19 Te Ti Bay (Waitangi)

Description and geomorphology

Te Ti Bay is located approximately 12 km south-east of Kerikeri. The site has an open coast shoreline facing north east and an estuary shoreline facing north-west.

The open coast shoreline (Te Ti Bay) is approximately 1.1 km long and comprises medium to coarse sand with some shell component. The beach face is relatively steep and has a berm width of 5 to 10 m above the high tide line.

The backshore is fully grassed down to the beach face, with no established dune vegetation. The backshore elevation is ranges from approximately RL 3 to 6 m.

The southern end of the site transitions to a cliff shoreline, which forms a rocky headland at this location. The headland comprises Greywacke material.

The estuary shoreline is approximately 400 m long. There is a relatively narrow fine sand beach that is approximately 5 m wide. The toe of the beach transitions into intertidal mud flats. The backshore elevation is approximately RL 1 to 3 m in this location.

Local considerations

Two stormwater outlets exist along Te Ti Bay, which have a localised effect on the shoreline position.

A rock revetment is located at the northern end of Te Ti Bay. The revetment is approximately 450 m long and the toe of the structure is location at or below the high tide line.

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 19-1. Short term erosion values range from 2 to 6 m within the estuary to 4 to 10 m on the ocean side. The shoreline is slightly erosional within the estuary and variable to accretionary on the ocean side.

Site Photograph A (estuary shoreline)

Site Photograph B (Ti te Bay - centre)

Site Photograph (Te Ti Bay - southern end)

Offshore slopes on the ocean side are very low resulting in large SLR-induced recession distances.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 19-2 to figure 19-5.

For cell 19A the cliff projection method has been adopted with future shoreline distances shown in Figure 19-1 and Table 3-2 instead of CEHZ distances.

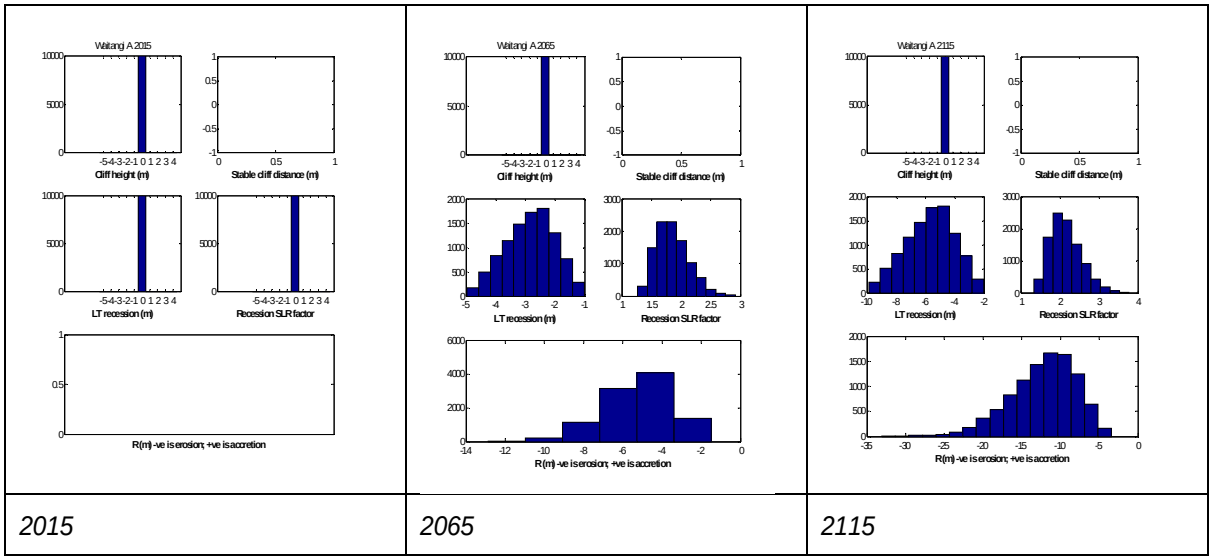
Coastal Erosion Hazard Zone widths are presented within Table 19-2 and Figure 19-6. CEHZ1 values are 4 m within the estuary and 24 to 29 m on the ocean beaches and 20 m on the cliffed shoreline. CEHZ2 values are 20 m within the estuary and 96 to 106 m on the ocean beach due to the very flat offshore slopes and 44 m for the cliffed shoreline. CEHZ's have been mapped in agreement with the calculated values. Note that cell 19D has experienced accretion since about 1951 over approximately 250 m, with CEHZs offset from the accreted most recent shoreline.

Figure 19-7 shows the available historic shorelines for Te Ti Bay (Waitangi).

