2017/22 Duneland health monitoring

Greater Wellington
Te Pane Matua Taiao

Contents

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Overview

The extent of dunelands under natural landcovers has undergone major declines across the country and in the Wellington Region. The remaining natural areas are under pressure by pest plants and animals, and human activities. This report summarises the results of Greater Wellington's (GW) programme monitoring the health of these natural dunelands in the Wellington region. The programme surveys the management effectiveness, pressures and state of a representative sample of dunelands over a 5 year cycle. The 20 sites surveyed include twelve sites managed in the GW Key Native Ecosystem (KNE) programme one of which includes a regional park, two sites on Public Conservation Lands managed by the Department of Conservation, one site managed by Wellington City Council and five sites without targeted management programmes.

Key monitoring objectives are to:

1. determine the state and trend of duneland health in the Wellington region,
2. monitor the outcomes of management at selected duneland KNE sites, and
3. establish a baseline against which to survey the impacts of sea level rise and increased storm surges resulting from climate change.

Monitoring network

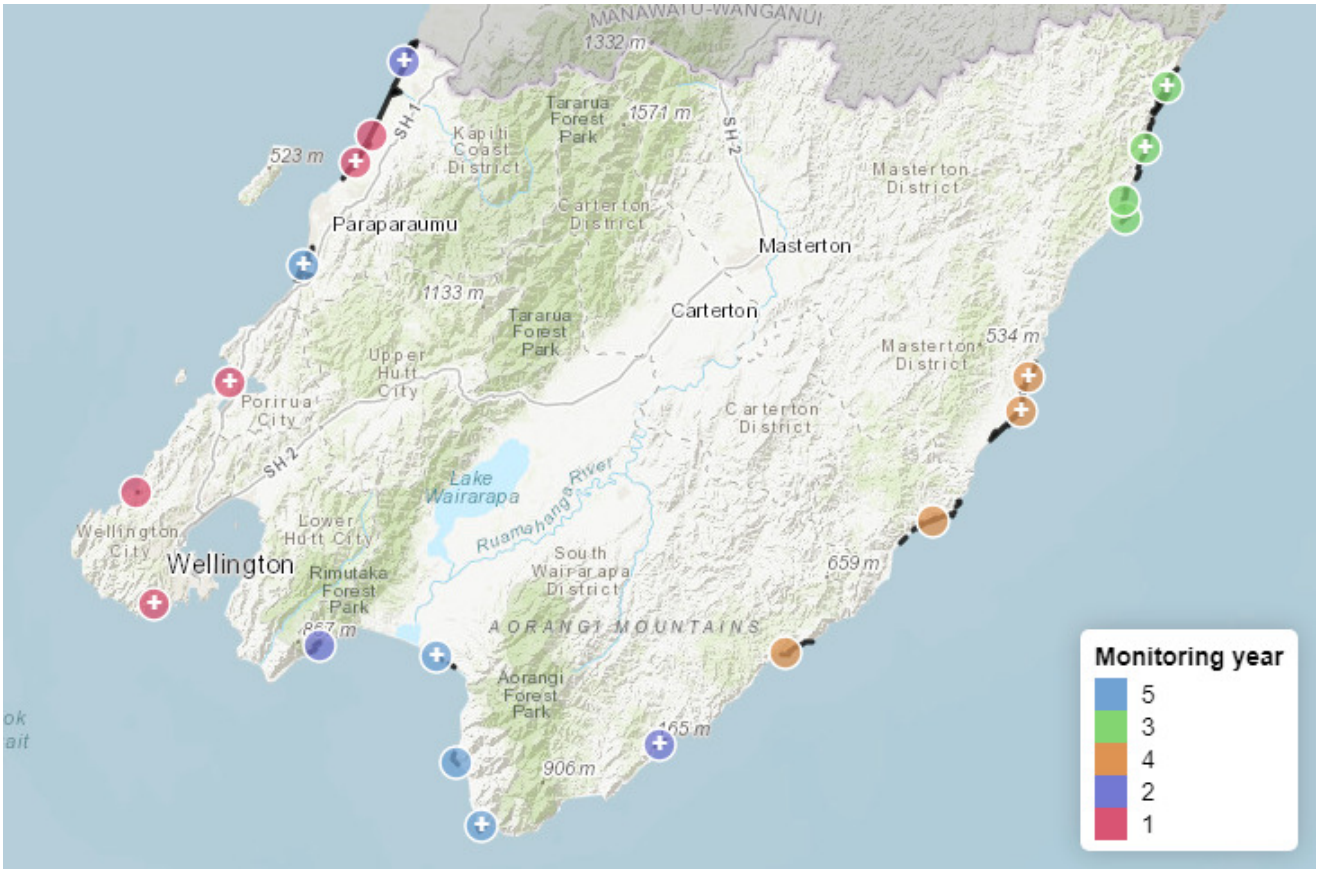

Figure 1: Dunelands in the Greater Wellington region are shown by the black outlines. Monitoring sites are shown above the dunes as circles and coloured by the year surveyed, where 1 = 2016/17, and 5 = 2021/22. KNE sites are marked with a '+' symbol. See Appendix 1: Duneland metadata for more information.

Monitoring results

Use the top menu bar "Results" dropdown list or links below to navigate to the following results sections:

- **Vegetation**: Measures of the indigenous dominance of the species richness and aerial cover, the proportion of bare ground and the canopy height of the vegetation.
- **Pest animals**: The presence of rats, mice and hedgehogs detected by chew track cards.
- **Condition**: The pressures and state of duneland health as measured by indigenous vegetation, surrounding land cover, animal and plant pests, pedestrian and vehicle access, and mining disturbances.

Methods

Vegetation, animal pests and the condition of the duneland were examined at each site. Vegetation monitoring provided measures of the indigenous dominance of the species richness and aerial cover, the proportion of bare ground and the canopy height of the vegetation. Animal pest monitoring was limited to chew track cards which detect the presence of hedgehogs, possums and rodent pests, but not lagomorphs or mustelids (the other main animal pests in dunelands). Duneland condition was scored for each site based on a method developed by a collection of regional councils. The monitoring methodology is outlined below and provided in more detail in the Duneland health monitoring protocol (contact GW for more information).

