

**BEFORE AN INDEPENDENT HEARING PANEL FOR WAITOMO
DISTRICT COUNCIL**

Under **The Resource Management Act 1991**

And

In the matter of **The Proposed Waitomo District Plan
Tranche 2**

By Waitomo District Council

Evidence of Andrew James Townsend (Ecology)
on behalf of the Director-General of Conservation Tumuaki Ahurei
Submitter ID 53 and Further Submission ID 03
Dated 21st October 2024

Department of Conservation Te Papa Atawhai

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Executive summary

1. The Waitomo District supports a range of diverse ecosystems, vegetation and habitats for fauna, ranging from the subalpine to coastal zone. Values include a relatively high percentage of indigenous cover; intact, natural ecological gradients; and Threatened, At Risk, uncommon and regionally endemic plants. The location of these and other biodiversity values is contingent on abiotic influences such as geology, landforms, soil types, temperature, and precipitation. The central part of the Waitomo District shows the greatest level of modification, with the coastal (western to southwestern) and inland (eastern) areas being the most ecologically intact.
2. My evidence highlights the importance of ecological values in the Waitomo District and how these interact with the Policies and Rules in the proposed District Plan, particularly relating to vegetation clearance in significant natural areas; and the importance of having strong provisions for protecting indigenous vegetation in the coastal environment.

Introduction

3. My full name is Andrew James Townsend.
4. I have been asked to provide ecological evidence on the proposed Waitomo District Plan (**pWDP**).
5. This evidence relates to Hearing Topic: Ecosystems and Indigenous Biodiversity.

Qualifications and experience

6. I hold bachelor's degree in Horticulture and a Post-graduate Diploma in Plant Science from Massey University. I am a member of the New Zealand Botanical Society and the New Zealand Plant Conservation Network.
7. I am currently employed by Te Papa Atawhai/Department of Conservation (**DOC/the Department**) as a senior technical advisor for ecology, in the Terrestrial Ecosystems Unit of the Biodiversity Heritage and Visitor Group. I have worked for DOC as a terrestrial ecologist since 1997, first based in Wellington (10 years) and then Northland (17) years.

Prior to 1997, I held fixed-term contracts with the Department and worked as an ecological consultant (Wildland Consultants Ltd.); this work required ecological survey across much of the North Island, using and refining ecological assessment criteria for the Protected Natural Areas (**PNA**) Programme and writing PNA survey reports.

8. I was involved in the preparation of the Department's Guidelines for assessing Ecological Significance¹ and have experience in providing advice on ecological significance assessments into internal and external organisational statutory processes such as Council hearings and the Environment Court.
9. I was involved with developing ecological significance criteria for the Northland Regional Council Regional Policy Statement (**RPS**) 2016, and processes to identify Significant Natural Areas (**SNAs**) for the Far North, Kaipara, Whangarei, and Thames-Coromandel Districts.
10. My current role requires me to provide ecological advice nationally, and I am specifically involved with projects across much of the North Island, including providing advice on managing threatened plants in Wairarapa, Hawke's Bay, Manawatu-Rangitikei, Waikato, Auckland and Northland regions. I have visited Moeatua to provide ecological advice on threatened plants occurring there (*Myosotis pansa subsp. praeceps*), and I recently provided ecological advice for the Department on the Thames-Coromandel District Plan and am conversant with the Waikato RPS.

Code of Conduct

11. I confirm that I have read the code of conduct for expert witnesses as contained in the Environment Court Practice Note 2023. I have complied with the Practice Note when preparing my written statement of evidence and will do so when I give evidence before the hearing.
12. For the avoidance of doubt, in providing this evidence as an expert witness in accordance with the Code, I acknowledge that I have an overriding duty to impartially assist the Panel on matters within my area

¹ Davis, M.; Head, N.J.; Myers, S.C.; Moore, S.H. 2016: Department of Conservation guidelines for assessing significant ecological values. *DOC. Wellington*.

of expertise. The views expressed are my own expert views, and I do not speak on the behalf of the Director-General of Conservation.

13. The data, information, facts and assumptions I have considered in forming my opinions are set out in my evidence. The reasons for the opinions expressed are also set out, and includes, where relevant:
 - a. why other alternative interpretations of data are not supported;
 - b. any qualification if my evidence may be incomplete or inaccurate without such qualification;
 - c. any knowledge gaps and the potential implication of the knowledge gap;
 - d. if my opinion is not firm or concluded because of insufficient research or data or for any other reason;
 - e. an assessment of the level of confidence and the likelihood of any outcomes specified in my conclusion.
14. Unless I state otherwise, this evidence is within my sphere of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Scope of evidence

15. My evidence will cover the following:
 - a. A broad description of the diversity of ecological values in Waitomo District with a focus on vegetation, flora, and ecosystems, including habitat for indigenous fauna
 - b. Evidence to support the importance of considering the adverse effects associated with vegetation clearance outside SNAs (ECO-P1).
 - c. The potential effects of allowing removal of manuka and kanuka from SNAs (ECO-P3(5) & ECO_R13).
 - d. The potential effects of removing indigenous vegetation clearance for fences (ECO-P3(1) & ECO-R4).

