

Ecological Assessment of NZ Ski Remarkables Sugar Bowl redevelopment

Brian Rance & Bruce McKinlay

Terrestrial Ecosystems Unit

Biodiversity Group

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Executive Summary

- There will be a range of ecological impacts resulting from the application as submitted. These impacts are discussed in the report below. Some of these impacts are assessed to be of such significance as to justify some of the proposed work being amended or not proceeding.
- The greatest ecological impacts are associated with the trail construction and particularly the extent of associated cut and fill requirements.
- The area of greatest ecological impact is along the lower Sugar Stash trail (below the Sugar Link trail) and lower and mid sections of the Sugar Trail.
- The proposal will result in impacts upon areas of snow tussock grassland, fellfield, wetland, snow banks and rock field. All of these ecosystems are of ecological importance and are representative of Ecological District. These ecosystems are not equivalent in the effects that will occur or the ability to successfully recover.
- The impacts from this proposal are cumulative upon previous and existing works, with extensive works in the past as part of an active skifield.
- This report concentrates on ecological impacts however there are landscape and other effects that require further consideration.

Recommendations

- That the lower section of the Sugar Stash trail below the Sugar Link Trail is not constructed.
- That the trail width of the Sugar Trail in the lower section (i.e. lower 2/3 from near to the intersection with the existing Sugar Basin chair lift) is reduced in width from 50 m width to 30m width (i.e. the same width as the Sugar Stash Trail).
- That the trail width of other sections of both the Sugar Trail and Sugar Stash Trail has some flexibility. In areas of high ecological impacts (including sensitive vegetation such as fellfields, populations of threatened plants etc) the width should be negotiated to a lesser width. This could be finalised before or during the construction phase.
- That in light of additional species information that DOC staff are aware of some additional work is undertaken. In particular:
 - That further field assessment is undertaken to confirm whether geckos (particularly Orange-spotted gecko (*Mokopirirakau* "Roys Peak")) is present.
 - To survey for and mark the location of *Aciphylla simplex* plants. (Note this is in order to undertake "best endeavours" of avoidance for this species within the high altitude rock fields.)
- If the application is approved that appropriate conditions are developed to reduce ecological impacts need to be developed to accompany any approvals that may be given.
- That an independent ecologist is utilised to input implement the concession conditions and ecological issues associated with construction, impact minimisation and restoration/revegetation works.
- That where onsite impacts cannot be avoided or mitigated that appropriate mitigation/ecological compensation provisions are implemented.

- That a landscape assessment is undertaken to provide professional landscape input regarding landscape values, impacts and to advise on the minimisation and mitigation of these impacts.
- That the department meets with NZ Ski to discuss this report and its recommendations, and to negotiate improved ecological outcomes.

Context

NZ Ski operate the Remarkables skifield. The Remarkables skifield operates on the Rastus Burn Recreation Reserve. The purpose of the Rastus Burn Recreation Reserve is essentially to allow the operation of the Remarkables skifield. The Remarkables skifield operates under concessions from the Department of Conservation (DOC). The Remarkables skifield has operated on the site for many years. During this time there has been ongoing upgrading of the skifield operations and facilities. The development works that have been undertaken over the years are generally associated with restoration, revegetation and rehabilitation activities which have been requirements of DOC. The restoration, revegetation and rehabilitation requirements have had the intention of maintaining high natural character through much of the skifield area. The current development programme proposal for the Sugar Basin is arguably the largest development project since the original skifield construction. The application states that the area of disturbance totals 12.2ha and will result in a range of ecological impacts. The Sugar Basin trail is proposed to be 50m width and will be the widest trail on the Remarkables skifield.

Introduction

NZ Ski propose the redevelopment of the Sugar Basin area of the Remarkables skifield. This redevelopment proposal has the following major components:

- the construction of a new Sugar Basin chairlift (including top and bottom stations),
- dismantling the existing Sugar Basin chairlift,
- construction of new ski trails, including the 50m wide Sugar trail and the 30m wide Sugar Stash trail and associated cut and fill works,
- snow making infrastructure.

The NZ Ski Sugar Basin redevelopment application (Dated 02 August 2018) included:

- a formal application
- an Ecological Assessment report by E3 Scientific
- Additional detail including cut and batter profiles associated with the trails were also provided.

The Ecological Assessment report by E3 Scientific included assessments of ecological values present, their significance and an assessment of the impacts. The E3 Scientific report is considered to have some deficiencies, including failing to identify some areas of wetlands present within the proposed Sugar Stash trail.