Vegetation

Natural duneland vegetation was surveyed using $1m^2$ quadrats spaced 4m apart along transects established at right angles to the prevailing coastline. Transects were randomly selected from a master set of transects mapped across the length of the duneland at 10m, 50m or 100m apart depending on the length of the duneland along the coast (<0.5km, 0.5 to 3km or > 3km long respectively, see the monitoring network map for details on each duneland). At least 10 transects were surveyed at each site, but the number of quadrats on each transect varied according to the width (from inland to the beach) of the duneland being sampled. Surveys started from the inland end of transects where the landcover type changed from natural duneland to another landcover type, typically to exotic grassland. Surveys were conducted seawards, along the transects, up to the start of the beach. All of the vascular plant species were recorded in each $1m^2$ quadrat. The aerial cover was estimated in 5 percent increments for bare ground and all plant species recorded. Cover scores were allocated to a total cover score of 100 percent. This included provision for plant species that individually represented less than 5 percent of the aerial cover. The average canopy height of the vegetation was also measured to provide a physiognomic description of the vegetation communities across each transect.

Animal pests

At least one line of 10 corflute plastic chew cards (loaded with peanut butter) was sampled at each site over three fine nights. Chew cards were spaced at 50m intervals with lines located at least 200m apart along the coast.

Condition and pressure

The pressures and state of dunelands were scored for the whole duneland at each site based on the criteria outlined below. Sites with little pressures and good state received high scores.

Scoring system for State of dunelands

'Buffering' refers to the state of surrounding land cover.

Score	Indigenous cover dominance (%)	Indigenous animal dominance (%)	Unnatural vegetation disturbance (% bare sand)	Buffering (% of indigenous land cover)	Buffering (% of indigenous cover dominance)
0	≤5	≤5	>20	<50	NA
1	>6 – ≤25	>6 – ≤25	>16 – ≤20	≥50	≤25
2	>26 – ≤50	>26 – ≤50	>11 – ≤15	≥50	>25
3	>51 – ≤75	>51 – ≤75	>6 – ≤10	≥75	>50
4	>75 – ≤95	>75 – ≤95	>1 – ≤5	≥90	>75
5	>95	>95	≤1	≥100	>95

