36 Long Beach

36.1 Description and geomorphology

Long Beach is located on the east coast, in the semi-sheltered waters of Oneroa Bay on the Russell peninsula. Figure 36.1 shows the site and its division into four coastal cells for the purpose of assessing coastal erosion hazards. Photos from the site visit are presented in Figure 36.2 and identify these cells.

Long beach is 1 km long and faces to the northeast being reasonably sheltered from open ocean wind and swell waves because of islands and mainland peninsulas located in all primary fetch directions. The morphology is typical of a low tide terrace beach, with dunes and a relatively steep and narrow beach face before a flatter terrace extends seaward from the low tide mark. Sediment in the lower beach is fine well sorted sand, with poorly sorted coarse sand at the upper beach and dune. The present-day beach is backed by a sedimentary coastal plain that was likely deposited as coastal sediments in the Holocene but may also be influenced by colluvium deposited from eroded hillslope material. The low-lying plain extends landward from the fore-dune crest for 30-50 m before reaching the base of a hillslope comprised of Waipapa greywacke geology.

Figure 36.1: Map showing 2019 shoreline position and cell extents with background aerial imagery from 2014.

Figure 36.2: Photos from Long Beach site visit on 21/01/2020.

36.2 Local considerations

The beach is a popular summer destination and a road runs along just landward of the dune crest for the majority of the site, with houses on the landward side. Dunes are not present at the north section and here the grass coastal terrace has been flattened by vehicle and human use. Coast Care dune restoration work has taken place along most of the main beach, as evidenced by planted vegetation, roped off beach access paths and signage.

36.3 Component values

Long beach is split into four cells for assessing coastal erosion, based on spatial differences in historic shoreline change and geomorphology. Cell A is located at the north end where an unconsolidated coastal terrace transitions into beach with a slight scarp and no dune features. The remaining cells are characterised by dunes, with Cell B and C strongly influenced by Coast Care work. All cells were

assessed using the unconsolidated beach method. Due to the mobile nature of dune sediment compared to the grassed terrace, the dune sites (i.e. Cells B-D) have a larger short-term component compared to Cell A. The dune height is reasonably consistent at Long Beach with a mean of 2 m and a slight increase in height moving from northwest to southeast. The analysed historic shoreline change shows a northwest to southeast gradient, with the highest rate of erosion at the north end, dynamically stable at the centre and accretion towards the south end at Cells C and D. The gradient in dune height and long-term change is likely influence by northwest to southeast sediment transport. It is likely that without dune restoration efforts the shoreline would be in a more erosive state. Shoreline retreat due to sea level rise was assessed using the closure slope and beach slope as described in the main report (T+T, 2020).

