IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Porter Ski Area Limited Private Plan Change 25 to the Selwyn District Plan

---

EVIDENCE OF SARAH MEGAN FLYNN

June 2011

INDEX

1. INTRODUCTION

Qualifications and Experience

1.1 My name is Sarah Megan Flynn. I am an Associate and Senior Terrestrial Ecologist with Golder Associates (New Zealand) Limited. I have over 15 years' professional experience in terrestrial ecology and related resource management issues. I hold the qualifications of BSc (Botany), MSc (Hons) (Botany) and PhD (Environmental Science; to be conferred in September 2011) from the University of Auckland. My particular areas of expertise are in botany and vegetation ecology.

1.2 In my career I have undertaken numerous ecological surveys and site assessments throughout the Auckland Region and New Zealand for a variety of clients in both the public and private sectors. I have also undertaken a variety of projects pertaining to ecosystem restoration and management, and provision of ecology-related strategic and policy advice.

1.3 Such work has included district-wide surveys to identify "Significant Natural Areas", evaluation of the ecological significance of wetlands and bush remnants on private property to determine their eligibility for conservation lot subdivision, covenanting or development, and assessment of ecological effects of subdivision and consequent development. I have also been responsible for developing management plans for the maintenance and enhancement of natural areas in a number of reserves and private properties throughout New Zealand.

1.4 I am familiar with the site in question, having visited it on two occasions (in December 2010 and January 2011).

1.5 I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 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 I express. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of Evidence

1.6 In my evidence I will:

i. Provide a brief overview of ecological features within the site and their significance.

ii. Present a summary of ecological effects of the proposed development.

iii. Review measures proposed to address adverse ecological effects, and give my opinion on the adequacy and appropriateness of these measures, and on protections provided by the proposed Plan Change provisions.

iv. Summarise and address ecology-related matters addressed in submissions.

2. OVERVIEW OF THE CRYSTAL BASIN/PORTERS BASIN ECOSYSTEM

Summary of ecological features present

2.1 The Ecology Report provided in support of the plan change application (Boffa Miskell 2010) provides a comprehensive description of the known ecological values within the proposed development site and surrounds.

2.2 I summarise key ecological features and attributes of the site and its surrounds in the following paragraphs.

2.3 The site subject to the Plan Change and development proposals lies at the southern end of the Craigieburn Range. The Plan Change area is the existing Porters Ski Area and, to the north-east, Crystal Basin,together with an area of 18.3 ha, immediately to the north-east of Crystal Valley (the Northern Terrace). The Plan Change area ranges in altitude from 900m at the Ski Area access road bridge across the Porter River to 2000m above Crystal Basin.

2.4 Most of the area subject to the proposed Plan Change lies in Craigieburn Ecological District (the Porter River system is situated on the boundary between Craigieburn and Torlesse EDs). The Craigieburn ED covers 42,700 ha of mountain ranges including the entire Craigieburn Range, which contains numerous alpine cirque basins in-filled by rock-fall scree, moraine and occasional rock glacier deposits. Vegetation generally comprises alpine shrublands, snow tussocklands, scree and fellfield at higher levels, and mountain beech forest at lower altitudes. However, lower-altitude vegetation cover throughout much of this ED has been modified by

burning, farming and forestry so that now secondary shrubland and grasslands dominate.

2.5 Characteristic fauna of Craigieburn ED alpine environments include kea, New Zealand falcon and New Zealand pipit (all recorded within the proposed Plan Change area), while common skink and common gecko and a characteristic alpine invertebrate fauna have been described from alpine habitats in the vicinity of the Plan Change area. A nationally rare skink (*Oligosoma longipes*) has been recorded in the ED, including on the screes adjacent to the existing Porters Ski Area.

2.6 Introduced mammals including red deer, chamois, feral stock, rabbits, hares and possums are common in the Ecological District. Evidence of hares, and "camps" for red deer, chamois and feral stock, are conspicuous in the tussocklands around Porters Ski Area. Mice are commonly reported in the existing Ski Area Lodge.

2.7 The area subject to the proposed Plan Change is broadly characteristic of those in the alpine environment of the Craigieburn ED. Screes and rock formations dominate the higher basins, with only small amounts of vegetation cover. At lower altitudes tall tussock grassland, and tall tussock - *Dracophyllum* shrubland mixes dominate, with localised wet flushes, wetlands and watercourses. Boundaries between vegetation types are often not distinct. All these habitats support specialist native plants and animals adapted to a "high-stress" environment and relatively frequent natural disturbances (erosion, land instability and extreme climatic conditions).

2.8 Crystal Basin and the upper Porter River Valley currently have a low degree of modification, intact functioning and hence a high degree of naturalness. Elsewhere, the vegetation and habitats are modified in some areas by existing ski area activities, historic land uses, removal of forest cover, weeds and pests, and introduced fish. Where there is high soil moisture, or greater disturbance history, exotic weed species have invaded and sometimes form the dominant cover.

2.9 Numerous tributaries or small waterways drain from Porters and Crystal Basins to the Porter River. Several are well formed and permanent streams (for example Porter Stream), while many are intermittent or ephemeral.

