

30 Ahipara

Description and geomorphology

Ahipara is located approximately 10 km west of Kaitiaki. The site is over 7 km long and includes a number of different beach morphology types.

The southern end of the beach forms a relatively sheltered pocket beach embayment between two basalt rock headlands (Shipwreck Bay). The backshore is relatively low with dune heights of approximately RL 3 to 5 m. A small stream (the Harihaia Stream) enters the beach at this location. To the west of the stream, relatively soft cliff backs the beach.

The next section of shoreline consists of basalt reef which is erosion resistant and relatively stable backshore (cell 30D). The central area is another relatively low lying section comprising unconsolidated beach sand (cell 30E). This section is protected by a rock revetment structure for approximately 300 m.

Another section of basalt reef-fronted shoreline extends for a further 500 m (cell 30F). The shoreline then returns to low lying unconsolidated beach (cell 30G) with a high, vegetated spit extending along to the Wairoa River mouth (cell 30H).

The river has a significant effect on the shoreline fluctuations in this area. While the river entrance has been managed in the past, this activity has since ceased and the river entrance has been pushed north by an intertidal sand spit feature and currently exists near the end of Kaka Street. This has resulted in erosion of the land adjacent the river (Cell 30I) with a scarp up to 2.5 m high now evident and a carpark at the end of Kaka Street lost (Cell 30J) as the shoreline rapidly retreats back up by up to 100 m since the 2002 position to near the 1950's shoreline position.

The shoreline north of the river to the northern extent of the site consists of relatively high sand dune topography (cell 30K). The dunes are actively eroding with no foredune or beach berm. Ahipara has a flat dissipative beach slope comprising fine sand. The dune elevation ranges from RL 3 to 6 m and they native dune vegetation is sparse.



Site Photograph (southern shoreline)



Site Photograph (basalt reef shoreline)



Site Photograph (Wairoa River and backshore)



Site Photograph (northern shoreline)

Local considerations

There is a rock revetment erosion protection structure located along the central 300 m of the site.

Without management, The Wairoa River is likely to retain its present position cutting into the backshore land and potentially continuing to migrate northward causing further erosion north of Kaka Street. This would become exacerbated as the intertidal sand spit migrates landward with SLR and retreat of adjacent coastline.

Alternatively, the river could potentially cut through the more established spit to the south creating a more southern river mouth and allowing the spit to the north to weld back onto the backshore providing increased protection to the backing land.

Coastal Erosion Hazard Assessment

The site is split into 11 cells based on differences in the dune elevation and long term shoreline movement. Adopted component values are presented within Table 30-1.

While long-term profile records are not available for this site, short-term erosion rates for beaches are estimated at 10 to 30 m based on statistical data from west coast beaches in the Auckland Region (Tonkin & Taylor, 2006) and in agreement with previous studies for Ahipara (NRC, 2003).

The baseline for Cells I and J is taken as the most landward historic shoreline position and the short-term rates set to zero to reflect the rapid erosion of this land currently occurring but also protective effect of the spit on storm erosion of the backing land.

Long-term shoreline trends range from erosion of -0.02 to -0.1 m/year for the cliffed coastline to erosion of up to -0.6 m/year along the beaches, increasing to the north. No data was available for the beach at Shipwreck Bay.

The offshore closure slope is very flat (slope of around 1 in 170) resulting in large SLR-induced recession distances along all beach cells.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo

technique are shown in Figure 30-1 to figure 30-11.

Coastal Erosion Hazard Zone widths are presented within Table 30-2 and Figure 30-12. For cliffed coastline CEHZ1 values range from 10 to 13 m with basalt Cells D and F being rounded from 5 m up to a 10 m minimum and CEHZ2 values ranging from 15 to 28 m with Cells D and F being rounded from 10 m to a 15 m minimum.

For beaches, CEHZ1 values range from 23 to 52 m and CEHZ2 values range from 112 to 161 m. This is due to both the very flat offshore slope and the erosive long-term trends.

As there is a greater level of uncertainty in the Wairoa River area (Cells 30H to 30J) due to the effects of fluvial processes on shoreline position, the hazard zones are dashed in these areas to reflect this uncertainty.

Site 30A transitions from beach to cliff ~58m behind the 2014 shoreline. Due to the uncertainty around how the cliff will behave once it intersects the shoreline, the CEHZ2 has been mapped at the 'base of the cliff'.

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

Table 30-1 Component values for Erosion Hazard Assessment

Site		30. Ahipara										
Cell		30A	30B	30C	30D	30E ²	30F	30G	30H	30I	30J	30K
Cell centre (NZTM)	E	1610820	1611048	1611197	1611551	1612290	1612682	1613107.1	1613482.4	1613927.9	1614203.1	1614770.3
	N	6107188	6107070	6107078	6107172	6107371	6107720	6108096.7	6108515.3	6108919.3	6109456.6	6110644.4
Chainage, m (from N/W)		0-370	370-500	500-680	680-1530	1530-2320	2320-2890	2890-3500	3500-3800	3800-4800	4800-5500	5500-7000
Morphology		Dune	Waipurapura conglomerates		Basalt	Dune	Basalt	Dune	Inlet	Inlet	Inlet	Dune
Short-term (m)	Min	5	0	0	0	5	0	10	10	0	0	10
	Mode	8	0	0	0	10	0	15	20	0	0	15
	Max	10	0	0	0	15	0	20	30	0	0	20
Dune/Cliff elevation (m above toe or scarp)	Min	2.8	2.0	2.7	2.9	2.7	6	3.3	3.0	3.0	4.0	4.0
	Mode	3.7	4.2	5.2	5.8	4.0	7	4.9	5.3	5.0	4.4	4.9
	Max	5.9	6.4	7.5	9.5	8.4	8	6.3	6.5	7.0	6.3	5.9
Stable angle (deg)	Min	30	26.6	26.6	45	30	45	30	30	32	30	30
	Mode	32	30.2	30.2	57.5	32	57.5	32	32	32	32	32
	Max	34	33.7	33.7	70	34	70	34	34	34	34	34
Long-term (m) -ve erosion +ve accretion	Min	0	-0.02	-0.02	-0.01	0.2	-0.01	0	0	-0.1	-0.2	-0.2
	Mode	0	-0.05	-0.05	-0.02	0.1	-0.02	-0.2	-0.2	-0.3	-0.4	-0.4
	Max	0	-0.1	-0.1	-0.05	-0.05	-0.05	-0.4	-0.4	-0.5	-0.6	-0.6
Closure slope (beaches)	Min	0.044	0.75	0.75	0.25	0.044	0.25	0.044	0.044	0.044	0.044	0.044
	Mode	0.008	0.5	0.5	0.125	0.008	0.125	0.008	0.008	0.008	0.008	0.008
	Max	0.006	0.25	0.25	0	0.006	0	0.006	0.006	0.006	0.006	0.006
SLR 2065 (m)	Min	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
	Mode	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
	Max	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
SLR 2115 (m)	Min	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
	Mode	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
	Max	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

