2018/24 Duneland health monitoring

Greater Wellington
Te Pane Matua Taiao

Contents

Disclaimer

This report has been prepared by the Environment Group of Greater Wellington (GW) and as such does not constitute Council policy.

In preparing this report, the authors have used the best currently available data and have exercised all reasonable skill and care in presenting and interpreting these data. Nevertheless, GW does not accept any liability, whether direct, indirect, or consequential, arising out of the provision of the data and associated information within this report. Furthermore, as GW endeavours to continuously improve data quality, amendments to data included in, or used in the preparation of, this report may occur without notice at any time.

GW requests that if excerpts or inferences are drawn from this report for further use, due care should be taken to ensure the appropriate context is preserved and is accurately reflected and referenced in subsequent written or verbal communications. Any use of the data and information enclosed in this report, for example, by inclusion in a subsequent report or media release, should be accompanied by an acknowledgement of the source.

For the latest available results go to the GW environmental data hub. Reports for previous years can be found in the GW document library.

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

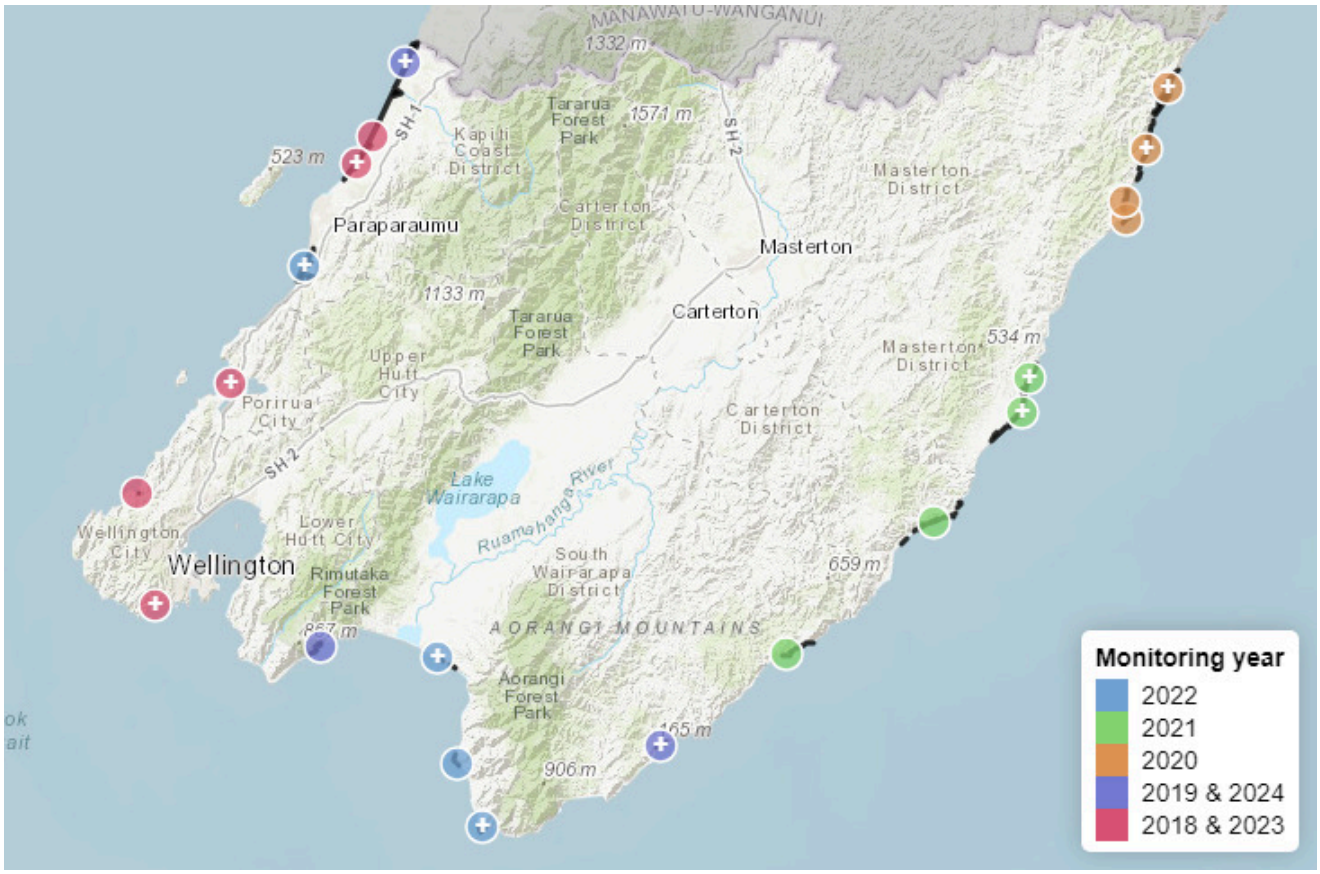


Figure 1: Dunelands in the Greater Wellington region are shown by the black outlines. Monitoring sites are shown above the dunes as circles and coloured by the year surveyed. KNE sites are marked with a '+' symbol. See Appendix 1: Duneland metadata for more information.

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

The average proportion of aerial vegetation cover is measured to provide a physiognomic description of the vegetation communities. All species are identified and classified as “Indigenous” or “Exotic”. See the methods page for details vegetation monitoring. The following subsections present vegetation composition using two key summaries:

- Indigenous species dominance: percent of total species recorded that are indigenous.
- Indigenous cover dominance: percent of total vegetated area covered by indigenous species.

These summaries are mapped for each survey cycle; **years 1-5** and **years 6-10**. Maps showing years 6-10 data also include arrows to denote change from the previous survey result at each site. A right arrow (→) indicates no change, and angled arrows (↘, ↗) indicate increases or decreases of **+/-10%** respectively. **KNE only** maps show only dunelands managed by the Key Native Ecosystem programme.

Indigenous species dominance

Figure 2: The percent of total species recorded that are indigenous at each site.

Indigenous cover dominance

Figure 3: The percent of total vegetated area covered by indigenous species at each site.

