

FLORA AND FAUNA ASSESSMENT

Proposed Redevelopment for

Selwyn Snow Resort

213A Kings Cross Road, Kiandra, NSW, 2630



**Prepared by David Woods
for**

TSA Management (on behalf of Selwyn Snow Resort P/L)

October 2020



Department of Planning
and Environment

Issued under the Environmental Planning and Assessment Act 1979

Approved Application No DA 22/5248

Granted on the 27 May 2022

Signed D James

Sheet No 4 of 30

Traditional Owner Acknowledgement

The author would like to pay his respects to the traditional owners, Wolgal, the original custodians of the land upon which this assessment and field work was carried out.

Documentation

Project Name	Flora and Fauna Assessment – Proposed Redevelopment for Selwyn Snowy Resort Inclusive of Guest Facilities, Resort Operation Centre, Quarry Dam Augmentation & Asset Protection Zone Selwyn Snow Resort, 213A Kings Cross Road, Kiandra, NSW, 2630	
Prepared for:	TSM Management (Marko Osti)	
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Draft Reviews	24/10/2020 (internal)	25/10/2020 (external)
Final Document	25/10/2020	

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Definitions and Acronyms used in this Report

APZ	Asset Protection Zone
BC Act	NSW <i>Biodiversity Conservation Act, 2016</i>
BC Regulation	NSW <i>Biodiversity Conservation Regulation, 2017</i>
BAM	Biodiversity Assessment Method
BOS	Biodiversity Offset Scheme
CEEC	Critically Endangered Ecological Community
DP	NSW Department of Planning
DPIE	NSW Department of Planning, Infrastructure and Environment
EEC	Endangered Ecological Community
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act, 2009</i>
FM Act	NSW <i>Fisheries Management Act, 1994</i>
NPWS	NSW National Parks and Wildlife Service
PCT	Plant Community Type
PMR	Protected Matters Report
ROC	Resort Operation Centre
TEC	Threatened Ecological Community

SUMMARY

A flora and fauna assessment was undertaken at Selwyn Snow Resort, 213A Kings Cross Road, Kiandra, NSW. The proponent wishes to build new Guest Facilities and a Resort Operation Centre (ROC) following the loss of most buildings during the January 2020 bushfire. These buildings will mostly site on the previous building envelope of the former resort. The proponent also wishes to increase the volume of water for snow making purposes that is currently retained in a former quarry. The proposal is to increase the current embankment at the front of the quarry by approximately 1.5 metres to increase the current full-dam level by approximately 1 m. Associated with each of the proposed Guest Facilities and ROC is an Asset Protect Zone (APZ). Part of the APZ includes roads and carpark. However, the APZ also includes part of the ski slope where vegetation is maintained short for ski slope use and management, and a more natural area of trees and shrubs to the north and west of the proposed buildings. Collectively the Guest Facilities, ROC, quarry dam augmentation and APZ areas form part of the survey area and have been referred to in this report as the 'Proposed Redevelopment'. A separate development application has been prepared for proposed staff accommodation and an associated water pipe and water tank. Some of the survey effort for that application was undertaken at the same time for this assessment.

A field survey was undertaken on 15th October 2020 following a database and literature review of candidate threatened species either known in the area or possibly occurring based on landscape vegetation. Threatened flora from the filtered species list was targeted while fauna was appraised based on habitat opportunity, both before the bushfire and in the context of the status of recovering vegetation approximately 10 months after the bushfire. The results of the field survey included 117 vascular plants of which 67 species were native, 40 were exotic and a further 10 species were unable to be identified to genus level (four grasses and six forbs) due to the time of year and regrowth status since the fire. Incidental fauna was also recorded and included 19 birds, five mammals (two native and three introduced), one amphibian and two reptiles.

No threatened flora was identified in the building footprint of the proposed buildings, dam embankment or in the associated APZ areas. Fresh Broad-toothed Rat scats were identified approximately 70 m south along Clear Creek from the existing pump house, but more than 330 m distant from the boundary of the closest APZ identified in this report. Some elements of Montane Peatland were also identified outside of the proposed APZ although these communities were showing little signs of regrowth at the time of the field assessment. For most parts, habitat opportunity has been lost or degraded within the survey area as a result of the bushfire. Most trees have lost their canopy and there is very little shrub understorey in or adjacent to the resort. In some areas, regrowth vegetation has completely covered the ground (southern APZ areas) while in other areas ground cover is patchy. Areas of trees and shrubs are showing signs of regeneration from basal coppice regrowth but at this stage there is very little ground debris of logs and branches – most having been consumed in the fire. However, overtime many of the habitat attributes present before the bushfire will be re-established (assuming no further high intensity wildfire in the near future).

At the time the field survey was undertaken, habitat complexity and opportunity were considered low, particularly around the northern and western APZ. However, as the vegetation starts to recover and tree debris is added to the ground, so too will the habitat opportunity for threatened species be improved. How the vegetation will be managed and to what extent will need to be subject to future discussions that will also need to be made in the context of the recovery status of the vegetation to be targeted and whether any threatened species are present at that time. The presence of several noxious weed species before the fire and those recorded in this assessment, should be managed to reduce competition with native species during this period of sensitive post-fire recovery.

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1 INTRODUCTION

1.1 Background

This flora and fauna report is to support a Development Application to the NSW Department of Planning for Selwyn Snow Resort P/L to construct new Guest Facilities and a Resort Operation Centre following the loss of most buildings and infrastructure to a bushfire in January 2020. The assessment is to account for the proposed building footprint and proposed asset protection zone for these developments. Important to the resurrection of Selwyn Snow Resort as a winter tourist destination, but not fire affected as a result of the January 2020 bushfire, is the augmentation of the current quarry that is used as a snow making dam. It is proposed to increase the volume of the dam by raising the height of the existing embankment by 1.5 m. For the purpose of this assessment, the Guest Facilities, Resort Operation Centre (ROC), APZ and quarry dam augmentation is collectively referred to as the 'Proposed Redevelopment for Selwyn Snow Resort' (see Figures 1, 3 and 4).

A separate Development Application has been prepared by Complete Town Planning for six staff dwellings further to south of the proposed Guest Facilities and ROC. A flora and fauna assessment was also undertaken as part of that submission to account for a new pipe to provide potable water to a water tank that will serve those dwellings as well as increase fire-fighting capabilities in the resort (see Figure 2). That flora and fauna assessment was provided as an addendum to the Staff Accommodation submission, but the field work was undertaken at the same time as the data collected for this assessment. This report includes reference to the data for the proposed water pipe where it is relevant to account for information on the southern areas of the resort.

For the proposed Guest Facilities and ROC, the building footprint will be located over much of the previous footprint associated with buildings prior to the bushfire. The configuration of the building sites will be different to the previous building arrangements, but they will still be located along the northern perimeter of the resort adjacent to Kings Cross Road and carpark, and the previous management road. Furthermore, and more importantly as it pertains to environmental impact, the Guest Facilities and ROC will occupy mostly disturbed ground. At the time this survey was undertaken, all remnants of the burnt buildings and structures had been removed. A portable barrier fence had been erected around proposed building areas and the colonising vegetation was mostly an exotic flora, consistent with those species present in heavily, and subsequently maintained, disturbed sites.



Image 1: Facing east, much of this cleared area is proposed to site the Guest Facilities. Projected further up the centre of the image will be the proposed ROC. A yet to be confirmed Sewerage Plant is tentatively proposed left of centre of the image.



Figure 1: Location of the Guest Facilities, Resort Operation Centre and Quarry Dam. The Guest Facilities and ROC overlap with the footprint of the previous resort buildings that can be seen from the superimposed image taken before the January 2020 bushfire. Management and staff accommodation have been relocated to a proposed site further to the south adjacent to Kings Cross Road. Coloured polygons relate to significant environmental attributes (source: map provided by TSA Management).



Figure 2: Location of the proposed Water Pipe, Water Tank and Staff Accommodation at Selwyn Snow Resort between the proposed water tank and existing pump house. These proposed assets are part of a separate development application, but some of the fauna habitat assessment was undertaken in this area and discussed in this report. The location of fresh Broad-toothed Rat scats is shown. The aerial image precedes the January 2020 bushfire. No tree canopy remains due to a bushfire in January 2020 (source: base map Google Earth, 2020).

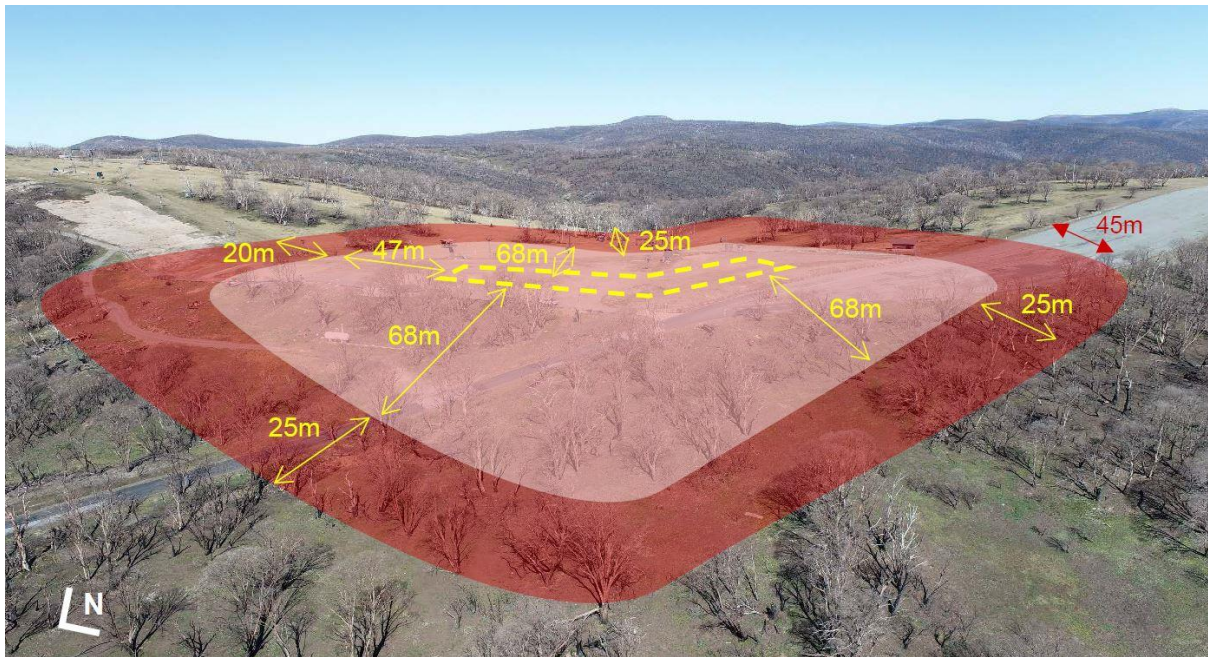


Figure 3: An oblique aerial view from the north-east with the proposed APZ superimposed from table calculations pertaining to the proposed Guest Facilities. The pink shading relates to the Inner APZ and the red shading relates to the Outer APZ (source: Complete Town Planning).