- e. Evidence to support the importance of including policies to manage Threatened/At Risk plants in the Coastal Environment (ECO-P11).
- f. Matters to consider around the removal of indigenous vegetation for outdoor education activities or adventure tourism activities (ECO-R14).

Material considered

16. I have read and considered the following:
 - a. Information contained in relevant PNA reports; the Landcover database 2020 (**LCDB5**)
 - b. The SNA overlay provided by Waitomo District Council as a shape (SHP) file for analysis in ArcMap, a Geographic Information Systems (GIS) application;
 - c. Threatened plants data stored in DOC's databases (Bioweb), which includes data from the field, national herbarium (Auckland war Memoria Museum (AK), Waikato University (WAIK), Te Papa Tongarewa/Museum of New Zealand (WELT), Allan Herbarium (CHR)) records, and plant lists;
 - d. Records of plant observations within the Waitomo District, stored on iNaturalist; and
 - e. The S42A report and the Ecosystems and indigenous biodiversity chapter.
17. Whilst I do not have an intimate association with the ecological values of much of the Waitomo District, I believe that the knowledge I hold from my work in other parts of the North Island, and the analysis that I have undertaken means that I can contribute meaningfully and provide an educated opinion for ensuring positive outcomes for biodiversity values.

Ecological values of Waitomo District: vegetation

18. In this section of my evidence, I will provide a general overview of biodiversity values in Waitomo District, as a breakdown against the national Landcover Database (LCDB5) and the ecological districts occurring within the Waitomo District.

19. The physical environment of the Waitomo District is relatively diverse, and this is reflected in its indigenous biodiversity. To be able to protect and manage this, it is important to understand what it is, and where it occurs. The Ecological Region and District classification of NZ (McEwen 1987) provides a systematic framework do this.
20. Of the 85 ecological regions and 268 ecological districts, five regions and eight districts occur within the boundary of the Waitomo District (Table 1).

Number	Ecological Region name	Ecological District name	Area (Ha)	Approximate proportion of ED in Waitomo District
11.07	Waikato	Waipa	8573.3	12%
12.02	Tainui	Kawhia	23333.4	18%
12.03	Tainui	Herangi	54460.7	100%
15.01	Western Volcanic Plateau	Ranginui	26130.2	23%
15.02	Western Volcanic Plateau	Pureora	21314.5	19%
23.01	King Country	Waitomo	156885.5	96%
23.02	King Country	Taumarunui	25658.1	11%
24.01	Taranaki	North Taranaki	36610.2	14%

Table 1. Ecological regions and districts within the boundary of the Waitomo District, and their approximate proportion that the District covers.

21. This shows the relative contribution that the Waitomo District provides in protecting indigenous vegetation in each ecological district, i.e., because 95-100 percent of Waitomo and Herangi Ecological Districts are within Waitomo District, it is solely responsible for protecting indigenous vegetation there.
22. I also used LCDB5 to analyse patterns of indigenous ecosystems in the Waitomo District (Table 2). (I have used the term 'indigenous ecosystems' rather than 'indigenous vegetation' because waterbodies and open areas (such as karst and limestone pavement) may not be vegetated but are still important natural ecosystems, however the terms could be used interchangeably in this context because the differences when they are excluded are negligible.)

Ecological District	Area of indigenous ecosystems in ED (Ha)	Proportion of indigenous ecosystem coverage in the ED	Average size (Ha) of indigenous ecosystem in ED	Area of indigenous vegetation ² (Ha)
Waipa	574.5	6.7%	4.2	561.3
Kawhia	11247.9	48.2%	30.1	10970.9
Herangi	36387.7	66.8%	89.6	36298.2
Ranginui	6999.7	26.8%	18.6	6996.6
Pureora	5060.4	23.8%	20.9	5058.1
Waitomo	34402.8	21.9%	14.8	34161.7
Taumarunui	5990.9	23.3%	17.0	5988.3
North Taranaki	28965.5	79.1%	118.2	28743.3

Table 2. Analysis of ecological patterns in the Waitomo District.

23. This analysis shows that while the ecological integrity of some ecological districts in the Waitomo District are relatively intact – e.g., North Taranaki, Herangi, Kawhia, and the north-western part of Waitomo District, others are highly developed, such as the Waipa Ecological District proportion of the Waitomo District (Figure 1).

