29 Tokerau Beach

Description and geomorphology

Tokerau Beach is located at the northern end of Doubtless Bay, approximately 28 km north of Kaitaia.

The east facing shoreline of Tokerau North is approximately 4 km long. The site starts from Whatuwhiwhi headland in the north and extends south.

A small stream enters the site at the northern end of the site. This stream has an effect on the shoreline causing localised retreat in this area. The backshore has no native dune vegetation along the northern 600 m of shoreline and is relatively low with an elevation of RL 2 to 6 m. The dunes are vegetated with spinifex from this point south with varying amounts of cover.

The dune crest height increases towards the south with dune crest elevations reaching RL 7 m at the southern end of the site. The dunes are in a re-building stage with the dune vegetation beginning to re-establish on the overstep dune face.

The site has a sandy beach comprising fine to medium sand. The beach is relatively flat and has a berm width of less than 5 m above the high tide line. The backshore is developed with the most seaward dwelling located 40 m from the dune toe.

A stream is located adjacent to Mellisa Road. The stream channel is controlled to some degree by a boat ramp and training groyne. Erosion is evident along the stream channel and also on the shoreline adjacent to the stream.

Local considerations

There is a failed erosion protection structure located at the northern end of the site. The structure comprises broken concrete and loose rock and has slumped with erosion continuing behind the structure.

There are two streams that enter the site and influence the shoreline position. There is a greater level of uncertainty in these areas because fluvial processes also effect shoreline movement. The resulting hazard zones are dashed in these areas to reflect this uncertainty.

Anecdotal accounts of degradation of the healthy spinifex/pingao foredune system may reduce in the ability of the dunes to rebuild following storm events. Future erosion rates may therefore be higher than historic rates.

Site Photograph A (north)

Site Photograph B (north)

Site Photograph C (south)

While it is likely that increased recession due to high future sea level rise estimates for the CEHZ2 line will account for these potential increases, future monitoring should note changes in the dune vegetation systems.

Coastal Erosion Hazard Assessment

The site is split into five cells based on differences in dune height and geomorphology. Adopted component values are presented within Table 29-1. Short-term erosion values are 5 to 15 m along all cells. Long-term trends range from erosion at the northern end, variable through the centre (cells B and C), and erosion through Cell D of up to -0.2 m/year. Offshore slopes are relatively flat (around 1 in 125) resulting in large SLR-induced recession values. Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 29-1 to Figure 29-5.

Coastal Erosion Hazard Zone widths are presented within Table 29-2 to 29-4Table 29- and Figure 29-6. CEHZ1 values range from 29 to 34 m, CEHZ2 values range from 95 to 110 m and CEHZ3 values range from 126 to 141 m, primarily due to the flat offshore slope and SLR-induced recession. CEHZ's have been mapped in agreement with the calculated values.

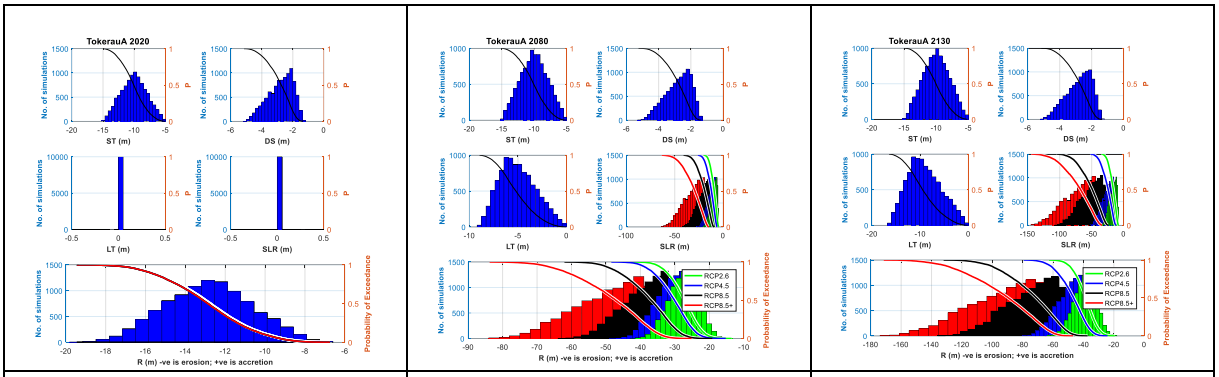
Figure 29-7 shows the available historic shorelines for Rangiputa.

