BEFORE THE HEARINGS PANEL
FOR THE QUEENSTOWN LAKES PROPOSED DISTRICT PLAN

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of the Rural Hearing Stream 2 (Indigenous Vegetation and Biodiversity, and Wilding Exotic Tree chapters)

STATEMENT OF EVIDENCE OF GLENN ALISTER DAVIS ON BEHALF OF QUEENSTOWN LAKES DISTRICT COUNCIL

ECOLOGIST

6 APRIL 2016

Simpson Grierson
Barristers & Solicitors

J G A Winchester / S J Scott
Telephone: +64-3-968 4018
Facsimile: +64-3-379 5023
Email: sarah.scott@simpsongrierson.com
PO Box 874
SOLICITORS
CHRISTCHURCH 8140

TABLE OF CONTENTS

1. INTRODUCTION

1.1 My full name is Glenn Alister Davis. I am Director and Principal Environmental Scientist of Davis Consulting Group Limited (**DCG**). I have been in this position since 2007. I have 18 years' postgraduate work experience in environmental management. I have a BSc in Ecology and MSc in Geography. I am a member of the New Zealand Plant Conservation Network.

1.2 I have worked as a professional ecologist in the Queenstown Lakes District (**District**) for the last 10 years. During this time, I have worked on a wide range of projects for the agricultural and land development sectors and for Queenstown Lakes District Council (**QLDC**). In addition, I have also held a contract with Land Information New Zealand to support the assessment of discretionary activities on high country pastoral leases under the Crown Pastoral Lease Act. Many of these projects have triggered the Operative District Plan (**ODP**) indigenous vegetation site standard. I therefore have a sound working knowledge of the indigenous vegetation protection measures within the ODP.

1.3 In 2009 I was engaged by QLDC to commence the first stage of the process to identify, assess and include further areas of significant indigenous vegetation and significant habitats of indigenous fauna, as outlined in Appendix 5 of the ODP (**Appendix A** to this evidence). I completed this first stage (initial identification) in collaboration with three Queenstown based ecologists - Neill Simpson, Dawn Palmer and Simon Beale. In conjunction with QLDC I have implemented Stages 2, 3 and 4 of the Assessment Criteria.

1.4 I have now been engaged by QLDC to provide evidence in relation to the Indigenous Vegetation and Biodiversity, and Exotic Wilding Trees chapters of the Proposed District Plan (**PDP**).

1.5 Although this is a Council hearing, I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.

1.6 The key documents I have used, or referred to, in forming my view while preparing this brief of evidence are listed in **Appendix B**.

(a) I am also familiar with the Strategic Direction chapter;
(b) Environment Court Decision C76/2001;
(c) Royal Forest and Bird Protection Society Incorporated (RFBPS) v Innes (2014) NZEnvC 201);
(d) The New Zealand Biodiversity Strategy. February 2000.
(e) .

1.7 I have attached to this evidence the following:

(a) **Appendix A** – Appendix 5 of the ODP;
(b) **Appendix B** – references to documents used, or refered to in preparing this evidence;
(c) **Appendix C** – Statement of National Priorities;
(d) **Appendix D** – Letter to Landowners;
(e) **Appendix E -** Project Schedule;
(f) **Appendix F** – Schedule of Sites; and
(g) **Appendix G** – Discussion Paper regarding criteria.

2. SCOPE

2.1 I have structured this evidence in two parts, focusing first on the Indigenous Vegetation and Biodiversity chapter, and second the Wilding Exotic Trees chapter. Within those two parts, my evidence covers the following:

Part A: Chapter 33 – Indigenous Vegetation And Biodiversity

(a) background;
(b) current protection under operative district plan;
(c) significant natural areas + methodology for identification;
(d) response to specific submission points;
(e) site specific submissions on Significant Natural Areas (**SNAs**);
(f) proposed general clearance rule for indigenous vegetation;
(g) list of threatened plants – technical justification for their inclusion on list;
(h) definitions;

(i) wilding trees: risk to indigenous biodiversity; and

(j) types of trees that represent a risk.

3. EXECUTIVE SUMMARY

3.1 The key conclusions in my evidence are that:

(a) Modification of the Districts indigenous vegetation and habitats is highly variable; some areas are largely untouched and highly unlikely to be affected by development activities, while pressure remains in the lowland and montane environments where much of the ecological loss has already occurred;

(b) In order to halt the loss of the ecological values remaining in our lowland and montane environments, it is critical that we have provisions within the PDP to ensure that anything remaining is assessed critically prior to consenting further loss;

(c) The vegetation clearing provisions within the ODP have been problematic to apply in some parts of the District. This has been most prevalent within highly modified ecosystems where the ecological values are less well understood by property owners, land managers, resource management planners and ecologists. This has resulted in landowners clearing rare dryland ecosystems and threatened species even though they understood the cultivation of the land to be a permitted activity.

(d) The vegetation clearance rules under the PDP provide a tiered approach based on the amount of indigenous vegetation cover remaining. Where the vegetation remaining is less 20% of its original extent the rule provides for the removal of up to 500 square metres with this increasing to 5000 square metres where the remaining indigenous cover is greater than 20%. This approach elevates the importance of the lowland environments and should assist with halting the decline of lowland ecosystems and the loss of threatened species within these environments.

(e) Areas of Significant Indigenous Vegetation and Habitats (**SNAs**) have been included into the PDP. The areas identified are the culmination

of six years of work that involved an initial desktop assessment of potentially significant areas undertaken in 2009, consultation with stakeholders and landowners, ground truthing work and subsequent report preparation. A total of 147 sites have been identified that I consider contain ecological values consistent with the assessment criteria. The SNAs are dominated by woodlands and shrublands and the reasons for their importance include:

- They are located in lowland or lower slope environments that have less than 20% indigenous vegetation cover remaining; and/or
- Are the best representative examples of shrublands in the District; and/or
- Contain a diversity of plant species that are important habitat for a diverse indigenous invertebrate fauna (some species of which are host plant specific on species such as tree daisys), insectivorous birds and the 'at risk' eastern New Zealand Falcon; and/or
- Are important with respect to ecological context such as part of an altitudinal sequence from valley floor to alpine environments.

(f) In addition to the low altitude dry shrublands and woodlands, the key other indigenous vegetation and habitats that have been identified include beech forests within drier parts of the District where these forests have a very restricted distribution, broadleaved indigenous hardwood communities situated adjacent to Lakes Wanaka and Wakatipu that provide habitat for invertebrates, lizards and birds, and cushionfields, herbfields and short tussock grassland communities within dryland valley floor environments where there is little indigenous vegetation cover remaining, contain threatened species and provide refuge for invertebrates, lizards and birds.

(g) Of the 147 SNAs recommended to be included into the PDP approximately 25 have been opposed in submissions with some of these areas requesting refinement to boundaries rather than total removal. In some cases I may be able to modify some boundaries in consultation with the submitter, but I oppose the total removal of SNAs as I consider we have completed a thorough process to identify SNAs and all the SNAs have ecological values that are consistent with the assessment criteria; and

(h) I provide evidence on Chapter 34 of the PDP 'Wilding Exotic Trees'. I consider the risks and effects of wilding exotic trees within the District have been well established and it is critical that we have provisions in the PDP that clearly state the species that should not be grown in the District. Prohibiting exotic species that are a high risk of spread is an appropriate approach given the ecological and landscape effects that these species can have within the District.

PART A: CHAPTER 33 - INDIGENOUS VEGETATION AND BIODIVERSITY

4. BACKGROUND

4.1 The District is made up of diverse geographical properties that drive biological diversity. From dry inland basins in the Upper Clutha Valley to alpine environments that border Fiordland and Westland, the District contains many environments that support a wide range of vegetation communities and habitats.

4.2 Broadly the ecological communities within the District include forests, shrublands, tall tussock grasslands, short tussock grasslands, dryland and alpine cushionfields, herbfields, a wide range of wetlands, and lake and river margin communities.

4.3 These communities support a high number of indigenous plants, many of which are endemic to southern New Zealand. To give you some context of the botanical diversity within the District, 438 native species were recorded on a single high country station[1] during a Department of Conservation botanical survey. Approximately 10% of the species recorded in this survey have been identified as either threatened, naturally uncommon or data deficient under the New Zealand threatened species classification system.

4.4 Given the wide range of environments and vegetation communities within the District it follows that the District has a wide range of habitats that support a diverse indigenous fauna of invertebrates, lizards, birds and bats.

4.5 Some of the ecological communities in the District such as beech forests in Mt Aspiring National Park and tall tussock grassland communities above 1100m

1 Crown Pastoral Land Tenure Review. Walter Peak Special Lease file:///C:/Users/Glenn%20Davis/Downloads/walter-peak-crr-pt1.pdf

are highly representative of the communities that would have been present prior to people arriving in the District. Altitudinal sequences of vegetation from valley floors to alpine environments also remain intact. However, at lower elevations in the District (below 1000 metres asl) our indigenous vegetation and habitats have been highly modified as a result of Polynesian fires, and subsequently a long history of agricultural activity. Furthermore, more recent land development activities to support dairy farming, vineyards and subdivision have resulted in ongoing modification to the District's indigenous vegetation and habitats.

4.6 The effect of historical activities on ecosystems and habitats within the District is clearly shown through the Threatened Environment Classification (**TEC**) system that was developed by Landcare Research. The TEC is an extension of the Land Environments of New Zealand (**LENZ**) classification. The LENZ classification groups together areas across New Zealand that have similar environmental conditions that drive biological diversity. The TEC combines the LENZ classification, the Landcover Database and areas across New Zealand under legal protection (i.e. areas administered by DOC, QEII covenants, and conservation covenants on private land for the purpose of protecting natural heritage (including biodiversity)) to assign a threat level based on the percentage of indigenous vegetation cover remaining and the area under formal protection. The Landcover Database maps vegetation cover across New Zealand and is used in the context of the TEC for determining the percentage of indigenous vegetation remaining within an environment defined by LENZ. I note that the Landcover Database version used in the TEC adopted for the SNA process is based on satellite imagery captured in 2001/02. It was updated recently based on imagery captured in 2011/12.

4.7 The TEC is a very useful landscape scale tool to show the areas within the District where ecosystem loss is most prevalent. As is the case for most of New Zealand the low lying dryland environments have lost the largest areas of indigenous vegetation cover with areas such as the Wakatipu Basin and the Upper Clutha Valley having less than 10% of the original vegetation cover. It is logical that the most threatened environments occur in the lowland areas that have been the subject of the most intensive landuse activity.

4.8 Modification of the District's ecosystems is highly variable; some areas are largely untouched and highly unlikely to be affected by development activities, while pressure remains in the lowland and montane environments where much of the ecological loss has already occurred. In order to halt the loss of the ecological values remaining in our lowland and montane environments, it is in my view critical that we have provisions within the PDP to ensure that anything remaining is assessed critically prior to consenting further loss.

4.9 Land Environments New Zealand (**LENZ**) is a national classification of environments mapped across New Zealand's landscape. LENZ environments are mapped on the basis of 15 climate, landform and soil parameters that were chosen for their roles in driving geographic variation in biological diversity (Leathwick *et.al.*, 2003). LENZ has been presented at four levels of detail containing 20, 100, 200 and 500 environments to facilitate use at a range of scales e.g. local, regional and national.

4.10 Because LENZ units are derived from parameters that "drive geographic variation in biological diversity", the LENZ units can be used as a surrogate for the potential full range of terrestrial ecosystems and their associated biodiversity (Walker *et. al.*, 2005). Walker *et al.* (2006) adopted this approach in recent work assessing New Zealand's remaining indigenous cover, recent changes and biodiversity needs.

4.11 To understand New Zealand's biodiversity protection needs Walker *et al.*, (2006) combined the LENZ Level IV database (500 environments) with the New Zealand Landcover Database (LCDB2 – based on 2001/02 imagery; Terralink 2004) and a spatial database of private and public land managed for conservation. This work estimated the percentage of remaining indigenous vegetation cover and the percentage of each unit formally protected. Based on these two criteria five categories of TEC have been established and include:

(a) Acutely threatened – <10% indigenous vegetation cover remaining;
(b) Chronically threatened – 10-20% indigenous vegetation cover remaining;
(c) At risk – 20-30% indigenous vegetation cover remaining;
(d) Critically underprotected – >30% indigenous vegetation cover remaining and less than 10% protected;

(e) Underprotected – >30% indigenous vegetation cover remaining and 10-20% protected; and

(f) No threat – >30% indigenous vegetation cover remaining and >20% protected.

