

ECOLOGICAL ASSESSMENT OF KATOA POINT SCENIC RESERVE AND THE THREAT POSED BY WILDING CONIFERS



 providing
outstanding
ecological
services to
sustain
and improve our
environments



Wildlands

R4803

ECOLOGICAL ASSESSMENT OF KATOA POINT SCENIC RESERVE AND THE THREAT POSED BY WILDING CONIFERS



Māhoe-kānuka forest in gullies and mānuka-kānuka scrub on ridges with a heavy infestation of radiata pine trees.

Contract Report No. 4803

November 2018

Project Team:

Kelvin Lloyd - Report author
Carey Knox - Report author (lizards)
Kelly Miekle - GIS mapping

Prepared for:

Apex Marine Farm Ltd
Blenheim

DUNEDIN OFFICE: 764 CUMBERLAND STREET, DUNEDIN 9016
Ph 03-477-2096, 03-477-2095

HEAD OFFICE: 99 SALA STREET, P.O. BOX 7137, TE NGAE, ROTORUA
Ph 07-343-9017; Fax 07-343-9018, email ecology@wildlands.co.nz, www.wildlands.co.nz

CONTENTS

1.	INTRODUCTION	1
2.	METHODS	1
3.	ECOLOGICAL CONTEXT	2
4.	VEGETATION AND HABITATS	2
4.1	Overview	2
4.2	Mānuka-kānuka scrub (108 hectares)	5
4.3	Mahoe-kānuka forest (10 hectares)	5
4.4	Radiata pine forest (14 hectares)	6
4.5	Coastal shrubland (not mapped)	8
4.6	<i>Carex geminata</i> -wharariki wetland (0.06 hectares)	8
5.	FLORA	9
5.1	Overview	9
5.2	Threatened and At Risk taxa	9
6.	FAUNA	10
6.1	Indigenous fauna	10
6.1.1	Avifauna	10
6.1.2	Lizards	11
6.2	Pest animals	11
7.	DEPARTMENT OF CONSERVATION MANAGEMENT	12
8.	OTHER MANAGEMENT	12
9.	FUTURE VEGETATION TRENDS	13
9.1	'Do nothing' scenario	13
9.2	Wilding conifer control scenario	14
9.2.1	Control methods	14
9.2.2	Scenarios after wilding conifer control	15
10.	CONCLUSIONS	15
	ACKNOWLEDGMENTS	16
	REFERENCES	16
	APPENDIX:	
1.	Vascular Plant species recorded during the site visit	17

Reviewed and approved for release by:



W.B. Shaw
Director/Principal Ecologist
Wildland Consultants Ltd

© *Wildland Consultants Ltd 2018*

This report has been produced by Wildland Consultants Ltd for Apex Marine Farm Ltd. All copyright in this report is the property of Wildland Consultants Ltd and any unauthorised publication, reproduction, or adaptation of this report is a breach of that copyright.

1. INTRODUCTION

Apex Marine Farm Ltd (Apex) has applied to Marlborough District Council for a Private Plan Change request to the Marlborough Sounds Resource Management Plan, and for a concurrent resource consent application. The plan change request and resource consent application relate to a proposed marine oyster and algae farming activity at a site on the northwestern shores of Onapua Bay, on the southern side of Tory Channel (Figure 1).

The application is currently before a Technical Advisory Group (TAG) which will provide recommendations to Marlborough District Council. Expert opinions on landscape and marine ecology have been provided to the TAG, but one aspect that has not been considered is the terrestrial ecology of the adjacent Katoa Point Scenic Reserve on the northern side of Onapua Bay (Figure 1), and how the ecological values and natural character of the reserve could be enhanced through the control of wilding pines.

Specifically, Apex requires an assessment of the following:

- The conservation history of Katoa Point Scenic Reserve, and where it sits in the Department of Conservation's current priorities.
- Ecological values and ecological processes within the reserve
- If no management was undertaken, what the reserve would look like in 20 years time and in 35 years time, especially in relation to the spread of wilding pines.
- If Apex were to assist by providing 80 hours per year of wilding pine control, an assessment of the state of the vegetation in the reserve in 20 years and in 35 years time.

This report comprises the above assessments.

2. METHODS

A field assessment was undertaken at Katoa Point Scenic Reserve on 16-17 October 2018. This assessment was concentrated on the faces within the reserve that overlook Onapua Bay, the site of the proposed marine farm. Desktop imagery was used to map the faces that overlook Tory Channel.

Information on the conservation history and Department of Conservation priorities for Katoa Point Scenic Reserve was obtained from the Nelson Office of the Department of Conservation.

A desktop assessment was undertaken of indigenous lizard (gecko and skink) habitat values in the vicinity of Onapua Bay. This involved evaluation of previous records in the area from the Department of Conservation's Bioweb herpetofauna database and a consideration of the habitat present in the area and its suitability for relevant lizard species. Google Earth imagery, field guides, and site maps were also used for this assessment.

3. ECOLOGICAL CONTEXT

Katoa Point Scenic Reserve is located in the Sounds Ecological District, which is based on the complex system of drowned river valleys, separated by ridges and hills, that comprises the Marlborough Sounds. The district has a reliable annual rainfall of 1,200-2,000 millimetres per annum. Sounds Ecological District was originally largely covered with beech forest above 250 metres elevation above sea level, and kohekohe-tawa forest at lower elevation, with a narrow coastal fringe of scrub in the inner sounds (McEwen 1987). However, much of the current forest vegetation is secondary and has regenerated following burning of the original forest by both Polynesian and European settlers (McEwen 1987).

Katoa Point Scenic Reserve is consistent with this pattern, currently wholly comprising secondary vegetation, with the oldest vegetation in fire refuges such as gullies. The original vegetation cover of the reserve was most likely hard beech (*Fuscospora truncata*), kamahi (*Weinmannia racemosa*), and emergent rimu (*Dacrydium cupressinum*) across most of the hill slopes, with black beech (*Fuscospora solandri*) on dry ridges and headlands, kohekohe (*Dysoxylum spectabile*), tawa (*Beilschmedia tawa*) and hīnau (*Elaeocarpus dentatus*) in warm, productive sites, and diverse podocarp/broadleaved forest comprising rimu, pukatea (*Laurelia novae-zelandiae*), tawa, tītoki (*Alectryon excelsus* subsp. *excelsus*), kohekohe, māhoe (*Melicytus ramiflorus*), pigeonwood (*Hedycarea arborea*), kamahi, and makomako/wineberry (*Aristotelia serrata*) (Simon Moore, Department of Conservation, pers. comm.).