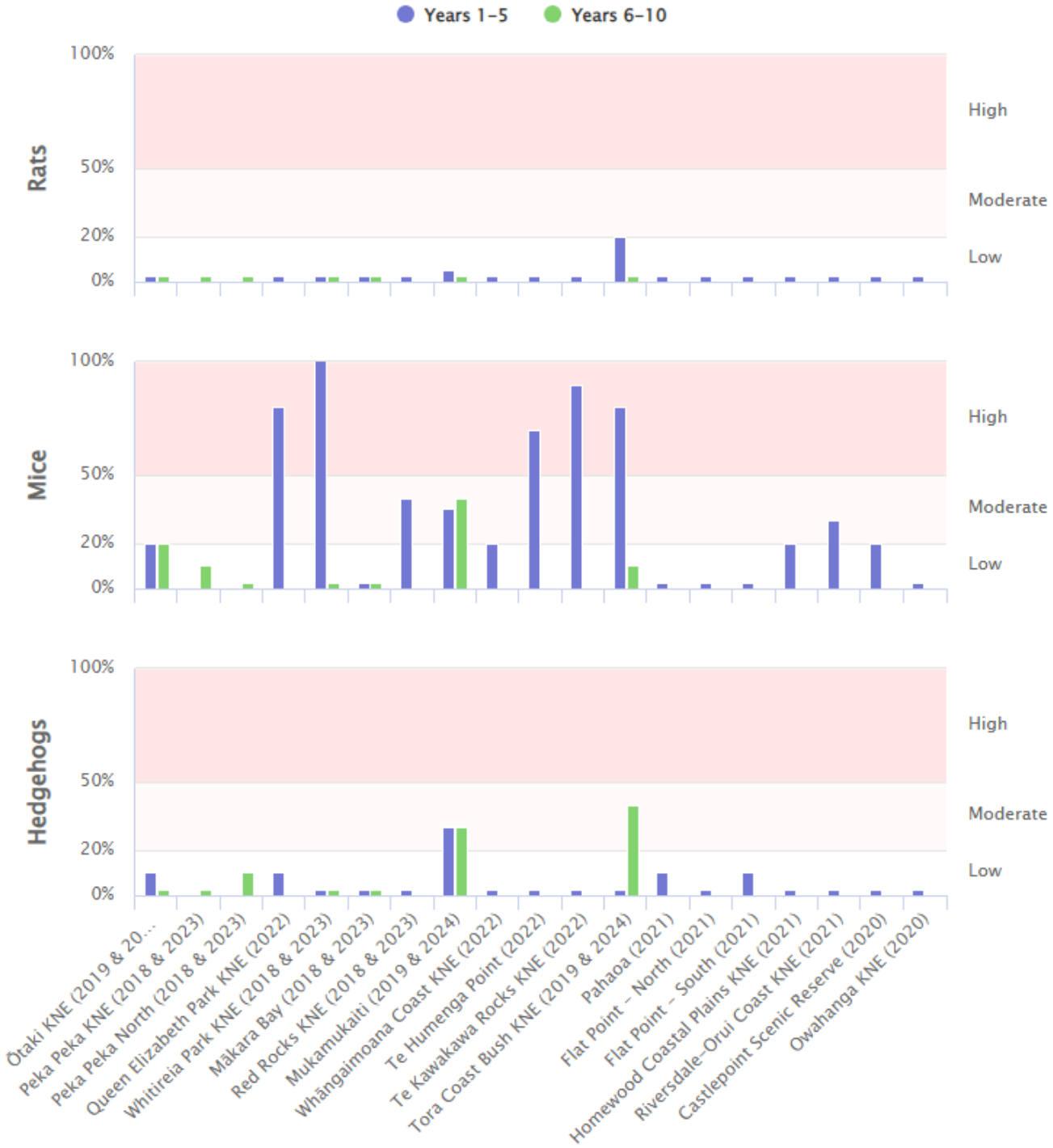
Data table

Table 1: Indigenous species & cover dominance results from each survey. Note that sites are ordered geographically anti-clockwise around the region.

Site	Programme	Survey cycle	Year/s	Indigenous cover dominance	Indigenous species dominance
Ōtaki	Ōtaki Coast KNE	1-5	2019	34.2	29.4
Ōtaki	Ōtaki Coast KNE	6-10	2024	28.0 ↘	31.2 →
Peka Peka	Peka Peka Coast KNE	1-5	2018	29.2	26.8
Peka Peka	Peka Peka Coast KNE	6-10	2023	38.0 ↗	32.3 ↗
Peka Peka North	Nil	1-5	2018	42.1	34.8
Peka Peka North	Nil	6-10	2023	43.6 →	37.3 →
Queen Elizabeth Park	Queen Elizabeth Park KNE	1-5	2022	46.6	40.2
Whitireia Park	Whitireia Coast KNE	1-5	2018	35.1	23.6
Whitireia Park	Whitireia Coast KNE	6-10	2023	42.9 ↗	35.5 ↗
Mākara Bay	WCC - Mākara Foreshore Reserve	1-5	2018	87.7	70.4
Mākara Bay	WCC - Mākara Foreshore Reserve	6-10	2023	82.0 →	62.8 ↘
Red Rocks	Wellington South Coast KNE	1-5	2018	20.2	17.4
Red Rocks	Wellington South Coast KNE	6-10	2023	22.5 ↗	15.1 ↘
Mukamukaiti	Nil	1-5	2019	59.2	45.3
Mukamukaiti	Nil	6-10	2024	29.0 ↘	55.0 ↗
Whāngaimoana Coast	Whāngaimoana Coast KNE	1-5	2022	37.5	46.2
Te Humenga Point	Nil	1-5	2022	25.0	28.3
Te Kawakawa Rocks	Te Kawakawa – Black Rock KNE	1-5	2022	15.4	14.8
Tora Coast Bush	Tora Coast Bush KNE	1-5	2019	10.1	18.7
Tora Coast Bush	Tora Coast Bush KNE	6-10	2024	10.0 →	17.7 →
Pahaoa	DOC - Pahaoa Scientific Reserve	1-5	2021	42.9	41.2
Flat Point	Nil	1-5	2021	34.1	27.0
Homewood Coastal Plains	Homewood Coastal Plains KNE	1-5	2021	43.5	42.2
Riversdale-Orui Coast	Riversdale-Orui Coast KNE	1-5	2021	54.4	48.3
Castlepoint Scenic Reserve	DOC - Castlepoint Scenic Reserve	1-5	2020	30.9	31.1
Castlepoint North	Nil	1-5	2020	35.1	21.8
Mataikona Coast	Mataikona Coast KNE	1-5	2020	40.8	28.8
Owahanga	Owahanga KNE	1-5	2020	44.4	21.6

Pest animals monitoring results

Percentage of tunnels tracked by rats, mice, and hedgehogs. Results are split by survey cycle and the dunes on the x-axis are ordered anti-clockwise around the region with the monitoring year/s included in brackets, see the monitoring network map for dune locations and the methods section for details on pest animal tracking.



Duneland condition & pressure results

The following subsections show duneland **Condition** and **Pressure** scores for each survey cycle; **years 1-5** and **years 6-10**. Maps showing years 6-10 data also include arrows to denote change from the previous survey result at each site. A right arrow (→) indicates no change, angled arrows (↘, ↗) indicate increases or decreases of **+/-10%** respectively, down or up arrow (↓, ↑) are increases or decreases of **two** categories, and finally double down or double up arrow (⇊, ⇈) represent increases or decreases of **more than two** categories. **KNE only** maps show only dunelands managed by the Key Native Ecosystem programme.

Duneland condition

Duneland condition scores are presented for the overall “Duneland condition index” and each individual duneland condition subcomponent. Higher scores indicate better condition, see the methods section for details on the scoring system.

Table 2: Duneland condition overall and sub-component scores rated at each site. “Buffering” refers to the state of surrounding land cover. Sites with asterisks are managed by the KNE programme. Note that sites are ordered geographically anti-clockwise around the region.

Site	Survey cycle	Year/s	Duneland condition index	Indigenous cover dominance	Indigenous bird dominance	Indigenous reptile dominance	Unnatural vegetation disturbance	Buffering
Ōtaki*	1-5	2019	12	1	2	5	4	0
Ōtaki*	6-10	2024	12 →	1 →	2 →	5 →	4 →	0 →
Peka Peka*	1-5	2018	13	2	2	5	4	0
Peka Peka*	6-10	2023	13 →	2 →	2 →	5 →	4 →	0 →
Peka Peka North	1-5	2018	13	2	2	5	4	0
Peka Peka North	6-10	2023	13 →	2 →	2 →	5 →	4 →	0 →
Whitireia Park*	1-5	2018	13	2	2	5	4	0
Whitireia Park*	6-10	2023	13 →	2 →	2 →	5 →	4 →	0 →
Mākara Bay	1-5	2018	16	4	2	5	5	0
Mākara Bay	6-10	2023	16 →	4 →	2 →	5 →	5 →	0 →
Red Rocks*	1-5	2018	14	1	2	5	4	2
Red Rocks*	6-10	2023	14 →	1 →	2 →	5 →	4 →	2 →
Mukamukaiti	1-5	2019	16	1	3	5	5	2
Mukamukaiti	6-10	2024	16 →	1 →	3 →	5 →	5 →	2 →
Whāngaimoana Coast*	1-5	2022	14	2	3	5	4	0
Te Humenga Point	1-5	2022	13	1	3	5	4	0
Te Kawakawa Rocks*	1-5	2022	12	1	3	5	3	0
Tora Coast Bush*	1-5	2019	13	1	3	5	4	0
Tora Coast Bush*	6-10	2024	13 →	1 →	3 →	5 →	4 →	0 →
Pahaoa	1-5	2021	14	2	3	5	4	0
Flat Point	1-5	2021	15	2	3	5	5	0
Homewood Coastal Plains*	1-5	2021	15	2	3	5	5	0
Riversdale-Orui Coast*	1-5	2021	10	2	3	5	0	0
Castlepoint Scenic Reserve	1-5	2020	15	2	3	5	5	0
Castlepoint North	1-5	2020	13	1	3	5	4	0
Mataikona Coast*	1-5	2020	14	1	2	5	4	2
Owahanga*	1-5	2020	16	2	2	5	5	2

