

Kawarau/Remarkables Conservation Area ecological values



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Cover: Schist tors and shrublands in lower Wye Creek. *Photo: Carl Walrond, DOC*

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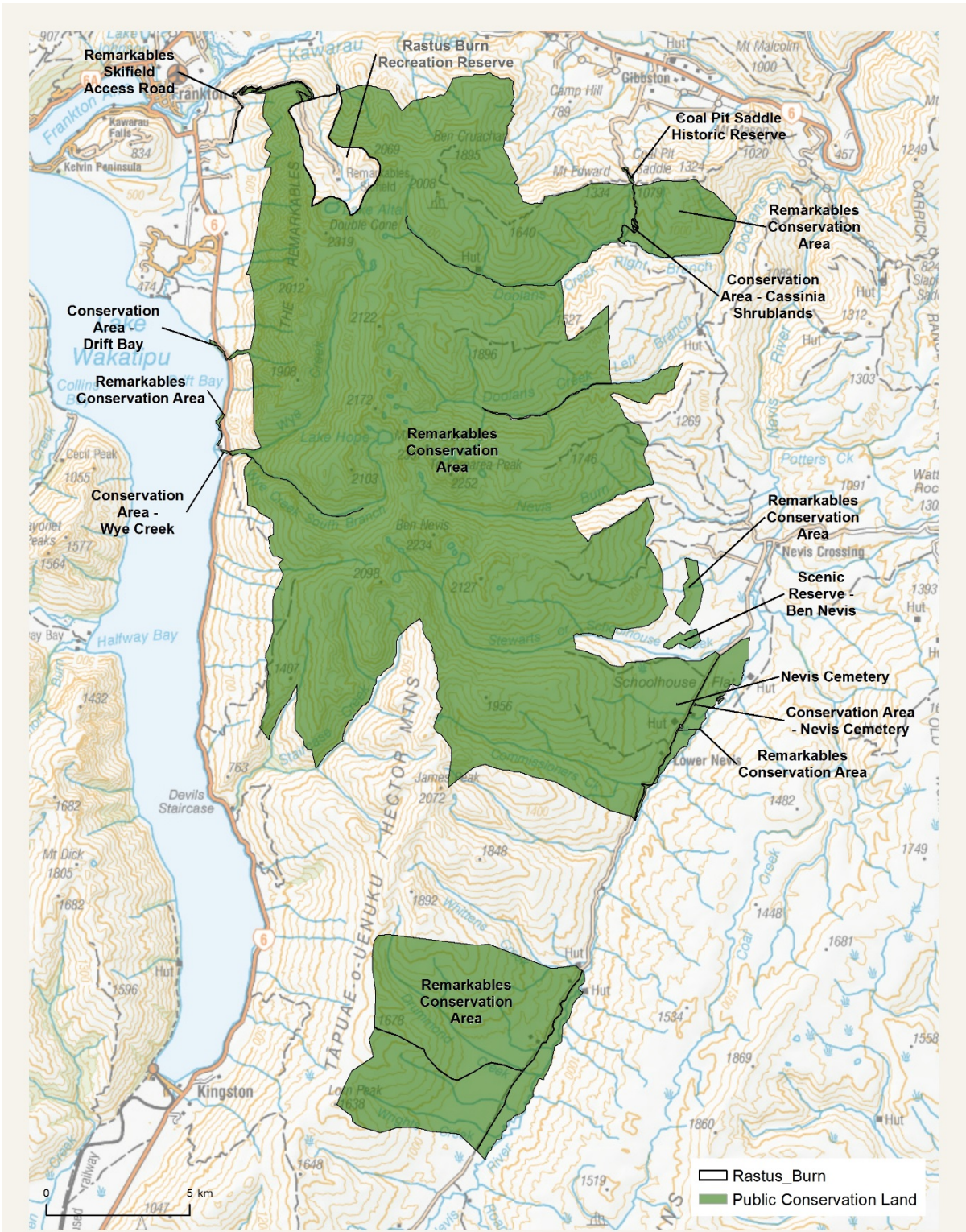
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1. Introduction

This report summarises the ecological and biodiversity values of the Remarkables Conservation Area made up of two large discontinuous land parcels that total just over 33,000 ha. The largest parcel lies immediately south of the Rastus Burn Recreation Reserve around Kawarau/The Remarkables. The second parcel lies further south around Tāpuae O’Uenuku/Hector Mountains) (Fig. 1).



Remarkables Conservation Area



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Figure 1. The ‘Remarkables Conservation Area’ is made up of two main land parcels totalling over 33,000 ha.

2. Geography

2.1 Location and description

Kawarau/The Remarkables are one of the most iconic mountain ranges in the southern South Island. Double Cone (2319 m) is the highest peak in Kawarau/The Remarkables and also within the Central Otago area.

The 'Remarkables Conservation Area' includes Kawarau and extends to the south to include the northern portion of the Tāpuae O'Uenuku/Hector Mountains.

The area is dominated by uplands and alpine areas and extends down to c. 550 m along the western side of The Remarkables and c. to 480 m at the Wye Creek bridge on SH6. To the east the area extends down to c. 680 m along Te Papapuni/Nevis River in the valley floor and to c. 400 m in Doolans Stream.

The area lies in the transition zone between the wet western alps and the drier Central Otago Mountains. The area located in the rain shadow of Ka Tiritiri-o-te-Moana (the Southern Alps) and so is subject to a semi-continental climate with warm summers and cold winters.

The rainfall ranges from c. 600 mm/year on the floor of Te Papapuni/Nevis Valley, rising to c. 1500 mm on the mountain tops. Winters bring intermittent snow to lower elevations; however permanent snow may lie in shady sites in higher parts. The floor of Te Papapuni/Nevis Valley is subject to severe frosts (Fig. 2).