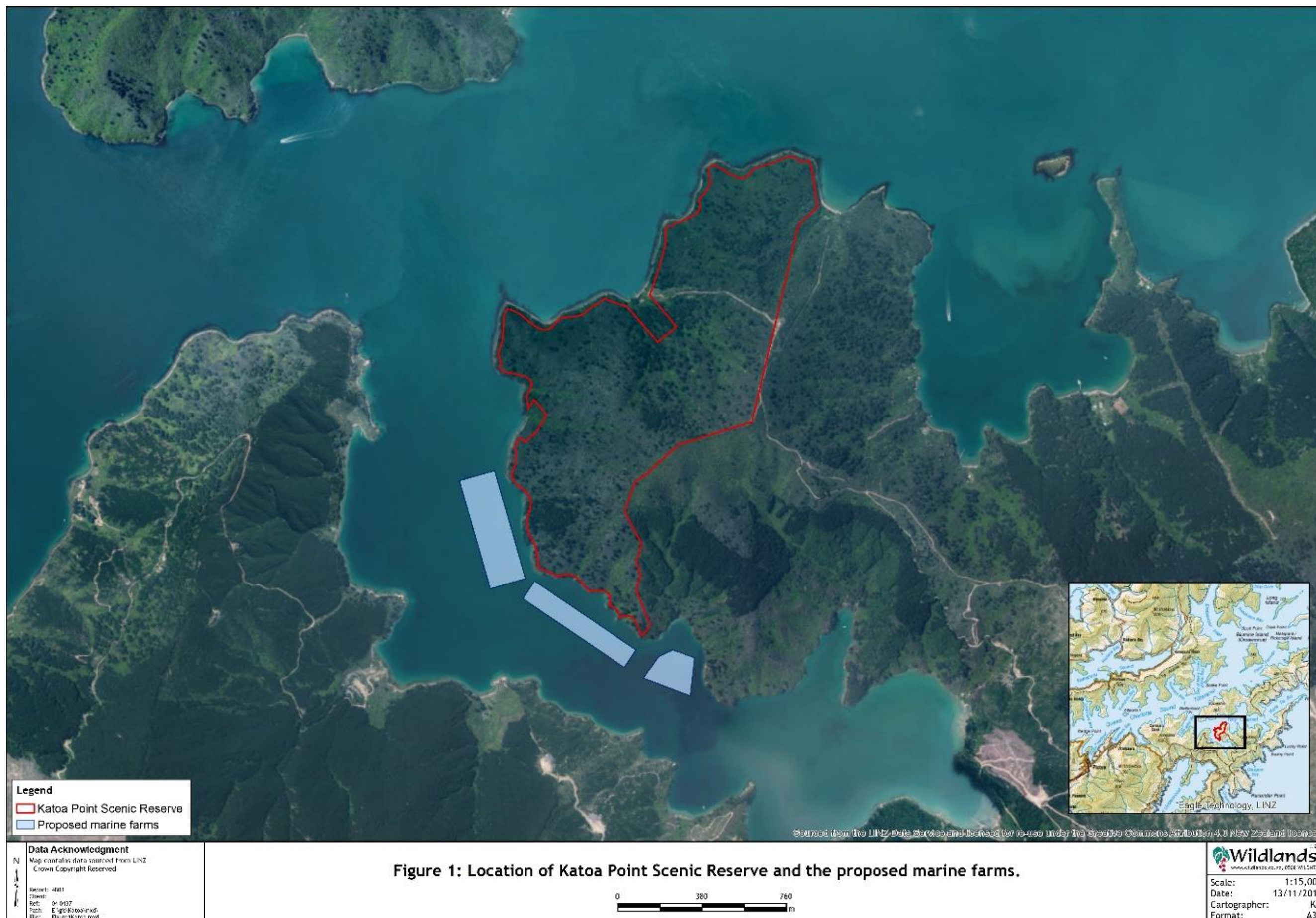
4. VEGETATION AND HABITATS

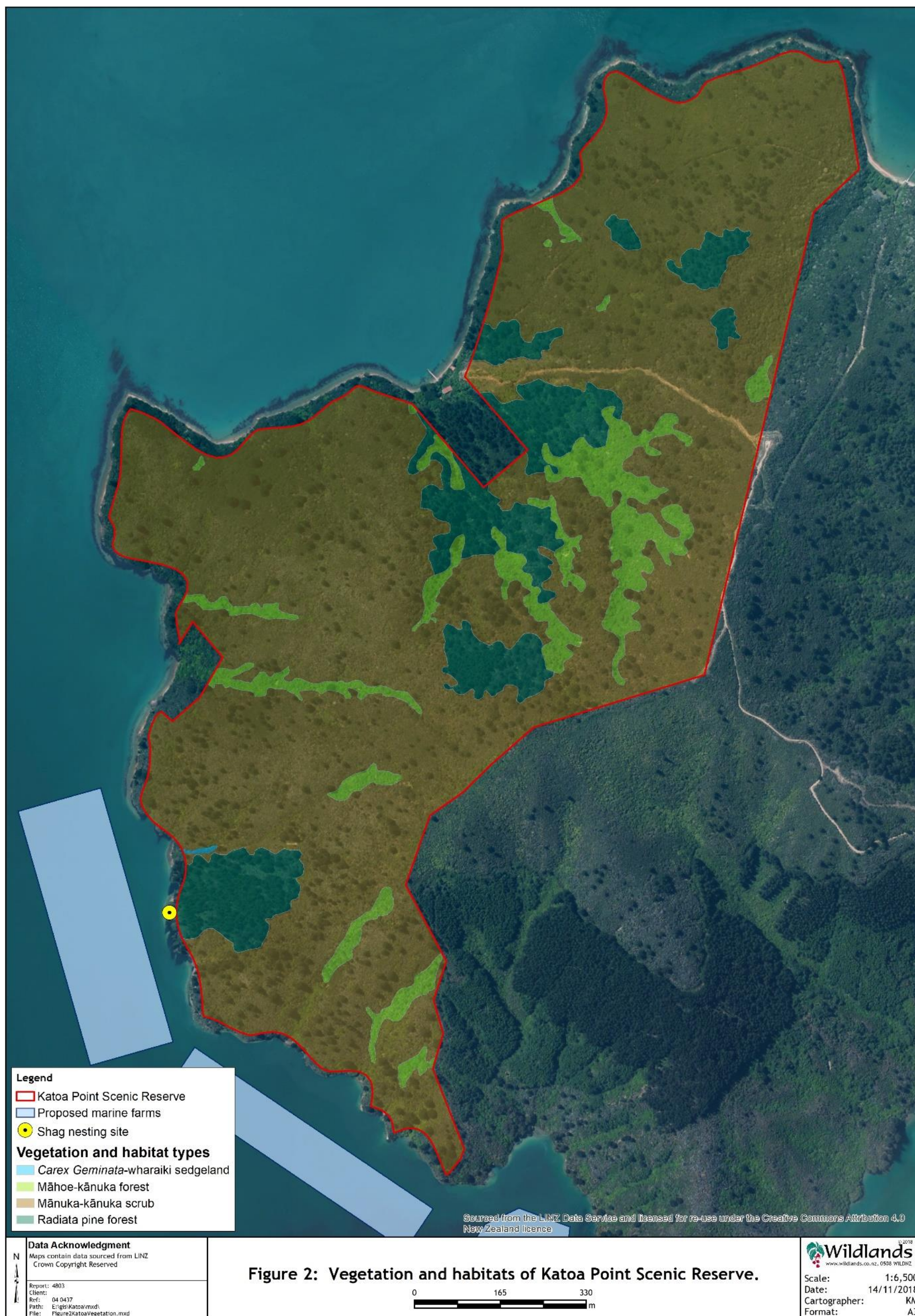
4.1 Overview

Five vegetation and habitat types were identified and described within Katoa Point Scenic Reserve:

- Mānuka-kānuka scrub was the most extensive vegetation cover within the reserve.
- Mahoe-kānuka forest was mostly restricted to gullies.
- Radiata pine forest occurred in scattered patches within the reserve.
- Coastal shrubland occupied steep coastal banks along the coastal margins of the reserve, but was not mapped separately.
- A small wetland was observed in one coastal gully mouth.

With the exception of coastal shrubland, these vegetation and habitat types are mapped (Figure 2) within the Reserve. Type descriptions are provided below.





4.2 Mānuka-kānuka scrub (108 hectares)

Scrub dominated by patches of mānuka (*Leptospermum scoparium*) and kānuka (*Kunzea robusta*) covers most of Katoa Point Scenic Reserve, with scattered emergent radiata pine (*Pinus radiata*) trees and small groves of pines throughout this vegetation type. Scrub dominated by mānuka on upper slopes is generally 3-4 metres tall, with shrubs of *Leucopogon fasciculatus*, mahoe, *Coprosma rhamnoides*, and *C. lucida*, with occasional kamahi beneath. The ground layer is generally sparse, but typical plant species included *Gahnia procera*, *Dianella nigra*, *Blechnum procerum*, and *Gonocarpus incanus*. On lower slopes, mānuka scrub is 4-5 metres tall, with mahoe, silver fern (*Cyathea dealbata*), *Coprosma rhamnoides*, *Leucopogon fasciculatus*, and scattered, browsed kamahi saplings. Scrub dominated by kānuka is generally taller, up to 8 metres tall, and contains abundant regenerating mahoe and silver fern (Plate 1), with *Coprosma rhamnoides* and putaputawētā at lower abundance. *Uncinia uncinata* is common in the ground layer. Small patches of gorse (*Ulex europaeus*) occur at a number of places in these scrub associations, and are often associated with steep, rocky slopes.



