

15 Te Mimiha (Helena)

Description and geomorphology

Te Mimiha Bay site is situated within Helena Bay, which is located approximately 35 km north of Whangarei. The site is a pocket beach embayment situated between the two headlands of Otama Point in the north and Te Maurea Point in the south.

The site shoreline is approximately 360 m long. The backshore is relatively flat with an elevation of approximately RL 4 to 6 m. The beach comprises medium to coarse sand with a portion of pebbles. The beach has a wide high tide berm and a relatively steep beach slope.

The site comprises a mobile spit feature that is likely to experience significant shoreline fluctuation over time. The spit width is approximately 90 m from the dune toe at the narrowest point and no dune system with vegetation exists.

The Mimiha Stream meanders behind the spit feature and cuts through the shoreline at the northern end of the site. The Mimiha stream is a significant feature at this site that controls the shoreline position over time. Based on visual observations the stream is likely to cause flooding and shoreline movement across most of the site.

The topography rises up to a headland at the southern end of the site. The southern headland comprises Greywacke and argillite with tectonically enclosed basalt.

Local considerations

There is a rock revetment located at the southern end of the site that is approximately 70 m long. The Mimiha stream influences the shoreline position at the spit and there is a greater level of uncertainty in this area because of fluvial processes. The resulting hazard zones are dashed in this area to reflect this uncertainty.

The shoreline north of the stream has also fluctuated over time and we have offset the hazard zones from the most landward shoreline (1951). The backshore area is also hillslope topography north of the stream and the hazard



Site Photograph A (southern end)



Site Photograph B (beach face)



Site Photograph C (spit backshore)

zones are dashed in this area to reflect the uncertainty in slope instability in this area.

Coastal Erosion Hazard Assessment

The site is split into three cells based on differences in geomorphology, dune height and shoreline movement trends.

Adopted component values are presented within Table 15-1. Short-term values for the northern section have been set to zero and the most landward shoreline (1951) adopted as the baseline.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 15-1 to Figure 15-3. Coastal Erosion Hazard Zone widths are presented within Table 15-2 and Figure 15-4.

The CEHZ1 value for Cell A has been rounded from 9 m to the minimum 10 m width and CEHZ2

has been set at 25 m due to the adopted landward baseline at this end.

CEHZ's have been mapped in agreement with the calculated values, although the CEHZ2 value has been located landward of the Te Mimihi Stream rather than on the landward edge of the low vegetated spit and is dashed to reflect the uncertainties to the north. Note that cell 15A has experienced accretion since about 1950 along approximately 150 m, with CEHZs offset from the accreted most recent shoreline.

Figure 15-5 shows the available historic shorelines for Te Mimihi (Helena).

Table 15-1 Component values for Erosion Hazard Assessment

Site		15. Helena		
Cell		15A	15B	15C ²
Cell centre (NZTM)	E	1723541	1723538	1723566
	N	6078346	6078196	6078096
Chainage, m (from N/W)		0-160	150-300	300-360
Morphology		Inlet	Dune	Soft Cliff
Short-term (m)	Min	0	10	0
	Mode	0	15	0
	Max	0	20	0
Dune/Cliff elevation (m above toe or scarp)	Min	3.6	3.6	5.8
	Mode	4.5	4.5	6.7
	Max	5.9	5.9	8.2
Stable angle (deg)	Min	30	30	26.6
	Mode	32	32	30.2
	Max	34	34	33.7
Long-term (m) -ve erosion +ve accretion	Min	0.1	0.1	-0.05
	Mode	0	0	-0.1
	Max	-0.1	-0.1	-0.15
Closure slope (beaches)	Min	0.107	0.107	0.75
	Mode	0.024	0.024	0.5
	Max	0.012	0.012	0.25
SLR 2065 (m)	Min	0.19	0.19	0.19
	Mode	0.29	0.29	0.29
	Max	0.39	0.39	0.39
SLR 2115 (m)	Min	0.45	0.45	0.45
	Mode	0.77	0.77	0.77
	Max	1.1	1.1	1.1