The scale of proposed works required a site inspection by DOC ecological staff. An inspection was undertaken on Tuesday 6th November 2018, by Brian Rance (Technical Advisor – Ecology), Bruce McKinlay (Technical Advisor – Ecology), James Holborow (Manager Terrestrial Ecosystems Southern team), Dawn Palmer (Private Ecological Contractor – monitors restoration works on Remarkables skifield), Susie Geh (Senior Ranger – Community, Queenstown District), accompanied by Ross Laurence (NZ Ski, Remarkables). During the inspection the route of the new ski trails and lift alignment was walked from the site of the base station to the top station, along the Sugar trail and back along the Sugar Stash trail. Despite areas of snow remaining the inspection allowed the following tasks to be completed:

- Familiarisation with the application area and visualisation of the proposal,

- Ecological values to be assessed and verified,
- Ecological impact to be assessed, and
- Confirm the proposal and seek clarification as required.

Results

Ecosystems present: Four major ecosystems/habitats types were identified as present within the part of the skifield subject to the present application. These are:

- Snow tussock grassland (dominated by slim snow tussock (*Chionochloa macra*))
- Fellfields/cushionfield
- Rock fields
- Wetlands (including snow banks)

These habitats are consistent with descriptions from the E3 Scientific Ecological Assessment report. The E3 Scientific report provides adequate descriptions of the vegetation.

Wetlands - Nationally wetlands are a much-reduced ecosystem, while snowbanks, seepages and flushes are naturally rare ecosystems and as such are all recognised as being ecosystems of national importance (MfE, 2017). All wetlands above 800m are considered Regionally Significant Wetlands by ORC. Wetlands, snowbanks, seepages and flushes are widespread but generally small scale within the Remarkables skifield. The wetlands located along the alignment include both seepages and snowbanks, some with a stream associated.

Other habitats - The snow tussock grasslands, fellfields and rockfields habitats are all common and widespread within Remarkables skifield. They are of high ecological representativeness within the Remarkables Ecological District and so are of ecological importance at this site.

The lower section of the area (i.e. that part of the trails between the carpark and the junction with the sugar link trail) applied for in the present application is dominated by snow tussock grassland, with some fellfield and rockfield. It also contains several scattered wetlands. The middle section of the development above the junction with the Sugar Link trail is dominated by fellfield with areas of snow tussock grassland and rock field. The upper section of the slope is dominated by rockfield with areas of fellfield.

Additional Species information: There is an updated threat classification for vascular plants which should be used. Threatened plants recorded on the current inspection or previously recorded by E3 Scientific include:

Aciphylla lecomtei	Declining (formerly Naturally Uncommon)
Carex berggrenii	Declining (formerly Naturally Uncommon)
Aciphylla simplex	Naturally Uncommon
Anisotome lanuginosa	Naturally Uncommon
Carex edgariae	Naturally Uncommon
Brachyscome montana	Data Deficient

In light of the increased threat status for *Aciphylla lecomtei* and *Carex berggrenii* and the confirmation of additional rare species, we suggest that all of these species should be uplifted, stored upright and reinstated into appropriate sites on the revegetated battered. *Aciphylla simplex*, which

was observed in high altitude rock fields, is unlikely to be able to be successfully uplifted and survive being reinstated, therefore efforts should be made to avoid disturbing it.

The site is within the known altitudinal range of the Orange-spotted gecko (*Mokopirirakau* “Roys Peak”). This is not discussed in the ecological assessment beyond noting that skinks might be present in the grassland. In this particular case the ecological assessment is deficient and further field assessment should be undertaken to test the assumptions in the Ecological Assessment with respect to geckos.

Ecological impacts: The activity includes different components, notably the construction of the new ski trails, the new Sugar Basin chairlift, the decommissioning/dismantling of the existing Sugar Basin chairlift and the establishment of new snow making infrastructure. Each of these components will have ecological impact. There will be appropriate measures to reduce the impacts of each component. However, the greatest ecological impact results from the ski trail construction. This impact is exacerbated by the width of ski trails and resultant extent of cut and fill works, especially across steep hill slopes. The application describes the extent of new trails to be 12.2ha of rock, soil and vegetation disturbance in a harsh and fragile alpine environment. This is because the depth of the cuts into soil and rock will significantly affect ground surface vegetation pattern and also subsoil systems. The largest areas of fill will cover areas of snow tussock grassland, fellfield, rock field, but will also impact on wetlands, snowbanks and streams.

The most significant area of ecological impact is on the lowest slopes of both the Sugar trail and the Sugar Stash trail (See Figure 3 in Southern Planning Group application). This is because these areas contain a more diverse vegetation and areas of steep slopes involving much cut and fill. These areas are also more highly visible.