²CEHZO included behind coastal protection structure.

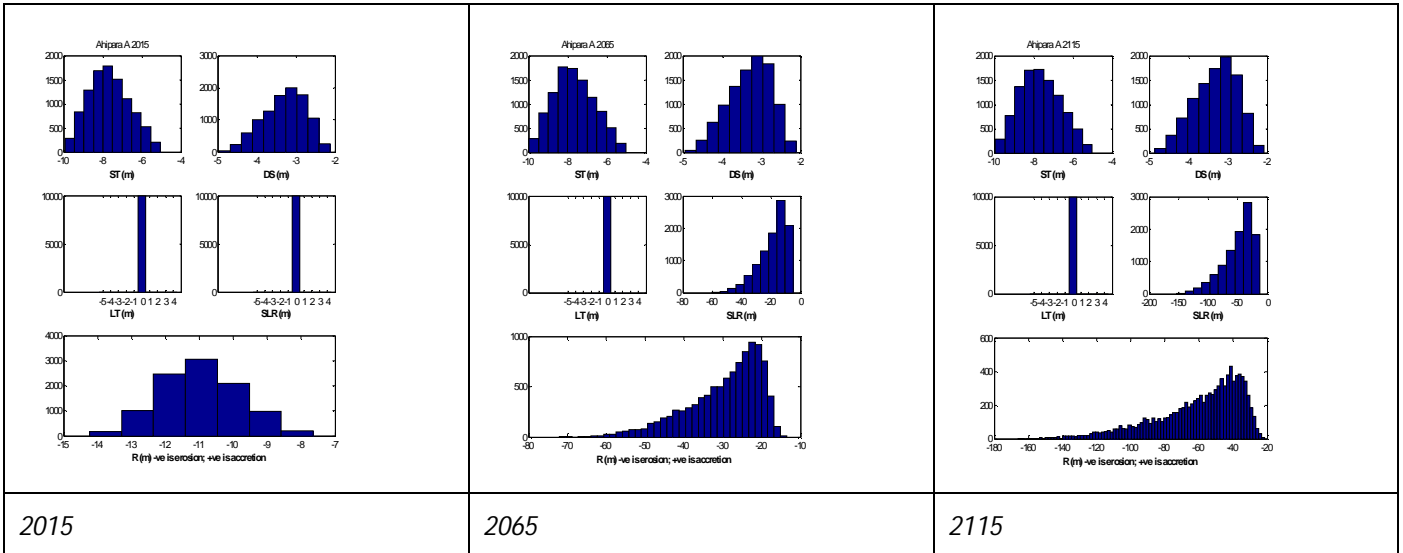


Figure 30-1 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30A

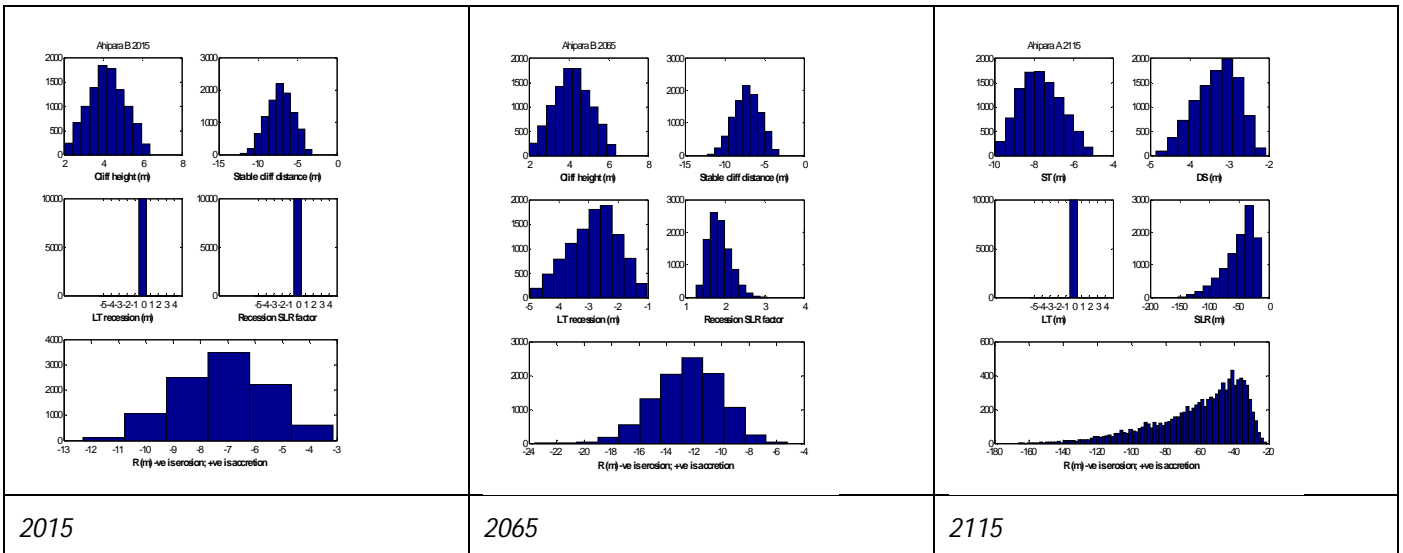


