

Christchurch District Plan Site of Ecological Significance

Site Significance Statement

Site name: Lion Rock

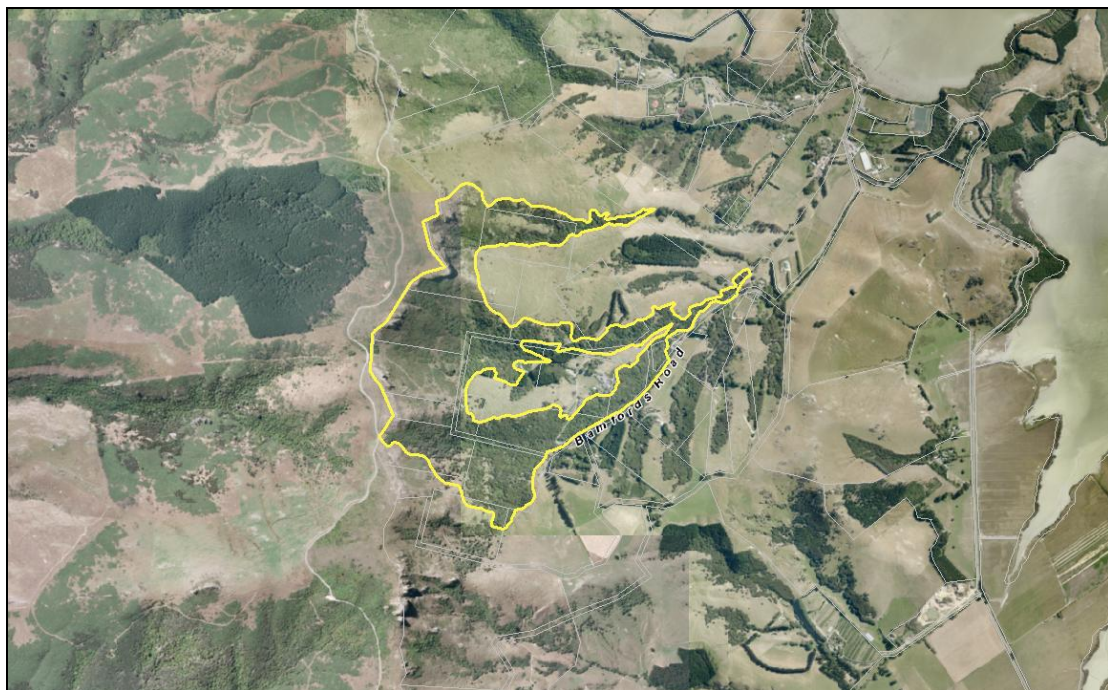
Site number: SES/PH/1

Physical address of site: Upper Allandale, Governors Bay

Summary of Significance:

The site is significant because it is a large example of rare and representative indigenous vegetation in the Port Hills Ecological District. It has a high diversity of indigenous plant and invertebrate taxa and supports a nationally Threatened invertebrate species of *Lepidoptera*, a number of nationally At Risk plant, invertebrate and fish species and plant and invertebrate species that are endemic to Banks Peninsula or uncommon within the ecological district or region. It has five species that are at their southern national or regional distributional limits on Banks Peninsula and has distinctive montane scrub and bluff vegetation associated with basic igneous bluffs, scarps and rock outcrops. The site contributes to an important ecological linkage and provides an important buffering function to Allandale Stream.

Site Map



Additional Site Information

Ecological District: Port Hills

Area of SES (ha): 93.97

Central Point (NZTM): E1569977, N5166784

Site Description

This site is located on the Port Hills above Allandale off Bamfords Road at Living Springs. It includes the rock bluffs and scarps below the Summit Road and the forested and regenerating vegetation on the upper and lower slopes. The altitudinal range of the site is from approximately 40 to 524 m above sea level. The Department of Conservation identified the site as a Recommended Area for Protection (Port Hills RAP 5 – Living Springs) (Wilson 1992). Wilson (1992) commented that it “is an outstanding area for the Port Hills”.

The main vegetation communities identified at the site by Jensen unpubl. data (2014) are:

- (Kahikatea-matai-totara)/secondary kanuka and mixed hardwood forest
- Secondary kanuka dominant forest
- Secondary mixed hardwood forest
- Rock bluff and outcrop herbfield and shrubland
- Bracken fernland/grassland

Indigenous birds recorded at the site during the botanical survey are bellbird, South Island fantail, and New Zealand pigeon (Jensen unpubl. data 2014).

