5.3.4 Targeted survey results

Candidate species credit species have been discussed below; addressing records of threatened flora and fauna, and identification of species polygons. As per the BAM (OEH 2017a), a species polygon must be developed to identify the area, or count and location, of suitable habitat for a species credit species within the development footprint.

Species polygons have been created for species within the development footprint as per the TBDC. For species without relevant guidelines, species polygons have been established based on requirements of similar species or identifying all suitable habitat, as required by the BAM (OEH 2017a).

i Threatened flora species results

Nine threatened flora species have been recorded within and immediately adjacent to the Main Works disturbance footprint (Figure 5.4). These include:

- *Caladenia montana*;
- Clover Glycine;
- Kiandra Leek Orchid;
- Leafy Anchor Plant;
- Mauve Burr-daisy;
- Max Mueller's Burr-daisy;
- Raleigh Sedge;
- Slender Greenhood; and
- *Thelymitra alipcola*.

Targeted surveys undertaken for Caldenia montana in October 2019 identified the species, with collected specimens confirmed as *Caladenia montana* by the Australian National Herbarium. Targeted surveys undertaken in November and December 2019 recorded *Caladenia* sp. that had gone to seed and could not be reliably identified. For the purposes of this assessment, all records of *Caladenia* sp. were deemed *Caladenia montana*.

Species polygons have been established for the species listed above by providing a circular buffer of 30 m around each record within and immediately adjacent to the disturbance footprint. This excludes Leafy Anchor Plant in which a count of individuals was provided, as per the TBDC.

Four additional flora species have been recorded adjacent to the disturbance area. These include:

- Hoary Sunray;
- Monaro Golden Daisy;
- *Prasophyllum innubum*; and
- *Pterostylis alpina*.

These species are listed in the calculator as not being present in the study area, and therefore not being impacted.

ii Threatened fauna survey results

Twenty-five threatened fauna species listed under the BC Act have been recorded within or adjacent to the Main Works disturbance footprint and three EPBC listed species (Figure 5.5).These include:

- fifteen threatened bird species, as well as three EPBC Act listed migratory species:
    - Brown Treecreeper (ecosystem credit species);
    - Diamond Firetail (ecosystem credit species);
    - Dusky Woodswallow (ecosystem credit species);
    - Flame Robin (ecosystem credit species);
    - Gang-gang Cockatoo;
    - Latham's Snipe (EPBC listed migratory species);
    - Little Eagle (ecosystem credit species);
    - Masked Owl;
    - Olive Whistler (ecosystem credit species);
    - Powerful Owl;
    - Pink Robin;
    - Satin Flycatcher (EPBC listed migratory species);
    - Scarlet Robin (ecosystem credit species);
    - Square-tailed Kite (ecosystem credit species);
    - Turquoise Parrot (ecosystem credit species);
    - Varied Sittella (ecosystem credit species);
    - White-bellied Sea-Eagle (ecosystem credit species);
    - White-throated Needletail (EPBC listed species);
- four threatened mammal species:
    - Broad-toothed Rat;
    - Eastern Pygmy-possum;
    - Smoky Mouse;

- Spotted-tailed Quoll (ecosystem credit species);

- three threatened microchiropteran bat species:
  - Eastern Bentwing-bat (ecosystem credit species);
  - Eastern False Pipistrelle (ecosystem credit species);
  - Southern Myotis (species credit species);
- two threatened amphibian species:
  - Alpine Tree Frog;
  - Booroolong Frog; and
- one threatened reptile species:
  - Alpine She-oak Skink.

Threatened fauna survey results are outlined for each survey group in the sections below. Ecosystem credit species are not discussed further in this section as they are not candidate threatened species credit species.

a Diurnal birds

Two target diurnal bird species, the Gang-gang Cockatoo and White-bellied Sea-Eagle, were recorded within and adjacent to the study area (Figure 5.6). The Pink Robin was recorded over 1,000 m from the disturbance footprint and is not considered to occur within the Main Works study area and is considered a low likelihood of occurring in the disturbance footprint. No other diurnal bird candidate species credit species were recorded, and all other species are considered a low likelihood of occurring in the disturbance footprint.

Gang-gang Cockatoo

The Gang-gang Cockatoo (Photograph 5.1) was found to be common throughout the survey area, with the species observed foraging at numerous locations (Figure 5.6). The species was observed to be most common in sub-alpine woodlands (such as at the top of Lobs Hole Ravine Road and Marica), riparian areas at lower elevations (close to the Yarrangobilly River) and dry sclerophyll forests (within Marica).

The Gang-gang Cockatoo nests in the trunks, limbs or dead spouts of tall living trees, in tall, mature sclerophyll forests, often near water (NSWSC 2005, 2008). Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts (OEH 2017b). Suitable hollows are most common in the areas where the species was observed to be most common; along the upper reaches of Lobs Hole Ravine Road, in PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion, along the Yarrangobilly River, in PCT 300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment, along Marica, in PCT 953 – Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion, and within Rock Forest, in PCT 1196 and PCT 952 – Mountain Gum - Narrow-leaved Peppermint - Snow Gum dry shrubby open forest on undulating tablelands, southern South Eastern Highlands Bioregion.

Targeted nest searches were undertaken across the Main Works survey area. The Gang-gang Cockatoo was observed nesting and investigating hollows on six occasions, five of which were recorded within 100 m of the disturbance footprint. One occurrence was along the upper sections of Lobs Hole Ravine Road, a second record was of a pair found in a large hollow along the Yarrangobilly River, the third occurrence was recorded within the Marica area, the fourth was a pair nesting in a tree adjacent to Lobs Hole Ravine Road north and the fifth record was a female nesting in a large hollow at Rock Forest. The other occurrence, outside of the disturbance footprint, was along Link Road, west of Lobs Hole Ravine Road, with a pair perched in a large hollow.

The TBDC does not specify how the species polygon for the Gang-gang Cockatoo should be defined. Thus, the species polygon has been established based on the requirements of the Superb Parrot, by providing a circular buffer of 100 m around the three nest trees identified above. The Superb Parrot is the only species in the order Psittaciformes that has a defined method for identifying the species polygon, and this was therefore deemed appropriate.

On this basis areas of the following PCTs were identified as potential breeding habitat for this species within the disturbance footprint where they occurred within 100 m of an identified breeding hollow:

- PCT 296 - Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion;
- PCT 300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment;
- PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion;
- PCT 952 - Mountain Gum - Narrow-leaved Peppermint - Snow Gum dry shrubby open forest on undulating tablelands, southern South Eastern Highlands Bioregion;
- PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion; and
- PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion.