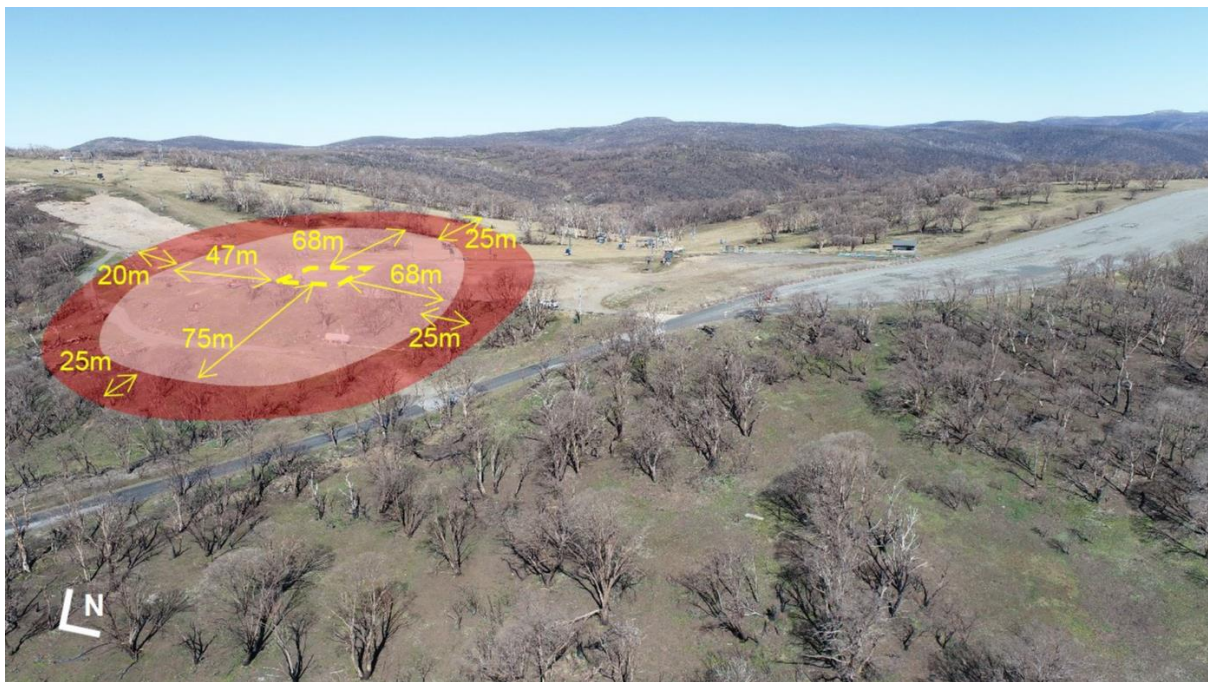


Figure 4: An oblique aerial view from the north-east with the proposed APZ superimposed from table calculations pertaining to the proposed Resort Operation Centre. The pink shading relates to the Inner APZ and the red shading relates to the Outer APZ (source: Complete Town Planning).

1.2 Aim of Flora and Fauna Assessment

This flora and fauna assessment is site-specific to qualify the condition of the existing environment and the potential impacts upon native vegetation, threatened species and threatened ecological communities as it pertains to the construction of proposed Guest Facilities, Resort Operation Centre and augmentation of the existing quarry dam. Associated with the Guest Facilities and ROC is the APZ. The assessment extends to the existing environment as indicated in Figures 3 and 4 with reference to ecological impacts from the January 2020 bushfire. However, at the time this flora and fauna assessment was prepared, there was uncertainty as to what vegetation clearing would be required to meet inner and outer APZ conditions, and how the APZ would be managed as vegetation started to regenerate. Therefore, this assessment focuses on the environment as observed and recorded in mid-October 2020, approximately 10 months after the wildfire event.

The key elements of this assessment include:

- Review BioNet data, Protected Matters Report and other localised literature for threatened species records
- Flora survey to identify vascular plants and vegetation community types inclusive of the building footprint of the proposed Guest Facilities, ROC and quarry embankment, as well as within the APZ as calculated by Complete Town Planning
- Threatened vascular plant survey for species known within the area and/or aligned to the vegetation type and landscape position of the proposed redevelopment structures and associated APZ
- Habitat assessment for the opportunity of threatened fauna species to occur surrounding the proposed redevelopment structures and APZ, targeting vertebrate species known or possibly occurring within the area, and
- Incidental recording of all vertebrate fauna detected during the site inspection as an indicator of animal activity during the day and in response to vegetation recovery approximately 10 months after the bushfire.

1.3 Survey Area

The proposed survey area of approximately 14 ha ranges from approximately 1540 m asl at the lower parts of the APZ, to approximately 1590 m asl at the quarry dam. At approximately 1550 m asl, an east-west aligned spur includes a relatively flat portion of land that is the historical site of the former resort buildings and the proposed site for the redevelopment. This same ridge forms the northern part of the upper catchment to Clear Creek that is centre to the ski slope to the south, an incline averaging 5 – 10°. On the northern side of the ridge commensurate with the slope for the northern APZ area, the average incline is 10 – 15° although the slope decreases to 5 – 10° around to the west.

Although the southern aspect is a highly modified ski slope where most of the open areas included a reduced shrub cover (before the bushfire), the area is still commensurate with a sub-alpine woodland as indicated by the landscape position of surrounding vegetation. The author also has previous site experience around Mt. Selwyn to account for the vegetation structure in the general area that included isolated and continuous shrub stands away from the ski slope. Some shrub species were also observed to be resprouting across the slope, some from seed and others from root stock burnt during the fire. However, most resprouting vegetation, or plants growing from seed, were less than 10 cm tall, and there was no large scale burnt shrub branches or root boles compared to burnt areas surrounding the resort.

There was little shrub stratum within or adjacent to the ski resort due to the intensity of the bushfire. All tree canopy (*Eucalyptus pauciflora* ssp. *niphophila* [*E.p.* ssp. *niphophila* assumed versus *E.p.* ssp. *debeuzevillei*]) has either been scorched or consumed by fire, and very little ground vegetation was left unburnt. However, since the January 2020 fire and with good rainfall since winter, ground vegetation (grasses, graminoids and forbs) had regenerated in many areas, particularly across the ski slope. Ground cover away from the ski slope, particularly in treed areas, was patchy and in some areas there was no ground vegetation present.



Image 2: A southerly view down Clear Creek from near the middle of the ski slope below the proposed new buildings. The recovery of ground vegetation on the ski slope since the bushfire was good, but patchy in tree covered areas. Little shrub understorey and stratum was present during the survey, both within and adjacent to the resort.

2 METHODOLOGY

2.1 Desktop and Literature Review

A desktop review was undertaken prior to the field survey so that an appreciation was gained on the diverse range of flora and fauna previously recorded in the area and, more specifically, to filter those threatened species and threatened ecological communities either known or predicted to occur within the area. Threatened species, threatened ecological communities and their associated habitats would in turn form the primary target of the field survey. The databases included records derived from OEH BioNet (DPIE 2020a), access to Sensitive BioNet data (Category 2), OEH BioNet Vegetation Classification (DPIE 2020b) and the Commonwealth's Protected Matters Report (PMR) for elements relevant under the *Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act)* (DoEE 2020) (see Appendix 1). A 10 km search radius was used to filter BioNet data and PMR records, although a wider radius was used when interrogating additional location information for some threatened species. Several other species were also considered based on the author's familiarity with the area and following a review of threatened species associated with the relevant Plant Community Type (see Table 1).

Literature review included several past environmental assessments but most relevant to this appraisal was the 'Natural and Cultural Inventory of Selwyn Snowfields Lease Area by ENFAC (2009) and the 'Kosciuszko Resorts Vegetation Assessment by Ecology Australia (2003).

2.2 Field Survey

A site inspection was carried out on 15th October 2020. A meandering traverse was employed to survey across the entire building footprint of the Guest Facilities and ROC, the quarry dam including the inner quarry wall and areas of the proposed embankment, and the APZ zones associated with the two proposed buildings. Within the survey area special attention was given to macro and micro habitat features, an appraisal of standing vegetation and surviving structure and stratum layers, inspection of hollows, logs and boulders, regrowth proliferation by different species following the fire, and any predominance of weeds species, particularly high threat exotics.

All vascular plants including exotic species were recorded according to nomenclature prescribed in the NSW Royal Botanical Database (PlantNET). A qualitative relative abundance score was also applied against each species and notes taken pertaining to any interesting or concerning high threat exotics that could proliferate as a result of the proposed activity, particularly in the context of a fire-affected landscape. The threatened flora identified from database records and literature review became the main target of the search.

No threatened fauna was targeted *per se*, but rather habit as a surrogate indicator of those threatened species known in the area became the focus of the fauna assessment. However, all fauna detected on the day including southern areas of the resort associated with a proposed new water pipe were recorded. Detection included observations, calls and scats.

2.3 Limitations

Surveying vegetation in mid-October above 1500 m in elevation is generally early. Many plants are only beginning to emerge after a winter dormancy, and therefore key attributes including flowers and fruits used to identify plants to species level are often absent. Occasionally plants may retain fruiting material from the previous season, however, this can be reduced in upland areas that succumb to

strong winds, severe frosts and seasonal snow loading. This may be further compounded by pest and native herbivore grazing (e.g. rabbits and macropods) and ski slope maintenance. However, Selwyn Snow Resort did not operate during the 2020 snow season due to major infrastructure loss from the bushfire. This same bushfire event also affected nearly all vegetation within the study area. Consequently, all ground species were regenerating and most shrub species appeared to be either suckering or responding by seedling regrowth.

At the time of the survey, very few vascular plants were in bud and even less were in flower. No grasses were observed to be in flower except for one exotic **Dactylis glomerata*. In contrast, several graminoids (e.g. Cyperaceae and Juncaceae) were in flower, allowing confident identification of plants to species level. The same issue of lacking flowering/fruitlet material also pertained to forbs and shrubs, although several abundant exotic species were in flower.

Therefore, it is possible that some of the targeted threatened species may have been missed or not fully developed to be detected. A slow and concentrated meander search was employed to account for that possibility. Where doubt existed as to part or full species identification, botanical conventions were used to communicate any uncertainty. It is likely that several plant species have gone undetected, but for targeted threatened vascular plants that are also known in the area, these species can generally be identified without the presence of reproductive material (perhaps excluding orchid species). Furthermore, many species identified in this report also reflect the author's relative experience for identifying vascular plants in this type of landscape, although many species were still left identified to the genera level.

For threatened vertebrate fauna, mid-October is a reasonable time for detecting returning seasonal migratory species, particularly woodland birds and microbats, although these vertebrates were not directly surveyed in this assessment. For local species that overwinter including reptiles and amphibians, animal activity at the time of the inspection will depend upon temperatures and other weather conditions, and the circumstances as to when respective species exited brumation and hibernation. However, limitations for detecting species presence is reconciled by focusing on habitat opportunity as a surrogate indicator, and the rationale that each of the development footprints for Guest Facilities, ROC and quarry embankment are highly disturbed sites with little native vegetation. In contrast, the APZ to the north and west of the proposed buildings, while temporarily modified due to the bushfire, retains a better habitat complexity. It is uncertain what structural elements have been lost that were used by species present before the fire without pre-fire site surveys. However, this does not negate the importance of recognising habitat opportunity as a surrogate for animal populations present now and into the future. Furthermore, the level of assessment presented here is also commensurate with the level of impact associated with building on disturbed sites. What is not discussed in any detail, as mentioned above, is the circumstances surrounding any vegetation clearing requirements to meet APZ thresholds. The state of the vegetation, and hence fuel loads, will change over time. How this is to be managed was still subject to discussions between Selwyn Snow Resort P/L, NSW Department of Planning and NSW NPWS. That said, the information contained in this flora and fauna assessment will help with the APZ appraisal, at least as it pertains to conservation elements.

Notwithstanding the challenges and limitations discussed in this section, the author is satisfied that the survey methods and survey effort undertaken in mid-Spring has provided a reasonable understanding as to whether the proposed redevelopment poses any significant risk to threatened species and threatened ecological communities in the area.

3 RESULTS

3.1 Database and Literature Review

The review of data filtered from the BioNet database, the Commonwealth's Protected Matters Report and in particular the ENFAC report (2009), has culminated in a suite of threatened species and threatened ecological communities as target candidates for the field survey. The list of candidate species is not a total representation of species extracted from databases and literature without some justification for inclusion. As the BioNet data was filtered within a 10 km radius, this two-dimensional filter will invariably include records that occur at lower elevations and species with narrow and unique habitat requirements. Therefore, not every species has been listed for subsequent assessment, but rather a list of candidates based on a possible likelihood of occurrence, even if that occurrence is deemed to be low. The species that were filtered and justified for preliminary assessment are presented in Table 1

Table 1: List of threatened species filtered from database records for their known or potential occurrence in or adjacent to the proposed redevelopment project at Selwyn Snow Resort. The table also includes the conservation status and justification for selection as a candidate species for field assessment. Where data has been extracted from NSW BioNet an indication of the number of site records has been provided within 10 km of the survey area.