Figure 30-2 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30B

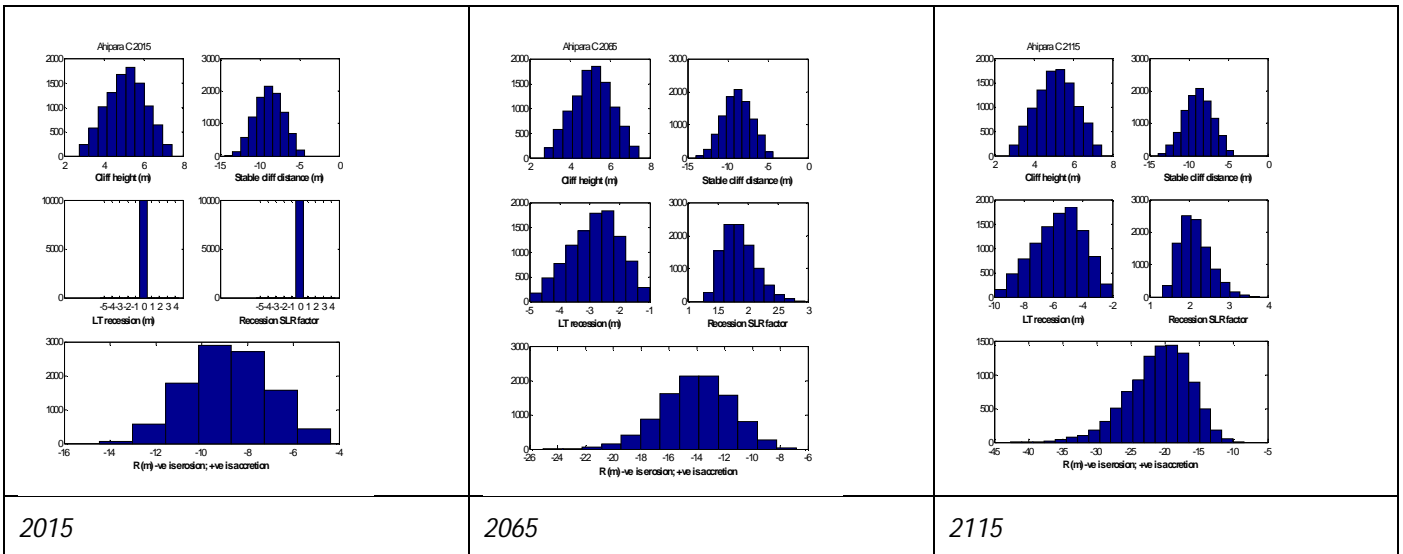


Figure 30-3 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30C

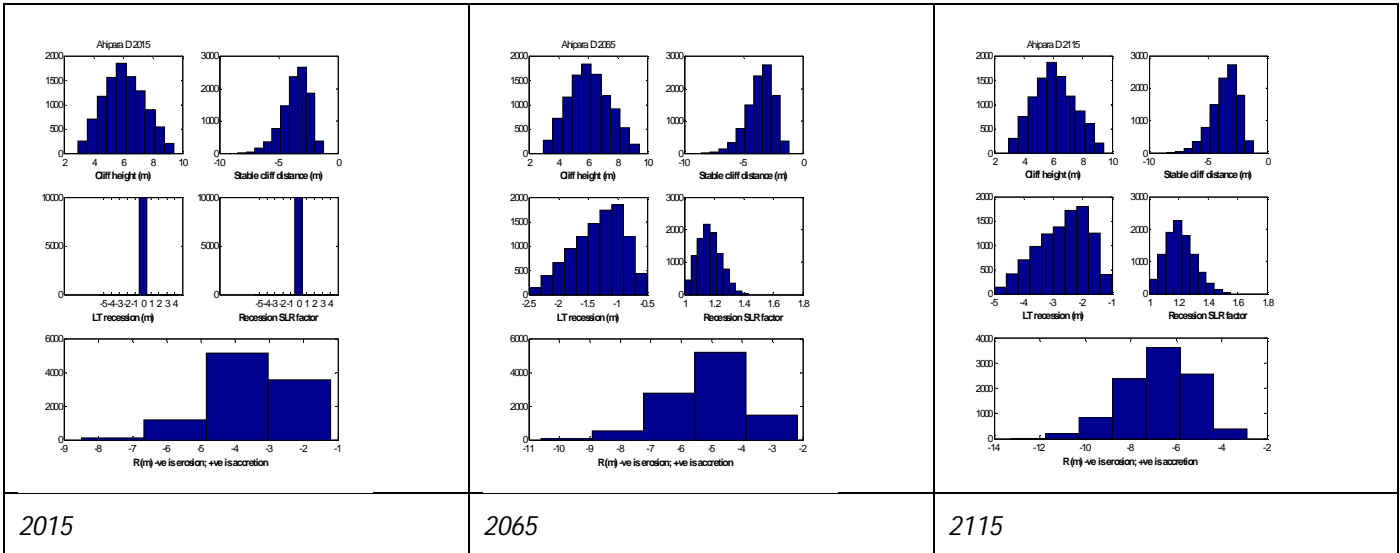


