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 affected 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 to 9-4 and Figure 9-4. CEHZ1 values have been rounded to 15 to 20 m, CEHZ2 values are rounded to 35 to 37 m and CEHZ3 values rounded to 35 and 41 m. CEHZ's have been mapped in agreement with the calculated values.

The CEHZ1-CEHZ3 for cell 9A at Whangaumu have been modified to better represent the increase in dune height at the western end of the coastal cell, with a variable dune height adopted for this 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 shows the maximum measured CEHZ width from the coastal edge within cell 9A for CEHZ1-CEHZ3. These maximum values are indicative only and do not supersede the mapped CEHZ1-CEHZ3 lines.

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 2080 (m)	RCP 2.6	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51

Site		9. Whangaumu		
Cell		9A[2,3]	9B	9C
SLR 2130 (m)	RCP 2.6	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17

[2]CEHZ0 included behind coastal protection structure
[3]Modified from the original T+T (2014) assessment to better represent topography

2020	2080	2130

Figure 9-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 9A

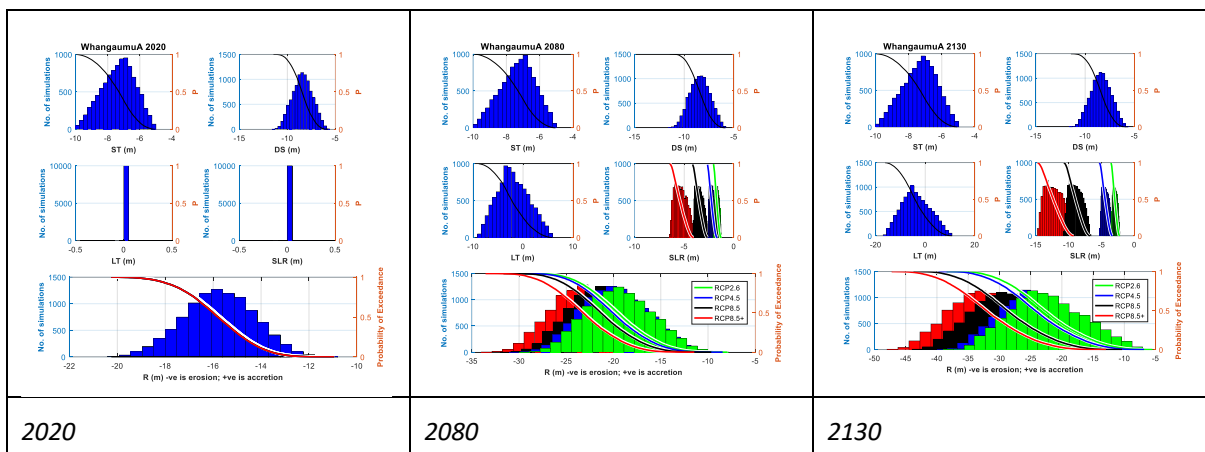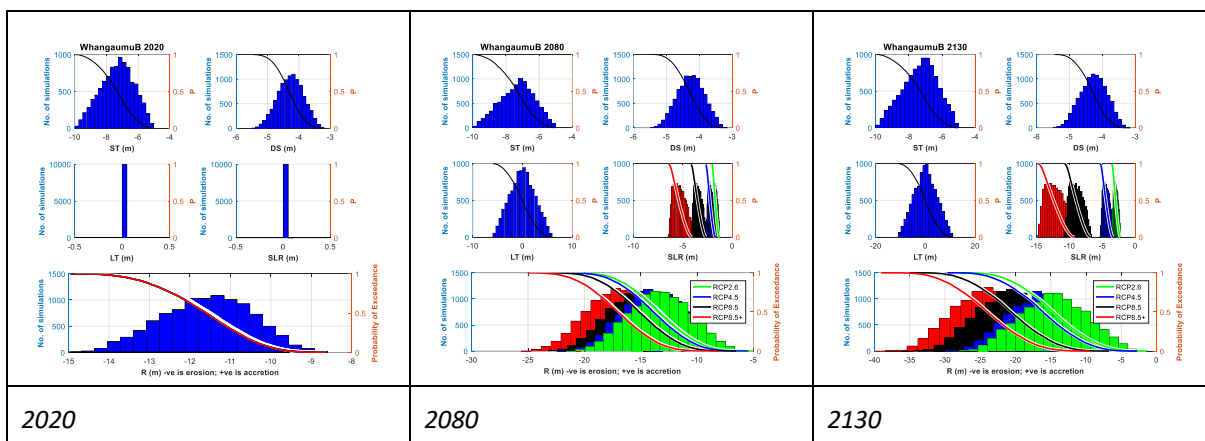| 2020	2080	2130

