



Ski Lift, Ski Slope and Associated Works – Corin Forest, ACT – Flora and Fauna Assessment

Dane Liepins

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1. Introduction

This report has been prepared by Eco Logical Australia (ELA) at the request of Dane Liepins, to provide an assessment of the potential impacts of the construction of snow sport infrastructure (a Ski Lift and Ski Slope) at Corin Forest, Blocks 217 and 218 Paddys River ACT (hereafter referred to as the subject land), pursuant to the ACT *Planning and Development Act 2007* (P&D Act), the ACT *Nature Conservation Act 2014* (NC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This assessment is based on surveys of the subject land and immediate surrounds undertaken on 23 October 2015, 27 and 28 April 2017, 29 November 2017 and 1 March 2018.

1.1 Project description

The proposal involves the construction of a ski lift and ski slope on the south facing slope within the Corin Forest lease located on Corin Road, Tidbinbilla ACT. The Corin Forest lease provides recreational opportunities for families to experience snow play close to Canberra during winter, and an Alpine slide during summer. The proposed snow sport infrastructure will complement existing winter operations at Corin Forest.

The proposed works include the following components:

- Installation of a ski lift and associated load and offload points, bullwheels, and towers
- Construction of a ski slope including vegetation clearing and earthworks

A map showing the location of the proposed works is provided in Figure 1 and Figure 2. The proposal is further identified in **Photos 1-5**.

The proposal has been modified from the original design, which included a significantly longer ski lift and ski slope. The original design had a lower bottom station, which affected the wet areas adjoining Gibraltar Creek and had a higher top station which affected a larger area of older growth forest and associated high quality fauna habitats. The modified design reduced the overall impact on native vegetation and associated habitats and also:

- Avoided impacts on the high conservation value wetlands associated with Gibraltar Creek
- Reduced impacts on older growth forest in association with the top station
- Concentrates the proposed development in areas that have been affected by historic clearing for ski slope development or which are relatively young post-fire regrowth.

The proposal has also been modified to remove the proposed increase in the size of the snowmaking supply dam and to remove the proposed expansion of the carpark.



Photo 1: The proposed bottom station will be in the regrowth forest just above the existing beginners slope.



Photo 2: The proposed Ski Lift alignment will mainly traverse relatively young post-fire regrowth forest.



Photo 3: The lift top station and offload will be just above this existing clearing which was cleared for historic ski slope development.



Photo 4: The lower parts of the proposed ski slope will traverse this existing clearing which was also cleared for historic ski slope development.



Photo 5: The ski slope will also require the clearing of approximately 2.25 ha of mainly regrowth native forest and associated habitats, including up to eight hollow-bearing trees and outcropping rock.

1.2 Potential direct and indirect impacts

The following direct impacts on flora and fauna are anticipated from the proposal:

- the removal of approximately 2.25 ha of native vegetation in various condition states and associated fauna habitats
- the loss of up to eight hollow-bearing trees
- the disturbance of rock and soils
- the compaction of soil within areas to be accessed by heavy machinery/vehicles.

The following indirect impacts on flora and fauna are anticipated from the proposal:

- microclimate changes to areas of adjoining remnant vegetation arising from the proposed clearing (anticipated to extend up to 10 m into adjoining native vegetation)
- possible weed invasion into areas of adjoining remnant vegetation.

This assessment has been undertaken under the assumption that the proposal will be designed so that the surface or subsurface drainage beyond the study area will not be adversely altered.



Figure 1: The proposed development

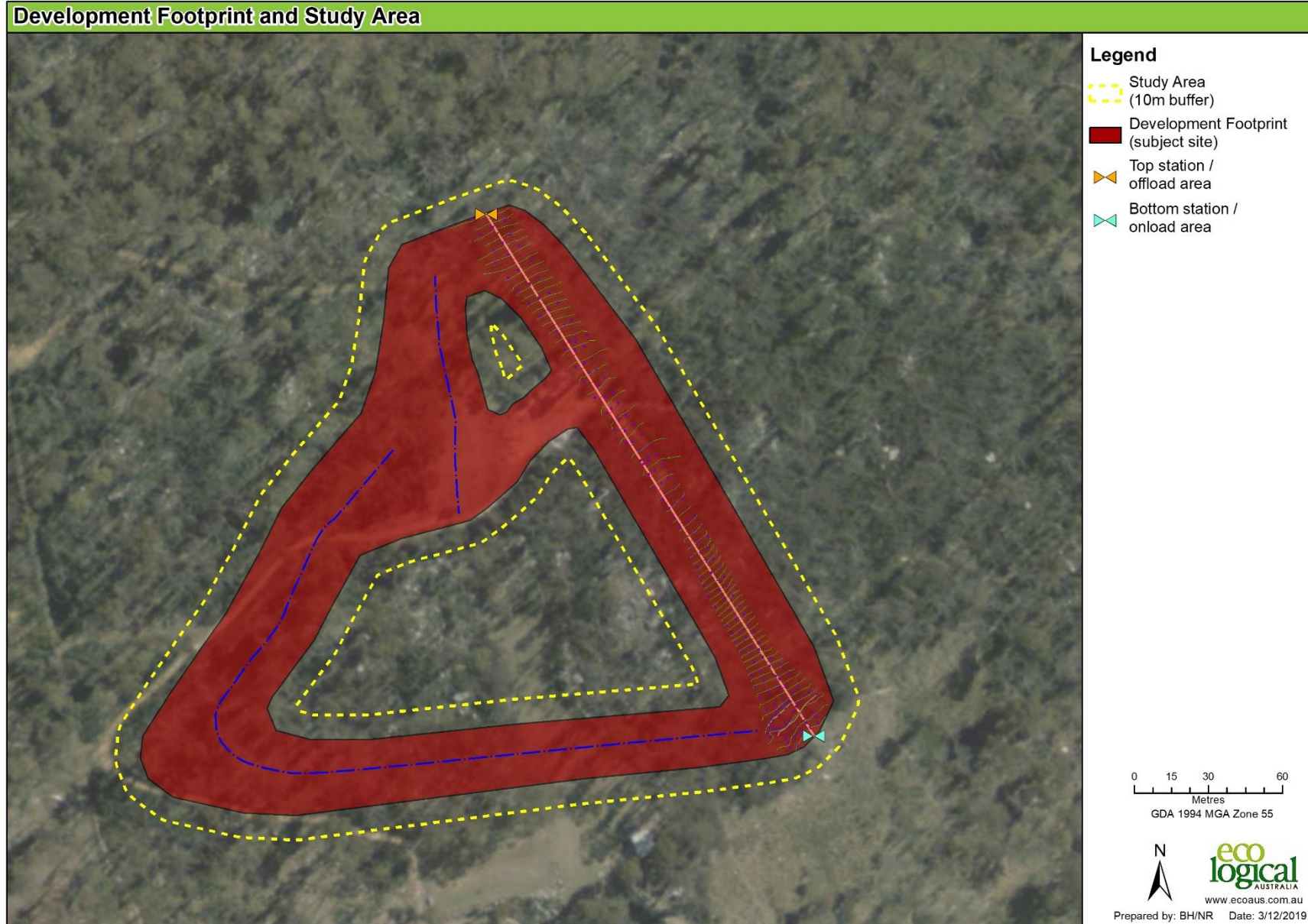


Figure 2: The proposed development footprint, subject site and study area.

1.3 Definition of subject site, study area and locality

The subject site, for the purpose of this report, refers to the area directly affected by the proposal. It includes the footprint of the proposed ski lift, ski slope, snowmaking and parking areas and any areas that need to be disturbed to support the construction, as shown in Figure 2.

The study area refers to the subject site and any additional areas which are likely to be affected by the proposal indirectly. Given the nature of the proposal, the indirect impacts are only anticipated to extend approximately 10 m beyond the subject site into adjoining vegetation, as shown in Figure 2.

The locality for the purposes of this report is the area of land within 10 km of the study area.

1.4 Legislative context

1.4.1 Environment Protection and Biodiversity Conservation Act 1999

The *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national framework for protecting the environment and conserving biodiversity.

Approval from the Commonwealth Minister is required under the EPBC Act if the action will, or is likely to, have a significant impact on matters considered to be of national environmental significance (NES matters). NES matters relevant to the proposal include species and ecological communities that are listed under the Act. The EPBC Act does not define significant impact but identifies matters that are necessary to take into consideration.

1.4.2 Planning and Development Act 2007

The *Planning and Development Act 2007* (P&D Act) was enacted in 2008 as part of a reform of the ACT planning system. The P&D Act establishes, amongst other things, the specific requirements and process for the assessment of development in the ACT. Under the Act, and in accordance with the associated Territory Plan, there are two assessment tracks: the Merit track and the Impact track. There are a number of triggers for assessment under the Impact track. Of relevance to this project, assessment under the Impact track is triggered if a proposal will result in the clearing of more than 0.5 ha of native vegetation as defined in the NC Act (Schedule 4), or if it is likely to have a significant impact on a matter listed under the NC Act.

If an assessment under the Impact track is triggered, the completion of an Environmental Impact Statement (EIS) is required. A proponent may prepare an Application for an Environmental Significance Opinion (ESO) when a proponent considers that the proposed works are unlikely to have a significant impact on a matter protected under the Act. In the instance that an ESO is requested, the Conservator of Flora and Fauna will review the proposal and provide a decision based on the information submitted and advice sought from relevant agencies as to the significance of the proposed works. If the Conservator is of the opinion that the proposed action will not result in a significant adverse impact to a protected matter then an ESO is provided, and may be subject to conditions. An ESO precludes the need for assessment within the Impact Track and instead moves the proposal into the merit track for assessment.

1.5 Consultation

Consultation regarding this proposal was undertaken with the ACT Environment and Planning Directorate in 2017. A pre-application meeting was attended with DA Gateway Team on 12 September 2017. Subsequent advice with respect to the Development Application process and potential development constraints was provided by Conservator Liaison Officer Helen McKeown. The outcome of the Pre-application meeting was that further advice from the Conservator Liaison Officer and staff within the Impact Assessment section would be required to further consider the environmental constraints associated with the proposal.

The proposal was subsequently modified to substantially reduce the length of the proposed lift and ski slope, remove the proposed increase in the size of the snowmaking supply dam, and to remove the proposed expansion of the carpark. These modifications resulted in reductions in the impacts on native vegetation and associated habitats.

2. Methods

A review of relevant information was undertaken prior to the commencement of field studies. Databases and other sources were interrogated to generate a list of species that have been recorded within 10 km of the study area and included:

- The ACTMAPi Database
- The EPBC Act Protected Matters Search Tool – last searched on 20 November 2019.
- Previous ecological assessments undertaken for the subject land (ELA 2016)

Data gathered during all field studies and the literature review was analysed and interpreted in accordance with the provisions of legislation and planning controls pertaining to flora and fauna.

2.1 Community identification and floristic audit

The Random Meander technique documented by Cropper (1993) was used across the study area to determine the flora species present in the study area, including those of conservation significance, and the location and extent of vegetation communities. All flora species encountered during the random meander traverse were identified to genus and species where practicable. Some species were sampled in the field and identified later using various references. The vegetation was surveyed at all levels: the canopy (trees), middle canopy (trees), understorey (shrubs), and groundcover (plants less than 1 m in height).

This methodology enabled the description of vegetation communities and comparison with the mapping and community descriptions of Armstrong et al (2011). General observations were also made of vegetation outside the study area.

Vegetation community boundaries were marked onto an aerial photo during the field survey and transposed into ArcMap.

2.2 Targeted surveys

The following surveys were aimed at detecting threatened species that, in light of the habitat present and the results of the database and literature review, were considered potential occurrences within the subject land and study area. The location of the surveys undertaken is identified in Figure 3.

2.2.1 Flora

***Prasophyllum canaliculatum* (Channelled Leek Orchid) survey**

At the request of the ACT Environment and Planning Directorate, surveys for *Prasophyllum canaliculatum* (the Channelled Leek Orchid, listed in NSW as Critically Endangered) were undertaken by Sarah Dickson-Hoyle on 9 January 2018. The species was flowering at a nearby reference site on this date and should have been detectable if present at the subject site. Surveys involved locating the *P. canaliculatum* at the nearby reference site, then walking through the extent of potential habitat for the species at the subject site, searching for and identifying orchids.

