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

Site Photograph A (south)

Site Photograph B (north - low foredune)

Site Photograph C (estuary)

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 to 13-4 and Figure 13-6. CEHZ1 values range from 14 to 50 m, CEHZ2 values from 35 to 114 m and CEHZ3 values range from 43 to 121 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) -ve erosion +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 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
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

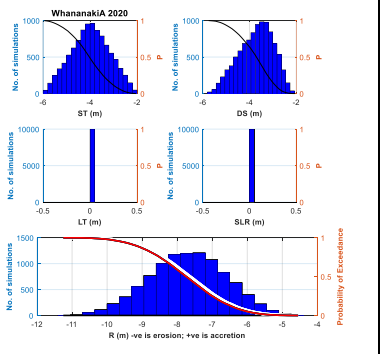	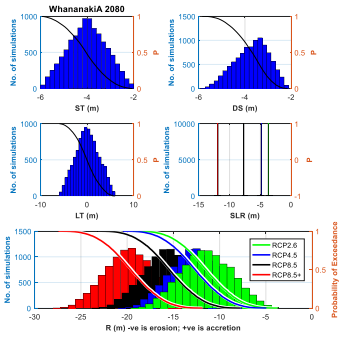	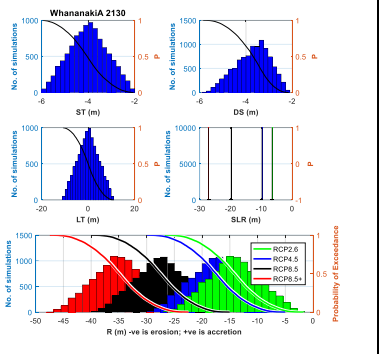
2020	*2080*	*2130*

Figure 13-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 13A

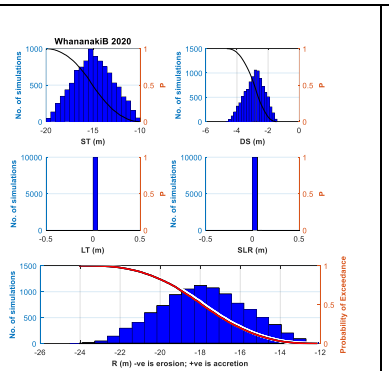	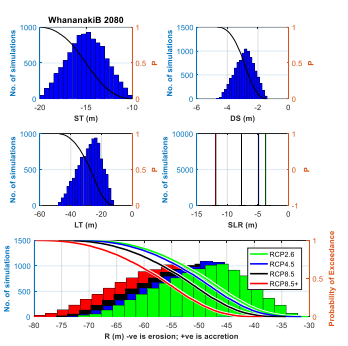	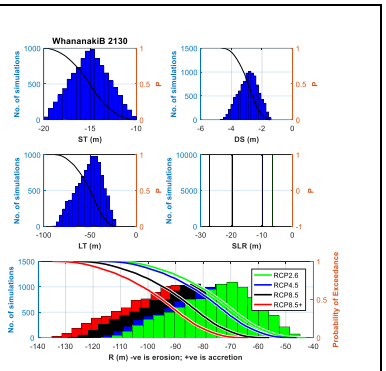
2020	*2080*	*2130*

Figure 13-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 13B

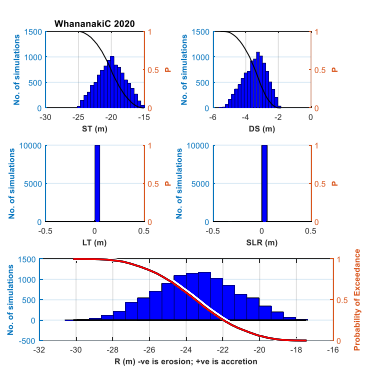	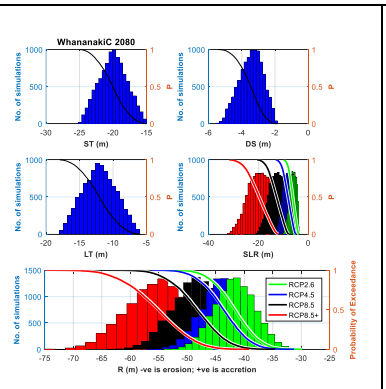	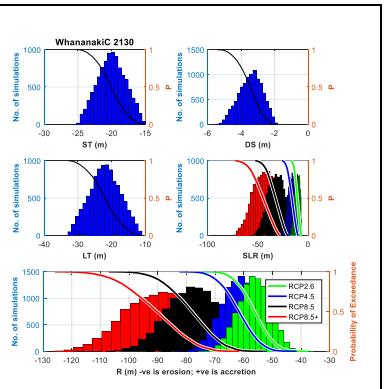
2020	*2080*	*2130*

