29   Tokerau Beach

Description and geomorphology

Tokerau Beach is located at the northern end of Doubtless Bay, approximately 28 km north of Kaitaia.

The east facing shoreline of Tokerau North is approximately 4 km long. The site starts from Whatuwhiwhi headland in the north and extends south.

A small stream enters the site at the northern end of the site. This stream has an effect on the shoreline causing localised retreat in this area. The backshore has no native dune vegetation along the northern 600 m of shoreline and is relatively low with an elevation of RL 2 to 6 m. The dunes are vegetated with spinifex from this point south with varying amounts of cover.

The dune crest height increases towards the south with dune crest elevations reaching RL 7 m at the southern end of the site. The dunes are in a re-building stage with the dune vegetation beginning to re-establish on the overstep dune face.

The site has a sandy beach comprising fine to medium sand. The beach is relatively flat and has a berm width of less than 5 m above the high tide line. The backshore is developed with the most seaward dwelling located 40 m from the dune toe.

A stream is located adjacent to Mellisa Road. The stream channel is controlled to some degree by a boat ramp and training groyne. Erosion is evident along the stream channel and also on the shoreline adjacent to the stream.

Local considerations

There is a failed erosion protection structure located at the northern end of the site. The structure comprises broken concrete and loose rock and has slumped with erosion continuing behind the structure.

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

Site Photograph A (north)

Site Photograph B (north)

Site Photograph C (south)

movement. The resulting hazard zones are dashed in these areas to reflect this uncertainty.

Anecdotal accounts of degradation of the healthy spinifex/pingao foredune system may reduce in the ability of the dunes to rebuild following storm events. Future erosion rates may therefore be higher than historic rates.

While it is likely that increased recession due to high future sea level rise estimates for the CEHZ2 line will account for these potential increases, future monitoring should note changes in the dune vegetation systems.

Coastal Erosion Hazard Assessment

The site is split into five cells based on differences in dune height and geomorphology. Adopted component values are presented within Table 29-1. Short-term erosion values are 5 to 15 m along all cells. Long-term trends range from erosion at the northern end, variable through the centre (cells B and C), and erosion through Cell D of up to -0.2 m/year. Offshore slopes are relatively flat (around 1 in 125) resulting in large SLR-induced recession values. Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 29-1 to figure 29-5.

Coastal Erosion Hazard Zone widths are presented within Table 29-2 and Figure 29-6. CEHZ1 values range from 26 to 33 m and CEHZ2 values range from 92 to 105 m, primarily due to the flat offshore slope and SLR-induced recession. CEHZ's have been mapped in agreement with the calculated values.

Figure 29-7 shows the available historic shorelines for Rangiputa.

Table 29-1 Component values for Erosion Hazard Assessment

Site		29. Tokerau				
Cell		29A[4]	29B	29C	29D	29E
Cell centre (NZTM)	E	1634918	1634541	1634077	1633804	0
	N	6140720	6140459	6139716	6137533	0
Chainage, m (from N/W)		0-230	230-1000	1000-2070	2070-2770	2770-3730
Morphology		Dune	Dune	Dune	Dune	Dune
Short-term (m)	Min	5	5	5	5	5
	Mode	10	10	10	10	10
	Max	15	15	15	15	15
Dune/Cliff elevation (m above toe or scarp)	Min	1.7	2.1	2.3	2.6	2.6
	Mode	2.6	2.8	3.8	4.5	4.5
	Max	6.2	3.6	5.3	6.5	6.5
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	0.05	0.1	-0.05	0.1
	Mode	-0.1	0	0	-0.1	0
	Max	-0.15	-0.05	-0.1	-0.2	-0.1
Closure slope (beaches)	Min	0.035	0.035	0.035	0.035	0.035
	Mode	0.012	0.012	0.012	0.012	0.012
	Max	0.008	0.008	0.008	0.008	0.008
SLR 2065 (m)	Min	0.19	0.19	0.19	0.19	0.19
	Mode	0.29	0.29	0.29	0.29	0.29
	Max	0.39	0.39	0.39	0.39	0.39
SLR 2115 (m)	Min	0.45	0.45	0.45	0.45	0.45