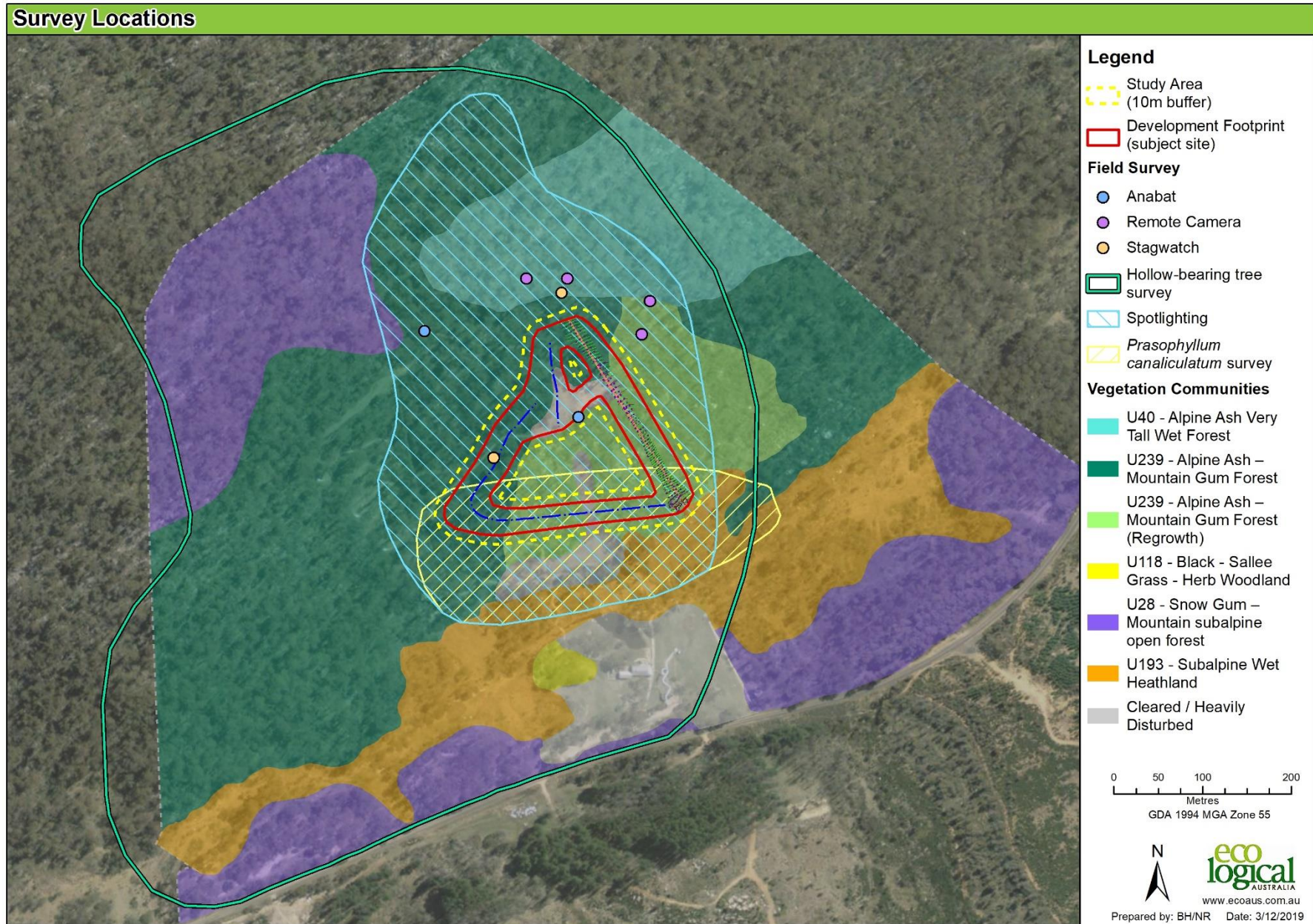


Figure 3: Survey locations

2.2.2 Fauna

2.2.3 Opportunistic diurnal fauna and habitat surveys

Opportunistic fauna surveys involved observations of animal activity, habitat surveys and searches for indirect evidence of fauna. Diurnal mammal searches were conducted in areas of potential habitat across the study area, with emphasis on searches for scats, tracks, burrows, diggings and scratchings. Specific searches were conducted for habitats or resources of relevance for those threatened fauna species known from the locality, or species, which might be anticipated to occur in the study area given the vegetation communities and habitats present. These resources included potential feed trees, foraging resources such as high nectar producing plants, hollow-bearing trees (described further below), understorey sheltering resources and water sources. Opportunistic records of all fauna species observed were maintained throughout the survey period, and an inventory was compiled of all species recorded during the current investigations.

2.2.4 Hollow-bearing Tree Surveys

Hollow bearing trees are important habitat features for a wide range of birds, mammals, amphibians and reptiles including a number of threatened species which are known to occur in the locality. Surveys of hollow-bearing trees were undertaken across most of the subject land with each hollow-bearing tree observed marked using a GPS, and the size and type (including branch, trunk and chimney) of hollows recorded.

2.2.5 Nocturnal surveys

Nocturnal surveys, including stag-watching, spotlighting, call playback and Anabat surveys, took place on 29 November 2017 (personnel: Ryan Smithers and Sarah Dickson-Hoyle) and 1 March 2018 (personnel: Ryan Smithers and Brian Hawkins). Nocturnal surveys were aimed at detecting a suite of nocturnal and/or hollow-dependent threatened species including Greater Glider, Spotted-tailed Quoll, Glossy black-cockatoo and various microbats.

2.2.6 Stag-watching Survey and Nesting Assessments for Hollow-dependant Fauna

Stag-watching surveys were used to assess breeding or sheltering use of tree hollows within the study area by fauna during the survey period. Species targeted by these techniques primarily included *Petaurioides volans* (Greater Glider), forest owls, and microchiropteran bats but also a range of other hollow-dependant species. Hollow-bearing trees within the study area were targeted for observation in order to assess the potential impacts of the proposal on hollow-dependent fauna. Stag-watching commenced at dusk and continued for one to 1.25 hours. During this period hollows were observed with the aid of binoculars and spotlights where necessary. Any audible vocalisations of nocturnal species were recorded throughout the stag-watching period and spotlighting survey.

2.2.7 Call Playback, Nocturnal Spotlighting and Listening Surveys

Following stag-watching, call playback techniques were used to survey for *Tyto novaehollandiae* (Masked Owl), *Ninox strenua* (Powerful Owl), and *Ninox connivens* (Barking Owl). Re-recorded digital calls were broadcast from a 15W Toa megaphone for a period of 2.5 to 5 minutes each, followed by a listening period of 10 minutes. Listening for vocalisations continued during the subsequent spotlighting surveys, for up to one hour. Spotlighting transects were undertaken within the subject land to illuminate nocturnal mammals, birds and amphibians. Listening surveys were also undertaken for the calls of mammals, birds and amphibians.

2.2.8 Anabat surveys

Echolocation recording was used to target ‘micro-bats’ in the study area on 29 November 2017 and 1 March 2018. A Titley ANABAT II bat detector linked to Titley Z-Caim digital data recorder and a Titley ANABAT SD2 bat detector were used to record microchiropteran bat echolocation calls. The detectors were activated from just before dusk and were left for up to 3 hours when microchiropteran bat activity was considered to be high. Echolocation calls recorded were analysed by ELA ecologist Alicia Scanlon.

2.2.9 Passive Infrared Motion Detector Camera Surveys

Between 29/11/2017 until the night of 7/2/2018, inclusive, four RECONYX™ HC600 HyperFire™ cameras and bait stations were set in four locations within the study area to target terrestrial and arboreal fauna species. Two of the cameras were attached to tree trunks approximately 2 m from the ground, and provided night and day surveillance of fauna visiting the bait stations with the temperature sensitive passive infrared motion detector in the cameras. Baits were a mixture of peanut butter, honey, oats and truffle or chicken and offal. The bait was replaced approximately every couple of weeks through the survey period. The cameras surveys yielded a survey effort of 280 days/nights.

2.2.10 Limitations

It was not the aim of the surveys to compile a complete inventory of the species occurring at the subject site. Nevertheless, the techniques used are adequate to assess the impacts of the proposal on the species and vegetation communities in the study area.

The results of fauna surveys can be optimised by conducting investigations over a long period to compensate for the effect of unfavourable weather, seasonal changes and climatic variation. In general, the longer the survey, the more species will be detected. Because some species are more likely to be detected by a particular method, results can also be improved by using a wide range of techniques. The current survey was subject to constraints that determine the amount of time allocated, the methods used and the timing of the work. The results should be viewed in the light of these limitations.

2.3 Survey conditions and effort

Survey conditions during the nocturnal fauna surveys are detailed in Table 1 below.

Table 1: Nocturnal fauna survey conditions

Date	Temperature	Wind	Cloud	Moon	Rain
29 November 2017	16°C	Still occasional light East	0/8	1/2	Nil but had been wet in proceeding days
1 March 2018	16°C	Still occasional light East	5/8	4/4	Nil

The ELA fauna survey effort employed a total of 21 person-hours, 280 camera day/nights, and 11 Anabat recording hours as documented in Table 2.

Table 2: Fauna survey effort employed over the study area and immediate surrounds

Date	Method	Effort	Target Species
29 November 2017 to 7 February 2018	RECONYX™ cameras (4)	280 day/nights	All terrestrial and scansorial fauna species
29 November 2017	Diurnal habitat search and hollow bearing tree mapping	6 person-hours	All species, but in particular Greater Glider and forest owl roosting habitat
	Stag-watching, spotlighting and listening surveys	2.5 person-hours	Nocturnal mammals, amphibians and birds
	Call playback	0.5 person-hours	Powerful Owl, Masked Owl, and Barking Owl
	ANABAT	5 Anabat hours	Microchiropteran bats
9 January	Targeted orchid survey	4 person-hours	<i>Prasophyllum canaliculatum</i>
1 March 2017	Diurnal habitat search and hollow bearing tree mapping	6 person-hours	All terrestrial and scansorial fauna species
	Stag-watching, spotlighting and listening surveys	3 person-hours	Nocturnal mammals, amphibians and birds
	Call playback	0.5 person-hours	Powerful Owl, Masked Owl, and Barking Owl
	ANABAT	6 hours	Microchiropteran bats

3. Results

3.1 Database and literature review

Appendix A provides a list of threatened and migratory species that have been recorded from database searches within a 10 km radius of the study area. The potential for each of these species to occur in the study area and the importance of the habitats within the study area are also discussed in **Appendix A**, and a decision made regarding the need for further assessment in this report. Shorebirds and marine species have been excluded from **Appendix A**.

3.2 Flora

3.2.1 Vegetation communities

The vegetation within the study area and surrounds is typically in excellent condition, with small areas dominated by exotic species such as *Holcus lanatus* and *Trifolium repens* where previous disturbance has occurred. The weed *Cirsium vulgare* was present in small numbers, also in areas of previous disturbance. Parts of the study area have been affected by historic clearing for ski infrastructure and remains open or is relatively young regrowth.

The subject land is considered to support five vegetation communities using the classification of Armstrong et al (2011):

- U239 Alpine Ash – Mountain Gum +/- Snow Gum wet sclerophyll open forest of the Australian Alps and South Eastern Highlands bioregions (Alpine Ash – Mountain Gum Forest)
- U40 Alpine Ash very tall wet sclerophyll open forest primarily of the Australian Alps bioregion (Alpine Ash Very Tall Wet Forest)
- U193 *Hakea microcarpa* – *Baeckea utilis* – *Leptospermum myrtifolium* subalpine wet heathland on escarpment and eastern tableland ranges of the South Eastern Highlands Bioregion (Subalpine Wet Heathland)
- U28 Snow Gum – Mountain Gum *Daviesia mimosoides* tall dry grass – shrub subalpine open forest (Snow Gum – Mountain subalpine open forest)
- U118 Black Sallee grass-herb woodland in drainage depressions and moist valley flats.