This data was used to determine species polygons for the species (Figure 5.6).



Photograph 5.1 Gang-gang Cockatoo

White-bellied Sea-Eagle

The White-bellied Sea-Eagle (Photograph 5.2) was recorded across the survey area, spanning from Tantangara to Talbingo (Figure 5.6). The species was observed near Tantangara Reservoir on four occasions; however, no nests were recorded.

The White-bellied Sea-Eagle nests in large emergent eucalypts, often with emergent dead branches or large dead trees nearby which are used as 'guard roosts' (OEH 2019). The large nest structure is composed of sticks and lined with leaves or grass (DoEE 2019). Suitable tall eucalypt forests are most common adjacent to Tantangara Reservoir, in PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment.

Target nest searches were undertaken across the Main Works survey area. The White-bellied Sea-Eagle was first observed nesting in a tall Eucalypt on the edge of Talbingo reservoir during October 2019. Two chicks were observed within the nest and an adult flying over on three occasions. The nest is recorded within the disturbance footprint; thus, a species polygon has been established. The TBDC outlines where the breeding site is 500 m or more from an urban area, a circular polygon with a 500 m radius from the breeding site is applied. Thus, the species polygon has been established based on these requirements, by providing a circular buffer of 500 m around the nest tree.

On this basis areas of the following PCTs were identified as potential breeding habitat for this species within the disturbance footprint where they occurred within 500 m of the nest:

- PCT 296 - Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion;
- PCT 300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment; and
- PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion.

This data was used to determine species polygons for the species (Figure 5.6).



Photograph 5.2 White-bellied Sea-Eagle

b Nocturnal birds

One target species, the Masked Owl, was recorded within the disturbance footprint (Figure 5.7). The Powerful Owl is considered likely to forage within the disturbance footprint on occasion given the species large home range, provided a nesting pair is present within the locality. A deceased Powerful Owl was recorded within Lobs Hole; however, no evidence of nesting was observed and the species was not recorded during targeted surveys.

The Barking Owl is considered a low likelihood of occurring within the disturbance footprint. The Barking Owl is considered scarce at higher elevations of the tablelands (NPWS 2003) and the species is known to respond strongly to call playback. Given the failure to record this species during targeted surveys it is considered unlikely to occur.

Masked Owl

The Masked Owl (Photograph 5.3) was recorded at two locations within the Main Works disturbance footprint during targeted surveys; on the Yarrangobilly River in Lobs Hole and in the upper sections of Lobs Hole Ravine Road, near the intersection with Link Road (Figure 5.7). Both records were from the species being “called in” as a result of call playback.

The Masked Owl nests in large (greater than 90 cm diameter at breast height), old, hollow eucalypts. Nesting hollows are greater than 40 cm wide and 100 cm deep. Unlike other forest owls, there is no relationship with distance to watercourses and the species will breed in a variety of topographic positions (DEC 2006b). Suitable sized trees and hollows are restricted to the two areas where the species was observed; the upper sections or Lobs Hole Ravine Road in areas of PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion and along the Yarrangobilly River in PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands. However, no nesting birds were identified during surveys.

As per the TBDC, the species polygon should be established by providing a circular buffer of 100 m around the nest tree. As no nesting birds were observed a species polygon for the Masked Owl has not been identified, and species credits are not required. Foraging habitat will be offset as an ecosystem credit.



Photograph 5.3 Masked Owl

c Small terrestrial mammals

Three target species, the Broad-toothed Rat, Eastern Pygmy-possum and Smoky Mouse, were recorded within or adjacent to the disturbance footprint (Figure 5.8).

Broad-toothed Rat

The Broad-toothed Rat (Photograph 5.4) was recorded at a number of locations within or adjacent to the disturbance footprint; along Link Road, west of the Snowy Mountain Highway and adjacent to Tantangara Reservoir (Figure 5.8). The species has been recorded in the following PCTs:

- PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion (with a dense shrubby midstorey); and
- PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion.

The Broad-toothed Rat favours dense vegetation used for tunnelling through wet grass, sedge or heath. Sheltering nests of grass are built within understorey vegetation or under logs. The Broad-toothed Rat feeds on grass and sedge stems, seeds and moss spore cases (OEH 2017b). The TBDC does not provide guidance on development of the species polygon for this species. All suitable habitat, as identified by the PCTs listed above, was used to develop the species polygon on the basis of suitable understorey habitat (Figure 5.8). PCTs in Low condition were excluded as they do not provide a sufficiently dense native understorey selected by the species.



Photograph 5.4 Broad-toothed Rat (image courtesy of George Madani)

Eastern Pygmy-possum

The Eastern Pygmy-possum (Photograph 5.5) was recorded at numerous locations within and adjacent to the disturbance footprint, within the upper reaches of Lobs Hole Ravine Road to Lobs Hole and spanning across to Marica (Figure 5.8). The species has been recorded in the following PCTs:

- PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion;
- PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment;
- PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion;
- PCT 639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion;
- PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- PCT 999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion; and
- PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion.

The Eastern Pygmy-possum can be found in a broad range of habitats from rainforest through sclerophyll forest and woodland to heath, but in most areas woodlands and heath appear to be preferred. The species feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes and there is a strong association with Banksias (Tulloch and Dickman 2006) and a dense, flowering understorey (Harris et al. 2014, Law et al. 2017).

The TBDC does not provide guidance on development of the species polygon for this species. All suitable habitat, as identified by the PCTs listed above, plus PCT 311 - Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion, were used to develop the species polygon on the basis of suitable understorey habitat were used to develop the species polygon on the basis of suitably dense understorey habitat with flowering Banksias (Figure 5.8). PCTs in Low or Derived grassland condition classes were excluded as they do not provide a sufficiently dense understorey selected by the species.



Photograph 5.5 Eastern Pygmy-possum (image courtesy of Lachlan Hall)

Smoky Mouse

Extensive targeted surveys for the Smoky Mouse (Photograph 6.5) have been undertaken, with the species identified at 71 locations, with 61 locations within and adjacent to the disturbance footprint (seven by terrestrial trapping, 53 by remote camera and one incidental record along Link Road, Figure 5.8).