4.12 National Priority One identifies acutely threatened and chronically threatened environments are a national priority for the protection of rare and threatened biodiversity. The acutely and chronically threatened environments within the District are predominantly located on valley floors and lower slopes of mountain ranges.

4.13 The mapping associated with LENZ and LCDB2 have a number of inaccuracies due to the scale of the mapping, the inability of the imagery to differentiate between some vegetation types and because of the temporal nature of vegetation cover i.e. vegetation cover changing over time. Notwithstanding this point, the information is the only district wide ecological information source available and provided it is used cautiously is a very effective tool to assist the identification and assessment of significant vegetation and fauna habitat.

4.14 The LENZ and TEC has been adopted by Environment Canterbury Regional Council in their 2013 Regional Policy Statement – Chapter 9: Ecosystems and Indigenous Biodiversity, in order to prioritise areas for protection including indigenous vegetation in environments that are acutely and chronically threatened. Furthermore, Environment Canterbury's criteria for determining SNA includes "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.

5. CURRENT PROTECTION UNDER OPERATIVE DISTRICT PLAN

5.1 Under the ODP there are two distinct provisions that provide protection for indigenous vegetation. These include Site Standards 5.3.5.1 (v) Significant Indigenous Vegetation and 5.3.5.1 (x) Indigenous Vegetation. In both cases compliance with the site standard is a permitted activity while a breach of the standard is discretionary with QLDC restricting its discretion as follows:

Site Standard 5.3.5.1 (v) Significant Indigenous Vegetation

The Council shall restrict the exercise of its discretion in relation to these matters to their effect on nature conservation values and the natural character of the rural environment.

Site Standard 5.3.5.1 (x) Indigenous Vegetation
The Council shall restrict the exercise of its discretion in relation to this matter to its effect on nature conservation, landscape and visual amenity values and the natural character of the rural environment.

5.2 Site Standard 5.3.5.1 (v) Significant Indigenous Vegetation relates directly to sites already identified and listed under Appendix 5 of the ODP. Appendix 5 was drafted in two parts. The first part provided a list of 17 sites that were considered significant at the time. This list was never intended to be exhaustive, rather it was a collection of sites identified by local ecological practitioners as a starting point. The second part of Appendix 5 set out the process for the identification of other significant indigenous vegetation and habitats across the district.

5.3 Given the limited number of sites identified as significant under Appendix 5, the trigger of Significant Indigenous Vegetation Site Standard 5.3.5.1(v) has been very limited. In fact, I am not aware of any resource consent applications that have requested clearance of listed areas of significance under the ODP.

5.4 Given the lack of sites identified as significant under the ODP the key protection measure has been through the Indigenous Vegetation site standard 5.3.1(x).

5.5 In practice this site standard is triggered where the area of vegetation exceeds 5000m^2 in area, is at an elevation greater than 1070m above sea level, is within 20m of a water body and contains one or more threatened species listed in Appendix 9 of the ODP.

5.6 In my experience the existing vegetation clearance rule has operated effectively in specific circumstances. Most notably is the clearance of bracken fern on high country stations. In this situation the fern invades through pastures effecting the production potential of the properties. These sites have had a long history of disturbance and in most situations consents have been granted (with conditions) to support clearance of the bracken fern. I have

supported QLDC in the review of approximately 30 consent applications and most of these properties have consents for 20 years to give them the flexibility in maintaining pasture over the medium term.

5.7 The Indigenous Vegetation site standard 5.3.5.1 (x) has been more problematic to implement in lowland areas where the vegetation is often highly modified and the ecological values less well understood by property owners, land managers, resource management planners and ecologists. One of the key problems with the application of the indigenous vegetation site standard in low lying areas is associated with the definition of 'indigenous vegetation'. The definition in the ODP is:

> *Means a plant community in which species indigenous to that part of New Zealand are important in terms of coverage, structure and/or species diversity.*

5.8 Ecological communities such as short tussock grassland and cushionfield communities are modified communities and contain exotic herbs and grasses. The dryland vegetation in these areas tends to grade between areas dominated by exotic herbs and grasses to areas dominated by indigenous species. These communities are also found within a mosaic of more developed pasture grassland that can be intensively grazed and has had a long history of pastoral activity.

5.9 The remaining indigenous vegetation in lowland and montane environments within the District consists of kanuka woodland, grey shrubland, short tussock grasslands, cushionfields and wetlands. These communities are often small in area, discontinuous, surrounded in exotic pasture grasslands and in poor condition. Notwithstanding this point, they remain important habitats for maintaining the full range of biodiversity in the District as they provide a refuge for flora and fauna species that can be absent or seldom occur in more remote areas, or they represent populations of species with specific adaptations to particular environments.

5.10 Furthermore, these communities often contain threatened species. It is my opinion that the ODP Indigenous Vegetation site standard does not provide the necessary protection for either of these communities, which has resulted in a reduction in the population of threatened species. In addition it has resulted in

an ongoing loss of ecological communities within environments that have very restricted indigenous vegetation cover.

6. SIGNIFICANT NATURAL AREAS + METHODOLOGY FOR IDENTIFICATION

6.1 In collaboration with a group of local ecologists I was engaged by QLDC to identify areas of significant indigenous vegetation and significant habitats of indigenous fauna (together, SNAs).

STAGE 1

6.2 The first stage of the process was to review the criteria for determining ecological significance. This review was undertaken to assess approaches taken by various district councils in terms of the criteria adopted and how they are applied. It was also completed as a critique of the assessment criteria set out in Appendix 5 of the ODP. I note that this review was specifically directed at the ecological parameters of the assessment criteria set out in Stage 3 of Appendix 5, not the five stage process. The review was undertaken in Stage 1 of the process as we needed to have a clear set of criteria that could be utilised for the identification of potentially significant sites when reviewing ecological reports and databases.

6.3 The review is set out in a discussion paper prepared by Simon Beale from MWH (**Appendix G**). In summary the review found that while the Assessment Criteria within Stage 3 of Appendix 5 was comprehensive the structure was confusing and some criteria duplicated. The criteria were also divided into 'Primary Criteria' and 'Other Criteria' which suggested some weighting should be given but no direction was provided regarding weight. Mr Beale considered the criteria could be condensed into fewer criteria and recommended the rationalisation of the assessment criteria as follows (as set out in Attachment 1 of Appendix G):

(i) Rarity & Distinctiveness

Whether the area supports or is important for:

- *an indigenous species, habitat or community of species which is rare or threatened within the Ecological District or is threatened nationally,*
- *indigenous species at their distribution limit,*
- *endemic species,*

- *indigenous fauna for some part of their life cycle (e.g. breeding, feeding, moulting, roosting), whether on a regular or infrequent basis,*
- *migratory indigenous fauna.*

OR

(ii) Representativeness

Whether the area contains one of the best examples of an indigenous vegetation type, habitat or ecological process which is typical of its Ecological District.

OR

(iii) Diversity and Pattern

The degree of diversity exhibited by an area in terms of vegetation and habitat types, ecotones and sequences along ecological gradients.

OR

(iv) The Ecological Context of the Area

The relationship of the area with its surroundings in terms of maintaining or enhancing connectivity due to its location and connections to a neighbouring area, or as part of a network of areas of fauna habitat, or as part of a corridor or stepping stone for movement/migration of species between or to areas of important habitat, or;

The role the area plays in buffering the ecological values of an adjacent area or site of significant ecological value, or;

Its size and shape in providing for predominantly intact habitats (with evidence of healthy ecosystem functioning) thereby providing for seasonal or "core" habitat for threatened species.

6.4 I note part vii of the ODP criteria (The Future Ecological Value of the Area) was not considered in the desktop review as this aspect needed to be considered during the ground-truthing stage of the project. It is however relevant, and the criteria considered at that stage was:

The Future Ecological Value of the Area

(vii) Long Term Sustainability – the degree to which an area is likely to maintain itself, taking into consideration the:

- *extent to which criteria in paragraphs A and B above are met;*
- *degree of historic modification to the area and its surroundings which affects its future;*
- *degree of resilience of species and habitats present;*
- *the effects of current management on identified ecological values; and*
- *the extent to which the area has achievable potential, with management input, for restoration of ecological values which are significant in the Ecological District.*

6.5 Collectively, the criteria are referred to as the "**Significance Criteria"** in this evidence.

6.6 In addition to the application of the four assessment criteria, Mr Beale recommended QLDC take account of the four national priorities for protecting rare and threatened native biodiversity on private land (MfE & DOC 2007) in determining ecological significance. The national priorities include:

(a) National Priority 1: To protect indigenous vegetation associated with land environments (Level IV) that have 20% or less remaining in indigenous cover;

(b) National Priority 2: To protect indigenous vegetation associated with sand dunes and wetlands; ecosystem types that have become uncommon due to human activity;

(c) National Priority 3: To protect indigenous vegetation associated with “originally rare” terrestrial ecosystem types not already covered by priorities 1 and 2; and

(d) National Priority 4: To protect habitats of acutely and chronically threatened indigenous species.

6.7 I also note the national priorities were subsequently adopted as significance assessment criteria in the proposed National Policy Statement on Indigenous Biodiversity.

6.8 The release of the Statement of National Priorities was significant to the process as it provided context and definition around the significance criteria of

representativeness and *rarity*, which are key drivers in the determination of ecological significance.[2] The Statement of National Priorities was also important in that it adopted work completed by Landcare Research in the development of the LENZ Classification, the TEC, and the Originally Rare Historic Ecosystems Framework which was released in 2007.

6.9 The Significance Criteria were subsequently used to assess possible SNAs, as set out in the following sections. Once we (when I use the word "we", I am referring to myself and the three other ecologist who worked together on Stage 1) had settled on the key drivers for the assessment of significance we needed to understand the scope of the project and identify the areas in the District that may potentially contain areas of vegetation worthy of protection. We were able to achieve this by utilising the Council's GIS to upload databases on vegetation cover, threatened environments and threatened species in order to graphically present areas that may potentially contain areas of vegetation that meet the definitions of *representativeness* and/or *rarity* (as set out above).

6.10 In terms of the *representativeness* definition, the Landcover Database was uploaded into QLDC's GIS. The Landcover Database maps vegetation cover throughout New Zealand with the use of satellite imagery. We used version II, which was the most recent version in 2009 when the desktop assessment was undertaken. A further two versions have been produced since this time. We reviewed the vegetation classes listed in Landcover Database II and identified the following landcover classes that would potentially contain vegetation that may meet the definition of representativeness:

(a) Herbaceous freshwater vegetation;
(b) Landslide;
(c) Low producing grassland (this class was included as we knew that low producing grasslands contain short tussock grassland and cushionfield communities);
(d) Depleted grassland;
(e) Tall tussock grassland;
(f) Manuka and/or Kanuka;
(g) Matagouri;
(h) Broadleaved indigenous hardwoods;

[2] There is no weighting to the criteria. The key relevance of the Statement of National Priorities was that it provided a national perspective on what is rare at an ecosystem and species level.

(i) Mixed Exotic Shrubland (this class was included as we knew that the mixed exotic shrubland contained an indigenous component);

(j) Grey Scrub; and

(k) Indigenous Forest.

6.11 As with using the Landcover Database as a tool to provide a district wide image of remaining indigenous cover that may meet the definition of *representativeness,* we were also able to compile district wide information on *rarity* at an ecosystem and species level. This was achieved by uploading the TEC (see paragraph 4.6 above) and the recorded locations of species listed under the New Zealand Threat Classification System (Townsend et. al., 2007)[3]. These threatened species databases included locations of threatened lizards and skinks, freshwater fish, and plants. We also used the Bird Atlas[4] to identify approximate locations of threatened bird species. The issue of *rarity* was also considered at a local/regional scale with species included that are rare locally but not included on the threatened species list. These species included kowhai, halls totara, mountain toatoa, kahikatea, matai and southern rata. We were not aware of any fauna that would be considered locally significant that was not already listed under the New Zealand threat classification system.