Duneland condition index

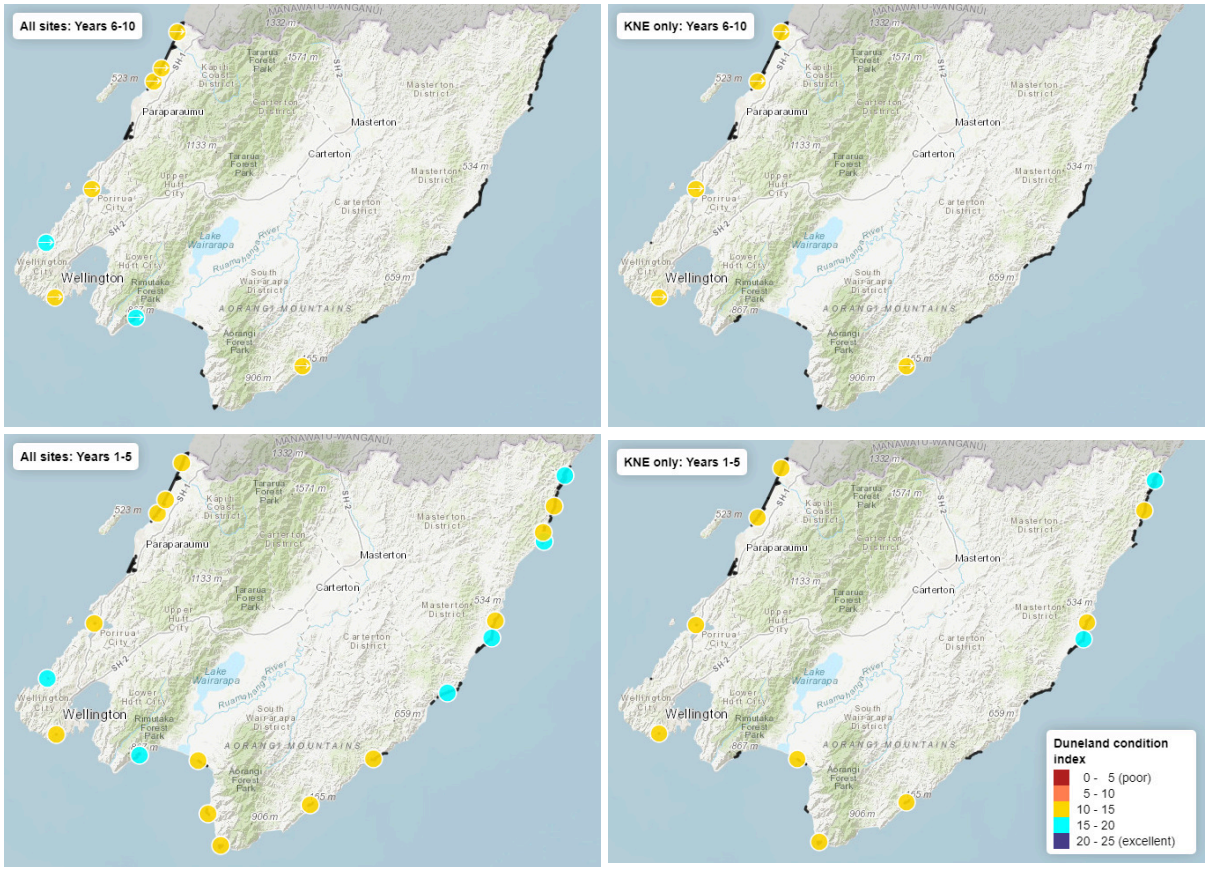


Figure 4: Duneland condition index overall scores.

Indigenous cover dominance

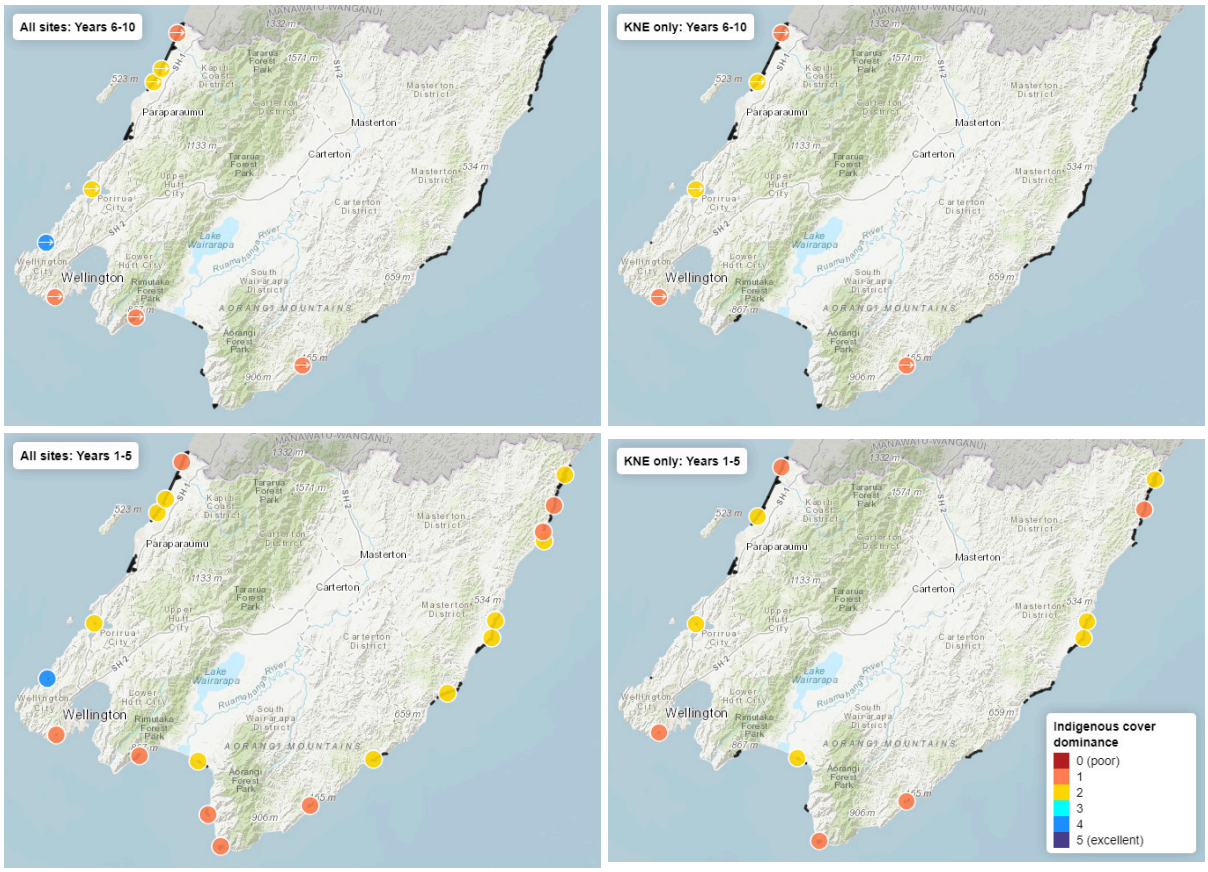


Figure 5: Indigenous cover dominance subcomponent scores.