Table 29-1 Component values for Erosion Hazard Assessment

Site		**29. Tokerau**				
Cell		29A[4]	29B	29C	29D	29E
Cell centre (NZTM)	E	1634918	1634541	1634077	1633804	0
	N	6140720	6140459	6139716	6137533	0
Chainage, m (from N/W)		0-230	230-1000	1000-2070	2070-2770	2770-3730
Morphology		Dune	Dune	Dune	Dune	Dune
Short-term (m)	Min	5	5	5	5	5
	Mode	10	10	10	10	10
	Max	15	15	15	15	15
Dune/Cliff elevation (m above toe or scarp)	Min	1.7	2.1	2.3	2.6	2.6
	Mode	2.6	2.8	3.8	4.5	4.5
	Max	6.2	3.6	5.3	6.5	6.5
Stable angle (deg)	Min	30	30	30	30	30
	Mode	32	32	32	32	32
	Max	34	34	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	0	0.05	0.1	-0.05	0.1
	Mode	-0.1	0	0	-0.1	0
	Max	-0.15	-0.05	-0.1	-0.2	-0.1
Closure slope (beaches)	Min	0.035	0.035	0.035	0.035	0.035
	Mode	0.012	0.012	0.012	0.012	0.012
	Max	0.008	0.008	0.008	0.008	0.008
SLR 2080 (m)	RCP 2.6	0.16	0.16	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51	0.51	0.51

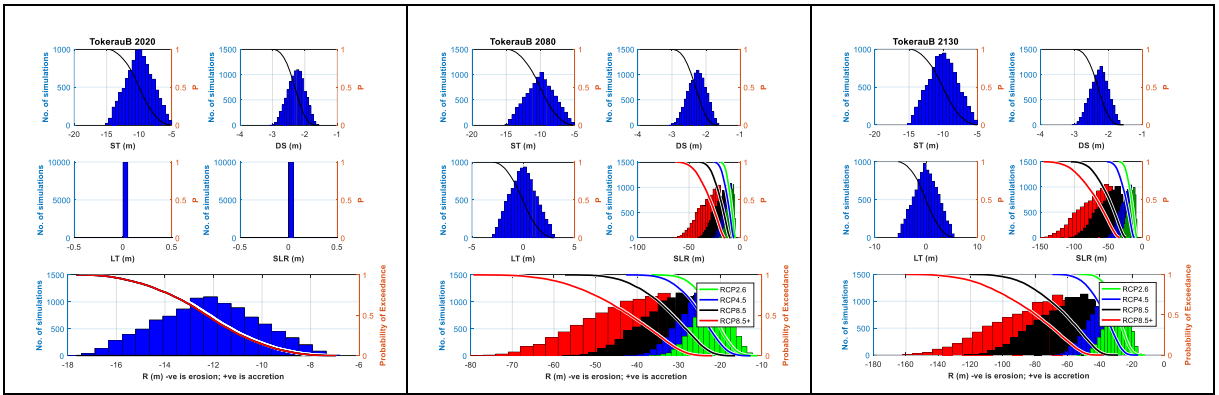
Site		29. Tokerau				
Cell		29A[4]	29B	29C	29D	29E
SLR 2130 (m)	RCP 2.6	0.28	0.28	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17	1.17	1.17

[4]Has been mapped in addition to T+T (2014)