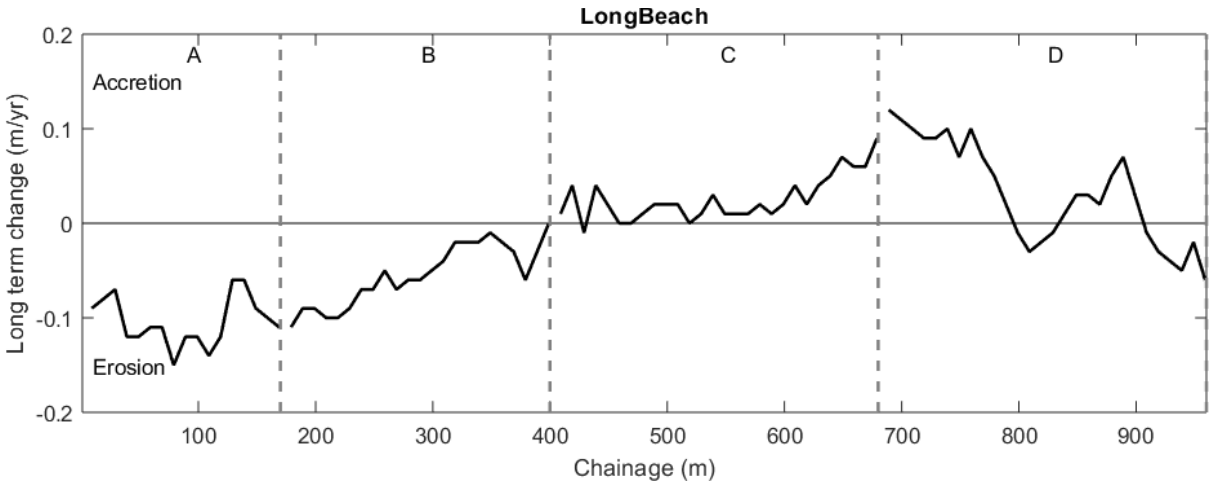


Figure 36.3: Rate of long-term shoreline change along the site showing each cell.

Table 36.1: Component values for Erosion Hazard Assessment

Site		36. Long Beach			
Cell		**36A**	**36B**	**36C**	**36D**
Cell centre (NZTM)	E	1702947	1703062	1703272	1703550
	N	6097786	6097665	6097539	6097443
Chainage, m (from E)		1-160	160-400	400-680	680-950
Morphology		Coastal terrace	Dune	Dune	Dune
Short-term (m)	Min	5	10	10	10
	Mode	8	15	15	15
	Max	10	20	20	20
Dune/Cliff elevation (m above toe or scarp)	Min	0.1	1.5	1.5	0.8
	Mode	1.6	2.0	2.0	2.3
	Max	2.5	2.5	2.5	4.6
Stable angle (deg)	Min	30	30	30	30
	Mode	32	32	32	32
	Max	34	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	-0.15	-0.10	0.00	-0.05
	Mode	-0.12	-0.06	0.00	0.00
	Max	-0.08	-0.02	0.05	0.05
Closure slope (beaches) / Cliff response factor	Min	0.021	0.021	0.021	0.021
	Mode	0.026	0.026	0.026	0.026
	Max	0.134	0.134	0.134	0.134

Table 36.2: Adopted sea level rise values (m) based on four scenarios included in MfE (2017) adjusted to 2019 baseline

Coastal type	Year	RCP2.6M	RCP4.5M	RCP8.5M	RCP8.5+
Unconsolidated beach[1]	2080	0.16	0.21	0.33	0.51
	2130	0.28	0.42	0.85	1.17

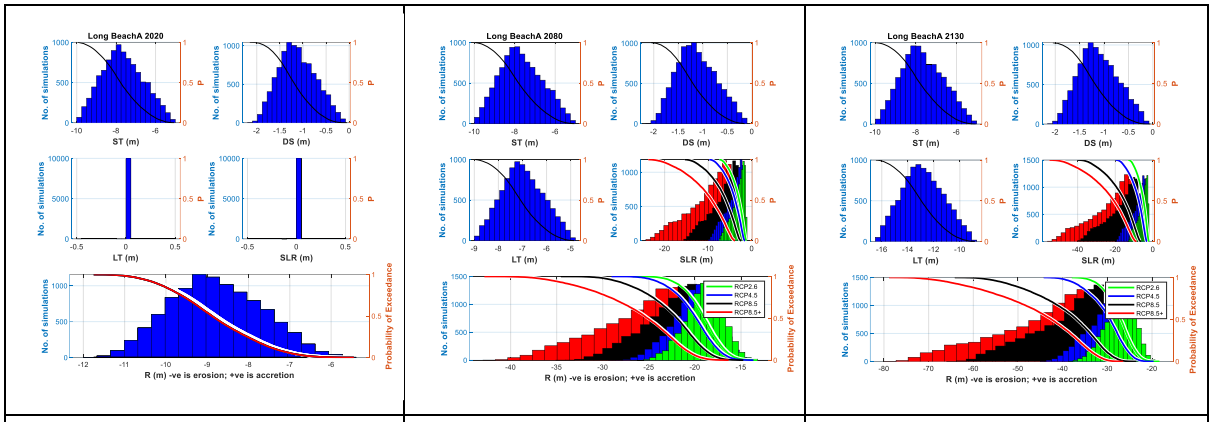
[1]Adjusted to remove the influence of historic SLR (2.2 mm/year) on long-term rates of shoreline change

36.4 Coastal erosion hazard assessment

Histograms of individual components and resultant CEHZ distances computed using a Monte Carlo technique are shown in Figure 36.4 to Figure 36.7. Coastal Erosion Hazard Zone are presented within Table 36.3 to Table 36.5 and mapped in Figure 36.8.