Figure 2. Large parts of the western slopes (left) of Te Papapuni/Nevis Valley fall within the 'Remarkables Conservation Area'. The valley floor contains rare LENZ environments. *Photo: John Roberts, DOC.*

The geographic location, altitudinal range, diversity of landform and habitat combine to contribute to the distinctive and diverse flora, fauna and vegetation present. This biodiversity is of special ecological importance.

The land which forms the Remarkables Conservation Area, administered under section 7 Conservation Act 1987, was previously held under various pastoral leases:

- Coneburn
- Glenroy
- Wentworth
- Loch Linnhe
- Ben Nevis
- Glen Nevis
- Mt Rosa

Over the last 30 years the tenure review process has added further land from these pastoral leases to the Remarkables Conservation Area and it now totals 33,085 hectares in size. Further detail on the history of the land parcels and which pastoral leases they came from, and when, is included in Appendix 1.

2.2 Geology and landform

Kawarau/The Remarkables and Tāpuae O'Uenuku/Hector Mountains are formed mainly of Palaeozoic Haast schist. Kawarau/The Remarkables and to a lesser extent the Tāpuae O'Uenuku/Hector Mountains) are extremely steep and are strongly glaciated (Turnbull 2000).

The views of the of the western face of The Remarkables from Queenstown are a distinctive New Zealand mountain image, being of similar iconic status as Aoraki/Mt Cook and Mitre Peak.

Kawarau/The Remarkables contains a rich diversity of landforms. The principle drivers for the landform are glacial, with some subsequent slumping, erosion and alluvial down cutting.

The evidence of the glacial influence includes the steep Whakatipu-wai-Māori faces with extensive rock faces and rock outcropping (particularly in the north on Kawarau/The Remarkables).

Other glacial and periglacial features include the U-shaped valleys, cirque basins, alpine lakes (Fig. 3), solifluction terraces and lobes. There are also localised areas of ice scraped rock, however valley floor roche-moutonnee are not present.

The eastern faces are typically gentler. There are alluvial flats and terraces present in the floor of Te Papapuni/Nevis Valley (Fig. 2).



Figure 3. Lake Hope feeds Wye Creek South Branch which flows into Whakatipu-wai-Māori.
Photo John Roberts, DOC.

3. Ecological diversity

3.1 Vegetation

The area contains a range of indigenous ecosystems (at least 17 – Appendix 1). These ecosystems form altitudinal sequences and mosaics of ecological importance.

The vegetation is generally dominated by snow tussock mainly narrow-leaved snow tussock (*Chionochloa rigida* ssp. *rigida*) but merging into slim snow tussock (*C. macra*) at higher altitude.

Much of the ecological and botanical diversity of the area occurs in the alpine zone, which contains a variety of snow tussock grasslands, herbfields, wetlands, snowbanks, fellfields and rock habitat (Fig. 4).

The abundance of rock terrain is a characteristic feature.

The extent of native woody vegetation has been much reduced by historic fires since human arrival. The original beech forest cover which would have covered the lower altitude parts of the area has largely been removed with the largest remnant being in the lower Wye valley (Fig. 5).

The only beech species currently present is tawhairauriki/mountain beech (*Fuscopora clifforioides*), however it is likely that tawhairaunui/red beech (*F. fusca*) and possibly tawhai /silver beech (*Lophozonia menziesii*) may also have once been present, along with tōtara kotukutuku/Halls' tōtara (*Podocarpus laetus*), mountain toatoa/celery pine (*Phyllocladus alpinus*) and other forest species.



Figure 4. Doolans Creek (left branch *lower* reaches) has extensive grey shrublands grading upwards into snow tussock. *Photo: John Roberts, DOC.*



Figure 5. Wye Creek drains Kawarau/The Remarkables and flows through regenerating forests dominated by *kōhūhū* and *kāpuka* /broadleaf (which are a successional stage in the return of *tawai*/beech forest) into Whakatipu-wai-Māori. *Photo: Carl Walrond, DOC.*

3.2 Wetlands, regenerating forests and shrublands

Another characteristic feature of the area are the alpine lakes and wetlands that are present. The largest lakes are Lake Alta (in the head of the Rastus Burn), Lake Hope (Wye Creek South Branch) (Fig. 3) and Lake Te Kōhua (Doolans Creek Left Branch). (Appendix 2 mapped wetlands).

There are some areas of regenerating forest in Wye Creek. These regenerating forests are of importance as they are a successional stage in the return of tawai/beechn forest. They tend to be dominated by kōhūhū (*Pittosporum tenuifolium*) and kāpuka /broadleaf (*Griselinia littoralis*). Shrublands have also been much reduced in extent, with one of the largest and most diverse areas also being in Wye Creek.

Other shrublands occur in the catchments flowing into the Te Papapuni/Nevis River. The lower altitude shrublands tend to consist of “grey scrub” dominated by matagouri (*Discaria toumatou*) and mingimingi (*Coprosma propinqua*), sometimes with prominent briar rose (*Rosa rubiginosa*).

At mid altitude the shrublands tend to be dominated by tauhinu (*Ozothamnus vauvilliersii*), *Hebe odora* and *Coprosma cheesemanii*, though mainly of shady aspects and generally with narrow-leaved snow tussock. At higher altitude, inaka (*Dracophyllum rosmarinifolium*) shrubland occurs, especially on shady aspects.

The most complete altitudinal sequences occur in Te Papapuni/Nevis River and at Wye Creek. In Te Papapuni/Nevis River there are altitudinal sequences from the floor of the valley up to the summit of Tāpuae O’Uenuku/Hector Mountains.

The floor of Te Papapuni/Nevis River has been modified through pastoral use (formerly having been part of Ben Nevis and Glen Nevis Pastoral Leases) and by gold mining (Fig 6).

The valley floor terraces contain several vegetation types of ecological and botanical interest including depleted fescue (*Festuca novae-zelandiae*) tussock on terraces, ma-uku-uku/red tussock (*Chionochloa rubra* var. *cuprea*) and wetlands (LINZ 1996).

