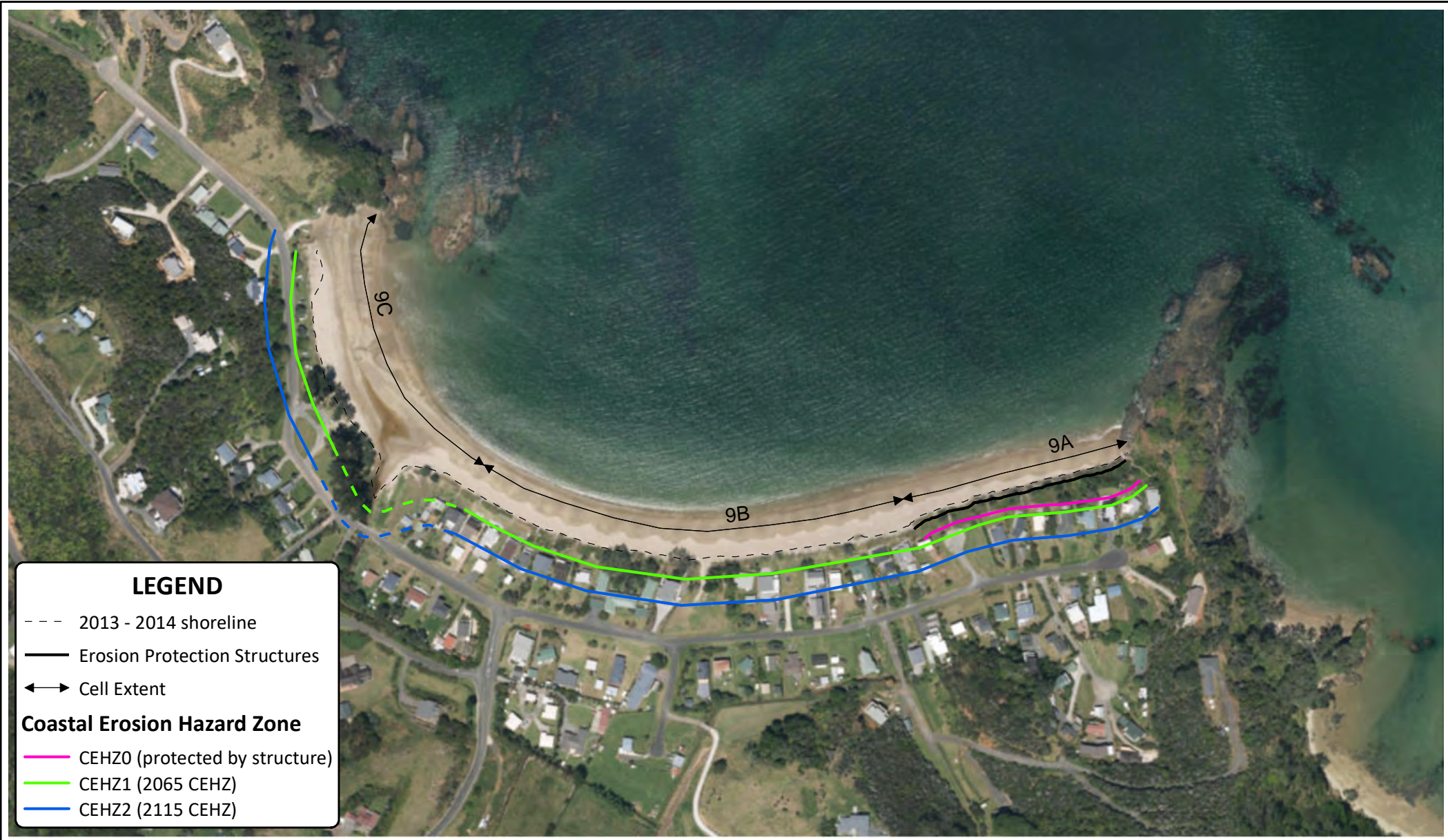
Figure 9-3 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 9C

Table 9-2 Coastal Erosion Hazard Zone Widths

Site		9. Whangaumu								
Cell		9A			9B			9C		
Time		2015	2065	2115	2015	2065	2115	2015	2065	2115
Probability of CEHZ (m) Exceedance	Min	-11	-12	-10	-8	-7	-7	-7	-7	-6
	99%	-13	-13	-15	-9	-9	-10	-8	-9	-10
	95%	-13	-15	-18	-10	-11	-12	-9	-11	-14
	90%	-14	-16	-20	-10	-11	-14	-10	-13	-15
	80%	-14	-18	-22	-11	-13	-16	-11	-14	-18
	70%	-15	-19	-24	-11	-13	-17	-11	-15	-20
	66%	-15	-19	-25	-11	-14	-18	-12	-16	-21
	60%	-15	-20	-26	-11	-14	-18	-12	-16	-22
	50%	-16	-21	-27	-12	-15	-20	-13	-17	-24
	40%	-16	-21	-29	-12	-15	-21	-13	-18	-25
	33%	-16	-22	-30	-12	-16	-22	-14	-19	-27
	30%	-17	-22	-30	-12	-16	-22	-14	-19	-27
	20%	-17	-23	-32	-13	-17	-24	-15	-21	-30
	10%	-18	-24	-34	-13	-18	-26	-15	-22	-33
	5%	-18	-25	-36	-14	-19	-27	-16	-24	-36
	1%	-19	-27	-39	-14	-20	-30	-17	-26	-40
	Max	-21	-30	-44	-15	-22	-34	-18	-30	-46
	CEHZ1	-19*			-15			-16		
CEHZ2	-36*			-35			-36			

*Modified from the original T+T (2014) assessment to better represent topography. Maximum distance has been tabulated.

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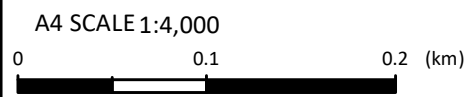
LEGEND

- 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).



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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) 1:4,000		
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 Whangauimu Bay
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FIGURE No. **Figure 9-4**

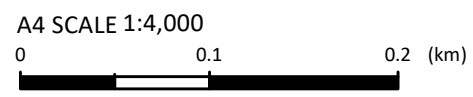
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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



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FIGURE No.	Figure 9-5	Rev.	2
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