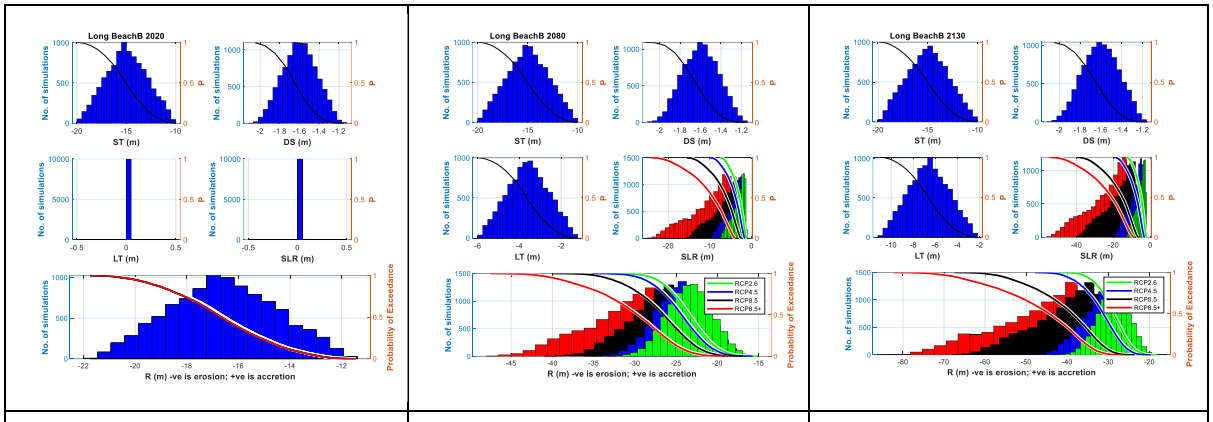
CEHZ1 distances range from 21 to 25 m, CEHZ2 distances range from 50 to 56 m and CEHZ3 distances range from 61 to 66 m.

Figure 36.9 shows the available historic shorelines for Long Beach.