Assessment of ecological significance

2.10 The Selwyn District Plan identifies that recognising and providing for the protection of significant areas of indigenous vegetation and habitats of indigenous fauna constitutes part of sustainable resource management.

2.11 The following is a précis of criteria set out in Appendix 12 of the Selwyn District Plan to identify whether a site is a "significant area of indigenous vegetation or habitat of indigenous fauna", in accordance with section 6(c) of the RMA:

- ***Representativeness*** *– the degree to which current vegetation and fauna is representative of that which formerly occupied Selwyn District…* [i.e.,] *to identify ecosystems that have suffered the greatest impact from human activities.*

- ***Diversity and pattern*** *– the level of diversity and/ or valuable natural ecological patterns … to concentrate protection efforts on sites which offer the greatest potential to preserve ecological processes and interactions*.

- ***Rarity/special features*** *– supports any rare or threatened species; or … habitat and vegetation types or species that have been reduced from their former extent (ie become rare).*

- ***Naturalness*** *– the extent to which the site has been modified directly or indirectly by human activities.*

- ***Ecological context*** *– the degree to which an area of indigenous habitat or vegetation has links to other such areas, or contributes to the ecological significance of the immediate vicinity.*

- ***Size and shape*** – the degree to which size and shape contribute to the viability of the site.

- ***Fragility, threat and buffering*** *– the degree to which a site is susceptible and resilient to specific threats and effects of threats.*

2.12 Boffa Miskell (2010) identifies 11 management units within the proposed Plan Change area, based on a combination of topography and proposed development activities. Each management unit is described, and its ecological significance assessed separately according to Selwyn District Plan criteria. On this basis, Boffa Miskell (2010) identifies Porter Stream Valley, Crystal Basin, Crystal Stream and Crystal Stream Valley management units as "significant", while noting that "within those management units there are areas of higher and lower ecological value", and that other parts of the site "may have locally important ecological values". A

summary of key attributes present in each of the management units that form the basis of the Boffa Miskell (2010) assessment is set out in Table 2.1 below.

Table 2.1: Summary of Boffa Miskell (2010) ecological significance assessment.

"Significant" according to Boffa Miskell (2010)	**Key attributes**
Units B, C: *Porter Stream Valley including Porter Stream*	• Comprises representative early successional vegetation (though vegetation types are common in Craigieburn ED); • Varied sequence of vegetation and habitat in response to physical gradients; • High quality aquatic habitat in Porter Stream, diverse aquatic macroinvertebrate fauna; • Forms linkage between Porter Basin with Porter River Valley (though neither of these management units were themselves identified as ecologically significant).
Unit H: *Crystal Basin*	• One of the largest examples of a cirque basin community sequence in the Craigieburn Range; • Relatively high species and community diversity for an alpine area, including alpine watercourse flushes/seeps that only occur in some of the cirque basins along the Craigieburn Range; • Naturally uncommon scree and rock outcrop plants present; • Relatively unmodified.
Units I, J: *Crystal Stream Valley and Crystal Stream*	• Representative of likely former cover of stream/riparian communities; • Varied sequence of riparian vegetation and habitat in response to physical gradients, extending from alpine flushes at source to main stem of Porter River; • Contains one of only two persistent native fish populations in the wider Porter River system; • Relatively unmodified, few weeds.
"Not significant" according to Boffa Miskell (2010)	**Key attributes**
Unit A: *Porter Basin*	• Modified, low species and community diversity.
Units D, E, F: *Lower Porter River Valley including Lower Porter River and Porter River hillslopes*	• Modified, low species and community diversity; • high weed component in place of former cover.

Unit G: *Southern terrace*	• Representative early successional vegetation (vegetation types common in ED); • High species diversity, but low community diversity (partly an artefact of considering the area as a standalone unit rather than part of the wider ecosystem). Contains local area of red tussock; • Locally modified, some weeds present; • Area by tracks and buildings associated with Ski Area; • Significance difficult to assess due to being intact but secondary vegetation cover.
Unit K: *Northern terrace*	• Representative early successional vegetation (vegetation types common in ED); • High species diversity, but low community diversity (partly an artefact of considering the area as a standalone unit rather than part of the wider ecosystem). Contains abundant young kanuka and manuka which is unusual for the site; • Relatively unmodified, few introduced species although these include wilding conifers; • Significance difficult to assess due to being intact but secondary vegetation cover.

2.13 I agree with the "rank order" of management units in terms of their significance, but in my opinion, assessment of ecological significance should also consider the site as an integrated unit. In this context, I do not consider that any part of the area can be wholly discounted as "not ecologically significant", given that all of the various management units identified contain: predominantly indigenous vegetation; and/or habitat for indigenous fauna (including one or more threatened species); and/or a naturally rare ecosystem feature (screes derived from acidic rocks); and/or watercourses in a relatively natural state (notwithstanding the presence of exotic fish).