3.2.2 Alpine Ash – Mountain Gum Forest

The Alpine Ash – Mountain Gum Forest comprises a tall forest to approximately 30 m co-dominated by *Eucalyptus delegatensis* (Alpine Ash) and *E. dalrympleana* (Mountain Gum) with a dense understorey dominated by *Daviesia latifolia* or *Daviesia mimosoides*, and *Olearia megaphylla*, *Acacia melanoxylon*, *Veronica perfoliata*, *Oxylobium ellipticum*, *Corposma repens*, *Exocarpos strictus*, *Lomatia myricoides*, *Polyscias sambucifolia* also occurring, and, in places, *Leptospermum myrtifolium*. Armstrong et al (2011) estimated that there are approximately 100,000 ha of the community of which 80% is contained within protected areas.

Within the study area, the community shows signs of previous disturbance resulting from the 2003 bushfires and land use associated with the resort area, including historic clearing and minor recent tree removal and removal of small areas of understorey.



Photo 6: Alpine Ash – Mountain Gum Forest within the subject land.



Photo 7: Alpine Ash Very Tall Wet Forest above the proposed upper bullwheel.

3.2.3 Alpine Ash Very Tall Wet Forest

This community occurs in the higher south facing slopes of the subject land and areas to the east. It is similar to the Alpine Ash – Mountain Gum Forest, but is characterised by a taller canopy which is more dominated by Alpine Ash, and by a more mesic understorey that includes species such as *Bedfordia arborescens* (Blanket bush).

3.2.4 Sub-alpine Wet Heathland

Within the study area and immediate surrounds, the Sub-alpine Wet heathland community occurs along south facing slopes, drainage lines and poorly draining areas, and is characterised by an open shrub layer dominated by *Baeckea utilis*, *Leptospermum myrtifolium* and *Hakea microcarpa* over a diverse ground layer dominated by species such as *Poa costiniana*, *Poa labillardieri*, *Empodisma minus*, *Oreomyrrhis ciliata*, *Acaena novae-zelandiae*, *Sphagnum cristatum*, *Brachyscome* spp., *Baumea gunnii* and *Cotula alpina*. According to Armstrong et al (2011), the community is likely to be evenly distributed across national parks, state forest and freehold lands. Tozer et al (2010) indicated that 70% of the community has been cleared or severely degraded across its range, with more than 2700 ha of the community extant including at least 880 ha in conservation reserves. The Subalpine Wet Heathland forms a component of Alpine Sphagnum Bogs and Associated Fens (Alpine Sphagnum Bogs and Fens) threatened ecological community (TEC), which listed as Endangered under the EPBC Act.

3.2.5 Snow Gum – Mountain subalpine open forest

This community occurs adjacent to Corin Road and in the saddle in the upper north-western parts of the subject land. It is similar to the Alpine Ash – Mountain Gum Forest, however it is characterized by a co-dominance of *E. pauciflora* subsp. *pauciflora* (Snow Gum), a dense understorey dominated by *Daviesia mimosoides* and a greater cover of grasses and forbs.



Photo 8: Sub-alpine Wet heathland on the lower slopes to Gibraltar Creek.



Photo 9: 3.1.5 Snow Gum – Mountain subalpine open forest in the north-western parts of the subject land.



Photo 10: Black Sallee grass-herb woodland along Gibraltar Creek.

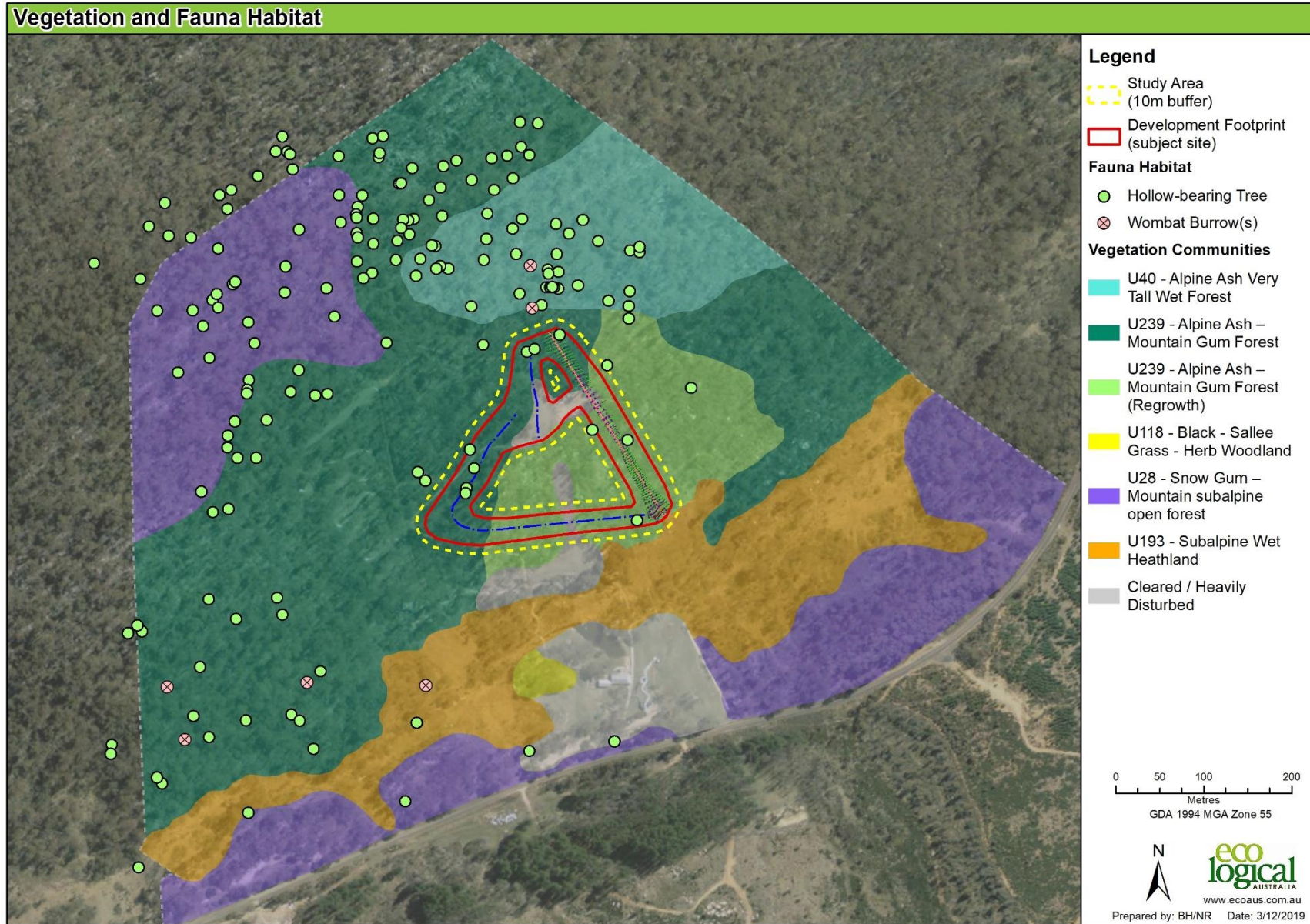


Figure 4: Vegetation communities and fauna habitats within the subject land and immediate surrounds.

3.2.6 Black Sallee grass-herb Woodland

This community occurs in the frost hollow associated with Gibraltar Creek and mostly modified within the subject land by the existing buildings and associated infrastructure such as the picnic area. It is characterized by a patchy canopy of *E. stellulata* (Black Sallee) and grass and forb rich groundcover.

3.2.7 Threatened flora species

No flora listed as threatened under the EPBC Act or NC Act were recorded within the study area. A targeted survey for *Prasophyllum canaliculatum* (Channelled Leek Orchid) was undertaken on 1/9/2018 when the species was flowering at a nearby reference site. The survey covered potentially suitable habitats within the study area (Figure 3). The species was not detected within the study area and it is considered unlikely that it occurs there.

3.2.8 Rare and uncommon flora in the ACT

No rare or uncommon flora species were recorded within the subject site.

3.2.9 Threatened ecological communities

The Subalpine Wet Heathland on the subject land comprises the Alpine Sphagnum Bogs and Associated Fens endangered ecological community (EEC) (hereafter referred to as the Alpine Bog EEC) which is listed on the EPBC Act.

3.3 Fauna habitats

The fauna habitats present in the study area are those generally associated with montane forests in the locality. The study area contains nectar, blossom, some small fruits and other vegetative and invertebrate foraging resources for native fauna species. Mature canopy trees provide additional foraging resources for native bird species, such as *Callocephalon fimbriatum* (Gang-gang Cockatoo), which is well known from the locality, and which was recorded foraging within the subject land during the day on one occasion. Canopy trees also attract insects when flowering that provide foraging resources for microchiropteran bats and birds, and for forest owls. The forests within the study area provide habitat for arboreal mammals such as *Trichosurus vulpecula* (Common Brushtail Possum) and *Petaurus breviceps* (Sugar Glider). The rock outcrops within the study area provide habitats for a range of reptiles such as *Austrelaps ramsayi* (Highland Copperhead) however the study area does not provide any potentially important habitats for amphibians or aquatic fauna. However Gibraltar Creek and associated habitats support a range of common amphibians and at least one *Ornithorhynchus anatinus* (Platypus) individual.

The study area supports at least ten hollow-bearing trees, some of which contain good quality hollows that could be used by a range of hollow-dependent fauna species, including relatively common species such as the Common Brushtail Possum and the cockatoos *Cacatua galerita* (Sulphur-crested Cockatoo) and *Calyptorhynchus funereus* (Yellow-tailed Black Cockatoo), but also some threatened species such as the Gang-gang Cockatoo, Powerful Owl, *Dasyurus maculatus* (Spotted-tailed Quoll) and *Petauroides volans* (Greater Glider). Good quality hollows are relatively abundant within the subject land with more than 80 hollow-bearing trees recorded.

3.4 Targeted surveys

3.4.1 Flora

***Prasophyllum canaliculatum* (Channelled Leek Orchid) survey**

No *P. canaliculatum* was found at the subject site, despite being recorded in flower at the reference site a short distance away.

3.4.2 Fauna

Stag-watching

Only one of the hollows stag-watched was in use during the stag watches, with a Common Brushtail Possum observed exiting the hollow in a large tree to the north of the proposed bullwheel location.

Spotlighting

A number of common species were seen or heard during the spotlighting surveys, including *Petaurus breviceps* (Sugar Glider), with at least five individuals seen foraging within the study area. Some *Canis lupus dingo* (Dingo) were heard howling nearby, possibly within the subject land, on dusk on 1 March 2018. *Aegotheles cristatus* (Australian Owlet-nightjar) and *Ninox novaeseelandiae* (Southern Boobook) were both heard calling from in or near the subject land during the nocturnal surveys.

Anabat surveys

Six to eight microbat species were recorded by the Anabat bat call detectors (see Appendix C); some calls could not be assigned to a single species. No microbat species listed under either the NC Act or EPBC Act were detected.

Camera trapping

The cameras aimed at tree-trunks did not record any fauna. The cameras aimed at the ground recorded a suite of common species (Table 3).

Table 3: Fauna species recorded on camera traps.

Scientific Name	Common Name	Number of photos
<i>Cracticus tibicen</i>	Australian Magpie	1
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	1
<i>Macropus rufogriseus</i>	Red-necked Wallaby	several
<i>Rattus fuscipes</i>	Bush Rat	4
<i>Strepera graculina</i>	Pied Currawong	3
<i>Sus scrofa</i>	Pig	2
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	1
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	many
<i>Vombatus ursinus</i>	Common Wombat	many
<i>Wallabia bicolor</i>	Swamp Wallaby	many
<i>Zoothera lunulata</i>	Bassian Thrush	1

No threatened fauna species were recorded during the targeted fauna surveys.



Photo 11: Wombats are common within the subject land and surrounds and were recorded on the camera traps on many occasions.



Photo 12: Common Brushtail Possums are common within the subject land and surrounds and were recorded on the camera traps on many occasions..



Photo 13: A Bush Rat was captured on the camera traps on four occasions.



Photo 14: Pigs were captured on the camera traps on two occasions.

4. Impact Assessment

The construction and operation of the proposed ski lift and ski slope will result in the following impacts:

- The clearing of up to 2.25 ha of Alpine Ash – Mountain Gum forest, 1.02 ha of which is relatively young regrowth.
- The loss of up to eight hollow-bearing trees.