Extent of Site of Ecological Significance

The site includes the secondary forest in the lower gullies and the montane scrub, grassland and rock bluff vegetation on the upper slopes. It also includes the regenerating bracken fernland that links and buffers the rock bluffs and forest on the upper slopes. Areas of exotic plantations, the Living Springs complex and other dwellings and planted amenity gardens associated with dwellings are excluded from the site.

There are several large patches of second-growth kanuka forest south of Bamfords Road. These areas are likely to be ecologically significant. However, they were not surveyed and there is no information to assess their significance. An ecological survey and assessment of these areas is recommended.

Assessment Summary

The Lion Rock Site has been evaluated against the criteria for determining significant indigenous vegetation and significant habitats of indigenous fauna listed in Appendix 3 of the Canterbury Regional Policy Statement (Environment Canterbury, 2013) (see below) referring also to the Wildland Consultants (2013) Guidelines and advice from the relevant Specialist Ecologist Groups. Under these criteria the site is ecologically significant because it meets the representativeness (criteria 1 and 2), rarity/distinctiveness (criteria 3, 4, 5 and 6), diversity and pattern (criterion 7) and ecological context criteria (criteria 8 and 10).

Assessment against Significance Criteria

Representativeness

- 1. Indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity of the relevant ecological district. This can include degraded examples where they are some of the best remaining examples of their type, or represent all that remains of indigenous biodiversity in some areas.***

The site is significant under this criterion.

Much of the forest within Living Springs has now been fenced and the understorey is regenerating strongly. The forest in the gully below the Living Springs buildings is highly representative. It has a dense understorey and several large remnant kahikatea, matai and totara. Less palatable species such as *Urtica ferox* are more common in the more open upper kanuka forest that has been fenced more recently. The forest occupying the head of the valley below the crater rim has a representative composition and structure and is typical of the ecological district. Fuchsia, broadleaf, narrow-leaved lacebark and lowland ribbonwood form the canopy with pepper tree, mahoe, kaikomako and *Coprosma rubra* also common (Jensen unpubl. data 2014).

The montane scrub and rock bluff vegetation is also representative and one of few examples of its type in the ecological district. The rock bluff vegetation supports a diverse range of specialised species such as *Raoulia monroi*, *Senecio glaucophyllus* subsp. *basinudus*, *Brachyglottis lagopus*, *Geranium brevicaule*, *Huperzia varia*, *Notogrammitis heterophylla*, *Metrosideros diffusa*, *Scleranthus uniflora* and *Scleranthus biflorus*, *Vittadinia australis* and *Colobanthus strictus* (Jensen unpubl. data 2014).

The site supports indigenous invertebrates that are characteristic of the range of habitats within the site and that reflect the altitudinal sequence from lowland forest to montane scrub, grassland and rock bluffs. It has many invertebrates that are characteristic of Banks Peninsula, including several of the endemic species (Wildland Consultants unpubl. data 2014).

2. *Indigenous vegetation or habitat of indigenous fauna that is a relatively large example of its type within the relevant ecological district.*

The site is significant under this criterion.

It contains a large example of secondary kanuka and mixed hardwood forest in the Port Hills Ecological District.

Rarity/Distinctiveness

3. *Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent in the Region, or relevant land environment, ecological district, or freshwater environment.*

All of the indigenous forest (including kanuka forest) within the site is significant under this criterion.

Forest has been reduced to less than 20% of its former extent in the ecological district. The Port Hills Ecological District is thought to have been almost entirely forested prior to the arrival of humans. Only small areas of tall tussockland and shrubs on bluffs and minor areas of wetland, rockland and coastal herbfield would not have been forested (Harding 2009). The present extent of all indigenous forest in the ecological district (including manuka and kanuka) is estimated to be 9% (New Zealand Landcover Database (Version 4)).

The lower and mid altitude forest in the gullies is also on Acutely and Chronically Threatened land environments (F3.1a and F3.1b) where there is 9.9 and 12.2% indigenous vegetation is left these land environments nationally (Walker et al. 2007).

4. *Indigenous vegetation or habitat of indigenous fauna that supports an indigenous species that is threatened, at risk, or uncommon, nationally or within the relevant ecological district.*

The site is significant under this criterion.

It supports a nationally Threatened invertebrate species of *Lepidoptera*, a number of nationally At Risk plant, invertebrate and fish species and plant and invertebrate species that are endemic to Banks Peninsula or uncommon within the ecological district or region.

