



Volume IV

Technical assessments

**Appendix J.3 Threatened
plants**

IN THE MATTER OF

the Resource Management Act 1991

AND

IN THE MATTER OF

applications for resource consents and notices
of requirement in relation to the Ōtaki to North
of Levin Project

BY

WAKA KOTAHI NZ TRANSPORT AGENCY
Applicant

ŌTAKI TO NORTH OF LEVIN: TECHNICAL ASSESSMENT

THREATENED PLANTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
INTRODUCTION	3
Qualifications and experience	3
Code of conduct	4
Purpose and scope of assessment	5
PROJECT DESCRIPTION	5
Overview	5
EXISTING ENVIRONMENT	6
Overview	6
METHODOLOGY	6
Introduction	6
Stakeholder engagement	7
Desktop review	7
Site surveys	8
Application of the EclAG	8
STATUTORY CONSIDERATIONS, INCLUDING NATIONAL STANDARDS, REGIONAL AND DISTRICT PLANS, AND OTHER RELEVANT POLICIES	9
RESULTS	9
Desktop assessment	9
Surveys	14
ASSESSMENT OF ECOLOGICAL VALUES FOR THREATENED PLANTS	14
ASSESSMENT OF EFFECTS	14
PROPOSED MEASURES TO REMEDY OR MITIGATE ACTUAL OR POTENTIAL ADVERSE EFFECTS ON THREATENED PLANTS	14

EXECUTIVE SUMMARY

1. This report provides an assessment of potential effects of the Ōtaki to North Levin Project (the Ō2NL Project) on Threatened and At Risk plants to inform resource consent applications for the Project 'Main Works'.
2. A desktop assessment was undertaken which showed that up to 47 plant species classified as 'Threatened' or 'At Risk' under the Department of Conservation's New Zealand Threat Classification System may be present within the Project footprint.
3. Common species within the Myrtaceae family which have had their threat status raised due to the potential threat that myrtle rust presents were not used as a trigger for significance in these assessments.
4. Following the desktop assessment, 40 total habitat types at 12 properties within the Ō2NL Project were surveyed. No notable Threatened or At Risk species were recorded within the Ō2NL Project's designated corridor.
5. It is unlikely that Threatened and At Risk plant species are present in the habitats within the Ō2NL Project's designated corridor due to the isolated and modified state of the existing vegetation.
6. Given the absence of Threatened and At Risk plants in the Project corridor, the ecological value of potential Threatened and At Risk plant habitat is considered to be negligible.
7. An assessment of the effects of the Ō2NL Project on Threatened and At Risk plant species within the designated corridor has not been carried out due to the absence of these species and low likelihood that they occur.

INTRODUCTION

8. My name is Nicki Rose Papworth. I have prepared this technical assessment with support from Ella Buckley (Ecologist, Wildland Consultants, Wellington). This technical assessment addresses threatened flora surveys undertaken for the Ō2NL Project.

Qualifications and experience

9. I have the following qualifications and experience relevant to this assessment:

- (a) In 2019, I obtained a Post-Graduate Diploma in Ecology and Biodiversity from Victoria University of Wellington.
- (b) In 2022, I obtained a Master's Degree in Ecology and Biodiversity from Victoria University, with a focus on the ecophysiology of plants.
- (c) I am a Botanist and Ecologist at Wildland Consultants Ltd, an ecological consultancy company specialising in ecological assessments, ecological restoration, ecological survey and monitoring, and ecological research. I have been employed as a consultant ecologist with Wildland Consultants since 2020.
- (d) My academic and professional work has involved assessments of ecological effects (AEEs), preparing environmental management plans (EMPs) and restoration planting plans, vegetation and plant population monitoring studies, and plant community studies.
- (e) I have worked across a range of environments and habitats, particularly within central to lower North Island.
- (f) Using geographic information systems (GIS), I analysed various Ō2NL Project alignment options within the Project's designation corridor overlaid on aerial imagery against potential indigenous vegetation and habitats.
- (g) I have also viewed digital and printed Ō2NL Preferred Alignment maps.
- (h) I undertook threatened flora surveys for the Ō2NL Project during November/December 2021 and January/February 2022.
- (i) I continue to be involved in vegetation surveys, flora surveys and biodiversity offsetting for the Ō2NL Project.