2.14 I have also undertaken a brief evaluation of the proposed Plan Change area in order to determine whether the effects envisaged from the proposed development should be considered in the context of the Canterbury Regional Policy Statement. The relevant criteria of sub-chapter 20.4(1) of the Canterbury Regional Policy Statement (1998) states that "a matter is of regional significance when it concerns:

> *(a) Species, communities and habitats that are predominantly endemic to Canterbury, or threatened or unusual within the region, or any*

other indigenous species, communities or habitats which, in the manner of their occurrence are or were recognisable as being unique to or characteristic of the Canterbury region;

(b) Existing indigenous ecosystems and associated ecological processes that are or were unique to, characteristic of the Canterbury region;

(c) Threatened (as determined by national criteria) species and communities of indigenous flora or fauna;

(d) Essential habitat linkages, or connectivity between species, communities, habitats or ecosystems that meet criteria (a), (b) or (c) above."

2.15 In my opinion, the proposed Plan Change area is to be regarded as "regionally significant" as it harbours several threatened species, including two species (*Schizeilema pallidum* and *Oligosoma longipes)* that are endemic to the east Coast of the South Island (though not confined to the Canterbury Region); encompasses an indigenous ecosystem and associated ecological processes that is characteristic of (though not unique to) the Canterbury region; and includes associated connective linkages between species, communities and habitats characteristic of (though not unique to) the Canterbury region. Therefore, I consider that it is appropriate to apply the provisions of the Canterbury RPS when assessing the implications of the proposed Plan Change.

3. ASSESSMENT OF THE ECOLOGICAL EFFECTS OF THE PROPOSED DEVELOPMENT

3.1 My understanding of the specific adverse ecological effects anticipated as a result of the proposed Porters Ski Area expansion (derived from Boffa Miskell 2010) are as follows:

i. Loss of ecologically significant vegetation and potential fauna habitat/populations due to development of part of an unmodified alpine Basin (Crystal Basin), and construction/upgrading of tracks, trails and infrastructure throughout the site;

ii. Fragmentation of ecotonal sequences between ecologically significant vegetation communities and habitats;

iii. Ongoing disturbance/degradation of ecologically significant alpine plant communities, fauna habitats and soils due to compaction from snow grooming;

iv. Ongoing disturbance due to increased public access and activity in the alpine environment, especially at seasonal margins, as skiers may damage vegetation if snow conditions are poor and snow cover is thin;

v. Modification to kea behavior and site use associated with construction and operation of the skifield expansion;

vi. Increased risk of weed and pest infestations due to disturbance associated with construction and operation of the skifield expansion;

vii. Clearance of approximately 15 ha *Dracophyllum*-tussock and associated fauna habitat/populations in construction of the village on the Southern Terrace;

viii. Disturbance to *Dracophyllum*-tussock vegetation and increased soil nutrient levels associated with irrigation of treated waste water to the northern terrace.

ix. Potential contamination of Crystal Stream and Porter River from wastewater irrigation on land on the northern terrace.

x. Potential contamination/disturbance due to stormwater discharge from the village development (other than the Village Base Area) entering the "red tussock gully wetland" and Porter River during high rainfall events.

xi. Potential contamination of watercourses from sediment/hazardous substances associated with construction and operation of the skifield expansion;

xii. Adverse effects on aquatic habitats in Porter Stream and ephemeral watercourses due to water takes.

3.2 It is my understanding is that infilling of a wetland to enable creation of Snow Play area that was envisaged in the AEE and ecological assessment report (Boffa Miskell 2010) is no longer proposed. I also understand that any earthworks affecting a wetland shall now be a non-complying activity under the proposed Plan Change.

4. MEASURES PROPOSED TO ADDRESS ADVERSE ECOLOGICAL EFFECTS

Summary of Proposed Measures to Address Ecological Effects

4.1 Table 7.1 in the ecology report (Boffa Miskell 2010) provides a summary of potential effects and identifies actions proposed to address each of the adverse ecological effects identified.

4.2 In order to determine which of the anticipated adverse effects are, in my opinion, effectively addressed as a result of actions proposed in the Boffa Miskell (2010) report, and what outstanding "residual effects" remain, I have further summarised and grouped the proposed actions into measures that will (in my opinion) wholly or partly avoid/minimise, remedy or mitigate adverse effects outlined in paragraph 3.1 above. These are set out in Table 4.1 below.

Table 4.1: Measures proposed to avoid/minimise, remedy or mitigate adverse ecological effects.