Indigenous bird dominance

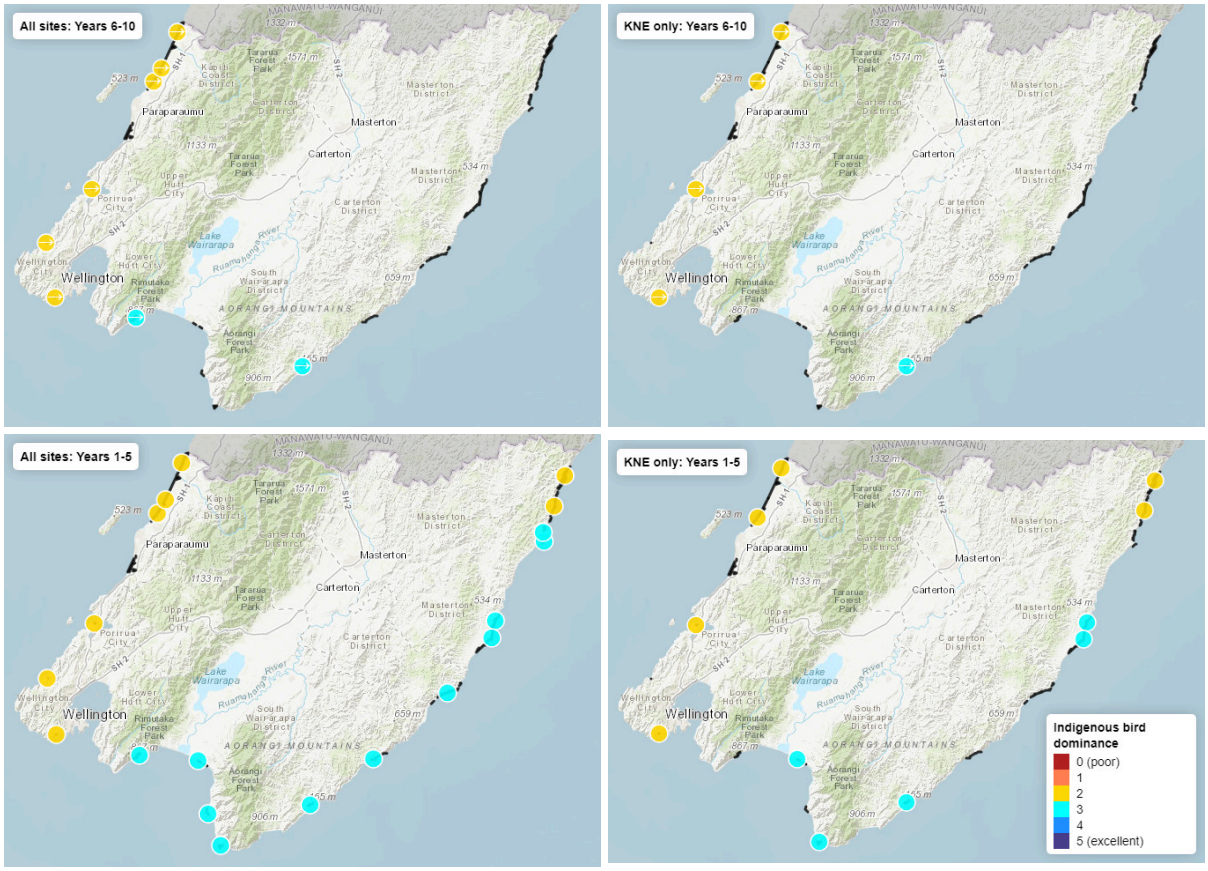


Figure 6: Indigenous bird dominance subcomponent scores.

Indigenous reptile dominance

Figure 7: Indigenous reptile dominance subcomponent scores.

Unnatural vegetation disturbance

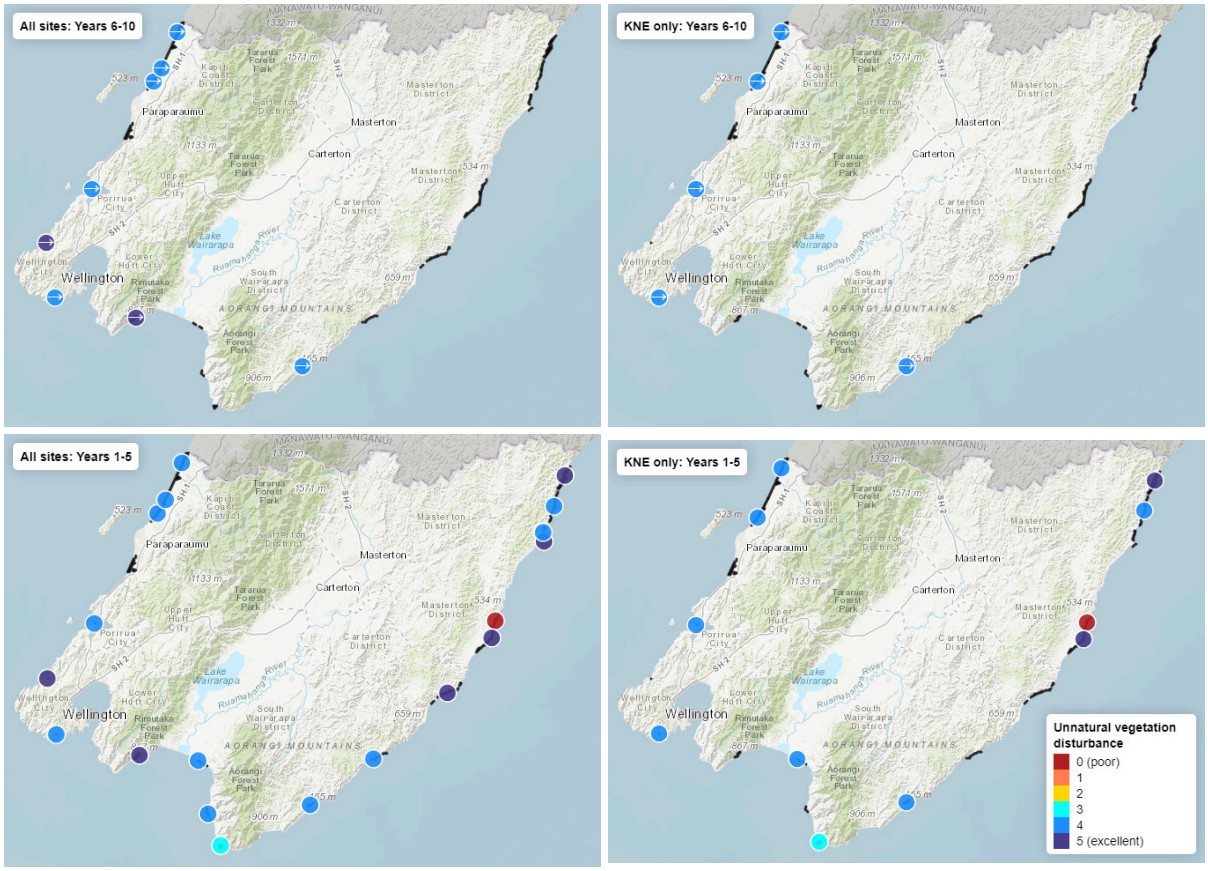


Figure 8: Unnatural vegetation disturbance subcomponent scores.

Buffering

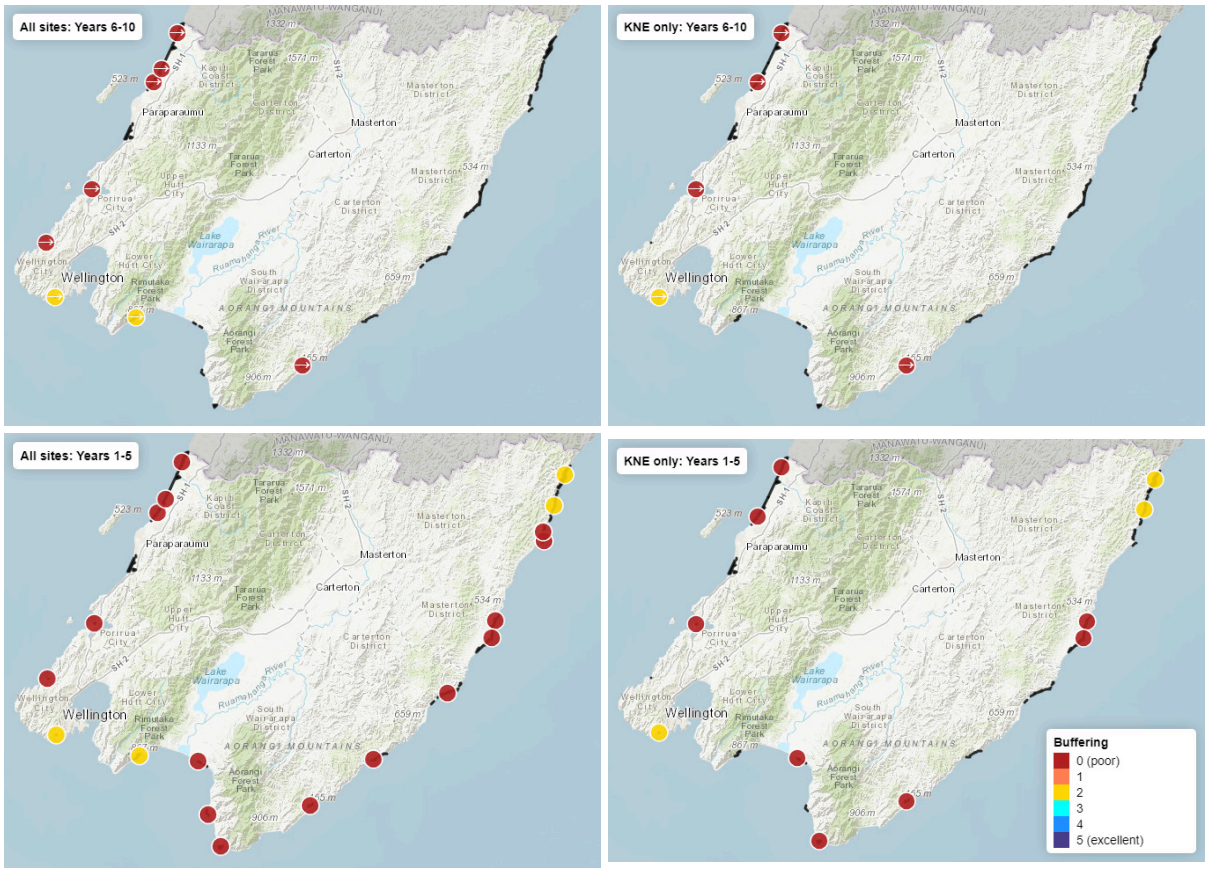


Figure 9: Buffering (the state of surrounding land cover) subcomponent scores.