2020 | *2080* | *2130*

Figure 29-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 29A



2020 | *2080* | *2130*

Figure 29-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 29B

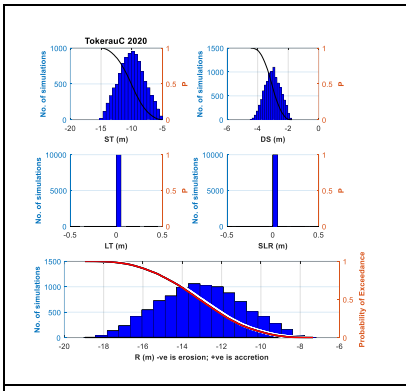
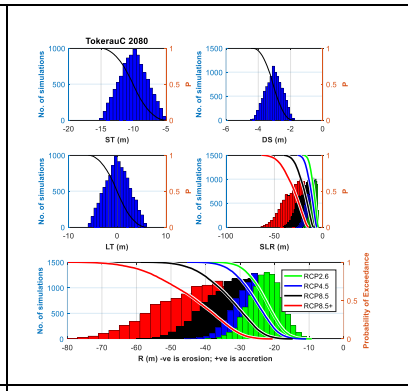
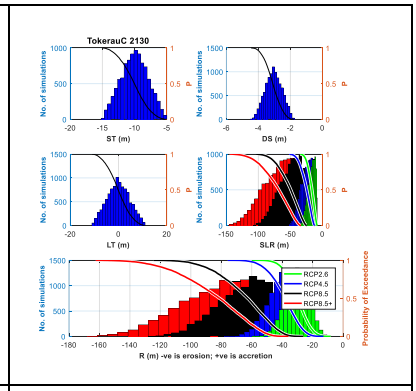
		
2020	*2080*	*2130*

Figure 29-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 29C

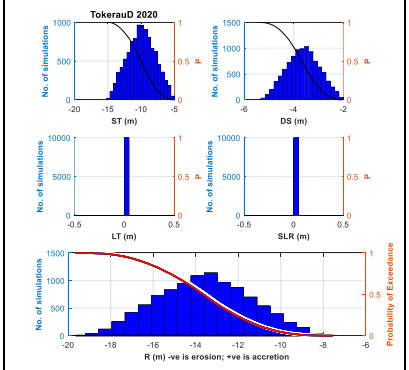
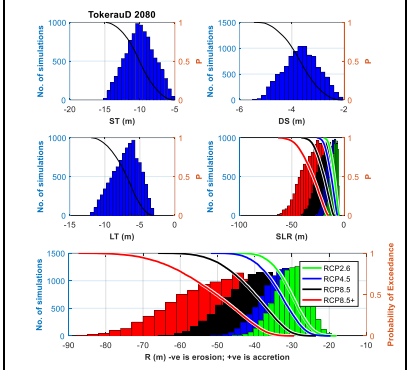
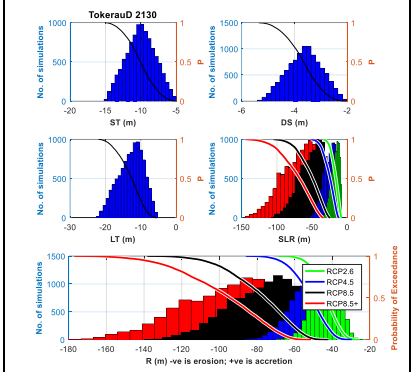
		
2020	*2080*	*2130*

Figure 29-4 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 29D

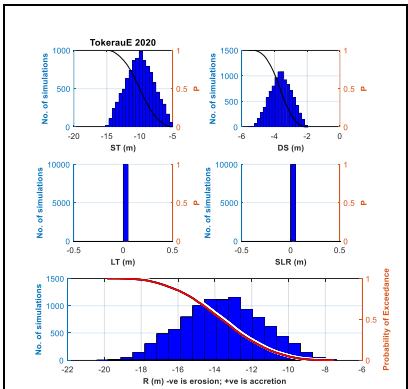
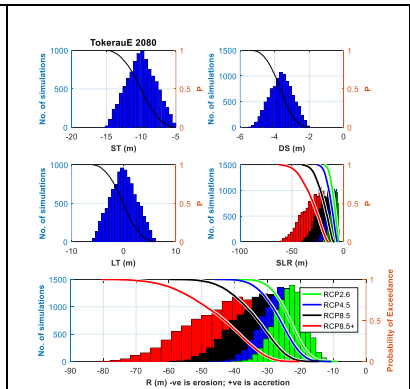
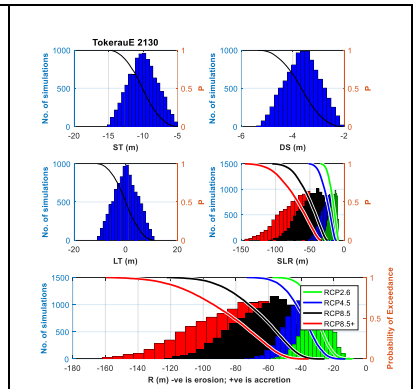
		