Table 19-1 Component values for Erosion Hazard Assessment

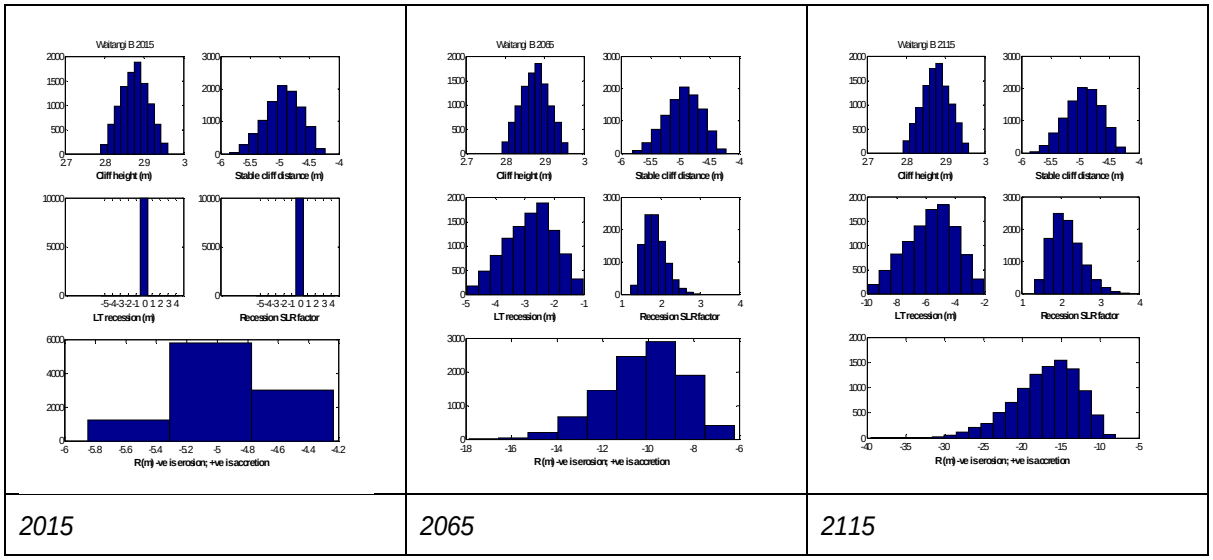
Site		19. Waitangi				
Cell		19A[1]	19B	19C[2]	19D	19E
Cell centre (NZTM)	E	1698138	1698197	1698343	1698711	1698953
	N	6096076	6096202	6095856	6095592	6095522
Chainage, m (from N/W)		0-410	410-520	520-1180	1180-1470	1470-1680
Morphology		Estuary Bank	Estuary Bank	Dune	Dune	Greywacke
Short-term (m)	Min	2	2	4	4	0
	Mode	4	4	6	6	0
	Max	6	6	10	10	0
Dune/Cliff elevation (m above toe or scarp)	Min	1.3	2.8	2.8	3.6	4.5
	Mode	2.0	2.9	3.7	4.3	6.8
	Max	2.6	3.0	5.7	5.3	9.2
Stable angle (deg)	Min	26.6	26.6	30	30	26.6
	Mode	30.2	30.2	32	32	30.2
	Max	33.7	33.7	34	34	33.7
Long-term (m) -ve erosion +ve accretion	Min	-0.02	-0.02	0.075	0.2	-0.05
	Mode	-0.05	-0.05	0	0.1	-0.1
	Max	-0.1	-0.1	-0.075	0	-0.15
Closure slope (beaches)	Min	0.75	0.75	0.024	0.024	0.75
	Mode	0.5	0.5	0.009	0.009	0.5
	Max	0.25	0.25	0.008	0.008	0.25
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

[1]Updated using cliff projection methodology.
[2]CEHZ0 included behind coastal protection structure.