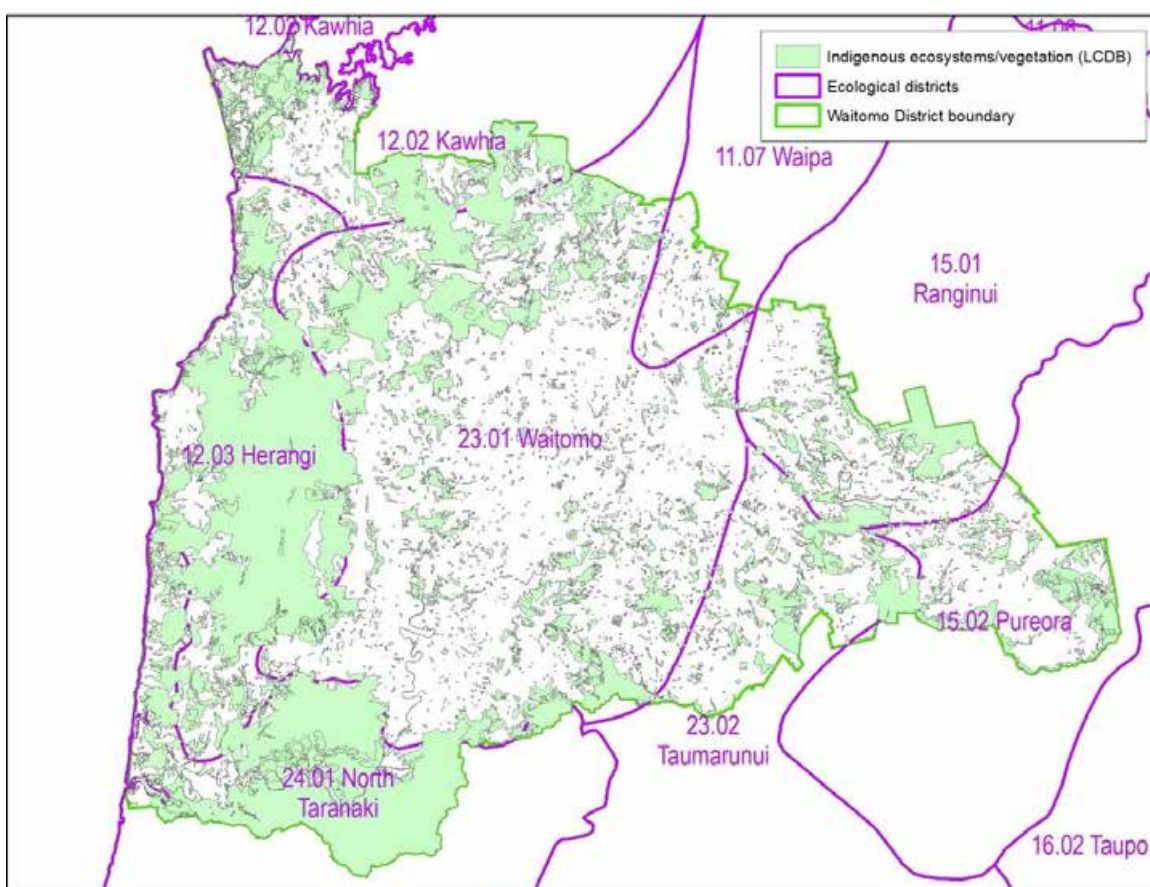


Figure 1. Indigenous ecosystem/vegetation cover and ecological districts in the Waitomo District.

² Excluding cover categories open water, lakes, ponds, rivers and landslide, as they are ambiguous about whether they are indigenous.

24. I then looked at SNAs in each of the ecological districts to gain an understanding of how these compare to the LCDB5 vegetation database (Table 3).

Ecological District	Total area of SNAs (Ha) in ED	Number of SNAs in ED	Approximate proportion of ED in Waitomo in SNA	Average size of SNA in ED in Waitomo District (Ha)
Waipa	2.4	1	0.03%	2.4
Kawhia	3371.2	57	14.4%	59.1
Herangi	20187.8	79	30.1%	255.5
Ranginui	3015.7	36	11.5%	83.8
Pureora	37.7	2	0.2%	18.8
Waitomo	14908.5	308	9.5%	48.4
Taumarunui	2730.7	49	10.6%	55.7
North Taranaki	15212.5	98	41.6%	155.2

Table 3. Relative coverage of SNAs in ecological districts in the Waitomo District.