2020	*2080*	*2130*

Figure 29-5 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 29E

Table 29-2 Coastal Erosion Hazard Zone Widths For 2020

Site		29. Tokerau				
Probability of CEHZ (m) Exceedance		A	B	C	D	E
	Min	-7	-7	-7	-8	-8
	99%	-8	-8	-9	-9	-9
	95%	-9	-9	-10	-10	-10
	90%	-10	-10	-10	-11	-11
	80%	-11	-10	-11	-12	-12
	70%	-12	-11	-12	-12	-12
	66%	-12	-11	-12	-13	-13
	60%	-12	-12	-13	-13	-13
	50%	-13	-12	-13	-14	-14
	40%	-13	-13	-14	-14	-14
	33%	-14	-13	-14	-15	-15
	30%	-14	-13	-14	-15	-15
	20%	-15	-14	-15	-16	-15
	10%	-16	-15	-16	-17	-16
	5%	-16	-16	-17	-17	-17
	1%	-18	-17	-18	-18	-18
	Max	-19	-18	-19	-20	-19

Table 29-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		29. Tokerau																			
Cell		29A				29B				29C				29D				29E			
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+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-14	-15	-19	-25	-11	-13	-16	-22	-9	-11	-15	-21	-18	-20	-24	-29	-9	-11	-14	-20
	99%	-18	-20	-25	-31	-14	-16	-20	-26	-13	-15	-19	-25	-22	-23	-28	-34	-14	-16	-20	-26
	95%	-21	-23	-28	-34	-16	-18	-22	-29	-16	-18	-22	-29	-24	-26	-30	-37	-16	-18	-23	-30
	90%	-22	-24	-29	-36	-17	-19	-24	-31	-17	-19	-24	-31	-25	-27	-32	-39	-18	-20	-25	-32
	80%	-24	-26	-31	-39	-18	-21	-26	-33	-19	-21	-26	-34	-27	-29	-34	-42	-19	-22	-27	-35
	70%	-25	-27	-33	-41	-20	-22	-28	-36	-20	-23	-28	-37	-28	-30	-36	-45	-21	-23	-29	-38
	66%	-25	-28	-34	-43	-20	-23	-28	-37	-21	-23	-29	-38	-28	-31	-37	-46	-21	-24	-30	-39
	60%	-26	-29	-35	-44	-21	-23	-30	-39	-21	-24	-30	-40	-29	-32	-38	-47	-22	-25	-31	-40
	50%	-27	-30	-37	-47	-22	-25	-31	-42	-23	-25	-32	-43	-30	-33	-40	-50	-23	-26	-33	-43
	40%	-28	-31	-39	-50	-23	-26	-33	-45	-24	-27	-34	-46	-31	-34	-42	-53	-24	-27	-35	-46
	33%	-29	-33	-41	-53	-24	-27	-35	-47	-25	-28	-36	-48	-32	-35	-43	-56	-25	-29	-37	-49
	30%	-30	-33	-41	-54	-24	-27	-36	-48	-25	-28	-37	-50	-32	-36	-44	-57	-26	-29	-37	-50
	20%	-31	-35	-44	-58	-25	-29	-38	-52	-27	-30	-40	-54	-34	-38	-47	-61	-27	-31	-40	-54
	10%	-33	-37	-48	-64	-27	-32	-42	-58	-29	-33	-43	-59	-36	-40	-51	-66	-29	-33	-44	-59
	5%	-35	-39	-50	-68	-29	-33	-45	-62	-30	-35	-46	-63	-38	-42	-53	-70	-31	-35	-47	-63
	1%	-38	-43	-55	-75	-32	-37	-49	-69	-34	-39	-51	-71	-41	-46	-58	-78	-34	-39	-52	-71
	Max	-43	-48	-62	-84	-37	-43	-57	-79	-40	-45	-59	-80	-46	-52	-66	-87	-40	-46	-60	-81
	CEHZ1	-34				-28				-29				-37				-30			