Plate1: Kānuka scrub with abundant silver fern and mahoe in the understorey.

4.3 Mahoe-kānuka forest (10 hectares)

Gullies are often occupied by older trees of mahoe, with kānuka common on the margins. Mamaku (*Cyathea medullaris*) is sometimes present, as is kaikomako (*Pennantia corymbosa*), makomako, heketara (*Olearia rani*), and putaputawētā. Kawakawa (*Macropiper excelsum*), silver fern, and heketera occur in the understorey, while the generally rocky ground is mostly covered with litter (Plate 2) but provides

habitat for a range of ferns including hen and chicken fern (*Asplenium bulbiferum*), shore spleenwort (*A. obtusatum*), *A. hookerianum*, maiden hair fern (*Adiantum cunninghamii*), *Hypolepis ambigua*, and *Blechnum membranaceum*.



Plate 2: Interior of mahoe forest, with mamaku in the background.

4.4 Radiata pine forest (14 hectares)

Patches of radiata pine-dominant forest are mostly located on the Tory Channel faces of Katoa Point Scenic Reserve, but there is one notable patch above coastal cliffs on the Onapua Bay faces, and another patch at the top of the hill above Onapua Bay. Occasional kānuka trees, saplings of kānuka and mahoe, and shrubs of *Leucopogon fasciculatus*, *Coprosma rhamnoides*, and *C. lucida* occur in these dense stands of radiata pine, but in general the understorey is sparse and the ground is mostly covered in pine needle litter (Plate 3).

Wilding radiata pines within the reserve include a widespread cohort of even-aged trees that likely established when shrubland and grassland covered the site, rather than taller scrub. Patches of younger radiata pine trees mostly occur on ridges and spurs in the northern part of the reserve. Active establishment of young pines is also associated with the margins of mature radiata pine stands (Plate 4), and where landslides have created open habitats more suitable for radiata pine establishment. Radiata pine was absent from shady broadleaved forest in gullies, but often occurred on the margins of these areas of broadleaved forest.