The hill slopes are generally clothed with snow tussock. The more modified lower slopes have a sparse snow tussock cover which increases with increasing altitude. Lower altitude narrow-leaved snow tussocklands, have a varying amount of exotic grasses (mainly browntop (*Agrostis capillaris*) and sweet vernal (*Anthoxanthum odoratum*), along with mouse-ear hawkweed (*Pilosella officinarum* – mainly on dry depleted sunny faces), catsear (*Hypochaeris radicata*), white clover (*Trifolium repens*) – locally present following past oversowing) and others.

However, native species generally remain diverse and common. Characteristic species include fescue tussock, blue tussock (*Poa colensoi*), prostrate shrubs snowberry (*Gaultheria depressa* ssp. *novae-zelandiae*), *Pimelia oreophila*, *Leucopogon fraserii*, and the herbs taramea /golden speargrass (*Aciphylla aurea*), native

violet (*Viola cunninghamii*), the buttercup (*Ranunculus multiscapus*), the mat daisy – *Raoulia subsericea*, ever-lasting daisy (*Helichrysum filicaule*), and other daisies (*Celmisia gracilentia* and *C. densiflora*).

The narrow-leaved snow tussocklands become relatively intact above 1250 m grading into slim snow tussock above 1500 m (Fig. 7). The slim snow tussockland thins above 1700 m, with blue tussock common and prominent associated species including the mat forming daisy – *Celmisia sessiliflora* and taramea/speargrasses – *Aciphylla kirkii* and *A. lecomptei*.



Figure 6. The middle reaches of Te Papapuni/Nevis River flow through a gorge out onto the flats of Lower Nevis. *Photo: Carl Walrond, DOC.*



Figure 7. The faces above the Kawarau River viewed from the Crown Range looking at Ben Cruachan (centre right), Mt Edward (centre) and Coal Pit Saddle are dominated by narrow-leaved snow tussock and slim snow tussock. *Photo Carl Walrond, DOC.*

The most exposed summit ridges have a fellfield community consisting of cushion forming plants (*Dracophyllum muscoides*, *Hectorella caespitosa*, *Phyllachne colensoi*, *Raoulia hectorii* and *Luzula pumila*) along with blue tussock and other species.

Other habitats and vegetation present provide additional ecological diversity. The gullies contain areas of shrubland and shrub-tussockland, the major shrub species present include koromiko *Veronica (Hebe) odora*, *Coprosma ciliata* and *C. propinqua*.

The high-altitude valley heads often have tarns associated with extensive wetlands and diverse snowbank communities (Wildland Consultants Ltd 2011). Areas of rock and associated debris slopes are distinctive though only sparsely vegetated with *Aciphylla simplex*, *Veronica birleyii* and *V. epacridea*.

Te Papapuni/Nevis River is an intermontane basin and so is of ecological importance. School House Flat supports a range of communities of importance including dryland terraces, wetlands, red tussock and fan ecosystems. These communities support numerous threatened and rare plants. This is the only habitat for these species within the Remarkables Conservation Area.

The rocky habitat includes cliffs/bluffs, tors, outcropping and associated debris fields. This habitat occurs at a range of scales from extensive faces (e.g. Whakatipu Waimāori/ faces of Kawarau/The Remarkables) to individual outcrops and tors characteristic of the Tāpuae O'Uenuku/Hector Mountains.

These rocky environments provide habitat for rock specialist species including the native carrot – *Anisotome caudicola*, Richard's spleenwort – *Asplenium richardii* and the woodrush *Luzula migrata*.

These rocky habitats also provide fire refuge habitat for other species including several shrubs including *Helichrysum aggregatum*, *Gaultheria antipoda*, *G. crassa* and *Coprosma rugosa*. Some associated species are now be considered to be locally or regionally rare such as *Hebe petrieii*, *H. rakiensis* and *Helichrysum intermedium*.

The highest, most rocky peaks are only sparsely vegetated but include *Veronica birleyi* (formerly *Parahebe birleyi*) – which is the highest growing vascular plant in New Zealand.

3.3 Land Environments of New Zealand

Land Environments of New Zealand (LENZ) is an environmental classification system mapped across New Zealand. The classification is based on climate, soil and landform characteristic. LENZ is available at a range of scales or levels, the most detailed is level 4 which has 500 environments across New Zealand.

The Remarkables Conservation Area has 11 level 4 LENZ environments present (Appendix 3). The presence of 11 LENZ units indicates a relatively rich environmental diversity for the area.

Some of the lower altitude LENZ units occurring in Te Papapuni/Nevis River have been classified as Acutely threatened (i.e. < 10% remaining in indigenous vegetation cover), Chronically threatened (i.e. 10–20% remaining in indigenous vegetation cover) or At Risk (i.e. 20–30% remaining in indigenous vegetation cover).

Notable ecological features of the area:

- A rich diversity of vegetation, particularly in the sub-alpine and alpine zones (Fig. 8)
- Extensive narrow-leaved snow tussockland
- An abundance of rocky terrain.
- The extent and diversity of alpine tarns, lakes, wetlands and snowbanks.
- The presence of the highly palatable slim snow tussockland is significant because this tussockland type has been reduced through pastoral use.
- The remnant of beech forest in Wye Creek is of significance (Fig. 9).
- River terraces in Te Papapuni/Nevis River that contain Threatened LENZ environments.