Table 29-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		29. Tokerau																			
Cell		29A				29B				29C				29D				29E			
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+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-19	-24	-37	-47	-12	-16	-29	-38	-8	-13	-26	-36	-26	-30	-42	-51	-9	-13	-26	-35
	99%	-25	-30	-45	-55	-17	-22	-37	-47	-15	-20	-35	-46	-30	-35	-50	-60	-15	-20	-35	-46
	95%	-28	-34	-50	-61	-20	-25	-41	-52	-19	-24	-40	-52	-33	-39	-54	-65	-19	-25	-41	-52
	90%	-30	-36	-53	-65	-22	-27	-44	-55	-21	-27	-44	-56	-35	-41	-58	-70	-21	-27	-44	-56
	80%	-33	-39	-57	-71	-24	-30	-48	-62	-24	-30	-49	-63	-38	-44	-62	-76	-24	-31	-49	-63
	70%	-35	-42	-62	-77	-25	-32	-52	-67	-26	-33	-54	-69	-40	-46	-67	-82	-26	-33	-54	-69
	66%	-36	-43	-63	-79	-26	-33	-54	-69	-27	-34	-56	-71	-40	-47	-69	-84	-27	-34	-55	-71
	60%	-37	-44	-66	-83	-27	-34	-57	-73	-28	-36	-58	-75	-41	-49	-71	-88	-28	-36	-58	-75
	50%	-38	-46	-71	-89	-29	-37	-61	-80	-30	-38	-63	-81	-43	-51	-76	-94	-30	-38	-63	-81
	40%	-40	-49	-76	-97	-30	-39	-66	-87	-32	-41	-68	-88	-45	-54	-81	-101	-32	-41	-68	-89
	33%	-42	-51	-80	-102	-32	-41	-71	-93	-33	-43	-72	-94	-46	-56	-85	-107	-34	-43	-72	-94
	30%	-42	-52	-82	-105	-32	-42	-72	-95	-34	-43	-74	-96	-47	-57	-87	-110	-34	-44	-74	-97
	20%	-45	-56	-90	-115	-35	-46	-79	-105	-36	-47	-80	-105	-49	-60	-94	-119	-37	-47	-81	-106
	10%	-48	-60	-99	-127	-38	-50	-88	-116	-40	-52	-89	-118	-53	-65	-102	-130	-40	-52	-90	-118
	5%	-51	-64	-106	-137	-41	-54	-95	-126	-43	-56	-97	-128	-55	-68	-109	-140	-44	-56	-97	-128
	1%	-56	-71	-117	-153	-45	-60	-106	-142	-48	-63	-109	-144	-61	-75	-122	-158	-49	-64	-111	-146
	Max	-63	-79	-132	-171	-53	-69	-121	-160	-60	-76	-125	-162	-69	-86	-138	-177	-57	-73	-122	-160
	CEHZ2	-106				-95				-97				-109				-97			
	CEHZ3	-137				-126				-128				-140				-128			

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

A4 SCALE 1:12,500

0 0.1 0.2 0.3 0.4 0.5 (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
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APPROVED		
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PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Coastal Erosion Hazard Assessment
Tokerau Beach
Site: 29

FIGURE No. Figure 29-6

Rev. 1

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

A4 SCALE 1:12,500

0 0.1 0.2 0.3 0.4 0.5 (km)

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ARCFILE	1012360_Historicv2.mxd	
SCALE (AT A4 SIZE)	1:12,500	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Tokerau Beach
Site: 29

FIGURE No. Figure 29-7

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