Scoring system for Pressures on dunelands

Score	Ungulates	Lagomorphs & possums	Predators	Dogs	Problem plants (% aerial cover)	Uncontrolled pedestrians (% area accessed)	Vehicles (% area accessed)	Mining (% area disturbed)
0	Animals or sign regularly seen	Animals or sign regularly seen	>10% tracking Index	No control of dog access	>30	>30	>30	>30
1	–	–	–	–	>20 – ≤30	>20 – ≤30	>20 – ≤30	>20 – ≤30
2	Animals or sign occasionally seen	Animals or sign occasionally seen	<10% tracking Index	Mostly under control	>10 – ≤20	>10 – ≤20	>10 – ≤20	>10 – ≤20
3	–	–	–	–	>5 – ≤10	>5 – ≤10	>5 – ≤10	>5 – ≤10
4	Rare incursion	Rare incursion	<5% tracking index	Rare incursion	>1 – ≤5	>1 – ≤5	>1 – ≤5	>1 – ≤5
5	None	None	None	None	≤1	≤1	≤1	≤1

Vegetation monitoring results

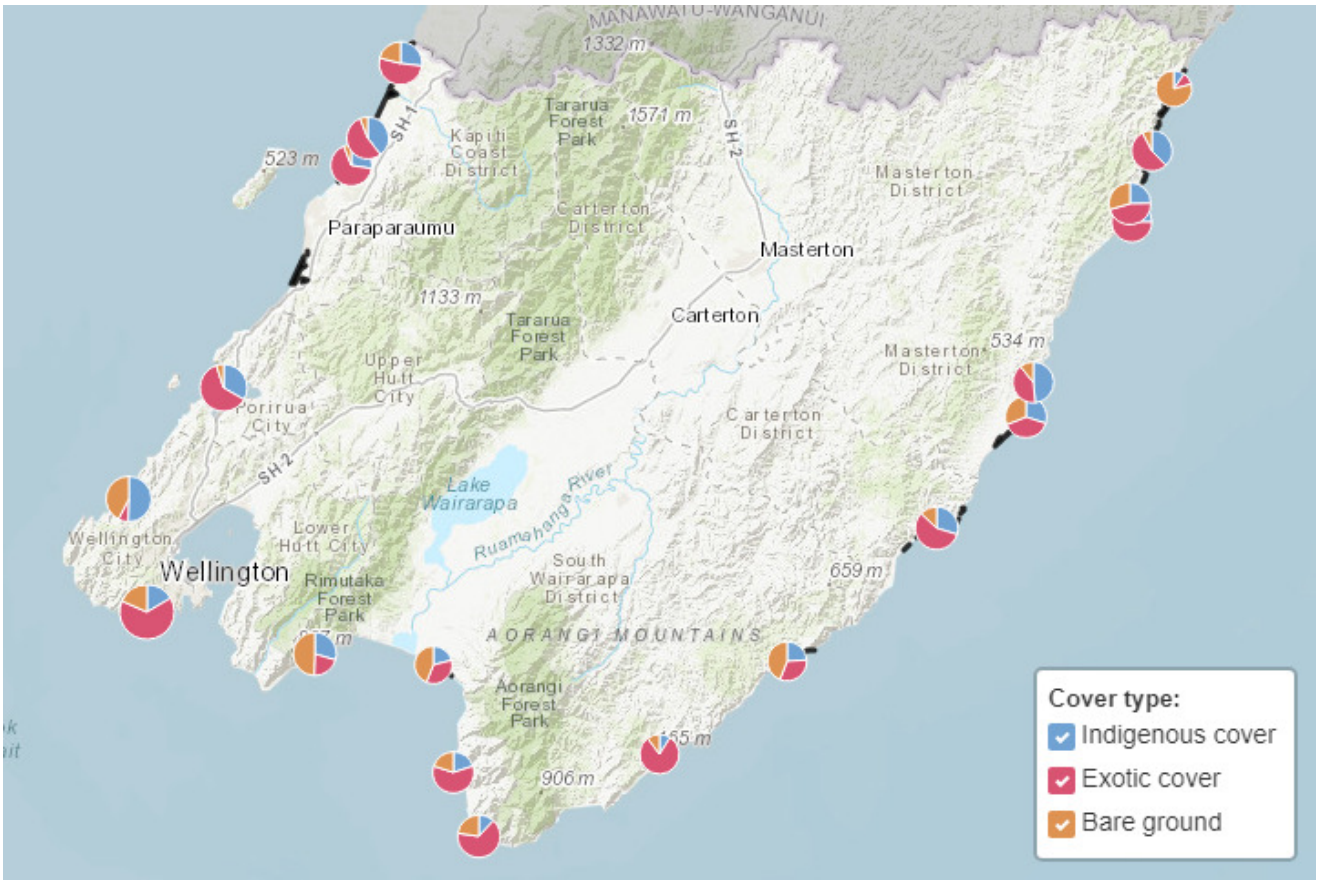

Figure 2: The average proportion of aerial cover of indigenous plants (■), exotic plants (■), and bare ground (■) recorded at each site. The radius of each pie chart is proportionate to the average number of different species recorded (richness) in the quadrats sampled at each site.

Table 1: The average proportion of aerial vegetation cover and the average number of species recorded in each quadrat. See the vegetation methods section for more details. Note that sites are ordered geographically anti-clockwise around the region.