Plants

Nationally At Risk plant species (de Lange et al. 2013) recorded from the site (Jensen unpubl. data 2014) are:

- *Aciphylla subflabellata* (At Risk - Declining) – there are high densities in the grassland between the Summit Road and the bluffs.
- *Hebe strictissima* (At Risk - Naturally Uncommon, endemic to Banks Peninsula) - occasional amongst boulders around Lions Head.
- *Heliohebe lavaudiana* (At Risk – Declining, endemic to Banks Peninsula) - rare on the rock outcrops

- *Hymenophyllum australe* (At Risk - Naturally Uncommon, rare in ecological region (Wilson 1992))
- *Leptinella minor* (At Risk - Naturally Uncommon, endemic to Banks Peninsula)
- *Raoulia monroi* (At Risk - Declining) - rare on rocks above Lions Head
- *Senecio glaucophyllus* subsp. *basinudus* (At Risk - Naturally Uncommon) - rare on rocks above Lions Head

Plant species recorded from the site (Jensen unpubl. data 2014) that are “uncommon to rare or very local” on Banks Peninsula (Wilson 2013) are:

- *Colobanthus strictus*
- *Hymenophyllum dilatatum* (rare in Canterbury (Wilson 1992)) - this is one of only two known sites for this species on Banks Peninsula (Hugh Wilson, 2013)
- *Hymenophyllum multifidum*
- *Hymenophyllum sanguinolentum*
- *Kahikatea* (*Dacrycarpus dacrydioides*) (uncommon in ecological district)
- *Lachnagrostis lyallii*
- *Microlaena avenacea*
- *Notogrammitis heterophylla*
- *Phlegmariurus varius*
- *Scleranthus biflorus*
- *Scleranthus uniflorus*

Invertebrates

Nationally Threatened and At Risk invertebrate species recorded from the site (Wildland Consultants unpubl. data 2014) are:

- *Stathmopoda albimaculata* (Threatened - Nationally Endangered)
- *Orthodera novaezealandiae* (praying mantis) (At Risk – Declining)
- *Dasyuris partheniata* (speargrass moth) (At Risk – Recovering)

Invertebrates recorded from the site (Wildland Consultants unpubl. data 2014) that are endemic to Banks Peninsula are:

- *Kikihia* new species (green cicada) (endemic to Banks Peninsula)
- *Asterivora* new species (Banks Peninsula jet) (endemic to Banks Peninsula)
- *Dichromodes cynica* (rock face moth) (endemic to Banks Peninsula)

Invertebrates recorded from the site (Wildland Consultants unpubl. data 2014) that are uncommon in the Port Hills Ecological District are:

- *Nola parvitis*
- *Argyrophenga antipodum* (tussock butterfly) (uncommon in the ecological district) - only known population on the Port Hills

Fish

Two nationally At Risk indigenous freshwater fish species have been recorded in the Allandale Lane Stream (EOS unpubl. data 2013):

- inanga (At Risk – Declining) – the lower reaches are a spawning site for this species (Golder Associates Ltd. 2012)
- blue gill bully (At Risk – Declining)

5. The site contains indigenous vegetation or an indigenous species at its distribution limit within Canterbury Region or nationally.

The site is significant under this criterion.

There are five species that are at their southern national or regional distributional limits on Banks Peninsula (Wilson 2013). These species are (Jensen unpubl. data 2014):

- *Alectryon excelsus* (southern national limit)
- *Asplenium oblongifolium* (southern national limit)
- *Dracophyllum acerosum* (southern national limit)
- *Hedycarya arborea* (southern regional limit)
- *Piper excelsum* (southern national limit)

6. Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, occurs within an originally rare ecosystem, or has developed as a result of an unusual environmental factor or combinations of factors.

The site is significant under this criterion.

The crater rim bluff system on the upper slopes of the site has distinctive montane scrub and bluff vegetation associated with basic igneous bluffs, scarps and rock outcrops. At a national scale, basic cliffs, scarps and tors are originally rare ecosystems (Williams et al. 2007). Montane scrub and bluff vegetation is of very restricted occurrence in the Port Hills Ecological District (Wilson 1992).