The proposed works have been designed to minimise impacts to the environment and ecologically sensitive areas through design changes and the use of minimal impact construction methods. These include:

- Moving and shortening the proposed lift to minimise impacts on bog, areas of older growth vegetation and associated habitats, particularly hollow-bearing trees.
- Designing the ski slope to utilise existing heavily disturbed areas as much as is possible.
- Using vegetation removal methods that retain a heavy mulch cover which will minimise erosion and sedimentation potential.
- Retaining hollow-bearing trees wherever possible where they are in close proximity to the ski lift and slope.
- Clearance of the minimum amount of vegetation required to meet the needs of the project.

4.1 Native vegetation

Under Schedule 4 of the P&D Act, the clearance of more than 0.5 ha of ‘native vegetation’ can trigger the requirement for the preparation of an EIS. All vegetation within the proposed works area is considered to be Native Vegetation as defined under the NC Act.

The impacts will be limited to the Alpine Ash – Mountain Gum Forest, as shown in Figure 4. The Alpine Ash – Mountain Gum Forest is a widespread and well conserved vegetation community with an estimated 7518 ha in the ACT alone. The proposal has been designed such that approximately half of the Alpine Ash – Mountain Gum Forest that will be affected by the proposal is relatively young post-fire regrowth, as shown in **Photo 1**. However, the forest around the proposed bull wheel location and in the upper parts of the proposed ski slope is older growth, with some very tall and hollow-bearing trees, as shown in **Photo 2**.

While the proposed works will impact approximately 2.25 ha of Native Vegetation, it is considered that the loss of vegetation is unlikely to result in a significant adverse impact, as the area of vegetation to be removed or modified is small in the context of the amount of similar vegetation contiguous with the study area or occurring elsewhere in the locality, and approximately half of the vegetation to be affected is relatively young post-fire regrowth.

4.2 Endangered ecological communities

The proposed works have been modified to avoid any direct impacts on the Alpine Bog EEC, which is listed under the EPBC Act. The proposed works are considered unlikely to affect the hydrology of the area supporting the Alpine Bog EEC, as all earthworks are located outside of the EEC and should not result in changed runoff patterns.

An assessment of the impact of the proposed works on the Alpine Bog EEC provided in **Appendix B** of this report.

4.3 Threatened flora

No impacts to threatened flora listed under the EPBC Act or NC Act will occur as a result of the proposed development.

4.4 Fauna habitats

The proposed works will result in the loss or modification of approximately 2.25 ha of fauna habitat, including the loss or substantial modification to the habitats surrounding up to ten hollow-bearing trees. There is an abundance of similar habitat within the local area and the subject land with more than 80 hollow-bearing trees within the subject land, many with excellent quality hollows. The proposal has also been designed such that approximately half of the fauna habitat to be affected is young regrowth with very few large or hollow-bearing trees.

The loss or modification of a relatively small amount of fauna habitat is unlikely to affect the local population of any threatened, rare or uncommon fauna species which currently utilise the subject land, particularly in the context of the extent of similar and better quality habitat in contiguous forests and elsewhere in the locality.

The subject site does not support any fauna habitat features that are not also present in surrounding areas. Whilst highly mobile threatened species such as *Petroica boodang* (Scarlet Robin), *Daphoenositta chrysoptera* (Varied Sitella), the Gang-gang Cockatoo, Spotted-tailed Quoll, threatened microchiropteran bats and forest owls such as the Powerful Owl may occur within the study area from time to time, they are unlikely to be dependent upon the habitats there.

4.5 Conclusion of EPBC Assessment

An assessment of significance under the EPBC Act was undertaken for the EECs which occur within the study area (**Appendix B**). The outcome of this assessment was that it is unlikely that the proposed works would significantly impact on any EEC. Referral to the Commonwealth under the EPBC Act is not recommended.

5. Recommendations

The proposal has been designed to minimise impacts to the environment as much as possible through modifications to the design and the use of low impact construction methods. In addition, the proposed mitigation and management measures outlined below will further minimise the impact of the proposal on ecologically sensitive areas.

1. Undertake required vegetation clearance using minimal impact techniques including:
 - a. All disturbance should be kept to the minimum required to achieve the proposal. In particular, the proposal should be undertaken so as to minimise damage to the vegetation surrounding the footprint of the proposed works.
 - b. Retain hollow-bearing trees within and on the margins of the ski slope where they do not pose unacceptable risks to guests.
 - c. Any trees to be removed should be felled in a manner which minimises impacts to areas of surrounding vegetation.
 - d. Undertake understorey and groundcover reduction using methods which retain groundcover and mulch levels that prevent erosion and sedimentation.
2. Ensure that the natural conditions of the site are maintained including:
 - a. No storage of plant, equipment or other items within the ski slope area outside of the ski season.
 - b. No sowing of exotic grass species within the lift alignment or ski slope. If groundcovers are to be sown then use only native grasses which are native to the subject land.
3. Develop and implement an Environmental Management Plan for the subject land which includes:
 - a. Development and implementation of a monitoring program to assess and monitor the ecological condition of native vegetation communities within the subject land, including specific monitoring of the condition of the Alpine Bog within the proposed ski slope area, adjacent areas, and downstream of the proposed works area.
 - b. Development and implementation of measures to monitor and control feral animals within the subject land.
 - c. Development and implementation of measures to monitor and control invasive plant species (including exotic perennial grasses) within the subject land.
 - d. Development of a list of suitable species which can be used where required for rehabilitation purposes.
 - e. Monitoring and management as required to minimise, repair and prevent erosion occurring along access tracks, carpark areas and areas of disturbed soil within the subject land.

6. Conclusion

This report assesses the potential impacts of the development of a ski lift and ski slope at Corin Forest on matters listed under the EPBC Act and the NC Act.

The proposed works will result in the modification or loss of approximately 2.25 ha of native vegetation as defined under the NC Act. While the proposed action will affect native vegetation, the surveys and assessment that have been undertaken demonstrate that the area that will be affected by the proposed works is unlikely to be particularly important to any threatened or regionally significant flora or fauna species. The subject land supports relatively extensive areas of similar and superior habitats, as do the contiguous forests, and in this context it is considered unlikely that the proposed ski lift and ski slope will have a significant adverse impact on the extent or occurrence of native vegetation or the species that it supports.

Following consideration of the administrative guidelines for determining significance under the EPBC Act, it is concluded that the proposal is unlikely to have a significant impact on matters of National Environmental Significance or Commonwealth land, and a referral to the Commonwealth Environment Minister is not recommended.

A number of impact mitigation and amelioration strategies have been recommended for the proposal and these are set out in the previous section. These strategies mitigate the effects of the proposal on ecologically sensitive matters within the subject land.

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Appendix A : Likelihood of occurrence

Shorebirds and marine species have been excluded from this assessment.

Latin Name	Common Name	EPBC Act status	NC Act status	Habitat And Distribution	Likelihood of occurrence
<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	Critically Endangered	Inhabits temperate woodlands and open forests of the inland slopes, particularly Box-Ironbark woodland, and riparian forests of <i>Casuarina cunninghamiana</i> (River Sheoak). These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. This species makes nomadic movements following winter flowering eucalypt species. Two of three known key breeding areas are in NSW: the Capertee Valley and the Bundarra-Barraba region. The other breeding area is in Chiltern, Victoria. They breed between July and January and usually nest in horizontal branches or forks in tall mature <i>Eucalyptus</i> spp. and <i>Casuarina/Allocasuarina</i> spp.	No
<i>Aprasia parapulchella</i>	Pink-tailed Worm Lizard	Vulnerable	Vulnerable	Sloping, open woodland areas with predominantly native grassy ground layers, rocky outcrops or scattered, partially-buried rocks. Also occurs in Chenopod scrub near Hay, NSW. No suitable habitat occurs on site.	No
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory	Not Listed	This species has been recorded in all regions of NSW. It most commonly occupies riparian woodland, swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and coastal sand-dunes.	No
<i>Arachnorchis actensis</i>	Canberra Spider Orchid	Critically Endangered	Endangered	Occurs in Box-Gum Woodland. No suitable habitat occurs on site.	No
<i>Bidyanus bidyanus</i>	Silver Perch	Critically Endangered	Endangered	Fast-flowing, open waters, especially where there are rapids and races; however, will also inhabit warm, sluggish water with cover provided by large woody debris and reeds. No suitable habitat occurs on site.	No
<i>Bossiaea grayi</i>	Murrumbidgee bossiaea	Not listed	Endangered	Occurs along the Murrumbidgee River around the high flood level mark. No suitable habitat occurs on site.	No
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Endangered	Found over most of NSW, this species' habitat consists of permanent freshwater wetlands, with tall, dense vegetation, particularly <i>Typha</i> spp. (Bulrushes).	No
<i>Calotis glandulosa</i>	Mauve Burr Daisy	Vulnerable	Not Listed	This species appears to be a coloniser of bare patches and occurs, often on roadsides, in the subalpine habitats of the Australian Alps. The species is known from montane grasslands dominated by <i>Poa</i> species, Natural Temperate Grassland dominated by Kangaroo Grass, and Snow Gum Woodlands in the Monaro and Shoalhaven regions.	No
<i>Calyptorhynchus lathamii</i>	Glossy Black-cockatoo	Not listed	Vulnerable	Largely restricted to hills and low ridges where suitable stands of its food plant <i>Allocasuarina verticillata</i> (Drooping Sheoak) remain.	Potential

Latin Name	Common Name	EPBC Act status	NC Act status	Habitat And Distribution	Likelihood of occurrence
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat, Large Pied Bat	Vulnerable	Not Listed	This species has been recorded from Rockhampton in Qld south to Ulladulla in NSW. The largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. It occupies wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Unlikely
<i>Climacteris picumnus</i>	Brown Treecreeper	Not listed	Vulnerable	Occurs in open woodland. No suitable habitat occurs on site.	Unlikely
<i>Corunastylis ectopa</i>	Brindabella Midge Orchid	Critically Endangered	Endangered	Known from a single population which occurs on a north facing slope in <i>Eucalyptus radiata</i> forest. Similar habitat is not present on site.	Unlikely
<i>Daphoenositta chrysoptera</i>	Varied Sitella	Not listed	Vulnerable	Widely distributed throughout NSW, it inhabits eucalypt forests and woodlands, mallee and <i>Acacia</i> woodland.	Potential
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Endangered	Vulnerable	Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. The subject site does not support any potential denning habitat. The species has a large home range and there is some potential for an individual to pass through the subject site on occasion, however it would not constitute a significant portion of even one individual's home range.	Unlikely
<i>Delma impar</i>	Striped Legless Lizard	Vulnerable	Vulnerable	Natural Temperate Grassland, secondary and modified grassland, open Box-Gum Woodland. No suitable habitat occurs on site.	No
<i>Euastacus armatus</i>	Murray River Crayfish	Not listed	Vulnerable	Streams in a variety of habitats, from pasture-lands to sclerophyll forest. No suitable habitat occurs on site.	Unlikely
<i>Eucalyptus aggregata</i>	Black Gum	Vulnerable	Vulnerable	In NSW, it is found in the Central and Southern Tablelands, in the South Eastern Highlands Bioregion and on the western fringe of the Sydney Basin Bioregion. It occurs on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Usually occurs in open woodland with a grassy groundlayer.	No
<i>Gadopsis bispinosus</i>	Two-spined Blackfish	Not listed	Vulnerable	Found in medium to large upland streams with low sediment input, and low velocities. No suitable habitat occurs on site.	No
<i>Gentiana baeuerlenii</i>	A subalpine herb	Endangered	Endangered	In ACT, was found in grassland and sedgeland in a moist area on the lower slope of a broad valley. No suitable habitat occurs on site.	Unlikely
<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	Vulnerable	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. The species is reliant upon Mistletoe for foraging. No suitable habitat occurs on site.	Unlikely
<i>Hieraetus morphnoides</i>	Little Eagle	Not listed	Vulnerable	Open eucalypt forest, woodland or open woodland, including Sheoak or <i>Acacia</i> woodlands and riparian woodlands of interior NSW.	Potential