Figure 9-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 9B
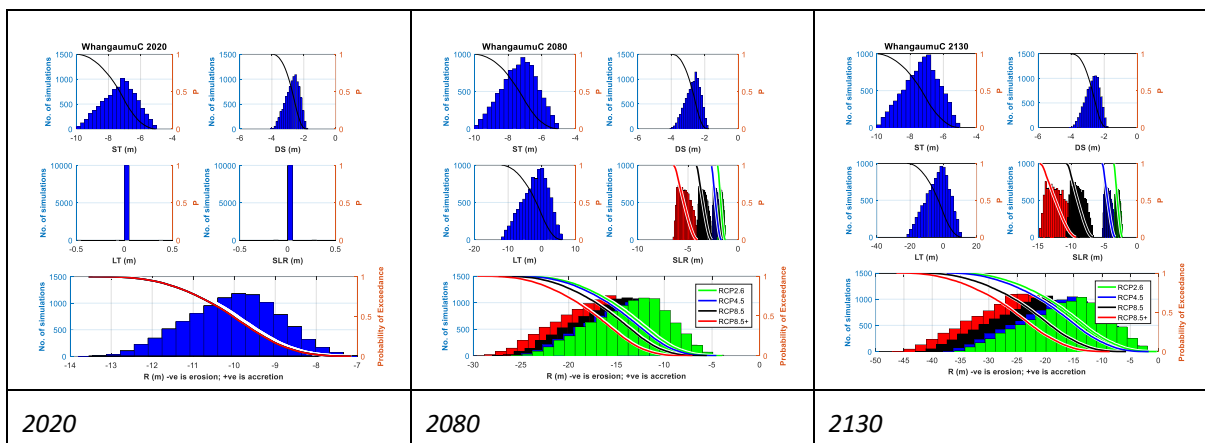
Figure 9-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 9C

Table 9-2 Coastal Erosion Hazard Zone Widths for 2020

Site		9. Whangaumu		
		A	**B**	**C**
	Min	-11	-9	-7
	99%	-13	-9	-8
	95%	-13	-10	-8
	90%	-14	-10	-9
	80%	-14	-11	-9
	70%	-15	-11	-9
	66%	-15	-11	-10
	60%	-15	-11	-10
	50%	-16	-12	-10
	40%	-16	-12	-10
	33%	-16	-12	-11
	30%	-17	-12	-11
	20%	-17	-13	-11
	10%	-18	-13	-12
	5%	-18	-13	-12
	1%	-19	-14	-13
	Max	-21	-15	-14

(Left column header, rotated: **Probability of CEHZ (m) Exceedance**)

Table 9-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		9. Whangaumu												
Cell		9A				9B				9C			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-8	-8	-10	-11	-5	-5	-7	-8	-4	-5	-6	-7
	99%	-11	-12	-13	-15	-7	-8	-9	-11	-6	-7	-8	-10
	95%	-14	-14	-15	-17	-9	-9	-11	-12	-8	-8	-10	-11
	90%	-15	-15	-17	-18	-10	-10	-11	-13	-9	-9	-11	-12
	80%	-16	-17	-18	-20	-11	-11	-13	-14	-10	-11	-12	-14
	70%	-18	-18	-19	-21	-12	-12	-14	-15	-11	-12	-13	-15
	66%	-18	-19	-20	-22	-12	-13	-14	-16	-12	-12	-13	-15
	60%	-19	-19	-20	-22	-13	-13	-14	-16	-12	-13	-14	-16
	50%	-19	-20	-21	-23	-13	-14	-15	-17	-13	-14	-15	-17
	40%	-20	-21	-22	-24	-14	-15	-16	-18	-15	-15	-16	-18
	33%	-21	-22	-23	-25	-15	-15	-16	-18	-15	-16	-17	-19
	30%	-21	-22	-23	-25	-15	-15	-17	-19	-16	-16	-18	-19
	20%	-22	-23	-24	-26	-16	-16	-18	-19	-17	-18	-19	-21
	10%	-24	-24	-26	-28	-17	-17	-19	-21	-19	-20	-21	-23
	5%	-25	-25	-27	-29	-18	-18	-20	-22	-21	-21	-23	-24
	1%	-27	-27	-28	-30	-19	-20	-21	-23	-23	-23	-25	-27
	Max	-30	-30	-32	-34	-21	-22	-23	-25	-25	-26	-27	-30
	CEHZ1	-20				-15				-15			