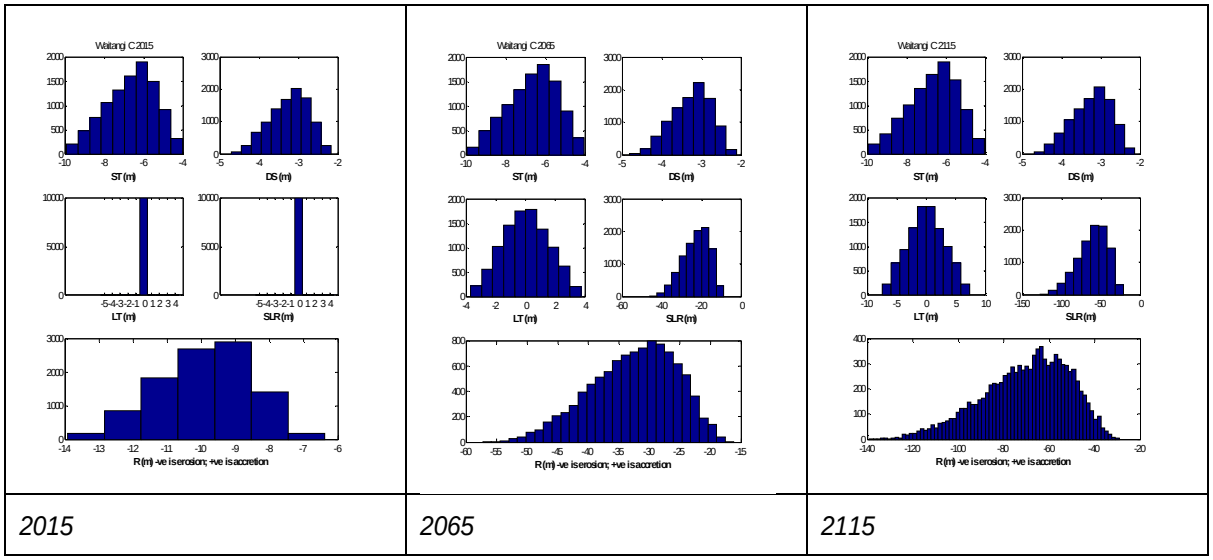
2015	2065	2115

Figure 19-1 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 19A



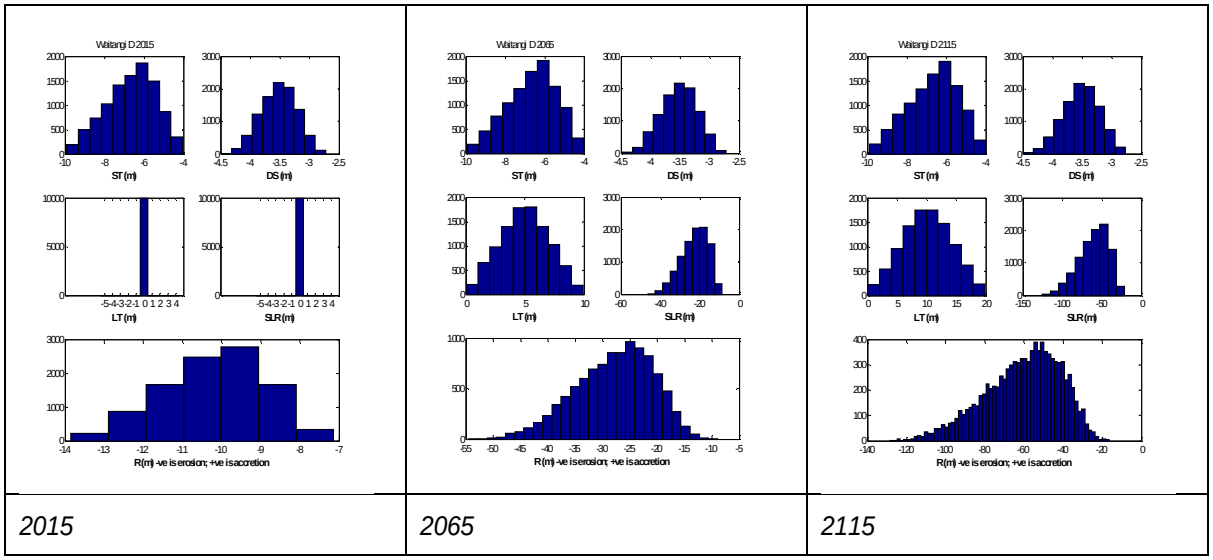
2015	2065	2115

Figure 19-2 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 19B



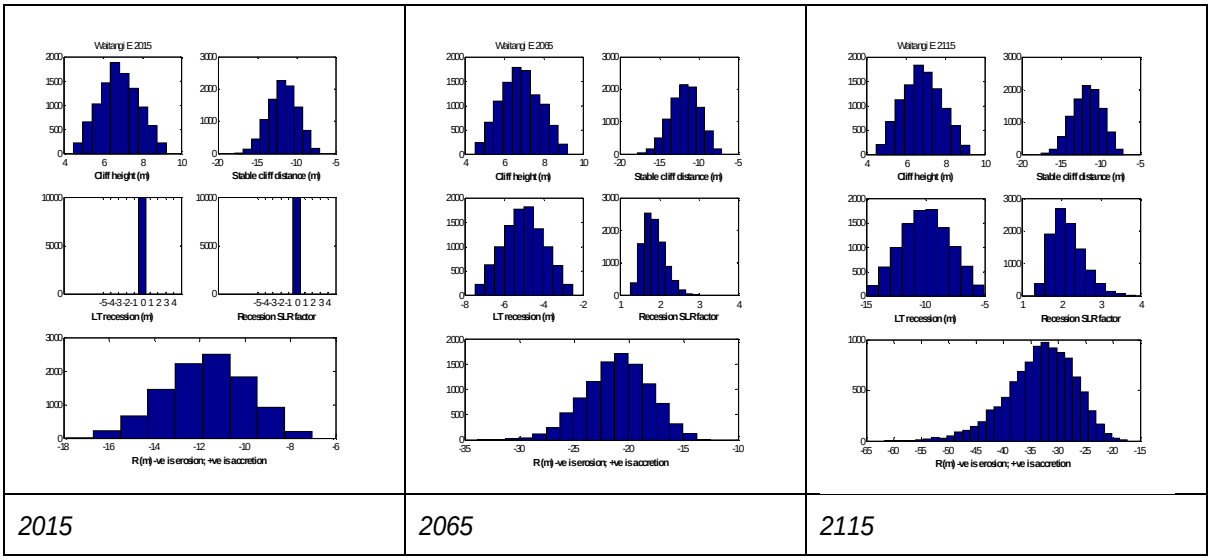
2015	2065	2115

Figure 19-3 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 19C



2015	2065	2115

Figure 19-4 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 19D



2015	*2065*	*2115*

Figure 19-5 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 19E

Table 19-2 Coastal Erosion Hazard Zone Widths

Site		19. Waitangi														
Cell		19A			19B			19C			19D			19E		
Time		2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115
Probability of CEHZ (m) Exceedance	Min	0	-2	-3	-4	-6	-8	-6	-16	-29	-7	-9	-17	-7	-13	-17
	99%	0	-2	-5	-4	-7	-10	-7	-20	-37	-8	-15	-26	-8	-15	-22
	95%	0	-3	-6	-4	-8	-11	-8	-22	-43	-8	-18	-33	-9	-16	-24
	90%	0	-3	-7	-5	-8	-12	-8	-24	-48	-9	-19	-37	-9	-17	-26
	80%	0	-4	-9	-5	-9	-13	-9	-26	-53	-9	-22	-43	-10	-19	-28
	70%	0	-4	-10	-5	-9	-15	-9	-28	-58	-9	-23	-48	-11	-19	-30
	66%	0	-4	-10	-5	-9	-15	-9	-29	-60	-10	-24	-50	-11	-20	-30
	60%	0	-5	-11	-5	-10	-16	-9	-30	-63	-10	-25	-53	-11	-20	-31
	50%	0	-5	-12	-5	-10	-17	-10	-32	-68	-10	-27	-58	-12	-21	-33
	40%	0	-6	-13	-5	-10	-18	-10	-34	-74	-10	-29	-64	-12	-22	-34
	33%	0	-6	-14	-5	-11	-18	-10	-35	-77	-11	-31	-68	-12	-22	-35
	30%	0	-6	-14	-5	-11	-19	-11	-36	-80	-11	-31	-70	-13	-23	-36