A. Measures proposed to avoid/minimise adverse effects	Effects addressed (all or in part)[1]
• Ongoing refinement of route and site selection to minimise areas affected by earthworks in Crystal and Porters Basins.	i, ii
• Protect all areas Crystal Basin outside the prospective development envelope via "Deed of Encumbrance".	i, ii
• Development and implementation of a Crystal Basin habitat management plan (integrating kea, weed infestation, recreation, snow making and grooming issues).	iii, iv, v, vi
• Implementation of "Best Practice" controls for earthworks, sediment control, stormwater and waste water management.	xi
• Preparation and implementation of a hazardous substances management plan.	xi
• Preparation and implementation of a kea management plan.	v
• Preparation of a weed monitoring and control plan and implementation during construction.	vi
• Maintenance of a fenced 20m setback around Porter River and Crystal Stream during construction and operation of the proposed development.	xi
• Maintenance of a setback (marked with bollards or similar) around the "spring flush" area to prevent disturbance during skifield operation.	iv
• Maintenance of fenced 5m setbacks around other watercourses and other sensitive sites (to be identified as part of the resource consent process) during construction.	xi
• Maintenance of a residual flow in Porter Stream (no water takes from the Porter River or Crystal Stream).	xii
• No direct discharges to any watercourses.	x, xi
• Monitoring of water quality and aquatic ecosystems in Crystal Stream and Porter River downstream of the proposed wastewater irrigation area to identify any adverse effect from the waste water treatment.	ix
• Monitoring of water quality and aquatic ecosystems to detect any potential adverse effects of snow-making nucleation compounds entering watercourses.	xi
• Monitoring soil nutrient status in the wastewater disposal area.	ix
• Monitoring of water quality and aquatic ecosystems in Porter River to detect any adverse effects of stormwater discharges during high rainfall events.	x
• Prohibit introduced animals except working dogs.	iv, vi
• Prohibit development of private gardens.	iv, vi

• Use low level, low intensity lighting near waterways to minimise disruption to fauna.	iv
B. Measures proposed to <u>remedy</u> adverse effects	**Effects addressed (all or in part)**
• Revegetation of the wastewater disposal field with *Dracophyllum acerosum*- kanuka shrubland, interspersed with mountain beech, red tussock and associated species in appropriate microsites.	viii
• Revegetation/enhancement of disturbed sites with appropriate locally sourced plant species to prevent ongoing weed infestation and remedy temporary vegetation clearance.	i, vii
• Covenanting and enhancement of the "red tussock gully wetland" to be used for stormwater disposal during high rainfall events.	x
C. Measures proposed to <u>mitigate</u> adverse effects	**Effects addressed (all or in part)**
• Habitat enhancement programme for Porter River and Crystal Stream, including construction of a trout barrier in Crystal Stream, removal of all trout upstream of the barrier; and introduction of alpine Galaxias upstream of the barrier.	xii
• To mitigate potential effects of disturbance/loss of lizard and invertebrate habitat, pre-construction lizard and invertebrate surveys are proposed in Crystal Basin to determine mitigation requirements (including development of a trap and transfer programme if needed).	i, ii
• Ongoing control of wilding exotic trees other invasive weed plants is proposed throughout the site.	i, vii

[1]Roman numerals refer to actions listed in paragraph 3.1.

4.3 I note that there are some minor differences in my assessment of what actions will address which effects compared to Boffa Miskell (2010). For example, I do not consider that retention, covenanting and enhancement of the "red tussock gully wetland" constitutes mitigation for the loss of the North Porters ephemeral watercourse, as retention of this wetland is required to receive stormwater discharges during high rainfall events, therefore its protection and maintenance simply remedies potential adverse effects of this use.

Feasibility, Adequacy and Appropriateness of Measures Proposed to Address Ecological Effects

4.4 Planning controls need to be sufficiently robust that they ensure that works cannot proceed unless all adverse ecological effects identified are appropriately addressed. It is my understanding that, under the proposed Plan Change, works and activities associated with the proposed Porters Ski Area expansion that require resource consent (as detailed in the AEE) will have Controlled Activity status. I understand that under this activity status, Council cannot decline any resource consent (i.e., resource consent must be granted) but they can impose conditions, including conditions to address adverse ecological effects.

4.5 I consider that, in principle, measures proposed to address adverse ecological effects outlined in Table 3.1 above are appropriate. While I note that the efficacy of a number of these are dependent on protocols, standards and management actions that are yet to be devised, the Council reserves control over these matters under proposed Plan Change provisions (Rule 25.2.1), and can therefore ensure that such measures are appropriate.

4.6 In my opinion, the following ecological effects are "residual", i.e., they are not wholly addressed by the measures proposed in Table 3.1 above:

i. Removal/degradation of vegetation/habitats, including fragmentation and interruption of community sequences, in Crystal Basin;

ii. Removal/degradation of vegetation/habitats, including fragmentation and interruption of community sequences, particularly in Crystal Stream Valley, Porters Basin and Porters Stream Valley;

iii. Loss of/modification to ephemeral watercourses;

iv. Vegetation clearance associated with development of the Village Area on the Porter Hill Slopes and Southern Terrace.

4.7 I consider that, in part, the "residual" nature of the above effects is a consequence of the development proposal not being sufficiently refined to enable their scale or severity to be quantified. Similarly, it is difficult to evaluate the efficacy of some proposed mitigation measures in the absence of specific details.

4.8 I am satisfied that viable and desirable mitigation opportunities exist, on-site or in the immediate vicinity of the proposed Plan Change area, to further reduce, remedy or mitigate ecological effects identified in paragraph 4.6(ii – iv) above (i.e., excluding

those in Crystal Basin) and that these measures can be developed as part of the resource consent application process. As outlined briefly in Boffa Miskell (2010), such opportunities include ongoing refinement of the detailed development design; implementing predator control operations to enhance the breeding success of fauna (including threatened species) that utilise the site; and restoration of Porter River valley floor and access road.