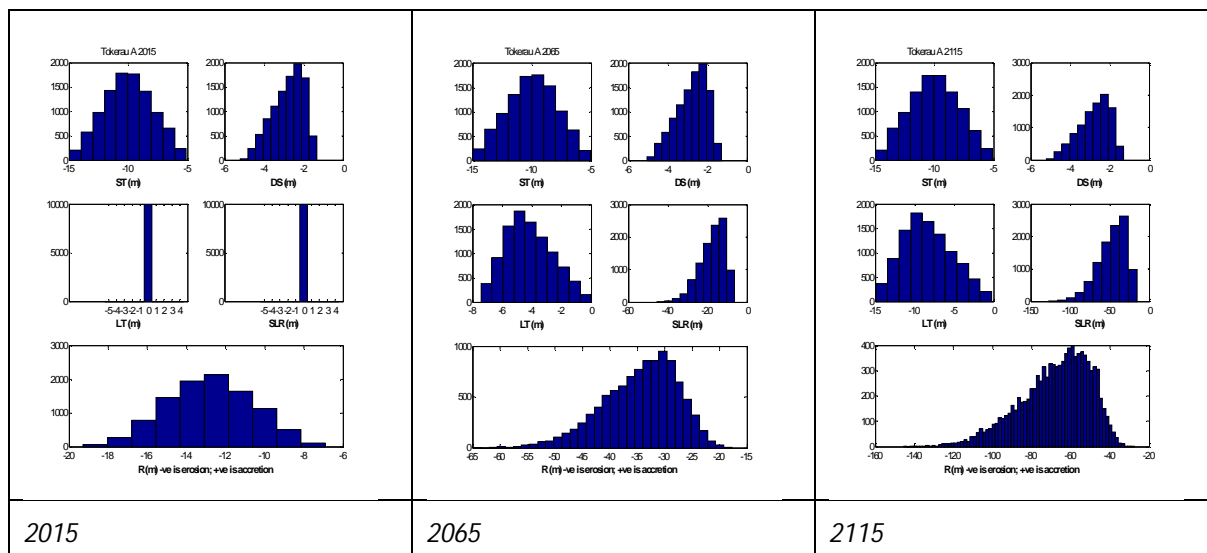| Site		29. Tokerau				
Cell		29A[4]	29B	29C	29D	29E
	Mode	0.77	0.77	0.77	0.77	0.77
	Max	1.1	1.1	1.1	1.1	1.1

[4]Has been mapped in addition to T+T (2014)

Figure 29-1 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 29A
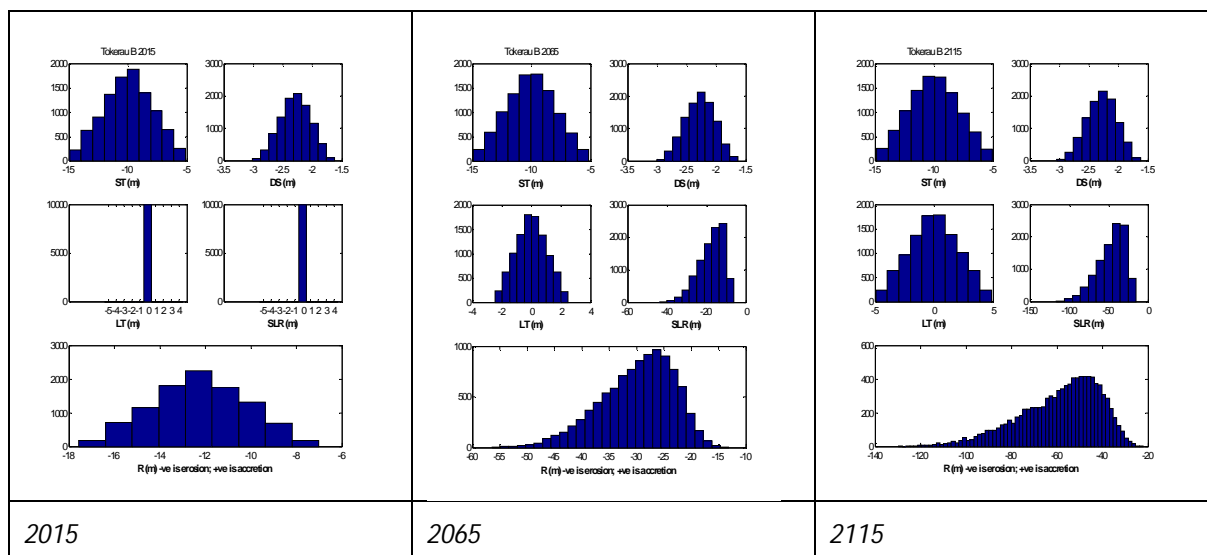

