31 Omapere and Opononi

Description and geomorphology

Omapere and Opononi are located within the Hokianga Harbour approximately 40 km west of Kaikohe. This site includes the shoreline between Omapere and Opononi and is approximately 4 km long.

The southern 2 km of the site comprises a mixed sandy gravel beach, which stretches from the southern rock outcrop that forms south head to a low lying cliff and terrace feature (cells 31G to 31J). The Omapere Stream enters the site approximately 600 m from the southern end of the site which has as a localised effect on the shoreline position.

The low lying cliff section of the site extends north some 1.8 km to Opononi (cells 31A to 31F) and comprises predominantly muddy limestone and sandstone conglomerates (Waipurapura Formation). The cliff sections of shoreline have crest elevations of RL 5 to 11 m. The material from these facies is a likely source of gravel sized sediment found on the foreshore along the site.

The foreshore fronting the cliff shoreline includes a relatively wide intertidal limestone rocky reef with a beach veneer of sand and pebble material. There are two relatively low lying areas which split the cliff shoreline, located adjacent to streams which supply sand to the site (Waiarohia and Opononi Stream). Small areas of sandy beach shoreline exist in these areas located north of the stream mouth, in the direction of longshore transport.

Local considerations

There is a rock revetment and boat ramp located approximately 300 m from the southern end of the site. The structures act as a groyne feature in this area and dune erosion is evident on the down drift northern side.

One further rock revetment exists on the dune shoreline which is approximately 80 m long. There is a rock revetment located along the base of the cliff south of Waiarohia Stream, which is approximately 340 m long. A grouted rock seawall exists along the northern 170 m of the site and a boat ramp is located at the northern extent.

Site Photograph A (dune shoreline)

Site Photograph B (cliff shoreline)

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.

Coastal Erosion Hazard Assessment

The site is split into 11 cells based on differences in geomorphology, exposure and dune/cliff height. Adopted component values are presented within Table 31-1 with long-term trends generally erosional with Waipurapura Formation conglomerates having rates of -0.02 to -0.15 m/year and some beaches having erosion rates of up to -0.3 m/year.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 31-1 to Figure 31-11.

Coastal Erosion Hazard Zone widths are presented within Table 31-2 to Table 31-4 and Figure 31-12. CEHZ1 values range from 10 to 27 m depending on shoreline type and cliff height,

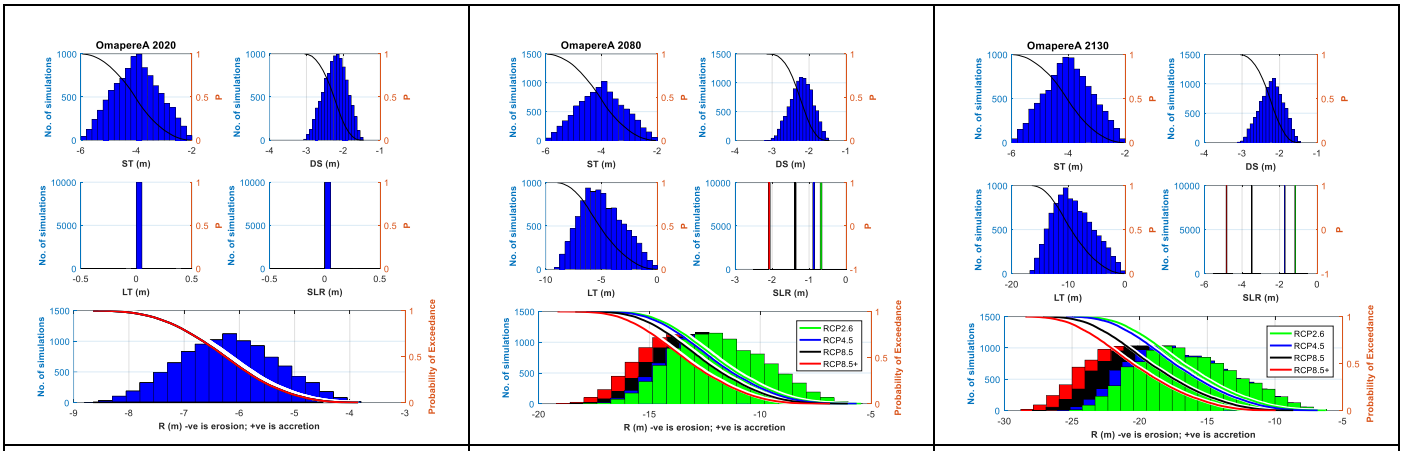
CEHZ2 values range from 25 to 61 m and CEHZ3 values range from 25 to 62 m, with Cells 31B and 31D values being rounded up to the minimum values of 10 m for CEHZ1 and 25 m for CEHZ2 and CEHZ3. CEHZ's have been mapped in agreement with the calculated values with area around stream entrances dashed to reflect the additional uncertainty due to fluvial processes. Note that some land reclamation works have likely been undertaken at cell 31B, with the most recent shoreline situated up to 20 m further seaward than the 1961 shoreline. CEHZs have been offset from the most recent shoreline.

Figure 30-13 shows the available historic shorelines for Omapere.