25. On average, approximately 35% of the Waitomo District is covered by an SNA³, however this is not evenly distributed across the District. Some ecological districts are very well represented; however, others are not.
26. One of the principles of ecological significance is ‘representativeness’, which is interpreted to include any examples of remaining indigenous vegetation that is typical of the ecological district, regardless of whether it is commonplace⁴.
27. Another principle of ecological significance is the provision for protecting relatively uncommon examples of indigenous vegetation that is under-represented; the Waikato RPS uses a threshold of 20% of the ecological region or district⁵ as a target.
28. Tables 2 and 3 show that even though some ecological districts such as Waipa are highly developed, and underrepresented in the SNA network, there may still be opportunities for further protection of indigenous vegetation as there appears to be 6.7% cover remaining interpreted as indigenous in LCDB5. Assuming that the data is correct, this requires further investigation on the ground, that is beyond the scope of my analysis.

³ Indigenous Biodiversity chapter

⁴ NPSIB 2023; Davis et al (2016).

⁵ Waikato RPS 2016 Appendix 5.

29. A third principle of ecological significance is rarity or distinctiveness. This includes species occurring at the limit of their range or is classified as Threatened/At Risk under the New Zealand Threat Classification System (Townsend et al 2008; Rolfe et al 2021; Michel 2021). I cover Threatened/At Risk plants occurring in the Waitomo District in the next section.

Ecological values of Waitomo District: Flora

30. This section of my evidence provides a summarised overview of the Threatened/At Risk plants in the Waitomo District.
31. Waitomo District has some distinctive features to its flora, with some species only occurring in the coastal environment; others confined to limestone substrates; and others occurring in the montane, frosty basins in the eastern part of the District. There are also a number of Threatened/At Risk plants that occur throughout the District, in wetlands or in forest ecosystems. A full flora of Threatened/At Risk plants is provided in Appendix 1.
32. The coastal environment of the Waitomo District is highly important for Threatened/At Risk plants. Several species only occur there; and because of its relatively intact nature, the Waitomo District coastal environment also supports populations of other Threatened/At Risk plants that are becoming rare in much of the rest of the country. Threatened/At Risk plants confined to the Waitomo coastal environment include:
- a. Tainui (*Pomaderris apetala* subsp. *maritima*) is a tree that grows in coastal forest from about Awakino to just south of Mokau. It is ranked as Threatened–Nationally Critical (de Lange et al 2024)⁶.
 - b. *Myosotis pansa* subsp. *praeceps* is a native forget-me-not herb that occurs in coastal forest and shrubland and on coastal bluffs, from near Marokopa to Waikawau. It is ranked as Threatened–Nationally Endangered.

⁶ All threat ranks follow the latest threat ranking for vascular plants (de Lange et al 2024), unless otherwise stated.

- c. Toetoe (*Austroderia splendens*) is a native grass that occurs in coastal shrubland from Northland to Waikawau, which is its southern limit. It is ranked as At Risk–Declining.
 - d. Sand coprosma (*Coprosma acerosa*) is a wiry shrub that occurs throughout New Zealand, on dunes. It is ranked as At Risk–Declining.
 - e. Pingao (*Ficinia spiralis*) is a showy sedge that occurs only on coastal dunes throughout New Zealand and is ranked as At Risk–Declining.
 - f. *Olearia albida* is a small tree that grows in coastal forest, coastal shrubland and on slip scars on coastal bluffs. It occurs from Northland to northern Taranaki (including on the Waitomo District coast) and is ranked as At Risk–Declining.
 - g. Sand tussock (*Poa billardiarei*) is a tussock-forming grass that occurs on dunes throughout New Zealand. It has been recorded from around Waikawau. It is also ranked as At Risk–Declining.
 - h. Puha (*Sonchus kirkii*) is a native thistle that occurs on coastal bluffs throughout New Zealand. It has been recorded from bluffs at Waikawau and Awakino and is ranked as At Risk–Declining.
 - i. Titirangi (*Veronica speciosa*) is a showy hebe shrub that is found on coastal bluffs from Northland to the Marlborough Sounds. Populations south of Muriwai Beach have been shown to be the result of translocations by Māori (Armstrong & de Lange 2005). It occurs on the Mokau-Awakino coast and is also ranked as At Risk–Declining.
33. The limestone upland and karst systems in the western Waitomo Ecological District are internationally important and are also highly important for Threatened/At Risk plants. Several species are endemic, including:
- a. *Veronica scopulorum* is a shrub hebe found only in Waitomo District and on the Awaroa massif, in the neighbouring Otorohanga District, to the north. It is ranked as At Risk–Declining, however 80% of its populations occur on private land and access

is difficult⁷. It is considered to have a restricted range (RR) and information on its population size and trajectory is limited (DPS, DPT)