Figure 29-2 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 29B
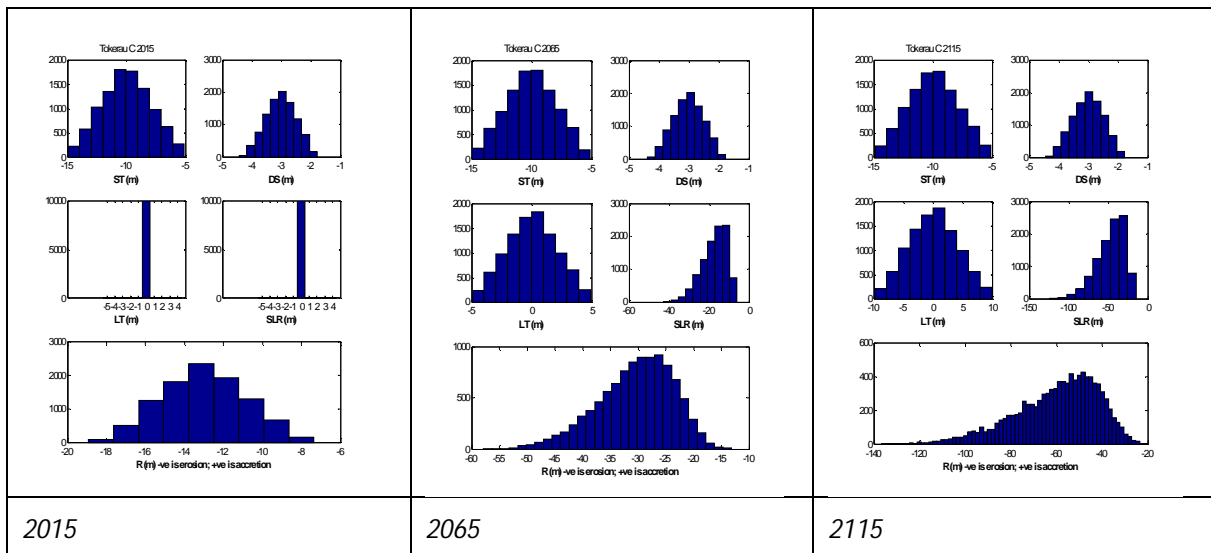
Figure 29-3 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 29C
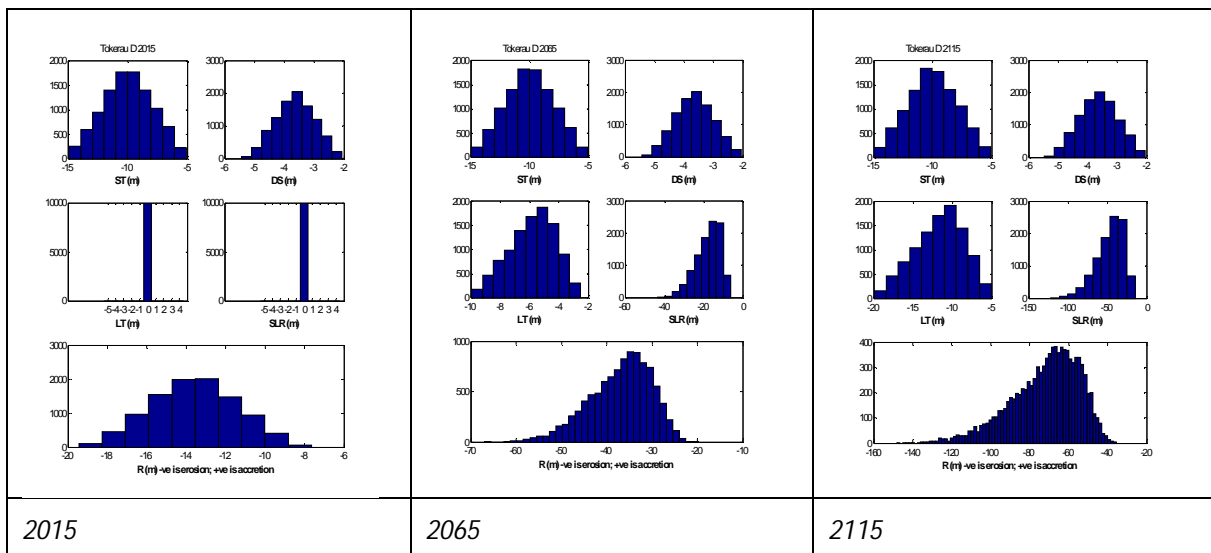