Table 31-1 Component values for Erosion Hazard Assessment

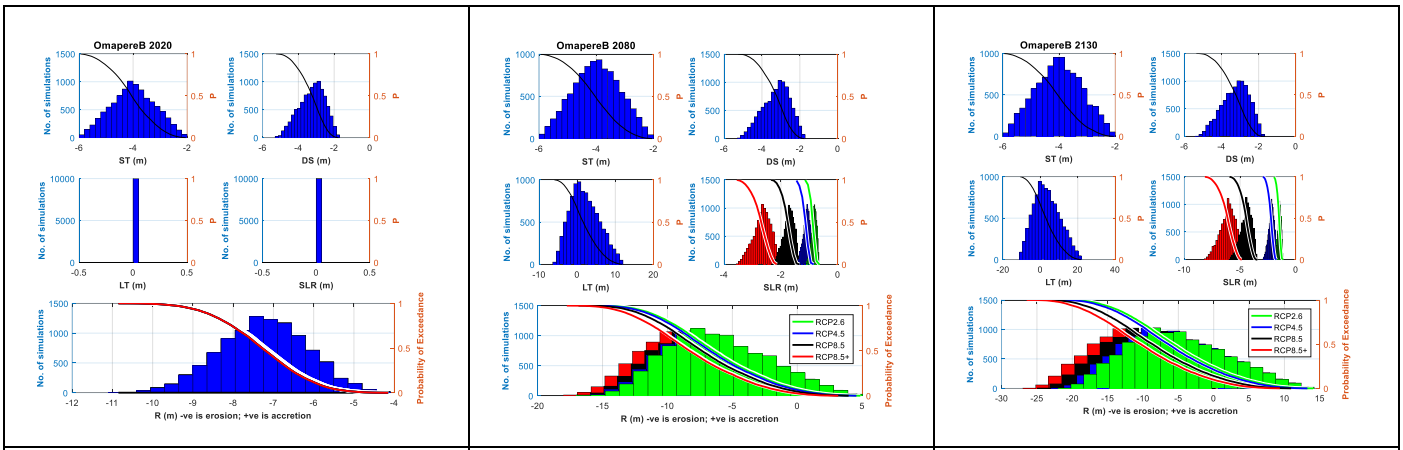
Site		31. Omapere/Opononi										
Cell		31A[2]	31B	31BB	31C[2]	31D	31E[2]	31F[2]	31G[2]	31H	31I[2]	31J[2]
Cell centre (NZTM)	E	1635458	1635333	1635333	1635293	1635186	1635208	1635101	1635257	1635189	1635055	1634911
	N	6070938	6070619	6070619	6070268	6069912	6069609	6069310	6068648	6067982	6067684	6067494
Chainage, m (from N/W)		0-420	420-650	650-820	820-1200	1200-1420	1420-1520	1520-1980	1980-3220	3220-3670	3670-3820	3820-4060
Morphology		Estuary Bank	Estuary Bank	Estuary Bank	Waipurapura conglomorates	Estuary Bank	Waipurapura conglomorates	Waipurapura conglomorates	Estuary Bank	Estuary Bank	Estuary Bank	Waipurapura conglomorates
Short-term (m)	Min	2	2	2	0	2	0	0	2	4	2	0
	Mode	4	4	4	0	4	0	0	4	8	4	0
	Max	6	6	6	0	6	0	0	6	10	6	0
Dune/Cliff elevation (m above toe or scarp)	Min	1.9	2.2	2.2	2.8	4.2	1.9	5.0	5.0	1.2	2.8	2.7
	Mode	2.7	3.6	4.2	4.4	7.8	3.4	7.5	7.4	4.6	5.2	3.9
	Max	3.7	6.4	6.4	6.1	10.6	5.5	10.1	11.1	10.4	6.8	4.7
Stable angle (deg)	Min	30	30	30	18.4	30	18.4	18.4	30	32	30	18.4
	Mode	32	32	32	22.5	32	22.5	22.5	32	32	32	22.5
	Max	34	34	34	26.6	34	26.6	26.6	34	34	34	26.6
Long-term (m) -ve erosion +ve accretion	Min	0	0.2	0	-0.03	0.2	-0.02	-0.02	-0.1	0.1	-0.15	-0.05
	Mode	-0.1	0	-0.1	-0.07	0	-0.07	-0.07	-0.15	0	-0.3	-0.1
	Max	-0.15	-0.1	-0.15	-0.12	-0.1	-0.15	-0.15	-0.3	-0.2	-0.5	-0.2
Closure slope (beaches)	Min	0.243	0.243	0.143	0.75	0.353	0.75	0.75	0.353	1.353	0.196	0.75
	Mode	0.243	0.193	0.143	0.5	0.248	0.5	0.5	0.2745	1.2745	0.196	0.5
	Max	0.243	0.143	0.143	0.25	0.143	0.25	0.25	0.196	1.196	0.196	0.25
SLR 2080 (m)	RCP 2.6	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51	0.51	0.51	0.51	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	0.28	0.28	0.28	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17

[2]CEHZ0 included behind coastal protection structure.