Figure 30-4 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30D

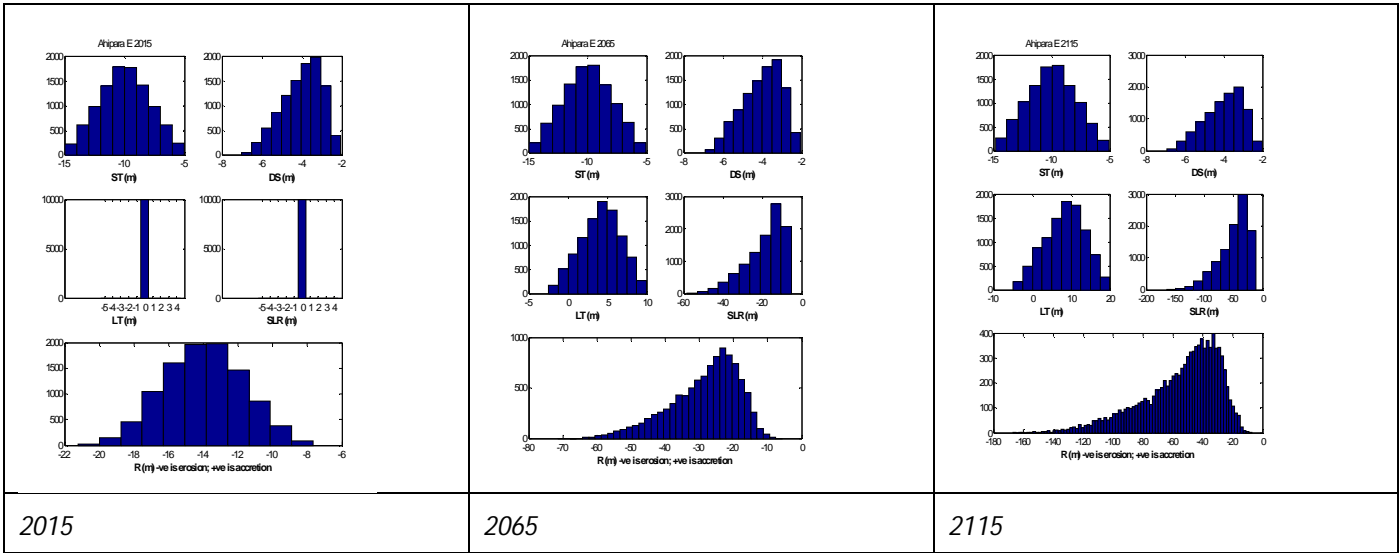


Figure 30-5 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30E

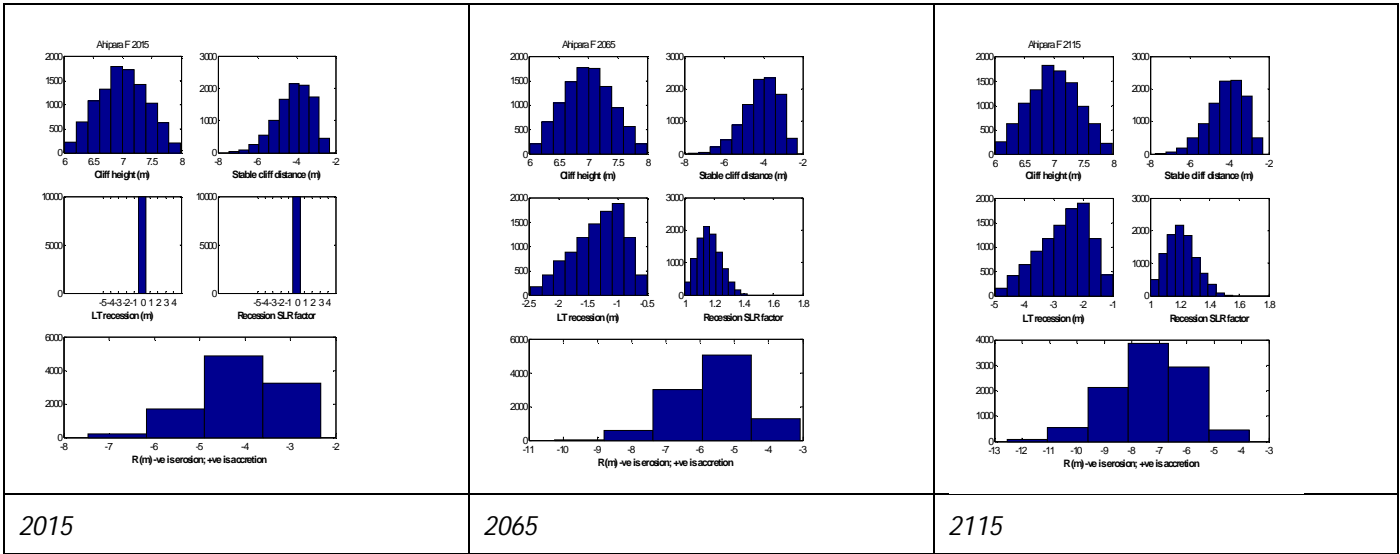