The lower section of Sugar Stash trail (i.e. the zig zag section from the Rastus Burn up to the connecting Sugar Link trail) contains a complex pattern of tussock grassland, rock field, snowbanks, seepages and wetlands. It also involves the crossing and covering of a stream. Compared to many other parts of the proposed works this part of the line displays a high degree of naturalness and ecological diversity. The values and impacts associated with this trail include:

Wetlands and water courses

- There is a series of seepage wetlands/snowbanks along the alignment of the trail. These occur along the gully outflow from the notable wetlands (Wildlands, 2011) and on the face above the Rastus Burn. Some wetlands will be covered and destroyed. These do not appear to be adequately recorded within the E3 Scientific report.
- There is a risk that adjacent wetlands could be impacted through changes to the hydraulic function of the wetlands as a consequence of construction works.
- Covering at least 100m of a stream (with associated wetland vegetation). Note the trail crosses the stream twice is proposed to be 50m wide, in addition there will be additional batters outside of the trail.
- Potential impact upon two wetland systems identified in Wildlands report (Wildlands, 2011). While these wetlands are to be avoided the trail will be relatively close and involve cut and fill works that could result in sedimentation or other impacts upon these wetlands.

- The steepness of the slope above the Rastus Burn involves extensive cut and fill requirements. The fill area appears to extend to close proximity to the Rastus Burn. There is a risk of sedimentation into the Rastus Burn.

Snow tussockland

- This area remains relatively unmodified from previous skifield development, consisting of tall snow tussock grassland with high associated plant diversity
- The steepness of the slope above the Rastus Burn involves extensive cut and fill requirements. This work increases the extent of vegetation modification.
- The seepages across the hillslope and steepness of the slope could result in instability and future slope stability issues.
- The slope above the Rastus Burn is in close proximity of the base building and so will be highly visible. The extent of cut and fill works increases the visibility of the impact from construction.

The high extent of ecological impact on the lower and mid portion of the Sugar Trail (i.e. from the Rastus Burn near to the intersection with the existing Sugar Bowl chairlift) results from:

- The steepness of slope (particularly the initial section above the Rastus Burn).
- The width of trail. The Sugar Trail is proposed to be 50m wide which will be the widest trail on the Remarkables skifield.

Note the application does not provide any justification for the increased trail width.

- The extent of cut and fill required is greatest in the lower and mid sections of ski trail. On some sections of the trail the width of the works will be c. 100 width (i.e. double the trail width). The width of trail therefore increases the cut and fill requirements and hence the ecological impact (particularly disturbance of indigenous vegetation).
- Much of the length of the trail (i.e. most of the lower half) of the trail is within fellfield vegetation. The fellfield vegetation is the most difficult vegetation to revegetate because of the combination of the predominance of deep-rooted cushion forming plants and the exposed situation. The slow regeneration which can be anticipated is likely to result in ongoing surface erosion for a number of years (at least in the most difficult, exposed sites). Therefore the combination of the alignment and trail width combine to exacerbate the ecological effects of the trail.
- The width of the trail results in limited opportunity to avoid or minimize effects upon areas of higher ecological value, highly exposed and sensitive areas or other areas that may create restoration concerns.
- The trail is not likely to be revegetated into its pre-disturbance, because of the predominance of fellfield, the desire to restrict vegetation height on the trails, vehicle tracking requirements and other factors. This will likely result in an exacerbated ecological impact because of the width of the trail.
- This trail will be highly visible especially in summer. (Note the number of summer visitors is increasing (R. Laurence pers. comm.).)

Other effects and concerns

Extent of wetlands to be impacted: Currently the small wetland along the lower Sugar trail is to be avoided. This reduces the width of the Sugar trail. NZ Ski believe that as a consequence of the exclusion of this wetland, that there are no wetlands to be impacted and therefore no ORC wetland

RMA requirements. Our assessment is that there are wetlands on the lower Sugar Stash trail (below the Sugar Link trail) and that these would be impacted if this section of trail construction proceeds.

A flexible approach to trail width: The ability to reduce the width of sections of trails to avoid ecologically sensitive areas is desirable. During the inspection some examples were discussed (i.e. to avoid a wetlands on the Sugar trail and near Stash Hut on the Sugar Stash trail). This suggests that there may be potential to reduce the trail width in other sensitive areas (e.g. the Sugar trail above the Rastus Burn). The more sensitive areas include fellfield vegetation and also steep slopes requiring greater amounts of cut and fill.

Decommissioning of the current Sugar Bowl lift: The current Sugar Bowl lift is to be decommissioned, removed and revegetated. This will involve accessing each tower with diggers to break the concrete foundation and remove it from the site. This will result in multiple passages to the towers. The excavated hole will need to be filled, resulting in additional disturbance. Most towers are readily accessible from access tracks, however some are within relatively intact vegetation. The ecological impact of foundation removal could be reduced by removing the towers and reducing the profile of the foundation to ground level or below. This minimisation should be built into conditions.