Figure 29-4 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 29D
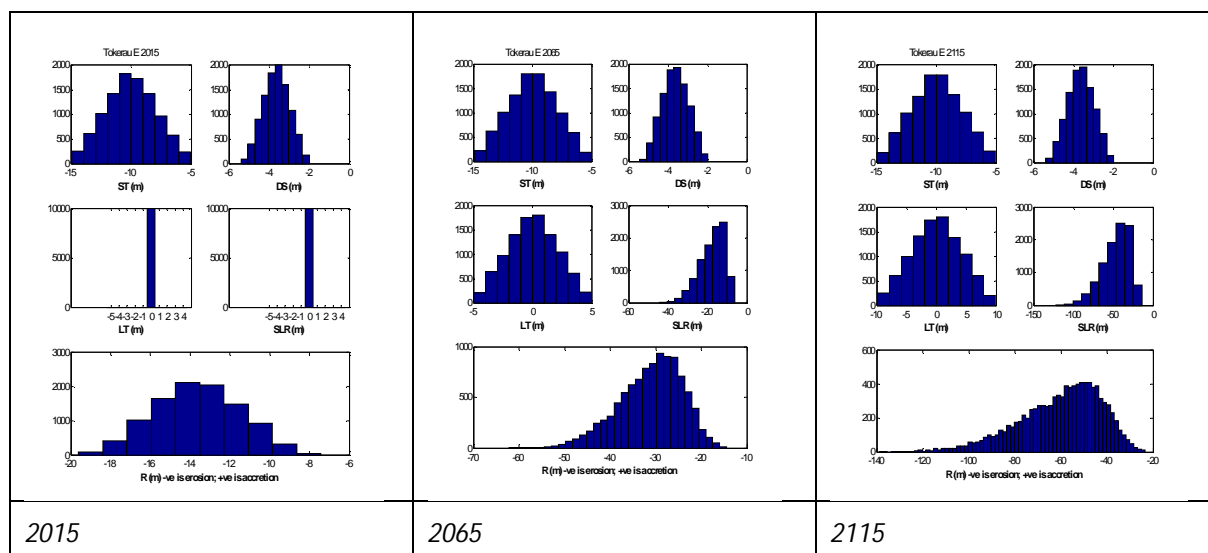
Figure 29-5 Histograms of parameter samples and the resultant shoreline distances for 2015, 2065 and 2115 timeframes for cell 29E