Figure 8. Taramea/speargrass and shrublands, lower Wye Creek. Shrublands have been much reduced in extent by historic burn offs during the pastoral farming era, with one of the largest and most diverse areas being in Wye Creek. *Photo: Carl Walrond, DOC.*

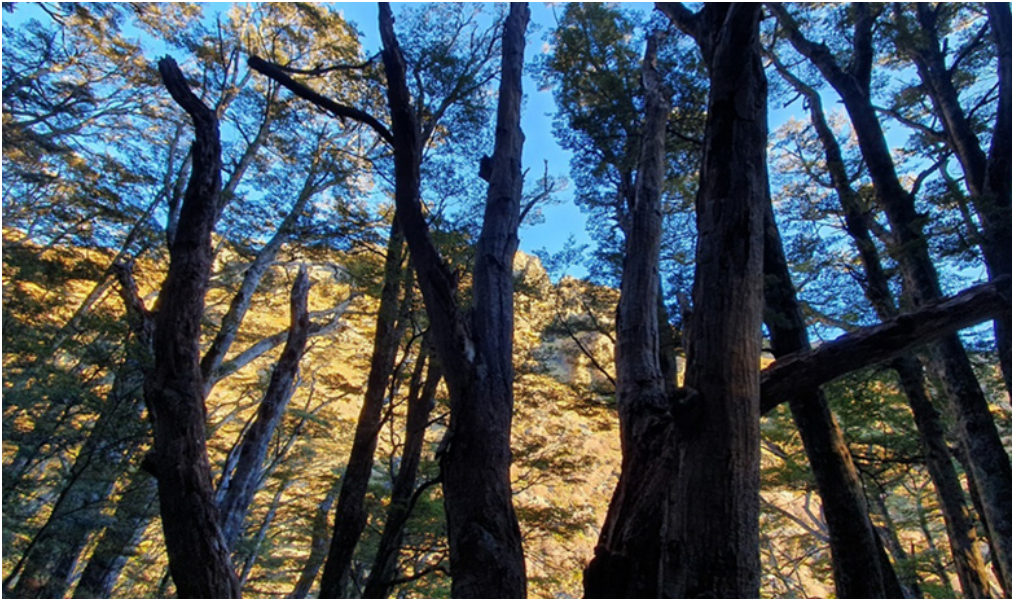


Figure 9: Lower Wye Creek contains a remnant pocket of tawai/beech forest.
Photo: Carl Walrond, DOC.

4. Species

4.1 Plants

The area contains a very diverse flora, c. 400 or more species have been recorded from Kawarau/the Remarkable Range. The diversity of the flora reflects the diversity of ecosystems and habitats present. This flora includes at least 50 nationally threatened and At Risk plant species that have been recorded from the area (Appendix 4).

The most notable plant species recorded include:

- *Veronica (Leonohebe) cupressoides* (threat status - Nationally Endangered) is known from the Wye valley.
- The creeping button daisy *Leptinella conjuncta* (threat status - Nationally Critical) at Schoolhouse Flat on the floor of Te Papapuni/the Nevis (LINZ 2004).
- Wetland species on the floor of Te Papapuni/the Nevis - *Euchiton ensifer* (threat status - Nationally Endangered), *Carex uncifolia* (threat status - Nationally Vulnerable), *Ranunculus ternatifolius* (threat status - Nationally Vulnerable) and *Tetrachondra hamiltonii* (threat status - Nationally Vulnerable).
- Records of the cress *Pachycladon cheesemanii* (threat status - Nationally Vulnerable) associated with rock outcrops.

- Some plant species found are at or near to distribution limits – *Ranunculus buchananii* and *Veronica birleyii* – at their eastern-most distribution and *Pachcladon wallii* – at its northern distribution.
- *Carex muelleri* has its type locality at Schoolhouse Flat and forms a national stronghold for this dryland sedge.
- The flora includes some species that are endemic to the Central Otago region and others that are endemic to the Eyre mountains/northern Murihiku/Southland area.

4.2 Birds

Notable birds that have been recorded include kea (threat status: Nationally Vulnerable) (Fig. 10), pīhoihoi/New Zealand pipit (threat status: At Risk – Declining) and kārearea /New Zealand falcon (threat status: At Risk – Recovering).

At lower altitudes beech forest remnants and associated shrublands provide habitat for pīwakawaka/fantail, riroriro/grey warbler, miromiro/tomtit and korimako/bellbird.

Other species associated with lakes, streams and braided river gravels include tūturiwhatu/banded dotterel, tōrea/South Island pied oystercatcher and karoro/black backed gull.



Figure 10. Kea with The Remarkables. The boulder fields intermixed with shrublands and tussocklands in the background are typical of the upland areas. *Photo: Carl Walrond, DOC.*

4.3 Mokomoko/lizards

Four skink species have been recorded from the within or adjacent to the area:

- Nevis skink (*Oligosoma toka*; threat status: Nationally Vulnerable),
- cryptic skink (*O. inconspicuum*; threat status: At Risk - Declining),
- McCann's skink (*O. maccanni*),
- common skink (*O. polychrome*; threat status: Not Threatened).

In addition, four gecko species have been recorded from within or adjacent to the area:

- orange-spotted gecko (*Mokopiriakao* "Roys Peak"; threat status: Nationally Vulnerable),
- korero gecko (*Woodworthia* "Otago/Southeast large"; threat status: At Risk - Declining),
- Kawarau gecko (*W.* "Cromwell"; threat status: At Risk - Declining),
- short toed gecko (*W.* "southern mini"; threat status: Not Threatened).

It is possible that additional species are present.

4.4 Te aitanga pepeke/invertebrates

A large number of invertebrate species are present. Features of the invertebrate fauna include an abundance of moth species (320 species recorded) and the presence of some large bodied species including giant weevils (Fig. 11), large diurnal chafer beetles, alpine cicadas, weta and grasshoppers. These include the moth *Xanthorhoe frigida* (threat status; Nationally Vulnerable) and giant ground beetle - *Mecodema chiltonii* (Patrick et al. 1992; LINZ 2007) (Fig. 12).



Figure 11. Alpine speargrass weevil. *Photo: Kerry Weston.*



Figure 12. Ground beetle *Mecodema chiltoni*, Nevis Valley. Photo: DOC.

4.5 Freshwater species

The Remarkables Conservation Area lies between the Te Papapuni/Nevis River and Whakatipu-wai-Māori, both of which drain into the Kawarau River. The Kawarau is a major tributary of Mata-au (the Clutha River), New Zealand's second largest river.