Plate 3: Radiata pine forest at the top of the hill overlooking Onapua Bay, showing gap infilling by younger trees, ground cover dominated by pine needle litter, and sparse indigenous tree saplings.



Plate 4: Young radiata pine trees regenerating on the margin of a stand of taller pine trees.

4.5 Coastal shrubland (not mapped)

Coastal shrubland occurs in an almost unbroken strip along the Katoa Point Scenic Reserve foreshore. It is maintained by salt spray that keeps taller vegetation from growing right to the coast, and by steep, rocky coastal slopes (Plate 5) with thin, dry, soils. Gorse commonly occurs in these shrublands, other typical species are wharariki (*Phormium cookianum*), akiraho (*Olearia paniculata*), small mānuka shrubs, knobby clubrush (*Ficinia nodosa*), *Aciphylla squarrosa*, toatoa (*Haloragis erecta*), *Oxalis exilis*, *Linum monogynum*, New Zealand ice plant (*Disphyma australe*), shore celery (*Apium prostratum*), *Dichondra repens*, and occasional *Melicytus crassifolius*.



Plate 5: Relatively intact coastal shrubland in a site less affected by salt spray, with prominent wharariki, akiraho, and *Acaena anserinifolia*.

4.6 *Carex geminata*-wharariki wetland (0.06 hectares)

Small wetlands are present in some places where streams join the coast, but in generally they are very small as the gullies rise steeply behind the coast and do not provide much gully floor habitat for wetlands. An exception was a wetland dominated by *Carex geminata* with scattered wharariki, knobby clubrush, wheki (*Dicksonia squarrosa*), and *Cyperus ustulatus*, in a gully floor (Plate 6) just north of the patch of dense coastal pine forest above Onapua Bay. Mānuka, tauhinu (*Ozothamnus leptophyllus*), and gorse shrubs were dominant on the margins of this wetland.



Plate 6: Coastal gully wetland dominated by *Carex geminata* with occasional wharariki and wheki. This wetland provides habitat for South Island fernbird.

5. FLORA

5.1 Overview

A total of 119 vascular plant species were recorded on the Onapua Bay faces within Katoa Point Scenic Reserve, comprising 93 indigenous plant species (78%), and 26 exotic plant species (22%). This represents a moderately high species richness of indigenous plant species.

5.2 Threatened and At Risk taxa

Of these species, mānuka, *Aciphylla squarrosa*, and *Melicytus crassifolius* have recently been classified as At Risk-Declining while kānuka and white rata (*Metrosideros diffusa*) have been classified as Threatened-Nationally Vulnerable (de Lange *et al.* 2018).

The assessments and status of mānuka, kānuka, and white rata reflect a precautionary approach due to the threat posed by the recently-invading myrtle rust (*Austropuccinia psidii*). To date, relatively low levels of myrtle rust have been recorded in Nelson-Marlborough, and most infections of myrtle rust elsewhere have been found on ramarama (*Lophomyrtus bullata*), pohutukawa, and rata (*Metrosideros* spp.)¹. Mānuka and kānuka are widespread and abundant in the Marlborough Sounds, and do not appear

¹ <https://www.mpi.govt.nz/protection-and-response/responding/alerts/myrtle-rust>. Accessed 2 November 2018.

to be infested with myrtle rust, so do not currently warrant these threat classifications. However, based on myrtle rust infection patterns elsewhere, white rata in the Marlborough Sounds could prove to be vulnerable to myrtle rust, so its threat ranking is more justified.

6. FAUNA

6.1 Indigenous fauna

6.1.1 Avifauna

A relatively diverse range of birds (Table 1) were observed within forest on the Onapua Bay faces of Katoa Point Scenic Reserve, and pied shag (*Phalacrocorax varius*) and red-billed gull (*Larus novaehollandiae*) were observed in the adjacent marine area. A few unoccupied shag nests, most probably pied shag, were observed on a cliff face above Onapua Bay. Pied shag, red-billed gull, and South Island fernbird (*Bowdleria punctata*) are all classified as At Risk (Robertson *et al.* 2017). Brown creeper, which were very common at the site, is regarded as a deep endemic (PCE 2017). This is relevant because deep endemics tend to be more vulnerable to predation and habitat loss, especially in warm forest habitats (Walker *et al.* 2017).

Table 1: Bird species observed within and adjacent to Katoa Point Scenic Reserve

Common Name	Species	Status	Endemicity Level
Bellbird	<i>Anthornis melanura</i>	Not Threatened	Genus
Black-backed gull	<i>Larus dominicanus</i> subsp. <i>dominicanus</i>	Not Threatened	Subspecies
Blackbird	<i>Turdus merula</i>	Introduced and naturalised	NA
Brown creeper	<i>Mohoua novaeseelandiae</i>	Not Threatened	Family
Californian quail	<i>Callipepla californica</i>	Introduced and naturalised	NA
Chaffinch	<i>Fringilla coelebs</i>	Introduced and Naturalised	NA
Fantail	<i>Rhipidura fuliginosa</i>	Not Threatened	Species
Grey warbler	<i>Gerygone igata</i>	Not Threatened	Species
Harrier	<i>Circus approximans</i>	Not Threatened	Not endemic to NZ
Pied shag	<i>Phalacrocorax varius</i> subsp. <i>varius</i>	At Risk-Recovering	Subspecies
Red-billed gull	<i>Larus novaehollandiae</i> subsp. <i>scopulinus</i>	At Risk-Declining	Subspecies
Silveryeye	<i>Zosterops lateralis</i>	Not Threatened	Not endemic to NZ
Song thrush	<i>Turdus philomelos</i>	Introduced and naturalised	NA
South Island fernbird	<i>Bowdleria punctata</i> subsp. <i>punctata</i>	At Risk-Declining	Species
South Island tomtit	<i>Petroica macrocephala</i>	Not Threatened	Species

6.1.2 Lizards

The desktop assessment for indigenous lizards revealed five lizard species that may possibly occur in Katoa Point Scenic Reserve (Table 2). One species, the Marlborough green gecko (*Naultinus manukanus*) is highly likely to be present, based on nearby records and suitability of habitat, while raukawa gecko (*Woodworthia maculata*) is also likely to be present in rocky habitat within the reserve. The other four species have a low to moderate possibility of being present.