The species distribution within the survey area is predominantly associated with tall forests dominated by Mountain Gum and Snow Gum, with a moderate to dense shrubby midstorey dominated by shrubs from the plant family Fabaceae (with some Epacridaceae and Mimosaceae), and dense groundcover with abundant sub-shrubs, logs and leaf litter along the upper reaches of Lobs Hole Ravine Road and in the Marica area, above 1,100 m. At around 1,100 m, vegetation transitions to drier communities dominated by Peppermint, Brittle Gum and Candlebark with a moderate to sparse midstorey and sparse grassy groundcover. Soils also become much rockier and may be less suitable for burrowing.

Recent remote camera surveys along Alpine Creek Fire Trail recorded a potential ID of Smoky mouse within PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion. The new record was found outside of the recorded extent of the species within the survey area.

Smoky Mouse was recorded in the following PCTs:

- PCT 300 –Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment (single record);
- PCT 639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record);
- PCT 643 – Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion (single record);
- PCT 644 –Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion (five records);
- PCT 729 – Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion (two records);
- PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record); and
- PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (19 records).

The TBDC does not provide guidance on development of the species polygon for this species. All suitable habitat, as identified by the PCTs listed above not in Low or Derived Grassland condition classes to around 1,100 m AHD, west of the Snowy Mountain Highway, in proximity of Link Road and the large patch of connected vegetation along Alpine Creek Fire Trail, was used to develop the species polygon on the basis of suitable dense and complex understorey habitat and proximity to the population recorded as a part of surveys undertaken for Snowy 2.0 (Figure 5.8).



Photograph 5.6 Smoky Mouse

d Large terrestrial mammals

No Spotted-tail Quolls were recorded during targeted surveys; however, an incidental record of a Quoll scat was recorded off Wallace's Creek Firetrail (Figure 5.9).

The Spotted-tail Quoll is known to have home ranges of several hundred to several thousand hectares and occurs at low densities (DELWP 2016, DEWHA 2009a, DSE 2011a). The species is primarily forest-dependent, and occupies a wide range of habitat types, including rainforest, wet and dry sclerophyll forest, coastal heathland, scrub and dunes, woodland, heathy woodland, swamp forest, mangroves, on beaches and sometimes in grassland or pastoral areas adjacent to forested areas. Given this, the species has potential to occupy the Main Works disturbance footprint at low densities, with large areas of suitable habitat present throughout the locality; the species is likely to be wide ranging. All areas of the survey area are deemed to provide suitable habitat, with suitable denning sites focused on boulderfields on Lobs Hole Ravine Road, and areas with a high density of hollow logs in sub-alpine areas at the top of Lobs Hole Ravine Road and along the Yarrangobilly River.

However, as the species is an ecosystem credit species for the purposes of the BAM a species polygon has not been developed.

e Arboreal mammals

No arboreal mammals were recorded during targeted surveys.

Although there is some potential for these species to occur at low densities and/or utilise habitats within the disturbance footprint on occasion, the species are not considered present for the purposes of this assessment.

The Koala is rare in the KNP, with a single record within 10 km of the Main Works survey area and a recent record in November 2016 from near Blowering Dam, east of Tumut (ABC News 2018). There is insufficient evidence to undertake a Koala habitat assessment in accordance with the Koala habitat assessment tool outlined in DoE (2014a). Therefore, RGB SAT surveys, spotlighting and Songmeter surveys were undertaken. The Koala was not observed during these surveys and is considered unlikely to occur for the purposes of this assessment.

f Microchiropteran bats

One target species, the Southern Myotis, was recorded during targeted acoustic detection three locations (Figure 5.10). Additionally, the Eastern Bent-wing Bat was recorded at twelve sites within the survey area, however no breeding habitat for the species was recorded in or adjacent to the disturbance footprint. Therefore, no specie polygon was required.

Southern Myotis

The species was recorded as a possible identification at each of the three sites. For the purposes of this assessment, a conservative approach was taken to record the species and create a species polygon. The TBDC specifies the species polygon for Southern Myotis should align with the PCTs on the subject land to which the species is associated within 200 m of waterbodies.

On this basis areas of the following PCTs within 200 m of waterbodies were identified as potential habitat for this species within the disturbance footprint:

- PCT 299 – Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands; and
- PCT 1191 – Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion.



Photograph 5.7 Southern Myotis (Williams 2019)

g Amphibians

Two target species, the Booroolong Frog and Alpine Tree Frog, were recorded within and adjacent to the Main Works study area.

Booroolong Frog

Extensive targeted surveys were undertaken of all permanent to intermittent watercourses within the survey area. The Booroolong Frog (Photograph 5.8) was recorded within the survey area along the Yarrangobilly River, from the full supply level (FSL) of Talbingo Reservoir to the upper reaches of the Yarrangobilly River, as well as along Wallace's Creek (Figure 5.11). It is likely that this population extends upstream to at least Blue Creek Firetrail (Dave Hunter, DPIE, pers. comm.).

The Yarrangobilly River is a major regional watercourse that flows into Talbingo Reservoir, downstream of Lobs Hole. The river's catchment has an area of 271 km^2 that is wholly with KNP. Baseline water monitoring was undertaken by EMM (2019c) within Yarrangobilly River and Wallace's Creek. Monitoring was undertaken at a monthly frequency within the Yarrangobilly River Catchment. A summary of the water quality results is presented in Annexure E. Key results from water quality sampling are summarised as follows:

- pH ranges between 6.2 to 8.5, with occasional lower and upper bound exceedances;
- Low concentrations of suspended solids and low turbidity;
- Carbonate and salinity vary seasonally, with higher levels occurring in summer/autumn;

- Oxidised nitrogen concentrations exceed WQO values frequently in summer/autumn and occasionally in winter/spring;
- Total and reactive phosphorus concentrations are generally below WQO values; and
- Aluminium concentrations in the Yarrangobilly River exceed WQO values frequently in winter/spring and occasionally in summer/autumn. Copper concentrations in Wallace's Creek exceed WQO values occasionally.
- The water quality during dry weather conditions in minor watercourses in Lobs Hole is generally poorer than larger watercourses, with elevated suspended sediment, nutrients and some metals (aluminium and copper).
- The understanding of water quality during wet weather conditions is informed by data from monitoring undertaken in March and May 2019 following moderate rainfall. Receiving water quality during wet weather conditions is generally poorer relative to baseflow conditions with higher turbidity, lower pH, higher nutrients and potential for non-trivial concentrations of some metals such as aluminium and copper.

The Yarrangobilly River provides optimal breeding habitat for Booroolong Frog, with a series of cobble banks and bedrock structures along stream margins, with slow-flowing water. These areas are connected by larger, slow-flowing pools. Breeding habitat in Wallace's Creek is much more limited, with small sections providing suitable breeding habitat. It is likely this area provides sub-optimal breeding habitat as well as connective and dispersal habitat.