Fish values in the Remarkables Conservation Area include Nevis galaxias (*Galaxias* "Nevis"), (Fig. 13) koaro (*Galaxias brevipinnis*) (Fig. 14) and introduced brook char (*Salvelinus fontinalis*) and brown trout (*Salmo trutta*).



Figure 13. Nevis galaxias are endemic to the valley. Photo: Rod Morris / rodmorris.co.nz.



Figure 14: Koaro are known from several locales in the Remarkables Conservation Area.
Photo: Angus McIntosh, University of Canterbury.

Nevis galaxias are classified as “Threatened: Nationally Endangered” based on a small population, a small area of occupancy and ongoing or predicted decline. They are nonmigratory (complete their entire life cycle within the freshwater environment) and extremely range-limited, being only found in tributaries of the Nevis river (Fig. 13).

Nevis galaxias are highly impacted by competition and predation by introduced brown trout and brook char, both of which are present in this catchment, but are more common in the Nevis mainstem than the small, steep tributaries.

Of the total mapped habitat area of Nevis galaxias 3.6% (3726.21 m²) lies within the Remarkables Conservation Area (See Appendix 6 map of Nevis galaxias distribution).

The upper reaches of tributary streams that have not yet been sampled may also contain Nevis galaxias populations as steep rapids may have prevented trout access. These isolated populations are highly vulnerable to climate change and trout invasion.

Koaro, classified as “At Risk: Declining,” are found in lakes and rivers throughout New Zealand. In lowland rivers and streams juveniles of these diadromous species migrate downstream after hatching to develop in the marine environment (McDowell 1984) (Fig. 14).

However, these species have flexible life strategies with the capacity to create landlocked populations with juveniles, becoming potamodromous, using the lake as a substitute for the marine environment. The larvae of landlocked koaro that are washed into the lakes have been observed to behave in a similar manner to whitebait runs in coastal areas of New Zealand.

The steep cascading creeks that are tributaries to Whakatipu-wai-Māori provide habitat and refuge for the koaro. Koaro are prodigious climbers and may scale substantial waterfalls into high elevation sub montane creeks.

Complex competitive interactions, dietary overlaps and the predatory behaviour of trout have been suggested as possible causes of the decline of many galaxiid species (Allibone 1999; McDowell 2006).

With reference to the Remarkables Conservation Area, the New Zealand Freshwater Fisheries Database has records of koaro in Wye Creek and Lumberbox Creek on the western slopes of the Kawarau/The Remarkables and Tāpuae O'Uenuku/Hector Mountains. There is potential for further koaro populations in other steep tributary creeks in this area that have not yet been sampled.

5. Ecological changes

5.1 Overview

Many parts of the Remarkables Conservation Area have been grazed or have been affected by human habitation, clearance and fire. Due to this influence pasture grasses can be found in open areas, disturbed sites, river valley flats and terraces.

Other weeds such as mouse-eared hawkweed, tussock hawkweed and other flat leaved pasture plants are found throughout the area. Control of these species is impractical and unachievable.

There are also vehicle tracks, walking tracks and huts within these areas. The predominant threat from these are the introduction of weeds, damage to the environment from inappropriate driving behaviour and fire risk.

5.2 Condition

The area has had a long fire history which has impacted upon the original extent of forest and shrubland vegetation. The area has also had a pastoral use, including stock grazing and over sowing pasture species and top dressing. Some areas have only recently been protected through Tenure Review and are still recovery from stock removal.

Mining has occurred in some parts (notably within Te Papapuni/Nevis River). Despite the past use and modification, most of the area remains dominated by indigenous ecosystems. The area is largely intact with limited tracking or other development.

The major exceptions being:

- The Remarkables ski field located in the Rastus Burn. The ski field facilities include the access road, car parks, base buildings, chair lifts and ski trails. The Remarkables ski field operates within the Rastus Burn Recreation Reserve under concession.
- The Nevis Road runs along the west side of the floor of Te Papapuni/Nevis River.
- There are some four-wheel drive tracks present (Fig. 15).
- There is a water take, pipeline and access track associated with the Wye Creek power station (Fig. 16).



Figure 15. 4WD tracks bulldozed in places - Glenroy/Wentworth looking from Mt Edward towards Mt Salmond. *Photo: historic photo circa 1980s, DOC files.*

Other potential modifications include:

- There is a proposal for a gondola from the floor of the Kawarau valley up the Rastus Burn to the Remarkables ski field.
- There have been proposals to expand the Remarkables ski field, notable to extend into the Doolans catchment.
- There has previously been a proposal for a dam in Te Papapuni/Nevis River.
- There has been previous gold mining activity in Te Papapuni/Nevis River.



Figure 16. Pipeline structure for Wye Creek hydro-electric station. *Photo: Carl Walrond, DOC.*

5.3 Ecological Management Units

There are three Ecological Management Units (Wye Creek, Lake Alta and Schoolhouse Flat) that are totally or partially included within the area. There are also three Species management Units (Nevis valley, lower Nevis and Rastus Burn).

5.4 Threats

5.4.1 Pest plants

While there are many native species that are present there are few pest plants. Those of greatest concern are wilding pines (Fig. 17) and other woody weeds of potential concern include hawthorn, elderberry and briar especially at lower altitude.

Control is carried out by DOC and Wakatipu Wilding Conifer Group. Broom, gorse and briar are present predominantly in the Coal Pit area with a few scattered populations throughout the rest of this area.



Figure 17. Wilding pine growing among rocks near the shore of Whakatipu-wai-Māori.
Photo: Carl Walrond, DOC.

5.4.2 Pest animals

The main biodiversity threat is from introduced animals, through both the predation of indigenous animals and the destruction and/or modification of ecosystems/habitat. Rabbits and hares are locally common. Other widespread exotic animals include possums, mustelids, rats, mice and hedgehogs.