Codes:

V – Vulnerable, E – Endangered, CE – Critically Endangered, EEC – Endangered Ecological Community, CEEC – Critically Endangered Ecological Community

Scientific Name	Common Name	NSW Conservation Status	C'th Conservation Status	Number of Site Records	Likely Occurrence	Justification
FLORA						
<i>Prasophyllum retroflexum</i>	Kiandra Leek Orchid	V	V	1	Moderate	Although only one record within 10 km of Selwyn Snow Resort (a record near Kiandra), the species occurs in sub-alpine grasslands and woodlands, consistent with some of the environment in the survey area (DPIE 2020c). Most plants have been recorded in the Long Plain, Kiandra and Tantangara area. Although the ground vegetation within ski slopes is modified, areas to the north of the proposed buildings in the APZ still retain a reasonable native composition and structure - although some of the ground layer weed vegetation is more intense in this area than on the modified ski slope.
<i>Pterostylis foliata</i>	Slender Greenhood	V	-	1	Low	Although found in several other states, in NSW this species occurs mainly in the Southern Tablelands south from Batlow (DPIE 2020d). The species grows in eucalypt forest amongst an understorey of shrubs, ferns and grasses. It grows on loam or clay loam soils on sheltered slopes and occasionally seepage areas. The one record from 1992 has been denatured, but it is unlikely to occur within Selwyn Snow Resort and probably the montane valleys to the west within

						10 km of the study area (DPIE 2020a). It is unlikely to be a sub-alpine species.
<i>Discaria nitida</i>	Leafy Anchor Plant	V	-	4	Moderate	Records of this species tend to be scattered either on or close to rocky stream banks or on rocky areas (DPIE 2020e). The species occurs in both woodland and heathy riparian vegetation and on treeless grassy sub-alpine plains (DPIE 2020e). In the local area most records are along the Kiandra Plains. Some of these habitat elements are present in or adjacent to Selwyn Snow Resort. However, most populations survive in sites that appear to be rarely burnt 'fire refugia' as the species is known to be highly fire sensitive and recruitment infrequent. An easy plant to identify if present.
<i>Thesium australe</i>	Austral Toadflax	V	V	10	Moderate	Several records exist for this small straggling parasitic herb. Away from the coast the species occurs in grassland and grassy woodland, often in association with <i>Themeda triandra</i> (Kangaroo Grass) (DPIE 2020f). This species is a moderate candidate for occurring in the survey area as local records exist not far near Cabramurra to the west and in the Kiandra Plain area to the east. A good candidate if Kangaroo Grass is present.
<i>Pimelea bracteata</i>	Rice Flower	CE	-	8	Moderate	Although only 8 site records exist in BioNet, one record is within 1 km to the north of the proposed buildings (DPIE 2020a). However, due to the critically endangered status of this species, the location is likely to be denatured as the record is not commensurate with its known habitat. The species is a localised shrub occurring in wetlands and along waterways and stream edges in high altitude treeless subalpine valleys. The study area is essentially a snow gum woodland and the survey area not aligned to wetland or creek lines (Clear Creek does not truly form until well south of the APZ and the bog/gully vegetation to the north of the proposed APZ is outside of the survey area (DPIE 2020g). However, the species is retained as records include the Kiandra area and the species has declined dramatically from a range of threats including pathogen or invertebrate-induced foliage dieback. An estimated 50% of the range of this species was burnt during the January 2020 bushfire (DPIE 2020g).
<i>Calotis glandulosa</i>	Mauve Burr-daisy	V	V	0	Moderate	No local records in BioNet but this species is found in sub-alpine grassland dominated by <i>Poa</i> spp. and in snow gum woodland (DPIE 2020h). The species also often occurs in disturbed environments where ground disturbance can act as a precursor for seed germination (DPIE 2020h). Habitat elements for this species can be expected around the Selwyn area.
<i>Diuris ochroma</i>	Pale Gold Moths	E	V	0	Low	This terrestrial orchid is better known for its occurrence in the Kybeyan area on the Monaro Tableland (DPIE 2020i), but a

						population also exists on the sub-alpine plains near Tantangara in Kosciuszko National Park (pers. obs). Habitat at Selwyn not typical of locations known for this species, but kept as a candidate as a precaution.
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	Hoary Sunray		V	0	Low	Frequent populations occur along roadsides along the western fringe and central areas of the Monaro Tablelands. Often occurs in disturbed environments including bare areas. In less disturbed areas it is also known to colonise grassland, woodland and forests (DPIE 2020j). An easy plant to identify when in flower. Although no records in BioNet, the species occurs along the Snowy Mountains Hwy at lower altitudes. Due to its predisposition to disturbed areas, it is kept as a candidate species, albeit low likelihood of occurrence.
<i>Pterostylis oreophila</i>	Blue-tongued Greenhood	CE	CE	0	Low	In Kosciuszko National Park this species is only known from a few small populations. It grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water, but less commonly in peaty soils and sphagnum mounds (DPIE 2020k). Highly unlikely to occur at Selwyn, but kept as a precaution.
<i>Rutidosis leiolepis</i>	Monaro Golden Daisy	V	V	0	Moderate	In Kosciuszko National Park this species occurs in sub-alpine grasslands, but generally at lower elevations compared to the Selwyn area (DPIE 2020l). Kept as a candidate as a precaution.
<i>Calotis pubescens</i>	Max Mueller's Burr-daisy	E	-	0	Moderate	No local records but grows in sub-alpine treeless plains in herb-rich grassland that is not subject to periodic inundation (DPIE 2020m). The few populations that occur in Kosciuszko National Park include elevation ranges similar to Selwyn, but often in frost hollow or open valleys (pers. obs). Kept as a candidate as a precaution.
FAUNA						
<i>Litoria verreauxii alpina</i>	Alpine Tree Frog	E	V	12	Moderate	In NSW the alpine tree frog usually occur above 1100 m in a wide variety of habitats including woodland, heath, grassland and herbfields (DPIE 2020n) It breeds in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are still or slow flowing (DPIE 2020n). Non-breeding habitat and overwintering refuges are poorly known but are likely to include flat rocks, fallen logs, leaf litter and other ground debris (DPIE 2020n). While most vegetation associated with this proposed development is a dry form, the quarry dam is proposed to increase in volume by increasing the height of the embankment by 1.5 m. As the closest BioNet records are within 2 km to the north of the proposed development (DPIE 2020a), this species has been included for further consideration.
<i>Cyclodomorphus praealtus</i>	Alpine She-oak Skink	E	E	1	Moderate	Only 1 BioNet record was retrieved within 10 km of the proposed

						development which was a 1969 entry (DPIE 2020a). Until recently the species' northern distributional limit was thought to be in the Kiandra area, but surveys associated with Snowy Hydro 2 and a PhD study have identified Alpine She-oak Skink further north in the Long Plain area (Schroder pers. comm.). The species has specific habitat requirements preferring treeless or very lightly treed areas that contain tussock grasses, low heath or combination of both (DPIE 2020o). Within this habitat the species shelters beneath litter, rocks, logs and other ground debris, and has been observed basking in tussocks (pers. obs – Rennix Gap). Broad habitat type includes alpine to sub-alpine grasslands in flat to gently sloping areas (DPIE 2020o).
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	34	High	This species is frequently observed in the area including snow gum woodland with numerous records over time showing persistence in the Snowy Mountains area. Nesting requirements are generally 10 cm diameter or larger hollows at least 9 m above the ground (DPIE 2020p). In autumn and winter the species is likely to move to lower altitudes.
<i>Pachycephala olivacea</i>	Olive Whistler	V	-	4	Moderate	Olive Whistler prefer moist forests with a thick understorey such as along creek lines or contiguous vegetation in wet sclerophyll forests (DPIE 2020q). The impact of fire upon this species is likely to be great given the extent of the event, consuming wet gully vegetation. The vegetation in the upper Selwyn Snow Resort area was probably not optimum habitat for this species, but further south along Clear Creek habitat was likely to be more favourable. Retained for habitat assessment during the field survey.
<i>Petroica phoenicea</i>	Flame Robin	V	-	60	High	Extending up to the alpine area, this species occupies a range of communities including wet sclerophyll forest, dry sclerophyll forests, woodlands, open woodlands and heathland. As a seasonal and altitudinal migrant, Flame Robin tend to be more prevalent in the area during non-winter months. Flame Robin often forage from low perches (including fence posts and taller vegetation e.g. thistles) from which they sally or launch into the air, on the ground or on other features to pursue insects (DPIE 2020r). Nests are often near the ground and are built in sheltered sites such as shallow cavities in trees, stumps or banks (DPIE 2020r). The species occurs in recently burnt areas but habitat is usually unsuitable following regeneration that results in closed vegetation (DPIE 2020r).
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	-	11	Low	A suite of recent records to the west at lower elevations in montane dry and wet sclerophyll forest and woodland, are the result of recent surveys pertaining to the Snowy Hydro 2 project. The species has a low chance of occurrence in

						Selwyn pending a habitat assessment, particularly since the fires. Selwyn Snow Resort is at the upper altitudinal limit for this species which have been recorded in Thredbo Village, above which Mountain Pygmy-possum tend to occur, but in specific habitats. It is found in a broad range of habitats from rainforest through sclerophyll forest and woodland to heath, but in most areas woodland and heath appear to be preferred (DPIE 2020s). It feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes. Also feeds on insects throughout the year which may be very important in habitats where flowers are less abundant, particularly after bushfire. Retained pending habitat assessment and the impact of the bushfire.
<i>Matacomys fuscus</i>	Broad-toothed Rat	V	V	19	Moderate	There are several records near Selwyn Snow Resort and fresh scats were identified approximately 70 m south of the pump house on Clear Creek that was assessed as an independent activity to this proposal. The Broad-toothed Rat lives in a complex of runways through the dense vegetation of wet grass, sedge, or heath, and under the snow in winter (DPIE 2020t). Sheltering nests of grass are built in the understorey or under logs, where two or three are born in summer. Food is mostly gathered at night in summer and autumn and during the early evening in winter. The diet consists almost solely of grasses and sedges, supplemented by seeds and moss spore cases (DPIE 2020t). The species has been recorded in and adjacent to the resort. The species has been retained pending assessment of habitat opportunity in the proposed development area and following the impact of the January 2020 bushfire.
<i>Pseudomys fumeus</i>	Smoky Mouse	CE	E	12	Low	Surveys associated with the Snowy Hydro 2 project have detected more Smoky Mouse populations. Most of these records are to the west at lower elevations. Up until the extra survey work, few sites existed. However, Selwyn Snowy Resort is within the elevation range for this species known across south-eastern Australia, albeit in disjunct populations. The Smoky Mouse appears to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland, and open forest, up to 1800 m asl (DPIE 2020u). Seeds and fruits from leguminous shrubs form the main summer and autumn diet with some invertebrates (DPIIE 2020u). In winter and spring, hypogaeal fungi with some flowers, seeds and soil invertebrates form the main diet (DPIE 2020u). The species may occur singly or in pairs based around patches of heath. Nesting burrows have been found in rocky localities among tree roots (and Grass Trees where present)(DPIE 2020u). The species has been retained pending habitat appraisal.