During the breeding season the species shelters under rocks or amongst vegetation near the ground on the stream edge (Anstis 2002, Robinson 1993). In winter, the frogs have been observed under rocks within the riparian zone (Anstis et al. 1998, OEH 2012a). The Booroolong Frog is not known to move very far along the stream from where they are recorded (less than 50 m within a season) with maximum movements recorded being 300 m (Hunter 2001). During targeted surveys, the Booroolong Frog was observed up to 130 m from the Yarrangobilly River during a high rainfall event that saw key breeding habitat flooded. During this period the majority of frogs were observed within the riparian zone (ie within 50 m of the River, see Figure 5.11).

Based on the above information, the Yarrangobilly River and Wallace's Creek have been identified as breeding habitat, while areas within 50 m of this breeding habitat has been identified as potential dispersal and refuge habitat. This criterion was used to develop the species polygon for the Booroolong Frog (Figure 5.11).



Photograph 5.8 Booroolong Frog

Alpine Tree Frog

The Alpine Tree Frog (Photograph 5.9) was recorded in various locations within and adjacent to the disturbance footprint, including near Tantangara Reservoir and along Nungar Creek Fire Trail (Figure 5.11). The species was recorded breeding in Tantangara Reservoir between minimum operating level (MOL) and full supply level (FSL) on several occasions as well as Nungar Creek, Eucumbene River and Tantangara Creek.

Baseline water monitoring was undertaken by EMM (2019c) in the Murrumbidgee and Eucumbene Rivers, Tantangara, Gooandra, Nungar and Kelly's Plain Creeks and associated minor watercourses. Monitoring was undertaken at a monthly frequency, predominantly during baseflow conditions. A summary of the water quality results is presented in Annexure E. Key results from water quality sampling are summarised as follows:

- pH that generally ranges between 6.2 and 8.5, with occasional lower and upper bound exceedances;
- carbonate and salinity vary seasonally, with higher levels occurring in summer/autumn;
- low concentrations of suspended solids and low turbidity;
- oxidised nitrogen concentrations exceed WQO values frequently in summer/autumn and occasionally in winter/spring;

- total and reactive phosphorus concentrations are generally below WQO values;
- aluminium concentrations exceed the WQO value on a frequent basis. Copper, iron and zinc concentrations exceed WQO values on an occasional basis;
- the water quality of minor watercourses in the vicinity of the proposed surface works near Tantangara Reservoir is generally poorer than larger watercourses, with elevated suspended sediment, nutrients and some metals (aluminium and iron); and
- the water quality during wet weather conditions is poorly understood. It is expected that concentrations of suspended sediment and some metals may be higher than dry weather concentrations. Wet weather sampling is proposed prior to commencement of works.

The Alpine Tree Frog occurs in the south-eastern NSW and Victorian high country (alpine and sub-alpine zones) generally above 1,100 m AHD. Most locations are within National Parks and some are close to alpine resorts. This species is found in a wide variety of habitats including woodland, heath, grassland and herb fields. They will utilise natural and artificial wetlands for breeding. Non-breeding habitat and overwintering refuges are poorly known but are likely to include flat rocks, fallen logs, leaf litter and other ground debris.

On the basis of the above information, the species polygon for the Alpine Tree Frog has been defined as breeding areas such as between FSL and MOL in Tantangara Reservoir and suitable watercourses, plus areas within the 50 m of suitable breeding habitat (Figure 5.11).



Photograph 5.9 Alpine Tree Frog recorded breeding in Tantangara Reservoir

Northern Corroboree Frog

The Northern Corroboree Frog was not recorded during targeted surveys within the survey area.

The Northern Corroboree Frog is highly restricted to two populations, one in Bogong Mountains/Fiery Range and the other in the ACT. The species has declined by 40% in the 2000s, having become locally extinct at a number of sites (TSSC 2013). The Northern Corroboree Frog was not observed during targeted surveys and is considered unlikely to occur for the purposes of this assessment.