The shady rock faces under forest below Lion Rock and the crater rim bluff system support also support a distinctive association of filmy ferns (*Hymenophyllum australe*, *H dilatatum*, *H multifidum* and *H sanguinolentum*) (Wilson unpubl. data n.d., Koller and Tripp 2010, Jensen unpubl. data 2014). Damp shady faces such as these are of restricted occurrence on the Port Hills and all four species are rare on the Port Hills and in the Banks Ecological Region. This site is the only known location on the Port Hills for *H. dilatatum* and *H. australe* and there are only one and two other known sites of *H. dilatatum* and *H. australe* in the Banks Ecological Region respectively (Koller and Tripp 2010, Wilson 2013).

Diversity and Pattern

7. Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of indigenous ecosystem or habitat types, indigenous taxa, or has changes in species composition reflecting the existence of diverse natural features or ecological gradients.

The site is significant under this criterion.

It has an altitudinal sequence from approximately 40 m to over 520 m above sea level. This altitudinal gradient is reflected in the composition of the vegetation. Warm coastal species such as ngaio, titoki, kawakawa and shining spleenwort grow in the forest in the lower gullies while montane species such as thin-barked totara and *Dracophyllum acerosum* are found in the montane scrub and bluff vegetation surrounding Lion Rock at the top of the site.

There are a number of vegetation communities within the site, including (kahikatea-matai-totara)/secondary kanuka and mixed hardwood forest, secondary kanuka dominant forest, secondary mixed broadleaved hardwood forest, montane scrub, rock bluff and outcrop communities and bracken fernland/grassland. These communities reflect, among other things, the altitudinal gradient, proximity to the coast, human disturbance, the occurrence of outcropping rock and bluff systems, aspect and moisture availability.

As a result the site contains a high diversity of indigenous plant taxa (Jensen unpubl. data 2014). One-hundred and thirty two indigenous plant species were recorded from the site by Jensen unpubl. data (2014). A list of these species is provided in Appendix 1.

The site also contains a high diversity of invertebrates compared to other sites on both the Port Hills and Banks Peninsula. A recent survey (Wildland Consultants unpubl. data 2014) (which targeted moths and butterflies) found 113 species, of which 93 were moths and butterflies. A list of the invertebrate species recorded at the site is provided in Appendix 2.

Ecological Context

8. *Vegetation or habitat of indigenous fauna that provides or contributes to an important ecological linkage or network, or provides an important buffering function.*

The site is significant under this criterion.

The indigenous vegetation communities along the upper slopes of the site are part of a network of otherwise largely protected indigenous vegetation and habitats that provide an important ecological corridor around the crater rim/summit of the Port Hills.

The site also has a continuously vegetated corridor of indigenous vegetation from the summit of the Port Hills that extends down onto the lower slopes within Lyttelton Harbour (from approximately 520 to 40 m above sea level). This is an important linkage for indigenous fauna.

This vegetated corridor also provides almost continuous riparian cover in the Allandale catchment that buffers the Allandale Stream and its tributaries from land-use effects such as increased nitrogen and phosphorus and sedimentation. Riparian buffering and shading of the waterways in this catchment is important because they provide habitat for indigenous freshwater fish (EOS unpubl. data 2013) and there is an inanga spawning site in the lower reaches (Golder Associates Ltd. 2012).

The Allandale Lane Stream is an important aquatic corridor for indigenous freshwater fish. It provides habitat for at least five species of migratory freshwater fish (shortfin eel, common bully, bluegill bully, inanga, and banded kokopu) (EOS unpubl. data 2013). The ecological linkage between the coast and the catchment is essential for these fish.

9. A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal system.

The site is not significant under this criterion. There are no wetlands within the site.

10. Indigenous vegetation or habitat of indigenous fauna that provides important habitat (including refuges from predation, or key habitat for feeding, breeding, or resting) for indigenous species, either seasonally or permanently.

The site is significant under this criterion.

It provides important habitat for a diverse range of indigenous invertebrates that the range of lowland to montane habitats within the site. This includes a Threatened - Nationally Endangered species, two nationally At Risk species, three species that are endemic to Banks Peninsula and another two that are uncommon within the ecological district.

Site Management

Existing Protection Status

The site is not legally protected.