Table 2: Lizard species present (or potentially present) in Katoa Point Scenic Reserve. Conservation status is from Hitchmough *et al.* 2016. The likelihood of occurrence for each species is based on their known habitat preferences and known distribution in the surrounding area.

Common Name	Scientific Name	Conservation Status	Likelihood of Occurrence	Notes
Marlborough green gecko	<i>Naultinus manukanus</i>	At risk - Declining	Very high	Nearest report 500 metres east of the area of interest. Likely to occur in indigenous forest and scrub in the area, particularly kānuka and/or mānuka.
Raukawa gecko	<i>Woodworthia maculata</i>	Not Threatened	High	Nearest report five kilometres to the east. Likely to occur in coastal areas under rocks or driftwood and/or in gullies with rocky ground cover and mature trees.
Northern grass skink	<i>Oligosoma polychroma</i>	Not Threatened	Low-Moderate	Patchy through the Marlborough sounds. Nearest report from Picton. May occur in grassland or around bush edges.
Forest gecko	<i>Mokopirirakau granulatus</i>	At risk - Declining	Low-moderate	Nearest report is Blumine Island (7.5 km away). Also known from sites on the mainland near Lochmara Bay (19 km east). May occur in mature kānuka or other indigenous forest.
Northern spotted skink	<i>Oligosoma kokowai</i>	At risk - Relict	Low	Known from several islands in the Marlborough sounds (e.g. Amerikiwhati Island, Long Island), but rarely encountered on the mainland. There is a record from Picton and populations are known on the coast near Nelson. May occupy damp and/or rocky areas, particularly around the coast.

6.2 Pest animals

Goats (*Capra hircus*) and possums (*Trichosurus vulpecula*) were observed on several occasions during the field survey of the Onapua Bay faces of Katoa Point Scenic Reserve. Extensive pig (*Sus scrofa*) rooting was also evident in various parts of the reserve. Other pest animals, such as red deer (*Cervus elaphus scoticus*), cats (*Felis*

catus), mustelids (*Mustela* spp.) hedgehog (*Erinaceus europaeus*), rats (*Rattus* spp.), and mice (*Mus musculus*) are also likely to be present.

7. DEPARTMENT OF CONSERVATION MANAGEMENT

Katoa Point Scenic Reserve was gazetted in 1985, and at that time probably comprised extensive early successional shrubland vegetation with areas of rough pasture being invaded by gorse, tauhinu, mānuka, and kānuka on ridges and spurs, similar to the Ruaomoko Scenic Reserve on the other side of Tory Channel, on the southwestern end of Arapawa Island.

The reserve doesn't appear to receive any active management from the Department of Conservation. It is not identified in the Department's network of Biodiversity Management Units, which are priorities for active conservation effort (Simon Moore, Department of Conservation, pers. comm.).

The abundant wilding radiata pine trees and pest animals and pest animal sign observed within the reserve are consistent with the reserve having a low priority for active management.

8. OTHER MANAGEMENT

The Marlborough District Council identifies areas in which wilding pine control is being or will be undertaken on a webmap application, which shows that Katoa Point Scenic Reserve is not prioritised for wilding conifer control, while wilding conifer control has been prioritised at Ruamoko Point Scenic Reserve on the other side of Tory Channel (Figure 3).

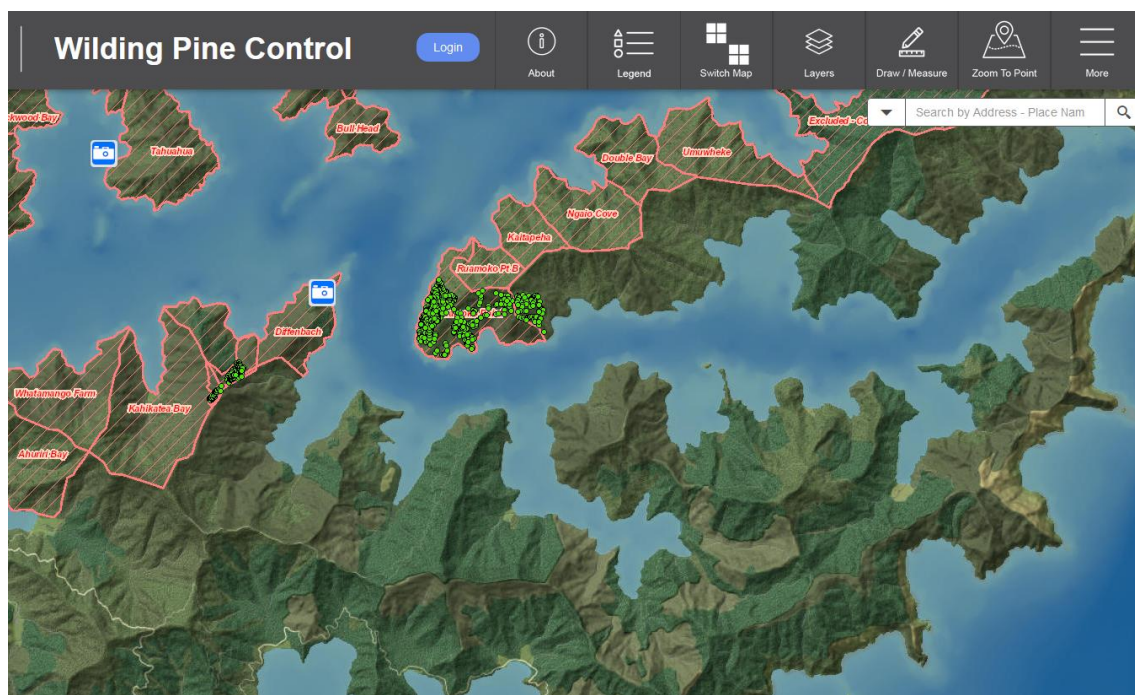


Figure 3: Reproduction of part of the Marlborough District Council webmap showing areas prioritised for wilding conifer control (pink boundaries) and individual pine trees in Ruamoko Scenic Reserve.