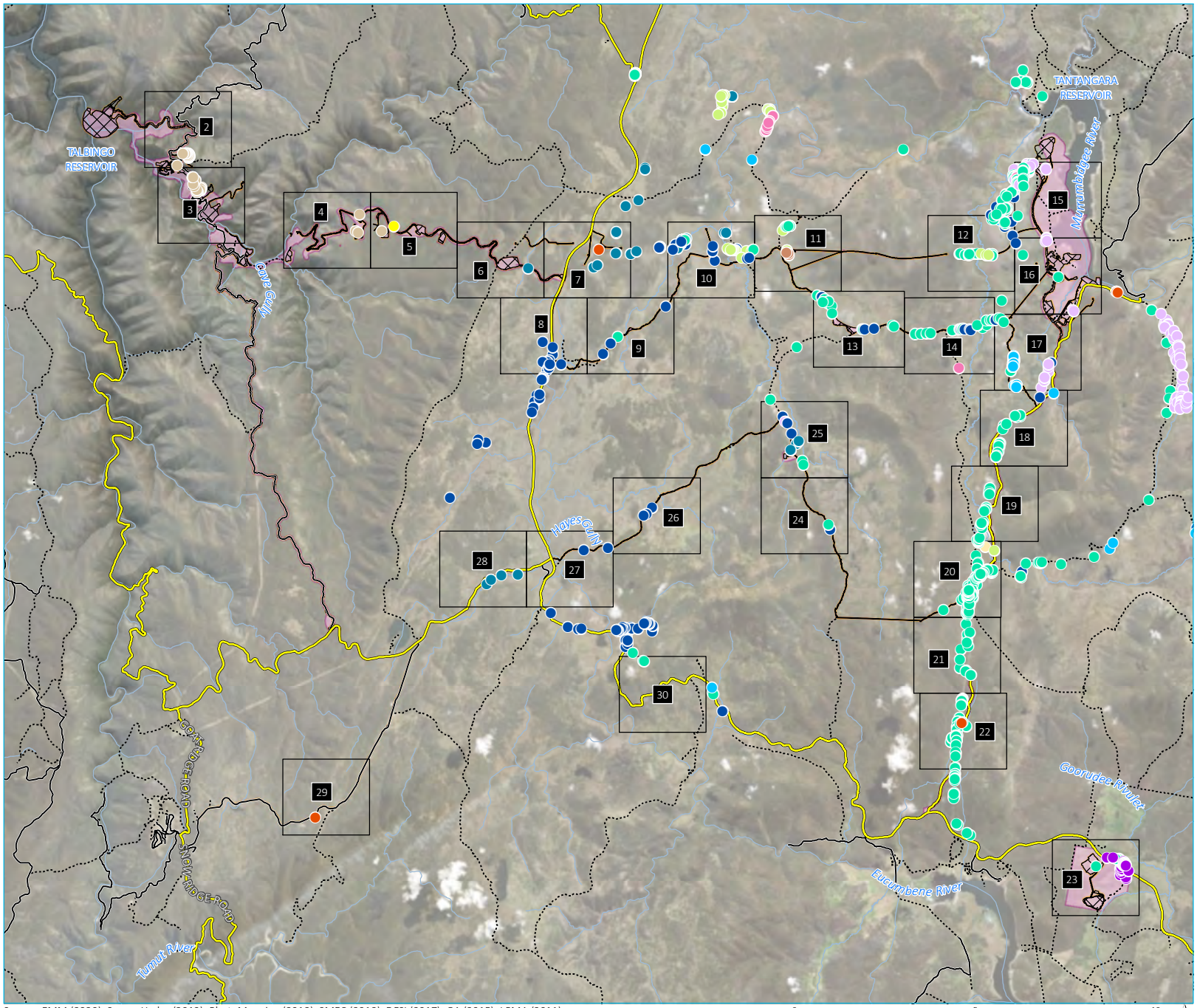
h Reptiles

The Alpine She-oak Skink (Photograph 5.10) was recorded within the Main Works disturbance footprint and adjacent areas (Figure 5.12). The species is known to occur in temperate montane grasslands, favouring tree-less or very lightly treed areas containing tussock grasses, low heath or a combination of both. Records were found within PCT 1224 – Sub alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion. The species was not recorded in PCT 644 - Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion or PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion despite targeted surveys sites being located within these PCT.

On the basis of the above information, PCT 1224 was used to determine species polygons for this species, including all condition classes excluding Low (Figure 5.12).



Photograph 5.10 Alpine She-oak Skink



KEY

- Watercourse
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened flora (point)

- Clover Glycine
- Hoary Sunray
- Kiandra Leek Orchid
- Leafy Anchor Plant
- Max Mueller's Burr-daisy
- Mauve Burr-daisy
- Monaro Golden Daisy
- Raleigh Sedge
- Slender Greenhood
- *Caladenia montana*
- *Pterostylis alpina*
- *Prasophyllum innubum*
- *Thelymitra alpicola*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

N

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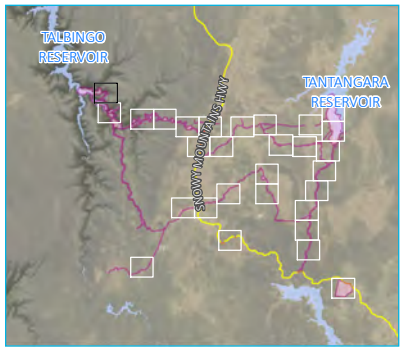
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Snowy 2.0
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Figure 5.4.1

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened species habitat

Threatened flora (point)

- *Caladenia montana*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Flora survey results

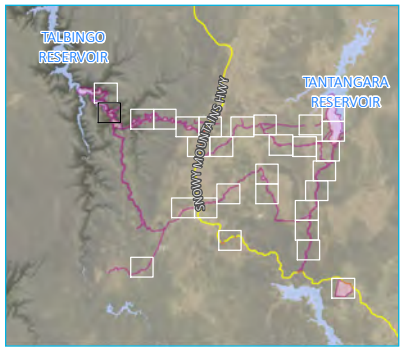
Snowy 2.0
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Figure 5.4.2

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- *Caladenia montana*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

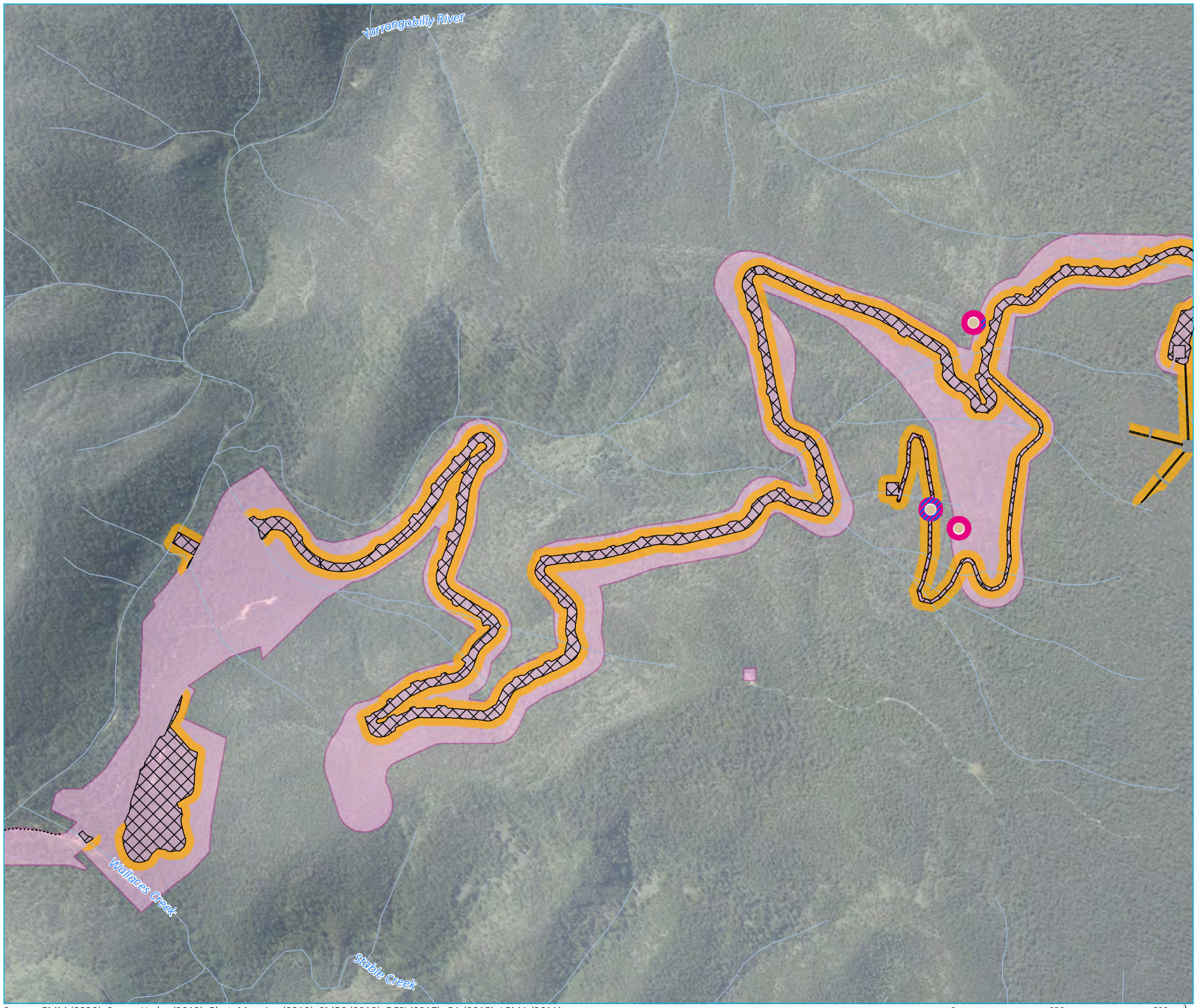
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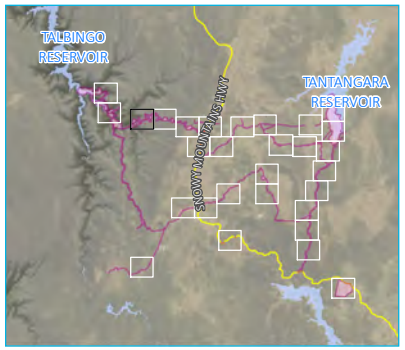
Snowy 2.0
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Figure 5.4.3