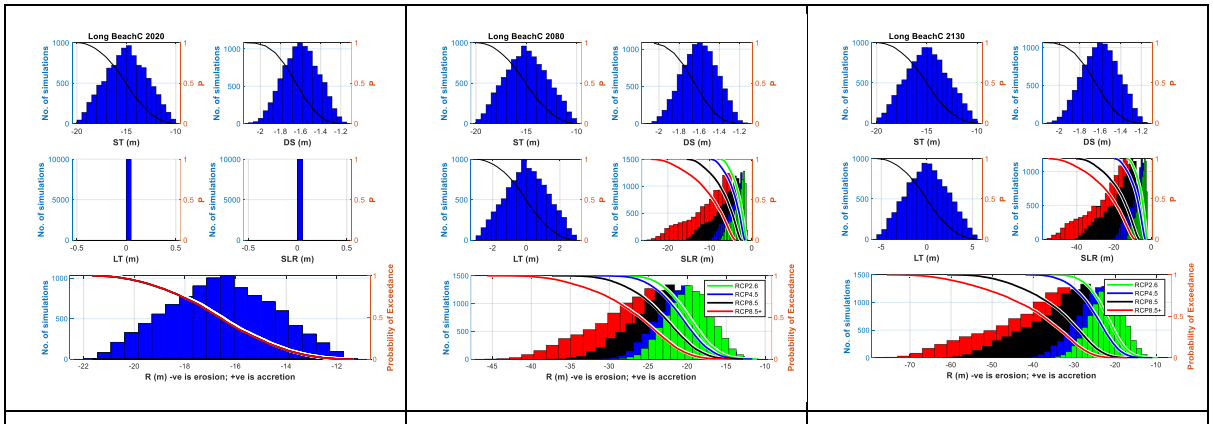
2020	2080	2130

Figure 36.4: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 36A



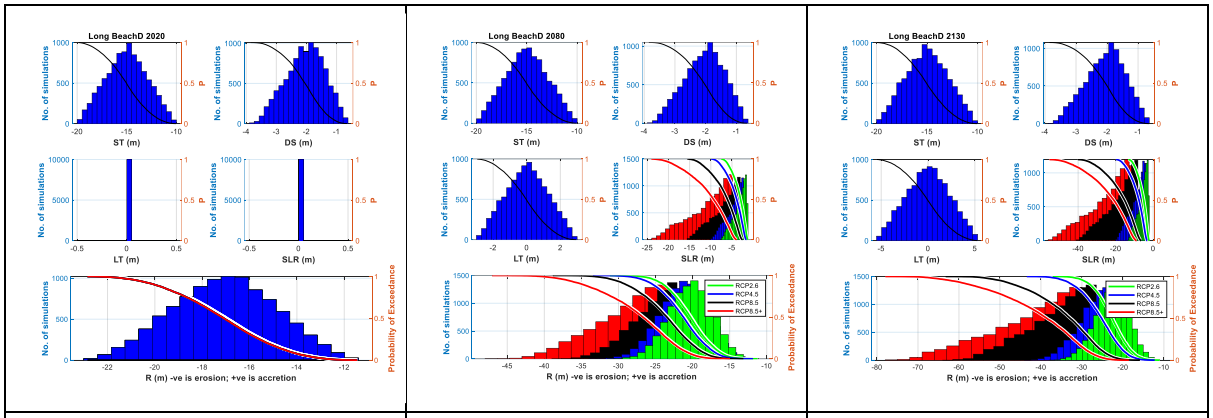
2020	2080	2130

Figure 36.5: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 36B



2020	2080	2130

Figure 36.6: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 36C



2020	2080	2130

Figure 36.7: Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 36D

Table 36.3: Coastal Erosion Hazard Zone Widths (m) Projected for 2020

Site		36. Long Beach			
	Cell	36A	36B	36C	36D
Probability of CEHZ (m) Exceedance	Min	-5	-11	-11	-11
	99%	-6	-12	-12	-12
	95%	-7	-13	-13	-14
	90%	-7	-14	-14	-14
	80%	-8	-15	-15	-15
	70%	-8	-15	-15	-16
	66%	-8	-16	-16	-16
	60%	-9	-16	-16	-16
	50%	-9	-17	-17	-17
	40%	-9	-17	-17	-18
	33%	-9	-18	-18	-18
	30%	-9	-18	-18	-18
	20%	-10	-18	-18	-19
	10%	-10	-19	-19	-20
	5%	-11	-20	-20	-21
	1%	-11	-21	-21	-22
	Max	-12	-22	-22	-23

Table 36.4: Coastal Erosion Hazard Zone Widths (m) Projected for 2080

Site		36. Long Beach															
Cell		36A				36B				36C				36D			
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+
Probability of CEHZ (m) Exceedance	Min	-13	-14	-15	-16	-15	-16	-17	-18	-11	-12	-13	-14	-11	-12	-13	-15
	99%	-15	-15	-17	-18	-18	-18	-20	-21	-14	-14	-15	-17	-14	-15	-16	-18
	95%	-16	-16	-18	-20	-19	-20	-21	-23	-15	-16	-17	-19	-16	-16	-18	-20
	90%	-17	-17	-19	-21	-20	-21	-22	-24	-16	-17	-18	-21	-17	-17	-19	-21
	80%	-17	-18	-20	-22	-21	-22	-24	-26	-17	-18	-20	-22	-18	-19	-20	-23
	70%	-18	-19	-20	-23	-22	-23	-25	-27	-18	-19	-21	-24	-19	-20	-21	-24
	66%	-18	-19	-21	-23	-22	-23	-25	-28	-19	-19	-21	-24	-19	-20	-22	-25
	60%	-18	-19	-21	-24	-23	-24	-26	-28	-19	-20	-22	-25	-20	-20	-22	-25
	50%	-19	-20	-22	-25	-23	-24	-26	-30	-20	-21	-23	-26	-20	-21	-23	-27
	40%	-19	-20	-23	-26	-24	-25	-27	-31	-20	-21	-24	-28	-21	-22	-24	-28
	33%	-20	-21	-24	-28	-25	-26	-28	-32	-21	-22	-25	-29	-22	-23	-25	-29
	30%	-20	-21	-24	-28	-25	-26	-29	-33	-21	-22	-25	-29	-22	-23	-26	-30
	20%	-21	-22	-25	-30	-26	-27	-30	-35	-22	-23	-27	-31	-23	-24	-27	-32
	10%	-22	-23	-27	-33	-27	-28	-32	-38	-24	-25	-29	-35	-24	-25	-29	-35
	5%	-23	-24	-29	-35	-28	-29	-34	-40	-25	-26	-30	-37	-25	-27	-31	-37
	1%	-24	-26	-31	-38	-30	-31	-36	-43	-26	-28	-33	-40	-27	-29	-33	-41
	Max	-27	-29	-35	-43	-33	-35	-40	-47	-30	-32	-37	-46	-31	-33	-39	-47
	CEHZ1	-21				-25				-21				-22			