Figure 13-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 13C

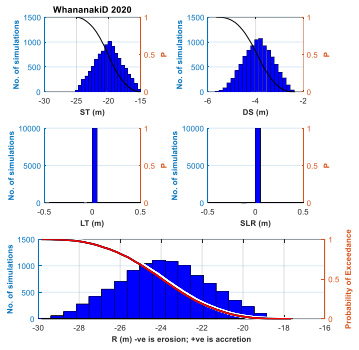	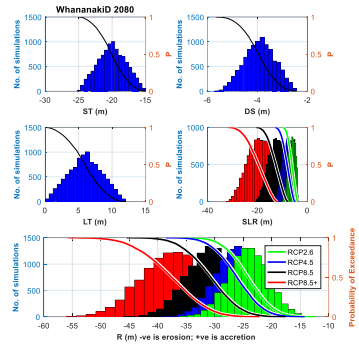	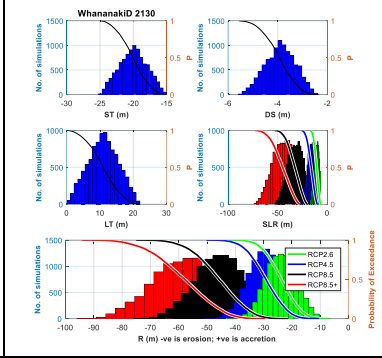
2020	*2080*	*2130*

Figure 13-4 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 13D

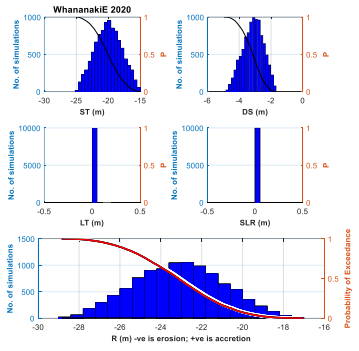	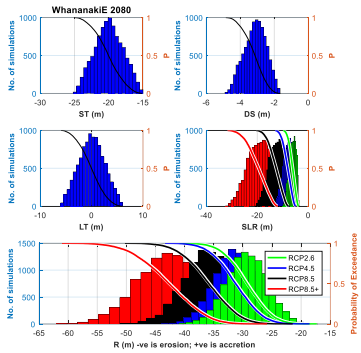	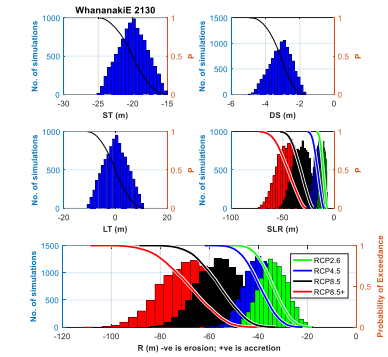
2020	*2080*	*2130*

Figure 13-5 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 13E

Table 13-2 Coastal Erosion Hazard Zone Widths for 2020

Site		13. Whananaki				
Probability of CEHZ (m) Exceedance		A	B	C	D	E
	Min	-5	-12	-17	-18	-17
	99%	-5	-13	-19	-19	-18
	95%	-6	-14	-20	-20	-20
	90%	-6	-15	-21	-21	-20
	80%	-7	-16	-22	-22	-21
	70%	-7	-17	-22	-23	-22
	66%	-7	-17	-23	-23	-22
	60%	-7	-17	-23	-23	-23
	50%	-8	-18	-23	-24	-23
	40%	-8	-18	-24	-24	-24
	33%	-8	-19	-24	-25	-24
	30%	-8	-19	-25	-25	-24
	20%	-9	-20	-25	-26	-25
	10%	-9	-21	-26	-27	-26
	5%	-10	-21	-27	-27	-27
	1%	-10	-23	-28	-28	-28
	Max	-11	-24	-30	-30	-29