² CEHZO included behind coastal protection structure

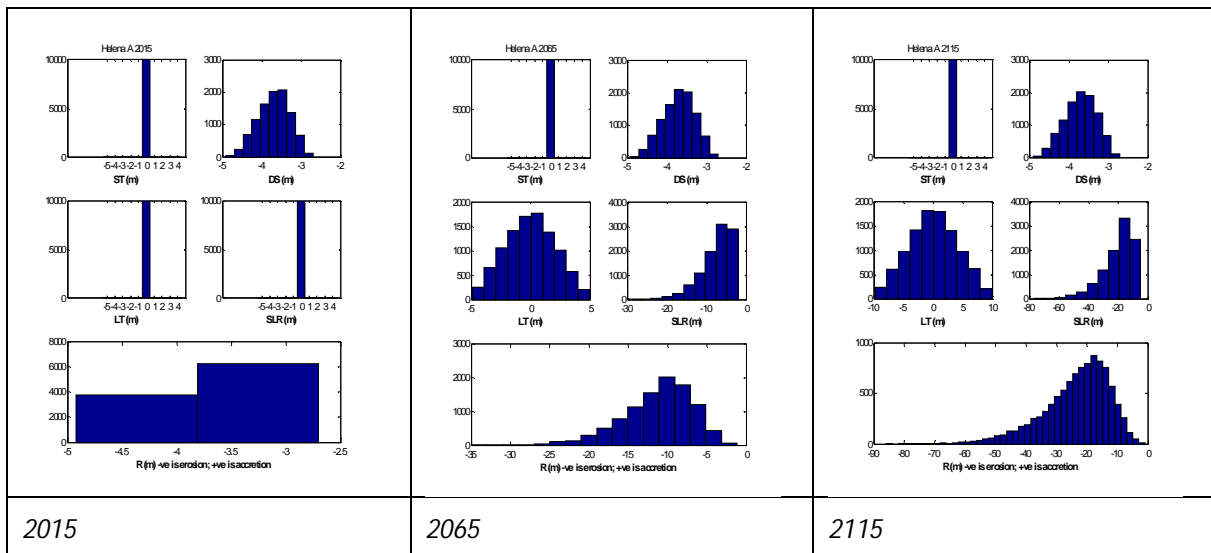


Figure 15-1 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 15A

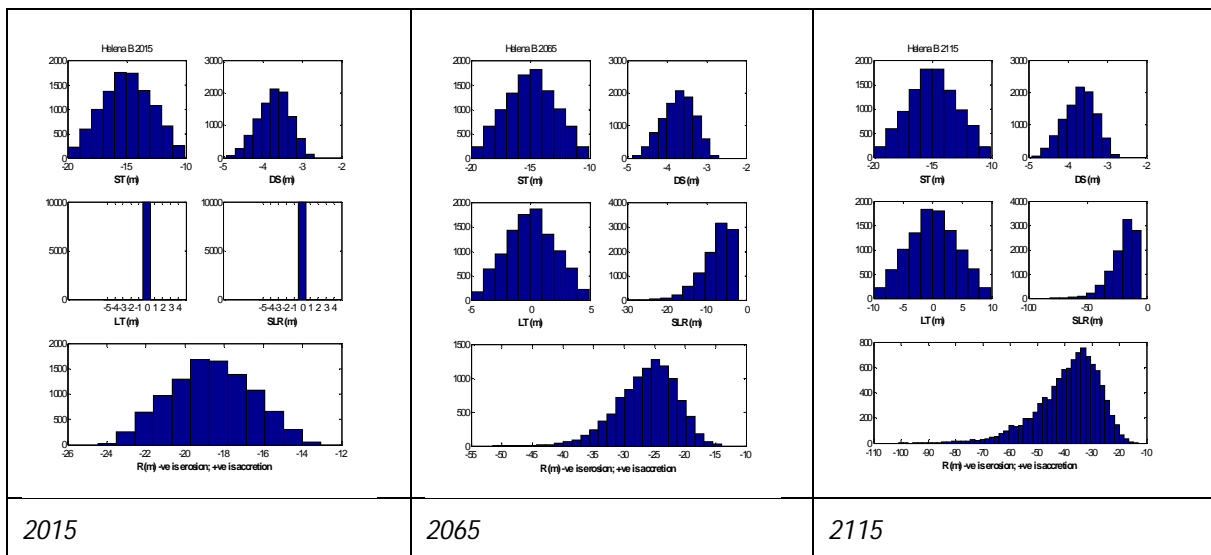


Figure 15-2 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 15B

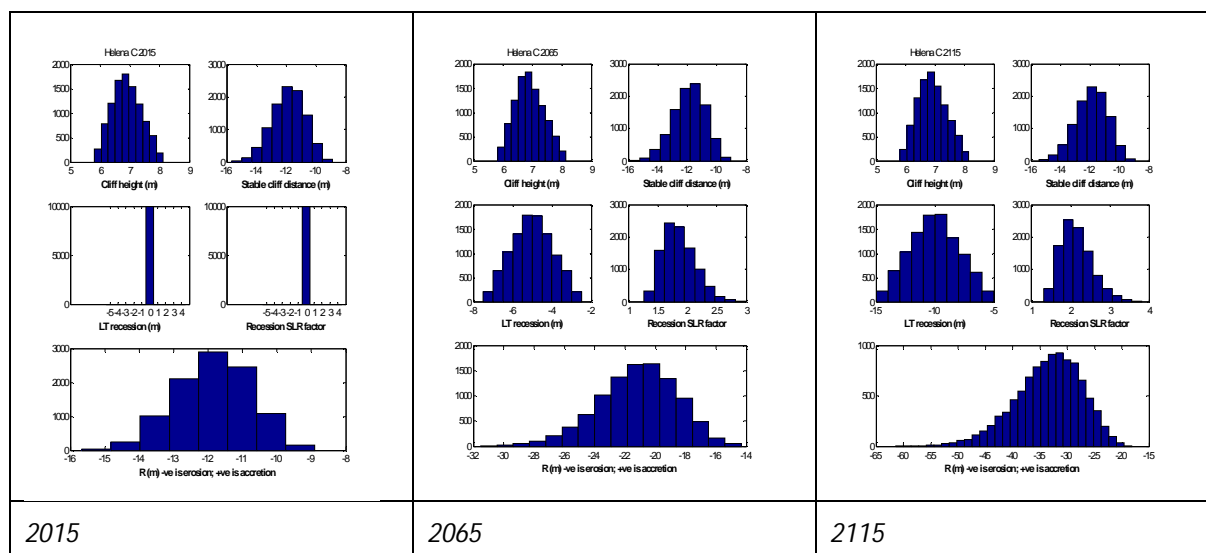


Figure 15-3 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 15C

Table 15-2 Coastal Erosion Hazard Zone Widths

Site		15. Helena								
Cell		15A			15B			15C		
Time		2015	2065	2115	2015	2065	2115	2015	2065	2115
Probability of CEHZ (m) Exceedance	Min	-3	-1	-1	-13	-14	-13	-9	-14	-18
	99%	-3	-4	-6	-14	-17	-20	-10	-16	-22
	95%	-3	-5	-9	-15	-19	-24	-10	-17	-24
	90%	-3	-6	-11	-16	-21	-26	-10	-18	-26
	80%	-3	-8	-14	-17	-22	-29	-11	-19	-28
	70%	-3	-9	-17	-18	-24	-32	-11	-20	-30
	66%	-4	-9	-18	-18	-24	-33	-11	-20	-30
	60%	-4	-10	-19	-18	-25	-34	-12	-20	-31
	50%	-4	-11	-22	-19	-26	-37	-12	-21	-33
	40%	-4	-12	-24	-19	-27	-40	-12	-22	-35
	33%	-4	-13	-27	-20	-28	-42	-12	-22	-36
	30%	-4	-13	-28	-20	-28	-43	-12	-22	-36
	20%	-4	-15	-32	-21	-30	-47	-13	-23	-39
	10%	-4	-17	-39	-22	-33	-54	-13	-25	-42
	5%	-4	-20	-46	-22	-35	-61	-14	-26	-45
	1%	-5	-24	-58	-23	-40	-76	-15	-28	-50
Max	-5	-35	-86	-24	-51	-101	-16	-32	-61	
CEHZ1		-10 ¹			-24			-20		
CEHZ2		-25 ¹			-61			-45		