Site	Management	Year	Total species	Indigenous species	Exotic species	Indigenous cover (%)	Exotic cover (%)	Bare ground (%)
Ōtaki	KNE	2	5.6	1.5 (16.9%)	4.2 (83.1%)	27.0	52.0	21.0
Peka Peka	KNE	1	4.6	1.2 (38.4%)	3.4 (61.6%)	27.5	66.7	5.9
Peka Peka North	Nil	1	4.9	1.6 (22.2%)	3.3 (77.8%)	39.6	54.5	5.9
Whitireia Park	KNE	1	7.6	1.5 (30.4%)	6 (69.6%)	33.3	61.6	5.1
Mākara Bay	WCC	1	6.8	4.6 (47.1%)	2.2 (52.9%)	50.5	7.1	42.4
Red Rocks	KNE	1	11.4	2.1 (34.6%)	9.3 (65.4%)	16.5	65.0	18.4
Mukamukaiti	Nil	2	5.6	1.7 (32.9%)	3.9 (67.1%)	29.5	21.0	49.5
Whāngaimoana Coast	KNE	5	2.7	1 (35%)	1.7 (65%)	21.0	35.0	44.0
Te Humenga Point	Nil	5	4.6	1 (21%)	3.6 (79%)	20.0	60.0	20.0
Te Kawakawa Rocks	KNE	5	5.3	0.7 (37.7%)	4.6 (62.3%)	11.9	65.3	22.8
Tora Coast Bush	KNE	2	3.8	0.7 (18.6%)	3.1 (81.4%)	9.1	80.8	10.1
Pahaoa	DOC	4	3.6	1.3 (30%)	2.4 (70%)	24.0	32.0	44.0
Flat Point	Nil	4	5.4	1.4 (27%)	4.1 (73%)	29.7	57.4	12.9
Homewood Coastal Plains	KNE	4	4.7	1.7 (31.6%)	3 (68.4%)	30.0	39.0	31.0
Riversdale-Orui Coast	KNE	4	4.5	1.9 (37.3%)	2.6 (62.7%)	48.5	40.6	10.9
Castlepoint Scenic Reserve	DOC	3	4.1	1.1 (43.4%)	3.1 (56.6%)	25.0	56.0	19.0
Castlepoint North	Nil	3	5.0	1.2 (26.7%)	3.8 (73.3%)	24.8	45.7	29.5
Mataikona Coast	KNE	3	4.2	1 (18.2%)	3.2 (81.8%)	37.7	54.7	7.5
Owahanga	KNE	3	2.1	0.5 (37.5%)	1.6 (62.5%)	9.8	11.0	79.3