Figure 30-6 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30F

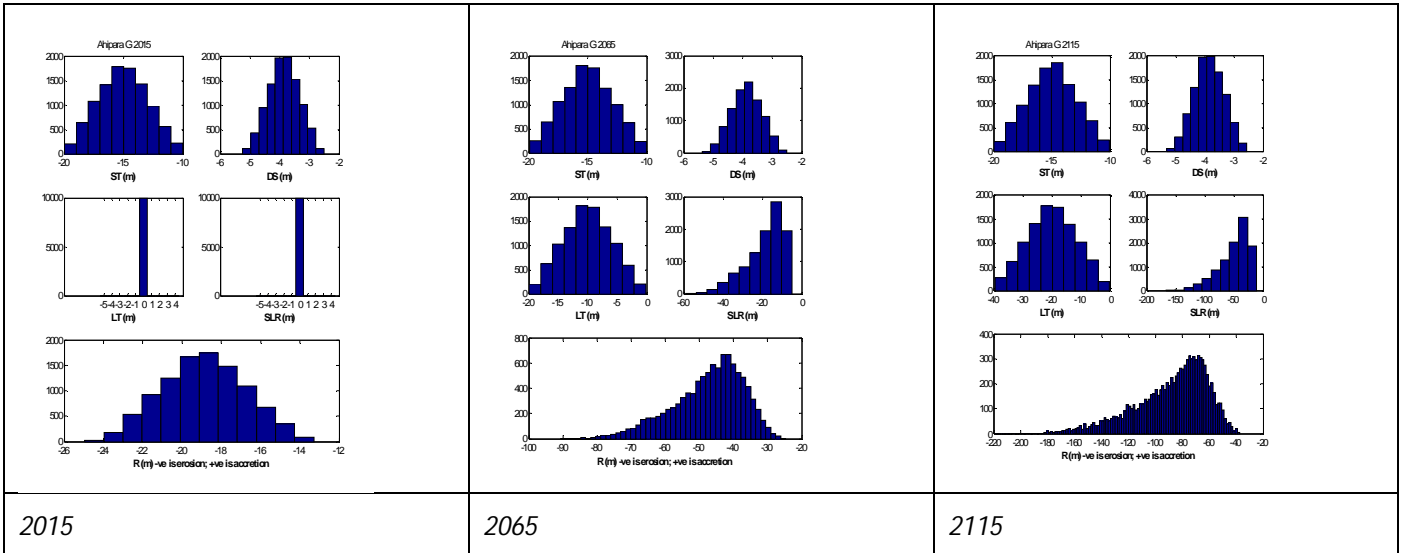


Figure 30-7 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30G

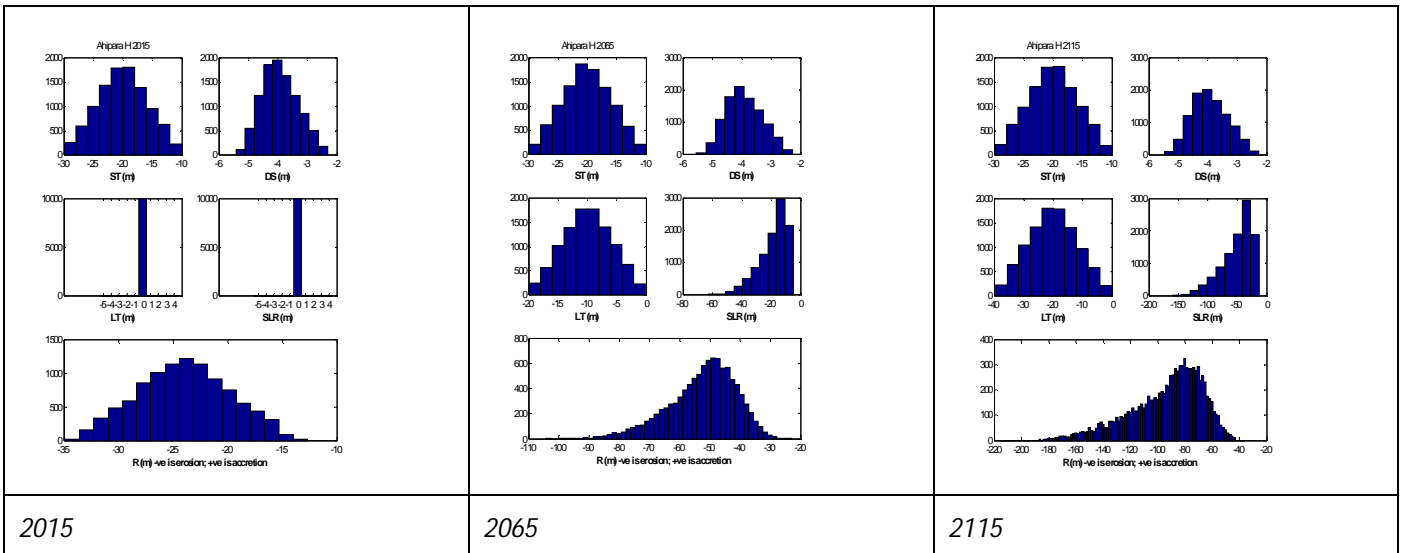