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

Table 9-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		9. Whangaumu										
Cell		9A				9B				9C			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-6	-7	-10	-13	-1	-3	-7	-10	0	-2	-6	-9
	99%	-9	-11	-15	-18	-5	-6	-10	-13	-4	-5	-9	-12
	95%	-12	-14	-18	-21	-7	-8	-13	-16	-6	-8	-12	-15
	90%	-14	-16	-20	-24	-8	-10	-14	-18	-8	-9	-14	-17
	80%	-17	-19	-23	-26	-10	-12	-16	-20	-11	-12	-16	-20
	70%	-19	-21	-25	-29	-12	-13	-18	-21	-12	-14	-18	-22
	66%	-20	-22	-26	-29	-13	-14	-19	-22	-13	-15	-19	-23
	60%	-21	-23	-27	-30	-13	-15	-19	-23	-14	-16	-20	-24
	50%	-23	-24	-29	-32	-15	-16	-21	-24	-16	-18	-22	-25
	40%	-24	-26	-30	-34	-16	-17	-22	-25	-18	-19	-24	-27
	33%	-25	-27	-31	-35	-17	-18	-23	-26	-20	-21	-26	-29
	30%	-26	-27	-32	-35	-17	-19	-23	-27	-20	-22	-26	-30
	20%	-28	-29	-34	-37	-19	-20	-25	-28	-23	-24	-29	-32
	10%	-30	-31	-36	-39	-21	-22	-27	-30	-27	-28	-33	-36
	5%	-32	-33	-38	-41	-22	-24	-28	-32	-29	-30	-35	-39
	1%	-34	-35	-40	-44	-24	-26	-31	-34	-32	-34	-39	-42
	Max	-38	-40	-44	-47	-28	-30	-35	-39	-36	-37	-43	-46
CEHZ2		-38				-35				-35			
CEHZ3		-41				-35				-39			

LEGEND

- – – – 2019 Shoreline
- ——— Erosion Protection Structures
- ◄——► Cell Extent
- ——— CEHZ0
- ——— CEHZ1
- ——— CEHZ2
- ——— CEHZ3

9C

9A

9B

9C

9A

9B

LEGEND
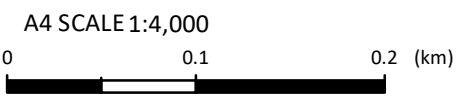
←——→ Cell Extent

- - - - 2019 Shoreline

Historic Shorelines

——— 2013/12/05

——— 2003/08/13

——— 1985/12/13

——— 1959/02/03

——— 1942/04/30

Notes: Dashed CEHZ indicates greater uncertainty around
stream mouths and backshore topography.
Northland 0.4m Rural Aerial Photos (2014-2016).

A4 SCALE 1:4,000

| 0 | 0.1 | 0.2 | (km) |
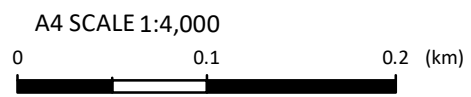
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APPROVED		

ARCFILE
1012360_Historicv2.mxd

SCALE (AT A4 SIZE)
1:4,000

PROJECT No.
1012360

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Whangaumu Bay

Site: 9

FIGURE No.

Figure 9-5

Rev.

1