Pest animals monitoring results

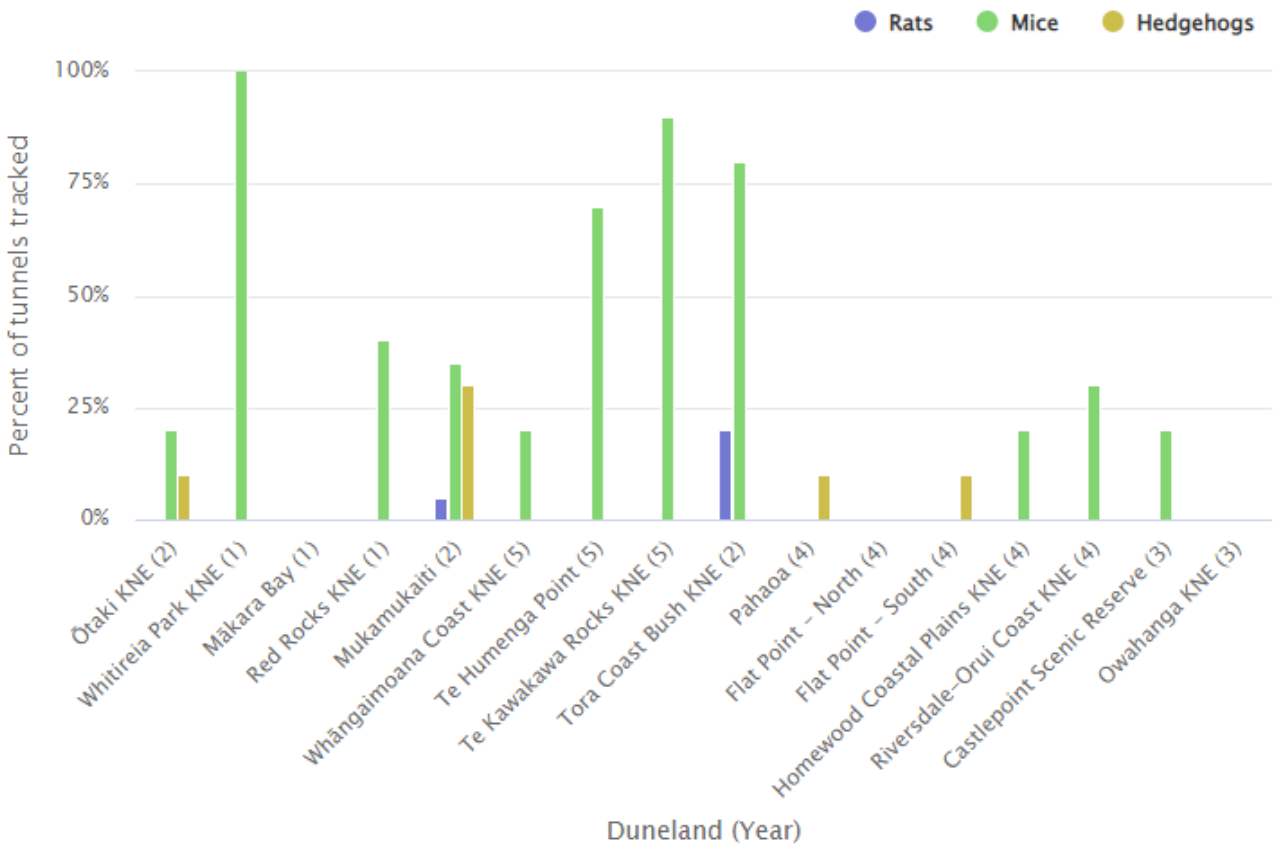

Figure 3: Percentage of tunnels tracked by rats ( ), mice ( ), and hedgehogs ( ). The dunes on the x-axis are ordered anti-clockwise around the region with the monitoring year included in brackets, see the monitoring network map for dune locations and the methods section for details on pest animal tracking.

Table 2: The total tunnels tracked by pest animals each survey.

Site	Management	Year	No. tunnels	Rats	Mice	Hedgehogs
Ōtaki	KNE	2	10	0	2	1
Whitireia Park	KNE	1	10	0	10	0
Mākara Bay	WCC	1	10	0	0	0
Red Rocks	KNE	1	10	0	4	0
Mukamukaiti	Nil	2	20	1	7	6
Whāngaimoana Coast	KNE	5	10	0	2	0
Te Humenga Point	Nil	5	10	0	7	0
Te Kawakawa Rocks	KNE	5	10	0	9	0
Tora Coast Bush	KNE	2	10	2	8	0
Pahaoa	DOC	4	10	0	0	1
Flat Point - North	Nil	4	9	0	0	0
Flat Point - South	Nil	4	10	0	0	1
Homewood Coastal Plains	KNE	4	10	0	2	0
Riversdale-Orui Coast	KNE	4	10	0	3	0
Castlepoint Scenic Reserve	DOC	3	10	0	2	0
Owahanga	KNE	3	10	0	0	0

Duneland condition results

State of dunelands

Higher scores indicate better condition, see methods for details on the scoring system.