9. FUTURE VEGETATION TRENDS

9.1 'Do nothing' scenario

Under a 'do nothing' scenario, in the absence of further disturbance, two vegetation trends are likely:

- Firstly, there will be a slow but widespread change from scrub dominated by mānuka and kānuka, to broadleaved forest initially dominated by mahoe, and ultimately by taller trees such as kamahi, and potentially beech trees, if the latter are able to colonise the reserve.
- Secondly, radiata pine will slowly become more dominant, especially on ridges and spurs, open coastal slopes, and where disturbance creates suitable habitat for radiata pine establishment. Less dense stands of radiata pine are likely to converge to radiata pine forest.

Under this scenario, in 20 years time, greater dominance of radiata pine would be apparent on ridges, faces, and on coastal slopes, with existing trees becoming taller, and less-dense stands of radiata pine infilling to become patches of forest. These changes would result in more of the mānuka-kānuka scrub being overtopped and replaced by pines. In gullies, there would be a slightly greater predominance of broadleaved forest, mainly of māhoe, with the existing broadleaved canopy expanding slightly upslope. A similar process would occur in other areas currently occupied by broadleaved forest. Mānuka-dominant scrub would be reduced in extent, with some of it succeeding to kānuka-dominant scrub, and some of it to radiata pine.

In 35 years time, each of these trends will have continued, but the most obvious trends would be greater dominance of radiata pine on ridges, faces, and on coastal slopes, less mānuka-kānuka scrub being visible, and a small but noticeable increase in the extent of broadleaved forest in gullies and on toeslopes.

9.2 Wilding conifer control scenario

9.2.1 Control methods

As part of its application, Apex is proposing to provide 80 person hours per year for wilding conifer control on the Onapua Bay faces of Katoa Point Scenic Reserve, for the duration of the 35 year consent period sought. The methods that would be used for this control have not been decided, but could be either felling of radiata pine trees using chainsaws, or application of herbicide to basal bark, or holes drilled to kill the pine trees standing. The choice of methods would have different visual and ecological outcomes. The results of application of herbicide to kill trees standing are currently very apparent in many parts of Queen Charlotte Sound, where the Marlborough Sounds Restoration Trust has implemented significant control of radiata pine (Plate 7).



Plate 7: An example of wilding radiata pine control using herbicide to kill trees standing, in East Bay, Queen Charlotte Sound.

Chemically-killed pine trees quickly lose their needles and then the dead spars slowly disintegrate over 10-20 years. Pine trees felled using chainsaws generally become invisible once needles have been lost, as they rot and ‘sink’ into the surrounding scrub vegetation. However felling is not a preferred method of the Marlborough Sounds Restoration Trust, as it tends to open up the scrub canopy near the base of the felled tree, creating favourable conditions for regeneration of pine trees, and requires significantly more follow-up control. In addition, access for this follow-up control would be made more difficult due to the many large pine trees lying in the scrub.

If felling is used by Apex as a method of wilding pine control, then only small pine trees should be felled, as this will not create the larger canopy disturbances that promote radiata pine regeneration.

Regardless of the control technique used, there will be some regeneration of radiata pine trees, and small uncontrolled trees will become more evident over time. Ongoing control of these small regenerating trees will be needed, with controlled areas subject to further control effort approximately five years after initial control. This should be much less onerous than initial control if radiata pine trees are killed standing.

9.2.2 Scenarios after wilding conifer control

As a general principle, wilding conifer control should start with sparsely-distributed trees and control of dense stands should be undertaken last. If this approach is followed by Apex, 80 person hours of effort per year should see relatively rapid control of all the radiata pine trees on the Onapua Bay faces, outside of the areas of dense pine forest. It is likely that less than ten years of control effort would be required for this. A further five years should see the dense areas of radiata pine forest being successfully controlled, and any necessary secondary control completed. Thus, after 20 years, it would be reasonable to expect few radiata pine spars in the areas where early control of sparse radiata pine had been undertaken, and grey radiata pine spars, similar to those shown in Plate 7, in areas controlled more recently. In all of these areas, mānuka-kānuka scrub and patches of broadleaved forest would be much more apparent than they currently are.

Where dense stands of radiata pine had been controlled, these would remain evident as a dense mass of grey pine spars for longer, due to the lack of regenerating indigenous trees in these areas.

After 35 years, even the areas where dense radiata pines have been controlled should have been replaced by indigenous regenerating forest associations. These would still appear different to the more widespread broadleaved forest and scrub associations, as they will contain younger regenerating vegetation. Overall, the Onapua Bay faces within the reserve will be visually dominated by indigenous forest, and there will be a small noticeable increase in the extent of broadleaved forest.

10. CONCLUSIONS

Katoa Point Scenic Reserve, while infested with wilding radiata pine trees, and largely comprising young, successional stands of indigenous scrub and forest, is still worth retaining as area of indigenous biodiversity. It has moderately high vascular plant species richness, a reasonably diverse assemblage of indigenous forest birds, probable presence of Marlborough green gecko and raukawa gecko, nesting habitat for shags, and small wetlands that provide habitat for South Island fernbird.

Katoa Point Scenic Reserve has only moderate value compared to other terrestrial vegetation in the Arapawa terrestrial landscape unit Boffa Miskell (2014). For example, there are mature stands of beech forest on Arapawa Island, and forest that has not been invaded by wilding conifers on Blumine Island and on Pickersgill Island. As described above, Katoa Point Scenic Reserve has not been prioritised for wilding conifer control, and is not prioritised as an ecosystem management unit by the Department of Conservation.

The ecological values of Katoa Point Scenic Reserve will decline if the wilding conifers that infest it are not controlled, but would improve under a successful control regime.

Control of wilding radiata pine trees would address one of the more significant threats to the ecological values within Katoa Point Scenic Reserve. The ecological values of the reserve would also benefit from control of goats, pigs, possums, and other feral pest animals.