<p>Microbats</p> <ul style="list-style-type: none"> • <i>Falsistrellus tasmaniensis</i> • <i>Miniopterus orianae oceanensis</i> 	<ul style="list-style-type: none"> • Eastern False Pipistrelle • Large Bent-winged Bat 	<p>V</p> <p>V</p>	-	<p>10</p> <p>1</p>	High	<p>Two species that have been recorded within 10 km of the proposed buildings have been listed. However, where Eastern False Pipistrelle usually roost in eucalypt hollows, loose bark and buildings (DPIE 2020v), Large Bent-winged Bat tend to favour caves, old mines, stormwater tunnels, buildings and other man-made structures (DPIE 2020w). That said, both species are listed in the same appraisal based on existing records, but also under the auspices of 'microbats' as a vertebrate group to account for other bats not recorded but possibly present in the area. Microbats are cryptic and unless special detection methods are employed (e.g. ultrasonic detection and harp traps), then the group will continue to go unrecorded in many areas. Habitat appraisal will be used to account for roosting, breeding and overwintering opportunities in the survey area. Potential impacts will be assessed against the habitat opportunities for microbats in and adjacent to the survey area.</p>
Threatened Ecological Community						
<p>Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions</p>		EEC	E	-	High	<p>The Montane Peatlands community is associated with accumulated peaty or organic-mineral sediments on poorly drained flats in the headwaters of streams. It occurs on undulating tablelands and plateaux, above 400-500 m elevation, generally in catchments with basic volcanic or fine-grained sedimentary substrates or, occasionally, granite (DPIE 2020x). Several communities have been mapped in and adjacent to Selwyn Snow Resort (see Figure 1). No construction footprint associated with the Guest Facilities, ROC or quarry dam augmentation will affect this community. However, there are elements of montane peatland to the north and north east of the proposed buildings within or bounded by the APZ. Retained for further assessment.</p>

3.2 Field Surveys

3.2.1 Flora

A total of 117 vascular plants were identified within the survey area of approximately 14 ha (see Appendix 2). This included 67 native species, 40 exotic species, four unidentified grasses and six unidentified forbs (unidentified to genus level). Very few species were in flower with the average ground cover height 5 cm, occasionally to 10 cm for some plants. Only one grass species was in flower (*Dactylis glomerata*) making grass identification difficult. In contrast, other graminoids including *Carex breviculmis*, *Carex appressa*, *Isolepis* sp. and *Luzula novae-cambriae* were in advanced stages of inflorescence development (though the author found it difficult to identify the *Isolepis* to species level).

Because of the lack of flowering material, it was difficult to identify many plants to species level, particularly grasses. The author's familiarity with some species allowed some confident determinations, but for many others it was left at the genera level or the species epithet questioned. Due to the predominance of grass cover within the southern survey area including the ski slope, it was also difficult to provide an accurate, although only a relative, cover abundance rating. In contrast to the open grassy vegetation in the south, much of the vegetation in the north of the survey area was part of a structural snow gum woodland, albeit burnt. Ground cover was less contiguous with grasses and forbs but presented as patches of open unvegetated areas interspersed with vigorous regrowth of sprawling native forbs (e.g. *Stellaria pungens*) and introduced weeds (e.g. **Viola arvensis*). There were also extensive patches of weeds surrounding the down slope areas immediately adjacent to the former management road where most resort activities and infrastructure was placed. Some shrub species showed signs of post-fire recovery as did many snow gums with lignotuber shoots emanating from the base of most trees. But most noticeable within the contiguous tree stands in the north and west of the survey area was the lack of tree canopy and the almost total removal of the shrub understorey.

Given the circumstances of the intense and extensive bushfire, the extent and recovery of ground vegetation was relatively good, covering most of the open areas that were burnt. Areas beneath trees showed less recovery which could be a combination of less seed material in those areas due to less plants from tree debris prior to the fire, and the fire intensity around trees being greater due to the prevalence of higher fuel loads.

In the coming weeks when the flora matures and other species germinate, plant identification would be more accurate and the abundance of species across the site better understood, though this dynamic will change over time as some slower growing species become more dominant.

Notwithstanding the challenges to identify plants to species level, and the incursion of introduced species, the proposed site is still a predominately native flora with a high composition of native species. The relative abundance rating used in Appendix 2 pertains to the whole survey area of the APZ inclusive of the proposed building footprints and the less structurally diverse ski slope area. It does not attempt to discriminate between areas in the north and south even though there are species and structural differences between these two areas. In essence the recorded species and relative abundance rating is an assessment of the entire survey area while searching for threatened species and assessing habitat complexity. However, as the Quarry Dam embankment is a separate project not bound to the APZ, those species recorded in an adjacent to the quarry have been listed separately. That said, only one species was recorded associated with the quarry that was not recorded in the broader proposed building and APZ areas, *?Elatine gratioides*, a partially submerged forb (there was still some uncertainty as to the correct identification of the species). There were 27 vascular plants

recorded that were associated with the quarry entrance including 12 native species, 13 exotic species and two unknown forbs.

Across the survey area the most dominant family was Poaceae with six natives, 11 exotics and four unidentified grasses. The dominant native grass was *Poa sieberiana* var *sieberiana* though it was difficult to determine the relative cover abundance of other native species. Several exotic species were also present though many such as **Holcus lanatus* and **Dactylis glomerata* only occurred in isolated patches. An exception was **Agrostis capillaris* that appeared to have a wide distribution.

Asteraceae species was also well represented with a dominance of native plants (19 native and eight exotic). Many species recorded are common constituent species of sub-alpine woodlands and grasslands in Kosciuszko National Park. Interestingly, Fabaceae was also well represented (four native and seven exotic) with most of the germinating shrub species belonging to this family. Besides *Poa sieberiana* and a mix of other native grasses, inter-tussock forbs were well represented by *Stellaria pungens*, *Asperula* spp., *Ranunculus* spp., *Acaena* spp., *Geranium* spp., *Pimelea* spp., *Scleranthus* spp. and a diverse array of Asteraceae including *Craspedia* spp., *Brachycome* spp., *Celmisia* sp., *Coronidium scorpioides*, *Leptorhynchus squamatus* and *Senecio gunnii*. The suite of native forbs was also matched by the distribution of the introduced **Hypochaeris radicata*, **Trifolium* spp. and the co-dominant **Acetosella vulgaris*. While some exotic species were distributed across the survey area, some species were more prevalent in isolated stands including **Viola arvensis* and **Leucanthemum x superbum*.

Several shrubs were resprouting and/or growing from seedlings including *Daviesia ulicifolia*, *Bossiaea foliosa*, *Hovea* sp. ?*Oxylobium ellipticum* (possibly *Podolobium alpestre*) and *Tasmania xerophila*. All shrub species were in the early stages of regrowth. Within the northern APZ area, both seedlings and lignotuber regrowth from *Eucalyptus pauciflora* were recorded – but very little epicormic response.

In summary, no threatened flora was detected in the survey area nor were the suite of constituent species that form a bog and fen community. There were elements of a bog complex to the north of the APZ area that was severely impacted by the bushfire, but this was beyond the survey area. Similarly, the lower reaches of Clear Creek (as part of the proposed water pipe assessment) contained species associated with damp sites and water ways (e.g. *Carex appressa* and *Geum urbanum*), but not bog. The quarry dam is artificial and there was no remnant species suggesting the site was a former bog or fen. Except for a few localised damp areas, the vegetation across the survey area was mostly a dry form commensurate with a snow gum woodland. This is in part related to the landscape position of the proposed activities being centred on a ridge line and past resort practices of maintaining the ski slope with a low ground cover.



Image 3: Part of the northern APZ associated with the proposed Resort Operation Centre. Many trees in this area were not large to provide good fauna habitat opportunity (e.g. hollows), but tree crowns would have still provided foraging opportunities for a range of bird species. While the above ground tree trunks are dead, technically the tree is still alive as evident by the coppicing base of most trees in the APZ across the survey area. However, ground cover was patchy in some areas of the APZ as depicted in this image (compared to Image 2 [p.10] for southern areas of the ski slope in the same APZ).



Image 4: A close-up of the patch-like recovery in some northern parts of the APZ. The image shows a native *Geranium* sp. (largest leafy ground plant) surrounded by the introduced *Taraxacum officinale* (yellow flower), *Viola arvensis* (pale-coloured flower) and *Acetosella vulgaris* (in flower but not easily seen in the image).

3.2.2 Fauna

Fauna data was collected while conducting other activities including the flora survey and habitat assessment. The time of year was relatively early to maximise detection of vertebrate species. This was compounded by the dramatic habitat change with an almost 100% loss of tree canopy and shrub understorey due to the January 2020 bushfire, which has no doubt reduced fauna species presence and abundance in the area. That said, 19 birds, five mammals, one amphibian and two reptiles were detected (see Appendix 3). A site inspection in late-Spring/early -Summer may detect a greater number of species, but the diversity of fauna on the day of the inspection was surprisingly high given the magnitude of habitat change. During the inspection cloud was approximately 2/8, there was a slight breeze from the north-west and temperatures ranged from 10 to 15° C.

Some birds were heard well distant of the ski resort, but most of those recorded in Appendix 3 were recorded either in burnt canopy, on tree trunks or flying low above the canopy. Many of the species recorded were heard throughout the day. All mammals were detected by scats. Of particular interest were a few fresh scats of Broad-toothed Rat approximately 70 m downstream of the pump house within the riparian corridor (well outside the survey area for the proposed redevelopment). This corridor appeared to have a partially contiguous shrub layer before being burnt by the bushfire. Ground vegetation was regenerating including grass tussocks. This was an encouraging sign that Broad-toothed Rat had survived the fire. No sign of Broad-toothed Rat was recorded within any part of the survey area for this assessment. Of the introduced animals, very few scats were observed suggesting that at least both rabbit and hare populations have been greatly reduced since the fire.

Common Eastern Toadlet were heard at two locations – along the creek line near the pump house, and in the quarry that supplies water for snowmaking. Tadpoles were also recorded in the quarry dam. Two reptiles were recorded: two Eastern Three-lined Skinks (one near the quarry and the other on the ski slope taking refuge under a rock) and one Highland Copperhead located to the north of the resort in the proposed APZ. The Highland Copperhead looked relatively thin, which may be due to the lack of available prey, including ground fauna such as lizards, small mammals (e.g. antechinus) and large insects.

Habitat complexity has been greatly reduced since the bushfire, both within and outside of the survey area. Very few rocks and no boulder outcrops were present in the survey area. There was no canopy remaining on the snow gum overstorey and most of the shrub understorey had been destroyed by fire. Some shrub regeneration was encouraging but height of shrub regrowth averaged 10 cm with a few species attaining a height of 15 cm. As described above in the plant results, ground cover was patchy in the northern and western areas within the APZ. Furthermore, there were few logs and other large ground debris that could provide refuge for ground dwelling fauna. The lack of logs indicates a high intensity wildfire when large ground fuels had very little moisture content, and the fire behaviour included a relatively long-residency time in the area that consumed large fuel types that would otherwise persist in fires of lower intensity. The same fire behaviour has also changed the habitat opportunity that existed amongst the larger trees before the fire, either by destroying the existing hollows, or in some cases, increasing hollow size and creating hollows that didn't exist prior to the fire.

For each of the threatened species identified in Table 1, if they have survived the January 2020 bushfire, then habitat following the fire up until the date of this survey has been greatly diminished or removed entirely. That said, habitat opportunity will improve over time as the vegetation regenerates. Many of the existing habitats lost during the January 2020 bushfire will be reinstated over time, subject to no further large conflagrated events, at least for the next 20 years. Twenty years should see a recovery of a shrub layer and ground material increased from falling trunks and branches of some of the surrounding snow gums. However, the trees will take longer to recover as most of the above

ground parts of *Eucalyptus pauciflora* are easily destroyed by fire and contain relatively little regenerative epicormic tissue under the thin bark. Most trees, however, still appeared to be alive as observed by the coppice regrowth emanating from most tree bases. Furthermore, in some sites, seedlings were germinating – this included on the ski slope in areas adjacent to tree stands (island vegetation) and in the northern and western areas of the APZ within the snow gum woodland.