Table 29-2 Coastal Erosion Hazard Zone Widths

| Site		29. Tokerau														
Cell		29A			29B			29C			29D			29E		
Time		2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115	2015	2065	2115
Probability of CEHZ (m) Exceedance	Min	-7	-18	-28	-7	-13	-22	-7	-13	-20	-8	-20	-35	-7	-14	-23
	99%	-8	-22	-38	-8	-18	-30	-8	-18	-29	-9	-25	-43	-9	-18	-30
	95%	-9	-25	-44	-9	-21	-36	-9	-21	-35	-10	-27	-48	-10	-21	-36
	90%	-10	-26	-47	-10	-22	-39	-10	-22	-39	-11	-29	-52	-11	-23	-40
	80%	-11	-29	-52	-10	-24	-43	-11	-25	-44	-12	-31	-57	-12	-25	-45
	70%	-12	-30	-57	-11	-26	-47	-12	-26	-48	-12	-33	-61	-12	-27	-49
	66%	-12	-31	-58	-11	-26	-49	-12	-27	-50	-13	-33	-62	-13	-28	-50
	60%	-12	-32	-61	-12	-27	-51	-12	-28	-52	-13	-34	-65	-13	-29	-53
	50%	-13	-34	-65	-12	-29	-56	-13	-30	-57	-14	-36	-69	-14	-30	-58
	40%	-13	-35	-71	-13	-31	-61	-14	-32	-62	-14	-38	-74	-14	-32	-62
	33%	-14	-37	-74	-13	-32	-64	-14	-33	-66	-15	-39	-77	-15	-34	-66
	30%	-14	-38	-76	-13	-33	-67	-14	-34	-68	-15	-40	-80	-15	-34	-68
	20%	-15	-40	-83	-14	-36	-74	-15	-36	-75	-15	-43	-87	-16	-37	-75
	10%	-16	-44	-93	-15	-39	-84	-16	-40	-85	-16	-46	-97	-16	-41	-85
	5%	-16	-47	-102	-16	-42	-92	-16	-43	-95	-17	-50	-105	-17	-44	-94
	1%	-18	-53	-117	-17	-48	-108	-18	-49	-110	-18	-55	-122	-18	-49	-111
	Max	-19	-65	-145	-18	-56	-130	-19	-58	-136	-19	-67	-148	-20	-62	-139
	CEHZ1	-31			-26			-27			-33			-28		
	CEHZ2	-102			-92			-95			-105			-94		

29A

29B

29C

29D

29E

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).

A4 SCALE 1:12,500

0   0.1   0.2   0.3   0.4   0.5   (km)