- b. Cave spleenwort (*Asplenium cimmeriorum*) occurs only in Waitomo Ecological District and on the West Coast of the South Island. It is confined to dark tombs and cave entrances and is also ranked as At Risk–Declining. It is restricted in range (RR), and biologically sparse (Sp) within the area which it occurs, and information on population size and trajectory is limited (DPS, DPT)
34. The other part of the Waitomo District that is notable for its Threatened/At Risk plants, is the Pureora basin in the east of the District. This area is montane–subalpine, and has a specialised flora confined to the frost flats, including:
- a. *Melicytus flexuosus* is a twiggy shrub that occurs locally in the North Island, and eastern South Island. It is ranked as Threatened–Nationally Vulnerable, and its northern limit occurs at Pureora, in the Waitomo District.
 - b. *Pittosporum turneri* is a columnar shrub-small tree of frost flats in the central North Island. It is ranked as Threatened–Nationally Vulnerable and used to occur as far north as a site near Otorohanga but is now only found from Pureora (in Waitomo District) southwards.
35. Several other Threatened plants also deserve mention:
- a. *Didymodon calycinus* is a Threatened–Nationally Critical moss, that was found in a forested stream margin near Pureora. It is known from very few collections, which are – apart from the Pureora record – in the northern Wairarapa and on the banks of the Waimakariri River.
 - b. Ramarama (*Lophomyrtus bullata*) is currently very widespread in forest ecosystems, but it is becoming much rarer due to the arrival

⁷ New Zealand Threat Classification database:
<https://nztcs.org.nz/assessments/112293>.

of myrtle rust (*Austropuccinia psidii*) in New Zealand. It is now classified as Threatened–Nationally Critical but appears to be still relatively common in forest remnants in the Waitomo District.

- c. *Pimelea tomentosa* is a small shrub that occurs in open forest, shrubland and on bluffs. It was recorded from near Pureora and is Threatened–Nationally Vulnerable.
 - d. Kirk’s tree daisy (*Brachyglottis kirkii* var. *kirkii*) is a shrub-daisy of forests ecosystems. It is ranked as Threatened–Nationally Vulnerable and occurs from Mt. Te Aroha to Wellington. It has been recorded from the Herangi Range, Waitaanga, Mangaotaki, Whareorino, Awakino and Waitomo in the District. It is very susceptible to possum browse.
 - e. Red leek orchid (*Corunastylis nuda*) is a small orchid of grassland, open shrubland and open places. It occurs from Aotea Island southwards and was possibly recorded from the Herangi Range⁸ in the Waitomo District. It is ranked as Threatened–Nationally Vulnerable.
36. Flower of shades (*Dactylanthus taylorii*) is a parasitic, woody herb that attaches to the roots of host trees. It is ranked as Threatened–Nationally Vulnerable and has been recorded from most of the larger forest remnants in the Waitomo District. Part of its decline has been caused by over-collecting.
- a. *Gratiola concinna* is a small herb of wetland margins and turfs, that is ranked as Threatened–Nationally Vulnerable. It was recorded from near Hangatiki in the Waitomo District but has not been seen recently.
 - b. Stalked adder’s tongue fern (*Ophioglossum petiolatum*) occurs in open places and wetlands and is also ranked as Threatened–Nationally Vulnerable. It was recorded from near Te Maika and Marokopa.

⁸ A.P. Druce (1992): unpublished list #178, held by Manaaki Whenua/Landcare Research Ltd.

- c. Maire tawake (*Syzygium mairi*) is a tree that occurs in wet forests. It is susceptible to myrtle rust (*Austropuccinia psidii*) and ranked as Threatened–Nationally Vulnerable. It is recorded from many lowland forest remnants including those around Awakino, Mokau, Pehitawa, Te Kuiti and Herangi.

37. Many of these Threatened/At Risk plants are located within legally protected SNAs, e.g., on Public Conservation Land, in a Queen Elizabeth II Open Space Covenant, or in a Ngawhenua Rahui kawenata, and would be considered secure. However, there are examples (Table 4) of Threatened/At Risk plants that occur in unprotected SNAs on private or legally unprotected land, highlighting the importance of retaining these in the network.