A community group undertakes predator control along the Wye Creek track. Goats, pigs, deer and chamois are also present. Issues with sheep occur when fencing is compromised.

5.4.3 Fire

A long fire history has modified the vegetation, and much reduced the original extent of forest. However, natural regeneration is actively occurring. Fortunately, the frequency of fires has now much reduced. However, the threat from fire remains and has the potential to impact upon remnant vegetation values and to set back the regeneration.

5.4.4 Climate change

The area could be vulnerable to some impacts from climate change, including:

- Changes to rainfall amounts, reduced snow cover and increased summer drought.
- Increased fire risk as the summer climate becomes warmer.
- Increased risks from weeds and pests.

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Appendix 1

History of Land Tenure ‘Remarkable Conservation Area’

In 1976 a Soil and Water Conservation Plan was entered into between the lessees of the Loch Linnhe pastoral lease and the Otago Catchment Board where it was agreed to surrender 3951ha from the lease, above the snowline fence and north of Staircase Creek. Formal surrender of the land did not occur until July 1990 and it was then gazetted as a conservation area in 1994 (NZ Gaz 1994/2851) along with an extensive area of crown land along the crest of Kawarau/ The Remarkables (Sec 2 so 23882, sec 7 SO 23209 and sec 10 Blk V Coneburn)

In 1982 the Minister of Lands approved in principle the reservation of land which had been surrendered from two pastoral leases. Survey was completed in 1987. Most of the land was allocated to DOC but two sections (Sections 13 and 14 Blk V Coneburn SD) were inadvertently missed off the land allocation schedule. One is a small section near the mouth of Wye creek and the other a strip along the lakeshore north of Wye creek. They were declared to be held for conservation purposes in 1993. (NZ gazette 1993 page 2628).

On 30/9/97 an agreement was signed between the lessees of Cone Peak pastoral lease, DOC Conservator and Commissioner of Crown Lands (CCL) to, amongst other things, surrender around 1500 ha for conservation purposes, to form part of the Remarkables Conservation Area. Most of this land lies to the east of the Rastus Burn recreation reserve while some of it adjoins the access road to the reserve/ski field. It was declared a conservation area in 2001 (NZ gazette 2001 page 2851) (Secs 1 - 6 SO 24738).

Following tenure review for the Glenroy pastoral lease, four areas were identified as having conservation values warranting legal protection and management by the Department of Conservation. They were surrendered from the pastoral lease on 25/9/1998 and gazetted for conservation purposes in 1999. The area which became part of the Remarkables Conservation Area is mountainous land surrounding Mt Salmon and Ben Cruachan. A 5 ha area became Conservation Area – Cassinia shrublands (NZ Gazette 1999/2148) (Sec 12 - other areas are Lepidium Kawarau CA, Coal Pit saddle HR).

A 584 ha area of the Glenroy pastoral lease which had not been recommended to become conservation land, was deemed by the CCL to be unsuitable for freeholding, so it was designated a special lease under Section 67(2) Land Act 1948. This area lies on an eastern extension of Kawarau/The Remarkables and includes land along the right branch of Doolans creek. The lease was relinquished in 2007 and became crown land. It was then declared to be held for conservation purposes in 2010 (NZ gazette 2010/1113) Secs 9,11 and 16 SO 24636).

The Wentworth pastoral lease tenure review resulted in an agreement to 3745 ha being set apart for conservation purposes. The area concerned is on the eastern side of Kawarau/ The Remarkables between the left and right branches of Doolans creek It was surrendered from the pastoral lease as at 31/12/96 on 23/7/98 and then declared a conservation area in 1998 (NZ gazette 1998, page 1260). (Sec 8 SO 24742, Sec 7 SO 24547).

Around 808 ha of the Mt Rosa pastoral lease adjoining Doolans creek, was identified as having conservation values warranting legal protection and management by DOC, following a tenure review process. It was surrendered from the lease on 11/11/98 and declared a conservation area in 1999. (NZ Gazette 1999 page 3592) (Sec 5 so 24743)