6.12 At an ecosystem level we adopted the TEC and took the view that existing indigenous vegetation present within environments with less than 20% indigenous vegetation cover remaining may be considered significant. The 20% indigenous vegetation cover remaining figure was adopted as species loss has been shown to accelerate when the area of habitat remaining falls below 20% (Statement of National Priorities, 2007 (see Appendix C); Walker *et. al.*, 2015), and I consider this to be an appropriate threshold.

6.13 The TEC is a very useful landscape scale tool to show the areas within the District where ecosystem loss is most prevalent. As is the case for most of New Zealand the low lying dryland environments have lost the largest areas of indigenous vegetation cover with areas such as the Wakatipu Basin and the Upper Clutha Valley having less than 20% of the original vegetation cover. It is logical that the most threatened environments occur in the lowland areas that have been the subject of the most intensive landuse activity. The most

3 Townsend, A.J.; de Lange, P.J.; Duffy, C.A.J.; Miskelly, C.M.; Molloy, J.; Norton, D.A. 2007: New Zealand Threat Classification System manual. Department of Conservation, Wellington. 35p. [please put full reference]

threatened environments are those with less than 20% remaining and scientific research has shown that species loss accelerates when the area of habitat remaining falls below 20% (Statement of National Priorities, 2007 (see Appendix C); Walker *et. al.*, 2015). The TEC provides a landscape scale map of areas within the district that contain less than 20% indigenous vegetation cover remaining. In my view this provides a reasonable basis for distinguishing between the clearance limits for indigenous vegetation in rules 33.5.3.

6.14 **Figure 1** below presents a plan of the threatened environments identified through the process I have just described within the District. The red and orange colours denote the areas where the percentage of remaining indigenous vegetation cover is estimated to be less than 20% of the original extent. **Figure 2** shows the change in vegetation cover from pre-settlement through until 2002 and clearly shows the loss of woody vegetation cover which the TEC represents. The areas within the District where indigenous vegetation cover is shown to be below 20% is in valley floors and low elevation environments of the Wakatipu Basin, Kawarau Gorge, Cardona Valley and Upper Clutha Basin.

6.15 Once the Landcover Database and TEC had been uploaded into the Council's GIS we were also able to determine the location of areas of representative vegetation that intersected with the threatened environments thereby locating sites of interest which may meet the definition of both *representativeness* and *rarity*. **Figure 3** presents a screenshot from QLDC's GIS showing areas of representative vegetation that intersects with threatened environments where the remaining vegetation cover is less than 20%.

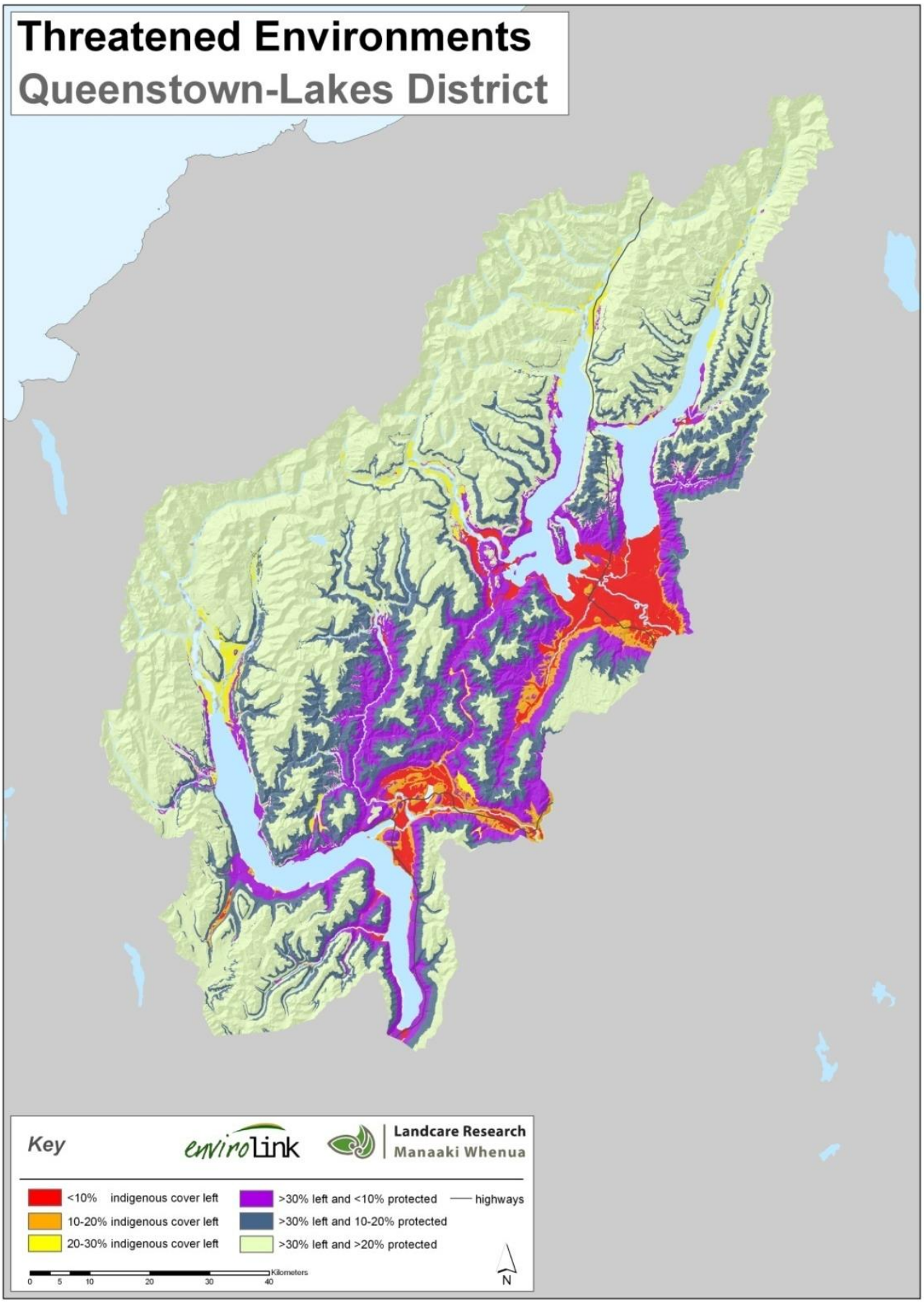


Figure 1: Threatened Environments within the Queenstown Lakes District

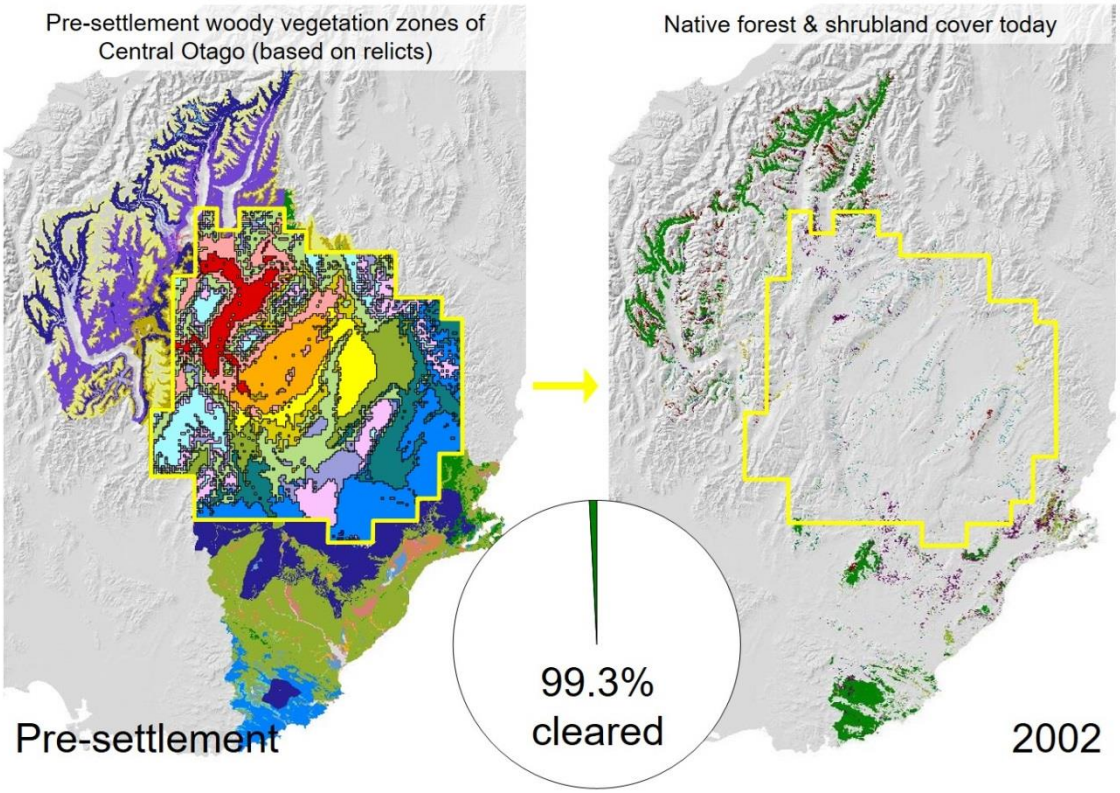


Figure 2: Change in Vegetation Cover – woodland and shrubland. Key: Colour denotes indigenous woody vegetation cover; grey denotes areas that have lost native vegetation cover.

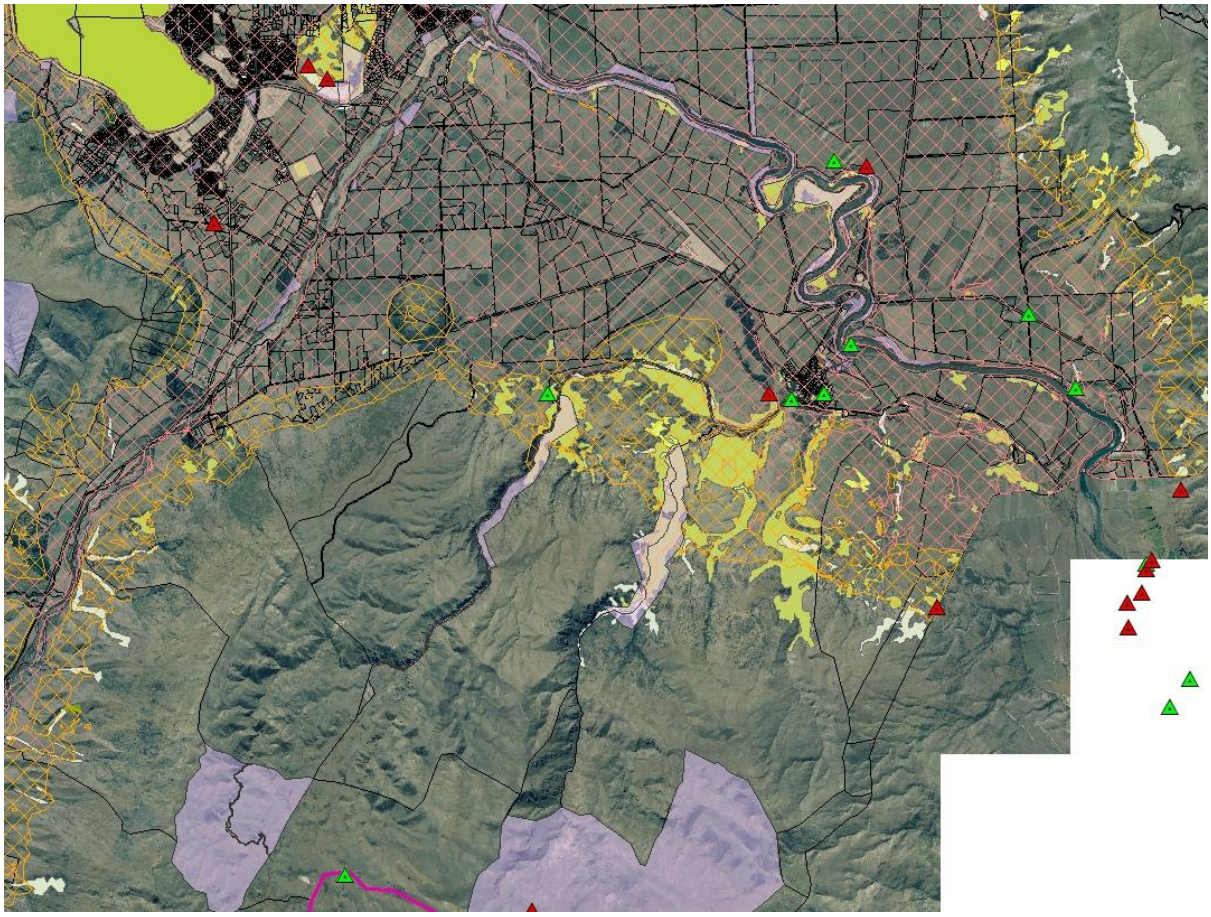


Figure 3: Screenshot from QLDC's GIS showing areas of representative vegetation that intersects with threatened environments where the remaining vegetation cover is less than 20%.