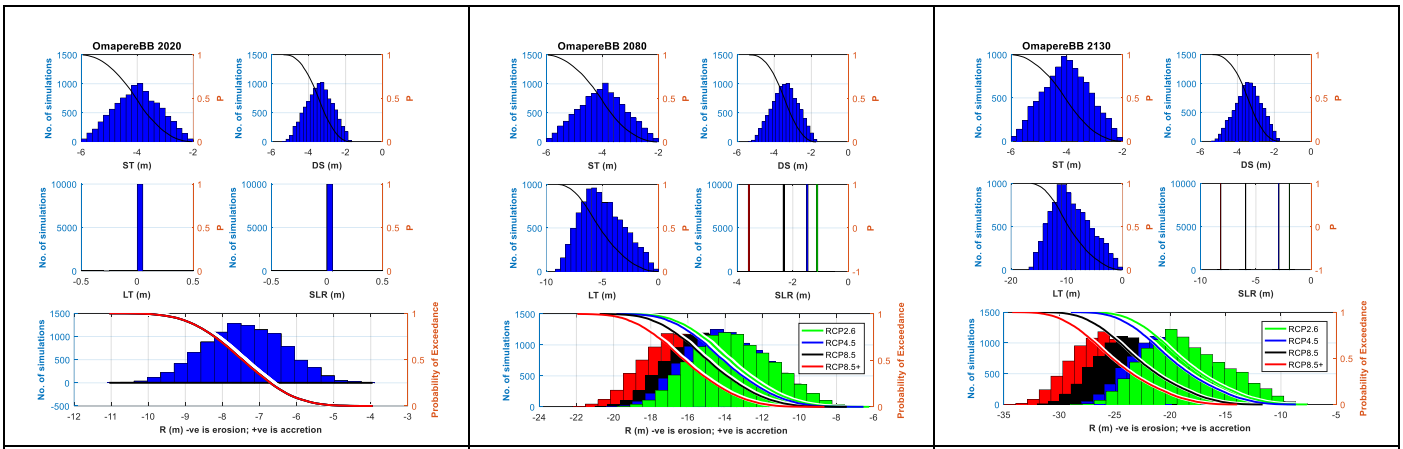
2020	2080	2130

Figure 31-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31A



2020	2080	2130

Figure 31-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31B



2020	2080	2130

Figure 31-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31BB

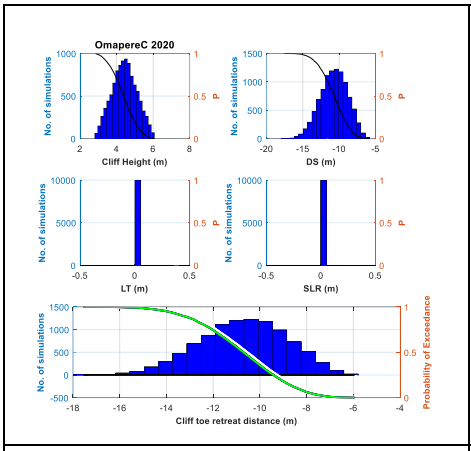
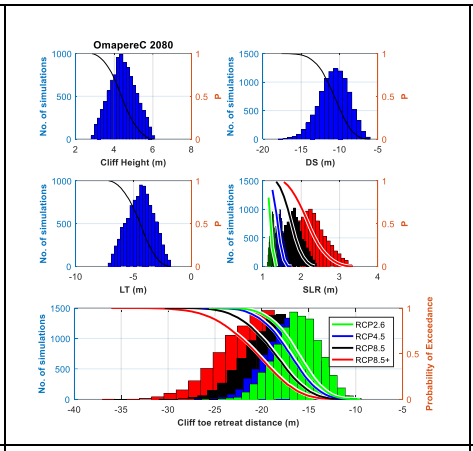
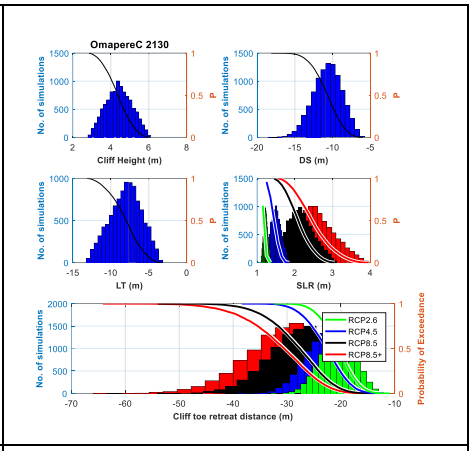
		
2020	*2080*	*2130*

Figure 31-4 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31C

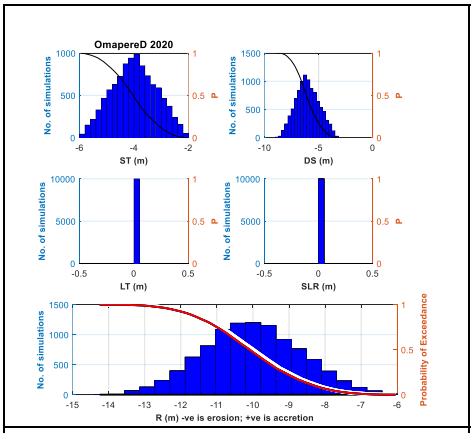
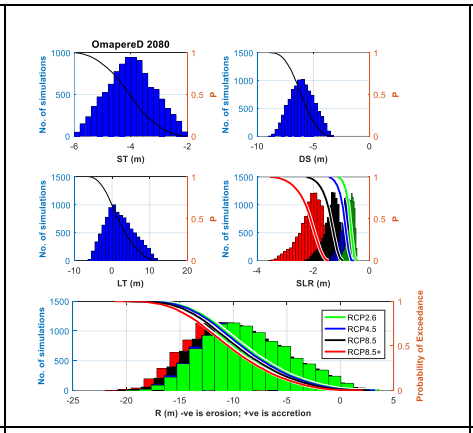
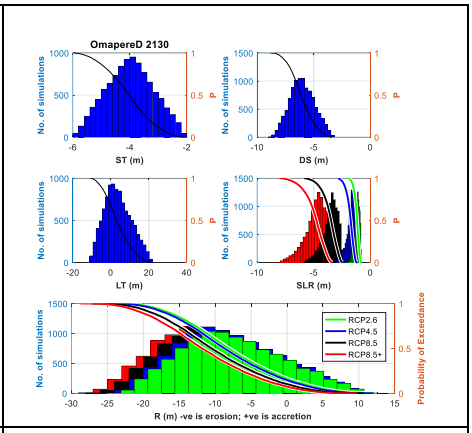
		