¹Measured from 1956 shoreline landward of Te Mimihi Stream.



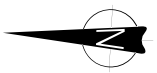
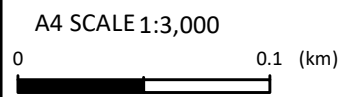
LEGEND

- 2013 - 2014 shoreline
- Erosion Protection Structures
- ↔ Cell Extent

Coastal Erosion Hazard Zone

- CEHZ0 (protected by structure)
- CEHZ1 (2065 CEHZ)
- CEHZ2 (2115 CEHZ)

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



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DRAWN	PPK	Dec.17
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ARCFILE 1001049-000-CEHZ001.mxd		
SCALE (AT A4 SIZE) 1:3,000		
PROJECT No. 1001049		

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 Coastal Erosion Hazard Assessment
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 Site: 15

FIGURE No. **Figure 15-4**

Rev. **2**

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Legend

←→ Cell Extent

Shorelines

- 2014 baseline
- 14/01/2014
- 18/05/1999
- 15/05/1999
- 13/12/1985
- 02/05/1966
- 17/03/1961
- 13/10/1950

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES IGN, and the GIS User Community

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

A4 SCALE 1:3,000

0 0.1 (km)

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Historic shorelines
Te Mimiha (Helena Bay)
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FIGURE No. Figure 15-5

Rev. 2