6.16 Once we had established the criteria and tools to support the assessment of significance and had uploaded the Landcover Database, TEC and threatened species databases we undertook an extensive search of ecological information held in a range of reports and databases to provide more detailed site specific reported ecological information. The key sources of the ecological information included Conservation Resources Reports for Tenure Review prepared by the Department of Conservation, ecological reports prepared to support consent applications and reports prepared for the Protected Natural Area Programme sites. These reports are referenced in Desktop Review report by Davis Environmental Services Limited (2009) (See Appendix B). Local knowledge was also used to support this process with Neill Simpson, Barry Lawrence and Brian Fitzpatrick providing information from ecological values that they had encountered in the field over many years working in the District.

6.17 Ecological research was also utilised to inform the assessment process. One of the key studies used to support the assessment of significance in dryland shrubland was a survey of invertebrates in low altitude shrubland in the Rock and Pillar Range in Central Otago (Derraik et al., 2003). This survey recorded 280 invertebrate species in pitfall traps and on *Coprosma propinqua* and *Olearia bullata* plants. Furthermore, this study found that 90% of species identified were endemic, indicating the importance of remnant dryland shrubland for the protection of biodiversity. The importance of dry shrubland to invertebrates was also highlighted in Brian Patrick's research on the Lepidoptera of small-leaved divaricating tree daisys (*Olearia spp*). Patrick (2000) found that the tree daisys have the largest documented moth fauna within the entire New Zealand flora. Furthermore, the research noted that some of the moths are host specific which means they are dependent on the tree daisy for at least part of their lifecycle.

6.18 Some areas of the District that contained high ecological values were excluded from the assessment process. These areas included land administered by the Department of Conservation and held within Queen Elizabeth II conservation covenants. We took the view that indigenous vegetation and habitats administered by DOC and QEII covenant would provide a level of protection commensurate with the significant indigenous vegetation provisions in the ODP. We also excluded subalpine and alpine communities and beech forests in wetter areas of the District. While these communities have a degree of representativeness, we considered the development pressure on these communities was low and they are situated in land environments where the percentage of indigenous vegetation remaining is relatively high. It would be relatively easy to include these areas if there was a desire to do this as the values are well known and the areas easily defined on the Landcover Database.

6.19 At the completion of the desktop assessment we had compiled multiple layers of ecological information that ranged from the broad district wide information associated with the Landcover Database, TEC through to specific local scale ecological information gathered in ecological surveys. I consider the multiple layers of ecological information all uploaded into the Council's GIS provided a sound basis for identifying areas of potential significance, and provided an appropriate tool for moving to the next stage of the process, which was to engage with landowners and undertake onsite ecological assessments.

STAGE 2

6.20 Stage 2 of the process sets out the requirement for consultation with landowners and other stakeholders. I note that consultation was not confined to Stage 2, rather consultation was undertaken at the completion of the desktop review, at the time of arranging access on to properties and following the completion of the assessment reports during Stage 3 of the process.

6.21 In 2009 at the completion of the desktop assessment, a stakeholder reference group was established to facilitate stakeholder input into the process and provide QLDC with the ability to update interested parties on the progress of the project. The reference group included Federated Farmers, members of the farming community, DOC, Forest and Bird, Kai Tahu ki Otago and Te Ao Marama.

6.22 The first stakeholder group meeting was convened on 16 June 2010. At this meeting I presented a summary of the outcomes of the desktop assessment including the findings of the review of the assessment criteria and a summary of the areas that were identified as potentially significant. It was resolved at this first stakeholder reference group meeting to undertake a pilot study of potentially significant areas identified on three properties within differing environments in the District. The three properties selected for the pilot study were Branch Creek, Loch Linnhe and Mt Burke Stations and the pilot studies were completed in late 2010 between September and November.

6.23 A second stakeholder reference group meeting was convened on 8 December 2010 to present the findings of the pilot studies on the three properties.

6.24 At this stage QLDC prepared a tender with the intent of appointing a project team to ground truth the sites identified as potentially significant across the whole district. This tender was awarded to a group of local based ecologists (myself included) to undertake this work. A work program was set up by QLDC and a letter sent to all property owners with sites of potential significance in April 2011. I attach the letter (**Appendix D**) sent to landowners at this time to show the initial engagement undertaken with landowners. The stakeholder reference group was also informed of the work programme.

6.25 For the purposes of planning the fieldwork the sites identified as potentially significant were grouped based on their respective environments. The intent was to undertake site visits in blocks to cover sites within similar environments to maintain consistency in the significance assessments. The project schedule is set out in **Appendix E**. A total of 249 sites had been identified through the desktop process although this was reduced to 220 sites through a process of refinement and reassessment of the information. These sites were located on approximately 55 properties throughout the District.

6.26 Site visits commenced in April 2011 and were completed by May 2013. In all cases the owners of the properties were contacted for permission to undertake the assessment. In many cases the property owners accompanied the project team during the site visits.

6.27 During this period we held a third stakeholder group meeting. This meeting was convened on 26 June 2012 to update the stakeholder group. At this stage most of the site visits had been completed. This was the final stakeholder group meeting to be held for the project.

6.28 By May 2013 the site visits and reports had been completed and in many cases follow up meetings or phone calls with landowners had been completed.

STAGES 3 AND 4

6.29 As discussed previously Stage 3 of Appendix 5 of the ODP sets out the significance assessment criteria. In practice Stage 3 was the fieldwork component of the project to ground truth the information collated in the desktop review that suggested an area may contain ecological values worthy of inclusion. As discussed previously the site visits to ground truth the information commenced in April 2011. At the same time as the site visits the matters for Final Consideration in Stage 4 of Appendix 5 of the ODP were also considered. The time of the site visits was the most appropriate time to consider these matters as the landowner was generally present and could provide helpful information with respect to the degree of modification, the economic effect on the landowner, presence and level of animal pests and weeds, resources required to implement effective protection, and whether or not the identified values are under threat.

6.30 At the completion of the fieldwork and writing of reports we had identified a total of 147 sites that contained ecological values that we considered were consistent with the Significance Criteria. This equates to 67% of the sites that were identified as potentially significant at the completion of the desktop phase of the project. The reasons why some sites were not taken forward fall into four Categories:

(a) sites that had been transferred to DOC administration through Tenure Review;
(b) QEII covenant sites;
(c) wetlands that were included as Regionally Significant; and
(d) sites that did not meet the criteria.

6.31 The site assessment schedule is provided in **Appendix F**. The sites identified are grouped into four key vegetation and habitat classes and can be summarised as follows.

6.32 **Dryland Shrublands and Woodland** – These sites contain stands of kanuka woodland and dry shrubland within land environments with less than 20% indigenous vegetation cover remaining, or large intact stands of kanuka woodland and dry shrubland containing populations of Olearia species (some of which are listed threatened species) and Kowhai within environments with less than 30% indigenous vegetation cover remaining. A total of 105 sites identified as significant contain these ecological values.

6.33 **Broadleaved hardwood stands** - These communities contain a diverse range of indigenous shrubs and trees including Coprosma spp, broadleaf (Griselinia littoralis), *Pseudopanax* spp, marbleleaf (*Carpodetus serratus*), cabbage trees, tutu (*Coriara* spp) and tree daisys (*Olearia* spp.). These communities provide important habitat for a range of indigenous bird species (tui, bellbird, grey warbler, brown creeper, fantail, and tomtit) as well as invertebrates and lizards. These communities are predominantly located adjacent to Lake Wanaka, Lake Wakatipu and Lake Hawea, and can be described as highly representative mid-successional vegetation. A total of 17 sites identified as significant contain these ecological values.

6.34 **Cushionfield, Herbfield and Short Tussock Grassland** – Sites containing these communities have been located in dryland environments of the Upper

Clutha and in land environments with less than 10% indigenous vegetation cover remaining. These sites also include threatened species such as Pimelea pulvinaris, Raoulia beauverdii and provide habitat for nationally vulnerable banded dotterel. A total of 7 sites identified as significant contain these ecological values.

6.35 **Beech forest remnants in drier parts of the district** – These communities are highly representative communities where much of the original late successional vegetation has been removed. These communities often support threatened species such as the threatened mistletoes *Alepis flavida* and *Peraxilla tetrapetala* and can form part of altitudinal sequences from lakeshore to alpine environments. A total of 10 sites identified as significant are beech forest remnants.

6.36 Subsequently, the sites identified as significant were listing in the Schedule of SNAs in 33.8.1 of the PDP.

7. RESPONSE TO SPECIFIC SUBMISSION POINTS

Policies

7.1 Paul Kane (Submitter 701) has requested an amendment to Policy 33.2.1.9 that would have the significance of vegetation assessed based on the indigenous coverage of the surrounding area.

7.2 Policy 33.2.1.9 sets out the criteria that are to be used to assess the nature and scale of the adverse effects of indigenous vegetation clearance on the District's indigenous biodiversity values. These criteria apply where the clearance of indigenous vegetation does not meet the permitted activity standards in (and falls to discretionary):

(a) Table 2 (for clearance not located within a SNA or within Alpine Environments;
(b) Table 3 (for clearance within SNAs identified in Schedule 33.8 and on the planning maps)
(c) Table 4 (for clearance within alpine environments, which is land above 1070m above sea level.

7.3 My understanding of the implications of Mr Kane's request is that if the surrounding area is residential or farmed land and only limited indigenous vegetation remains, then the site in question should not be protected from clearance. In my view, if an area of land has indigenous vegetation that exceeds the criteria within Objective 33.2.1, then the vegetation requires protection in order to protect and maintain the District's indigenous biodiversity, irrespective of the surrounding residential or farming land use.

7.4 Forest and Bird NZ (Submitter 706) has requested the following three amendments to Policy 33.2.1.9:

(a) that the description for the *representativeness* criteria is adjusted to include 'habitat of indigenous fauna', the terms 'typical' and 'characteristic' as well as 'representative', and that reference to 'formerly covered' be adjusted to include indigenous vegetation that may have been modified to some extent;

(b) that the description of the *diversity* criteria be adjusted to include 'pattern', indigenous taxa and ecological changes over gradients; and

(c) insert 'or' between each criteria.

7.5 The assessment criteria *'Representativeness'* as set out in Policy 33.2.1.9 refers directly to indigenous vegetation or habitat that is formerly present within the ecological district. I consider the terms 'typical' and 'characteristic' should not be added to the definition as I do not consider the addition of these terms necessary. I also consider that the term 'habitat' implies the area of interest applies to fauna. Further, I consider it is inherent in the term representativeness that the habitat will have had some degree of modification. Whether the level of modification is significant to the assessment process will be driven by other assessment criteria such as rarity, diversity, distinctiveness or ecological context.

7.6 I support the inclusion of 'pattern', 'indigenous taxa' and 'ecological changes over gradients' as they provide specific examples of the range of diversity that may be present at varying scales. All are important considerations when considering the nature and scale of adverse effects where indigenous vegetation clearing activities are proposed.

7.7 Part 3 of the Forest and Bird submission (the inclusion of 'or' between criterion) should in my view be accepted as any of the criteria could indicate the area is significant.

7.8 Forest and Bird NZ (Submitter 706) has requested an amendment to Policies 33.3.3.2 and 33.3.3.3 that would include reference to both vascular and non-vascular plants. In my view, a change is appropriate to provide greater clarification. However, for greater understanding a change to 'indigenous vascular plants and non-vascular plants (e.g. mosses, liverworts, hornworts, lichens and algae)' would be better. Note that lichens are not strictly plants but are normally included being a symbiosis between fungus and algae.