ACKNOWLEDGMENTS

Bruce Hearn (Apex Marine Farm) is thanked for arranging transport to Katoa Point Scenic Reserve. Simon Moore (Department of Conservation) is gratefully acknowledged for information on the Department's management priorities for Katoa Point Scenic Reserve.

REFERENCES

- Boffa Miskell 2014: Marlborough coastal landscape study. Prepared for Marlborough District Council.
- 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., Schönberger I., Hindmarsh-Walls R., Heenan P.B. and Ladley K. 2018: Conservation status of New Zealand indigenous vascular plants, 2017. *New Zealand Threat Classification Series 22*. Department of Conservation, Wellington. 82 pp.
- Hitchmough R., Barr B., Lettink M., Monks J., Reardon J., Tocher M., van Winkel D., and Rolfe J. 2016: Conservation status of New Zealand reptiles, 2015. *New Zealand Threat Classification Series 17*. Department of Conservation, Wellington. 14 pp.
- McEwen M. 1987. Ecological regions and districts of New Zealand. Booklet to cover Sheet 3: descriptions of districts in central New Zealand, from eastern Wairarapa to Akaroa; also Chathams, not shown on map. *New Zealand Biological Resources Centre Publication No. 5*. Department of Conservation, Wellington.
- PCE 2017: Taonga of an island nation: saving New Zealand's birds. Parliamentary Commissioner for the Environment, Wellington.
- Robertson H.A., Baird K., Dowding J.E., Elliott G.P., Hitchmough R.A., Miskelly C.M., McArthur N., O'Donnell C.J., Sagar P.M., Scofield R.P., and Taylor G.A. 2017: Conservation status of New Zealand birds, 2016. *New Zealand Threat Classification Series 19*. Department of Conservation, Wellington. 23 pp.
- Walker S., Monks A. and Innes J. 2017: Status and change in native forest birds on New Zealand's mainland, 1969-1979 to 1999-2004. *Landcare Research Contract Report No. 2786*.

VASCULAR PLANT SPECIES RECORDED DURING THE SITE VISIT

Asterisk (*) denotes exotic species.

Species	Common Name	Plant Type	Abundance
<i>Acaena anserinifolia</i>	Bidibidi	Dicot herb	Occasional
<i>Acaena novae-zelandiae</i>	Bidibidi	Dicot herb	Rare
<i>Aciphylla squarrosa</i>	Speargrass	Dicot herb	Occasional
<i>Adiantum cunninghamii</i>	Maidenhair	Fern	Occasional
<i>Anagallis arvensis</i> *	Scarlet pimpernel	Dicot herb	Occasional
<i>Anthoxanthum odoratum</i> *	Sweet vernal	Grass	Occasional
<i>Apium prostratum</i>		Dicot herb	Occasional
<i>Aristotelia serrata</i>	Wineberry; makomako	Tree	Occasional
<i>Asplenium appendiculatum</i>	Ground spleenwort	Fern	Occasional
<i>Asplenium bulbiferum</i>	Hen and chicken fern	Fern	Occasional
<i>Asplenium flabellifolium</i>	Necklace fern	Fern	Rare
<i>Asplenium hookerianum</i>	Hooker's spleenwort	Fern	Rare
<i>Astelia fragrans</i>	Kakaha	Monocot herb	Occasional
<i>Blechnum chambersii</i>	Lance fern, rereti	Fern	Occasional
<i>Blechnum discolor</i>	Crown fern	Fern	Occasional
<i>Blechnum fluviatile</i>	Kiwakiwa	Fern	Occasional
<i>Blechnum membranaceum</i>		Fern	Rare
<i>Blechnum novae-zelandiae</i>	Kiokio	Fern	Occasional
<i>Blechnum procerum</i>	Kiokio	Fern	Occasional
<i>Brachyglottis repanda</i>	Rangiora	Tree	Occasional
<i>Cardamine forsteri</i>		Dicot herb	Rare
<i>Carex appressa</i>		Sedge	Occasional
<i>Carex forsteri</i>	Cutty grass	Sedge	Occasional
<i>Carex geminata</i>	Rautahi	Sedge	Occasional
<i>Carex solandri</i>		Sedge	Occasional
<i>Carpodetus serratus</i>	Putaputāwētā	Tree	Occasional
<i>Centaurium erythraea</i> *	Centaury	Dicot herb	Occasional
<i>Centella uniflora</i>	Centella	Dicot herb	Rare
<i>Cerastium fontanum</i> *	Mouse-ear chickweed	Dicot herb	Occasional
<i>Cirsium vulgare</i> *	Scotch thistle	Dicot herb	Occasional
<i>Clematis paniculata</i>	Puawananga	Vine	Occasional
<i>Coprosma lucida</i>	Karamu	Tree	Occasional
<i>Coprosma rhamnoides</i>	0	Shrub	Frequent
<i>Coprosma robusta</i>	Karamu	Tree	Rare
<i>Cordyline banksii</i>	Ti rakau / cabbage tree	Tree	Rare
<i>Crassula moschata</i>		Dicot herb	Occasional
<i>Cyathea dealbata</i>	Silver fern	Fern	Abundant
<i>Cyathea medullaris</i>	Mamaku	Fern	Occasional
<i>Cyperus ustulatus</i>		Sedge	Occasional
<i>Dactylis glomerata</i> *	Cocksfoot	Grass	Occasional
<i>Dianella nigra</i>	Turutu	Monocot herb	Occasional
<i>Dichelachne crinita</i>	Plume grass	Grass	Rare
<i>Dichondra repens</i>	Mercury Bay weed	Dicot herb	Occasional
<i>Disphyma australe</i>	NZ ice plant	Dicot herb	Occasional
<i>Erica lusitanica</i> *	Spanish heath	Shrub	Occasional
<i>Erigeron canadensis</i> *	Canadian fleabane	Dicot herb	Rare
<i>Euchiton audax</i>	Native cudweed	Dicot herb	Rare
<i>Euchiton</i> sp.		Dicot herb	Occasional