Duneland pressure

Duneland pressure scores are presented for the overall "Duneland pressure index" and each individual duneland pressure subcomponent. Higher scores indicate less pressure, see the methods section for details on the scoring system.

Table 3: Duneland pressure overall and sub-component scores rated at each site. Sites with asterisks are managed by the KNE programme. Note that sites are ordered geographically anti-clockwise around the region.

Site	Survey cycle	Year/s	Duneland pressure index	Ungulates	Lagomorphs & possums	Predators	Dogs	Problem plants	Uncontrolled pedestrians	Vehicles	Mining
Ōtaki*	1-5	2019	13	4	2	2	0	0	0	0	5
Ōtaki*	6-10	2024	13 →	4 →	2 →	2 →	0 →	0 →	0 →	0 →	5 →
Peka Peka*	1-5	2018	21	5	4	0	0	0	2	5	5
Peka Peka*	6-10	2023	21 →	5 →	4 →	0 →	0 →	0 →	2 →	5 →	5 →
Peka Peka North	1-5	2018	21	5	4	0	0	0	2	5	5
Peka Peka North	6-10	2023	21 →	5 →	4 →	0 →	0 →	0 →	2 →	5 →	5 →
Whitireia Park*	1-5	2018	23	5	4	2	0	2	0	5	5
Whitireia Park*	6-10	2023	23 →	5 →	4 →	2 →	0 →	2 →	0 →	5 →	5 →
Mākara Bay	1-5	2018	37	5	4	4	4	5	5	5	5
Mākara Bay	6-10	2023	37 →	5 →	4 →	4 →	4 →	5 →	5 →	5 →	5 →
Red Rocks*	1-5	2018	25	5	4	4	2	0	0	5	5
Red Rocks*	6-10	2023	25 →	5 →	4 →	4 →	2 →	0 →	0 →	5 →	5 →
Mukamukaiti	1-5	2019	20	0	0	0	5	1	5	4	5
Mukamukaiti	6-10	2024	20 →	0 →	0 →	0 →	5 →	1 →	5 →	4 →	5 →
Whāngaimoana Coast*	1-5	2022	30	5	2	4	5	0	5	4	5
Te Humenga Point	1-5	2022	26	0	2	4	5	1	5	4	5
Te Kawakawa Rocks*	1-5	2022	21	0	2	4	5	0	5	0	5
Tora Coast Bush*	1-5	2019	24	0	2	4	4	0	5	4	5
Tora Coast Bush*	6-10	2024	24 →	0 →	2 →	4 →	4 →	0 →	5 →	4 →	5 →
Pahaoa	1-5	2021	22	2	2	0	4	0	5	4	5
Flat Point	1-5	2021	31	5	2	4	5	0	5	5	5
Homewood Coastal Plains*	1-5	2021	25	0	2	4	4	0	5	5	5
Riversdale-Orui Coast*	1-5	2021	22	5	2	4	0	1	0	5	5
Castlepoint Scenic Reserve	1-5	2020	30	5	2	4	5	0	4	5	5
Castlepoint North	1-5	2020	29	5	2	4	5	0	3	5	5
Mataikona Coast*	1-5	2020	29	5	5	4	5	1	1	3	5
Owahanga*	1-5	2020	30	0	5	2	5	3	5	5	5

Duneland pressure index

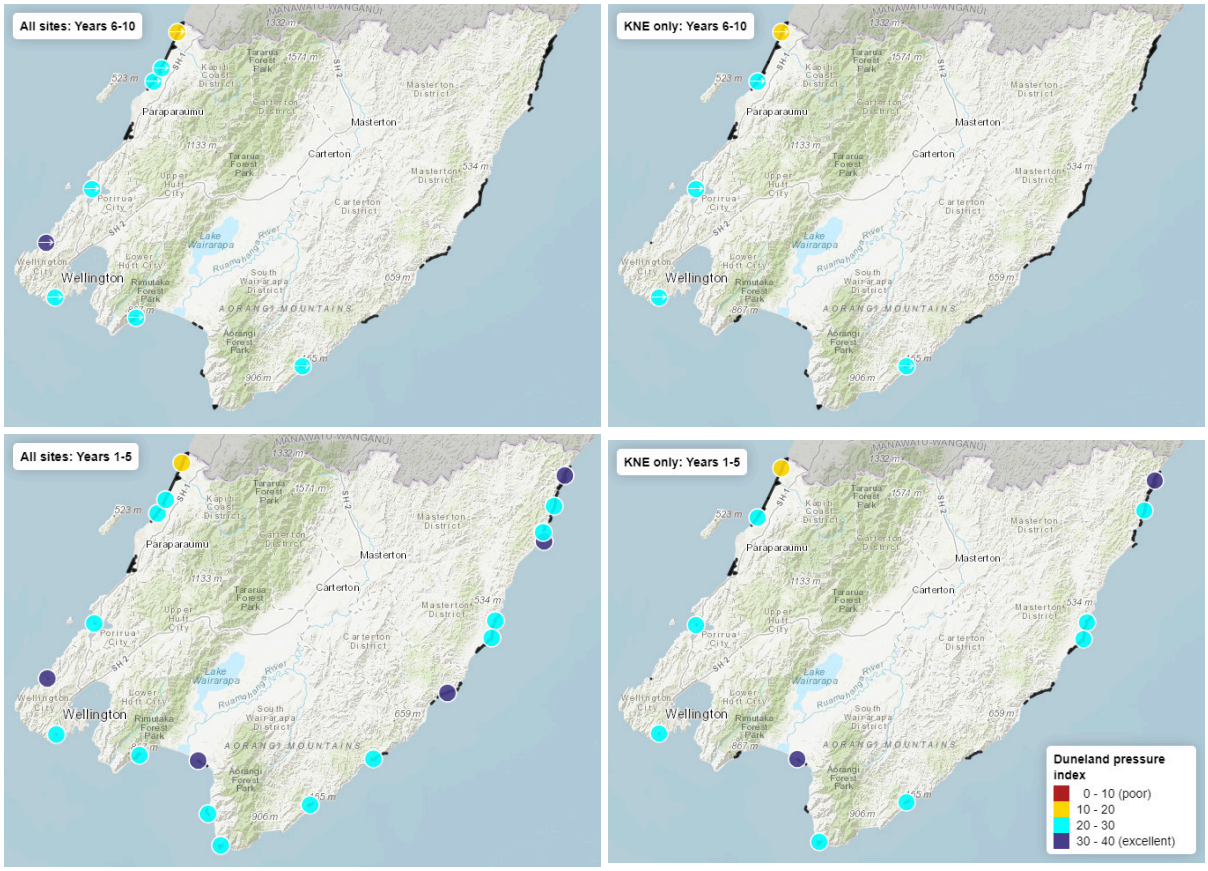


Figure 10: Duneland condition index overall scores.