There are encouraging signs of different fauna vertebrate groups occupying areas in and around Selwyn Snow Resort. No threatened fauna was detected in the area although no specialised target fauna surveys were employed for this assessment. However, habitat opportunity on the site for the proposed Guest Facilities, ROC and quarry embankment wall is poor (non-existent). That said, the inner quarry area with its rocky alignment could provide habitat for other reptile species (above the full dam level) and possibly refuge areas for frog species other than *Crinia signifera*. The full spectrum of other habitat requirements to support the critical life-cycle of threatened frog species in the region or *Cyclodomorphus praelatus* were not present, but the quarry by virtue of containing water, rocks and boulders and unburnt shrubs still retains a relatively good habitat complexity compared to many other areas around the resort (e.g. the eastern three-lined skink and common eastern toadlet were record at the quarry site).

In contrast to the development footprints, the APZ area to the south across parts of the upper ski slope area is recovering well with a complete ground cover of vegetation, although rarely exceeding 5 cm height. Habitat complexity for this environment before the bushfire would be considered low, and not provide for too many threatened species known in the area with the exception of Alpine She-oak Skink (assuming it was present). Key habitat features for Alpine She-oak Skink also appears low without appropriate rocky refuge areas or a greater cover of woodland debris. This does not negate the ability of the site to improve in habitat complexity in the future and allow occupancy of Alpine She-oak Skinks from adjacent areas. The prevalence of Alpine She-oak Skink assumes they were present in surrounding areas and a viable population has survived the bushfire to be able to colonise new sites.

Most habitat opportunity associated with the proposed redevelopment pertains to the northern and western areas of the APZ. In these areas most woodland trees still remain, although habitat potential for the immediate future is low until canopied stratum returns (trees and shrubs). Until there is a substantial return of leafy canopy, most threatened birds identified in Table 1 will not be able to nest. Some bat species may find suitable hollows to roost and breed in this area, but other requirements such as food availability will take some time to respond until the total ecosystem starts to recover – most of which is based on plant regeneration.



Image 5: The image was taken within a tree stand at the southern end of the ski slope adjacent to the proposed water pipe. However, it is presented here as a relatively better representation of habitat opportunity compared to many areas in the northern APZ. As tree material starts to fall to the ground and accumulate, then habitat complexity and subsequent fauna opportunity will increase – both for common and threatened species.



Image 6: The quarry dam showing little habitat complexity associated with the embankment that is proposed to increase in height by 1.5 m. However, the inner environment, some of which will be flooded when the dam increases to its new full potential, is more complex than surrounding areas. A separate species list for the area on and adjacent to the current embankment is presented in Appendix 2.



Image 6: Some tree material was cut down during the bushfire event in an attempt to protect some of the resort assets. Other material that had fallen since the fire and was obstructing access was pushed into a pile. As shown in the right of the image, large habitat trees were burnt. Habitat complexity in the northern areas of the APZ will take many years to return to the state that existed prior to the bushfire.



*Image 7: Part of the APZ area to the north-west of the proposed Guest Facilities. Patchy regeneration of native and exotic grasses and forbs, no shrub understorey and basal coppicing of *Eucalyptus pauciflora* was the typical environment present in most sub-alpine woodland when the flora and fauna assessment was undertaken approximately 10 months after the January 2020 bushfire.*

4 IMPACT ASSESSMENT

The results of this flora and fauna assessment did not identify any threatened flora species within the survey area, or suitable habitat that could support any threatened species identified in Table 1 ***at the time of the survey***. That said, only flora and threatened ecological communities were targeted during the field survey, with threatened species assessed through habitat opportunity. Furthermore, some species are mobile or may not use one location to fulfill all habitat or niche requirements. However, as the vegetation regenerates in and around Selwyn Snow Resort as a result of the January 2020 bushfire, habitat will also recover and so will the opportunity for many species to reoccupy sites. The presence of habitat, however, does not necessarily guarantee occupancy by common or threatened species. A suite of circumstances needs to occur including the survival and persistence of more localised species (e.g. reptiles and some ground mammals) having survived the bushfire and the challenges posed thereafter including habitat availability, prey and foraging opportunities, increased predation and competition with other surviving species and populations. For more mobile species including birds, micro-bats and larger mammals, the same circumstances are also relevant, except the species has a greater opportunity to search for unburnt or less burnt environments. That said, some of these species could also become prey for larger animals in the short term after fire if refuge and roosting areas are no longer available. Furthermore, if key habitat requirements aren't available or fully sustainable in the area, the species may succumb to hunger, fall prey or unable to breed.

To state the obvious, the proposed building footprint and operational area pertaining to the Guest Facilities and ROC will have no impact upon threatened flora and fauna. The sites are effectively devoid of most native vegetation and for most parts, commensurate with the previous building precinct of the former resort. Similarly, the raising of the earthen embankment by 1.5 m will not have a detrimental impact on any threatened species at the site *per se*, as the site is highly disturbed and retains little habitat complexity. However, other parts of the quarry that serve to retain water for snowmaking does include some habitat variability that could provide opportunity for several species. By raising the wall and subsequent height of the water by an extra 1 m above the current full-dam level, some of the existing habitat will be submerged. That said, it is unlikely that the quarry and dam support threatened species known in the wider area as there are other habitat components missing that would need to be present for any of the threatened species to complete their respective life-cycles.

Threatened species habitat opportunity was of a better relative complexity to support a range of vertebrate fauna and vascular plants in the APZ, particularly in the northern areas. Southern APZ areas are also diverse in terms of vascular plant richness, but as a ski slope it lacks vegetation structure and stratum. In addition, most rocks have been removed over the years to make the slope safe for guests and slope grooming operations. In the southern APZ area, most habitat complexity is found in remnant tree stands. These sites are not of the highest condition, but tree structure, canopy, occasional shrubs and rocks can be found, particularly in the larger stands. In contrast to southern APZ areas on the ski slope, the northern and western APZ area has a higher habitat complexity, but much of this has been diminished since the January 2020 bushfire. Therefore, habitat opportunity needs to be considered in the short and long term – how it exists at the time of this assessment, and the projected habitat quality that may return and provide opportunity to the same (and other) species that it did prior to the fire.

If any of the trees and shrubs are to be removed in the future, or not permitted to regenerate to maintain inner and outer APZ thresholds, then obviously habitat opportunity will be reduced. The state of the environment when this assessment was undertaken was also in a critical phase of recovery, with several introduced species starting to proliferate including those with a relatively early

flowering period. This means that these species will have an advantage over native species to colonise new areas, or at least contribute more seed to the seed bank and germinate when other opportunities become available. The survey data also provides the recovery status of the environment approximately 10 months after the bushfire. This challenged the ability to detect as many plant species as possible and confidently identify flora to species level at a time when most grasses, forbs and emerging shrubs were not budding or in flower. Unfortunately, this challenge also extends to threatened flora. There remains the possibility that some of the flora in Table 1 may have been present but overlooked due to concealment amongst other plants or at an inconspicuous stage of growth. As a simple comparison between the flora identified by Ecology Australia in 2003 and presented in the ENFAC report (2009), 174 vascular plants were recorded of which 12 were introduced. That inventory was taken across the entire resort area and included more diverse community variation than that assessed for this assessment, notwithstanding the impact of the bushfire. However, there are some presentation and interpretation issues amongst the data in the report as ENFAC also identified 35 weed species. This contrasts with the 40 exotic species identified in this report, many of which were not identified by Ecology Australia nor reported by ENFAC. Accepting that there will be some identification differences and errors amongst all botanists and ecologists, and some nomenclature changes over time between surveys, concerning is the diversity of the weed species present in the area. Using the list of exotic and noxious weeds recorded by ENFAC in 2009 before the fire (p. 37 ENFAC 2009), and those identified in this report (Appendix 2), the potential incursion and abundance of weeds over the warmer months is great. All introduced species compete with the integrity of native species. However, some species, often those described and formally listed as noxious, tend to be more concerning. Table 3 lists those species that may pose a risk of increasing their current distributional limit in the resort area and take advantage of bare areas yet to be colonised by native species. The list is taken from noxious weeds listed by ENFAC in 2009 and those identified in this report as identified on the 15th October 2009. These species should be the subject of priority weed control although a broader discussion should be made with NPWS to account for any other potential noxious weeds in the area including appropriate control methods.

Table 2: Noxious weeds identified in the Selwyn Snow Resort area.

Scientific Name	Common Name
<i>Perennial grasses</i>	<i>(although some may not be practical control)</i>
<i>Dactylis glomerata</i>	Cock's Foot
<i>Holcus lanatus</i>	York-shire Fog
<i>Phleum pratense</i>	Timothy Grass
<i>Achillea millefolium</i>	Milfoil
<i>Cirsium vulgare</i>	Scotch Thistle
<i>Collomia grandiflora</i>	Great Collomia
<i>Echium vulgare</i>	Viper's Bugloss
<i>Echium plantagineum</i>	Paterson's Curse
<i>Hypericum perforatum</i>	St. John's Wort
<i>Leucanthemum x superbum</i>	Shasta Daisy
<i>Onopordum acanthium</i>	Scotch Thistle
<i>Rubus</i> sp.	Blackberry
<i>Salix cinerea</i>	Black Willow

To appraise the impacts of the proposed redevelopment on the species listed in Table 1, and the field work that attempted to search for those species and assess habitat potential, each species has been

assessed in the context of the existing environment with consideration for how habitat will change overtime as vegetation regrowth progresses.

Table 3 below provides an assessment of those threatened species and threatened ecological communities either known or possibly occurring in and adjacent to the proposed redevelopment buildings, structures and APZ, **and** whether the proposed redevelopment and its use has the **potential to adversely affect** those species and threatened ecological communities. Those species identified as ‘occurring’ **or** having a ‘high likelihood of occurrence’, **and** where the potential to adversely affect is considered ‘high’, would be subjected to a ‘Test of Significance’ under the *BC Act* and/or ‘Significant Impact Criteria’ under the *EPBC Act* respectively. Consideration of the ‘potential to adversely affect’ species and threatened ecological communities is commensurate with the extent and type of disturbance activities prescribed and anticipated with the redevelopment. However, it does not attempt to explicitly interpret any vegetation clearing associated with northern and western areas of the APZ as the degree of impact would depend upon the amount and type of vegetation to be cleared. In the most simple of responses, the greater the vegetation removal of trees and/or shrubs, the lesser the habitat complexity and in turn, the less habitat available to common and threatened species, whether that be for foraging, roosting, refuge or nesting sites. However, a cursory comment has been provided to indicate a general impact description upon each species in the northern and western APZ based on the species’ general occupancy within the structure of their preferred habitat.

Table 3: Evaluation of threatened species and threatened ecological communities as potential candidates for assessment of the ‘Test of Significance’ under the BC Act and ‘Significance Assessment Criteria’ under the EPBC Act.

Codes:

V – Vulnerable, E – Endangered, CE – Critically Endangered, EEC – Endangered Ecological Community.