2020	*2080*	*2130*

Figure 31-5 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31D

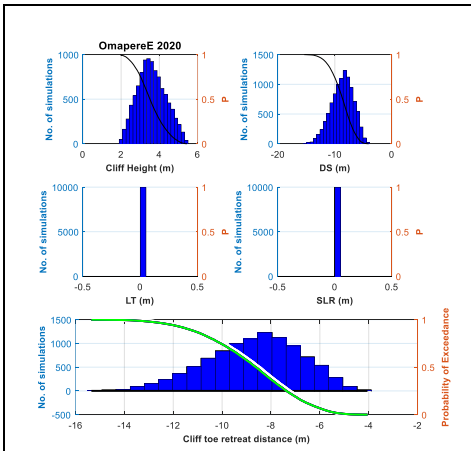
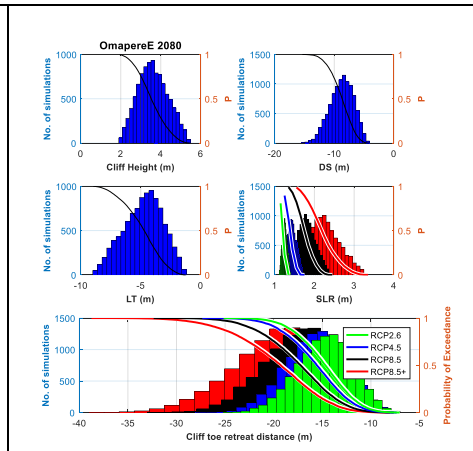
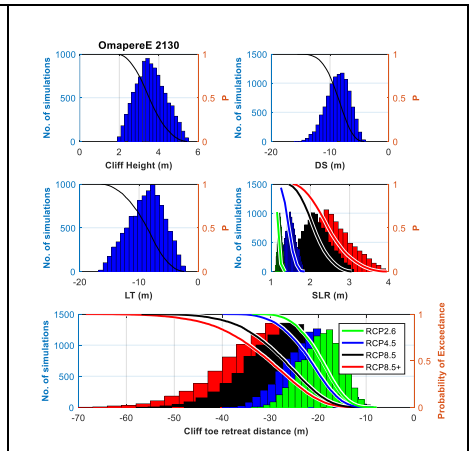
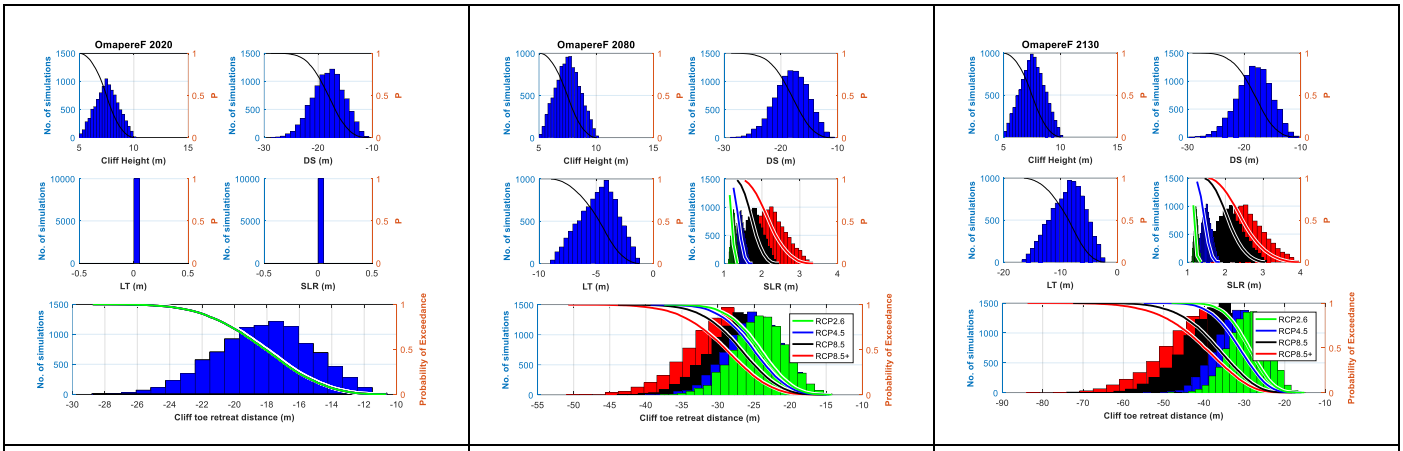
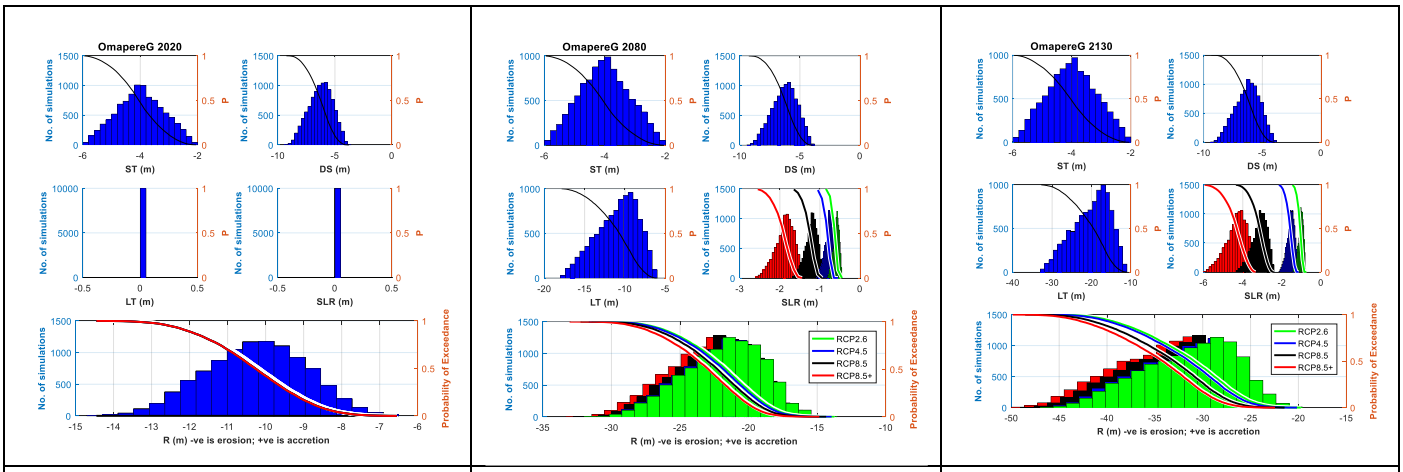
		