Standard 33.5.3 and 33.9 – Threatened Environment Classification Maps

7.9 Jeremy Bell Investments Limited (**JBIL**) (Submitter 784), Tim Burdon (Submitter 791) and Lakes Land Care (Submitter 794) have submitted that the use of the LENZ TEC is not appropriate. I refer to my evidence above in paragraphs 4.6 and 4.7 in relation to the use of the TEC. I note that the TEC does need to be used with caution as it has a high level district wide application. Notwithstanding this point it does provide a district wide context and is very useful to identify areas where the remaining indigenous cover is very restricted.

33.3, 33.4, 33.5 Other Provisions and Rules, Standards for Permitted Activities

7.10 Rule 33.3.3.2 provides that Rules 33.5.1 to 33.5.4 apply where indigenous vegetation attains 'structural dominance' and the area of proposed clearance contains more than 20% indigenous vegetation cover of the total area to be cleared or total number of species is 20% or more of the total area to be cleared. "Structural dominance" means "*indigenous species that are in the tallest stratum*" (as explained in 33.3.3.4). Queenstown Park Limited (Submitter 806) has requested that the 20% threshold be reduced in 33.3.3.2 because it is too restrictive. This is not consistent with their reason provided and I understand Queenstown Park Limited mean an increase in the 20% threshold to make the provision less restrictive. In my view, a reduction to the 20% threshold is not appropriate because the indigenous vegetation must also have structural dominance (i.e. be in the tallest stratum) and in lowland

environments these modified semi natural ecosystems can contain threatened plants.

7.11 Jeremy Bell Investments Limited (**JBIL**) (Submitter 784) has requested an exemption for the clearance of indigenous vegetation for the purposes of irrigation for new farm areas. In my view, this change is not appropriate because a blanket exemption for the expansion of irrigation would result in a decline in indigenous biodiversity values (refer to 10.4 for evidence). This view is further supported by the fact that irrigation expansion is likely to occur on land environments where the remaining indigenous vegetation cover is less than 20%.

7.12 Soho Ski Area Limited and Blackmans Creek No.1 LP (Submitter 610) and Treble Cone Investments Limited (Submitter 613) have requested an exemption be added to 33.3.4 'Exemptions' that would allow indigenous vegetation clearance to be undertaken within land managed under the:

(a) Crown Pastoral Lease, Conservation Act in accordance with a Conservation Management Strategy or Concession;
(b) Land Act, in accordance with a Recreation Permit; or
(c) Reserve Act in accordance with a Reserve Management Strategy.

7.13 The Alpine Group (Submitter 315) has also requested an exemption from the Council's indigenous vegetation clearance rules and SNAs, where the land is subject to the Crown Pastoral Act 1998.

7.14 The Land Act and Reserves Act do not have the same detailed consideration towards biodiversity values as under the Resource Management Act 1991. Under the Crown Pastoral Land Act 1998 any advice given by the Department of Conservation to the Commissioner of Crown Lands is not binding and does not have to be heeded or enforced as the Commissioner only has a duty to consult. Additionally, these Acts do not have the same consideration as the legislation under which SNAs are required, specifically Part 2, Section 6c "Matters of National Importance" within the Resource Management Act 1991.

7.15 JBIL (Submitter 784) has requested that the standards relating to indigenous vegetation clearance above a specified altitude be removed. In my view, that change is not appropriate because these environments are fragile, have a high

level of naturalness and are important (e.g. water capture and retention by native tussocks) and any clearance or exotic planting would have a significant negative impact on indigenous biodiversity values.

7.16 Te Ao Marama Inc (**TAMI**) (Submitter 817) has requested an amendment to the alpine limit from 1070m to 800m. In my view, this change is not appropriate given that the alpine zone and (sub alpine zone) is generally above 1000 metres in the District.

7.17 Forest and Bird NZ (Submitter 706) has requested an amendment to Table 2, whereby clearance is not allowed for a set of particular plant species and habitats. In my view, this change is not appropriate because the habitats put forward will be protected under other Objectives and Policies within Chapter 33. For example, tall tussock grassland within the District often occurs above 1070m, where no clearance of indigenous vegetation is allowed (33.4, Table 4); vegetation near water bodies is address within Objective 33.2.3; and diverse shrublands, including bog pine, celery pine, Hall's totara and Mountain totara, if present are likely already within SNAs or will be identified as such through the resource consent process, specifically through Policies 33.2.1.1 and 33.2.1.9.

8. SITE SPECIFIC SUBMISSIONS ON SNAs

8.1 Forest and Bird and DoC support the schedule of SNAs.

8.2 Florence Micoud (Submitter 115) has requested an amendment to the schedule in 33.8.1 that the Bullock Creek spring and stream is included as an SNA. This site was not identified within the desktop assessment and therefore not considered further. Notwithstanding this point, I am not aware of the ecological values of the site that would merit recognition through the SNA process. Some assessment of the wetland vegetation community would need to be undertaken.

8.3 Vaughn Woodfield and Kate Woodfield (Submitters 133, 163 and 198) have requested an amendment to 33.8.1 that would remove SNA E38A_1. We note the previous landowner was aware of the identification of SNAs on this property. Further, I am aware that the previous landowner had applied for

resource consent for a building site in close proximity to the SNA and I was consulted on the potential effects of the application on the SNAs.

8.4 QLDC (Submitter 383) in its corporate submission seek to reduce the SNAs identified on Hillend Station. The landowner provided limited feedback on the site assessments and after notification, it was made aware that some of the SNAs identified within Hillend Station have resource consent to be cleared (RM090630). I had no involved in this resource consent application.

8.5 As set out in Mr Barr's evidence the land is actively farmed and the resource consent does not expire until 2029. Therefore it is reasonable to expect this resource consent to be implemented and I accept Mr Barr's view that it is not fair or reasonable to schedule these areas as an SNA.

8.6 In addition, subdivision consent RM120131 associated with the establishment of residential building platforms and subdivision, has been completed and involves a vegetation management plan that includes 'passive revegetation areas' within areas also identified as an SNA. Therefore, I consider that SNA F21C_1 and 2 should be removed and SNA's F21A, F21B_1 and F21B_3 should be reduced to the exclusion areas identified on the approved plans of RM090630 (as is attached to Mr Barr's section 42A report).

8.7 Lake McKay Station (submitter 439) has requested a number of amendments to the boundaries of 5 of the 7 SNAs identified on the Station. I am prepared to discuss the SNAs with Lake McKay Station in an attempt to refine SNA boundaries. I do however note that the areas identified by Lake McKay to be excluded from the SNAs contain closed canopy stands of kanuka woodland that are significant under the assessment criteria.

8.8 I understand from the submission the exclusion of existing tracks from the SNA is not sufficient to allow for development of farm tracks. Expansion of the tracks may involve large areas of disturbance within areas of significant indigenous vegetation. In my view this expansion should be considered through a consent process rather than providing for unknown future development. With respect to rates remission, I understand there is a rates remission policy and it is up to the landowner to pursue this with QLDC.

8.9 Tim Burdon (Submitter 791) seeks that a SNA is removed where the landowner is not in agreement. In my view Appendix 5 does set out a consultation process but does not provide for Council to remove SNAs based on landowners not wanting them on their property. I consider their inclusion on the merits is more appropriate. If SNAs are excluded landowners may be able to clear up to 5000m^2 of vegetation as a permitted activity. In my view this will not provide adequate protection for ecological values in the District as the areas identified contain threatened plants, fauna and areas of vegetation in areas with less than 20% remaining.

SNAs F32A_1 to 3, F32B - Queenstown Park Limited (QPL) (Submitter 806)

8.10 QPL has requested an amendment to 33.8.1 that would remove the SNAs on QPL's land due to lack of detail in mapping and lack of significance of the SNAs.

8.11 In my view, this change is not appropriate, as the current mapping is considered accurate for the protection of indigenous biodiversity values. The assessment for the relevant SNAs is on pages 285 to 295 of **Appendix F**. I also provide the following detail with respect to the significance criteria that the QPL site meet:

(a) **Rarity and Distinctiveness** - The threatened environment classification identifies that the lower areas of the grey shrubland are located within a TEC with 18.6% indigenous vegetation cover remaining and only 2.3% protected. The higher areas are identified to have 39.92% indigenous vegetation cover remaining, with 5.07% protected. The better grey shrubland communities in the District that were historically abundant at lower elevations now tend to be found at slightly higher elevations in environments that supported beech forest. The grey shrubland will support prey and breeding habitat for the 'at risk' eastern New Zealand Falcon and will support a range of endemic invertebrates associated with both Olearia and Coprosma species that are in abundance within the SNAs. The shrubland is distinctive within the ecological district given the size of the shrubland and the population of Olearia. Many similar shrublands in the district are much smaller in size and often dominated by matagouri and briar.

(b) **Representativeness** – the two SNAs F32A and F32B contain grey shrubland which is characteristic of lower altitude dryland vegetation within the District. The grey shrublands are two of the largest closed canopy stands present and are some of the best examples of this indigenous vegetation and habitat.

(c) **Diversity and Pattern** - The shrubland will contain a diverse range of grey shrubland species and includes both riparian and drier hillside communities

(d) **The Ecological Context of the Area** - The shrublands are part of a relatively uninterrupted sequences of indigenous communities from the valley floor through to the tall tussock and alpine communities situated at higher elevations in the neighbouring DOC administered Rastus Burn Recreation Area and Remarkables Conservation Area.

(e) **Future Ecological Value of the Area** - It is likely that the shrublands have been expanding their distribution in recent years as a result of the current land management regime i.e. limited vegetation clearing activities. Under current management practices the shrublands are sustainable and expected to continue development.

8.12 In summary these shrublands are excellent examples of vegetation and habitat that is highly representative of this environment and has become rare, particularly within the drier areas of the District. It is also important as habitat for a diverse and abundant invertebrate fauna and passerines that are critical for the maintenance of eastern falcon. Given the high level of representativeness and rarity of high quality grey shrubland in the District and the altitudinal sequence of indigenous communities, in my view the areas are Significant Indigenous Vegetation and Fauna Habitat and should remain scheduled in the PDP.

SNAs F26C1 to F26C3 - Run 505 Ltd (Submitter 390)

8.13 Run 505 Ltd states that SNAs F26C1 to F26C3 were viewed aerially rather than on the ground. I can confirm that I flew over this vegetation and that the threatened species *Olearia lineata* was present. I consider that the area will support a diverse and unique invertebrate fauna and the eastern falcon. I do

not consider the removal of the areas are appropriate as sought by the submitter however some refinement to the boundaries of these sites could be made in consultation with the property owner.

SNA E39A - Crosshill Farms Ltd (Submitter 531)

8.14 Crosshill Farms Ltd request the removal of SNA E39A on the grounds that the vegetation does not meet the criteria set out in Appendix 5. I note that the Significance Criteria that was used to assess the SNAs before their inclusion in the PDP is set out at paragraphs 6.3 and 6.4 above (rather than in Appendix 5 of the ODP)

8.15 I provide the following detail with respect to the significance criteria (noting the assessment is set out on pages 209 to 212 of **Appendix F** is also relevant):

(a) **Rarity and Distinctiveness** - The threatened environment classification identifies that the cushionfield and short tussock grassland is located within a TEC with 2.7% indigenous vegetation cover remaining and only 0.8% protected. In addition the lack of indigenous vegetation cover the SNA supports a population of the 'at risk' cushion Pimelea (*Pimelea sericeovillosa* subsp. *pulvinaris*).

(b) **Representativeness** – The pre-European settlement vegetation representative of this environment is understood to have consisted of continuous grasslands with kanuka. The vegetation on the Crosshill property lacks the diversity of the original grassland vegetation, but remains as one of the only modified examples of the original vegetation cover.

(c) **Diversity and Pattern** - The continued disturbance is shown in the lack of diversity of plant species, but the presence of the threatened *Pimelea sericeovillosa* subsp. *pulvinaris* and the areas of short tussock grassland show that the area of interest has the potential to sustain an ecologically important community

(d) **The Ecological Context of the Area** - The short tussock grassland and cushion field is connected to modified indigenous vegetation

communities located adjacent to the upper reaches of the Clutha River.