Scientific Name/Common Name/Conservation Status	Previously recorded in survey area	Recorded during field surveys	Potential to be impacted by the proposed redevelopment	Justification
FLORA				
<i>Prasophyllum retroflexum</i> <i>Kiandra Leek Orchid</i> V – BC Act V – EPBC Act	No	No	Low	Habitat elements present in the area, but not fully commensurate with environments where the species occurs in other areas in KNP. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Pterostylis foliata</i> <i>Slender Greenhouse</i> V – BC Act	No	No	Low	Arguably a forest species and at lower elevations. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Discaria nitida</i> <i>Leafy Anchor Plant</i> V – BC Act	No	No	Low	A strong fidelity to rocky creek lines or rocky areas not too distant from natural water bodies. Habitat not consistent within the northern parts of Selwyn Snowy Resort. An easy plant to identify, although slow growing. The species was not present on sites proposed for the buildings and embankment, nor present in the southern APZ. If it were present in the northern APZ, then it could be impacted by clearing to

				meet APZ thresholds. However, very unlikely to be present.
<i>Thesium australe</i> Austral Toadflax V – BC Act V – EPBC Act	No	No	Low	A greater appreciation of this species' distribution as a result of more surveys associated with the Snowy Hydro 2 project. A strong association with Kangaroo Grass – <i>Themeda australis</i> . Not detected and unlikely to be present. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Pimelea bracteata</i> Rice Flower CE – BC Act	No	No	Low	A species that grows on the fringe of wetlands and waterways, but habitat not present within the survey area except for the artificial quarry dam. The closest possible habitat is further to the north of the APZ along a mapped bog area. This site was severely impacted by the wildfire and inspected, but no plants noted. In summary the species is unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is likely to be impacted by any shrub clearing as it is of height that could be targeted to meet APZ thresholds. But given the APZ occurs in dry vegetation types, the species is very unlikely to be present.
<i>Calotis glandulosa</i> Mauve Burr-daisy V - BC Act V - EPBC Act	No	No	Low	A possible occurring species even though no plants were detected during this survey or surveys undertaken by Ecology Australia (2003) and ENFAC (2009). However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Diurus ochroma</i> Pale Gold Moths E – BC Act V – EPBC Act	No	No	Low	Some habitat elements present in the area, but not fully commensurate with environments where the species occurs in other areas in KNP. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Leucochrysum albicans</i> var. <i>tricolor</i> Hoary Sunray V – EPBC Act	No	No	Low	Generally occurs at lower elevations than Selwyn, but tends to occur in unexpected disturbed sites. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Pterostylis oreophila</i> Blue-tongued Greenhood CE – BC Act CE – EPBC Act	No	No	Low	A species with a fidelity to sub-alpine watercourses under thickets of Mountain Tea-tree. An unlikely candidate in the survey area, but possibly occurring in other areas of the resort, particularly further to the south along Clear Creek. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retainment as it is not part of the targeted fuel load.
<i>Rutidosia leiolepis</i> Monaro Golden Daisy V – BC Act V – EPBC Act	No	No	Low	A lower elevation growing species compared to environments around Selwyn. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance

				before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retention as it is not part of the targeted fuel load.
<i>Calotis pubescens</i> Max Mueller's Burr-daisy E – BC Act	No	No	Low	Tends to occur in natural treeless sub-alpine treeless plains compared to the environment that has been created around Selwyn. Not detected but possibly missed during the survey. However, unlikely to occur on sites proposed for the buildings and embankment. If it were present in the southern APZ, then it has survived ongoing slope maintenance before the fire. If it is present in the northern APZ, then it is unlikely to be impacted whatever the future of the shrub and tree retention as it is not part of the targeted fuel load.
FAUNA				
<i>Litoria verreauxii alpina</i> Alpine Tree Frog E – BC Act V – EPBC Act	No	No	Moderate	Although not subject to any direct surveys, and arguably any attempts to survey for this species may be considered too early in the season to maximise detection. However, the quarry dam was the only site in the survey area where there was a water body to support tadpoles. However, there was a lack of other supporting vegetation around the perimeter. That said, if animals were present and found enough niche requirements within the confines of the dam, then some impacts could be considered if the current full-dam level were to increase by another vertical 1 m. If that were to occur, the quarry basin would still provide the same attributes of grasses, forbs and rock refuge that currently exists, except the amount of area currently available would be reduced.
<i>Cyclodomorphus praeltus</i> Alpine She-oak Skink E – BC Act E – EPBC Act	No	No	Moderate	The species has specific habitat requirements preferring treeless or very lightly treed areas that contain tussock grasses, low heath or combination of both (DPIE 2020o). Within this habitat the species shelters beneath litter, rocks, logs and other ground debris, and has been observed basking in tussocks (pers. obs – Rennix Gap). Broad habitat type includes alpine to sub-alpine grasslands in flat to gently sloping areas (DPIE 2020o). Little optimum habitat currently exists since the 2020 bushfire, although other components such as rocks are not prolific in the survey area. There is no habitat available for this species at any of the proposed buildings and the quarry dam embankment. If habitat were present in the southern areas of the APZ, then the species survived winter recreation and slope grooming activities before the fire. If the species were present on the northern areas of the APZ, then they are unlikely to be affected by the removal of any trees or the thinning of shrubs, particularly if grass tussocks continue to grow and more tree and shrub debris is left on the ground as refuge sites. The current environment in the northern APZ area lacks rocks and ground debris. Future regrowth of shrub species may actually detract from this area being candidate habitat for Alpine She-oak Skink. The probability for this species being present in and adjacent to the redevelopment is low and therefore impacts are also low. However, without absolute knowledge of species being present or absent, a more conservative Moderate impact is declared based on the types of activities associated with the redevelopment.
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo BC – V	No	No	Low	The chances of this species being present either flying over the canopy or feeding on seed on unburnt trees is high, at least before the bushfire. Feeding opportunities have been diminished although Gang-gang Cockatoo are known to feed on grasses, graminoids and forbs on the ground. Perhaps more critical within the Selwyn area is the availability of tree hollows, an attribute that is limiting the conservation status for this species. Due to the fire many of the tree hollows have been lost, although some others have been created but in smaller trees and with less hollow sites that may not meet the bird's requirements of 10 cm diameter or larger and at least 9 m above the ground. The vegetation type and exposed area on a ridge top and adjacent spur is not optimum for this species. The lack of records in the resort area for such

				an easily identified bird may reflect the lack of critical breeding opportunities in the area. In summary, some nesting opportunities still exist, feeding opportunities in the canopy have been lost, and there is no immediate impact upon this species by the proposed activities associated with the redevelopment. If some of the larger trees in the northern and western areas of the APZ were to be felled, then there could be a minor impact of breeding opportunities for this species, but it would not be deemed significant for this area.
<i>Pachycephala olivaceae</i> Olive Whistler V – BC Act	No	No	Low	Although a sub-alpine resident or seasonal/altitudinal migrant, the species does prefer a thick and contiguous understorey along creek lines or in wet sclerophyll forests. Much of this habitat has been lost due to the intensity of the bushfire. However, optimum habitat is not present and unlikely to have been present before the wildfire. No impact associated with the proposed buildings and embankment upgrade, and a low impact should any shrubs be removed from the northern APZ.
<i>Petroica phoenicea</i> Flame Robin V – BC Act	Yes	No	Moderate	Only one record exists for this species in the survey area, but it would be expected that historically more species would have been present across the ski slope as the resort and surrounding area provides optimum summer habitat. However, since the 2020 bushfire, foraging and nesting habitat has been either diminished or entirely lost. The critical components of tree and shrub canopy will regenerate in woodland areas in the future to a level that will provide breeding and nesting opportunities for this species. However, at the time of this survey, critical habitat components were absent and will take some time to return. Birds may still be present in the resort and perch from trees to sally for insects, or from other structures. However, whether there are enough insects in the area during the non-winter months is unknown. However, the suite of bird species in Appendix 2 would suggest omnivores, insectivores and granivores are finding enough food 10 months after the fire, though the relative abundance and relative densities for each of these species is unknown. The species is unlikely to be impacted by any of the activities associated with the proposed development, with only local impacts should trees and shrubs in the northern APZ area be removed in the future.
<i>Cercartetus nanus</i> Eastern Pygmy-possum V – BC Act	No	No	Low	No Eastern Pygmy-possum have been identified in the Selwyn area, although new records have been established within 5 km to the north-east as part of Snowy Hydro survey assessments. However, these sites are at lower altitudes to Selwyn. Eastern Pygmy-possum was listed by the author in Table 1 as the species has been recorded above 1400 m in a few other areas in KNP, and most records until recently were incidental. Areas above 1500 m elevation appear to be too high for the species to survive, though the environment in the northern APZ area before the bushfire did contain elements consistent for this species including tree hollows at various heights, ground debris including logs, and a contiguous shrub cover. If Eastern Pygmy-possum were in these environments before the bushfire, there is little habitat available that could support this species in the near future. Vegetation in sub-alpine areas is slow to recover, particularly given the extent and intensity of the January 2020 fire.
<i>Mastacomys fuscus</i> Broad-toothed Rat V – BC Act V – EPBC Act	Yes (the species was recorded outside of the western edge of the APZ area, but considered close enough as the vegetation was the same type)	No (but fresh scats were identified about 70 m south of the existing pump house along Clear Creek)	Moderate	There is no effective habitat on any of the proposed development sites and the current and projected height of ground vegetation in the southern areas of the APZ would not be adequate. However, vegetation around the northern and western areas of the APZ could have provided sub-optimum habitat for this species that prefers wet grassland, wet heath and bog communities or a complex of these types. Dry shrub understorey is not optimum but could be used to bridge areas. Perhaps more important are thick Poa tussocks from which the animal makes runways and tunnels from where it feeds on grasses and sedges. The northern and western APZ area has been severely fire affected, and currently there is no effective

				contiguous grass cover, shrubs are absent, and the degree of burnt trunks and absence of a tree canopy indicates a high intensity fire. It is highly unlikely that Broad-toothed Rat are currently present in this area and it will take some time for any species to recolonise. For this to happen, optimum habitat will have to regenerate and there needs to be animals in the area that survived the fire. Relatively fresh scats were identified along Clear Creek. This is encouraging as the grass growth in this area was good although not thick or contiguous enough to provide cover for transitory animals away from the creek line. At this point in time it is unlikely that Broad-toothed Rat are present in the survey area and nor would they be impacted by the proposed redevelopment. A reassessment would be required in the future if regenerated shrubs or seedling regrowth needed to be removed to meet APZ thresholds. It is possible that no significant impact could occur if a contiguous tussock ground cover was present and left intact. Detection of this species is relatively easy using the presence of scats.
<i>Pseudomys fumeus</i> Smoky Mouse CE – BC Act E – EPBC Act	No	No	Low	Unlike Broad-toothed Rat, Smoky Mouse require a greater habitat complexity than thick contiguous Poa tussocks. Records for this species have included high sub-alpine areas in KNP, although most records are from lower elevations including a new suite of records about 5 km to the north-west. Given the loss of ground and shrub vegetation including most ground debris and logs, it is highly unlikely that Smoky Mouse would be present in the northern and western APZ area. Whether habitat opportunity changes in the future will depend upon post-fire regeneration, the accumulation of ground debris including logs and the survival or recolonisation of a local population. At this point in time there is a low risk of impacting this species by the proposed activities associated with the redevelopment. However, if there is a requirement in the future to remove vegetation to meet APZ thresholds, then this species will need to be re-evaluated with the likely requirement to undertake trapping to determine whether this species is present.
Microbats (V – BC Act) <ul style="list-style-type: none"> <i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle <i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat 	No	No	Moderate	Although no records in the survey area, the chances of species of microbat being present in the Selwyn area is high, even for short periods of time during the non-winter months. The chances of roosting in some of the larger trees with small hollows, fissures and larger slabs of decorticated bark is also high – at least before the January 2020 bushfire changed the habitat. Suitable hollows are still present but the loss of foliage and other vegetation that supported various insect species including moths has been lost – the degree of impact can only be postulated. By the development of the Guest Facilities, ROC and increased size of the embankment there will be no impact upon any microbat species. There is no habitat value within the southern APZ except tree stands scattered across the slope. The trees in the northern and western APZ are still likely to provide some roosting opportunities, but persistence in the immediate area will also depend upon prey (e.g. insects and other invertebrates). Habitat opportunities will improve over time as the vegetation regenerates, although tree canopy to match the pre-fire status will take a long time as this will only take place by the maturing coppice shoots currently sprouting at the base of most trees. If trees are to be removed to meet APZ thresholds, then a greater level of assessment would be required to determine which species are present and which trees would be providing roosting or nesting sites at that point in time. Furthermore, specialised detection methods would be required to identify microbats including harp traps and ultrasonic equipment.
Threatened Ecological Community				
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East	No	No	Low	No Montane Peatland is present within the survey area. The closest recorded community is to the north of the northern APZ area. The current outer APZ calculations identify the zone to be within the snow