2020	*2080*	*2130*

Figure 31-6 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31E



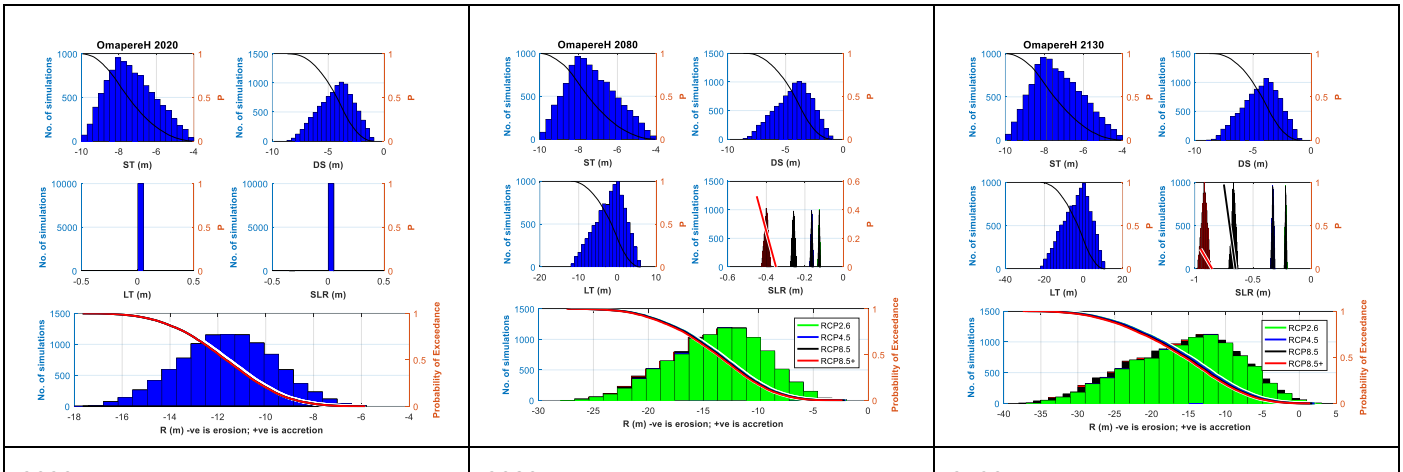
2020	2080	2130

Figure 31-7 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31F



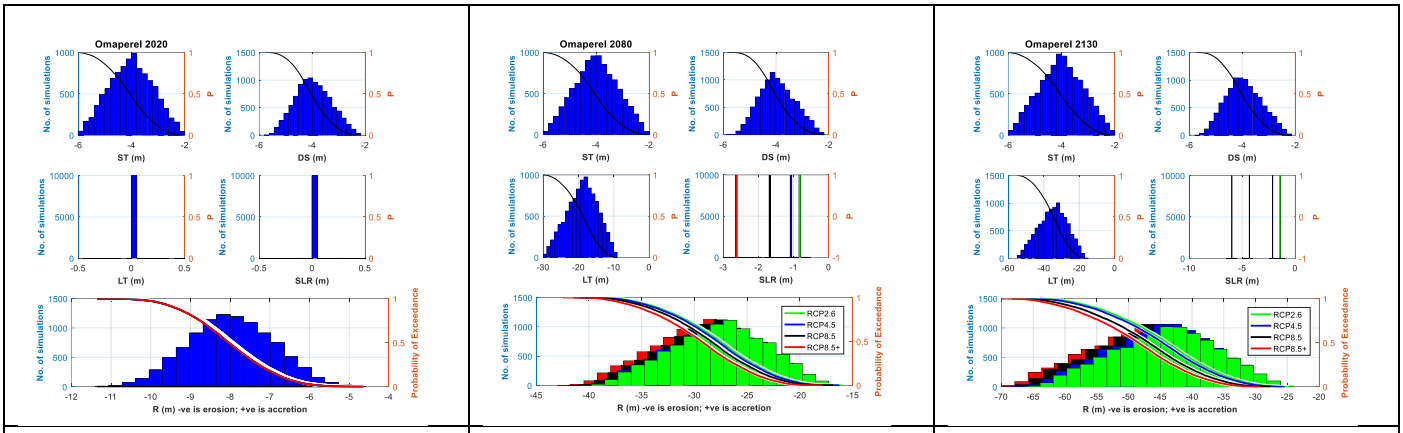
2020	2080	2130

Figure 31-8 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31G



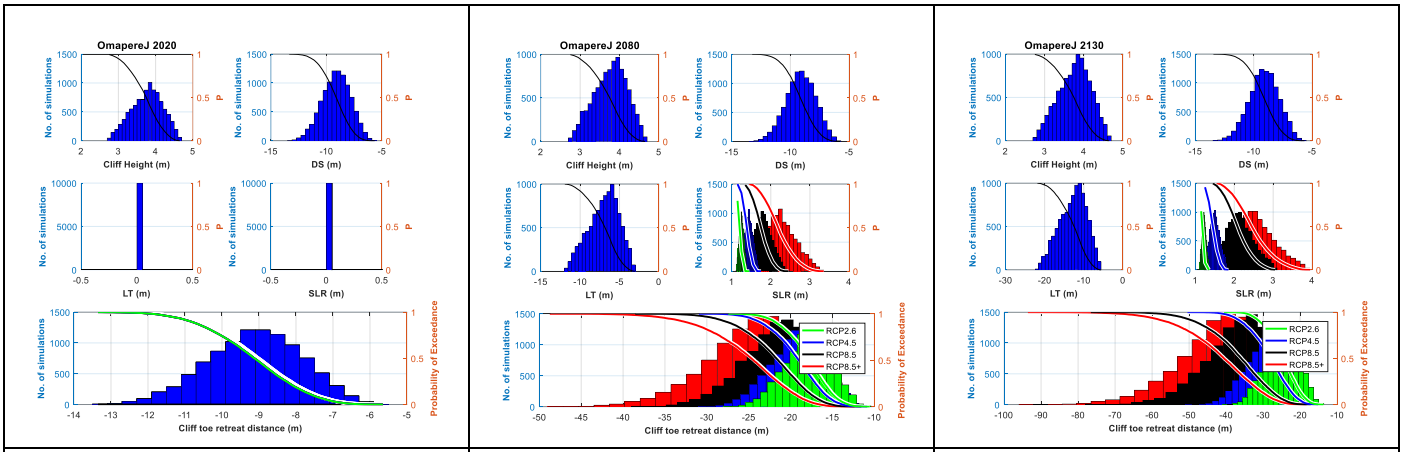
2020	2080	2130

Figure 31-9 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31H



2020	2080	2130

Figure 31-10 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31I



2020	2080	2130

Figure 31-11 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 31J

Table 31-2 Coastal Erosion Hazard Zone Widths For 2020

Site		31. Omapere										
Probability of CEHZ (m) Exceedance		A	B	BB	C	D	E	F	G	H	I	J
	Min	-4	-4	-4	-6	-6	-4	-11	-7	-6	-5	-6
	99%	-4	-5	-5	-7	-7	-5	-12	-7	-7	-6	-7
	95%	-5	-6	-6	-8	-8	-6	-14	-8	-8	-6	-7
	90%	-5	-6	-6	-8	-8	-6	-14	-9	-9	-7	-7
	80%	-5	-6	-6	-9	-9	-7	-16	-9	-10	-7	-8
	70%	-6	-7	-7	-10	-9	-8	-17	-10	-11	-7	-8
	66%	-6	-7	-7	-10	-9	-8	-17	-10	-11	-8	-9
	60%	-6	-7	-7	-10	-10	-8	-17	-10	-11	-8	-9
	50%	-6	-7	-7	-11	-10	-9	-18	-10	-12	-8	-9
	40%	-6	-8	-8	-11	-10	-9	-19	-11	-12	-8	-9
	33%	-7	-8	-8	-12	-11	-9	-19	-11	-13	-8	-10
	30%	-7	-8	-8	-12	-11	-10	-20	-11	-13	-9	-10
	20%	-7	-8	-8	-12	-11	-10	-21	-11	-13	-9	-10
	10%	-7	-9	-9	-13	-12	-11	-22	-12	-14	-9	-11
	5%	-8	-9	-9	-14	-12	-12	-23	-13	-15	-10	-11
	1%	-8	-10	-10	-15	-13	-13	-26	-13	-16	-10	-12
	Max	-9	-11	-11	-17	-14	-16	-29	-14	-18	-11	-14

Table 31-3 Coastal Erosion Hazard Zone Widths Projected for 2080

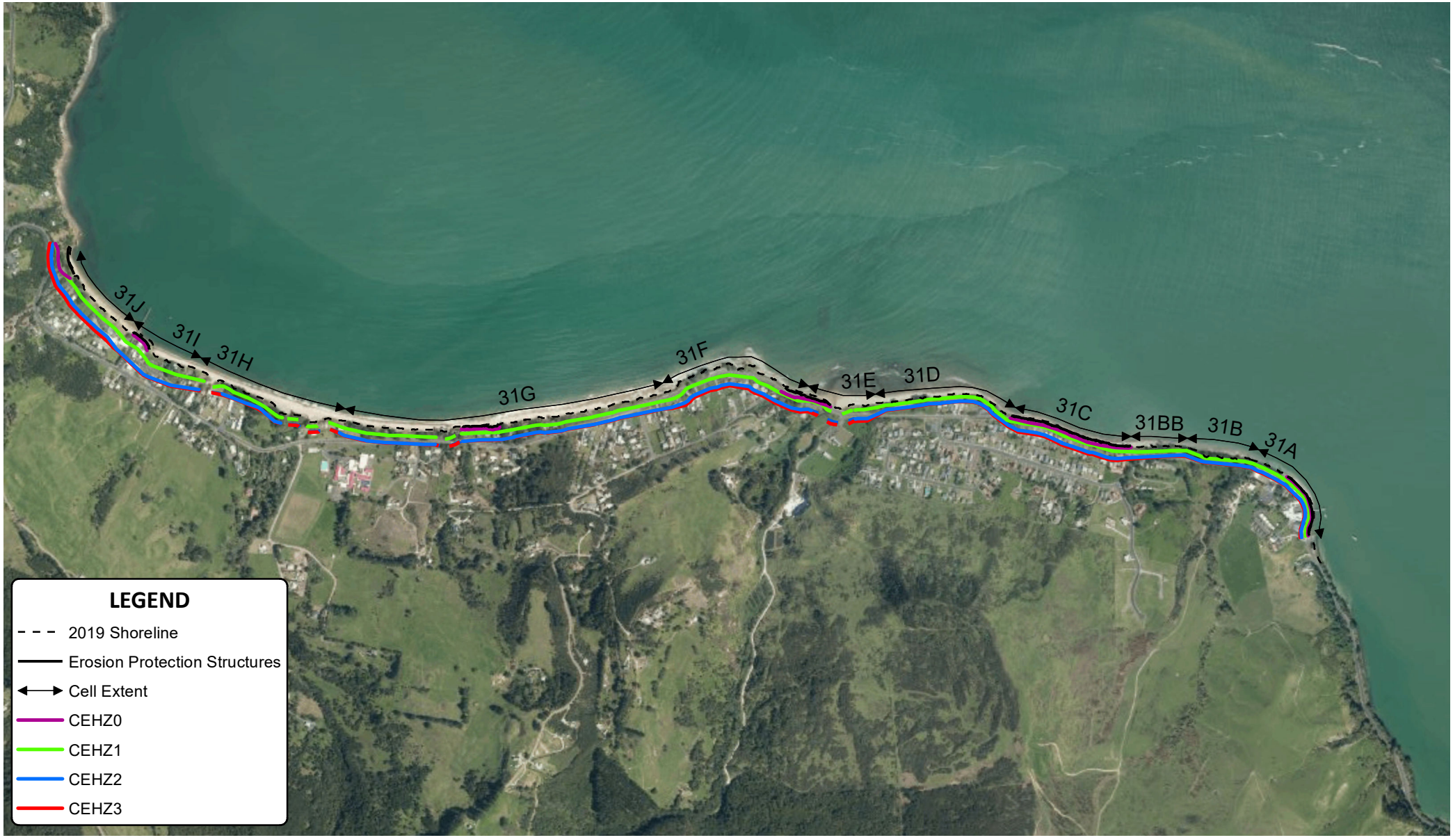
Site		31. Omapere																							