Species	Threat classification rank	SNA number/name
<i>Myosotis pansa</i> subsp. <i>praeceps</i>	Threatened–Nationally Endangered	<ul style="list-style-type: none"> • R17UP003 (Waikawau River mouth) • R17UP183 (Paparoa Point)
Flower of hades	Threatened–Nationally Vulnerable	<ul style="list-style-type: none"> • R16047 (Tawarau Forest extension) • R1870439.02 (Mohakatino Conservation Area Extension)
Stalked adder's tongue fern	Threatened–Nationally Vulnerable	<ul style="list-style-type: none"> • R15UP002 (Kawhia Harbour margins/Lake Taharoa)
Carmine rātā	At Risk–Declining	<ul style="list-style-type: none"> • R16UP052.03 (Kihitere) • R16UP077 (Herangi/Whareorino) • R15UP002 (Kawhia Harbour margins/Lake Taharoa) • S16UP055 (Mangapu River)
King fern (<i>Ptisana salicina</i>)	At Risk–Declining	<ul style="list-style-type: none"> • R16UP077 (Herangi RAP3) • R15UP002 (Kawhia Harbour margins/Lake Taharoa)
<i>Ranunculus urvilleanus</i>	At Risk–Declining	<ul style="list-style-type: none"> • R15UP002 (Kawhia Harbour margins/Lake Taharoa)
Cave spleenwort	At Risk–Naturally Uncommon	<ul style="list-style-type: none"> • R16UP055.01 (Tawarau Forest extension)

Table 4. Examples of Threatened/At Risk plants occurring in proposed SNAs in the Waitomo District.

38. The following section focuses on the pWDP and highlights some points where Policies or Rules could be strengthened to meet the Objectives in the Ecosystems and Biodiversity Chapter.

ECO-P1: The importance of considering the adverse effects associated with vegetation clearance outside SNAs.

39. As shown previously, there is relatively little indigenous vegetation outside the mapped SNAs in the Waitomo District. The exception is perhaps Waipa Ecological District, where only one mapped SNA (of 2.4 ha) exists but there is the possibility of up to 560 ha of indigenous vegetation (Tables 2 & 3) that could be representative of the ecological district.
40. There are also examples of Threatened/At Risk plants occurring in locations outside the mapped SNAs (Table 5).

Species	Threat classification rank	Observation
Carmine rātā	At Risk–Declining	• D. Taucher, Kihitere, 2003
Sneezeweed (<i>Centipeda minima</i> subsp. <i>minima</i>)	At Risk–Naturally Uncommon	• P.J. de Lange, Te Maika Swamp (but just outside SNA boundary), 1985
Stout water milfoil (<i>Myriophyllum robustum</i>)	At Risk–Naturally Uncommon	• P. J. de Lange, Mangapu River, 1985

Table 5. Examples of Threatened/At Risk plants occurring outside mapped SNAs in the Waitomo District.

41. These highlight the importance of having criteria alongside the mapped SNAs, and utilising an experienced, suitably qualified ecologist, when undertaking ecological assessments to ensure that they are recognised.

ECO-P3(5) & ECO-R13: Removal of manuka or kanuka on a sustainable basis

42. The Policy and Rule allows sustainable removal of up to 250 m² per year from within an SNA as long as it is replanted within six months or allowed to regenerate.
43. Allowing sustainable, long-term indigenous vegetation clearance within an SNA is an unusual approach and there are some advantages and disadvantages from an ecological perspective.
44. The long-term and ongoing removal of indigenous vegetation from a SNA is likely to have cumulative effects, in that:
- edge effects on the remaining part of the SNA will be increased, increasing opportunities for weeds to invade and reduce buffering on neighbouring parts of the SNA;

- b. machinery regularly entering the SNA to harvest manuka or kanuka is likely to affect soil micro-organisms and compact soil and affect drainage;
 - c. native arboreal geckoes (*Naultinus* spp.) utilise manuka and kanuka for important lifecycle stages and often exist solely within this habitat;
 - d. the clearance itself increases the risk of increased erosion;
45. Replanting with non-ecosourced manuka or kanuka may have a negative effect on the local naturally occurring manuka or kanuka by introducing new strains or species to the District that become problematic (weeds), in time.
 46. The two species of manuka (*Leptospermum scoparium*; *L. hoipolloi*) and kanuka (*Kunzea robusta*; *K. serotina*) most likely to be found in the Waitomo District are ranked as Not Threatened, so there is little risk of further reduction of a Threatened/At Risk species of manuka or kanuka by allowing its clearance. Previously, these species were ranked as At Risk–Declining (*L. scoparium*) and Threatened–Nationally Vulnerable (the other three taxa) in 2017 (de Lange et al 2018), which may have contributed to them being included in SNA mapping.
 47. There could be some positive effects in that early successional communities that contain species such as native orchids have more available habitat than they currently do, however this is minor, in consideration potential negative effects.
 48. In my opinion, such a rule is more appropriate for indigenous vegetation occurring outside SNAs.

ECO-P3(1) & ECO-R4: indigenous vegetation clearance for fences

49. Rule 4 allows for indigenous vegetation clearance of up to 500 m² per year from within a SNA (for SNAs larger than 5 ha or 1% of the area if smaller), to build or maintain fences around its perimeter for stock exclusion.
50. In my opinion, removing vegetation from a wetland to place a fence on its perimeter, or inside it is not an appropriate activity because wetlands

are hydrologically constrained by their topography. It makes more sense to place the fence outside the wetland.