<p>Corner, South Eastern Highlands and Australian Alps bioregions</p> <p>EEC – BC Act E – EPBC Act</p>				<p>gum woodland. There are other patches of Montane Peatland within the resort, but these are mostly scattered to the south and to the north-east. Where adjacent Montane Peatland community to the APZ is present, it would only be impacted if the adjacent APZ were to include future clearing. Surface and sub-surface drainage is an integral process to the maintenance of Montane Peatland communities. Any changes to water flow by removing upslope vegetation that could increase flow rates away from the site or increase evaporation rates by the loss of canopy species, would be detrimental. The challenges faced by fire-affected Montane Peatlands is significant. Many of the peatlands observed by the author as part of a Peatland Monitoring project in KNP that includes many sites along the Snowy Mountains Hwy and Cabramurra Rd., shows a dramatic loss of peatland species including the constituent Sphagnum component. Recovery of these ecosystems will take years to see the return of previous species, but in some cases, where the peat has been destroyed by fire, the main process driver of this ecosystem has been lost. If upslope vegetation from the adjacent Montane Peatlands is to be removed as part of any future APZ commitments, then a reappraisal of these communities may need made in the context of how much vegetation and the location of that vegetation in relation to the peatland. However, the sites for the proposed Guest Facilities, ROC and enlarged quarry embankment will not have any impact upon Montane Peatlands adjacent to the survey area.</p>
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In summary, no adverse impacts are anticipated upon threatened flora and fauna as a result of the proposal to build Guest Facilities and Resort Operation Centre on the previously disturbed sites that contained the former resort buildings prior to the January 2020 bushfire. The proposal to increase the embankment height at the quarry dam and subsequent water volume will also not have any adverse impacts as the quarry is essentially a disturbed area, and habitat will remain within the enclosure, although the amount of area will be reduced when the full-dam level is periodically reached. APZ areas to the south of the Guest Facilities and ROC are mostly a managed ski slope where the height of the vegetation is maintained to a low profile for skier safety and snow grooming operations. The plant diversity in this area is high with a strong representation of native species, although habitat opportunity is low due to that lack of vegetation structure and stratum and other features such as rocks and boulder outcrops. Vegetation has recovered relatively well since the bushfire.

APZ areas to the north and west of the Guest Facilities and ROC had a greater habitat complexity before the bushfire as provided by trees and shrub layer. The bushfire has removed most tree canopy and nearly all shrubs. Ground cover is patchy with some areas recovering well like southern APZ areas, while other areas are still devoid of any vegetation. The presence of numerous noxious weeds in this area as identified by ENFAC (2009) before the fire, and those identified here approximately 10 months after, pose an ongoing risk to the recover of native vegetation. Habitat potential within the northern and western APZ areas has been diminished due to the bushfire, although this will be reinstated overtime as the vegetation regenerates and more ground debris accumulates. The severity of the fire has removed most logs and branches that are important habitat components for ground fauna, but this will also be reinstated when some of the standing tree material including trunks and branches collapse.

While burnt vegetation is considered aesthetically unpleasing, the opportunity that fire can have by creating or enhancing hollows needs to be recognised. There will be different opportunities to different species in the short and long term of tree and community regeneration. Unless unsafe to staff and guests, or where slope operations are impeded, burnt trees and felled material should be left as part of fauna habitat, including habitat opportunities for non-threatened species.

6 CONCLUSIONS

The building of new Guest Facilities and Resort Operation Centre will not have any adverse impact upon threatened species or threatened ecological communities as it is sited over the same building envelope and precinct as existed before the January 2020 bushfire. The quarry dam augmentation will not have any impact upon threatened species or threatened ecological communities at the embankment wall, and the subsequent increased dam potential is not anticipated to have any adverse impacts upon threatened species as area with the dam will still be available (should threatened species be present). The APZ area to the south will continue to be managed as a ski slope as it existed before the bushfire, and therefore will pose no risk to threatened species and threatened ecological communities. The post-fire recovery of the APZ area to the north and west will take many years to attain the same habitat opportunities to that which existed prior to the bushfire. However, prevention or subsequent removal of any tree and shrub regrowth will have an impact upon habitat potential, the degree to which is uncertain without specific vegetation targets. Future targets or work may have to be assessed in the context of the vegetation to be removed at that point in time and the species present or likely to be present at that point in time reappraised.

At the time this assessment was undertaken approximately 10 months after the bushfire, no threatened flora was detected and habitat potential for most threatened species was absent or greatly diminished. The proposed redevelopment and associated activities pose no risk to threatened species or threatened ecological communities given the information provided and, in the context prescribed, discussed in this report. Therefore, no 'Test of Significance' under the BC Act or the Commonwealth's 'Significant Impact Criteria' under the *EPBC Act* was applied. However, future vegetation clearing could require specialised fauna survey methods to be employed and respective significant impact criteria to be tested against possible candidate species and communities.

REFERENCES

- DoEE (2020). Protected Matters Search Tool (PMST) for MNES search undertaken 14th October 2020 (new report generated on 19th October 2020) <http://www.environment.gov.au/epbc/protected-matters-search-tool>
- DPIE (2020a). *BioNet Atlas of NSW Wildlife*. Area searched, viewed and species filtered on 14th October 2020. <http://bionet.nsw.gov.au/>
- DPIE (2020b). *BioNet Vegetation Classification*. Department of Planning, Infrastructure and Environment. <http://environment.nsw.gov.au/NSWVCA20PRapp/search/pctsearch.aspx>
- DPIE (2020c). Kiandra Leek Orchid – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020d). Slender Greenhood Orchid – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020e). Leafy Anchor Plant – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020f). Austral Toadflax – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020g). NSW Threatened Species Scientific Committee – Final Determination. *Pimelea bracteata*, a shrub – critically endangered species listing
- DPIE (2020h). Mauve Burr-daisy – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020i). Pale Gold Moths – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020j). Hoary Sunray – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020k). Blue-tongued Greenhood – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020l). Monaro Golden Daisy – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020m). Max Mueller’s Burr-daisy – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020n). Alpine Tree Frog – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/
- DPIE (2020o). Alpine She-oak Skink – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020p). Gang-gang Cockatoo – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020q). Oliver Whistler – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020r). Flame Robin – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020s). Eastern Pygmy-possum – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020t). Broad-toothed Rat – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020u). Smoky Mouse – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020v). Eastern False Pipistrelle – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020w). Large Bent-winged Bat – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

DPIE (2020x). Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions – profile: threatened species database. NSW Department of Planning Infrastructure and Environment. www.environment.nsw.gov.au/threatenedSpeciesApp/

Ecology Australia (2003). Kosciuszko Resorts Vegetation Assessment. Vegetation mapping and report for the NSW Department of Planning.

ENFAC (2009). Natural and Cultural Inventory of Selwyn Snowfields Lease Area. Report to Department of Environment and Climate Change, Sydney, NSW.

Mitchell, P. (2008). *Mitchell Landscapes - Landscape dataset and descriptions (V.3)*. Revised by Ecological Australia for Office of Environment and Heritage).

APPENDIX 1:

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 19/10/20 17:58:05

[Summary](#)

[Details](#)

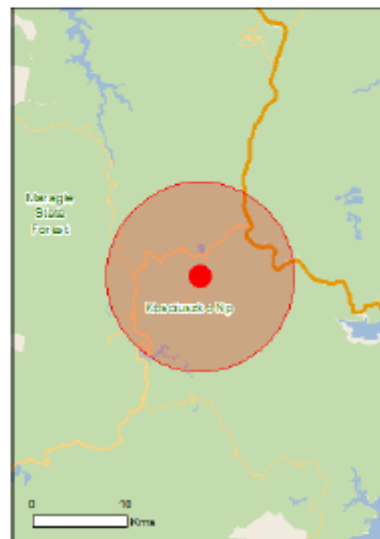
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

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[Caveat](#)

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[Buffer: 10.0Km](#)



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	2
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	34
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	30
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
Australian Alps National Parks and Reserves	NSW	Listed place
Historic		
Snowy Mountains Scheme	NSW	Listed place
Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Banrock station wetland complex		700 - 800km upstream
Hattah-kulkyne lakes		500 - 800km upstream
Riverland		700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland		700 - 800km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community known to occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Maccullochella macquariensis		
Trout Cod [26171]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence area
Maccullochella peelii Murray Cod [88633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [88632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area
Litoria spenceri Spotted Tree Frog [25959]	Endangered	Species or species habitat likely to occur within area
Litoria verreauxii alpine Alpine Tree Frog, Verreaux's Alpine Tree Frog [88689]	Vulnerable	Species or species habitat known to occur within area
Pseudophryne corroboree Southern Corroboree Frog [1915]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Burramys parvus Mountain Pygmy-possum [267]	Endangered	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87817]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Pseudomys fumeus Smoky Mouse, Konoom [88]	Endangered	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [188]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Calotis glandulosa Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat may occur within area
Colobanthus curtisiae Curtis' Colobanth [23981]	Vulnerable	Species or species habitat likely to occur within area
Diuris ochroma Pale Golden Moths [84585]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area
Prasophyllum bagoense Bago Leek-orchid [84276]	Critically Endangered	Species or species habitat may occur within area
Pterostylis oreophila Blue-tongued Orchid, Kiandra Greenhood [22903]	Critically Endangered	Species or species habitat likely to occur within area
Rutidosia leiopis Monaro Golden Daisy [21490]	Vulnerable	Species or species habitat likely to occur within area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Cyclodomorphus praealtus Alpine She-oak Skink [84721]	Endangered	Species or species habitat may occur within area
Liopholis guthega Guthega Skink [83079]	Endangered	Species or species habitat may occur within area
Listed Migratory Species		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [812]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Kosciuszko	NSW

Regional Forest Agreements	[Resource Information]
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Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

Invasive Species	[Resource Information]
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Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Alauda arvensis</i> Skylark [656]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Carduelis carduelis</i> European Goldfinch [403]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species

Name	Status	Type of Presence
Passer domesticus House Sparrow [405]		habitat likely to occur within area Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		

Name	Status	Type of Presence
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-35.90748 148.44945

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- [Natural history museums of Australia](#)
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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APPENDIX 2:

Flora Survey – Species List and Relative Abundance Weighting

Vascular plants recorded as part of the broader APZ for the proposed new Guest Facilities and Resort Operation Centre, as well as a stand-alone species list for the proposed height increase of the embankment in front of the quarry to raise the capacity of the dam. No flora species list is presented specifically for the building footprint of the Guest Facilities and Resort Operation Centre as the proposed sites are mostly devoid of vegetation or only contain exotic ground flora commensurate with the exotic grasses and forbs present surrounding the original buildings.

Data was collected on 15th October 2020. Scientific nomenclature follows that prescribed in the NSW PlantNet Database managed by the Royal Botanical Gardens.

Relative Abundance – code and description:

- 1 – rarely observed within the survey area. May be numerous but only in a very small area or isolated clump.
- 2 – occasionally observed in the survey area. May include scattered clumps.
- 3 – frequently observed in the survey area. May be scattered as isolated plants or clumps but expect to observe in different areas along the alignment.
- 4 – abundant. Frequently observed in the survey area without traversing too far. A dominant plant in terms of frequency or vertical projection and characterises the relevant community composition and structure.