Table 13-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		13. Whananaki																			
Cell		13A				13B				13C				13D				13E			
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	-4	-5	-8	-12	-30	-31	-34	-38	-30	-31	-35	-39	-13	-14	-18	-22	-17	-19	-21	-26
	99%	-6	-7	-10	-14	-35	-36	-39	-43	-34	-35	-39	-44	-16	-18	-21	-26	-22	-23	-27	-32
	95%	-7	-8	-11	-15	-38	-39	-42	-46	-36	-38	-41	-47	-18	-20	-24	-29	-24	-25	-29	-35
	90%	-8	-9	-12	-16	-40	-41	-44	-48	-37	-39	-43	-48	-20	-21	-25	-31	-25	-27	-31	-36
	80%	-9	-10	-13	-17	-42	-44	-46	-51	-39	-40	-45	-51	-21	-23	-27	-33	-26	-28	-32	-38
	70%	-10	-11	-14	-18	-45	-46	-49	-53	-40	-42	-46	-52	-22	-24	-28	-35	-27	-29	-34	-40
	66%	-10	-11	-14	-18	-46	-47	-50	-54	-40	-42	-46	-53	-23	-24	-29	-35	-28	-30	-34	-40
	60%	-11	-12	-15	-19	-47	-48	-51	-55	-41	-43	-47	-54	-23	-25	-30	-36	-28	-30	-35	-41
	50%	-11	-13	-15	-20	-49	-50	-53	-57	-42	-44	-48	-55	-24	-26	-31	-38	-29	-31	-36	-43
	40%	-12	-13	-16	-20	-51	-52	-55	-59	-43	-45	-49	-56	-25	-27	-32	-39	-30	-32	-37	-44
	33%	-13	-14	-17	-21	-53	-54	-57	-61	-43	-45	-50	-58	-26	-28	-33	-40	-31	-33	-38	-45
	30%	-13	-14	-17	-21	-54	-55	-57	-62	-44	-46	-50	-58	-26	-28	-33	-40	-31	-33	-38	-46
	20%	-14	-15	-18	-22	-56	-58	-60	-65	-45	-47	-52	-60	-27	-29	-34	-42	-32	-34	-39	-47
	10%	-15	-16	-19	-23	-60	-62	-64	-69	-46	-48	-54	-62	-29	-31	-36	-45	-34	-36	-41	-50
	5%	-16	-17	-20	-24	-63	-64	-67	-71	-48	-50	-55	-64	-30	-32	-38	-47	-35	-37	-43	-52
	1%	-17	-18	-21	-25	-67	-69	-71	-76	-50	-52	-58	-68	-32	-35	-41	-50	-37	-40	-46	-55
	Max	-19	-20	-23	-27	-72	-73	-76	-80	-54	-56	-64	-75	-36	-39	-45	-56	-41	-43	-50	-61
	CEHZ1	-14				-50				-46				-29				-34			

Table 13-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		13. Whananaki																			
Cell		13A				13B				13C				13D				13E			
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	-2	-5	-15	-22	-43	-46	-56	-64	-38	-42	-53	-62	-7	-10	-21	-30	-18	-22	-33	-41
	99%	-4	-8	-18	-25	-49	-53	-63	-70	-44	-48	-61	-69	-12	-16	-28	-37	-22	-26	-38	-47
	95%	-6	-10	-20	-27	-55	-58	-68	-75	-47	-52	-65	-74	-15	-19	-33	-42	-25	-29	-43	-52
	90%	-8	-11	-21	-29	-58	-61	-71	-79	-49	-54	-67	-77	-17	-21	-35	-44	-27	-31	-45	-55
	80%	-10	-13	-23	-31	-63	-67	-77	-84	-52	-56	-71	-81	-19	-24	-38	-49	-29	-34	-48	-58
	70%	-12	-15	-25	-32	-67	-70	-80	-88	-53	-58	-73	-84	-21	-26	-41	-52	-31	-36	-51	-62
	66%	-12	-16	-26	-33	-69	-72	-82	-89	-54	-59	-74	-85	-21	-27	-42	-53	-32	-37	-52	-63
	60%	-13	-16	-26	-34	-71	-74	-84	-91	-55	-60	-76	-87	-22	-28	-43	-55	-32	-38	-54	-65
	50%	-14	-17	-27	-35	-74	-78	-88	-95	-56	-62	-78	-90	-24	-29	-46	-58	-34	-39	-56	-68
	40%	-15	-19	-29	-36	-78	-82	-92	-99	-58	-63	-80	-93	-25	-31	-48	-61	-35	-41	-58	-71
	33%	-16	-20	-30	-37	-81	-85	-95	-102	-59	-64	-82	-96	-26	-32	-50	-63	-37	-42	-60	-73
	30%	-17	-20	-30	-37	-83	-86	-96	-104	-59	-65	-83	-97	-27	-32	-50	-64	-37	-43	-61	-74
	20%	-18	-22	-32	-39	-89	-92	-102	-109	-61	-67	-86	-100	-28	-34	-53	-68	-39	-45	-64	-78
	10%	-20	-24	-34	-41	-96	-99	-109	-117	-63	-70	-90	-105	-31	-37	-57	-73	-41	-47	-67	-83
	5%	-22	-25	-35	-43	-101	-104	-114	-121	-65	-72	-93	-109	-33	-39	-61	-77	-43	-49	-71	-87
	1%	-24	-27	-37	-45	-107	-111	-121	-128	-68	-75	-98	-116	-36	-43	-66	-83	-46	-53	-76	-94
	Max	-27	-30	-40	-47	-114	-117	-127	-135	-75	-82	-107	-126	-42	-50	-75	-94	-53	-62	-89	-108
	CEHZ2	-35				-114				-93				-61				-71			
	CEHZ3	-43				-121				-109				-77				-87			

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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APPROVED		
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PROJECT No.	1012360	

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Coastal Erosion Hazard Assessment
Whananaki
Site: 13

FIGURE No. Figure 13-6

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

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Whananaki
Site: 13

FIGURE No. Figure 13-7

Rev. 1

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