Table 36.5: Coastal Erosion Hazard Zone Widths (m) Projected for 2130

Site		36. Long Beach															
Cell		36A				36B				36C				36D			
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+
Probability of CEHZ (m) Exceedance	Min	-18	-20	-24	-26	-18	-20	-24	-26	-10	-11	-14	-17	-11	-12	-16	-19
	99%	-21	-23	-27	-30	-21	-23	-27	-30	-14	-15	-20	-23	-14	-16	-20	-23
	95%	-22	-24	-28	-32	-23	-25	-29	-33	-16	-18	-23	-26	-16	-18	-23	-26
	90%	-23	-25	-30	-33	-24	-26	-31	-35	-17	-19	-24	-28	-18	-20	-25	-28
	80%	-24	-26	-32	-35	-26	-28	-33	-37	-19	-21	-26	-30	-19	-21	-27	-31
	70%	-25	-27	-33	-37	-27	-29	-35	-39	-20	-22	-28	-33	-21	-23	-29	-33
	66%	-26	-28	-34	-38	-27	-29	-36	-40	-20	-23	-29	-34	-21	-23	-30	-34
	60%	-26	-28	-35	-40	-28	-30	-37	-42	-21	-23	-30	-35	-22	-24	-31	-36
	50%	-27	-29	-37	-42	-29	-31	-39	-44	-22	-25	-32	-38	-23	-25	-33	-39
	40%	-28	-30	-39	-46	-30	-32	-41	-48	-23	-26	-34	-41	-24	-26	-35	-42
	33%	-28	-31	-41	-48	-30	-33	-43	-50	-24	-27	-36	-44	-24	-27	-37	-44
	30%	-29	-32	-42	-50	-31	-34	-44	-52	-24	-27	-37	-45	-25	-28	-38	-46
	20%	-30	-34	-46	-55	-32	-36	-48	-57	-26	-29	-41	-50	-26	-30	-41	-50
	10%	-32	-36	-51	-62	-34	-38	-53	-64	-27	-32	-46	-57	-28	-32	-46	-57
	5%	-33	-38	-54	-66	-35	-40	-56	-68	-29	-34	-49	-61	-30	-34	-50	-62
	1%	-35	-41	-58	-72	-38	-43	-61	-74	-32	-37	-55	-68	-32	-38	-55	-68
	Max	-38	-44	-64	-79	-42	-48	-67	-82	-36	-42	-61	-76	-37	-43	-63	-78
	CEHZ2	-54				-56				-49				-50			
	CEHZ3	-66				-68				-61				-62			

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

A4 SCALE 1:4,500

0 0.1 0.2 (km)

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NORTHLAND REGIONAL COUNCIL

Coastal Erosion Hazard Assessment

Long Beach

Site: 36

FIGURE No. Figure 36-8

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 1:4,500

0 0.1 0.2 (km)

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ARCFILE	1012360_Historicv2.mxd	
SCALE (AT A4 SIZE)	1:4,500	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Long Beach
Site: 36

FIGURE No. Figure 36-9

Rev. 1

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