Figure 30-8 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30H

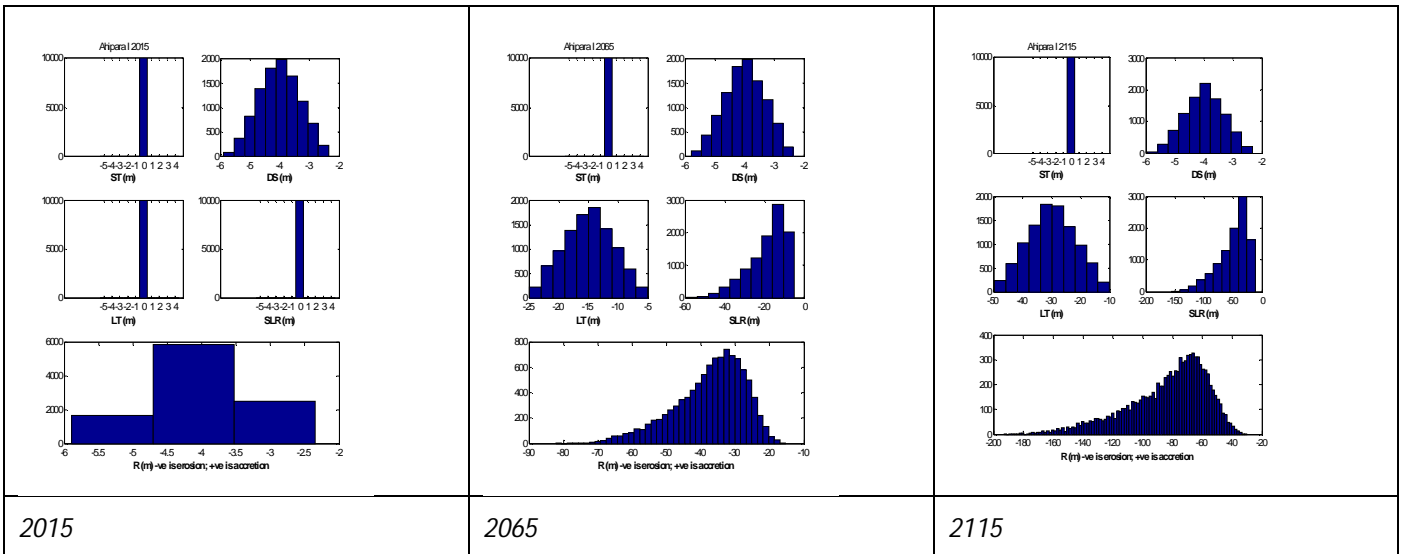


Figure 30-9 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30I

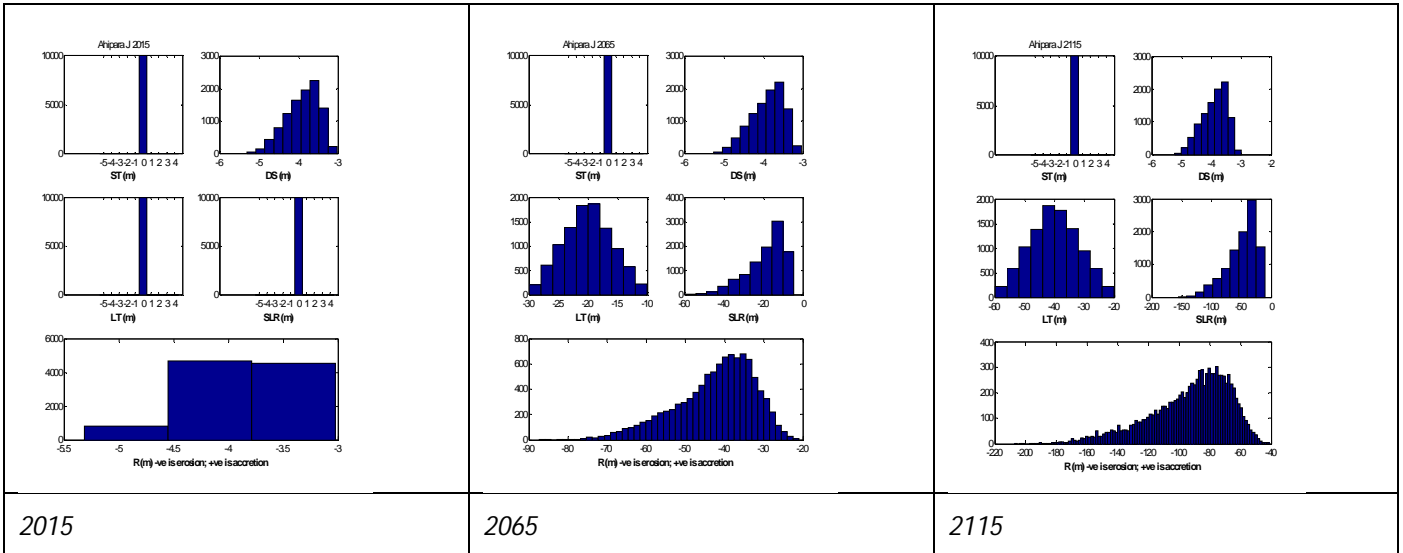