Code of conduct

10. I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014. This assessment has been prepared in compliance with that Code, as if it were evidence being given in Environment Court proceedings. In particular, unless I state otherwise, this assessment is within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Purpose and scope of assessment

11. The purpose of this assessment was to determine the presence of Threatened or At-Risk plant species within the Ō2NL Project's designation corridor, and to describe the potential effects of the proposed road alignment on these species. For the purposes of this assessment, the Ō2NL Project Area is defined as "the designation corridor and any adjacent areas of high value that might be subject to indirect effects i.e., noise/traffic mortality/fragmentation – these are included at the ecologist's discretion e.g., forest at Property 43".
12. The scope of this assessment was to:
 - (a) Compile and review existing information regarding the presence of Threatened or At-Risk plants and their distribution within and around the Ō2NL Project's designation corridor.
 - (b) Undertake a desktop assessment to identify potential sites for Threatened or At-Risk plants within the Ō2NL Project's designation corridor.
 - (c) Undertake targeted field surveys.
 - (d) Provide an assessment of the potential adverse ecological effects on Threatened and At-Risk plants utilising EIANZ's guidance on Ecological Impact Assessments (EclAG, 2018).
 - (e) Outline management measures proposed to avoid and/or minimise potential impacts on any Threatened or At-Risk plants found.
13. Engagement with iwi and stakeholders is described in Technical Assessment J prepared by Dr Tim Martin (former Principal Ecologist, Wildland Consultants) and Nick Goldwater (Principal Ecologist, Wildland Consultants).

PROJECT DESCRIPTION

Overview

14. Technical Assessment J includes a description of the Project.
15. The components of the Project particularly relevant to threatened plants are:
 - (a) The earthworks, vegetation clearance and landform modifications required to construct the highway.

- (b) The construction and operational activities that could have adverse effects on habitats retained and associated flora within these habitats.

EXISTING ENVIRONMENT

Overview

- 16. The proposed Project alignment is located almost entirely in the southern part of the Manawatū Plains Ecological District, in the Manawatū Ecological Region. A small section of the proposed route, near Manakau, lies within the western edge of the Tararua Ecological District.
- 17. The southern parts of the Manawatū Plains Ecological District lie between the coastal sands of the Foxton Ecological District to the west and the ranges of the Manawatū Gorge South and Tararua Ecological Districts to the east. Detailed descriptions of the Manawatū Plains and Tararua Ecological Districts are provided in Technical Assessment J - Terrestrial Ecology.
- 18. The landscape within the Project area comprises a mosaic of agricultural land, fragments of indigenous and exotic forest, shelterbelts, and riparian corridors. A detailed description of vegetation and habitat types within the Ō2NL Project Area is provided in Technical Assessment J.

METHODOLOGY

Introduction

- 19. As per described in Technical Assessment J, the presence of common Myrtaceae species found in the designation (kānuka, aka, pōhutukawa, and mānuka) during the site surveys for habitat mapping that are listed as Threatened and At Risk have not been used as a trigger for significance, as the threat rankings consider the potential threat of myrtle rust (*Austropuccinia psidii*). These species are still widespread and in places locally abundant.
- 20. An initial desktop review was undertaken to identify Threatened or At Risk plants within the Manawatū Plains and Tararua Ecological Districts.
- 21. A further desktop review was undertaken to identify Threatened or At Risk plants recorded as present within or near the Ō2NL Project designation corridor.

22. The vegetation and habitat types mapped and described in Technical Assessment J were assessed and records were searched to determine the likelihood of Threatened or At Risk plants being present within the Project designation.
23. Site surveys were carried out in identified habitats.
24. Where site surveys could not be carried out (due to land owner permission delays), threatened plant values were informed by the detailed vegetation and habitat assessments described in Technical Assessment J.