4.9 A proviso to my favourable assessment of mitigation opportunities in the above paragraphs is that, as acknowledged in the Boffa Miskell (2010) report, the alpine environment poses a number of challenges to any extensive revegetation project within the proposed Plan Change area. Given this element of uncertainty, I consider that an activity status of "Restricted Discretionary" is more appropriate for earthworks generally, as revegetation or restoration plantings is a potential component of mitigation for the effects of earthworks undertaken for all the purposes listed in Rule 25.2.1 of the proposed Plan Change.

4.10 I also consider that the District Council will need reliable evidence that proposed mitigation measures that include a revegetation or restoration component are achievable (i.e., can be delivered to an acceptable standard within a reasonable timeframe) prior to giving approval for works to proceed. Establishment of restoration trials well in advance of consent applications (including specimen plantings of species to be used for revegetation, beech trees, and investigation of methodologies such as direct transfer of alpine vegetation communities) would greatly inform future assessments of the achievability of any revegetation or restoration proposals, as well as enabling refinement of suitable techniques prior to large-scale implementation.

Appropriateness of a 'Biodiversity Offset' as Mitigation for Residual Effects on Crystal Basin

4.11 I agree with the conclusion of the Boffa Miskell (2010) report that the proposed development site does not offer an opportunity to mitigate the significant adverse ecological effects of large-scale earthworks and vegetation clearance within Crystal Basin anticipated as a result of the proposed development, or associated losses of connectivity between vegetation communities and habitats (as identified in paragraph 4.6(i) above). Boffa Miskell (2010) instead proposed "environmental compensation" as a means of addressing adverse ecological effects in Crystal Basin. The Boffa Miskell (2010) report does not provide details of what such compensation might

entail, other than to note that "analysis of off-site options for biodiversity protection/enhancement or management should be considered to address this situation", and that opportunities for a direct "like-for-like" offset do not appear to exist, i.e., there are no large alpine basins outside existing protected areas in the Craigieburn ED in need of protection and enhancement. I note that the Steephead Gully land exchange is not factored into any environmental compensation for adverse effects of the proposed development, as this is an agreement between the Applicant and the Department of Conservation to enable access to the site, and does not address RMA considerations.

4.12 Subsequent to release of the Boffa Miskell (2010) report, the Applicant has circulated a figure (file reference C09153_105, entitled "Protected Sensitive Areas After Construction Completed", dated 8 April 2011) showing the anticipated extent of the proposed development footprint within Crystal Basin. This figure indicates that proposed development works within Crystal Basin will be confined to trails, while approximately 141 ha (79%) of Crystal Basin will be afforded some level of protection from further development or modification under a "Deed of Encumbrance" with the Department of Conservation (the details of which are subject to final discussions between DOC and the Applicant).

4.13 Scree habitat comprises most (87%) of the area excluded from the development footprint, as I understand site topography necessitates that trail development is concentrated in the centre of the basin where the habitat mosaic is most diverse. Therefore, the impact of development will disproportionately affect herbfield, boulderfield and tussock grassland habitats, by way of direct clearance and fragmentation within and between habitat types. Nevertheless, Figure C09153_105 indicates that a proportion of all these component features will be retained within Crystal Valley. Therefore, notwithstanding the Boffa-Miskell (2010) assessment that "the large-scale disturbance of Crystal Basin [...] represents a large-scale negative outcome for the project in ecological terms", my understanding is that the extent of works proposed will not result in the wholesale loss of ecological values from Crystal Basin.

4.14 I have reviewed the operative Canterbury Regional Policy Statement (1998) and the draft 2010 Canterbury Regional Policy Statement (which I understand is to be publicly notified on 18 June 2011) in order to clarify the appropriateness of, and

requirements for, off-site mitigation to address adverse ecological effects in Crystal Basin envisaged as a result of the proposed development.

4.15 Section 8.2: Objective 3 of the operative Canterbury Regional Policy Statement (1998) requires "the protection or enhancement of:

- *Indigenous biodiversity, (including the survival of threatened species, communities and habitats, and species, biological communities and habitats unusual in, or characteristic of Canterbury);*
- *Indigenous ecosystem functioning; and*
- *Indigenous vegetation and habitats which contribute to the region's natural character."*

4.16 Accordingly, Policy 4 in Section 8.2 of the Canterbury Regional Policy Statement (1998) states:

> *"Areas of indigenous vegetation and habitats of indigenous fauna that meet the relevant criteria of sub-chapter 20.4(1)* [i.e., to determine regional significance] *should be protected from adverse effects of the use, development, or protection of natural and physical resources, and their enhancement should be promoted. In particular, indigenous species, communities and habitats that are threatened, unusual in, or characteristic of Canterbury should be identified, and their survival, and the survival of ecosystems on which they depend, safeguarded as far as practicable. The particular sensitivity of these areas of vegetation or habitats to regionally significant adverse effects in terms of sub-chapter 20.4(2) should be reflected in the provisions of district plans in the region."*

4.17 As I have identified in Paragraphs 2.14 – 2.15 of my evidence, areas of indigenous vegetation and habitats of indigenous fauna within the proposed Plan Change area generally (and Crystal Basin in particular) are regionally significant according to criteria set out in the Canterbury RPS (1998).