(e) **Future Ecological Value of the Area** - The short tussock grassland and cushion fields have maintained a moderate degree of ecological integrity despite rabbit grazing. Thus, the area is sustainable even without protection from rabbits; however the ecological integrity and processes would be greater still with decreased pressure from grazing

8.16 In summary, the short tussock grassland and cushion fields lack the diversity of the original vegetation cover along the Clutha River. However, given the size and number of plant species surviving and the refuge the area provides for the threatened cushion Pimelea I consider the area contains ecological values that are consistent with the significance criteria.

SNAs E19A, E19B and E19C - Sam Kane (Submitter 590)

8.17 Sam Kane has requested the removal of E19A, E19B and E19C on the grounds that these areas are not rare, not threatened and DOC had no interest in these sites through the tenure review process.

8.18 I accept Mr Kane's submission that the risk of the kanuka woodlands identified within the SNA being cleared is very low. Notwithstanding this point I consider the three sites are significant based on the following assessment of significance criteria noting the assessment is set out on pages 156 to 164 of **Appendix F** is also relevant:

(a) **Rarity and Distinctiveness** – The TEC identifies that part of the kanuka woodland intercepts an environment that has 18.6% indigenous vegetation cover remaining, with 2.3% protected. I note that vegetation modelling undertaken by Walker *et. al,* 2003 found that kanuka was an integral component of woodlands throughout the lowland environments of the Upper Clutha and their extent is now greatly reduced. The kanuka woodland communities are expected to support invertebrates, insectivorous birds and the 'at risk' eastern New Zealand Falcon.

(b) **Representativeness** – The kanuka shrubland present is representative of original pre-settlement vegetation cover in the Upper Clutha area.

(c) **Diversity and Pattern** – The kanuka woodland is typical of regenerating stands found on the lower slopes of the Upper Clutha Valley.

(d) **The Ecological Context of the Area** - The assessed area is part of a mosaic of grassland and shrubland across the lower west facing slopes of the Grandview mountain system. It should be viewed as a core contributor to the ecology of the lower slopes of the mountain range that is supported by multiple smaller stands of kanuka and grey shrubland.

(e) **Future Ecological Value of the Area** – Mr Kane states in his submission that there is no economic incentive/benefit for harming or reducing the values of the proposed SNAs. This suggests the sites sustainable under the current management regime.

8.19 In summary, the kanuka woodland within the catchment is a good example of the vegetation representative of the lower slopes of the Grandview mountain system. Further the proposed SNAs are located within an environment with less than 20% indigenous vegetation cover remaining and are expected to support the 'at risk' eastern New Zealand falcon. I consider the area contains ecological values that are consistent with the significance criteria.

New listing: Roger Gardiner (Submitter 260)

8.20 Roger Gardiner (Submitter 260) has requested an amendment to 33.8.1 seeking that the Fish and Game owned 'Wanaka Fish Hatchery, Stone Street' i.e. the spring fed source for Bullock Creek is included as an SNA. This site was not identified within the desktop assessment and therefore not considered further. Notwithstanding this point, I am not aware of the ecological values of the site that would merit recognition through the SNA process. Some assessment of the wetland vegetation community would need to be undertaken.

SNAs B11A, SNA B11C, SNA B11D and SNA B11F - The Alpine Group (Submitter 315)

8.21 The Alpine Group (Submitter 315) has requested an amendment to 33.8.1 that would remove the SNAs on Minaret Station because in their view the SNAs are not significant. In my view and for the reasons that follow, the SNAs on Minaret Station should remain. I provide the following assessment of the proposed SNAs with the assessment criteria.

8.22 SNA B11A noting the assessment is set out on page 42 of **Appendix F** is also relevant):

(a) **Rarity and Distinctiveness** - The TEC identifies the environment the kanuka woodland stand is situated in has less than 3.6% indigenous vegetation cover remaining and 0.8% protected. Indigenous vegetation adjacent to Lake Wanaka is very restricted compared to its original extent and the kanuka woodland is a very distinctive community. Furthermore, kanuka woodland on Minaret Station and the neighbouring Albert Burn is at its western distributional limit.

(b) **Representativeness** – Historically the vegetation on the Estuary Burn alluvial fan and lakeshore is likely to have comprised a beech-podocarp forest on the more stable areas, broadleaved indigenous hardwoods and manuka/kanuka woodland occupying areas that were exposed to more regular disturbance events (mainly floods). The kanuka woodland is considered to be representative of areas prone to regular disturbance events

(c) **Diversity and Pattern** – The Kanuka woodland has a low diversity which is typical of kanuka stands at an early stage of development. However, over time this woodland is expected to provide the conditions for the establishment of podocarps, and indigenous broadleaved species.

(d) **The Ecological Context of the Area** - The woodland is connected to other lakeshore kanuka stands in addition to indigenous broadleaved hardwood stands and beech forest in the Estuary Burn.

(e) **Future Ecological Value of the Area** – The kanuka woodland is of a sufficient size to be self-sustaining and has the potential to develop further with increasing diversity as the canopy opens up over time providing the conditions for podocarps, kowhai and other indigenous broadleaved species to successfully establish.

8.23 In summary, the woodland is a good example of vegetation that is representative of an environment with less than 5% indigenous vegetation cover remaining. Given the rarity of indigenous vegetation cover, the fact that the kanuka is close to its western distribution limit, and the ecological trajectory of the community I consider the area contains ecological values that are consistent with the significance criteria.

8.24 SNA B11C noting the assessment is set out on page 45 of **Appendix F** is also relevant:

(a) **Rarity and Distinctiveness** - The TEC identifies the environment the kanuka woodland stand is located in has approximately 22% indigenous vegetation cover remaining and 8% protected. Indigenous vegetation adjacent to Lake Wanaka is very restricted compared to its original extent and the kanuka woodland is a very distinctive community.

(b) **Representativeness** – Historically the vegetation on the Estuary Burn alluvial fan and lakeshore is likely to have comprised a beech-podocarp forest on the more stable areas, broadleaved indigenous hardwoods and manuka/kanuka woodland occupying areas that were exposed to more regular disturbance events (mainly floods). The kanuka woodland is considered to be representative of areas prone to regular disturbance events.

(c) **Diversity and Pattern** – The Kanuka woodland has a low diversity which is typical of kanuka stands at an early stage of development. However, over time this woodland is expected to provide the conditions for the establishment of podocarps, and indigenous broadleaved species.

(d) **The Ecological Context of the Area** - The woodland is connected to other lakeshore kanuka stands in addition to indigenous broadleaved hardwood stands and beech forest in the Albert Burn and Mt Albert Station.

(e) **Future Ecological Value of the Area** – The kanuka woodland has a closed canopy and is of a sufficient size to be self-sustaining and has the potential to develop further with increasing diversity as the canopy opens up over time providing the conditions for podocarps, kowhai and other indigenous broadleaved species to successfully establish.

8.25 In summary, the kanuka woodland is a good example of representative indigenous vegetation located adjacent to Lake Wanaka. The community is expected to provide the conditions for the establishment of podocarps, kowhai and other hardwood species, therefore the floral and faunal diversity of this community is expected to increase over time.

8.26 SNA B11D consists of three ecological communities including manuka/kanuka woodland, regenerating broadleaved indigenous hardwoods and beech forest. My assessment against the criteria is as follows (noting the assessment is set out on page 49 of **Appendix F** is also relevant):

(a) **Rarity and Distinctiveness** – The TEC identifies the environment the SNA is located within contains 44.68% indigenous vegetation cover remaining and 1.96% formally protected.

(b) **Representativeness** – Historically the vegetation on the lake faces adjacent to Minaret Burn comprised a beech forest. The communities associated with this assessment are regenerating broadleaved indigenous hardwoods and manuka woodland. These communities are both representative of mid successional vegetation development within this environment.

(c) **Diversity and Pattern** – The kanuka woodland has a low diversity which is typical of kanuka stands at an early stage of development. However, over time this woodland is expected to provide the

conditions for the establishment of podocarps, and indigenous broadleaved species.

(d) **The Ecological Context of the Area** - The SNA consists of three vegetation communities including kanuka/manuka woodland and broadleaved indigenous hardwoods and beech forest and is part of a lakeshore to alpine environment sequence of indigenous vegetation.

(e) **Future Ecological Value of the Area** – The site is of a size that is sufficient to provide a permanent habitat for a range of indigenous invertebrates and bird species. Ecological processes such as vegetation development and succession, disturbance events and recruitment will all be viable within this site.

8.27 In summary, while the vegetation in itself is not within an environment that is nearing the 20% threshold where species loss accelerates, it is significant in that it provides for a relatively uninterrupted lake shore to alpine sequence that is rare within the District.

8.28 SNA B11F consists of regenerating broadleaved indigenous hardwoods (noting the assessment is set out on page 54 of **Appendix F** is also relevant):

(a) **Rarity and Distinctiveness** - The TEC identifies the environment the SNA is located within contains 44.68% indigenous vegetation cover remaining and 1.96% formally protected. I consider the site to be highly distinctive given much of the original indigenous cover adjacent to Lake Wanaka has been removed.

(b) **Representativeness** – Historically the vegetation on the lake faces would have comprised a mix of indigenous broadleaved hardwoods and beech forest. The communities associated with this assessment are regenerating and established broadleaved indigenous hardwood communities. This community is highly representative of this lakeside environment.

(c) **Diversity and Pattern** – Indigenous broadleaved hardwood communities contain a diverse range of plants species and provide habitat for invertebrates and birds.

(d) **The Ecological Context of the Area** – The SNA is located adjacent to the Minaret Wetland and will provide habitat for bird species that can move between patches of vegetation along the lakeshore.

(e) **Future Ecological Value of the Area** – The vegetation within the SNA is self-sustaining and will continue to develop providing the site is not affected by inadvertent fires.

8.29 In summary, the broadleaved hardwood forest is representative of the original lakeshore ecosystems. Much of the original lake shore vegetation has been lost and in my opinion the remaining remnant vegetation is important and meets the Significance Criteria.

8.30 The Alpine Group has also requested the removal of the SNAs on Minaret Station for the further following reasons:

(a) The land is administered in accordance with the Land Act 1948 and Crown Pastoral Land Act 1998;
(b) Exotic weeds within the SNA will require on-going management;
(c) The encumbrance or valuation considerations caused by SNAs have not be identified;
(d) The vegetation within SNAs are already protected by the ODP and PDP; and
(e) Some of the SNAs are intensively farmed.

8.31 I provide the following response to the above points:

(a) The Land Act 1948 and Crown Pastoral Land Act 1998 Act do not have the same consideration towards biodiversity values under the Resource Management Act 1991. Under the Crown Pastoral Land Act 1998, any advice received from the Department of Conservation is not binding and does not have to be heeded or enforced; and
(b) No active management of noxious weeds is implied or required in the classification of SNAs.

SNA E18C - Allenby Farms (Submitter 502)

8.32 Allenby Farms (Submitter 502) has requested an adjustment to SNA E18C based on the report 'Evaluation of a Potential Significant Natural Area at Mt Iron, Wanaka' by Wildlands (2015), which suggests northern and southern boundary changes. In my view, the requested change to pull back the current northern boundary of the SNA is not appropriate, however, an extension to the southern boundary of the SNA would be appropriate. This is because the Wildlands (2015) report specifically states that the reduction of the northern boundary is 'at the expense of losing some kanuka scrub and shrubland'. It states that this is acceptable due to kanuka being common in the local area. While kanuka woodland is the most prevalent indigenous community in the local area it remains situated within an environment that has less than 20% indigenous vegetation cover remaining. It is within this context that the assessment of significance should be applied. The report highlights a further extension to the southern boundary as it better captures the ecological gradient present and habit for the 'At Risk' *Pimelea sericeovillosa* subsp. *pulvinaris*. I agree with this latter finding in the Wildlands (2015) report, and a revised boundary is included in Mr Barr's section 42A report.

SNA B16A, B16B_1 to 3 - Glen Dene Ltd and Glen Dene Holdings (Submitter 384)

8.33 Glen Dene Ltd and Glen Dene Holdings has requested an amendment to 33.8.1 that would remove the SNAs on Glen Dene Station. In large part this is because they consider that the SNAs are not significant and the areas could not be cleared under the operative rules.