Cell		31A				31B				31BB				31C				31D				31E			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-5	-6	-6	-7	5	5	4	3	-6	-7	-7	-9	-10	-10	-10	-11	3	3	3	2	-7	-7	-8	-8
	99%	-7	-7	-8	-9	3	3	2	1	-9	-9	-10	-11	-11	-12	-13	-14	1	0	0	-1	-9	-9	-10	-11
	95%	-8	-8	-9	-10	1	0	0	-1	-10	-10	-11	-12	-13	-13	-14	-15	-2	-2	-2	-3	-10	-11	-12	-13
	90%	-9	-9	-10	-10	-1	-1	-2	-2	-11	-11	-12	-13	-13	-14	-15	-16	-3	-3	-4	-4	-11	-12	-13	-14
	80%	-10	-10	-11	-11	-3	-3	-3	-4	-12	-12	-13	-14	-14	-15	-16	-18	-5	-5	-6	-7	-12	-13	-14	-16
	70%	-11	-11	-11	-12	-4	-4	-5	-6	-12	-13	-14	-15	-15	-16	-17	-19	-7	-7	-7	-8	-13	-14	-15	-17
	66%	-11	-11	-12	-12	-5	-5	-6	-6	-13	-13	-14	-15	-15	-16	-17	-19	-7	-7	-8	-9	-13	-14	-16	-17
	60%	-11	-12	-12	-13	-5	-6	-6	-7	-13	-13	-14	-16	-16	-16	-18	-20	-8	-8	-9	-9	-14	-15	-16	-18
	50%	-12	-12	-13	-13	-6	-7	-7	-8	-14	-14	-15	-16	-16	-17	-19	-20	-9	-9	-10	-10	-15	-16	-17	-19
	40%	-13	-13	-13	-14	-7	-8	-8	-9	-14	-15	-15	-17	-17	-18	-19	-21	-10	-10	-11	-12	-15	-16	-18	-20
	33%	-13	-13	-14	-14	-8	-8	-9	-10	-15	-15	-16	-17	-17	-18	-20	-22	-11	-11	-12	-12	-16	-17	-19	-21
	30%	-13	-13	-14	-15	-8	-9	-9	-10	-15	-15	-16	-17	-17	-18	-20	-23	-11	-11	-12	-13	-16	-17	-19	-22
	20%	-14	-14	-14	-15	-10	-10	-10	-11	-15	-16	-17	-18	-18	-19	-21	-24	-12	-12	-13	-14	-17	-18	-21	-23
	10%	-14	-15	-15	-16	-11	-11	-12	-13	-16	-17	-17	-19	-19	-20	-23	-25	-14	-14	-14	-15	-19	-20	-22	-26
	5%	-15	-15	-16	-16	-12	-12	-13	-14	-17	-17	-18	-19	-20	-21	-24	-27	-15	-15	-15	-16	-20	-21	-24	-28
	1%	-16	-16	-17	-17	-14	-14	-15	-15	-18	-18	-19	-20	-22	-23	-26	-30	-16	-17	-17	-18	-22	-23	-27	-31
	Max	-18	-18	-18	-19	-16	-16	-17	-18	-20	-20	-21	-22	-26	-26	-30	-36	-19	-20	-20	-21	-25	-27	-32	-39
	CEHZ1	-12				-10				-14				-17				-10				-16			