Ungulates

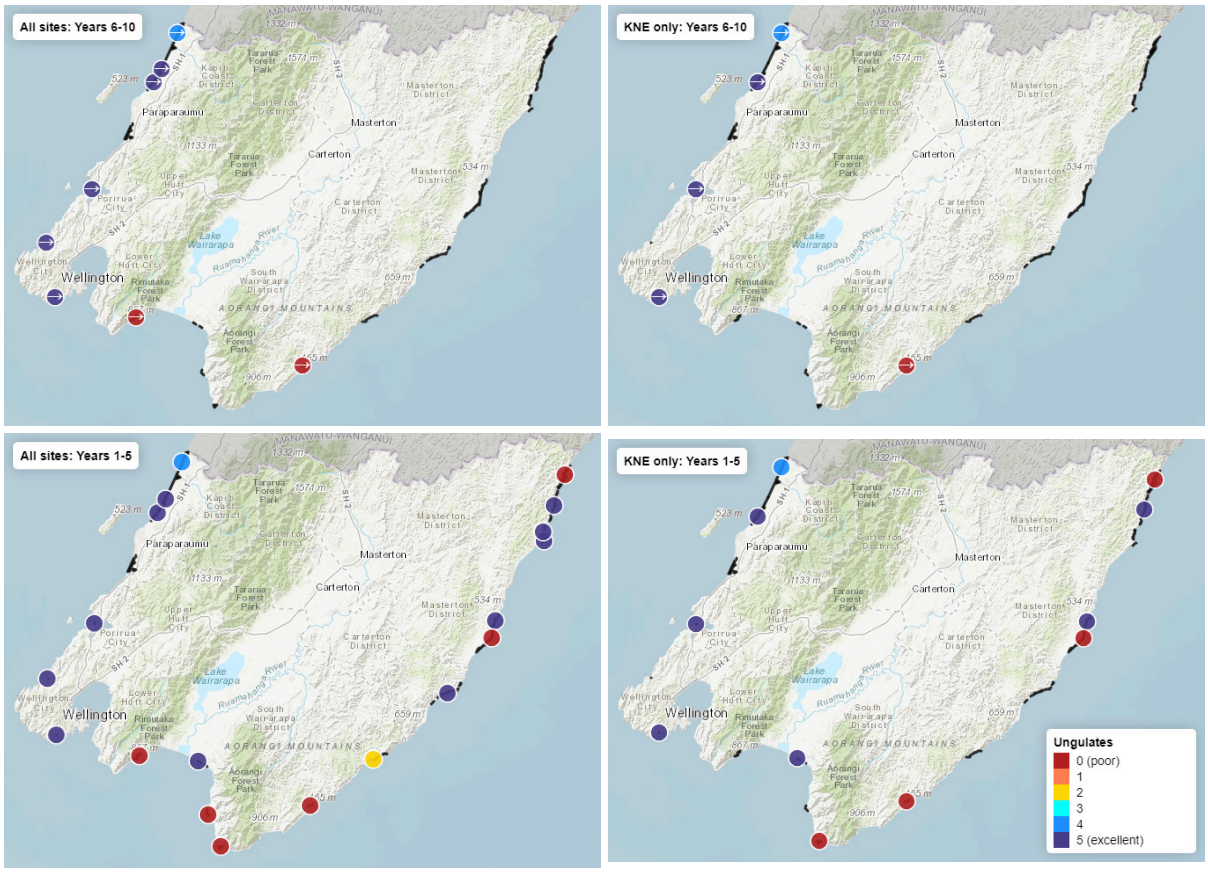


Figure 11: Ungulates subcomponent scores.

Lagomorphs & possums

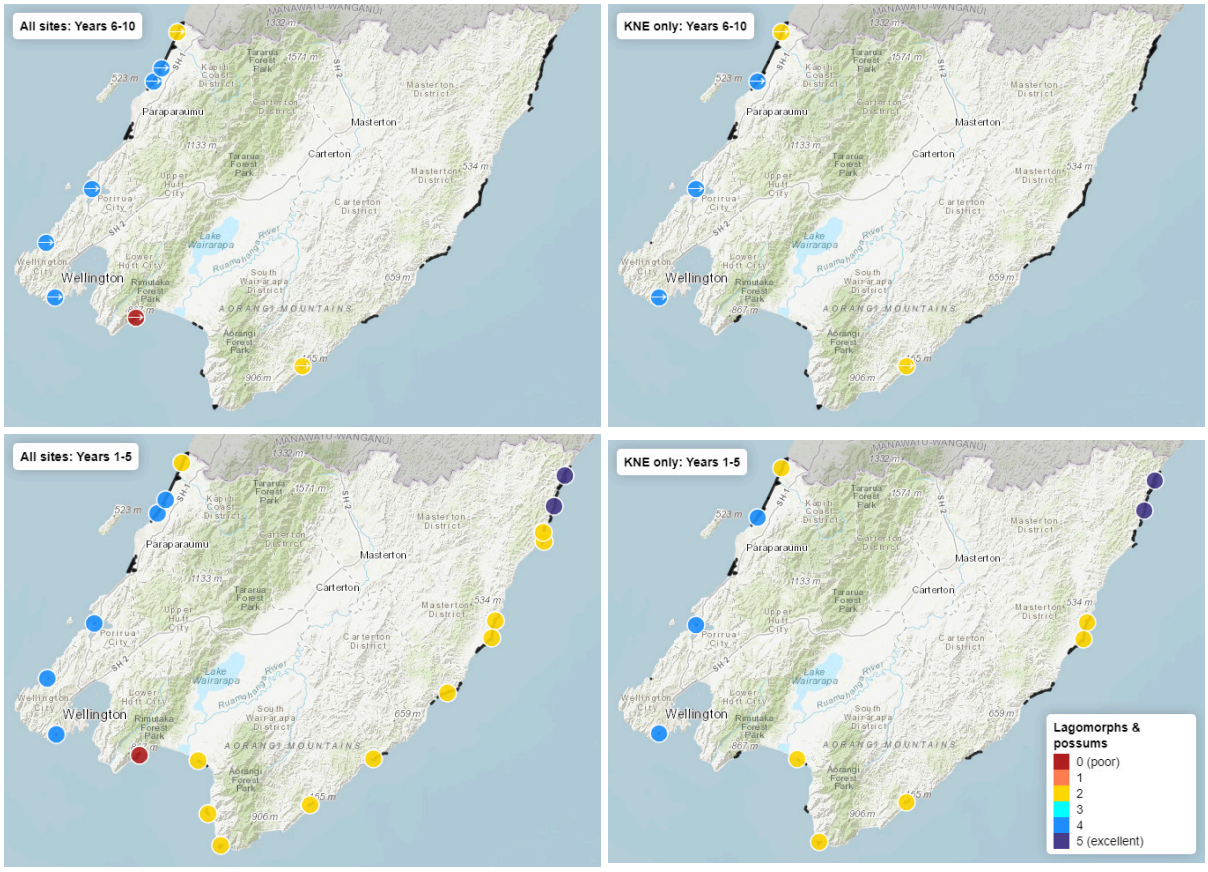


Figure 12: Lagomorphs & possums subcomponent scores.