Figure 30-10 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30J

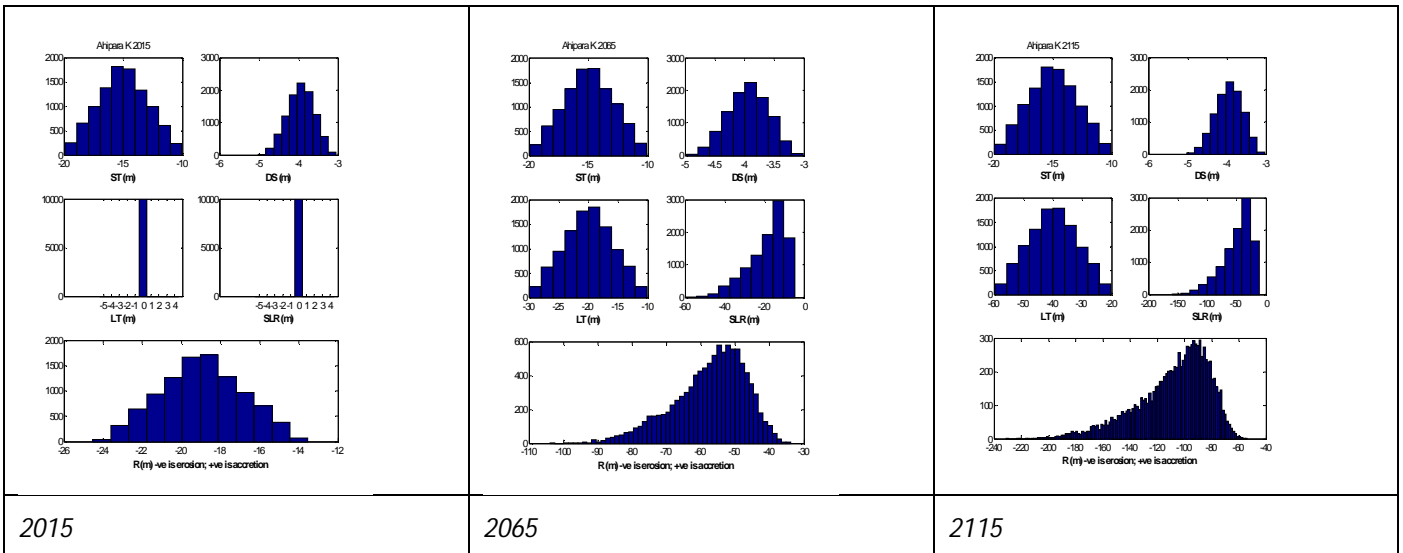


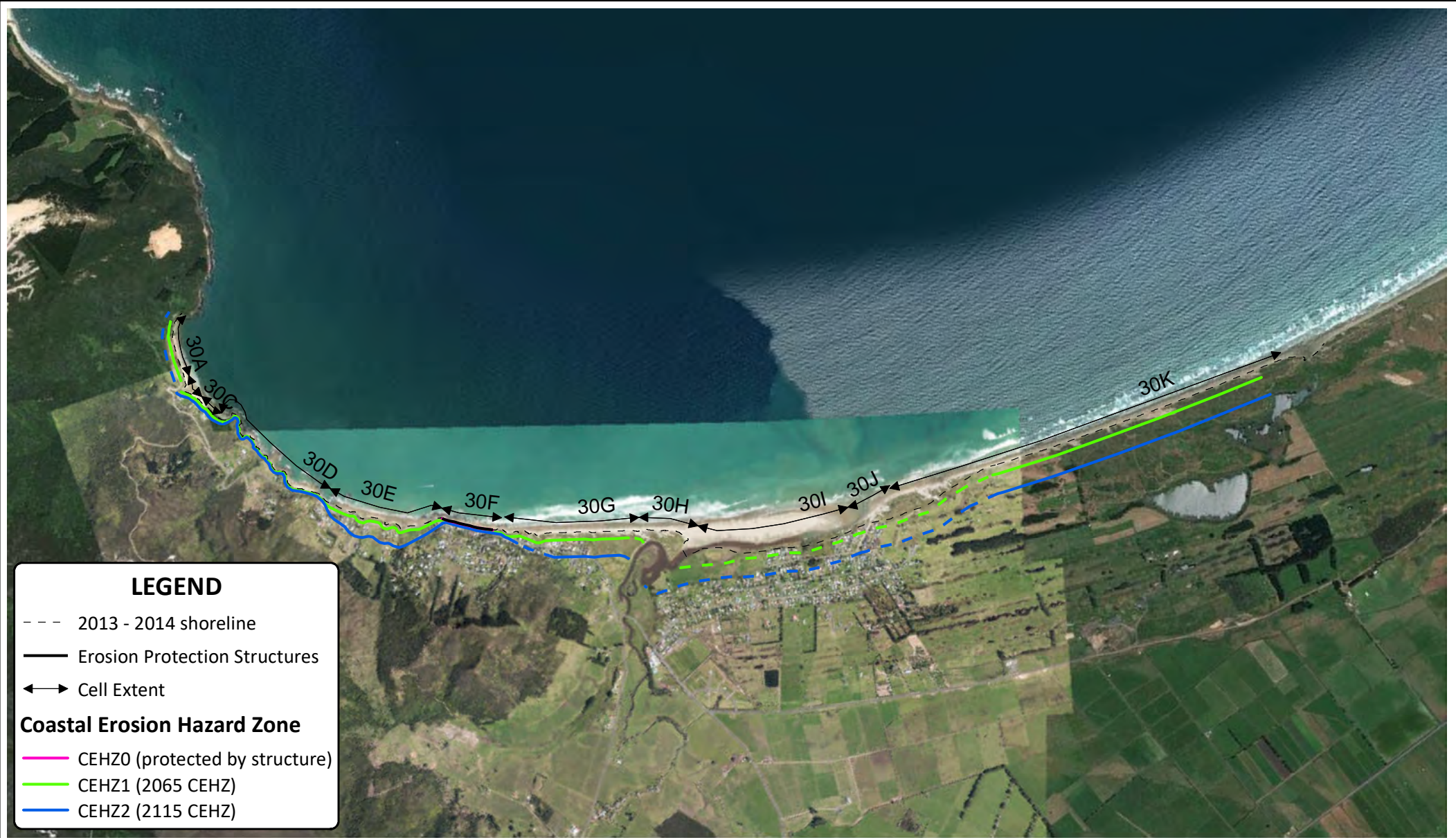
Figure 30-11 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 30K