51. For forested SNAs, similarly, clearing indigenous vegetation on its edge to place a fence on the margin reduces buffering and increases the risk of the SNA being degraded by weed invasion. In my opinion, it makes more sense to place the fence on the outside of the SNA boundary.

ECO-P11: Evidence to support the importance of including policies to protect Threatened/At Risk plants in the Coastal Environment.

52. As mentioned previously, the coastal environment of the Waitomo District is extremely important for Threatened/At Risk plants. At least nine species are obligated to the coastal environment, and two – *Tainui* and *Myosotis pansa* subsp. *praeceps* – are not found anywhere else. Both are ranked as Threatened; *Tainui* being Nationally Critical because it has a total natural population of <250 mature individuals⁹, suffers from recruitment failure (RF), requires conservation management (CD) but is secure overseas (SO); and *M. pansa* subsp. *praeceps* is Nationally Endangered because it is confined to an area <10 hectares, but biologically sparse (Sp) within this area, is difficult to recognise (DPR), suffers from extreme population fluctuations (EF), and there is low confidence in its population size (DPS) and trajectory (DPT).
53. These Threatened/At Risk plants occur exclusively in the coastal environment, and in many cases continue to decline. *Myosotis pansa* subsp. *praeceps* was ranked as Threatened–Nationally Vulnerable in 2017 (de Lange et al 2018), largely because new information shows that it is in a more precarious state than previously thought; and *Olearia albida* (At Risk–Declining) was Not Threatened in 2017 (de Lange et al 2018). Many of these species are not easy to recognise or are easily overlooked and this contributes to their decline.
54. Because of its relatively intact nature, the coastal environment of the Waitomo District is a stronghold for many of these plants. In addition, the risk of erosion from more frequent storm events is a significant risk to indigenous vegetation and the species' habitats.

⁹ New Zealand Threat Classification database (<https://nztc.org.nz>).

References

- Armstrong, T.J.; de Lange, P.J.; 2005: Conservation genetics of *Hebe speciosa* (Plantaginaceae) an endangered New Zealand shrub. *Botanical Journal of the Linnean Society* 149: 229–239.
- Davis, N.J. Head, S.C. Myers and S.H. Moore 2016; Conservation status of New Zealand indigenous vascular plants. Department of Conservation guidelines for assessing significant ecological values. *Science for Conservation* 327. 73 p
- de Lange, P.J.; Gosden, J.; Courtney, S.P.; Fergus, A.J.; Barkla, J.W.; Beadel, S.M.; Champion, P.D.; Hindmarsh-Walls, R.; Makan, T.; Michel, P. 2024: Conservation status of vascular plants in Aotearoa New Zealand, 2023. *New Zealand Threat Classification Series* 43. Department of Conservation, Wellington. 105 p.
- de Lange, P.J.; Rolfe, J.R.; Barkla, J.W.; Courtney, S.P.; Champion, P.D.; Perrie, L.R.; Beadel, S.M.; Ford, K.A.; Breitwieser, I.; Schonberger, I.; Hindmarsh-Walls, R.; Heenan, P.B.; Ladley, K. 2018: Conservation status of New Zealand indigenous vascular plants, 2017. *New Zealand Threat Classification Series* 22. Department of Conservation, Wellington. 82 p.
- McEwen, W.M. (Ed.) 1987: Ecological regions and districts of New Zealand. *New Zealand Biological Resources Centre publication No. 5. Department of Conservation, Wellington*
- Michel, P. 2021: Amendment to the New Zealand Threat Classification System manual 2008: revised categories 2021. Department of Conservation, Wellington. 5 p.
- Rolfe, J.; Makan, T.; Tait, A. 2021: Supplement to the New Zealand Threat Classification System manual 2008: new qualifiers and amendments to qualifier definitions, 2021. Department of Conservation, Wellington. 9 p.
- Townsend, A.J.; de Lange, P.J.; Duffy, C.A.J.; Miskelly, C.M.; Molloy, J.; Norton, D.A. 2008: New Zealand Threat Classification System manual. Department of Conservation, Wellington. 35 p.