Threats and risks	Management recommendations	Support package options
Stock. Almost all the areas of high ecological value at Living Springs have now been fenced to keep stock out (Jensen unpubl. data 2014).	Consider fencing any remaining areas to promote natural regeneration of the understorey.	- Discussion with landowner about the benefits to biodiversity of fencing the remainder of the site. - Assistance as appropriate.
Biodiversity pest plants. There is a small amount of old mans beard in the gully below the Living Springs buildings. An occasional hawthorn is present on the forest edges. Wilding pines are becoming established on the bluffs. <i>Polypodium vulgare</i> is becoming established on rock outcrops above the Living Springs track (Jensen unpubl. data 2014).	- Control biodiversity pest plants using appropriate methods. Priority species for control are old mans beard and wilding pines. - Consider ongoing weed surveillance for biodiversity pest plants such as Darwin's barberry, banana passionfruit, spur valerian, <i>Bomarea</i> and cotoneaster.	- Guidance and advice for landowner about effective and appropriate weed control methods. - Guidance for landowner on the identification of weeds.
Spread of garden plants from amenity gardens	Monitor (and control) the spread of any 'garden escapes' into the site.	Guidance and advice for landowner about monitoring and control of garden escapes.
Wilson (unpubl. data n.d.) recorded non-local and hybrid natives.	- Consider planting only locally sourced and appropriate indigenous plants. - Consider removing any species that are potentially invasive and could threaten the ecological values and genetic integrity of the species native to the site.	Provision to landowner of ecological advice and information packages for planting (e.g. 'Plant Me Instead').
Forestry plantations and other exotic trees. There are small areas of exotic	These exotic plantations are excluded from the site. Depending on the species,	

plantations in the gully near the Living Springs Complex and other areas with mature exotic tree species.	they may have the potential to spread. Harvesting methods should aim to minimise damage to the surrounding ecological values.	
• Walking and mountain biking tracks. There are a number of walking and mountain bike tracks throughout Living Springs.	• Landowners will be able to use and maintain existing tracks but should ensure that disturbance to areas of indigenous vegetation is minimised.	• Ensure that the landowners are aware that existing tracks can be used and maintained.

References

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Assessment completed by: Scott Hooson
Date: 29 January 2015

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Date: 29 January 2015

Statement updated by: XXX
Date: XXX

PLEASE NOTE THIS STATEMENT IS BASED ON INFORMATION AVAILABLE AT THE TIME OF WRITING. DUE TO THE DYNAMIC NATURE OF ECOSYSTEMS, FUTURE REASSESSMENT OF THE SITE MAY BE NECESSARY TO REFLECT ANY CHANGES IN KNOWLEDGE OF ITS ECOLOGICAL SIGNIFICANCE.

Appendix 1: Indigenous Plant Species List

Sourced from Jensen unpubl. data (2014).

N.B. exotic species were not recorded during this survey.

Scientific Name	Common Name(s)
Indigenous species	
<i>Acaena anserinifolia</i>	bidibidi, piripiri
<i>Acaena juvenca</i>	bidibidi, piripiri
<i>Acaena novae-zelandiae</i>	red bidibidi
<i>Aciphylla subflabellata</i>	grassland speargrass
<i>Alectryon excelsus</i>	titoki
<i>Anaphalioides bellidioides</i>	everlasting daisy, hells bells
<i>Aristotelia serrata</i>	wineberry, makomako
<i>Arthropodium candidum</i>	grass lily, repehinapapa
<i>Asplenium appendiculatum</i>	ground spleenwort
<i>Asplenium flabellifolium</i>	necklace fern
<i>Asplenium flaccidum</i>	hanging spleenwort, raukatauri
<i>Asplenium gracillimum</i>	
<i>Asplenium hookerianum</i>	Hooker's spleenwort
<i>Asplenium oblongifolium</i>	shining spleenwort, huruhuruwhenua
<i>Astelia fragrans</i>	kakaha, bush lily
	native wheatgrass, blue wheatgrass
<i>Athnosachne solandri</i>	
<i>Austroderia richardii</i>	toetoe
<i>Blechnum chambersii</i>	lance fern
<i>Blechnum fluviatile</i>	kiwakiwa
<i>Blechnum procerum</i>	small kiokio
<i>Brachyglottis lagopus</i>	groundsel, yellow rock daisy
<i>Calystegia tuguriorum</i>	NZ bindweed, pōwhiwhi
<i>Carex forsteri</i>	cutty grass
<i>Carmichaelia australis</i>	native broom, common broom
<i>Carpodetus serratus</i>	marbleleaf, putaputāwētā
<i>Clematis foetida</i>	yellow clematis
<i>Colobanthus strictus</i>	
<i>Coprosma crassifolia</i>	thick-leaved coprosma, mikimiki
<i>Coprosma dumosa</i>	mikimiki
<i>Coprosma linariifolia</i>	yellow-wood
<i>Coprosma lucida</i>	karamū
<i>Coprosma propinqua</i>	mingimingi, mikimiki
<i>Coprosma rhamnoides</i>	mingimingi, mikimiki
<i>Coprosma robusta</i>	karamū
<i>Coprosma rotundifolia</i>	round-leaved coprosma, mikimiki
<i>Coprosma rubra</i>	mikimiki
<i>Cordyline australis</i>	cabbage tree, tī kōuka
<i>Coriaria arborea</i>	tree tutu
<i>Crassula colligata</i>	stonecrop
<i>Cyathea dealbata</i>	silver fern, ponga
<i>Cyathea smithii</i>	Smith's tree fern, kātote