8.34 I oppose this submission for the following reasons in light of the significance criteria (noting the assessment is set out on pages 67 to 75 of **Appendix F** is also relevant):

(a) **Rarity and Distinctiveness** – The regenerating broadleaved indigenous hardwoods, manuka woodlands and beech forests are located within a TEC with 44.68% indigenous vegetation cover remaining and only 1.96% protected. These SNAs support habitat of the 'at risk' New Zealand eastern falcon.

(b) **Representativeness** – Historically the vegetation within the SNAs would have been dominated by beech forest. This community is present in patches within the areas today, however, the vegetation is now dominated by regenerating broadleaved indigenous hardwoods and manuka woodland. The broadleaved forest and manuka woodland communities are both representative of mid successional vegetation development within this environment.

(c) **Diversity and Pattern** - The areas consist of two vegetation communities (kanuka/manuka woodland and broadleaved indigenous hardwoods), which provide sections for contiguous sequences of indigenous vegetation from shrubland/lakeshore through to the alpine environment.

(d) **The Ecological Context of the Area** - The vegetation is continuous with the tall tussock grassland at higher elevations and, in B16A is continuous with the mature beech forests within the Craig Burn Conservation Covenant area.

(e) **Future Ecological Value of the Area** – The sites are of a size that is sufficient to provide a permanent habitat for a range of indigenous invertebrate and bird species. Ecological processes such as vegetation development and succession, disturbance events, and recruitment, will all be viable within these areas.

8.35 In summary, the regenerating broadleaved indigenous hardwoods, manuka woodlands and beech forests are good, sustainable representations of mid successional vegetation development. The vegetation also provides feeding habitat for the 'at risk' eastern New Zealand falcon. Furthermore, the SNAs provide for sequences of indigenous vegetation over altitudinal sequences. Consequently, I consider the area contains ecological values that are consistent with the Significance Criteria.

SNA A23A - Jed Frost and Adam Smith (Submitter 323)

8.36 I understand the SNA referred to in this submission covers an area of a consented subdivision. The submission does not provide specific changes to

the SNA boundary. This detail would be required to allow an assessment of the implications to the SNA.

F2A, F2B_1, F2B_2, F2C and F2D - Isabella Anderson (Submitter 829)

8.37 Isabella Anderson requests that F2A, F2B_1, F2B_2, F2C and F2D are removed as 'they are still going through the process' and has not wanted their inclusion through all stages of the SNA process. I accept Isabella Anderson's concerns regarding the movement of the proposed SNA sites on Branch Creek through to this stage. However, I note that a letter was sent to all landowners in April 2014 stating that QLDC had progressed the project to Stage 4 of the process and requested further feedback at this time. I understand QLDC received no further information from this submitter.

8.38 I oppose the submission and consider the SNAs identified are significant based on the assessment criteria noting the assessment is set out on pages 222 to 241 of **Appendix F** is also relevant).

Rarity and Distinctiveness

(a) SNA F2A – The shrubland and beech forest within F2A are not within an area that has a high percentage of indigenous vegetation cover loss. However they are rare in that beech forest in the Cardrona Valley is very restricted from its pre-settlement distribution and the shrubland is very distinctive as it contains a diverse assemblage of species (*Dracophyllum longifolium, Dracophyllum uniflorum, Olearia avicennifolia, Olearia arborscens, Olearia nummularifolia, Olearia odorata,* mountain ribbonwood *(Hoheria lyallii),* koromiko *(Hebe salicifolia), Coprosma rugosa, Coprosma propinqua, Carmichaelia petriei, matagouri, Melicytus alpinus, Aristotelia fruiticosa, Phormium cookianum*) that are not commonly found in the Cardrona Valley.

(b) SNAs F2B_1, F2B_2, F2C and F2D contain dry shrubland communities within environments that range between less than 20% remaining in the case of F2C and F2D and less than 40% remaining in F2B_2, F2C. The better grey shrubland communities in the district that were historically abundant at lower elevations now tend to be found at slightly higher elevations in environments that supported

beech forest. The grey shrubland will support prey and breeding habitat for the 'at risk' eastern New Zealand Falcon and will support a range of endemic invertebrates associated with both Olearia and Coprosma species that are in abundance within the SNAs. The shrublands are distinctive within the ecological district given the size of the shrublands and the populations of Olearia. Many similar shrublands in the district are much smaller in size and often dominated by matagouri and briar.

Representativeness

(c) SNA F2A contains beech forest that is highly representative of the environment and would have been the dominant cover in the area prior to settlement. The shrubland community is rare in the context of the Cardrona Valley with the assemblage more consistent with shrublands to the west of the district.

(d) SNAs F2B_1, F2B_2, F2C and F2D are dry shrubland communities that are highly representative of the drier parts of the District. The shrublands within the SNAs are well developed and contain closed canopy stands and include good populations of Olearia species that are often absent from dry shrublands in the District. I therefore conclude that the shrublands are some of the best examples of dry shrubland in the District.

(e) **Diversity and Pattern** - The shrublands will contain a diverse range of grey shrubland species and include both riparian and drier hillside communities

(f) **The Ecological Context of the Area** - The shrublands form patches of indigenous communities in dryland environments and collectively provide important habitat for a range of faunal species.

(g) **Future Ecological Value of the Area** - It is likely that the shrublands have been expanding their distribution in recent years as a result of the current land management regime i.e. limited vegetation clearing activities. Under current management practices the shrublands are sustainable and expected to continue to develop.

8.39 In summary the shrublands are excellent examples of vegetation and habitat that are some of the best examples in the District. It is also important habitat for a diverse and abundant invertebrate fauna and passerines that are critical for the maintenance of eastern falcon. Given the high level of representativeness and rarity of high quality grey shrubland in the District, I consider that the areas are Significant Indigenous Vegetation and Fauna Habitat.

9. LIST OF THREATENED PLANTS

9.1 It is possible that further threatened species are present within the District and if they can be identified and justified, I would consider their inclusion within 33.7.1. The DOC (Submitter 373) has provided a list of additional species they consider should be included in the list. I have reviewed the list and can confirm that there are habitats in the district that could support these threatened plants however I cannot confirm if these species are present. Given the habitats are present I consider it is appropriate to include these species within 33.7.

10. DEFINITIONS

Clearance of Vegetation (Includes Indigenous Vegetation)

10.1 Forest and Bird NZ (Submitter 706) has requested an amendment to the definition of 'Clearance of Vegetation' in Chapter 2 that would include 'soil disturbance including direct drilling' as a method of indigenous vegetation clearance. In my view, this change is appropriate, as direct drilling can crush native vegetation to a degree that constitutes direct clearance of indigenous vegetation.

10.2 The Department of Conservation (Submitter 373) has requested an amendment to the definition of 'Clearance of Vegetation' that would include 'oversowing' as a method of indigenous vegetation clearance. This requested change is similar to the proposal to include irrigation in the definition in that the activity will not have an immediate physical disturbance but it is likely to result in the competitive exclusion of indigenous species in some

environments, notably dryland environments where the indigenous cover is dryland cushionfields.

10.3 Within the District much of the oversowing that has occurred is undertaken following the burning or spraying of predominantly bracken fern dominated vegetation. In this instance I do not think it is reasonable to include oversowing in the definition of clearing. Notwithstanding this point, I am of the opinion that the combination of oversowing and irrigation would have a detrimental effect on dryland communities that would result in the loss of indigenous vegetation cover. Given the spatial nature of this issue in the district I consider the issue of oversowing and irrigation may be better captured in a site standard rather than within the definition of 'Clearance of Vegetation'.

10.4 Federated Farmers of New Zealand (Submitter 600) has requested an amendment to the definition of 'Clearance of Vegetation' that would exclude irrigation as a method of indigenous vegetation clearance. In my view, this change is not appropriate for the following reasons. The variation in amount of water available within an environment can determine the plant species composition. Specifically, indigenous vegetation adapted to naturally drier habitats cannot successfully compete with exotic pasture species that are better adapted to wetter conditions (Walker, Aff. 45; Lee, Aff.18). Accordingly, the application of water via irrigation to a dryland environment provides a competitive advantage to exotic species, which outcompete certain native species and therefore is considered to constitute clearance of indigenous vegetation (Walker, Aff. 45; Lee, Aff. 18). Furthermore, irrigation will be undertaken in tandem with the application of seed and fertiliser, which will further enhance the competitive exclusion process and clearance of indigenous vegetation (Lee, Aff. 17, 21).

10.5 Natural dryland habitats do occur within the District, for example the valley floors of the Upper Clutha basin, where native cushion field communities have adapted to relatively dry conditions and would not successfully compete with exotic species that grow taller and more rapidly in the presence of irrigation.

10.6 The Department of Conservation (Submitter 373) has requested the inclusion of a definition for 'Biodiversity Offset' and 'no net loss' in Chapter 2. In my view, the inclusion of definitions of 'biodiversity offset' and 'no net loss' is helpful as biodiversity offsetting is not well understood. The definitions

presented by the DOC provide a clear statement on what offsetting is and it is consistent with my understanding of the application of biodiversity offsets.

10.7 Biodiversity offsetting is not a form of mitigation and is only considered when all measures of avoidance, minimisation, remediation or mitigation have been exhausted. If biodiversity offsetting is proposed the offset must be a site equivalent to the affected area and must result in a net biodiversity gain. I have not encountered a project within the District that has promoted the use of biodiversity offsets to support a consent application. They are generally associated with large scale disturbance activities such as mining activities and they are difficult to implement given the expectation that an offset will result in 'no net loss' of biodiversity.

Appendix A – Appendix 5 of the ODP

Appendix 5

Areas of Significant Indigenous Vegetation

AREAS OF SIGNIFICANT INDIGENOUS VEGETATION AND HABITAT OF INDIGENOUS FAUNA - PART I				
2A	5	Hunter River Delta	G38 270 557	WERI: A braided river used for fishing and recreational boating activities. An important site for bird breeding.
16A	10	Caspar Flat Bush	E40 669 936	SSWI: An area with mountain beech. Bird species present include yellow breasted tit, rifleman, grey warbler and silvereye. Reasonable canopy but low plant diversity (natural for environment).
17A	10	Left Branch bush	E40 665 925	SSWI: An area of mountain beech, mountain toatoa, small leaf *Coprosmas* and ferns. A very steep south facing habitat. Reasonable canopy but very little plant diversity (natural for environment). Bird species include yellow breasted tit, rifleman, silvereye and grey warbler. Some large slips.
18A	10	Butchers Gully Bush	E40 665 906	SSWI: An area with mountain beech and mountain toatoa. Bird species include grey warbler, rifleman and yellow breasted tit. A steep south facing habitat. Reasonable canopy but little plant diversity. Some slipping.
35A	10	Mount Aurum Remnants	S123 520 930	SSWI: An area with mountain beech, situated in gullies and on southern faces. Reasonable canopy, but low plant diversity. Yellow breasted tit, rifleman and grey warbler present.
38A	12	Moke Lake	S132 470 738	WERI, SSWI: A steep montane lake surrounded by tussock farmland. Brown trout fishery.
40A	12	Lake Isobel	S132 406 807	WERI: A lake with restiad bog and tussock land (*Chionochloa* species).
41A	12	Lake Kirkpatrick	S132 477 704	WERI, SSWI: A sub-alpine lake with *Carex* bog and surrounded by tussock farmland. Common native water-fowl present. More important as trout fishery.
42A	12, 38	Few Creek Bush (includes 127)	S132 440 675	SSWI: A moderate sized plain beech forest (red beech, mountain beech) with common forest birds, including brown creeper, fantail, bellbird, rifleman, grey warbler and yellow breasted tit.
43A	12, 38	Twelve Mile Bush	S132 420 655	SSWI: Reasonable sized bush with more diversity than usual, with red beech, mountain beech, broadleaf shrubbery, bracken and tussock surrounds. Good range of common forest birds, including brown creeper, fantail, bellbird, rifleman, grey warbler and yellow breasted tit. Very good lakeshore diversity.
57A	31	Lake Johnson	F41 735 695	WERI, SSWI: An eutrophied lowland lake, rush and sedge swamp (*Carex* species - Cyperaceae).
69A	13	Shadow Basin Tarn	F41 798 639	Montane lake and montane flush surrounded by steep slopes of snow tussock, cushion vegetation and herb fields.
71A	13	Lake Alta (adjoins 70)	F41 801 632	WERI: A montane lake surrounded by steep snow tussock slopes with extensive cushion vegetation and herb fields.
72A	13	Upper Wye Lakes	F41 812 612	WERI: Four montane lakes surrounded by scree and snow tussock. Cushion vegetation and herb fields.
91A	5	Dingle Lagoon	G39 220 347	WERI SSWI: A lagoon with a sloping edge with good plant communities and populations of paradise shelduck, mallard, grey duck and Canada geese.
114A	6, 9	Mt Earnslaw Forest and Bush Remnants	E40	SSWI: A healthy area of bush with red beech, totara, mountain beech, *Grisilinea,* fuchsia, wineberry, *Coprosma* sp., hard fern. Good numbers of bush birds present, including yellow breasted tit, rifleman, bellbird, grey warbler and silvereye.
126A	32	Gorge Road Wetland	S132 555 720	Significant site of insects and plants *(Carox socta).*

PART II CRITERIA

The purpose of this part of the appendix is to outline a process by which areas of significant indigenous vegetation and significant habitats of indigenous fauna can be identified and included in the District Plan.