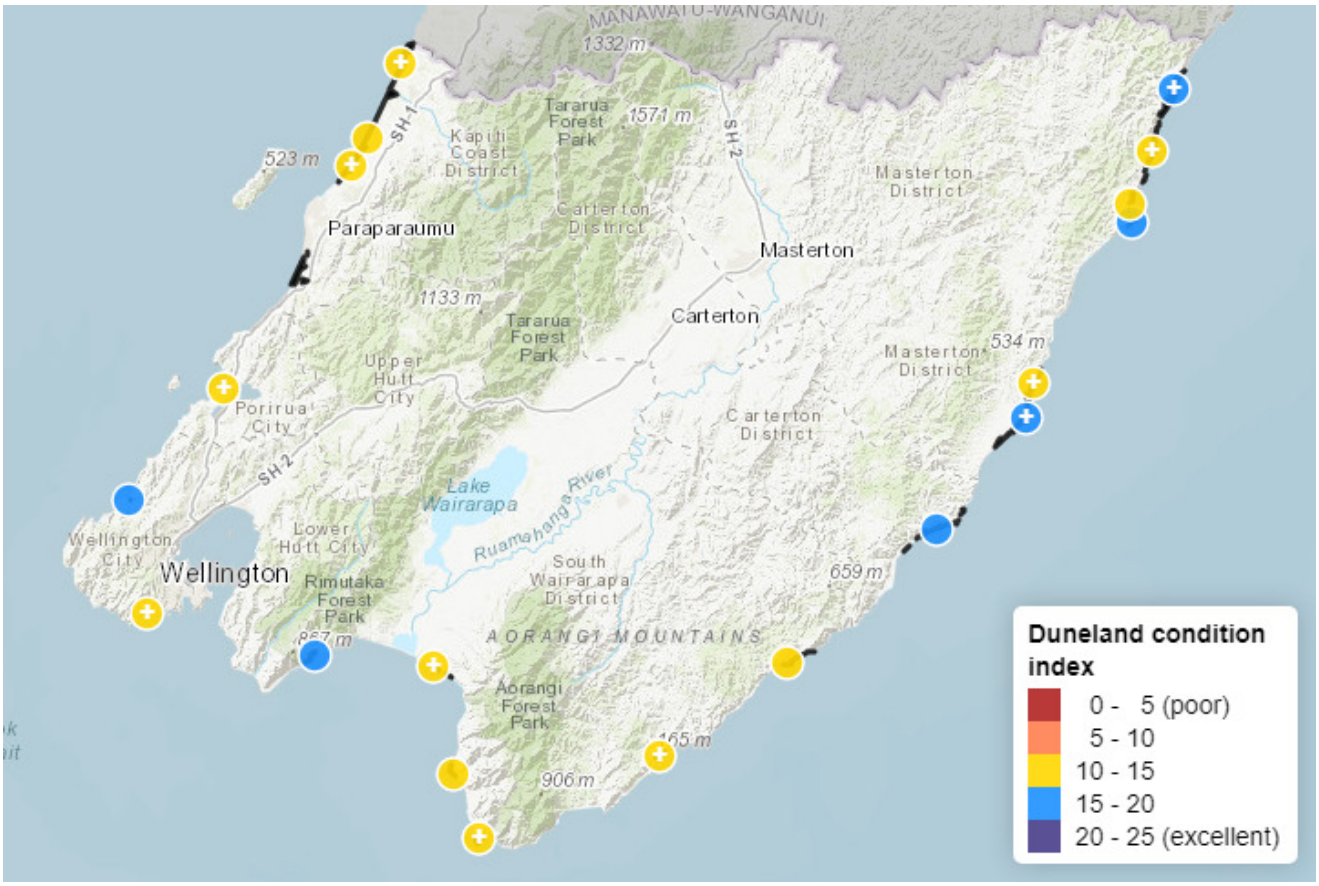

Figure 4: Overall dune condition state scores rated at each site. KNE sites are marked with a '+' symbol.

Table 3: Dune condition state overall and sub-component scores rated at each site.