<i>Dacrycarpus dacrydioides</i>	kahikatea, white pine
<i>Dichelachne crinita</i>	plume grass
<i>Dracophyllum acerosum</i>	turpentine scrub
<i>Epilobium pubens</i>	willow herb
<i>Festuca novae-zelandiae</i>	fescue tussock, hard tussock
<i>Fuchsia excorticata</i>	tree fuchsia, kōtukutuku
<i>Gaultheria antipoda</i>	bush snowberry
<i>Geranium brevicaule</i>	short-flowered cranesbill
<i>Griselinia littoralis</i>	broadleaf, kāpuka
<i>Haloragis erecta</i>	toatoa
<i>Hebe salicifolia</i>	koromiko
<i>Hebe strictissima</i>	Banks Peninsula hebe
<i>Hedycarya arborea</i>	pigeonwood, porokaiwhiri
<i>Helichrysum filicaule</i>	slender everlasting daisy
<i>Helichrysum lanceolatum</i>	niniao
<i>Heliohebe lavaudiana</i>	Banks Peninsula sun hebe
<i>Hierochloa redolens</i>	holy grass, kāretu
<i>Hoheria angustifolia</i>	narrow-leaved lacebark, houhere
<i>Hydrocotyle</i> sp.	pennywort
<i>Hymenophyllum australe</i>	filmy fern
<i>Hymenophyllum dilatatum</i>	filmy fern, matua mauku
<i>Hymenophyllum multifidum</i>	filmy fern
<i>Hymenophyllum sanguinolentum</i>	filmy fern
<i>Kunzea robusta</i>	kānuka
<i>Lachnagrostis lyallii</i>	mountain wind grass
<i>Lastreopsis velutina</i>	velvet fern
<i>Leptinella dioica</i> x <i>squalida</i>	
<i>Leptinella minor</i>	Banks Peninsula button daisy
<i>Leucopogon fraseri</i>	dwarf heath, pātōtara
<i>Libertia ixioides</i>	mikoikoi, native iris
<i>Lophomyrtus obcordata</i>	rōhutu, NZ myrtle
<i>Luzula banksiana</i> var. <i>orina</i>	woodrush
<i>Luzula rufa</i>	woodrush
<i>Melicope simplex</i>	poataniwha
<i>Melicytus alpinus</i>	porcupine shrub
<i>Melicytus ramiflorus</i>	māhoe, whiteywood
<i>Metrosideros diffusa</i>	white climbing rātā
<i>Microlaena avenacea</i>	bush rice grass
<i>Microsorium pustulatum</i>	hounds tongue, kōwaowao
<i>Muehlenbeckia australis</i>	large-leaved pōhuehue
<i>Muehlenbeckia complexa</i>	scrub pōhuehue, wire vine
<i>Myoporum laetum</i>	ngaio
<i>Myrsine australis</i>	red māpou, red matipo
<i>Myrsine divaricata</i>	weeping matipo, weeping māpou
<i>Notogrammitis heterophylla</i>	comb fern
<i>Olearia paniculata</i>	akiraho
<i>Oxalis exilis</i>	yellow oxalis
<i>Parsonsia capsularis</i>	native jasmine, akakaikiore
<i>Parsonsia heterophylla</i>	native jasmine, akakaikiore
<i>Pellaea rotundifolia</i>	round-leaved fern, tarawera
<i>Pennantia corymbosa</i>	kaikōmako, ducks foot
<i>Phlegmariurus varius</i>	clubmoss