Stakeholder engagement

25. Stakeholder engagement is summarised in Technical Assessment J.

Desktop review

26. A desktop review was undertaken to identify existing background information regarding threatened plant species presence, distribution, and abundance from within or near the Project footprint. Sources of information include:
 - (a) Ecological reports, particularly the PNAP survey for the Manawatū Plains Ecological District (Ravine 1995);
 - (b) Flora species lists available on the NZPCN website (<https://www.nzpcn.org.nz/publications/plant-lists/>);
 - (c) Department of Conservation BioWeb Flora Database (accessed November 2021 and January 2022);
 - (d) the Australasian Virtual Herbarium Database (accessed November 2021 and January 2022);
 - (e) Forest Owners Association Rare Species Database (rarespecies.nzfoa.org.nz, accessed November 2021 and January 2022); and
 - (f) iNaturalist (www.inaturalist.nz, accessed November 2021 and January 2022). iNaturalist contains indigenous and exotic species presence records including indigenous 'Threatened' and 'At Risk' species. The iNaturalist database is maintained by the Californian Academy of Sciences and National Geographic.
27. Species lists of identified habitats were reviewed to identify key host plants for Threatened and At-Risk parasitic plants and epiphytes.

Site surveys

28. After desktop reviews, a total of 12 properties were identified for survey (Table 1).
29. Site surveys were undertaken in 2021 between 29 November and 03 December, and in 2022 between 20 January and 23 February (inclusive) to determine the presence of Threatened plants. Survey locations are mapped in Appendix 1.s

Table 1: Summary of properties and search effort for Threatened and At Risk plants during November-December 2021 and January-February 2022.

Property ID	Survey dates	Survey duration (hrs)	Habitat targeted
19	1/12/2021	3	Wetland habitats associated with Paruaaku Swamp
21	23/02/2022	4	Wetland habitats associated with Paruaaku Swamp
38	29/11/2021 & 3/12/2021	3.5 & 4	Tawa-kohekohe forest & seepage wetland
42	20/01/2022	4	Tawa-kohekohe forest
43*	N/A		Tawa-kohekohe forest
207*	N/A		Alluvial forest remnants and wetlands
212	20/11/2022	3.5	Mixed indigenous and exotic scrub
461	2/12/2021	2.5	Wetlands
465	1/12/2021 & 3/12/2021	2.5 & 1	Arepaepae Road forest blocks
479*	N/A		Arepaepae Road forest blocks
493	2/12/2021	4	Wetlands and māhoe scrub bordering wetlands
519	16/02/2022	3	Seepage wetlands
605*	N/A		Wetlands on stream banks

* Unable to access these properties.

30. For each survey site, the track log function on a GPS unit was used to document search effort. Each habitat surveyed was slowly walked whilst searching for threatened plants. A full species list of all plant species observed was compiled to document survey effort at each property.
31. Within forested habitats, binoculars were used to survey any large emergent trees where epiphytic species such as *Pittosporum kirkii* and *Brachyglottis kirkii* var. *kirkii* may be present.
32. Potential threats to flora were identified, such as environmental pest plants, browsing animals and other species that have the potential to hybridise with any Threatened or At Risk plant species.

Application of the EciAG

33. I have assessed the Threatened and At Risk plant values and the 'Level of Effects' of the Ō2NL Project on these values using the guidelines provided

by the EclAG (2018). Effects associated with habitat loss are addressed in detail in Technical Assessment J, and are therefore not discussed further here. The current report focuses on all other potential effects on threatened plants.

STATUTORY CONSIDERATIONS, INCLUDING NATIONAL STANDARDS, REGIONAL AND DISTRICT PLANS, AND OTHER RELEVANT POLICIES

34. A detailed description of the statutory considerations, including national standards, regional and district plans, and other relevant policies for are provided in Technical Assessment J.

RESULTS

Desktop assessment

35. The desktop literature review and database search indicated that several Threatened or At Risk plant species may be present in the Ō2NL Project designation corridor. All species identified are presented in Table 2 below.

Table 2: Summary of threatened plant species that are potentially present in the Project corridor based on literature review.