Appendix 1

Species	Threat classification rank (de Lange et al 2024)	Habitat
<i>Didymodon calycinus</i> moss	Threatened–Nationally Critical (de Lange et al 2009)	Forest (montane?)
<i>Lophomyrtus bullata</i> ramarama	Threatened–Nationally Critical	Forest-shrubland
<i>Pomaderris apetala</i> subsp. <i>maritima</i> Tainui	Threatened–Nationally Critical	Coastal forest-shrubland
<i>Myosotis pansa</i> subsp. <i>praeceps</i>	Threatened–Nationally Endangered	Coastal forest-shrubland; bluffs
<i>Pimelea tomentosa</i>	Threatened–Nationally Endangered	Forest-shrubland; bluffs
<i>Brachyglottis kirkii</i> var. <i>kirkii</i>	Threatened–Nationally Vulnerable	Forest
<i>Corunastylis nuda</i>	Threatened–Nationally Vulnerable	Grassland; open places
<i>Dactylanthus taylorii</i>	Threatened–Nationally Vulnerable	Forest
<i>Gratiola concinna</i>	Threatened–Nationally Vulnerable	Wetland
<i>Melicytus flexuosus</i>	Threatened–Nationally Vulnerable	Frost hollow shrubland
<i>Ophioglossum petiolatum</i>	Threatened–Nationally Vulnerable	Wetland
<i>Pittosporum turneri</i>	Threatened–Nationally Vulnerable	Frost hollow shrubland
<i>Syzygium maire</i>	Threatened–Nationally Vulnerable	Forest wetland
<i>Austroderia splendens</i>	At Risk–Declining	Coastal dunes and bluffs
<i>Carmichaelia australis</i>	At Risk–Declining	Forest-shrubland
<i>Coprosma acerosa</i>	At Risk–Declining	Coastal dunes
<i>Cyclosorus interruptus</i>	At Risk–Declining	Wetland
<i>Epilobium insulare</i>	At Risk–Declining	Wetland
<i>Epilobium tenuipes</i>	At Risk–Declining	Wetland
<i>Euchiton delicatus</i>	At Risk–Declining	Wetland; shrubland; open places
<i>Ficinia spiralis</i>	At Risk–Declining	Coastal dunes
<i>Linum monogynum</i> var. <i>monogynum</i>	At Risk–Declining	Bluffs; grassland; open places
<i>Loxsoma cunninghamii</i>	At Risk–Declining	Forest
<i>Lophomyrtus obcordata</i>	At Risk–Declining	Forest-shrubland
<i>Loxsoma cunninghamii</i>	At Risk–Declining	Forest
<i>Metrosideros carminea</i>	At Risk–Declining	Forest
<i>Metrosideros robusta</i>	At Risk–Declining	Forest
<i>Olearia albida</i>	At Risk–Declining	Coastal forest-shrubland
<i>Pentapogon quadrisetus</i>	At Risk–Declining	Bluffs-open places
<i>Peraxilla tetrapetala</i>	At Risk–Declining	Forest
<i>Pittosporum cornifolium</i>	At Risk–Declining	Forest
<i>Pittosporum kirkii</i>	At Risk–Declining	Forest
<i>Poa billardierei</i>	At Risk–Declining	Coastal dunes
<i>Ptisana salicina</i>	At Risk–Declining	Forest
<i>Ranunculus macropus</i>	At Risk–Declining	Wetland
<i>Ranunculus urvilleanus</i>	At Risk–Declining	Wetland
<i>Raukaua edgerleyi</i>	At Risk–Declining	Forest
<i>Rytidosperma buchananii</i>	At Risk–Declining	Gravelfield; open places
<i>Sonchus kirkii</i>	At Risk–Declining	Coastal bluffs
<i>Asplenium cimmeriorum</i>	At Risk–Naturally Uncommon	<u>Limestone cave entrances</u>
<i>Pseudopanax laetus</i>	At Risk–Declining	Forest
<i>Teucrium parvifolium</i>	At Risk–Declining	Forest: river margins
<i>Veronica scopulorum</i>	At Risk–Declining	Limestone bluffs

Species	Threat classification rank (de Lange et al 2024)	Habitat
<i>Veronica speciosa</i>	At Risk–Declining	Coastal bluffs
<i>Bulbophyllum tuberculatum</i>	At Risk–Naturally Uncommon	Forest
<i>Centipeda minima</i> subsp. <i>minima</i> sneezeweed	At Risk–Naturally Uncommon	Wetland
<i>Corybas cryptanthus</i>	At Risk–Naturally Uncommon	Forest
<i>Christella dentata</i>	At Risk–Naturally Uncommon	Forest-shrubland
<i>Leptinella dispersa</i> subsp. <i>dispersa</i>	At Risk–Naturally Uncommon	Coastal bluffs; lake margins
<i>Myriophyllum robustum</i>	At Risk–Naturally Uncommon	Wetland
<i>Pelargonium inodorum</i>	At Risk–Naturally uncommon	Shrubland-open places
<i>Pseudopanax ferox</i>	At Risk–Naturally Uncommon	Forest-shrubland
<i>Chaerophyllum racemosum</i>	Data Deficient	Frost hollow-shrubland
<i>Corybas sanctigeorgianus</i>	Data Deficient	Forest