The Council will adopt a five stage process which is to commence within 18 months of the District Plan becoming operative, as follows:

Stage 1 – Initial Identification

Initial identification of significant areas will involve:

(a) Review of existing environmental databases and information on the Districts biodiversity to identify potentially significant sites.

(b) Identification of information and data gaps on the district's biodiversity and those parts of the district where potentially significant sites may exist but which have not yet been studied or assessed.

Stage 2 – Consultation Process

Before commencing an assessment under Stage 3 the Council will:

(a) Initiate personal consultation with the affected landowner and occupier.

(b) Consult with the Department of Conservation and other interested parties regarding suitable ecological experts.

(c) Arrange in conjunction with the landowner and occupier for a professional ecological assessment of the site to be carried out.

(d) Discuss with the landowner and occupier, the Department of Conservation and other interested parties the scope and nature of the brief used to undertake the assessment and the sharing of information.

Having completed an assessment under Stage 3 the Council will:

(a) Discuss the results of any assessment with the landowner and occupier and where necessary, appropriate methods of management or protection.

(b) Make the outcomes of any ecological assessment part of the public record.

Stage 3 – Assessment

In determining whether an area is significant in terms of section 6(c) of the Resource Management Act 1991 the Council will use the following ecological criteria as the basis for determining ecological significance:

Primary Criteria

A The Ecological Values of the Area – the values of the place itself

(i) Representativeness – Whether the area contains one of the best examples of an indigenous vegetation type, habitat or ecological process which is typical of its Ecological District.

(ii) Rarity – Whether the area supports or is important for the recovery of, an indigenous species, habitat or community of species which is rare or threatened within the Ecological District or is threatened nationally.

(iii) Diversity and Pattern – the degree of diversity exhibited by the area in:

- vegetation,
- habitat types,
- ecotones,
- species,
- ecological processes.

(iv) Distinctiveness/Special ecological character – the type and range of unusual features of the area itself and the role of the

area in relationship to other areas locally, regionally and nationally, including:

- presence of indigenous species at their distribution limit,
- levels of endemism, eg the presence of endemic species,
- supporting protected indigenous fauna for some part of their life cycle (eg breeding, feeding, moulting, roosting), whether on a regular or infrequent basis,
- Playing a role in the life cycle of migratory indigenous fauna,
- containing one of the best examples of an intact sequence, or substantial part of an intact sequence of ecological features or gradients,
- supporting predominantly intact habitats with evidence of healthy natural ecosystem functioning

Other Criteria

B The Ecological Context of the Area including its relationship with its surroundings

(v) Size and Shape – the degree to which the size and shape of an existing area is conducive to it being, or becoming ecologically self sustaining.

(vi) Connectivity – the extent to which the area has ecological value due to its location and functioning in relation to its surroundings. An area may be ecologically significant because of its connections to a neighbouring area, or as part of a network of areas of fauna habitat. For example an area may act as a corridor or stepping stone for movement/migration of species between or to areas of important habitat.

C The Future Ecological Value of the Area

(vii) Long Term Sustainability – the degree to which an area is likely to maintain itself, taking into consideration:

- extent to which criteria in paragraphs A and B above are met
- degree of historic modification to the area and its surroundings which affects its future
- degree of resilience of species and habitats present
- the effects of current management on identified ecological values
- the extent to which the area has achievable potential, with management input, for restoration of ecological values which are significant in the Ecological District.

The fact that a particular area satisfies one or more of the above criteria does not necessarily mean the area is significant.

The Council will give particular consideration to the ecological criteria in paragraphs (i) to (vii) along with any other relevant considerations in deciding whether or not an area should be included in Part I of the Appendix.

Stage 4 – Final Consideration

Before deciding whether or not to adopt any area identified in Stage 3 as being significant into the District Plan the Council will have regard to the following matters:

(a) existing land use and the degree of modification associated with the site

(b) the economic effect on the landowner including development costs and lost potential (If these are relevant under section 7(b) of the Act)

(c) consideration of non regulatory and regulatory methods which ensure the identified values and their needs are recognised and protected

(d) presence and level of animal pests and weeds

(e) resources required to implement effective protection

(f) whether or not identified values are under threat

(g) the extent to which values are or are not protected elsewhere

(h) any other relevant factor.

Stage 5 – Adoption into the District Plan

This process will include a Plan Change to the District Plan. That process is outlined in Part 1.6 Introduction of the District Plan.

Glossary of Terms:

Endemic: Refers to species of plants and animals which are unique to an area or animals which may migrate but only to breed in the area.

Ecological District: One of the major levels used for the ecological classification of land. New Zealand has been divided up into 85 ecological regions and 269 ecological districts according to geological, topographical, climatic and biological features and processes. This reflects the small scale variability of New Zealand's ecological patterns. An ecological district is a land where topographical, climatic, soils and biological features and broad cultural patterns produce a characteristic landscape of biological communities. An ecological region compromises adjacent ecological districts with closely related characteristics, or may only include one ecological district with very distinct features.

Habitat: The environment in which a particular species or group of species live. It includes the physical and biotic characteristics that are relevant to the species concerned. For example, the habitat of whio/blue duck consists of swift water with an abundance of freshwater insects.

Ecotone: A transitional zone between two habitats, which has distinct species or ecological characteristics of its own.

Resilience: The ability of a community or species to recover quickly (return to its original state) from perturbation, disturbance or displacement.

Community: The species that occur together in the same place at the same time.

Population: A group of individuals of one species in an area.

Ecosystem: A biological system comprising a community of living organisms and its associated non-living environment (such as sunlight, air, water, minerals and nutrients), interacting as an ecological unit.

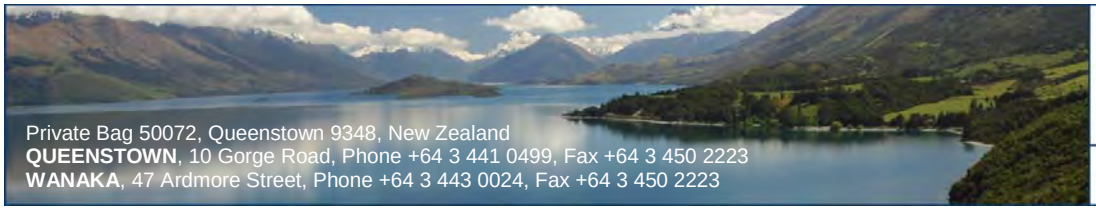
Rare: Species with small world populations that are not at present endangered or vulnerable but are at risk of extinction. The species are usually localised within restricted geographical areas or habitats, or thinly scattered over a more extensive range.

Endangered: Species in danger of extinction and whose survival is unlikely if the factors causing their decline continue to operate.

Vulnerable: Species likely to move into the endangered category in the near future if the factors causing their decline continue to operate.

Threatened species: A species or community that Is vulnerable or endangered.

Biological diversity: The variability among living organisms from all sources, this includes diversity within species, between species and ecosystems. Components include genetic diversity, species diversity and ecosystem diversity.



Private Bag 50072, Queenstown 9348, New Zealand
QUEENSTOWN, 10 Gorge Road, Phone +64 3 441 0499, Fax +64 3 450 2223
WANAKA, 47 Ardmore Street, Phone +64 3 443 0024, Fax +64 3 450 2223

QUEENSTOWN LAKES DISTRICT COUNCIL

www.qldc.govt.nz

Significant Natural Area Assessment

Project No: *11001/018*	Property Name: *Allenby Farms* Site Name: *Mt Iron SNA C*	Ecologist: *Glenn Davis* Date: *17 November 2011*

Survey Undertaken By: *Glenn Davis and Ralph Henderson*	Waypoint No (mid-point of survey area): *See aerial photograph for site location.*
LENZ Units: *N4.1d* Ecological District: *Wanaka Ecological District*	Photo No.(s): *No photos.*

Topography: *Gentle slope.*	Slope: *Variable*	Altitude: *400 masl*	Aspect: *Various*
Threatened Environment Status: *Chronically threatened*		Area Size (ha): *48.08*	

Representativeness:
Pre-settlement vegetation representative of N4 LENZ environments is understood to have consisted of kanuka, matagouri, coprosmas, olearias, native brooms and kowhai. The vegetation on the Allenby Farms site is dominated by kanuka woodland but lacks the diversity of the original vegetation cover. The existing vegetation remains a degraded form of the original community.

Are there threatened species expected/identified in the survey area? If so, list species and threat status.
No threatened species expected, the eastern falcon may hunt in the Mt Iron area and its threat status is 'At Risk – Recovering'.

Threatened Species	Threat Status
None observed	

Provide onsite description of vegetation:
Vegetation type: Kanuka woodland.
Degree of Modification: The area has experienced extensive historical disturbance with the lack of woodland diversity a clear indication species have been lost through multiple disturbance events. Notwithstanding this point, the kanuka woodland remains a representative example of a community within the N4 LENZ unit.

Provide onsite description of fauna habitat:
The kanuka woodland is expected to provide habitat for the following species:
Birds – indigenous insectivorous birds including bellbird, fantail, grey warbler, tomtit and possibly tui.
Herpetofauna – Common skink, McCanns skink, Southern Alps Gecko and Cromwell Gorge Gecko.
Invertebrates – A kanuka woodland canopy has closed in some places and will provide the conditions for the development of a litter layer which will support a range of invertebrates.

Threats to vegetation and flora/fauna species? (Weeds, predators, current management practices): Key threats include grazing of regenerating shrubland and the risk of inadvertent events such as fire.
Rarity: The threatened environment classification identifies indigenous vegetation cover associated with the N4.1d environment to be chronically threatened with only 18.6% indigenous vegetation cover remaining and 2.3% formally protected. The 'proposed National Policy Statement on Indigenous Biodiversity' considers indigenous vegetation within this environment should be considered significant under section 6c of the RMA.
Area Size and Shape (degree to which the area may be or is becoming self-sustaining): The kanuka woodland on the Allenby Farms is directly connected to the kanuka woodland that covers the rest of Mt Iron and is a key component of Mt Iron kanuka woodland community.
Diversity and Pattern (is there a notable range of species and habitats, aspects, sequences?): The kanuka woodland has a generally low level of botanical diversity.
Distinctiveness/special ecological characteristics (unusual veg. & landform features, distribution limits?): Mt Iron is a roche moutonee that is a distinctive geological feature of the Wanaka area.
Connectivity (how is the site connected to surrounding communities/areas?): The woodland is directly connected to other areas of indigenous cover on Mt Iron, including the DOC administered Mt Iron Scenic Reserve.
Sustainability (does the site possess the resilience to maintain its ecological integrity and processes?): The kanuka woodland is sustainable and has the ability to keep regenerate even in the event of disturbances such as fire.
Recommendation (Accept/Decline): The vegetation and habitat is a degraded representation of the original vegetation cover of Mt Iron. Notwithstanding this point, the kanuka woodland is representative of this environment and forms part of a relatively extensive area of indigenous vegetation within a chronically threatened environment. Based on the above considerations we recommend this area for inclusion as an area of Significant Indigenous Vegetation and Fauna Habitat.

Figure 1: The area of potential significance - Mt Iron SNA C - E18C.

February 4, 2015

1:8,000

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Proposed Significant Natural Area

Parcels

Proposed Significant Natural Area

Please note the area shown is indicative and only for discussion purposes.