Latin Name	Common Name	EPBC Act status	NC Act status	Habitat And Distribution	Likelihood of occurrence
<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable	Not Listed	The White-throated Needletail is recorded in all coastal regions of Qld and NSW, extending inland to the western slopes of the Great Divide and occasionally onto the adjacent inland plains. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. They are recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but are less commonly recorded flying above woodland. The species also occurs over heathland, but less often over treeless areas such as grassland or swamps. When flying above farmland, Needletails are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks.	No
<i>Lalage sueurii</i>	White-winged Triller	Not listed	Vulnerable	Occurs in open woodlands and open forest. No suitable habitat is thought to occur on site.	Unlikely
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Vulnerable	Box-ironbark forests and woodlands. No suitable habitat occurs on site.	Unlikely
<i>Lepidium ginninderrense</i>	Ginninderra Peppercross	Vulnerable	Endangered	Known from Natural Temperate Grassland and Box-Gum woodland. No suitable habitat occurs on site.	Unlikely
<i>Lepidium hyssopifolium</i>	Aromatic Peppercross	Endangered	Not Listed	In NSW, it occurs near Bathurst, Bungendore, and Crookwell and may also be extant near Armidale. It is known from woodland with a grassy understorey and grassland.	No
<i>Leucochrysum albicans</i> var. <i>tricolor</i>	Hoary Sunray	Endangered	Not Listed	In NSW it occurs on the Southern Tablelands and adjacent areas in an area roughly bounded by Albury, Bega and Goulburn. Grassland, woodland and forest, generally on relatively heavy soils.	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	Endangered	Vulnerable	Since 1990, recorded from approximately 50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region, but the only remaining extant inland population is an old gold mine at Captains Flat. All other records within 10 km of coastal waters where the effects of the chytrid fungus are ameliorated.	No
<i>Litoria booroolongensis</i>	Booroolong Frog	Endangered	Not Listed	The Booroolong Frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. It has disappeared from much of the Northern Tablelands, however several populations have recently been recorded in the Namoi catchment. The species is rare throughout most of the remainder of its range. They live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. It is considered unlikely that the species would occur within the study area given its rarity and the small size of the study area.	No
<i>Litoria castanea</i>	Yellow-spotted Bell Frog	Critically Endangered	Critically Endangered	Resides in permanent ponds or slow flowing streams with emergent vegetation such as bulrushes. This species has not been recorded in the wild since the 1970s. It is considered highly unlikely that the species would occur within the study area.	No

Latin Name	Common Name	EPBC Act status	NC Act status	Habitat And Distribution	Likelihood of occurrence
<i>Litoria verreauxii alpina</i>	Alpine Tree Frog	Vulnerable	Vulnerable	This species occurs in the alpine and subalpine zones of south-eastern NSW and Victoria. It is found in a wide variety of habitats including woodland, heath, grassland and herbfields. It breeds in natural and artificial wetlands including ponds, bogs, fens, streamside pools, dams and drainage channels that are still or slow flowing. The species has disappeared from much of its former range in the last 20 years and is restricted to a few breeding sites in murky ponds. There is no suitable breeding habitat for the species within the study area and it is highly unlikely that it would occur there.	No
<i>Maccullochella macquariensis</i>	Trout Cod	Endangered	Endangered	Found in relatively fast currents, especially in fairly deep water close to the bank, and often congregate around large woody debris (snags). No suitable habitat occurs on site.	No
<i>Macquaria australasica</i>	Macquarie Perch	Endangered	Endangered	River and lake habitats, especially the upper reaches of rivers and their tributaries. No suitable habitat occurs on site.	Unlikely
<i>Mastacomys fuscus mordicus</i>	Broad-toothed Rat	Vulnerable	Vulnerable	This species occurs in two widely separated areas in NSW, the Barrington Tops area and the wet alpine and subalpine heaths and woodlands of the Kosciuszko NP and adjacent areas. The species lives in a complex of runways through dense vegetation of wet grass, sedge or heath and under the snow in winter.	Potential
<i>Melanodryas cucullata</i>	Hooded Robin	Not listed	Vulnerable	Occurs in dry Eucalypt woodlands. The species could utilise the site but it is considered unlikely.	Unlikely
<i>Monarcha melanopsis</i>	Black-faced Monarch	Migratory	Not Listed	In NSW and the ACT, the species occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. It is rarely recorded farther inland. It occurs mainly in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.	No
<i>Muehlenbeckia tuggeranong</i>	Tuggeranong Lignum	Endangered	Endangered	Occurs in flood prone river terraces. No suitable habitat occurs on site.	No
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory	Not Listed	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and, on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	No
<i>Perunga ochracea</i>	Perunga Grasshopper	Not listed	Vulnerable	Natural temperate grassland. No suitable habitat occurs on site.	No

Latin Name	Common Name	EPBC Act status	NC Act status	Habitat And Distribution	Likelihood of occurrence
<i>Petauroides volans</i>	Greater Glider	Vulnerable	Vulnerable	The Greater Glider occurs in Eucalypt forests along the ranges and coastal plains of eastern Australia, feeding almost exclusively on the young leaves and flower buds of select Eucalypt species. It shelters in tree hollows, with a particular preference for large hollows in large, old trees. Individuals occupy relatively small home ranges (1-3 ha).	Unlikely
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	Vulnerable	Endangered	Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges. No suitable habitat occurs on site.	Unlikely
<i>Petroica multicolor</i>	Scarlet Robin	Not listed	Vulnerable	Typically occurs in open forests and woodlands. The species could utilise the site but it is considered unlikely.	Unlikely
<i>Phascolarctos cinereus</i>	Koala	Vulnerable	Vulnerable	In NSW, it mainly occurs on the central and north coasts, with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District and at several sites on the southern tablelands. It inhabits eucalypt woodlands and forests.	Unlikely
<i>Polytelis swainsonii</i>	Superb Parrot	Vulnerable	Vulnerable	Box-gum woodland, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. No suitable habitat occurs on site.	Unlikely
<i>Pomaderris pallida</i>	Pale Pomaderris	Vulnerable	Vulnerable	In NSW, recorded from near Kydra Trig (north-west of Nimmitabel), Tinderry Nature Reserve, the Queanbeyan River (near Queanbeyan), the Shoalhaven River (between Bungonia and Warri), the Murrumbidgee River west of the ACT and the Byadbo area in Kosciuszko National Park. Shrub communities surrounded by Brittle Gum and Red Stringybark or Callitris woodland.	No
<i>Pterostylis oreophila</i>	Blue-tongued Orchid	Critically Endangered	Critically Endangered	In New South Wales, the Blue-tongued Greenhood is known from a few small populations within Kosciuszko National Park and a population of about 40 plants (possibly now extinct) in Bago State Forest and adjoining Crown Leases south of Tumut. It grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water. It less commonly grows in peaty soils and sphagnum mounds. It flowers from November to January.	No
<i>Prasophyllum petilum</i>	Tarengo leek orchid	Endangered	Endangered	Natural Temperate Grassland, grassy woodland, and Box-Gum woodland. No suitable habitat occurs on site.	No
<i>Pseudomys fumeus</i>	Smoky Mouse	Endangered	Endangered	Sclerophyll forest, heathland and open forest, mainly on ridgetops but sometimes occurs in ferny gullies. Subject site is unlikely to provide habitat for the species. It hasn't been recently recorded in the ACT.	Unlikely
<i>Pseudophryne pengilleyi</i>	Northern Corroboree Frog	Critically Endangered	Endangered	Breeding habitat includes pools and seepages in sphagnum bogs, wet tussock grasslands and wet heath. Non-breeding habitat comprises forest, sub-alpine woodland and tall heath.	Unlikely

Latin Name	Common Name	EPBC Act status	NC Act status	Habitat And Distribution	Likelihood of occurrence
<i>Pteropus poliocephalus</i>	Grey-headed Flying-Fox	Vulnerable	Not Listed	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. Camps are often located in gullies, typically close to water, in vegetation with a dense canopy. There are no camps in the locality and the species would not occur within the study area.	No
<i>Rhipidura rufifrons</i>	Rufous Fantail	Migratory	Not Listed	The Rufous Fantail inhabits the coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. It is often found in sclerophyll forests and subtropical and temperate rainforest. It sometimes inhabits drier sclerophyll forests and woodlands.	No
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Endangered	In NSW, records of the Painted Snipe are from the Murray-Darling Basin, including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp, and swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. It prefers the fringes of swamps, dams and nearby marshy areas, where there is a cover of grasses, Lignum, low scrub or open timber. It nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	No
<i>Rutidosis leptorrhynchoides</i>	Button Wrinklewort	Endangered	Endangered	Box-Gum Woodland, secondary derived grassland or in Natural Temperate Grassland, usually on shallow, stony red-brown clay loams. No suitable habitat occurs on site.	Unlikely
<i>Swainsona recta</i>	Small Purple Pea	Endangered	Endangered	Grassland, open woodland and open forests dominated by <i>Eucalyptus blakelyi</i> (Blakely's Red Gum), <i>E. melliodora</i> (Yellow Box), <i>E. rubida</i> (Candlebark Gum) and <i>E. goniocalyx</i> (Long-leaf Box). No suitable habitat occurs on site.	No
<i>Synemon plana</i>	Golden Sun Moth	Critically Endangered	Endangered	Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by <i>Austrodanthonia</i> spp. (wallaby grasses). No suitable habitat occurs on site.	No
<i>Thesium australe</i>	Austral Toadflax	Vulnerable	Vulnerable	This species is associated with native grasslands and is a hemi-parasite of Kangaroo Grass. The species is usually detected in areas where Kangaroo Grass is abundant	No
<i>Tympanocryptis pinguicolla</i>	Grassland Earless Dragon	Endangered	Endangered	Restricted to a small number of Natural Temperate Grassland sites dominated by <i>Notodanthonia</i> spp. (wallaby grasses), <i>Austrostipa</i> spp. (spear grasses), Poa Tussock (<i>Poa sieberiana</i>), <i>Bothriochloa macra</i> (Red Grass), and occasionally <i>Themeda australis</i> (Kangaroo Grass). No suitable habitat occurs on site.	No
<i>Xerochrysum palustre</i>	Swamp Everlasting	Vulnerable	Not Listed	Grows in swamps and bogs which are often dominated by heaths. Also grows at the edges of bog margins on peaty soils with a cover of shrubs or grasses. Found in Kosciuszko National Park and the eastern escarpment south of Badja. Flowers appear from November to March.	No

Appendix B EPBC Act Assessment of Significance

EPBC Significant impact criteria and assessment

The EPBC Act Administrative Guidelines on Significance set out ‘Significant Impact Criteria’ that are to be used to assist in determining whether a proposed action is likely to have a significant impact on MNES. A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. MNES listed under the EPBC Act include:

- listed threatened species and ecological communities
- listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- nuclear actions
- Great Barrier Reef
- a water resource, in relation to coal seam gas development and large coal mining development.

An action will require federal approval if the action has, will have, or is likely to have a significant impact on a species or community listed in any of the following categories:

- extinct in the wild
- critically endangered
- endangered
- vulnerable.