TЬT
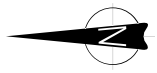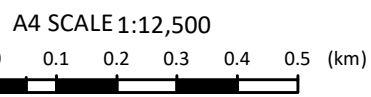
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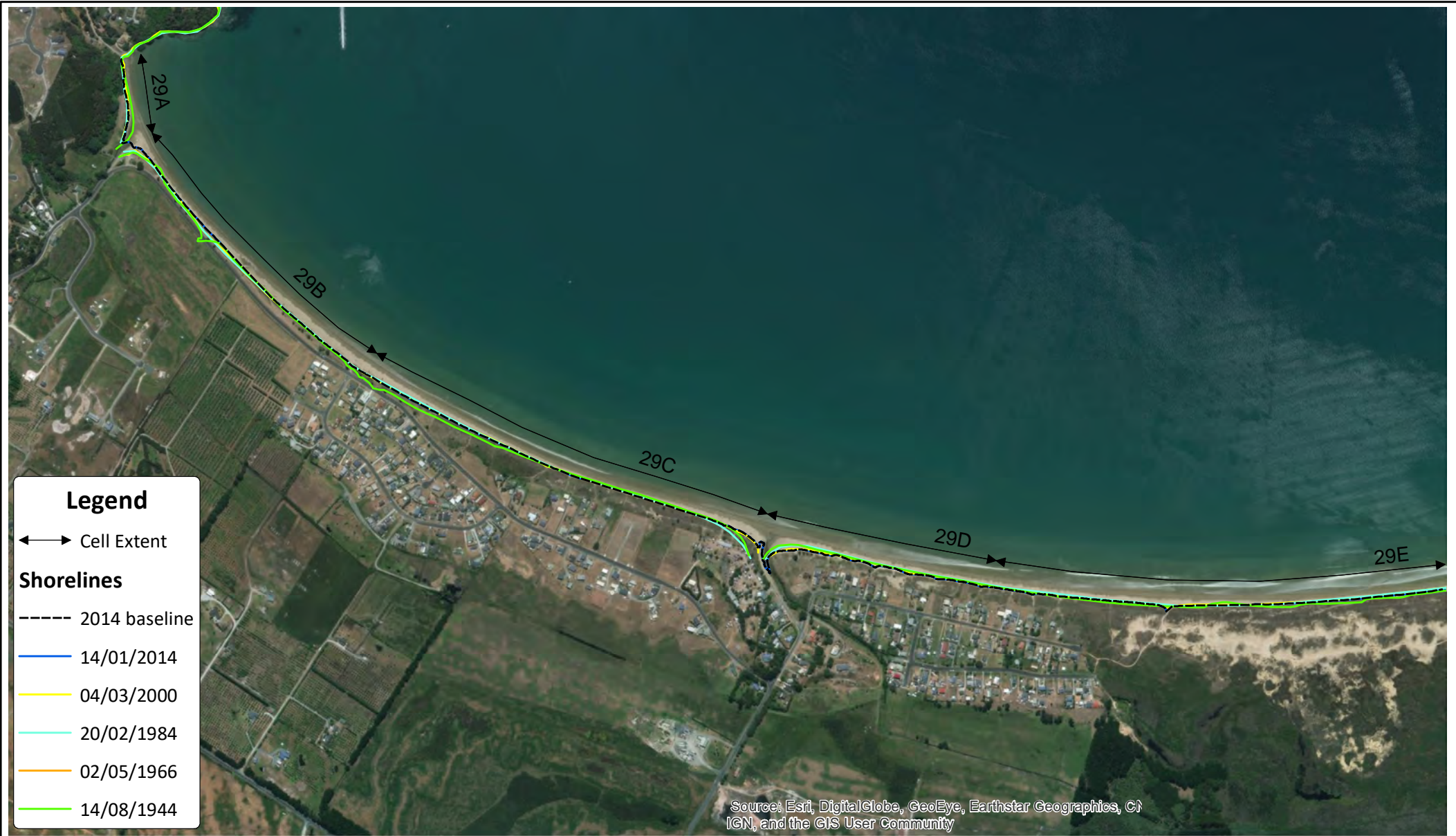
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CHECKED	TDS	Dec.17
APPROVED	RRH	Dec.17

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SCALE (AT A4 SIZE)
1:12,500

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Coastal Erosion Hazard Assessment
Tokerau Beach
Site: 29

FIGURE No.
Figure 29-6

Rev.
2

29A

29B

29C

29D

29E

Legend

⟷ Cell Extent

Shorelines

- - - - 2014 baseline

────── 14/01/2014

────── 04/03/2000

────── 20/02/1984

────── 02/05/1966

────── 14/08/1944

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CN
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 1:12,500

0   0.1   0.2   0.3   0.4   0.5   (km)
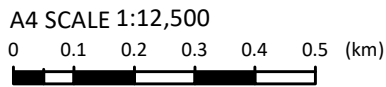
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DRAWN	PPK	Dec.17
CHECKED	TDS	Dec.17
APPROVED	RRH	Dec.17

ARCFILE
HistoricShorelines.mxd

SCALE (AT A4 SIZE)
1:12,500

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1001049

NORTHLAND REGIONAL COUNCIL
Historic shorelines
Tokerau Beach
Site: 29

FIGURE No. Figure 29-7

Rev. 2