4.18 Sub-chapter 20.4(2) of the Canterbury RPS (1998), lists the following factors to be considered when determining whether an effect is of regional significance:

> *(a) Whether there is likely to be substantial modification of identified values, including substantial damage, loss, restoration or enhancement;*

(b) Whether any effects are likely to be long term;

(c) Whether any short term effects are likely to be widespread;

(d) Whether ecological resilience is likely to be affected;

(e) Whether, and to what extent, there is likely to be an increase or decrease in scientific or educational value to the regional or national community;

(f) Whether any effects are of widespread public concern within the region;

(g) Whether any effects which although minor, short term or infrequent, become material when taken cumulatively, including whether any effects are potentially of high probability, or, if potentially of low probability, have a high potential impact;

(h) Whether any effects are of widespread concern to Tangata Whenua within the region;

(i) Whether any effect is likely to lead to irreversible changes (other than minor changes); and

(j) Whether there are likely to be any effects on the ability of structures and infrastructures to function in a safe and efficient manner.

4.19 The proposed development will result in substantial, and in some cases permanent and irreversible, modification of significant vegetation and habitats, including a potential reduction in ecological resilience of some vegetation communities and habitats in Crystal Basin. Therefore, adverse effects of the proposed development on the characteristic biological diversity of the Canterbury Region are regionally significant according to Canterbury RPS (1998) provisions.

4.20 The Canterbury RPS (1998) provides little guidance on how such effects may be mitigated, and does not contemplate the use of biodiversity offsets to mitigate adverse effects. However, the draft Canterbury RPS (2010) includes a review of limitations on the use of biodiversity offsets in Policy 9.3.6, noting that biodiversity offsets should only be treated as appropriately mitigating adverse effects on indigenous biodiversity:

1) where the ecosystems or habitats are not so significant that their major modification or loss is inappropriate;

2) *where they compensate for residual adverse effects that cannot otherwise be avoided, remedied or mitigated;*

3) *where there is strong likelihood that the offsets will be achieved in perpetuity; and*

4) *where the offset involves the ongoing protection of a separate site, it offers a significant improvement in the status quo.*

4.21 In my opinion, criterion(1) of Policy 9.3.6 is met, insofar as vegetation and habitat types found in the Plan Change area are well represented and well protected elsewhere in the Craigieburn ED (as detailed in the Boffa Miskall (2010) report); and the proposal will not result in the wholesale loss of existing threatened, unusual or regionally distinctive species, communities or habitats from within the Plan Change area, though the extent of some vegetation communities and habitats will be modified or reduced.

4.22 I also consider that and criterion (2) is met, as addressed in Paragraph 4.10 above. Furthermore, I consider that it is likely to be in the applicant's interests to minimise adverse effects on-site, given that the amount of mitigation required to offset an adverse effect must be "more than equal" to the effect itself (as per criterion (4) of the draft Canterbury RPS). In my opinion, the "mitigation to effect" ratio of should increase with:

- Increasing uncertainty as to whether expected gains will be achieved;
- Any "lag time" between the adverse effect occurring and the appearance of biodiversity gains resulting from mitigation measures; and
- Decreasing relevance of the offset to the impacted ecosystem (i.e., a larger offset is required where measures undertaken do not in some way benefit biodiversity in the affected area).

4.23 Criteria (3) and (4) of Policy 9.3.6 cannot be evaluated in the absence of details on the proposed offset, though I consider that these criteria can be met "in principle", i.e., there are likely to be opportunities to provide for the protection in perpetuity and enhancement of significant natural areas/features within the region (if not the Ecological District) that amount to an overall net biodiversity gain. I also recognise that determination of an appropriate scale or extent of offset requires detailed project designs and a comprehensive assessment of effects, and I consider that the resource consent application process is the appropriate phase of the project to undertake such detailed design and assessment work.

4.24 My main concern with proposed Plan Change is that there is great uncertainty around what both the Applicant and the Council may perceive as appropriate in terms of a biodiversity offset to address residual adverse effects of development (particularly in Crystal Basin), in contrast to the relative certainty of development given the "Controlled Activity" status in the proposed Plan Change. In the event that the Council's assessment of an appropriate scale of offset is beyond what the Applicant considers is reasonable or affordable in the context of the development proposal, or if there are difficulties with securing access to/protection of suitable "mitigation sites", the plan provisions may constrain the Council's ability to ensure adverse effects are mitigated to its satisfaction as consent for a "controlled activity" cannot be declined, nor can conditions that "frustrate" a consent be imposed. In my opinion, Council should retain an element of discretion over whether development within Crystal Basin can proceed, subject to the merits of the mitigation package proposed to address residual adverse ecological effects.

5. MATTERS RAISED IN SUBMISSIONS

Summary of Ecological Issues Raised in Submissions

5.1 I have compiled ecology related concerns raised in submissions into six themes (refer i – vi below). I then address points raised under each of these themes in subsequent paragraphs.

i. <u>Loss of biodiversity</u>.