Table 30-2 Coastal Erosion Hazard Zone Widths

Cell		30A			30B			30C			30D			30E		
Time		2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115
Probability of CEHZ (m) Exceedance	Min	-8	-14	-21	-3	-5	-8	-4	-7	-8	-1	-2	-3	-8	-6	-7
	99%	-8	-17	-27	-4	-8	-11	-5	-9	-12	-2	-3	-4	-9	-12	-17
	95%	-9	-18	-31	-5	-9	-13	-6	-10	-14	-2	-3	-4	-10	-15	-23
	90%	-9	-20	-34	-5	-9	-14	-7	-11	-16	-2	-4	-5	-11	-17	-27
	80%	-10	-21	-38	-6	-10	-16	-7	-12	-17	-3	-4	-5	-12	-20	-33
	70%	-10	-23	-43	-6	-11	-17	-8	-13	-18	-3	-4	-6	-13	-22	-38
	66%	-10	-24	-44	-6	-11	-17	-8	-13	-19	-3	-5	-6	-13	-23	-40
	60%	-11	-25	-48	-7	-12	-18	-8	-13	-19	-3	-5	-6	-13	-24	-43
	50%	-11	-27	-54	-7	-12	-19	-9	-14	-21	-3	-5	-7	-14	-27	-49
	40%	-11	-30	-61	-8	-13	-20	-9	-15	-22	-4	-5	-7	-15	-29	-56
	33%	-12	-32	-67	-8	-13	-21	-10	-15	-23	-4	-6	-7	-15	-31	-61
	30%	-12	-33	-69	-8	-14	-21	-10	-15	-23	-4	-6	-8	-15	-33	-65
	20%	-12	-38	-81	-9	-14	-23	-10	-16	-25	-4	-6	-8	-16	-37	-76
	10%	-12	-44	-98	-9	-16	-26	-11	-17	-27	-5	-7	-9	-17	-43	-93
	5%	-13	-48	-112	-10	-17	-28	-12	-18	-29	-6	-7	-10	-18	-48	-107
	1%	-13	-57	-136	-11	-18	-32	-13	-20	-34	-7	-9	-11	-19	-57	-131
	Max	-14	-72	-166	-12	-24	-42	-14	-25	-43	-8	-11	-13	-21	-72	-167
CEHZ1		-24			-11			-13			-10			-23		
CEHZ2		-112 ⁵			-28			-29			-15			-107		

⁵ Site 30A transitions from beach to cliff ~58m behind the 2014 shoreline. Due to the uncertainty around how the cliff will behave once it intersects the shoreline, the CEHZ2 has been mapped at the 'base of the cliff'.

Cell		30F			30G			30H			30I			30J			30K		
Time		2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115
Probability of CEHZ (m) Exceedance	Min	-2	-3	-4	-13	-25	-37	-13	-23	-36	-2	-15	-30	-3	-21	-41	-14	-34	-54
	99%	-3	-4	-5	-14	-30	-45	-15	-32	-50	-3	-20	-41	-3	-25	-52	-15	-39	-67
	95%	-3	-4	-5	-15	-33	-53	-17	-37	-59	-3	-24	-49	-3	-29	-59	-15	-43	-74
	90%	-3	-4	-6	-16	-36	-59	-18	-40	-64	-3	-26	-54	-3	-31	-64	-16	-45	-79
	80%	-3	-5	-6	-17	-39	-65	-20	-43	-71	-3	-29	-61	-4	-34	-71	-17	-49	-86
	70%	-4	-5	-7	-18	-41	-71	-22	-46	-77	-4	-31	-66	-4	-36	-76	-18	-51	-91
	66%	-4	-5	-7	-18	-42	-73	-22	-47	-78	-4	-32	-68	-4	-37	-78	-18	-52	-93
	60%	-4	-5	-7	-18	-43	-76	-23	-48	-82	-4	-33	-72	-4	-38	-82	-18	-53	-97
	50%	-4	-6	-7	-19	-46	-82	-24	-51	-88	-4	-36	-78	-4	-41	-88	-19	-56	-103
	40%	-4	-6	-8	-19	-49	-90	-25	-54	-95	-4	-38	-85	-4	-43	-95	-19	-59	-110
	33%	-4	-6	-8	-20	-51	-96	-26	-56	-101	-4	-40	-90	-4	-45	-101	-20	-61	-115
	30%	-5	-6	-8	-20	-52	-99	-26	-57	-105	-4	-42	-94	-4	-47	-104	-20	-62	-118
	20%	-5	-7	-9	-21	-56	-110	-28	-61	-116	-5	-46	-105	-4	-51	-115	-21	-66	-130
	10%	-5	-7	-9	-22	-63	-128	-30	-68	-133	-5	-52	-123	-4	-57	-131	-22	-73	-147
	5%	-6	-8	-10	-22	-67	-142	-31	-74	-147	-5	-58	-137	-5	-62	-146	-22	-77	-161
	1%	-6	-8	-11	-23	-76	-167	-33	-83	-170	-5	-66	-161	-5	-71	-168	-23	-86	-186
	Max	-7	-10	-13	-25	-91	-219	-35	-104	-217	-6	-82	-193	-5	-87	-207	-25	-104	-231
	CEHZ1	-10			-42			-47			-32			-37			-52		
CEHZ2	-15			-142			-147			-137			-146			-161			



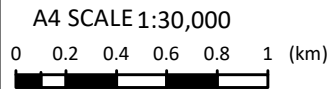
LEGEND

- 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
CHECKED	TDS	Dec.17
APPROVED	RRH	Dec.17
ARCFILE 1001049-000-CEHZ001.mxd		
SCALE (AT A4 SIZE) 1:30,000		
PROJECT No. 1001049		

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 Coastal Erosion Hazard Assessment
 Ahipara
 Site: 30

FIGURE No. **Figure 30-12**

Rev. **2**



Legend

←→ Cell Extent

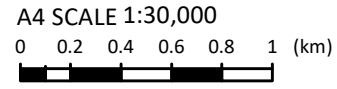
Shorelines

- 2014 baseline
- 14/01/2014
- 05/02/2007
- 11/11/2002
- 01/03/2000
- 28/10/1981
- 07/07/1977
- 02/05/1966
- 02/05/1960
- 07/07/1950

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

Path: P:\1001049\WorkingMaterial\GIS\FINAL\HistoricShorelines.mxd Date: 4/10/2017 Time: 3:08:19 PM

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



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ARCFIELD HistoricShorelines.mxd		
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PROJECT No. 1001049		

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Historic shorelines
Ahipara
Site: 30

FIGURE No.: figure 30-13

Rev. 2