Species	Common name	Conservation status (as per de Lange et al. 2018)	Habitat preference (source: www.nzpcn.org.nz)	Likelihood of presence
<i>Amphibromus fluitans</i>	Water brome	Threatened – Nationally Vulnerable	Moderately fertile, seasonally dry wetlands or along the edges of shallow lakes and lagoons.	Moderate
<i>Anemanthele lessoniana</i>	Gossamer grass	At Risk – Relict	Forest, forest margins, scrub and on cliff faces and associated talus.	Low to moderate
<i>Anogramma leptophylla</i>	Annual fern	Threatened – Nationally Vulnerable	Clay banks, rock faces and alluvial banks.	Low
<i>Botrychium australe</i>	Pātōtara, parsley fern	At Risk – Naturally Uncommon	Open ground, short and tall tussock grassland, forest clearings, shrubland, river flats, reverting pasture, and seasonally flooded ground. Sometimes peat bog margins.	Low
<i>Brachyglottis kirkii</i> var. <i>kirkii</i>	Kohurangi	Threatened – Nationally Vulnerable	Epiphytic. Found on the trunks and branches of trees in lowland to montane forest.	Unlikely
<i>Brachyglottis sciadophila</i>	Climbing groundsel	At Risk – Declining	Margins of lowland or alluvial forest.	Low to moderate
<i>Bulbophyllum tuberculatum</i>		At Risk – Naturally Uncommon	Epiphytic. Found on the trunks and inner branches of trees in coastal and lowland areas, often with <i>Pyrrosia elaeagnifolia</i> .	Moderate to high
<i>Carex buchananii</i>	Buchanan's sedge	At Risk – Declining	Beaches, lagoon, lake, and stream margins, or in damp ground within open forest or short tussock grassland.	Low
<i>Centipeda minima</i>	Sneezeweed	Threatened – Nationally Endangered	Open and wet, or partially dried out lake, pond, and stream margins.	Unlikely
<i>Coprosma virescens</i>		At Risk – Declining	On well drained to poorly draining fertile soils, often overlying calcareous or base-rich igneous rocks. In forest and shrubland.	Moderate
<i>Corunastylis nuda</i>	Red leek orchid	Threatened – Nationally Endangered	Favours open shrublands, skeletal soils overlying rock, peat bogs, infertile clay bank scrub, and road banks. Also found in short grassland overlying sand, clay or gley podzols that are now dominated by introduced grasses.	Moderate
<i>Dactylanthus taylorii</i>	Pua o te reinga, wood rose	Threatened – Nationally Vulnerable	Parasitic. Found on the roots of hardwood trees and shrubs such as <i>Griselinia littoralis</i> , <i>Pseudopanax arboreus</i> , and <i>Pittosporum euginioides</i> . Prefers damp but well drained soils, often at the head of streams.	Unlikely
<i>Daucus glochidiatus</i>	New Zealand carrot	At Risk – Declining	Cliff faces, rock outcrops, and talus slopes. Also found in short tussockland or grassland in open forest.	Low
<i>Drymoanthus flavus</i>	Spotty fleshy tree orchid	At Risk – Declining	Epiphytic. Found on the trunks and branches of trees in lowland to montane forest.	Low
<i>Epilobium hirtigerum</i>	Hairy willowherb	At Risk – Recovering	Open ground, seepages on cliff faces, sparsely-vegetated wetland margins, braided riverbeds, lake edges, and swamps.	Moderate to high