Matters to be addressed	Impact (Commonwealth legislation)
(a) any environmental impact on a World Heritage Property;	NA: the proposed action does not impact on a World Heritage Property.
(b) any environmental impact on Wetlands of International Importance;	NA: The proposed action will not affect any part of a Ramsar Wetland.
(c) any impact on Commonwealth Listed Endangered Species or Communities	<p>The subject land contains the Endangered Ecological Community: Alpine Sphagnum Bogs and Fens</p> <p>The significant impact criteria in terms of endangered ecological communities are discussed below:</p> <p>a. reduce the extent of an ecological community</p> <p>The proposal has been modified from the original design to avoid any impacts on the Alpine Sphagnum Bogs and Fens which occurs within the subject land.</p> <p>b. fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;</p> <p>The proposed action will not fragment the Alpine Sphagnum Bogs and Fens.</p> <p>c. adversely affect habitat critical to the survival of an ecological community</p>

Matters to be addressed	Impact (Commonwealth legislation)
	<p>The proposed action will not adversely affect habitat critical to the survival of the Alpine Sphagnum Bogs and Fens.</p> <p>d. modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community’s survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns</p> <p>The proposed action will not affect abiotic factors necessary to the survival of the Alpine Sphagnum Bogs and Fens. It is not expected that the proposed works will adversely impact the hydrological environment such that the Alpine Sphagnum Bogs and Fens within the subject land will be adversely affected.</p> <p>e. cause a substantial change in the species composition of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting.</p> <p>The proposed action will not adversely affect the composition of the Alpine Sphagnum Bogs and Fens in the subject land. The proposal has been redesigned to avoid the community which is already in part affected by the recently approved and constructed beginner ski slope.</p> <p>f. cause a substantial reduction in the quality or integrity of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> -assisting invasive species, that area harmful to the listed ecological community, to become established, or -causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in the ecological community which kill or inhibit the growth of species in the ecological community <p>The proposed action will include appropriate safeguards to limit the potential for invasive plants or pathogens to further encroach upon the Alpine Sphagnum Bogs and Fens. It should also include safeguards that limit the potential for any chemicals or pollutants to affect the community during construction and operation of the proposed ski lift and ski slope.</p> <p>g. interfere with the recovery of an ecological community</p> <p>The action proposed will not interfere with the wider recovery of the Alpine Sphagnum Bogs and Fens in a significant manner.</p> <p>Conclusion: The proposed development is not considered likely to significantly impact the Alpine Sphagnum Bogs and Fens EEC.</p>
(d) any impact on Commonwealth Listed Vulnerable Species;	NA: the proposed action will not impact any Commonwealth Listed Vulnerable Species.
(e) any environmental impact on Commonwealth Listed Migratory Species;	A number of migratory species listed under the EPBC Act could utilise the subject land from time to time, however, all species are highly mobile and the site does not support an ecologically significant portion of a population of any migratory species. The proposal is too small to have any substantially effects on populations or their habitat. The proposed action will not result in a significant impact to a migratory species.
(f) does any part of the Proposal involve a Nuclear Action;	NA: the proposal does not involve a Nuclear Action.
(g) any environmental impact on a Commonwealth Marine Area;	NA: the proposed action will not impact on a Commonwealth Marine Area.
(h) In addition, any direct or indirect impact on Commonwealth lands	NA: the proposed action will not directly or indirectly impact on Commonwealth land.

Appendix C : Anabat analysis report

Ultrasonic Recording Results – 6568 Corin Forest, ACT.

3 AnaBat nights 29 November 2017 and 1 March 2018.

Methods

Bat calls were analysed using the program AnalookW (Version 3.8 25 October 2012, written by Chris Corben, www.hoarybat.com). Call identifications were made by Rod Armistead and Alicia Scanlon from Eco Logical Australia Pty Ltd (ELA) using regional based guides to the echolocation calls of microbats in New South Wales (Pennay, M., Law, B., and Reinhold, L. 2004); and south-east Queensland and north-east New South Wales (Reinhold, L., Law, B., Ford, G., and Pennay, 2001) and the accompanying reference library of over 200 calls from north-eastern NSW. Available: (<http://www.forest.nsw.gov.au/research/bats/default.asp>). Alicia has over eleven years of experience in the identification of ultrasonic call recordings and Rod has over three years of experience in the identification of ultrasonic recordings.

Bat calls are analysed using species-specific parameters of the call profile such as call shape, characteristic frequency, initial slope and time between calls (Reinhold, L., Law, B., Ford, G., and Pennay, M. 2001). To ensure reliable and accurate results the following protocols (adapted from Lloyd, A.M., Law, B.S., and Goldingay, R. 2006) were followed:

- Search phase calls were used in the analysis, rather than cruise phase calls or feeding buzzes (McKenzie, N. L., Start, A. N., and Bullen, R. D. 2002)
- Recordings containing less than three pulses were not analysed and these sequences were labeled as short (Law, B. S., Anderson, J., and Chidel, M. 1999)
- Four categories of confidence in species identification were used (Mills, D. J., Norton, T. W., Parnaby, H. E., Cunningham, R. B., and Nix, H. A. 1996):
 - definite – identity not in doubt
 - probable – low probability of confusion with species of similar calls
 - possible – medium to high probability of confusion with species with similar calls
 - unidentifiable – calls made by bats which cannot be identified to even a species group.
- *Nyctophilus* spp. (Long-eared Bats) are difficult to identify confidently from their calls and no attempt was made to identify this genus to species level (Pennay et al. 2004)
- Sequences not attributed to microbat echolocation calls were discounted from the analysis
- Sequences labelled as unidentifiable were of poor quality and therefore not able to be identified to any microbat species, they can however be used as an indicator of microbat activity at the site

Results

There were 178 sequences recorded from three AnaBat detectors recording on two separate nights (29 November 2017 and 1 March 2018) for a total of 8 AnaBat hours within the study area at Corin Forest, ACT. Approximately 80% of sequences submitted were able to be identified to genus or species with the remainder being too short or of low quality preventing positive identification.

Species diversity

There were at least 6, and up to 8 species identified (**Tables 1 - 3, Figures 1 – 8**). Two threatened species listed as vulnerable under the NSW TSC Act 1987 were also potentially present; *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat), and *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) but calls were not clear enough to provide confident identifications of these species.

Activity

The most commonly recorded species as represented by number of calls were *Vespadelus darlingtoni* (Large Forest Bat) and / or *Vespadelus regulus* (Southern Forest Bat).

High microbat activity levels were recorded during surveys in November 2017 with calls recorded more often than every two minutes on average throughout the survey period. Low microbat activity levels were recorded during surveys in March 2018 with calls recorded less often than every ten minutes throughout the survey period.

Infrequent feeding buzzes were observed in the data set from Large Forest Bat and/or Southern Forest Bat. These type of calls indicate that bats were actively foraging at these sites.

Notes on species identification

The calls of **Eastern False Pipistrelle**, **Scoteanax rueppellii (Greater Broad-nosed Bat)**, *Scotorepens greyii* (Little Broad-nosed Bat), *Scotorepens orion* (Eastern Broad-nosed Bat) and *Scotorepens species* (Central-eastern Broad-nosed Bat) can be difficult to separate as their call frequencies and some other call characteristics overlap falling between 32 and 40 kHz. In this geographic region Little Broad-nosed Bat, Central-eastern Broad-nosed Bat and **Greater Broad-nosed Bats** were excluded based upon the current known distribution of these species. **Eastern False Pipistrelle** can only be separated from Eastern Broad-nosed Bat when calls are above 37 kHz. Eastern Broad-nosed Bat can only be distinguished when calls are between 34 and 35 kHz, and the frequency of the knee is above 38 kHz. Calls unable to be separated were assigned mixed species labels.

The calls of *Myotis macropus* (**Southern Myotis**) are very similar to all *Nyctophilus* (Long-eared Bat) species and it is often difficult to separate these species. The habitat of the site (being upon a dry ridge), lack of suitable waterbodies in the surrounding landscape and the lack of records within 10 km of the survey area allowed us to discount **Southern Myotis** from the analysis.

Calls of the Large Forest Bat, Southern Forest Bat and **Eastern Bentwing Bat** overlap in this geographic region with overlapping calls between 40 and 44.5 kHz. Large Forest Bat calls can be distinguished by a longer characteristic section and for the purposes of this report any call falling between the listed frequencies with the duration of the characteristic section greater than 5ms was labelled as Large Forest Bat. Calls with up-sweeping tails, a characteristics section length below 3ms and / or a characteristic frequency above 44 kHz were labelled as Southern Forest Bat. **Eastern Bentwing Bats** can be distinguished by the presence of a down-sweeping tail, variable pulse shape and time between calls and a drop of more than 2 kHz from the knee to the characteristics section of the call. Calls with intermediate characteristics were assigned mixed species labels.

Calls of *Chalinolobus morio* (Chocolate Wattled Bat) and *Vespadelus vulturnus* (Little Forest Bat) overlap in this geographic region with overlapping calls ranging between 48.5 to 52.5 kHz. Chocolate Wattled Bats can be distinguished by having a down-sweeping tail that is not present in search phase calls of Little Forest Bat. Little Forest Bats have an up-sweeping tail or no tail. Calls with intermediate characteristics were assigned mixed species labels.

Table 1. Microbat species recorded at Corin Forest, ACT on NAR 1 on the 29 November 2017.

SCIENTIFIC NAME	COMMON NAME	DEFINITE	PROBABLE	POSSIBLE	TOTAL
<i>Austronomus australis</i>	White-striped Freetail Bat		1		1
<i>Chalinolobus morio</i> / <i>Vespadelus vulturnus</i>	Chocolate Wattled Bat / Little Forest Bat				3
<i>Miniopterus schreibersii oceanensis</i>* / <i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	Eastern Bentwing Bat / Large Forest Bat / Southern Forest Bat				1
<i>Nyctophilus</i> spp.	Long-eared Bats	2			2
<i>Vespadelus darlingtoni</i>	Large Forest Bat	8	1		9
<i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	Large Forest Bat / Southern Forest Bat				35
<i>Vespadelus regulus</i>	Southern Forest Bat	1			1
Unidentifiable					12
Useable calls					52
Total calls					64
Percentage useable calls					81.25

* Threatened species

Table 2: Microbat species recorded at Corin Forest, ACT on NAR 2 on the 29 November 2017.

SCIENTIFIC NAME	COMMON NAME	DEFINITE	PROBABLE	POSSIBLE	TOTAL
<i>Austronomus australis</i>	White-striped Freetail Bat	3			3
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	3	1		4
<i>Falsistrellus tasmaniensis</i> * / <i>Scotorepens orion</i>	Eastern False Pipistrelle / Eastern Broad-nosed Bat				2
<i>Miniopterus schreibersii oceanensis</i> * / <i>Vespadelus darlingtoni</i> / <i>Vespadelus</i> <i>regulus</i>	Eastern Bentwing Bat / Large Forest Bat / Southern Forest Bat				6
<i>Nyctophilus</i> spp.	Long-eared Bats				29
<i>Vespadelus darlingtoni</i>	Large Forest Bat				18
<i>Vespadelus darlingtoni</i> / <i>Vespadelus</i> <i>regulus</i>	Large Forest Bat / Southern Forest Bat				20
Unidentifiable					22
Useable calls					82
Total calls					104
Percentage useable calls					78.84615

* Threatened species

Table 3: Microbat species recorded at Corin Forest, ACT on 1 March 2018.

SCIENTIFIC NAME	COMMON NAME	DEFINITE	PROBABLE	POSSIBLE	TOTAL
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	2		1	3
<i>Falsistrellus tasmaniensis</i> * / <i>Scotorepens orion</i>	Eastern False Pipistrelle / Eastern Broad-nosed Bat				1
<i>Nyctophilus</i> spp.	Long-nosed Bats	2			2
<i>Vespadelus darlingtoni</i> / <i>Vespadelus</i> <i>regulus</i>	Large Forest Bat / Southern Forest Bat				1
<i>Vespadelus regulus</i>	Southern Forest Bat		1		1
Unidentifiable					2
Useable calls					8
Total					10
Percentage useable calls					80

* Threatened species

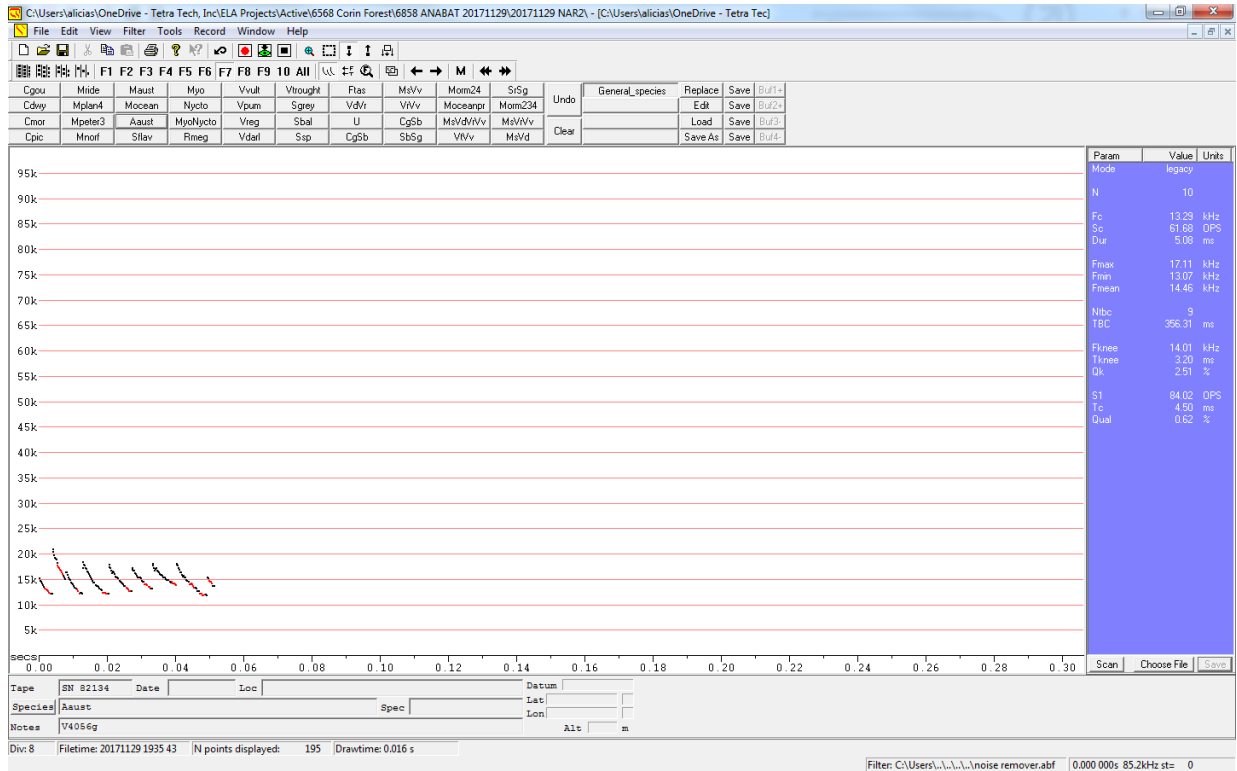


Figure 1: Call profile of *Austronomus australis* recorded on NAR 2 at 19:35 at Corin Forest, ACT on 29 November 2017.