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- *Caladenia montana*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

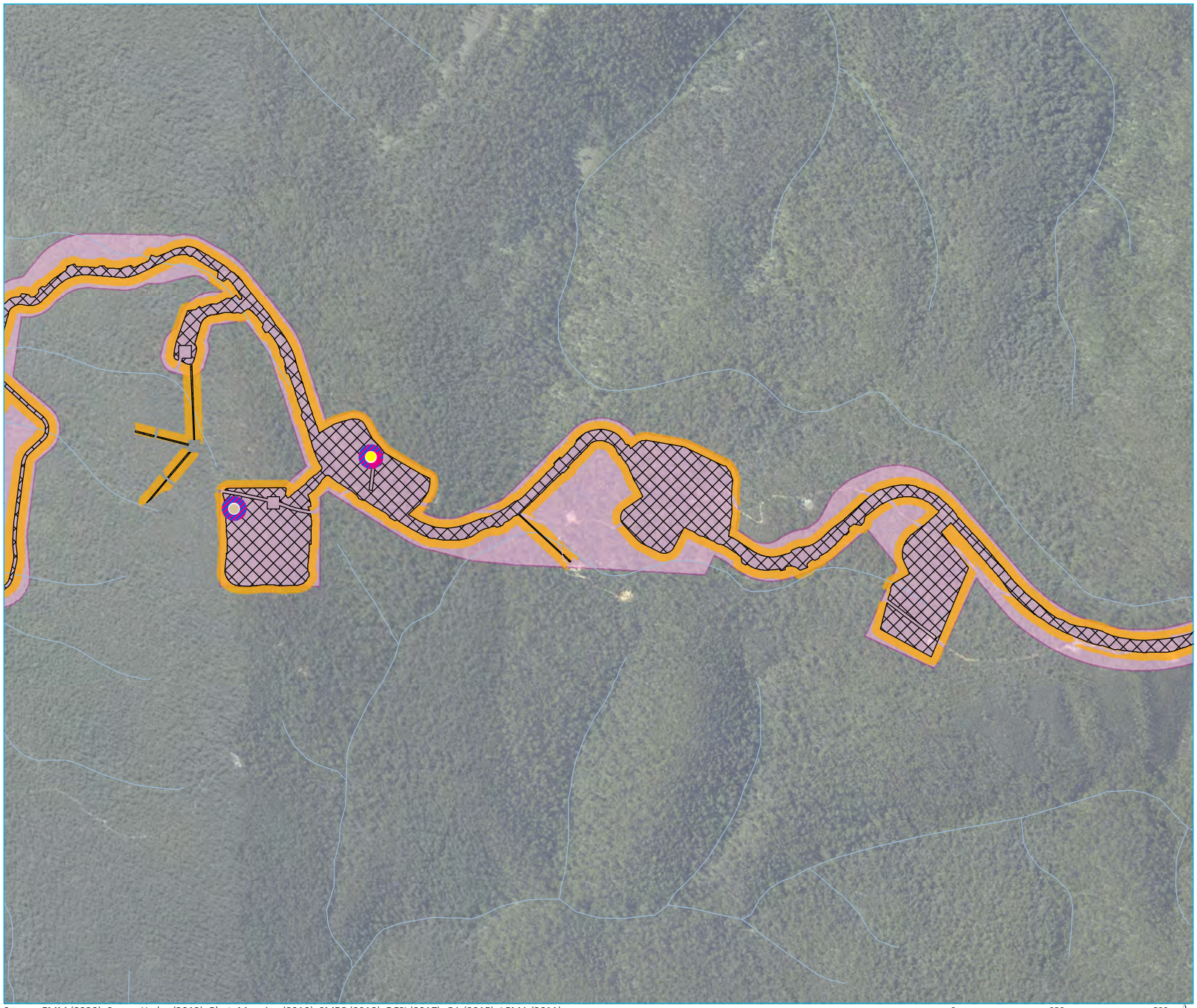
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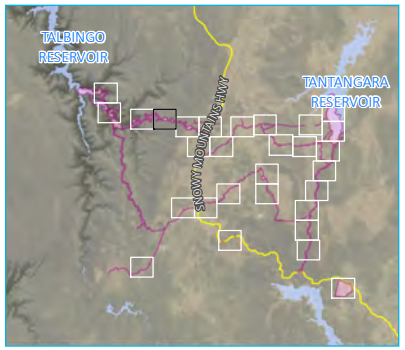
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.4

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Slender Greenhood
- *Caladenia montana*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