Species	Common Name	Plant Type	Abundance
<i>Euphorbia peplus</i> *	Petty spurge	Dicot herb	Occasional
<i>Ficinia nodosa</i>	Wiwi	Sedge	Occasional
<i>Gahnia procera</i>	Giant sedge, gahnia	Sedge	Occasional
<i>Gaultheria antipoda</i>	Bush snowberry	Shrub	Rare
<i>Gonocarpus incanus</i>		Dicot herb	Occasional
<i>Haloragis erecta</i>	Toatoa	Dicot herb	Occasional
<i>Hebe stricta</i>	Koromiko	Shrub	Rare
<i>Histiopteris incisa</i> *	Water fern	Fern	Occasional
<i>Holcus lanatus</i> *	Yorkshire fog	Grass	Occasional
<i>Hydrocotyle moschata</i>		Dicot herb	Occasional
<i>Hypochaeris radicata</i> *	Catsear	Dicot herb	Rare
<i>Hypolepis ambigua</i>		Fern	Occasional
<i>Isolepis cernua</i>		Sedge	Rare
<i>Juncus effusus</i> *	Soft rush	Rush	Occasional
<i>Kunzea robusta</i>	Kānuka	Tree	Frequent
<i>Lagenifera petiolata</i>		Dicot herb	Rare
<i>Leptospermum scoparium</i>	Mānuka	Tree	Abundant
<i>Leucopogon fasciculatus</i>		Shrub	Frequent
<i>Leycesteria formosa</i> *	Himalayan honeysuckle	Shrub	Rare
<i>Libertia grandiflora</i>		Monocot herb	Occasional
<i>Linum monogynum</i>	NZ linen flax	Dicot herb	Occasional
<i>Luzula picta</i>	Woodrush	Rush	Occasional
<i>Lycopodium volubile</i>	Climbing clubmoss	Fern	Occasional
<i>Macropiper excelsum</i>	Kawakawa	Tree	Frequent
<i>Melicytus crassifolius</i>	Thick-leaved māhoe	Shrub	Rare
<i>Melicytus ramiflorus</i>	Māhoe	Tree	Abundant
<i>Metrosideros diffusa</i>	White climbing rātā	Vine	Rare
<i>Microlaena stipoides</i>	Meadow rice grass, pātiti	Grass	Occasional
<i>Microsorium pustulatum</i>	Hound's tongue fern	Fern	Rare
<i>Muehlenbeckia australis</i>	Pōhuehue	Vine	Occasional
<i>Muehlenbeckia complexa</i>	Shrubby pōhuehue	Vine	Occasional
<i>Notogrammitis billardierei</i>	Common strap fern	Fern	Occasional
<i>Olearia paniculata</i>	Akiraho	Tree	Occasional
<i>Olearia rani</i>	Heketara	Tree	Frequent
<i>Oxalis exilis</i>	Yellow oxalis	Dicot herb	Occasional
<i>Ozothamnus leptophyllus</i>	Tauhinu	Shrub	Occasional
<i>Paesia scaberula</i>	Ring fern	Fern	Occasional
<i>Parsonsia heterophylla</i>	Native jasmine	Vine	Occasional
<i>Pellaea rotundifolia</i>	Button fern	Fern	Rare
<i>Phormium cookianum</i>	Wharariki	Monocot herb	Occasional
<i>Pinus radiata</i> *	Radiata pine	Tree	Frequent
<i>Pittosporum tenuifolium</i>	Kohuhu	Tree	Occasional
<i>Poa anceps</i>		Grass	Occasional
<i>Polystichum oculatum</i>	Shield fern	Fern	Occasional
<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed	Dicot herb	Occasional
<i>Pseudopanax colensoi</i>	Three finger	Tree	Rare
<i>Pteridium esculentum</i>	Bracken	Fern	Occasional
<i>Pteris tremula</i>	Trembling brake	Fern	Occasional
<i>Pterostylis alobula</i>		Orchid	Rare
<i>Pyrrosia eleagnifolia</i>	Leatherleaf fern	Fern	Occasional
<i>Ranunculus reflexus</i>	Hairy buttercup	Dicot herb	Frequent
<i>Ripogonum scandens</i>	Supplejack / kareao	Vine	Occasional
<i>Rubus cissoides</i>	Lawyer	Vine	Rare
<i>Rytidosperma racemosum</i> *	Danthonia	Grass	Rare
<i>Schedonorus phoenix</i> *	Tall fescue	Grass	Occasional
<i>Senecio bipinnatisectus</i> *		Dicot herb	Rare
<i>Senecio hispidulus</i>		Dicot herb	Occasional

Species	Common Name	Plant Type	Abundance
<i>Senecio jacobaea</i> *	Ragwort	Dicot herb	Occasional
<i>Senecio lautus</i>		Dicot herb	Occasional
<i>Senecio minimus</i>	Native fireweed	Dicot herb	Rare
<i>Simpliglottis cornuta</i>	Bird orchid	Orchid	Rare
<i>Spergularia rubra</i> *	Sand spurrey	Dicot herb	Occasional
<i>Stellaria parviflora</i>	Native chickweed	Dicot herb	Occasional
<i>Teline monspessulana</i> *	Montpellier broom	Shrub	Occasional
<i>Trifolium dubium</i> *	Suckling clover	Dicot herb	Rare
<i>Trifolium repens</i> *	White clover	Dicot herb	Rare
<i>Ulex europaeus</i> *	Gorse	Shrub	Frequent
<i>Uncinia uncinata</i>	Hooked sedge	Sedge	Abundant
<i>Vicia sativa</i> *	Vetch	Dicot herb	Occasional
<i>Vulpia myuros</i> *	Vulpia hair grass	Grass	Occasional
<i>Weinmannia racemosa</i>	Kamahi	Tree	Occasional



Call Free 0508 WILDNZ
Ph: +64 7 343 9017
Fax: +64 7 3439018
ecology@wildlands.co.nz

99 Sala Street
PO Box 7137, Te Ngae
Rotorua 3042,
New Zealand

Regional Offices located in
Auckland, Hamilton, Tauranga,
Whakatane, Wellington,
Christchurch and Dunedin

ECOLOGY RESTORATION BIODIVERSITY SUSTAINABILITY

www.wildlands.co.nz