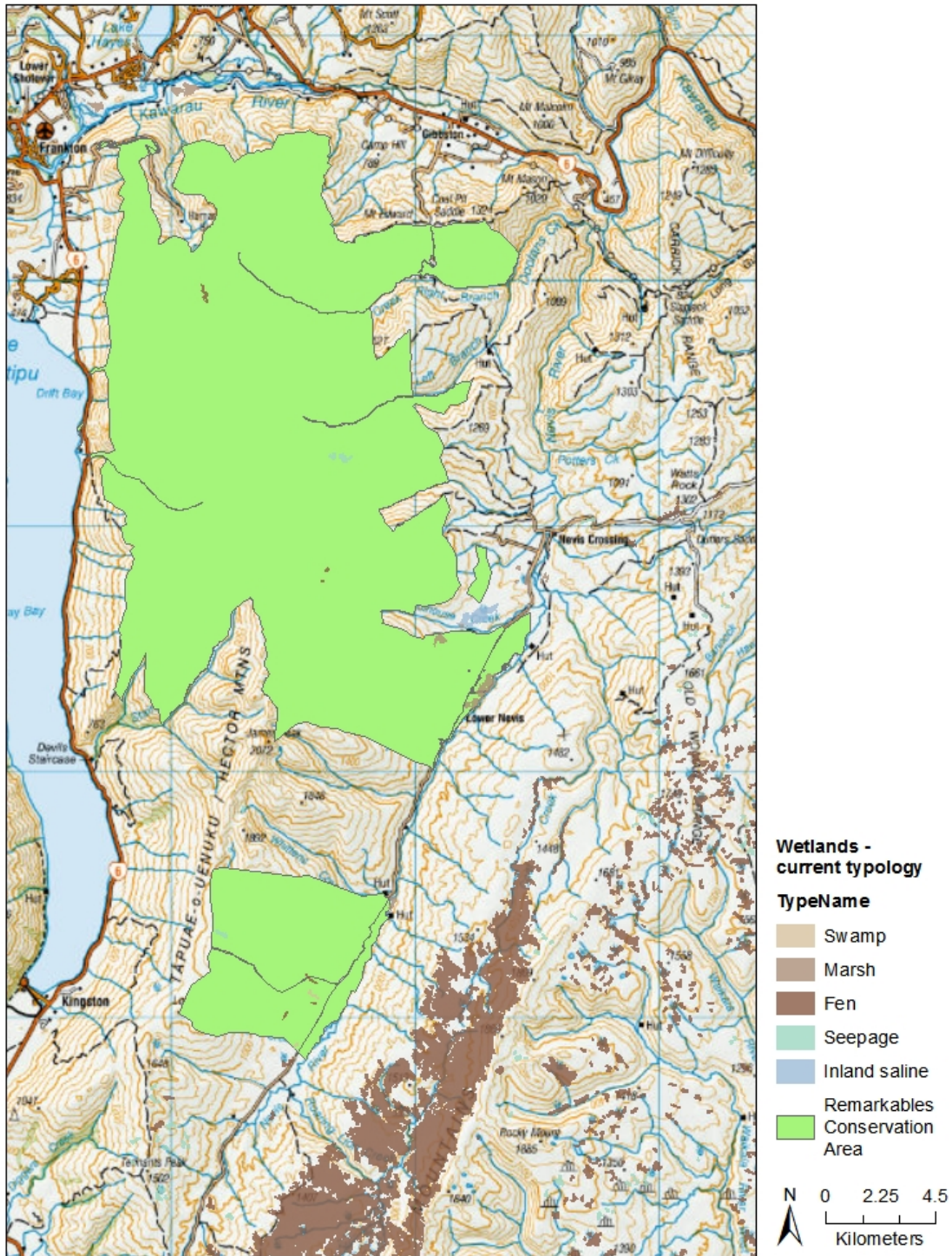
On 31/1/2003, following tenure review, the lessee of Glen Nevis Station accepted a proposal for 4474 ha to be designated as land to be restored to full crown ownership and control as a conservation area. This is the southernmost part of the Remarkables Conservation Area and lies on the eastern side of the Tāpuae O'Uenuku/Hector Mountains. In 2004 it vested in the Crown as a conservation area under Section 65 of the Crown Pastoral Land Act 1998. (Secs 7-9 SO 332816).

In 2014 the lessee of the Ben Nevis pastoral lease accepted a proposed designation that saw 9760 restored to full Crown control as a conservation area. The land lies on the north-eastern side of Tāpuae O'Uenuku/Hector Mountains, to the west of the Te Papapuni/Nevis River. (Secs 13-17,19, 20 and 22 SO 475739)

Conservation Area-Nevis cemetery was allocated to DOC (F42/3) and is stewardship land.

Appendix 2

Remarkables Conservation Area – mapped wetlands



Appendix 3

Ecosystems found in the Remarkables Conservation Area

Note: These ecosystems are derived from the report “A classification of New Zealand’s terrestrial ecosystems” (Singers & Rogers 2014)

Code	Ecosystem name
CDF3	Mountain beech forest
CDF2?	<i>Dracophyllum</i> , mountain celery pine, <i>Olearia</i> , <i>Hebe</i> shrub [sub-alpine scrub]
AL1	Narrow-leaved and slim snow tussock
AH2	<i>Dracophyllum muscoides</i> cushionfield
WL8?	Herbfield/mossfield/sedgeland (thought likely to be present)
WL9	Cushionfield
WL16	Red tussock, <i>Schoenus pauciflorus</i> tussockland (thought likely to be present)
WL17	<i>Schoenus pauciflorus</i> sedgeland [alpine seepages/flushes]
WL22?	<i>Carex</i> , <i>Schoenus pauciflorus</i> sedgeland
CL8	<i>Helichrysum</i> , <i>Melicytus</i> shrubland/tussockland/rockland
SC1	Gravelfield [Screes and boulderfields]
VS5?	Broadleaved species scrub/forest
VS6	Matagouri, <i>Coprosma propinqua</i> , kowhai scrub
VS7	Mountain tauhinau, <i>Dracophyllum rosmarinifolium</i> scrub
VS 10	Bracken fernland
VS11	Short tussockland
VS14	Tall snow tussock tussockland

Appendix 4

Land Environments of New Zealand

The level 4 LENZ units present in the Remarkables Conservation Area and threat status is listed below:

LENZ Unit	Threat Status
K3.2a	At Risk
N3.1d	Chronically Threatened
N3.2a	Acutely Threatened
N6.2a	Chronically Threatened
Q1.1a	Not Threatened
Q1.1b	Critically Under protected
Q1.1c	Under protected
Q1.2a	Not Threatened
Q2.2a	Critically Under protected
Q3.3b	Critically Under protected
R1.1b	Not Threatened

Appendix 5

EMUs and SMUs

EMU No 300517 Wye Creek

EMU No 300825 Lake Alta

EMU No 300842 Schoolhouse Flat (part of northern portion and all of southern portion)