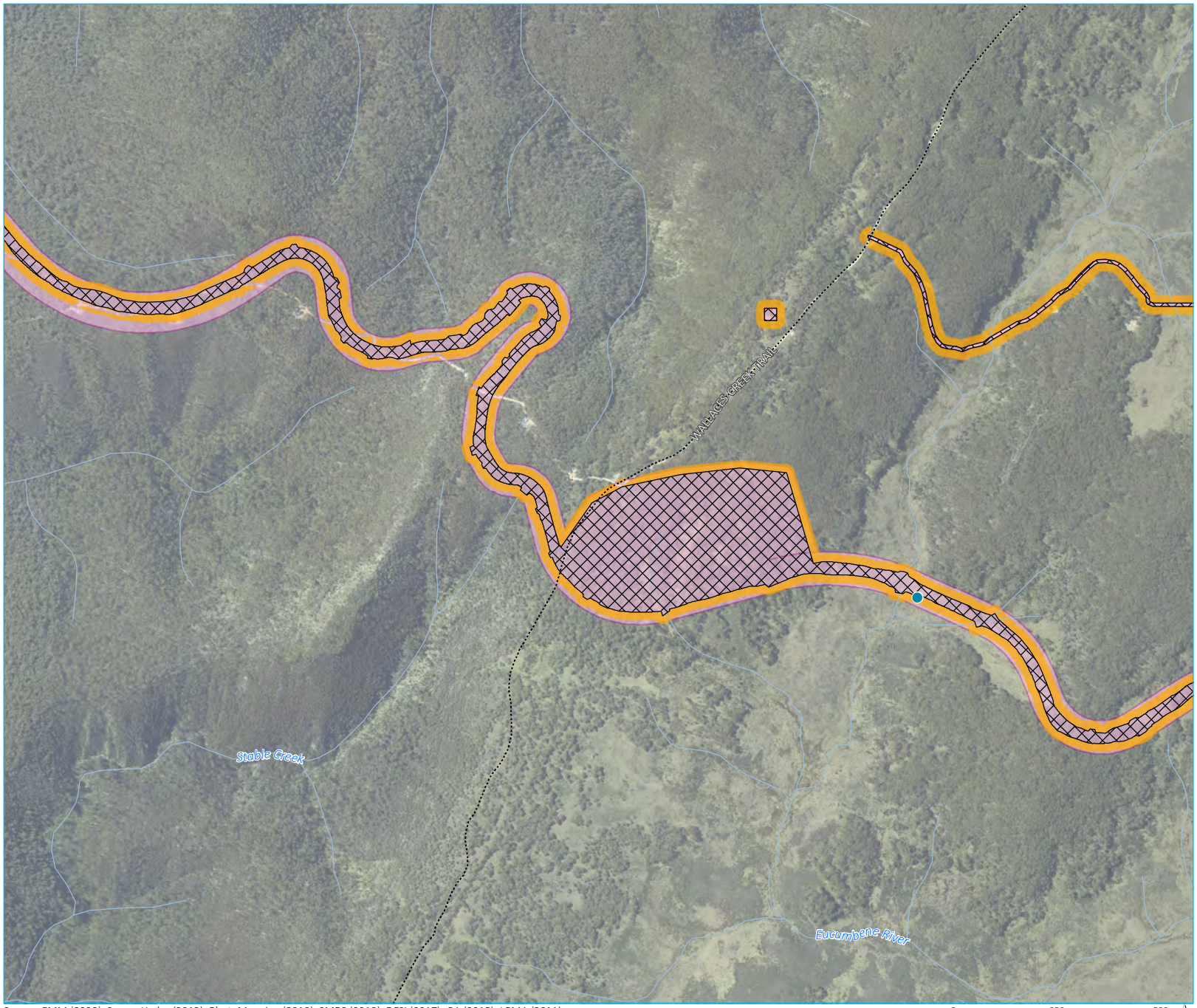
GDA 1994 MGA Zone 55

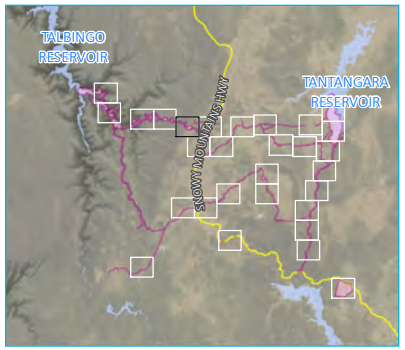
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.5





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened flora (point)

- Leafy Anchor Plant

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

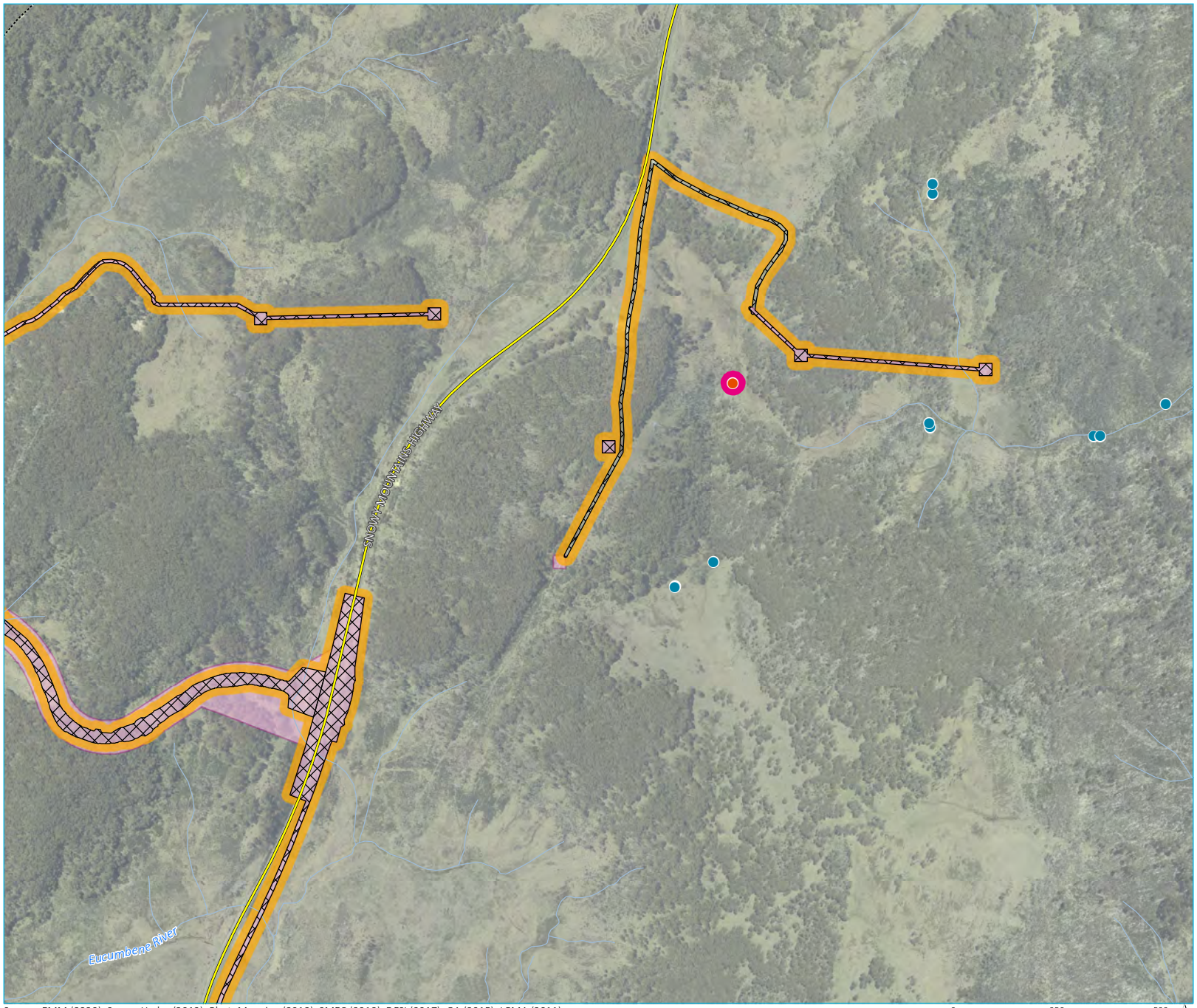
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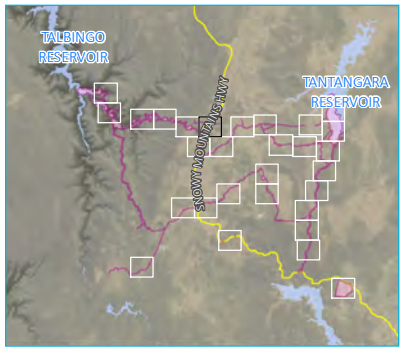
Flora survey results