Site	Management	Year	Indigenous cover dominance	Indigenous bird dominance	Indigenous reptile dominance	Unnatural vegetation disturbance	Buffering	TOTAL
Ōtaki	KNE	2	1	2	5	4	0	12/25
Peka Peka	KNE	1	2	2	5	4	0	13/25
Peka Peka North	Nil	1	2	2	5	4	0	13/25
Whitireia Park	KNE	1	2	2	5	4	0	13/25
Mākara Bay	WCC	1	4	2	5	5	0	16/25
Red Rocks	KNE	1	1	2	5	4	2	14/25
Mukamukaiti	Nil	2	1	3	5	5	2	16/25
Whāngaimoana Coast	KNE	5	2	3	5	4	0	14/25
Te Humenga Point	Nil	5	1	3	5	4	0	13/25
Te Kawakawa Rocks	KNE	5	1	3	5	3	0	12/25
Tora Coast Bush	KNE	2	1	3	5	4	0	13/25
Pahaoa	DOC	4	2	3	5	4	0	14/25
Flat Point	Nil	4	2	3	5	5	0	15/25
Homewood Coastal Plains	KNE	4	2	3	5	5	0	15/25
Riversdale-Orui Coast	KNE	4	2	3	5	0	0	10/25
Castlepoint Scenic Reserve	DOC	3	2	3	5	5	0	15/25
Castlepoint North	Nil	3	1	3	5	4	0	13/25
Mataikona Coast	KNE	3	1	2	5	4	2	14/25
Owahanga	KNE	3	2	2	5	5	2	16/25

Pressures on dunelands

Higher scores indicate less pressure, see methods for details on the scoring system.