	20%	0	-7	-16	-5	-12	-21	-11	-39	-87	-11	-34	-78	-13	-24	-38
	10%	0	-8	-18	-5	-13	-23	-12	-42	-97	-12	-38	-88	-14	-25	-42
	5%	0	-8	-20	-5	-13	-25	-12	-45	-106	-12	-41	-96	-15	-26	-44
	1%	0	-10	-24	-6	-15	-29	-13	-50	-119	-13	-46	-110	-16	-29	-50
	Max	0	-13	-33	-6	-18	-40	-14	-57	-139	-14	-54	-128	-18	-34	-62
	CEHZ1	-4*			-10			-29			-24			-20		
	CEHZ2	-20*			-25			-106			-96			-44		

*Updated using cliff projection methodology, so distance to future cliff toe position has been tabulated. Actual CEHZ width will be greater depending on cliff height and stable slope angle.

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

A4 SCALE 1:6,000

0 0.1 0.2 0.3 (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
www.tonkintaylor.co.nz

DRAWN	PPK	Dec.17
CHECKED	TDS	Dec.17
APPROVED	RRH	Dec.17

ARCFILE: 1001049-000-CEHZ001.mxd
SCALE (AT A4 SIZE): 1:6,000
PROJECT No.: 1001049

NORTHLAND REGIONAL COUNCIL

Coastal Erosion Hazard Assessment
Te Ti Bay (Waitangi)
Site: 19

FIGURE No.: Figure 19-6
Rev.: 2

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

A4 SCALE 1:6,000

0 0.1 0.2 0.3 (km)

Tonkin+Taylor

www.tonkintaylor.co.nz

DRAWN	PPK	Dec.17
CHECKED	TDS	Dec.17
APPROVED	RRH	Dec.17
ARCFILE	HistoricShorelines.mxd	
SCALE (AT A4 SIZE)	1:6,000	
PROJECT No.	1001049	

NORTHLAND REGIONAL COUNCIL

Historic shorelines

Te Ti Bay (Waitangi)

Site: 19

FIGURE No. Figure 19-7

Rev. 2

Path: P:\1001049\WorkingMaterial\GIS\FINAL\HistoricShorelines.mxd Date: 4/10/2017 Time: 3:07:45 PM