Cumulative effects: The activity will result in cumulative effects of additional disturbance within the skifield. The progressive increase in ski field activity and infrastructure, progressively impacts upon the condition and character of the site. This redevelopment proposal within the Sugar Basin represents possibly the largest developments since the establishment of the skifield.

Overview of ecological values: Development activity on the skifield proceeds on a piece meal basis. There appears to be no overall plan upon which to assess applications. Also, there is no overall assessment of ecological values (i.e. threatened species distribution, key ecosystems and ecological sites) within the Rastus Burn Recreation Reserve and Remarkables skifield. Undertaking this ecological assessment of ecological values would allow a better identification of key sites/values. These key sites/values should ideally be avoided when designing/undertaking development works.

Ecological compensation: The mitigation efforts associated with the proposal concentrates on restoration, revegetation and rehabilitation activities. Despite requirements for extensive restoration/revegetation works there will be residual effects that cannot be avoided, particularly new trails, changed slopes and modified vegetation/habitat. The current works proposed are a major development programme with significant ecological impacts. Therefore, there is a strong case for an ecological compensation package beyond minimisation and restoration requirements.

Revegetation Options

The four ecosystems present have differing abilities to be transplanted/rehabilitated. Of the 4, snow tussockland has the greatest success ratio and there is a history of successful rehabilitation on the Rastus Burn Skifield. However, while the snow tussock transplants readily some other species with taproots (e.g. speargrasses) or more extensive roots (e.g. shrubs) are less able to survive.

Fellfields are challenging to transplant and rehabilitate, and from past experience this is expected to have a lower success ratio. The challenges are due to a combination of the exposed location, thin soils and low plant stature/cushion form. In other sites despite best design intentions there is only

moderate initial success of rehabilitation, there is a greater reliance on natural recolonization over time. The trail alignment often extends along ridges with fellfield vegetation. The impact is greatest where there are greater amounts of cut and fill (i.e. a wider corridor of exposure).

There is limited experience with wetland transplanting and rehabilitation, and current experience shows this to be a challenging exercise. Success is dependent upon having suitable areas to translocate to and establishing or maintaining the appropriate hydrological regime. Consequently, the best option is avoidance of wetlands.

The rock fields are only sparsely vegetated. Therefore, the proposed trails and other works will have limited ecological effect. However, there is limited ability to undertake revegetation along trails because of a lack of soil and large substrate size. The landscape impact within rock fields is considered to be considerable as the trails carve through rockfields, often consisting of large boulders, to create a gentle terrain with a much smaller sized substrate. This should be the subject of expert evaluation.

The batters (i.e. cut and fill area) should all be revegetated with the exception of rock fields. However, some mechanical rehabilitation of rock fields will be appropriate. Revegetated should be in keeping with the original vegetation occurring on the site (i.e. to restore snow tussockland where snow tussockland previously occurred). To increase the cover of native vegetation cover on disturbed surfaces supplementary planting will be needed because of the extent of batters (especially on fellfields). The actual trails should also be planted and those within snow tussockland should be planted with snow tussock (as has occurred on some other trails) except where trails are also used for road access.

Conclusion

The proposed works will have a range of ecological (and other) adverse effects. The works proposed are largely in keeping with what is expected on a skifield. However, this proposal does represent a major new development. Parts of the alignments are through previously undisturbed and intact ecosystems/vegetation, especially on the lower slopes of the Sugar and the Sugar Stash trail. The design as set out in the application will result in significant ecological effects in these parts of the application area.

Adverse ecological impacts associated with the Sugar trail and the Upper Sugar Stash Trail can only partly be managed. However, it is our view that the works for the Lower Sugar Stash trail (from the carpark to the merger with the Sugar Link Trail) will have significant ecological impacts (including upon wetland function and pattern). Additionally, the lower section of the Sugar trail will also have significant and undesirable ecological effects if developed to the full 50m trail width as proposed. The ecological effects in these two areas cannot be avoided or remedied with the current design and that these works should not proceed as proposed.

It is our assessment that the significant adverse effects of the proposed works for the works cannot be avoided, however the effects can be minimised. The areas of greatest ecological effect could be much reduced by:

- 1) Not proceeding with the Lower Sugar Stash Trail.

- 2) Reducing the width of the Sugar Trail from 50m width to c. 30m width.
- 3) Undertaking extensive restoration/rehabilitation planting.
- 4) Developing appropriate ecological conditions.
- 5) The utilisation of an approved ecologist during construction and to monitor restoration will reduce impacts and enhance restoration success.