Bottom of Form	
<i>Phormium cookianum</i>	mountain flax, wharariki
<i>Phormium tenax</i>	flax, harakeke
<i>Piper excelsum</i>	kawakawa
<i>Pittosporum eugenoides</i>	lemonwood, tarātā
<i>Pittosporum tenuifolium</i>	kōhūhū, black matipo
<i>Plagianthus regius</i>	lowland ribbonwood, mānatu
<i>Pneumatopteris pennigera</i>	gully fern, pākau
<i>Poa cita</i>	silver tussock, wī
<i>Poa matthewsii</i>	Matthew's poa
<i>Podocarpus cunninghamii</i>	mountain tōtara, thin-barked tōtara
<i>Podocarpus totara</i>	lowland tōtara
<i>Polystichum oculatum</i>	shield fern
<i>Polystichum vestitum</i>	prickly shield fern, pūniu
<i>Prasophyllum colensoi</i>	leek orchid
<i>Prumnopitys taxifolia</i>	mataī, black pine
<i>Pseudognaphalium luteoalbum</i>	jersey cudweed
<i>Pseudopanax arboreus</i>	five-finger, whauwhaupaku
<i>Pseudopanax colensoi</i>	mountain five-finger
<i>Pseudopanax crassifolius</i>	lancewood, horoeka
<i>Pseudowintera colorata</i>	horopito, peppertree
<i>Pteridium esculentum</i>	bracken, rārahu, rauaruhe
<i>Ranunculus reflexus</i>	hairy buttercup, maruru
<i>Raoulia glabra</i>	mat daisy
<i>Raoulia monroi</i>	fan-leaved mat daisy
<i>Ripogonum scandens</i>	supplejack, kareao
<i>Rubus cissoides</i>	bush lawyer, tātarāmoa
<i>Rubus schmidelioides</i>	bush lawyer, tātarāmoa
<i>Schefflera digitata</i>	patē, seven-finger
<i>Scleranthus biflorus</i>	Canberra grass
<i>Scleranthus uniflorus</i>	
<i>Senecio glaucophyllus</i> subsp. <i>basinudus</i>	yellow rock groundsel
<i>Solanum laciniatum</i>	poroporo
<i>Sophora microphylla</i>	small-leaved kōwhai
<i>Stellaria decipiens</i>	native chickweed
<i>Thelymitra longifolia</i>	white sun orchid
<i>Uncinia uncinata</i>	hook grass
<i>Urtica ferox</i>	ongaonga, tree nettle
<i>Vittadinia australis</i>	white fuzzweed
<i>Wahlenbergia gracilis</i>	

Appendix 2: Invertebrate Species List

Sourced from Wildland Consultants unpubl. data (2014)

* = exotic species

NEUROPTERA	lacewings
Hemerobiidae	
<i>Drepanacra binocula</i>	
* <i>Micromus tasmaniae</i>	
HEMIPTERA	
Tibicinidae	cicada
<i>Amphipsalta zelandica</i>	clapping cicada
<i>Kikihia new species</i>	
<i>Kikihia rosea</i>	
Miridae	
<i>Chinamiris species</i>	
ORTHOPTERA	
Tettigoniidae	katydid
<i>Conocephalus bilineatus</i>	
Gryllidae	cricket
<i>Pteronemobius bigelowi</i>	
Acrididae	grasshoppers
<i>Sigaus campestris</i>	
COLEOPTERA	
Carabidae	ground beetles
<i>Neocicindella latecincta</i>	tiger beetle
Cerambycidae	
<i>Prionoplus reticularis</i>	huhu
Coccinellidae	
<i>Coccinella leonina</i>	ladybird
Curculionidae	weevils
<i>Eugnomus dispar</i>	
Scarabaeidae	chafers
<i>Costelytra zelandica</i>	
<i>Odontria striata</i>	striped chafer
HYMENOPTERA	
Formicidae	ant
<i>Monomorium antarcticum</i>	
Ichneumonidae	
<i>Netelia producta</i>	
Pompilidae	spider wasp
<i>Priocnemis carbonarius</i>	
Colletidae	native bee
<i>Leioproctus huakiwi</i>	
LEPIDOPTERA	
Nepticulidae	
<i>Stigmella kaimanua</i>	
Tineidae	
<i>Endophtora omogramma</i>	
<i>Erechthias fulguritella</i>	