Species	Common name	Conservation status (as per de Lange et al. 2018)	Habitat preference (source: www.nzpcn.org.nz)	Likelihood of presence
<i>Epilobium insulare</i>		At Risk – Declining	Relatively open, marshy places such as bogs and lake margins.	Moderate
<i>Ileostylus micranthus</i>	Pirita, green mistletoe	Regionally Uncommon	Shrubland and secondary regrowth forests.	Moderate to high
<i>Isolepis basilaris</i>	Pygmy clubrush	At Risk – Declining	On damp, sandy or silty margins of lagoons, tarns, ephemeral lakes and rivers – freshwater or brackish.	Low
<i>Juncus distegus</i>		At Risk – Naturally Uncommon	Swamp and cloud forest margins. Also present in drier hill country and tussock grassland. Tends to favour poorly drained clay soils.	Low
<i>Juncus pauciflorus</i>	Leafless rush	Threatened – Nationally Vulnerable	Wetlands, bog mires and muddy ground.	Moderate
<i>Korthalsella salicornioides</i>	Dwarf mistletoe	Threatened – Nationally Critical	Parasitic. Found on the branches of trees in forest and shrubland. Most commonly found on mānuka and kānuka species.	Low to moderate
<i>Kunzea amathicola</i> *	Rawiritoa, kānuka	Threatened – Nationally Vulnerable	Coastal to lowland shrubland on mobile sand, sand dunes and sandy soils. Occasionally found on clay soils.	Moderate
<i>Kunzea robusta</i> *	Kānuka	Threatened – Nationally Vulnerable	Coastal to lowland shrubland, regenerating forest and forest margins, montane forest and ultramafic shrubland.	High
<i>Leptospermum scoparium</i> *	Mānuka	At Risk-Declining	Abundant from coastal situations to low alpine habitats. Wetlands, river gravels, well drained hillsides, and inland dunes.	High
<i>Libertia peregrinans</i> *	Mikoikoi, New Zealand iris	Threatened – Nationally Vulnerable	Dune slacks and swales, on the margins of swamps, in open poorly draining ground under scrub. Prefers sandy, peaty or pumiceous soils.	Low
<i>Lophomyrtus bullata</i> *	Ramarama	Threatened – Nationally Critical	Coastal to montane forest and shrubland. Often found in regenerating shrubland in wetter sites.	Low
<i>Lophomyrtus obcordata</i> *	Rōhutu	Threatened – Nationally Critical	Coastal to lowland forests, occasionally montane forests. Found on stable sand dunes and alluvial forest remnants.	Low
<i>Mazus novaeseelandiae</i> subsp. <i>novaeseelandiae</i>	Dwarf musk	At Risk – Declining	Lowland wet swampy forest and pasture.	Low to moderate
<i>Metrosideros colensoi</i> *	Aka	Threatened – Nationally Vulnerable	Liana. Lowland to montane forest, particularly in riparian and alluvial forest.	Low
<i>Metrosideros diffusa</i> *	White rātā	Threatened – Nationally Vulnerable	Liana. Found on the trunks and branches of trees throughout New Zealand forests. Often rupestral.	Moderate
<i>Metrosideros fulgens</i> *	Climbing rātā	Threatened – Nationally Vulnerable	Liana. Found on the trunks and branches of trees throughout New Zealand forests. Often rupestral.	Moderate
<i>Metrosideros perforātā</i> *	Akatea	Threatened – Nationally Vulnerable	Liana. Coastal to montane scrub, dense forest, or rock-land.	Moderate
<i>Metrosideros robusta</i> *	Northern rātā	Threatened – Nationally Vulnerable	Coastal and lowland forest, particularly where <i>Dacrydium cupressinum</i> occurs.	Low