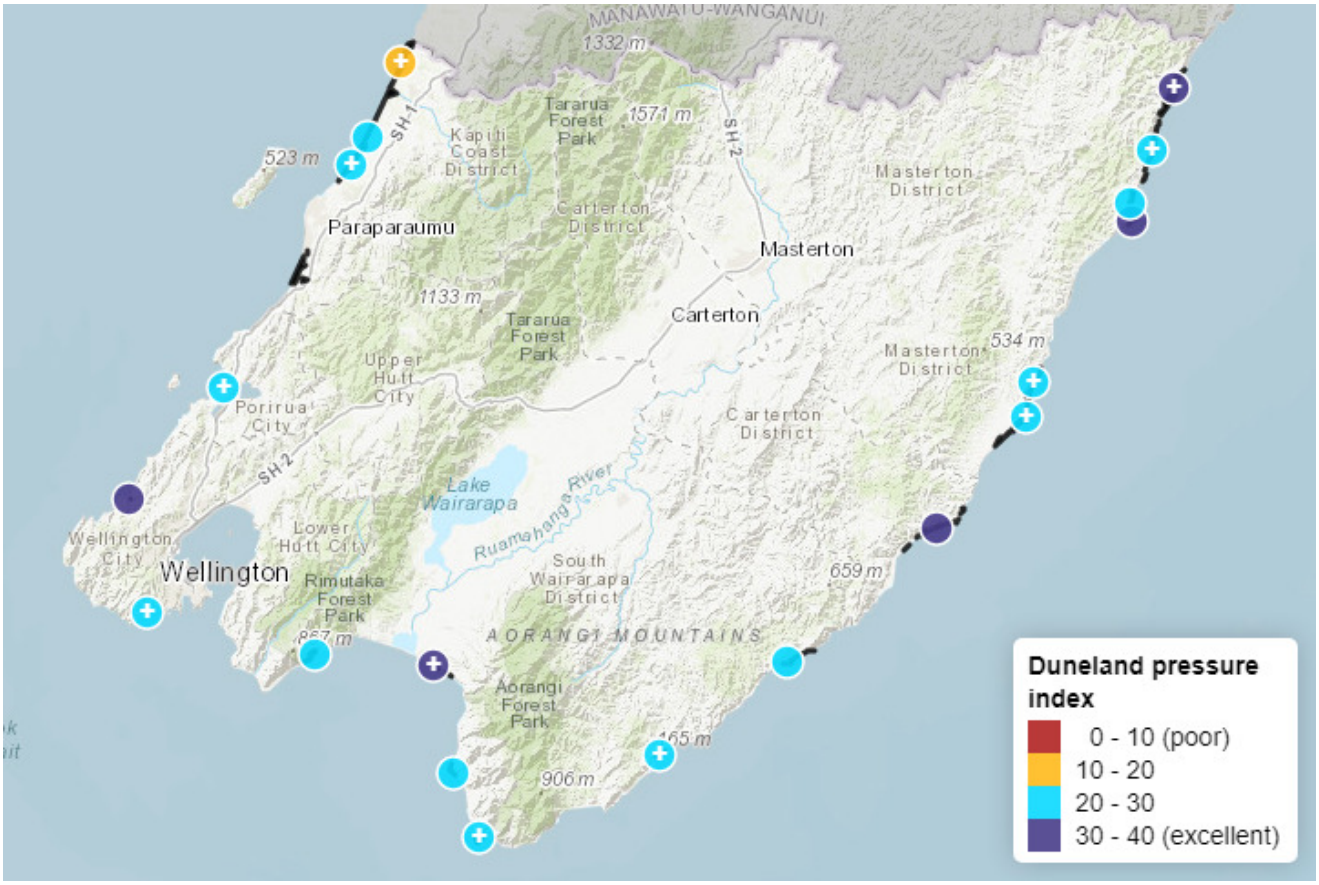

Figure 5: Overall dune condition pressure scores rated at each site. KNE sites are marked with a '+' symbol.

Table 4: Dune condition pressure overall and sub-component scores rated at each site.

Site	Management	Year	Ungulates	Lagomorphs & possums	Predators	Dogs	Problem plants	Uncontrolled pedestrians	Vehicles	Mining	TOTAL
Ōtaki	KNE	2	4	2	2	0	0	0	0	5	13/40
Peka Peka	KNE	1	5	4	0	0	0	2	5	5	21/40
Peka Peka North	Nil	1	5	4	0	0	0	2	5	5	21/40
Whitireia Park	KNE	1	5	4	2	0	2	0	5	5	23/40
Mākara Bay	WCC	1	5	4	4	4	5	5	5	5	37/40
Red Rocks	KNE	1	5	4	4	2	0	0	5	5	25/40
Mukamukaiti	Nil	2	0	0	0	5	1	5	4	5	20/40
Whāngaimoana Coast	KNE	5	5	2	4	5	0	5	4	5	30/40
Te Humenga Point	Nil	5	0	2	4	5	1	5	4	5	26/40
Te Kawakawa Rocks	KNE	5	0	2	4	5	0	5	0	5	21/40
Tora Coast Bush	KNE	2	0	2	4	4	0	5	4	5	24/40
Pahaoa	DOC	4	2	2	0	4	0	5	4	5	22/40
Flat Point	Nil	4	5	2	4	5	0	5	5	5	31/40
Homewood Coastal Plains	KNE	4	0	2	4	4	0	5	5	5	25/40
Riversdale-Orui Coast	KNE	4	5	2	4	0	1	0	5	5	22/40
Castlepoint Scenic Reserve	DOC	3	5	2	4	5	0	4	5	5	30/40
Castlepoint North	Nil	3	5	2	4	5	0	3	5	5	29/40
Mataikona Coast	KNE	3	5	5	4	5	1	1	3	5	29/40
Owahanga	KNE	3	0	5	2	5	3	5	5	5	30/40

Appendix 1: Duneland metadata

Table A1: Monitored dunelands ordered geographically anti-clockwise around the Greater Wellington region.

Duneland	Management	Length (km)	Sampling year
Queen Elizabeth Park	Queen Elizabeth Park	>3	5
Peka Peka & Peka Peka North	Peka Peka Coast KNE	>3	1
Ōtaki	Ōtaki	>3	2
Riversdale–Orui & Homewood	Riversdale–Orui Coast KNE & Homewood Coastal Plains KNE	>3	4
Owahanga	Owahanga	>3	3
Mukamukaiti	Mukamukaiti	>0.5 to <3	2
Red Rocks	Red Rocks	<0.5	1
Mākara Bay	Mākara Bay	<0.5	1
Pahaoa	Pahaoa	>0.5 to <3	4
Te Kawakawa Rocks	Te Kawakawa Rocks	>0.5 to <3	5
Te Humenga Point	Te Humenga Point	>0.5 to <3	5
Whitireia Park	Whitireia Park	<0.5	1
Flat Point	Flat Point	>0.5 to <3	4
Castlepoint Scenic Reserve & Castlepoint North	DOC – Castlepoint Scenic Reserve	>0.5 to <3	3
Tora Coast Bush	Tora Coast Bush	>0.5 to <3	2
Mataikona Coast	Mataikona Coast	>0.5 to <3	3
Whāngaimoana Coast	Whāngaimoana Coast	<0.5	5