Key points:

- The Canterbury Region has already suffered extensive biodiversity loss, and the few remaining natural areas should be protected.
- The proposal will result in the loss of an "excellent example of an alpine cirque basin ecosystem" in almost pristine condition.
- The proposed area for development is potentially one of the few remaining eastern most locations where kea (a threatened species) now live, and interaction with humans and human structures is a contributing factor to their decline.
- Inadequate consideration has been given to the potential adverse effect on the high natural state of both the Crystal and Porters Streams.

ii. Impact on the integrity of a large, continuous tract of natural areas.

Key points:

- The site forms part of a continuous east-west sequence of indigenous habitats and ecosystems extending from Otira's beech and rata forests in Arthur's Pass National Park, across the alpine shrublands, rock fields, and beech forests of the national park and Craigieburn Forest Park, to the dryland habitats of the Torlesse and Big Ben Ranges. Crystal Basin supports an unbroken and unmodified altitudinal sequence of alpine habitats and is important part of this corridor of public protected land. The proposed development would disrupt this ecological sequence.

iii. Undermining of previous process to provide for permanent protection of the site's conservation values.

Key points:

- Crystal Valley was brought with public money from the Nature Heritage Fund because of its outstanding natural values. It also provides a linkage of natural values. The proposed plan change ignores previous public processes, assessments and management decisions which recognised the area's conservation values and provided for their permanent protection, and ultimately undermines the Nature Heritage Fund process.

iv. Failure to give effect to local and regional plans, policy statements and strategies.

Key points:

- Fails to give effect to relevant objectives and policies of the Canterbury Regional Policy Statement (Chapter 8: Objectives 2 and 3, Policies 3 & 4; and Chapter 12: Objectives 1 and 4, Policies 2 and 6).
- Inconsistent with objectives, policies and rules in the Operative Selwyn District Plan concerning vegetation and ecosystems (Objectives B1.2.1, B1.2.3 and Policies B1.2.2, B1.2.5 and B1.2.6).
- Fails to have regard to Objectives 6.1 and 7.1 and corresponding Policies 6.1 and 7.1 in the Waimakariri River Regional Plan.
- Fails to have regard to provisions of the Biodiversity Strategy for the Canterbury Region.
- Contrary to or inconsistent with the Canterbury Conservation Management Strategy.

v. Uncertainty or inadequacy of mitigation outcomes.

Key points:

- Measures proposed are insufficient to avoid, remedy or mitigate adverse effects on the environment.
- The lack of design detail means effects are potentially understated.

- Increased risk of weed invasion.
- Beech forest revegetation unlikely to be viable.
- Concerns on the details of the wastewater treatment, including the cumulative effect of microbial loading over time on relatively permeable soils and run-off effects; and the considerable length of time likely to be required for plantings to establish and contribute to the treatment process.

vi. Inadequacy of proposed planning provisions to ensure adverse effects are avoided, remedied or mitigated.

Key points:

- Controlled Activity status for buildings and structures, subdivision, earthworks, amenity plantings and roading means the Council cannot decline consent (or impose conditions that may 'frustrate' a consent) if significant adverse effects cannot be avoided, remedied or mitigated; however inadequate information is provided to enable the Applicant's ability to address such effects to be properly assessed through the Plan Change process.
- Weakening controls on such activities within a "Ski Area sub zone" may lessen the test required for wider scale earthworks on other more natural ski fields.

Loss of biodiversity

5.2 As I note in Paragraph 4.20 above, vegetation and habitat types found in the Plan Change area are well represented and well protected elsewhere in the Craigieburn ED, and the proposal will not result in the wholesale loss of existing threatened, unusual or regionally distinctive species, communities or habitats from within the Plan Change area. The cirque basin ecosystem of Crystal Basin will no longer be "near-pristine", but will retain all component plant communities and habitats currently present. Hence, while I agree that the adverse ecological effects envisaged as a result of proposed development should not be contemplated in the absence of appropriate mitigation, I consider that it is feasible (at least in principle) to achieve an outcome of "no net biodiversity loss" through a combination of ongoing refinement to the development footprint to minimise adverse effects, and an appropriate mitigation package to offset residual effects.

5.3 In my opinion, potential adverse effects to kea (and other threatened species), and maintenance of the natural state of Crystal and Porters Streams, can be appropriately addressed by way of management plans.

Impact on the integrity of a large, continuous tract of natural areas

5.4 I acknowledge the value of maintaining a continuous tract of conservation estate across the eastern South Island, though I consider that its importance lies primarily in the security it provides for coordinated conservation management and public access. I understand that this security will be retained through the "Deed of Encumbrance" between the Applicant and the Department of Conservation. While the proposed plan Change area is certainly a valuable component of the alpine habitats that occur across the Craigieburn Range, I do not consider that the proposed development would result in any substantive impact to the ecological functions or connectivity of surrounding natural areas.

Undermining of previous process to provide for permanent protection of the site's conservation values

5.5 The appropriateness of the Crystal Valley/Steephead Gully land exchange decision is a matter for the Department of Conservation, and I have not considered this in my assessment of ecology-related outcomes with respect to the proposed Plan Change.