Site		31. Omapere																			
Cell		31F				31G				31H				31I				31J			
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	-15	-15	-14	-14	-14	-15	-2	-2	-2	-2	-16	-16	-17	-18	-11	-11	-12	-12
	99%	-17	-17	-18	-19	-16	-16	-17	-17	-5	-5	-5	-5	-19	-19	-20	-20	-12	-13	-14	-15
	95%	-19	-19	-20	-21	-18	-18	-18	-19	-7	-7	-7	-7	-21	-21	-21	-22	-14	-14	-16	-18
	90%	-20	-20	-22	-23	-18	-19	-19	-20	-8	-9	-9	-9	-22	-22	-23	-24	-15	-15	-17	-19
	80%	-21	-22	-23	-25	-19	-19	-20	-21	-10	-10	-10	-10	-24	-24	-25	-25	-16	-17	-18	-20
	70%	-22	-23	-25	-26	-20	-20	-21	-21	-11	-11	-11	-12	-25	-25	-26	-27	-16	-17	-19	-22
	66%	-23	-23	-25	-27	-20	-21	-21	-22	-12	-12	-12	-12	-26	-26	-27	-27	-17	-18	-20	-22
	60%	-23	-24	-26	-28	-21	-21	-21	-22	-12	-12	-12	-13	-26	-27	-27	-28	-17	-18	-20	-23
	50%	-24	-25	-27	-29	-22	-22	-22	-23	-13	-13	-14	-14	-27	-28	-28	-29	-18	-19	-21	-24
	40%	-25	-26	-28	-30	-22	-23	-23	-24	-15	-15	-15	-15	-29	-29	-30	-31	-18	-20	-22	-26
	33%	-26	-27	-29	-31	-23	-23	-24	-24	-15	-16	-16	-16	-30	-30	-30	-31	-19	-20	-23	-27
	30%	-26	-27	-29	-32	-23	-23	-24	-25	-16	-16	-16	-16	-30	-30	-31	-32	-19	-21	-24	-27
	20%	-27	-28	-30	-33	-24	-25	-25	-26	-17	-17	-18	-18	-32	-32	-33	-33	-20	-22	-25	-29
	10%	-29	-30	-33	-36	-26	-26	-26	-27	-20	-20	-20	-20	-34	-34	-35	-36	-22	-23	-27	-32
	5%	-30	-32	-34	-38	-27	-27	-28	-28	-21	-21	-21	-21	-35	-36	-36	-37	-23	-25	-29	-35
	1%	-33	-35	-38	-42	-29	-29	-29	-30	-24	-24	-24	-24	-37	-38	-38	-39	-24	-27	-32	-39
	Max	-37	-39	-44	-51	-31	-32	-32	-33	-27	-27	-27	-27	-41	-41	-41	-42	-27	-31	-39	-49
	CEHZ1	-25				-21				-12				-27				-20			