Species	Common name	Conservation status (as per de Lange <i>et al.</i> 2018)	Habitat preference (source: www.nzpcn.org.nz)	Likelihood of presence
<i>Mida salicifolia</i>	Maire	At Risk – Declining	Hemi-parasitic, free-standing. Found in coastal to lowland forest, particularly where <i>Agathis australis</i> occurs.	Unlikely
<i>Ophioglossum petiolatum</i>	Stalked adder's tongue	Threatened – Nationally Critical	Ephemeral wetlands, moist talus and grassy areas, sandy margins of coastal lagoons, herbfields near lake margins, swamps and streams, and damp hollows within podocarp forest.	Low
<i>Peraxilla tetrapetala</i>	Pirirangi, red mistletoe	At Risk – Declining	Hemi-parasitic. Found on the trunks and branches of up to 17 indigenous tree species in coastal to montane forests. Main hosts are <i>Fuscospora cliffortioides</i> , <i>Fuscospora solandri</i> , <i>Fuscospora fusca</i> , and <i>Lophozonia menziesii</i> .	Low
<i>Pomaderris apetala</i>	Tainui, NZ hazel	Threatened – Nationally Critical	Wind-shorn coastal forest and scrub, occasionally found under pines.	Unlikely
<i>Pseudopanax ferox</i>	Fierce lancewood	At Risk – Naturally Uncommon	Coastal to subalpine, on stable sand dune forests, grey scrub overlying pumice, alluvial soils, limestone outcrops, boulder fall, cliff faces, talus slopes and scarps.	Unlikely
<i>Pterostylis micromega</i>	Swamp greenhood	Threatened – Nationally Endangered	A plant of bogs, fens, and swamps, ranging from acidic to eutrophic, often under willows.	Low
<i>Ranunculus macropus</i>	Swamp buttercup	Data deficient	Coastal to lowland. Usually found in <i>Typha orientalis</i> dominated wetlands where it grows in still moderately deep to deep water.	Moderate
<i>Ricciocarpos natans</i>	Liverwort	Threatened – Nationally Endangered	Fresh, open water, rich in nutrients.	Low
<i>Solanum aviculare</i>	Poroporo	Threatened – Nationally Vulnerable	Coastal to lowland open shrublands and forest margins.	Unlikely
<i>Spiranthes novae-zelandiae</i>	Lady's tresses	At Risk – Declining	Coastal to montane in open sites within wetlands of varying tropic levels. Most frequently seen in acidic peat bogs. Occasionally in lake margins, on the banks of slow flowing streams, in seepages within tussock grassland, or in damp shingle within river beds.	Low to moderate
<i>Syzygium maire</i>	Maire tawake	Threatened – Nationally Critical	Coastal and lowland riparian forest in waterlogged ground, or on the margins of swamps and streamsides.	Unlikely
<i>Teucrium parviflorum</i>	Teuclidium	At Risk – Declining	Along fertile streamsides and river terraces in lowland dry forest and podocarp-hardwood forest.	Low
<i>Tupeia antarctica</i>	Tāpia, white mistletoe	At Risk – Declining	Parasitic. Found on the branches of trees in coastal to montane forest or scrub, often in regenerating vegetation. Parasitic on a wide range of hosts including <i>Pittosporum eugenioides</i> , <i>Pittosporum crassifolium</i> , <i>Coprosma</i> species, <i>Carpodetus serratus</i> , <i>Pseudopanax arboreus</i> , and <i>Nestegis lanceolata</i> .	Moderate

Species	Common name	Conservation status (as per de Lange <i>et al.</i> 2018)	Habitat preference (source: www.nzpcn.org.nz)	Likelihood of presence
<i>Urtica perconfusa</i>	Swamp nettle	At Risk – Declining	Fertile, lowland swamps, lakes and river margins, swampy shrubland and forest, often growing over tree stumps and rushes or through dense sedges such as swards of <i>Carex secta</i> .	Moderate

* species with threat rankings elevated in response to the potential threat of myrtle rust.

Surveys

36. Surveys conducted to date have revealed no Threatened or At Risk plants within the habitats surveyed that do not belong to the Myrtaceae family as outlined in paragraph 19.

ASSESSMENT OF ECOLOGICAL VALUES FOR THREATENED PLANTS

37. As no Threatened or At Risk plants were detected, the ecological value of habitats within the Ō2NL Project designation corridor is considered to be negligible with respect to Threatened or At Risk plant species.

ASSESSMENT OF EFFECTS

38. No Threatened or At Risk plants were detected within the footprint and therefore the Ō2NL Project will not have any adverse effects on threatened plant species.

PROPOSED MEASURES TO REMEDY OR MITIGATE ACTUAL OR POTENTIAL ADVERSE EFFECTS ON THREATENED PLANTS

39. The Ō2NL Project will have no actual or potential adverse effects on Threatened or At Risk plant species and therefore no remediation or mitigation measures are required.

Nicki Papworth



Volume IV

Technical assessments

Appendix J.4 Bats