Predators

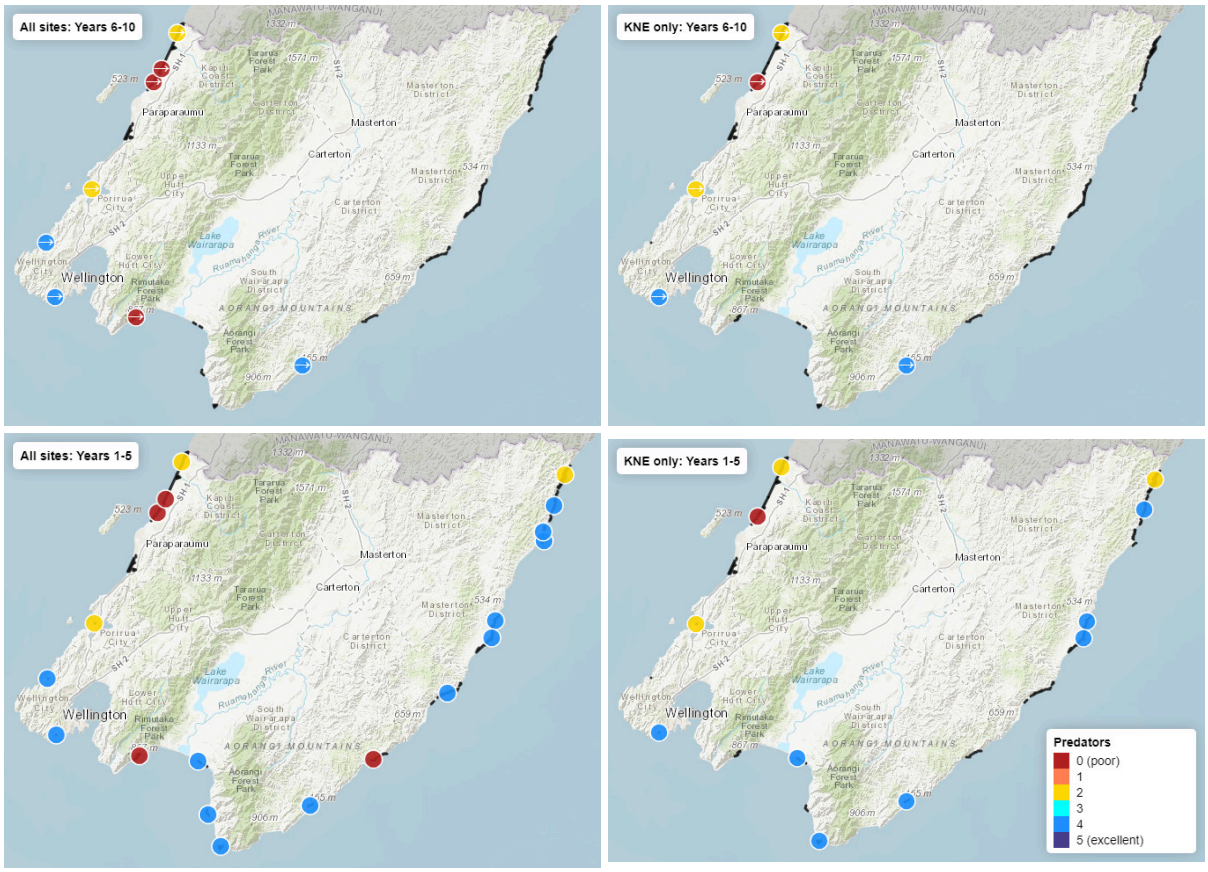


Figure 13: Predators subcomponent scores.

Dogs

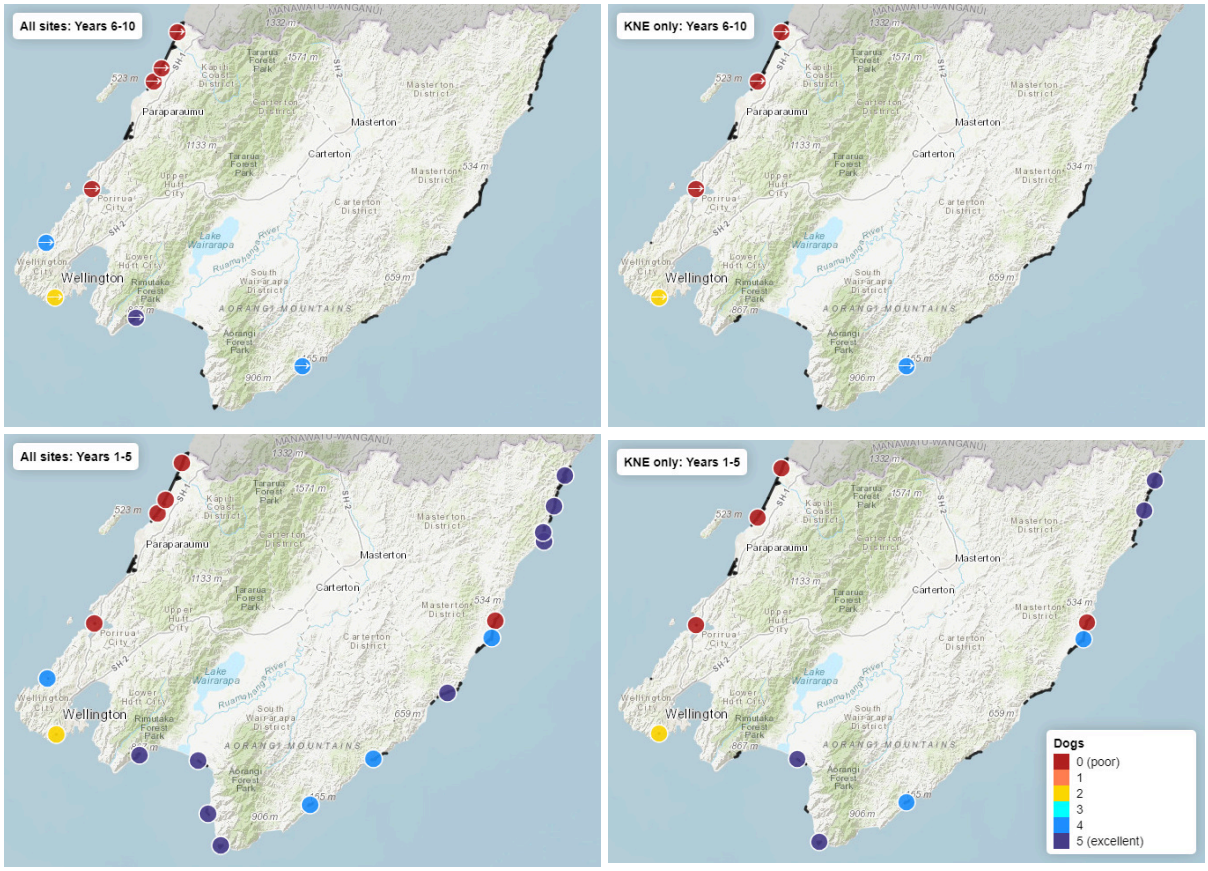


Figure 14: Dogs subcomponent scores.

Problem plants

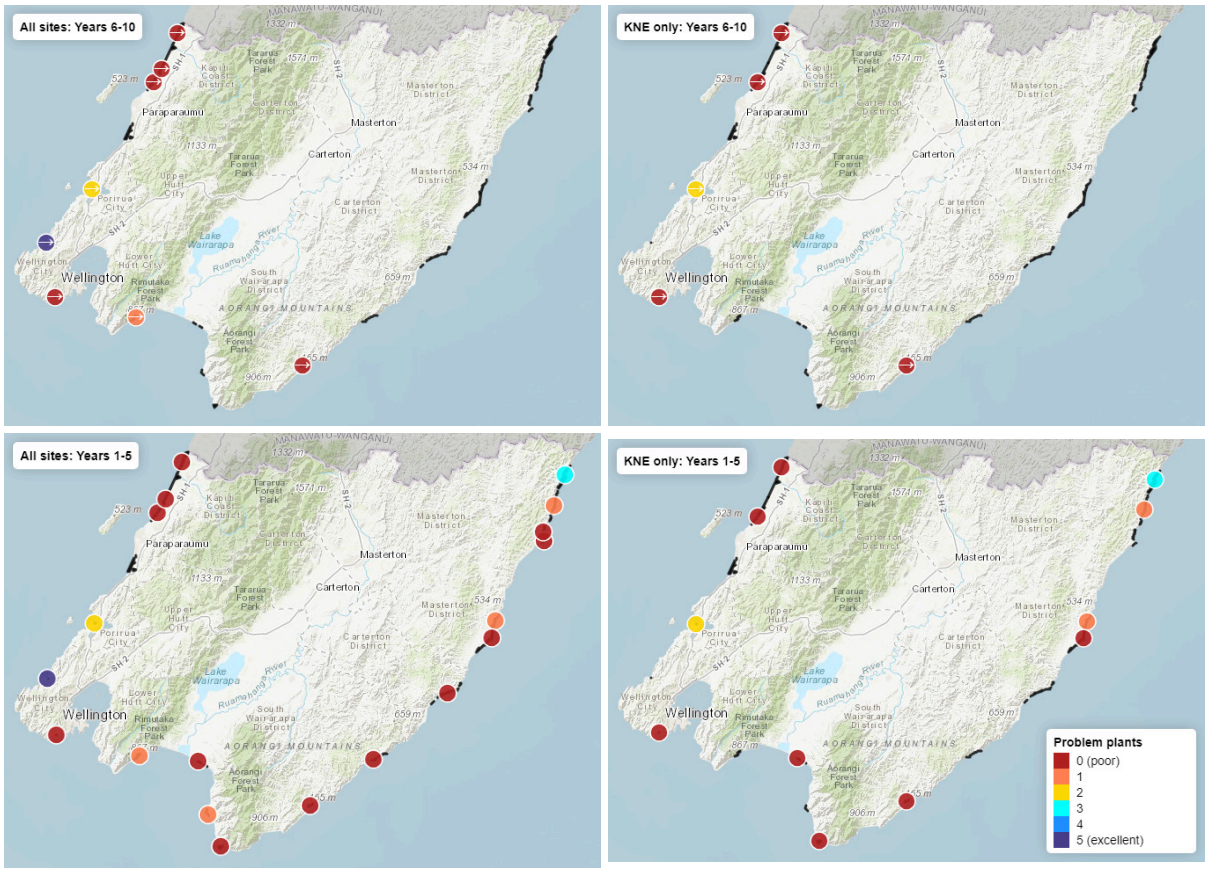


Figure 15: Problem plants subcomponent scores.