<i>Erechthias acrodina</i>	
<i>Eschatotypa derogatella</i>	
<i>Opogona omoscopa</i>	
<i>Sagephora phortigera</i>	
Cosmopterigidae	
<i>Microcolona limodes</i>	
Glyphipterigidae	
<i>Glyphipterix cionophora</i>	
<i>Glyphipterix triselena</i>	
<i>Glyphipterix erastis</i>	
Lyonetiidae	
<i>Bedellia psammitis</i>	
Plutellidae	
<i>Plutella antiphona</i>	
Carposinidae	
<i>Heterocrossa philpotti</i>	
Depressariidae	
<i>*Agonopterix umbellana</i>	
<i>Nymphostola galactina</i>	
Gelechiidae	
<i>Anisoplaca achyrotia</i>	
Oecophoridae	
<i>Gymnobathra flavidella</i>	
<i>Gymnobathra tholodella</i>	
<i>Leptocroca scholaea</i>	
<i>Stathmopoda albimaculata</i>	
<i>Tingena plagiatella</i>	
<i>Tingena basella</i>	
<i>Tingena ophiodyras</i>	
<i>Trachypepla photinella</i>	
<i>Trachypepla galaxias</i>	
Pterophoridae	plumemoth
<i>Aciptilia monospilalis</i>	
<i>Stenoptilia orites</i>	
Choreutidae	jets
<i>Asterivora new species</i>	
Tortricidae	leaf rollers
<i>Apoctena flavescens</i>	
<i>Capua semiferana</i>	
<i>*Cydia succedana</i>	
<i>Epichorista siriana</i>	
<i>Harmologa amplexana</i>	
Pyalidae	
<i>*Stericta carbonalis</i>	
Crambidae	
<i>Deana hybreasalis</i>	
<i>Eudonia dinodes</i>	
<i>Eudonia philerga</i>	
<i>Eudonia leptalea</i>	
<i>Eudonia sabulosella</i>	
<i>Eudonia submarginalis</i>	
<i>Orocrambus flexuosellus</i>	
<i>Orocrambus lewisi</i>	

<i>Orocrambus ramosellus</i>	
<i>Orocrambus vittellus</i>	
<i>Orocrambus vulgaris</i>	
<i>Scoparia exilis</i>	
<i>Scoparia minusculalis</i>	
<i>Scoparia ustimcaula</i>	
<i>Sceliodes cordalis</i>	
<i>Udea flavidalis</i>	
<i>Udea marmarina</i>	
<i>Uresiphita maoralis</i>	
GEOMETRIDAE	
<i>Austrocidaria similata</i>	
* <i>Chloroclystis filata</i>	
<i>Chloroclystis inductata</i>	
<i>Cleora scriptaria</i>	
<i>Dasyuris partheniata</i>	
<i>Declana floccosa</i>	
<i>Declana leptomera</i>	
<i>Dichromodes cynica</i>	
<i>Elvia glaucata</i>	
<i>Epiphyrne undosata</i>	
<i>Epiphyrne verriculata</i>	
<i>Epyaxa lucidata</i>	
<i>Gellonia dejectaria</i>	
<i>Homodotis megaspilata</i>	
<i>Helastia cinerearia</i>	
<i>Hydriomena deltoidata</i>	
<i>Ischalis fortinata</i>	
<i>Pasiphila muscosata</i>	
<i>Pseudocoremia lactiflua</i>	
<i>Sarisa muriferata</i>	
Noctuidae	
<i>Agrotis ipsilon</i>	
<i>Bityla defigurata</i>	
<i>Feredayia graminosa</i>	
<i>Graphania insignis</i>	
<i>Graphania morosa</i>	
<i>Graphania mutans</i>	
<i>Graphania nullifera</i>	
<i>Graphania plena</i>	
<i>Graphania ustistriga</i>	
<i>Meterana ochthistis</i>	
<i>Meterana stipata</i>	
<i>Persectania aversa</i>	
<i>Tmetolophota atristriga</i>	
<i>Tmetolophota propria</i>	
<i>Tmetolophota steropastis</i>	
<i>Tmetolophota sulcana</i>	
Erebidae	
<i>Celama parvitis</i>	
<i>Nyctemera annulata</i>	magpie moth
<i>Rhapsa scotoscialis</i>	
Lycaenidae	coppers/ blues

<i>Lycaena "comon copper" complex</i>	
<i>Zizina oxleyi</i>	
Nymphalidae	admirals
<i>Argyrophenga antipodum</i>	tussock
<i>Vanessa gonerilla</i>	red admiral
<i>Vanessa itea</i>	yellow admiral
Pieridae	white butterfly
<i>*Pieris rapae</i>	
MANTODEA	praying mantis
<i>Orthodera novaezelandiae</i>	
PHASMIDA	stick insects
<i>Clitarchus hookeri</i>	