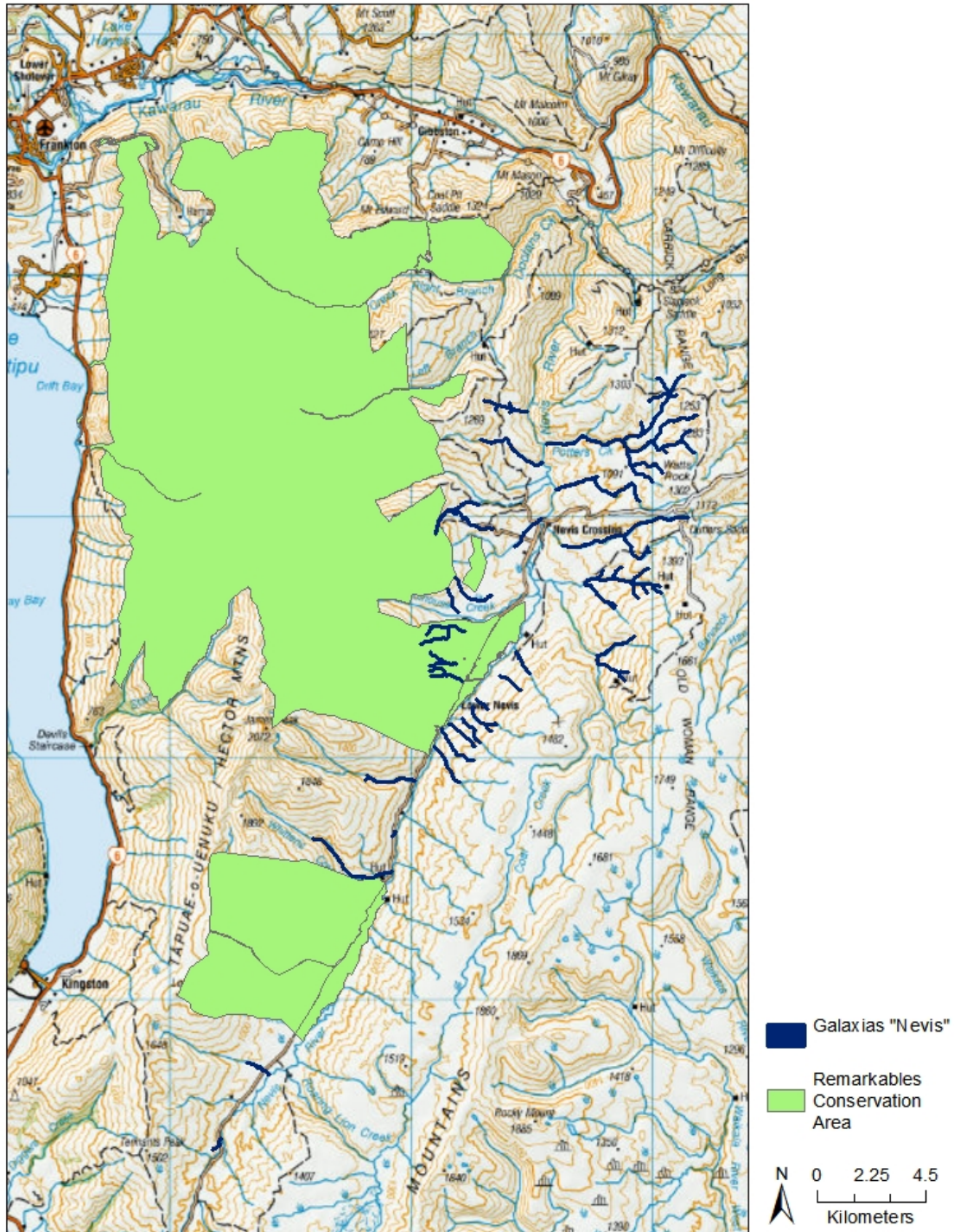
SMU No. 406368 Lower Nevis (Nevis skink)

SMU No. 406416 Nevis Valley (part) (giant ground beetle - *Mecodema chiltonii*)

SMU No. 406424 Rastus Burn (Remarkables) (part) (moth - *Xanthorhoe frigida*)

Appendix 6

Remarkables Conservation Area – Nevis Galaxias distribution



Remarkables Conservation Area
 - Nevis Galaxias distribution -

NZGD 2000 New Zealand Transverse Mercator
 Not for publication nor navigation
 1:200,000
 NZTopo, © Crown
 Produced by: nboddy on 19/09/2019

Appendix 7

Threatened plant records

(from Bioweb)

Nationally Critical

Leptinella conjuncta

Nationally Endangered

Euchiton ensifer

Pachycladon cheesemani

Senecio dunedinensis

Veronica cupressoides

Nationally Vulnerable

Carex uncifolia

Carmichaelia crassicaulis ssp. *racemosa*

Myosotis brevis

Myosotis elderi

Myosotis glauca

Olearia fimbriata (note only known from an adjacent property)

Ranunculus ternatifolius

Sonchus novae-zelandiae

Tetrachondra hamiltonii

Declining

Acaena buchananii

Acaena microphylla var. *pauciglochidiata*

Achnatherum petriei

Aciphylla lecomtei

Alepis flavida

Anthoscachne falcis

Carmichaelia crassicaulis ssp. *crassicaulis*

Carmichaelia petriei

Carmichaelia vexillata

Coprosma intertexta

Discaria toumatou

Leptinella serrulata

Mentha cunninghamii

Myosotis pygmaea

Olearia lineata

Pachycladon wallii

Pimelea aridula

Pterostylis tanypona

Ranunculus buchananii

Ranunculus pilifera

Raoulia australis

Naturally Uncommon

Aciphylla simplex

Carex breggrenti

Carex edgariae

Carex kaloides

Carex lachenalia ssp. *parkeri*

Carex purpurata

Epilobium purpuratum

Lachnagrotis uda

Montia angustifolia

Myosotis bryonoma

Plantago obconica

Ranunculus maculatus

Urtica aspera

Veronica annulata

Veronica dilatata

Data Deficient

Brachyscome montana

Euchiton paludosus

Myosotis glabrescens

Appendix 8

Lizard species present

cryptic skink	<i>Oligosoma inconspicuum</i>	threat status: At Risk – Declining
McCann’s skink	<i>O. maccanni</i>	threat status: Not Threatened
common skink	<i>O. polychroma</i>	threat status: Not Threatened
orange-spotted gecko	<i>Mokopiriakao</i> “Roys Peak”	threat status: Nationally Vulnerable
korero gecko	<i>Woodworthia</i> “Otago/Southland large”	threat status: At Risk – Declining)
Kawarau gecko	<i>W.</i> “Cromwell”	threat status: At Risk – Declining)
short toed gecko	<i>W.</i> “southern mini”	threat status: Not Threatened