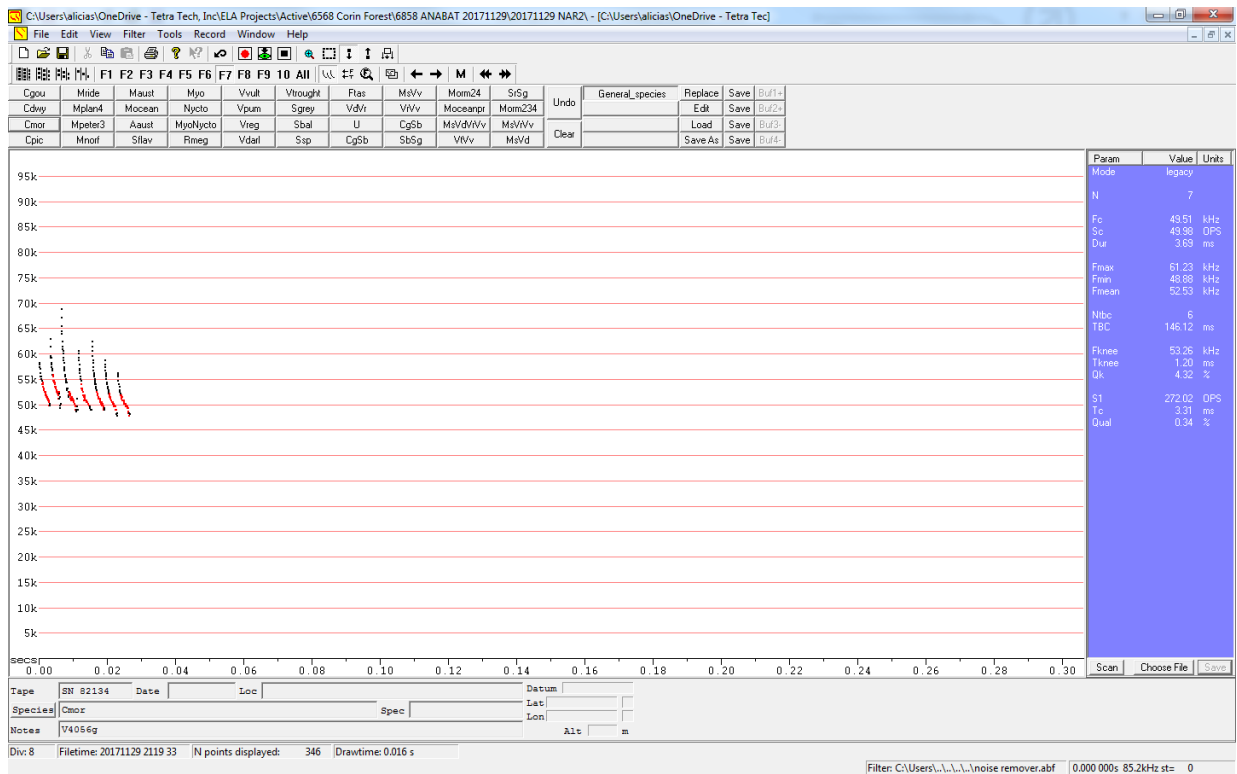


Figure 2: Call profile of *Chalinolobus morio* recorded on NAR 2 at 21:19 at Corin Forest, ACT on 29 November 2017.

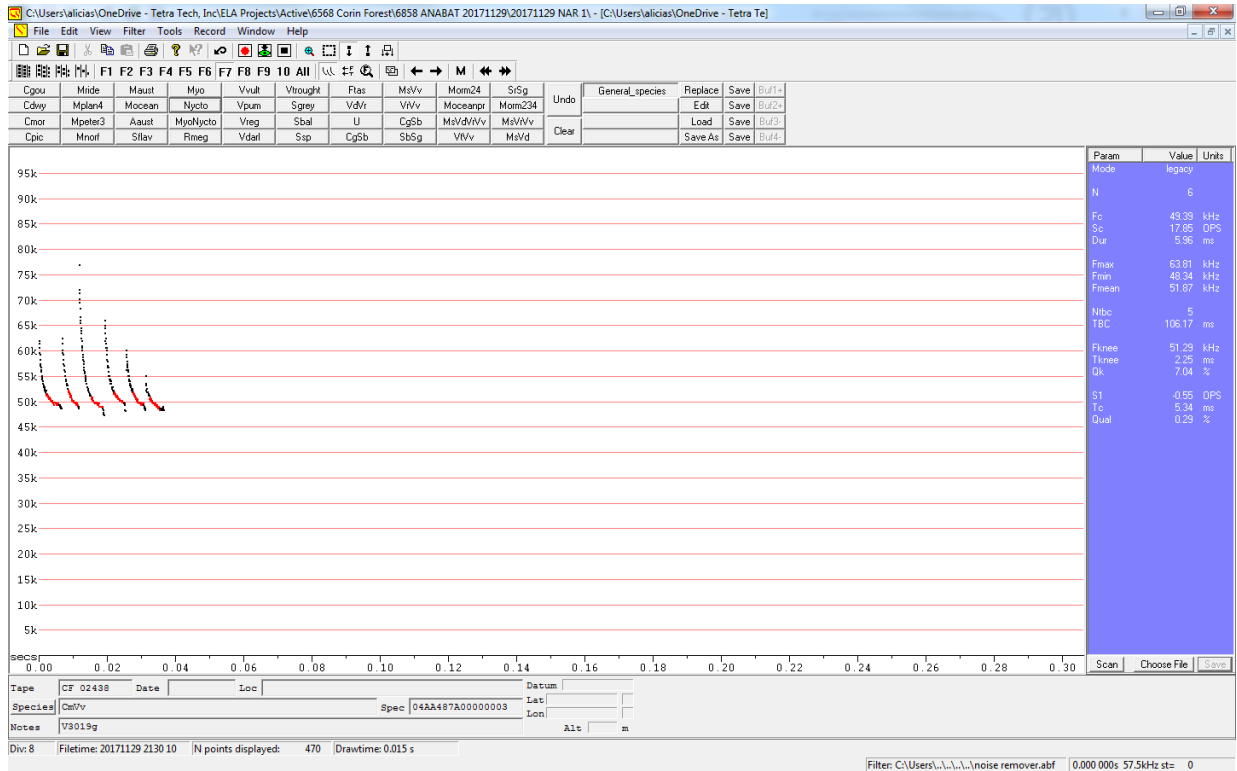


Figure 3: Call profile for *Chalinelobus morio* / *Vespadelus vulturinus* recorded on NAR 1 at 21:30 at Corin Forest, ACT on 29 November 2017.

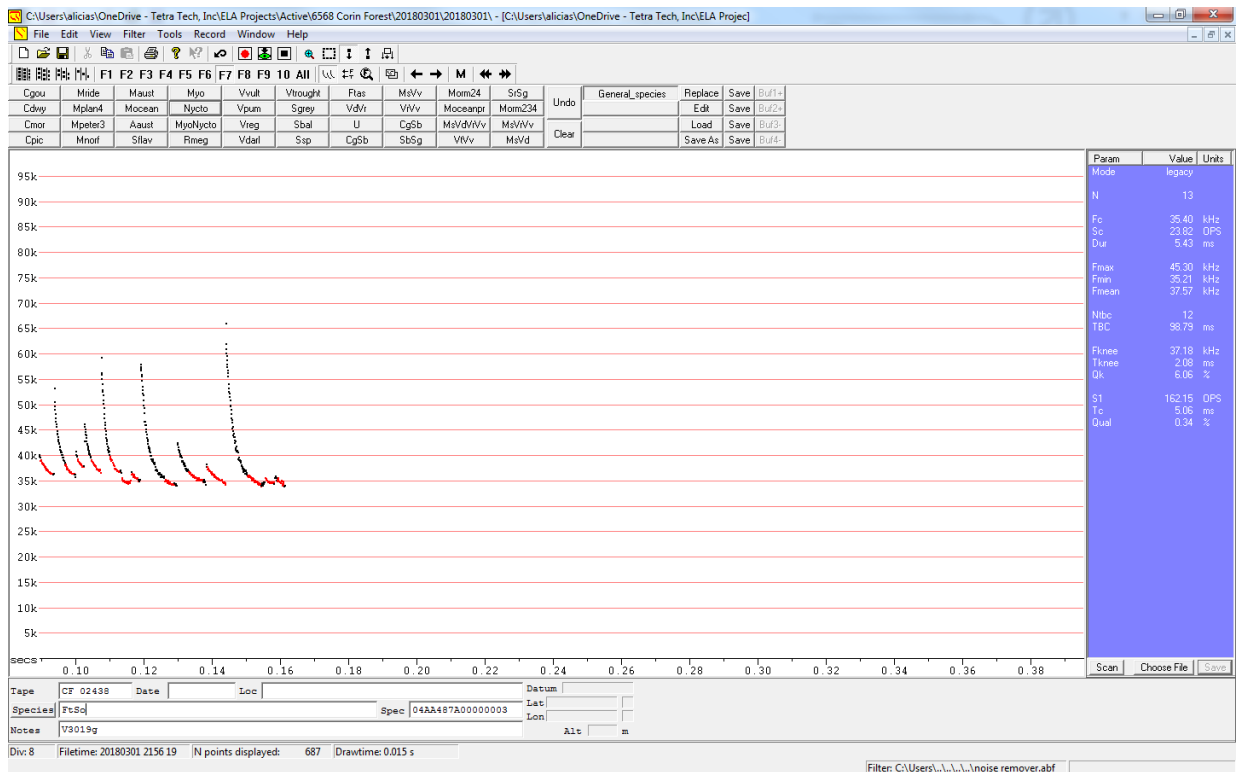


Figure 4: Call profile of *Falsistrellus tasmaniensis* / *Scotorepens orion* recorded at 21:56 at Corin Forest, ACT on 1 March 2018.