Table 31-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		31. Omapere																			
Cell		31A				31B				31C				31D				31E			
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	-6	-7	-9	-10	14	13	11	9	-8	-9	-12	-14	-11	-12	-14	-14	12	12	11	10
	99%	-8	-9	-11	-12	11	10	8	6	-10	-11	-14	-16	-14	-15	-17	-18	9	8	6	5
	95%	-10	-11	-13	-14	7	6	4	2	-12	-13	-16	-18	-16	-17	-20	-21	5	4	3	1
	90%	-11	-12	-14	-15	5	4	2	0	-13	-14	-17	-20	-17	-18	-21	-23	3	2	0	-1
	80%	-13	-14	-16	-17	1	0	-2	-4	-15	-16	-19	-21	-18	-20	-23	-25	-1	-2	-3	-5
	70%	-15	-15	-17	-18	-2	-2	-5	-6	-17	-18	-21	-23	-19	-21	-25	-27	-4	-4	-6	-7
	66%	-15	-16	-17	-19	-2	-3	-5	-7	-17	-18	-21	-23	-19	-21	-25	-28	-5	-5	-7	-8
	60%	-16	-16	-18	-19	-4	-4	-7	-8	-18	-19	-22	-24	-20	-22	-26	-29	-6	-7	-8	-10
	50%	-17	-17	-19	-21	-6	-6	-9	-10	-19	-20	-23	-25	-20	-23	-28	-30	-8	-9	-10	-12
	40%	-18	-18	-20	-21	-8	-8	-11	-12	-20	-21	-24	-26	-21	-24	-29	-32	-10	-10	-12	-14
	33%	-18	-19	-21	-22	-9	-9	-12	-13	-21	-22	-25	-27	-22	-24	-30	-34	-11	-12	-14	-15
	30%	-19	-19	-21	-22	-9	-10	-12	-14	-21	-22	-25	-27	-22	-25	-31	-34	-12	-12	-14	-15
	20%	-20	-20	-22	-23	-11	-12	-14	-16	-22	-23	-26	-28	-23	-26	-33	-37	-14	-14	-16	-18
	10%	-21	-22	-23	-25	-14	-15	-17	-19	-23	-24	-27	-29	-25	-28	-36	-40	-16	-17	-19	-20
	5%	-22	-22	-24	-26	-16	-17	-19	-20	-24	-25	-28	-30	-26	-29	-38	-43	-18	-19	-21	-22
	1%	-23	-24	-26	-27	-18	-19	-21	-23	-26	-27	-30	-32	-28	-32	-42	-49	-21	-21	-23	-25
	Max	-25	-25	-27	-28	-21	-22	-25	-26	-28	-29	-32	-34	-32	-38	-54	-64	-24	-25	-27	-29
	CEHZ2	-24				-19				-28				-38				-21			
	CEHZ3	-26				-20				-30				-43				-22			

Site		31. Omapere																			
Cell		31F				31G				31H				31I				31J			
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	-15	-16	-17	-18	-20	-20	-21	-22	2	2	2	1	-25	-25	-28	-29	-14	-15	-17	-18
	99%	-19	-21	-23	-24	-23	-23	-25	-26	-2	-2	-2	-2	-28	-29	-31	-33	-16	-18	-21	-23
	95%	-22	-23	-26	-27	-24	-25	-27	-28	-5	-5	-5	-5	-31	-32	-34	-36	-18	-20	-24	-26
	90%	-23	-25	-28	-30	-26	-26	-28	-29	-7	-7	-7	-7	-34	-35	-37	-38	-19	-22	-26	-29
	80%	-25	-27	-31	-33	-27	-28	-29	-30	-9	-9	-10	-10	-37	-38	-40	-42	-21	-23	-29	-32
	70%	-26	-28	-33	-35	-28	-29	-30	-32	-11	-11	-12	-12	-40	-40	-43	-44	-22	-25	-32	-35
	66%	-27	-29	-34	-36	-29	-29	-31	-32	-12	-12	-12	-13	-41	-41	-43	-45	-23	-26	-32	-36
	60%	-28	-30	-35	-37	-30	-30	-32	-33	-13	-13	-13	-14	-42	-43	-45	-46	-23	-26	-34	-38
	50%	-29	-31	-37	-40	-31	-31	-33	-34	-15	-15	-15	-15	-44	-45	-47	-48	-24	-28	-36	-41
	40%	-30	-33	-39	-42	-32	-33	-34	-36	-17	-17	-17	-18	-46	-47	-49	-51	-26	-29	-38	-43
	33%	-31	-34	-40	-44	-33	-34	-36	-37	-18	-19	-19	-19	-48	-48	-51	-52	-27	-31	-40	-45
	30%	-31	-34	-41	-45	-34	-35	-36	-37	-19	-19	-20	-20	-49	-49	-51	-53	-27	-31	-41	-46
	20%	-33	-36	-44	-48	-36	-36	-38	-39	-22	-22	-22	-23	-52	-52	-54	-56	-29	-33	-44	-50
	10%	-35	-39	-47	-53	-38	-39	-41	-42	-25	-25	-26	-26	-55	-56	-58	-60	-31	-36	-48	-56
	5%	-37	-41	-51	-57	-40	-41	-42	-43	-28	-28	-28	-29	-58	-59	-61	-63	-33	-38	-52	-61
	1%	-40	-44	-57	-65	-43	-43	-45	-46	-32	-32	-32	-33	-61	-62	-64	-66	-35	-42	-60	-72
	Max	-48	-55	-72	-84	-46	-47	-49	-50	-37	-37	-37	-37	-65	-66	-68	-70	-41	-50	-77	-94
	CEHZ2	-51				-42				-28				-61				-52			
	CEHZ3	-57				-43				-29				-63				-61			



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

A4 SCALE 1:15,000

0 0.1 0.2 0.3 0.4 0.5 (km)

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Coastal Erosion Hazard Assessment
Omapere and Opononi

Site: 31

FIGURE No. Figure 31-12

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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 1:15,000

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)	1:15,000	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Omapere and Opononi
Site: 31

FIGURE No. Figure 31-13

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