Scientific Name	Common Name	Cover Abundance APZ	Cover Abundance Quarry Dam
(FERNS)			
DRYOPTERIDACEAE			
<i>Polystichum proliferum</i>	Broad Shield Fern	1	1
(MONOCOTYLEDONS)			
CYPERACEAE			
<i>Carex appressa</i>	Saw Sedge	2	
<i>Carex breviculmis.</i>	A Sedge	3	1
? <i>Isolepis</i> sp.	A Club Sedge	2	
JUNCACEAE			
<i>Luzula novae-cambriae</i>	Luzula	3	1
* <i>Juncus effusus</i>	Soft Rush	1	
AMARYLLIDACEAE			
?* <i>Narcissus</i> sp.	Daffodil	1	
PHORMIACEAE			
<i>Dianella tasmanica</i>	Tasman Flax-lily	2	
LOMANDRACEAE			
<i>Lomandra longifolia</i>	Spiny Headed Mat-rush	2	
POACEAE			
<i>Agrostis</i> sp.	A Native Bent Grass	2	
? <i>Deyeuxia</i> sp.	A Native Bent Grass	2	
<i>Poa constiniana</i>	Bog Snow Grass	1	
<i>Poa phillipsiana</i>	Purple Snow Tussock	1	

<i>Poa sieberiana</i> var. <i>sieberiana</i>	Snow Grass	4	2
? <i>Rytidosperma</i> sp.	A Wallaby Grass	2	
* <i>Agrostis capillaris</i>	Brown-top Bent	3	2
* <i>Aira</i> sp.	A Hair Grass	2	
* <i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	1	
* <i>Dactylis glomerata</i>	Cock's Foot	2	2
* <i>Festuca arundinaceae</i>	Tall Fescue	2	
* <i>Festuca nigrescens</i>	Chewing's Fescue	1	
* <i>Festuca rubra</i>	Red Fescue	2	2
* <i>Holcus lanatus</i>	Yorkshire Fog	1	2
* <i>Phleum pratense</i>	Timothy Grass	1	1
* <i>Poa annua</i>	Winter Grass	2	
* <i>Poa pratensis</i>	Kentucky Blue Grass	2	
Unidentified grass 1 (no inflorescence)		2	
Unidentified grass 2 (no inflorescence)		1	
Unidentified grass 3 (annual)		1	
Unidentified grass 4 (annual)		1	
(DICOTYLEDONS)			
APIACEAE			
<i>Aciphylla simplicifolia</i>	Mountain Aciphylla	1	
<i>Oreomyrrhis argentea</i>	Silvery Carraway	2	
ASTERACEAE			
<i>Brachyscome decipiens</i>	Field Daisy	2	
<i>Brachyscome spathulata</i>	Spoon Daisy	1	
<i>Brachyscome</i> sp.	A Daisy	1	
<i>Cassinia</i> ? <i>monticola</i>	Mountain Cassinia	1	
<i>Celmisia</i> sp.	Silver Snow Daisy	2	
<i>Coronidium scorpioides</i>	Button Everlasting	3	
<i>Craspedia</i> ? <i>coolaminica</i> (linear basal leaves)	A Billy Button	1	
<i>Craspedia</i> ? <i>jamesii</i>	A Billy Button	2	
<i>Craspedia</i> sp. (large hairy leaved)	A Billy Button	2	
? <i>Erigeron bellidioides</i>	A Native Feabane	1	
<i>Euchiton</i> sp.	A Cudweed	2	
<i>Leptorhynchus squamatus</i> ssp. <i>alpinus</i>	Scaly Buttons	2	
<i>Olearia erubescens</i>	Pink-tip Daisy Bush	2	
<i>Olearia phlogopappa</i> ssp. ? <i>serrata</i>	Dusty Daisy Bush	1	
<i>Cassinia monticola</i>	Mountain Cassinia	1	
<i>Picris angustifolia</i> ssp. <i>merxmulleri</i>	Native Picris	1	
<i>Podolepis laciniata</i>	Mountain Lettuce	1	
<i>Rhodanthe anthemoides</i>	Chamomile Sunray	1	
<i>Senecio gunnii</i>	A Montain Grounsel	2	1
* <i>Achillea millefolium</i>	Milfoil	1	
* <i>Cirsium vulgare</i>	Spear Thistle	2	
* <i>Crepis</i> ? <i>foetida</i>	Stinking Crepis	1	2
* <i>Hypochaeris glabra</i>	Smooth Cat's Ear	1	
* <i>Hypochaeris radicata</i>	Cat's Ear	3	3
* <i>Leucanthemum x superbum</i>	Shasta Daisy	2	
* <i>Taraxacum officinale</i>	Dandelion	2	2
* <i>Tragopogon dubius</i>	Goatsbeard	1	

BORAGINACEAE			
<i>*Myosotis discolor</i>	Forget-me-not	1	
BRASSICACEAE			
<i>Cardamine</i> sp.	A Bitter-cress	1	
<i>*Erophila verna</i>	Whitlow Grass	1	
CAMPANULACEAE			
<i>Lobelia pedunculata</i>	Trailing Pratia	2	
<i>Wahlenbergia</i> sp.	A Bluebell	1	
CARYOPHYLLACEAE			
<i>Scleranthus biflorus</i>	Two-flowered Knawel	2	
<i>Scleranthus? fasciculatus</i>	Knawel	1	
<i>Stellaria pungens</i>	Prickly Starwort	3	2
<i>*Cerastium</i> sp.	A Chickweed	1	2
<i>*Spergularia rubra</i>	Sandspurry	1	
ELATINACEAE			
<i>?Elatine gratioloides</i>	Water Wort		2
EUPHORBIACEAE			
<i>Poranthera microphylla</i>	Small Poranthera	1	
FABACEAE			
<i>Bossiaea foliosa</i>	Leafy Bossiaea	1	
<i>Daviesia ulicifolia</i>	Gorse Bitter Pea	2	
<i>Hovea montana</i> or <i>H asperifolia</i> (just emerging)	Hovea	2	
<i>?Oxylobium ellipticum</i> (possibly <i>Podolobium alpestre</i> – material just emerging)	Bush Pea	2	2
<i>*Trifolium arvense</i>	Haresfoot Clover	1	
<i>*Trifolium ?campestre</i>	Hop Clover	2	
<i>*Trifolium ?dubium</i>	Yellow Suckling Clover	2	
<i>*Trifolium fragiferum</i>	Strawberry Clover	1	
<i>*Trifolium pratense</i>	Red Clover	1	1
<i>*Trifolium repens</i>	White Clover	3	2
<i>*Trifolium ?subterraneum</i>	Subterranean Clover	2	
GERANIACEAE			
<i>Geranium ?antrorsum</i>	Common Crane's Bill	2	
<i>Geranium ?solanderi</i> var. <i>solanderi</i>	Cut-leaf Crane's Bill	2	2
<i>*Erodium cicutarium</i>	Common Stork's Bill	1	
GOODENICACEAE			
<i>Goodenia hederaceae</i> ssp. <i>alpestris</i>	Mountain Ivy Goodenia	2	
<i>Scaevola hookeri</i>	Mountain Mat-flower	1	
HALORAGACEAE			
<i>Gonocarpus ?tetragynus</i> (Possibly <i>G. montanus</i>)	A Raspwort	2	
HYPERICACEAE			
<i>*Hypericum peforatum</i>	St. John's Wort	2	2
MYRTACEAE			
<i>Baeckea gunniana</i>	Alpine Baeckea	1	
<i>Eucalyptus pauciflora</i> ssp. <i>niphophila</i> (assumed to be <i>E. p. niphophila</i> and not <i>E. p. debeuzevillei</i>)	Snow Gum	3	1
ONAGRACEAE			
<i>Epilobium billardierianum</i> ssp. <i>hygrophilum</i>	Hairy Willow Herb	1	2
OXALIDACEAE			
<i>Oxalis ?perennans</i>	Oxalis	1	

* <i>Oxalis corniculata</i>	Oxalis	1	
PLANTAGINACEAE			
* <i>Plantago lanceolata</i>	Lamb's Tongues	2	
* <i>Veronica anagallis-aquatica</i>	Blue Water Speedwell	1	
POLYGONACEAE			
* <i>Acetosella vulgaris</i>	Sheep Sorrell	4	4
* <i>Polygonum aviculare</i>	Wireweed	1	
RANUNCULACEAE			
<i>Ranunculus graniticola</i>	Granite Buttercup	2	
<i>Ranunculus</i> sp.	Buttercup	1	
ROSACEAE			
<i>Acaena novae-zelandiae</i>	Bidgeee-widgee	2	2
<i>Acaena</i> sp.	A Sheep's Burr	2	
<i>Geum urbanum</i>	Herb Bennett	1	
RUBIACEAE			
<i>Asperula gunnii</i>	Mountain Woodruff	2	
<i>Asperula scoparia</i>	Prickly Woodruff	2	
STYLIDIACEAE			
<i>Stylidium ?montanum</i>	Alpine Triggerplant	2	
THYMELEACEAE			
<i>Pimelea biflora</i>	Matted Rice Flower	1	
<i>Pimelea linifolia</i>	Poison Rice Flower	3	
<i>Pimelea ?curviflora</i>	Poison Rice Flower	1	
VIOLACEAE			
<i>Viola betonicifolia</i>	Showy Violet	1	
* <i>Viola arvensis</i>	Field Pansy	3	
WINTERACEAE			
<i>Tasmannia xerophila</i> ssp. <i>xerophila</i>	Pepper Bush	2	
Unidentified forb 1		2	
Unidentified forb 2 (possibly an Asteraceae)		2	1
Unidentified forb 3 (possibly exotic – close to road)		1	
Unidentified forb 4		1	
Unidentified forb 5 (possibly exotic – highly disturbed area)		2	1
Unidentified herb (lily-like).		1	

*denotes exotic species

Site Summary	Total Native	67	12
	Total Exotic	40	13
	Unknown	10 (4 grasses & 6 forbs)	2 (forbs)
	Total Species	117	25

APPENDIX 3:

Fauna Records – Incidental Species List

Vertebrate fauna detected across Selwyn Snow Resort while conducting vegetation surveys and habitat assessments on 15th October 2020. Scientific nomenclature follows that used by the NSW Department of Planning, Infrastructure and Environment.

Detection Codes: O – Observed, H – Heard, S – Scats

Birds

Common Name	Scientific Name	Detection
Nankeen Kestrel	<i>Falco berigora</i>	O/H
Yellow-tailed Black Cockatoo	<i>Calyptrorhynchus funereus</i>	H
Crimson Rosella	<i>Platycercus elegans</i>	H
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	O/H
Brown Thornbill	<i>Acanthiza pusilla</i>	O/H
Striated Pardalote	<i>Pardalotus striatus</i>	H
Yellow-faced Honeyeater	<i>Caligavis chrysops</i>	H/O
Red Wattlebird	<i>Anthochaera carunculata</i>	O/H
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	O/H
Black-faced Cuckooshrike	<i>Coracina novaehollandiae</i>	O/H
Australian Magpie	<i>Cracticus tibicen</i>	O
Pied Currawong	<i>Strepera graculina</i>	O/H
Willie Wagtail	<i>Rhipidura leucophrys</i>	O/H
Australian Raven	<i>Corvus coronoides</i>	H
Fairy Martin	<i>Petrochelidon ariel</i>	O
Australasian Pipit	<i>Anthus novaeseelandiae</i>	O/H
Common Starling	<i>*Sturnus vulgaris</i>	O/H
Unknown Bird 1	<i>Possibly a whistler</i>	H
Unknown Bird 2	<i>Possibly another cuckoo species</i>	H

Mammals

Common Wombat	<i>Vombatus ursinus</i>	S
^Broad-toothed Rat	<i>Mastacomys fuscus</i>	S
Horse	<i>*Equus caballus</i>	S
European Hare	<i>*Lepus europaeus</i>	S
Rabbit	<i>*Oryctolagus cuniculus</i>	S

^ fresh scats were found about 70 metres down stream of the Pump House within the creek line. Very little vegetation above the creek line of suitable height and density to provide refuge, safe passage and food for this species. Poa and other species of native tussock yet to attain full height since the bushfire.

Amphibians

+Common Eastern Toadlet	<i>Crinia signifera</i>	H/O
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+ heard along the creek near the Pump House and in the Quarry Dam at the top of the resort.

Reptiles

Eastern three-lined Skink	<i>Acritoscincus dupperei</i>	O
#Highland Copperhead	<i>Astelaps ramsayi</i>	O

the animal looked thin and malnourished, suggesting limited feeding opportunities since exiting the winter brumation period.

*denotes introduced species