Uncontrolled pedestrians

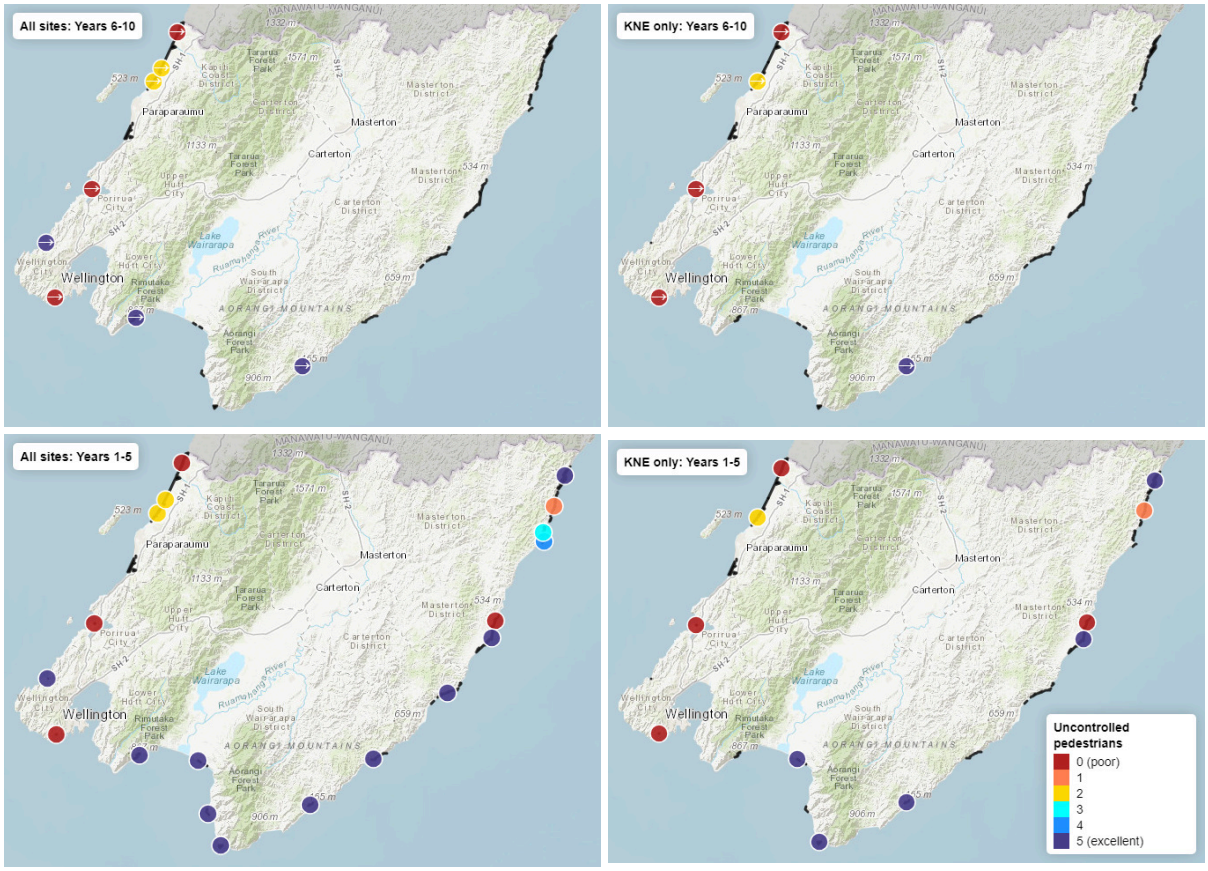


Figure 16: Uncontrolled pedestrians subcomponent scores.

Vehicles

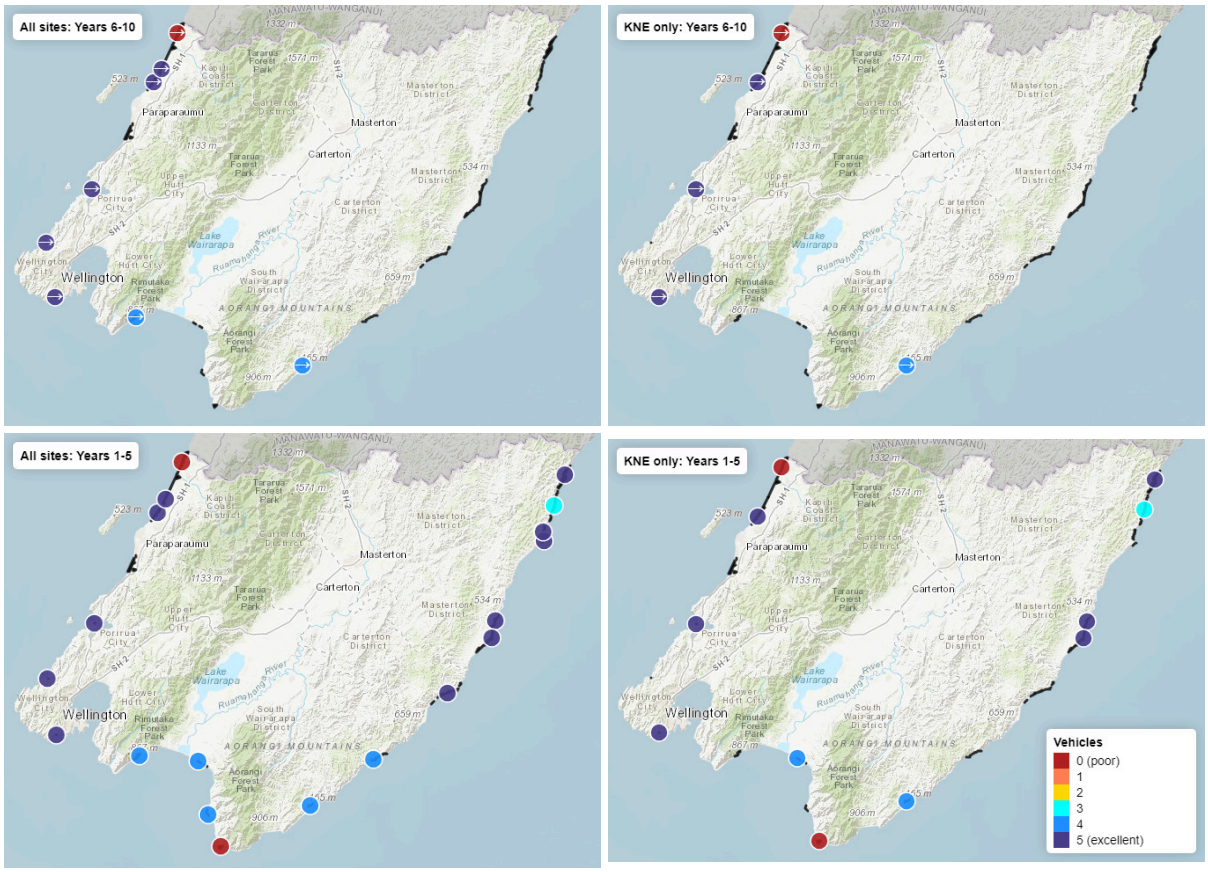


Figure 17: Vehicles subcomponent scores.

Mining

Figure 18: Mining subcomponent scores.

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