Failure to give effect to local and regional plans, policy statements and strategies.

5.6 Ecology-related objectives and policies of the Canterbury Regional Policy Statement and the Operative Selwyn District Plan referred to in submissions concern the need to provide for the protection of significant vegetation, habitats and ecosystems, and avoid, remedy or mitigate adverse effects on such features. I address these matters in Section 4 of my statement.

5.7 Ecology-related objectives and policies of the Waimakariri River Regional Plan concern protection of the "natural state" of watercourses. As I note in Paragraph 5.3, I consider that this matter can be appropriately addressed by way of a management plan.

5.8 The Biodiversity Strategy for the Canterbury Region is a non-statutory document. Nevertheless, Selwyn District Council supported its development, and its recommendations are consistent with the policies and objectives of the Selwyn District Plan. The Canterbury Biodiversity Strategy advocates a target of *"No further loss of significant habitats and ecosystems from 2010"*, and identifies "*Change in the*

area (ha) of land under formal protection" and *"Area (ha) of significant habitat lost"* as performance indicators. In my opinion, these performance indicators should be included among criteria for evaluation of the biodiversity offset proposed to mitigate residual adverse effects of the development, in order to ensure an outcome of "no net biodiversity loss".

5.9 Conservation Management Strategies implement policies and establish objectives for management of natural and historic resources by the Department of Conservation. The Canterbury CMS outlines the Department's role in the management of natural and historic resources within the Canterbury Conservancy. As such, it is not relevant to Council's assessment of the merits of proposed Plan Change.

Uncertainty or inadequacy of mitigation outcomes.

5.10 Matters raised will largely be addressed in resource consent applications. My recommendation to undertake restoration planting trials would assist in alleviating uncertainties regarding the viability of beech forest restoration and the time required for to plantings within the wastewater treatment field to establish and contribute to the treatment process.

Inadequacy of proposed planning provisions to ensure adverse effects are avoided, remedied or mitigated.

5.11 I address these matters in Paragraph 4.23 of my statement.

6. SUMMARY AND CONCLUSIONS

6.1 I consider that the Ecology Report provided in support of the plan change application (Boffa Miskell 2010) provides a comprehensive description of the known ecological values within the proposed development site and surrounds.

6.2 In my assessment, the Plan Change area as a whole is ecologically significant according to criteria set out in the Selwyn District Plan. Nevertheless, I agree with the "rank order" of management units set out in the Boffa Miskell (2010) report in terms of their significance.

6.3 Furthermore, in my opinion, the proposed Plan Change area is to be regarded as "regionally significant" according to criteria set out in the Canterbury Regional Policy

Statement (1998). Therefore, I consider that it is appropriate to apply the provisions of the Canterbury RPS when assessing the implications of the proposed Plan Change.

6.4 I am satisfied that viable and appropriate mitigation opportunities exist, on-site or in the immediate vicinity of the proposed Plan Change area, to address identified ecological effects other than those in Crystal Basin, and that such measures can be developed as part of the resource consent application process.

6.5 Nevertheless, given the uncertainties associated with undertaking revegetation or restoration planting in an alpine environment (acknowledged in the Boffa Miskell (2010) report), I consider that an activity status of "Restricted Discretionary" is more appropriate for earthworks generally, as revegetation or restoration plantings is likely to be a key component of mitigation for the effects of earthworks throughout the Plan Change area.

6.6 I also consider that the District Council will need reliable evidence that proposed mitigation measures that include a revegetation or restoration component are achievable prior to giving approval for works to proceed. I consider that the Applicant would be well advised to establish planting trials in advance of consent applications to demonstrate their capability to restore or revegetate alpine vegetation communities on-site.

6.7 I agree with the conclusion of the Boffa Miskell (2010) report that the proposed development site does not offer an opportunity to mitigate the significant adverse ecological effects of the proposed development within Crystal Basin.

6.8 In my assessment against criteria listed in Policy 9.3.6 of the draft Canterbury RPS (2010), mitigation by way of a "biodiversity offset" (i.e., ecological compensation undertaken at a location other than the subject site) is appropriate in this case, at least in principle.

6.9 I recognise that determination of an appropriate scale or extent of offset requires detailed project designs and a comprehensive assessment of effects, and I consider that the resource consent application process is the appropriate phase of the project to undertake such detailed design and assessment work. Determination of an appropriate offset will also depend on the specific characteristics of the offset

proposed, and must allow for factors such as uncertainty, lag time before biodiversity gains are realised, and relevance to the ecosystem within the development site.

6.10 In my opinion, the activity status for development within Crystal Basin in the proposed Plan Change Council should be at least “Restricted Discretionary”, subject to the merits of the mitigation package proposed to address residual adverse ecological effects, as this ensures development will not proceed unless Council has certainty that adverse effects will be mitigated to its satisfaction.

Sarah Flynn

15 June 2011

REFERENCES

Boffa Miskell Limited 2010: Ecology Report and Assessment of Effects. Prepared for Porters Ski Area Limited, July 2010.