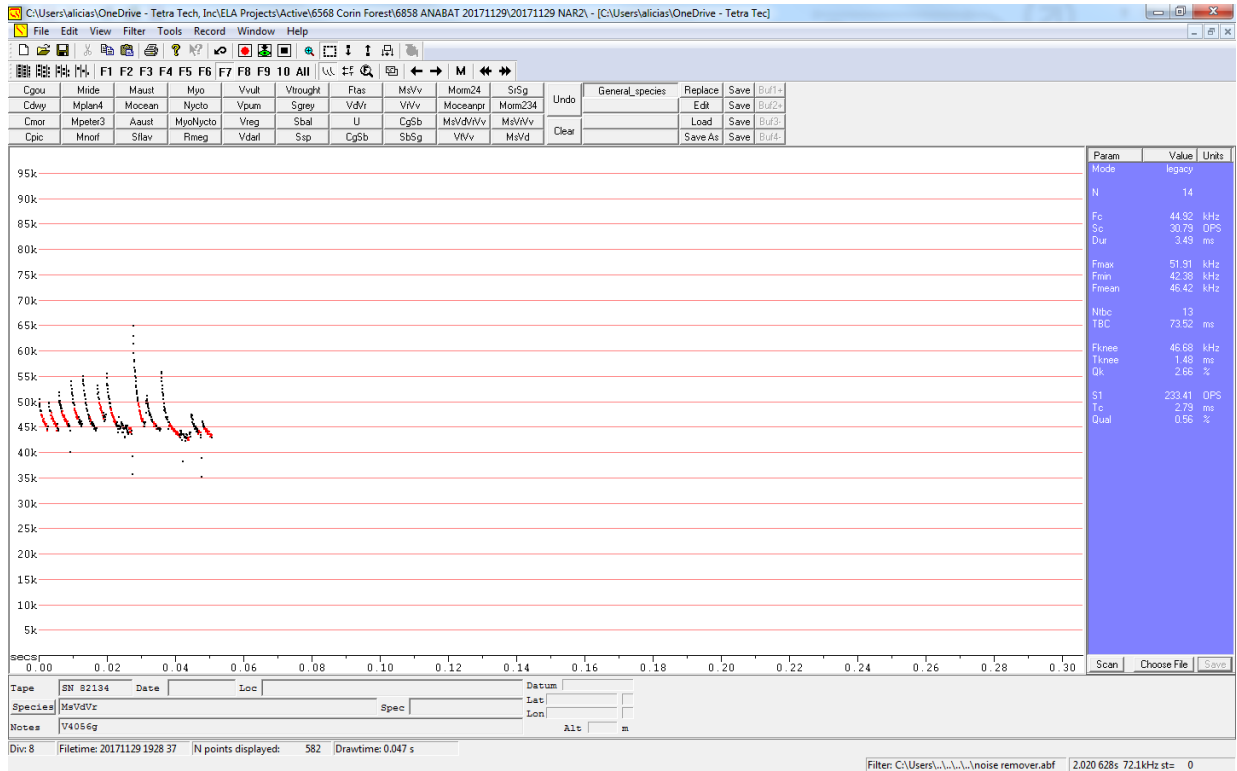


Figure 5: Call profile for *Miniopterus schreibersii oceanensis* / *Vespadelus darlingtoni* / *Vespadelus regulus* recorded at 19:28 on NAR 2 at Corin Forest, ACT on 29 November 2017.

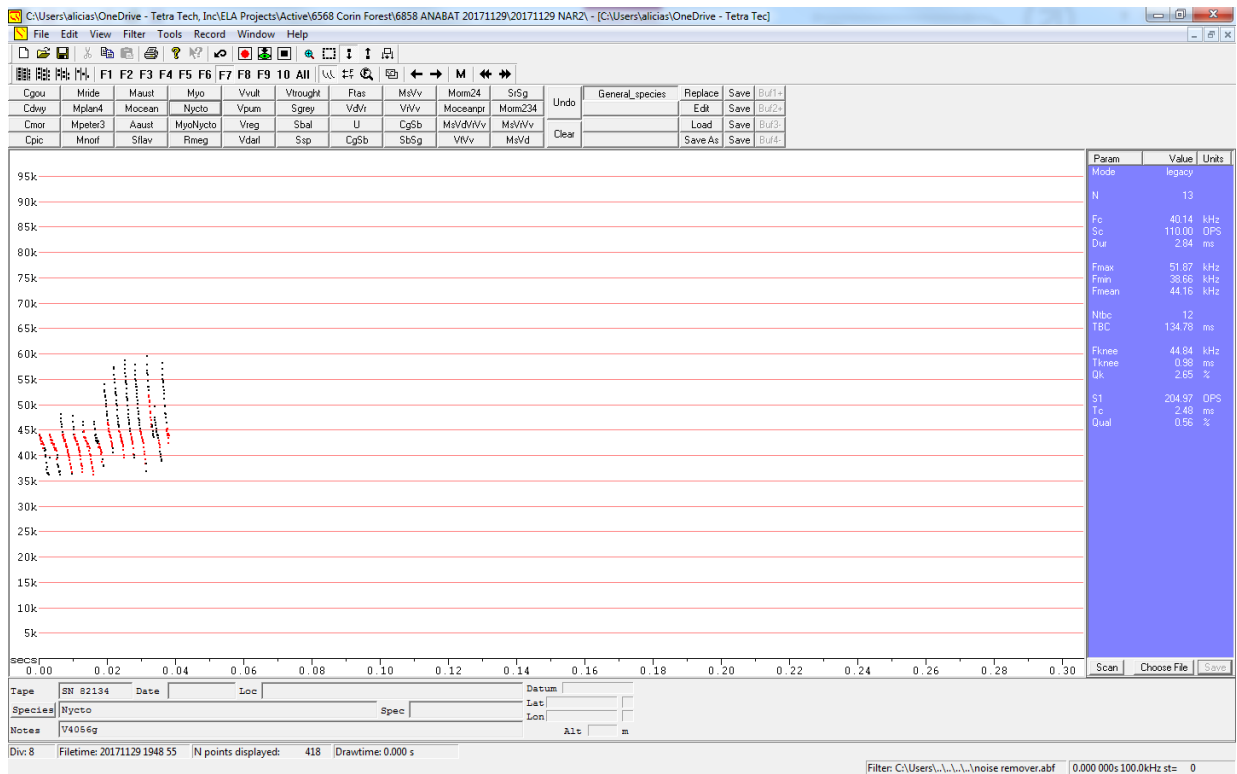


Figure 6: Call profile of *Nyctophilus sp.* recorded on NAR 2 at 19:48 at Corin Forest, ACT on 29 November 2017.

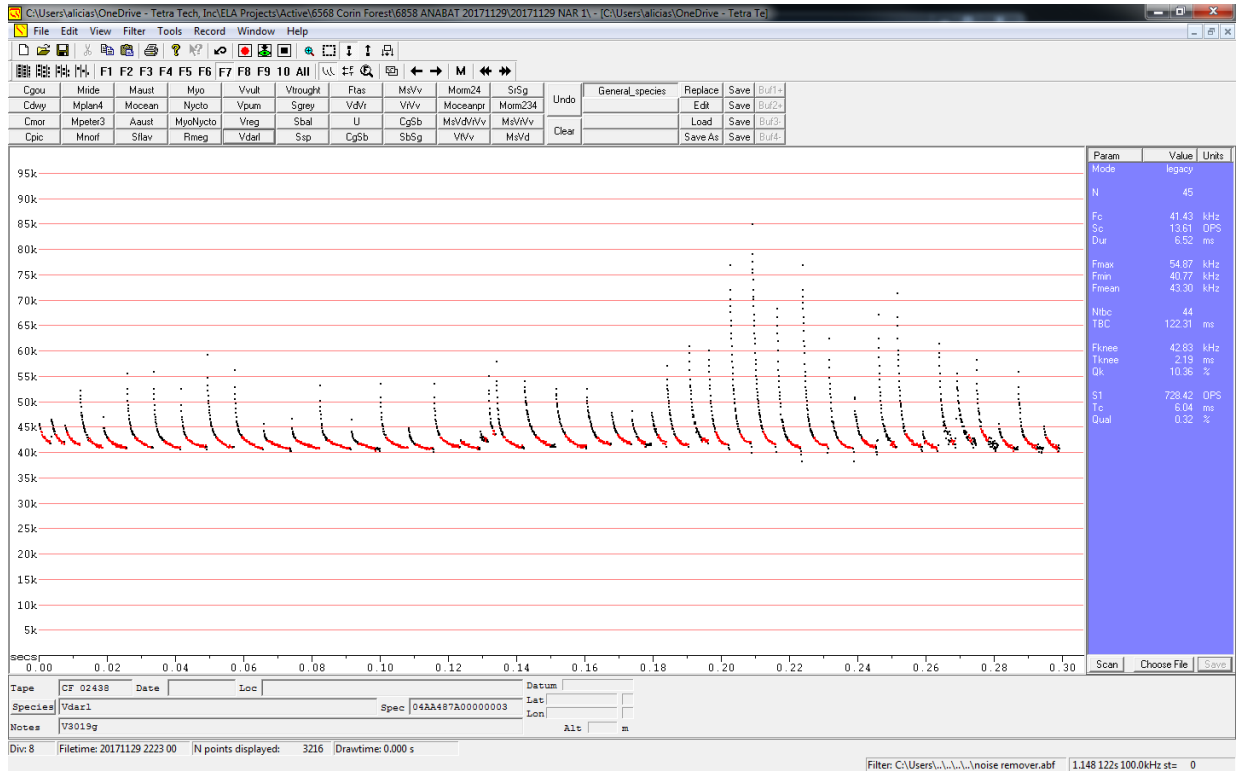


Figure 7: Call profile of *Vespadelus darlingtoni* recorded on NAR 2 at 22:23 at Corin Forest, ACT on 29 November 2017.

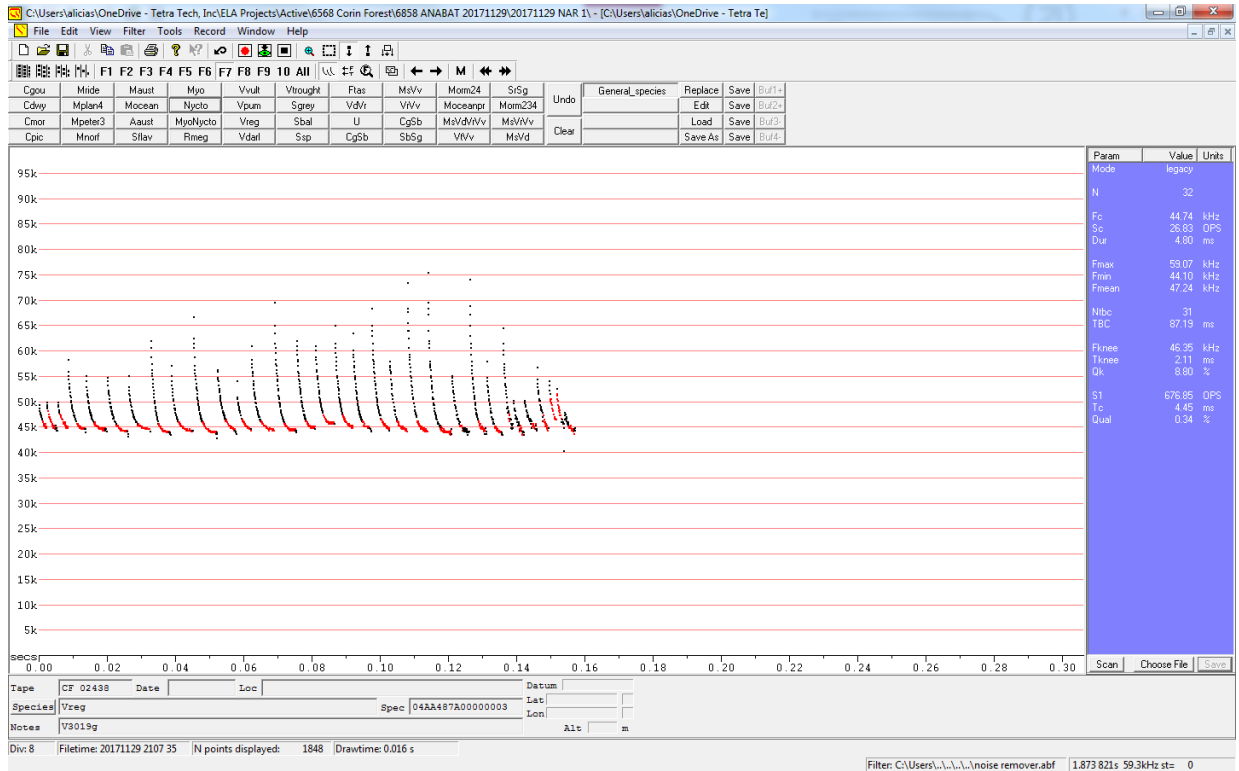


Figure 8: Call profile for *Vespadelus regulus* recorded on NAR 1 at 21:07 at Corin Forest, ACT on 29 November 2017.

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