Snowy 2.0
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Figure 5.4.6

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened species habitat

Threatened flora (point)

- Leafy Anchor Plant
- *Thelymitra alpicola*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

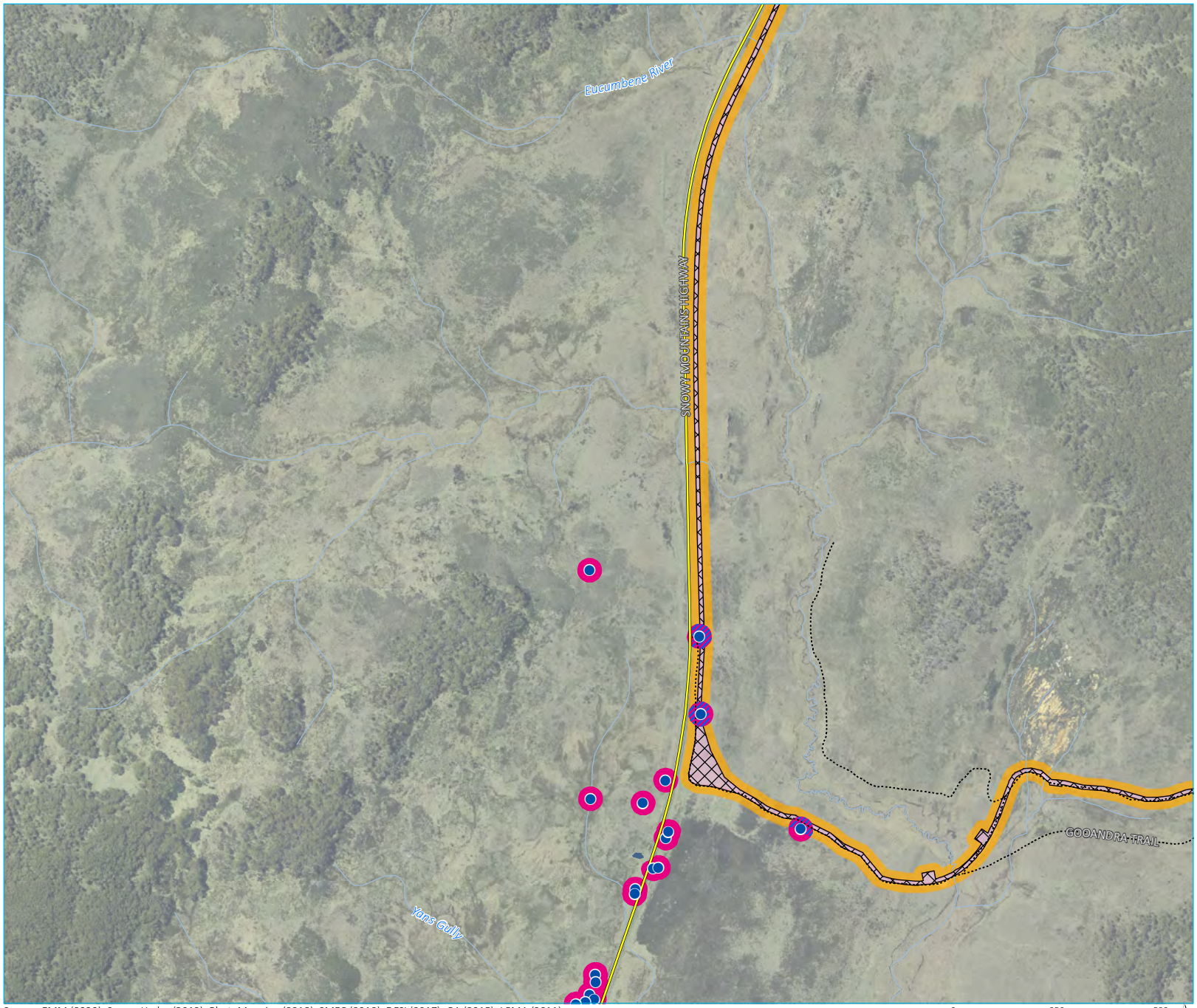
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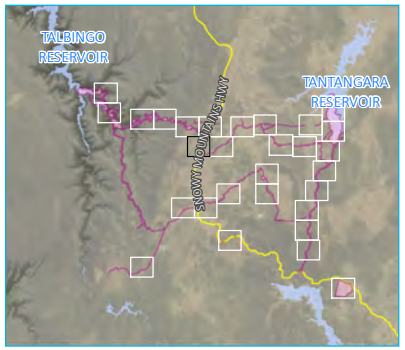
Flora survey results

Snowy 2.0
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Figure 5.4.7

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Kiandra Leek Orchid

Threatened flora (point)

- Kiandra Leek Orchid

Flora survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

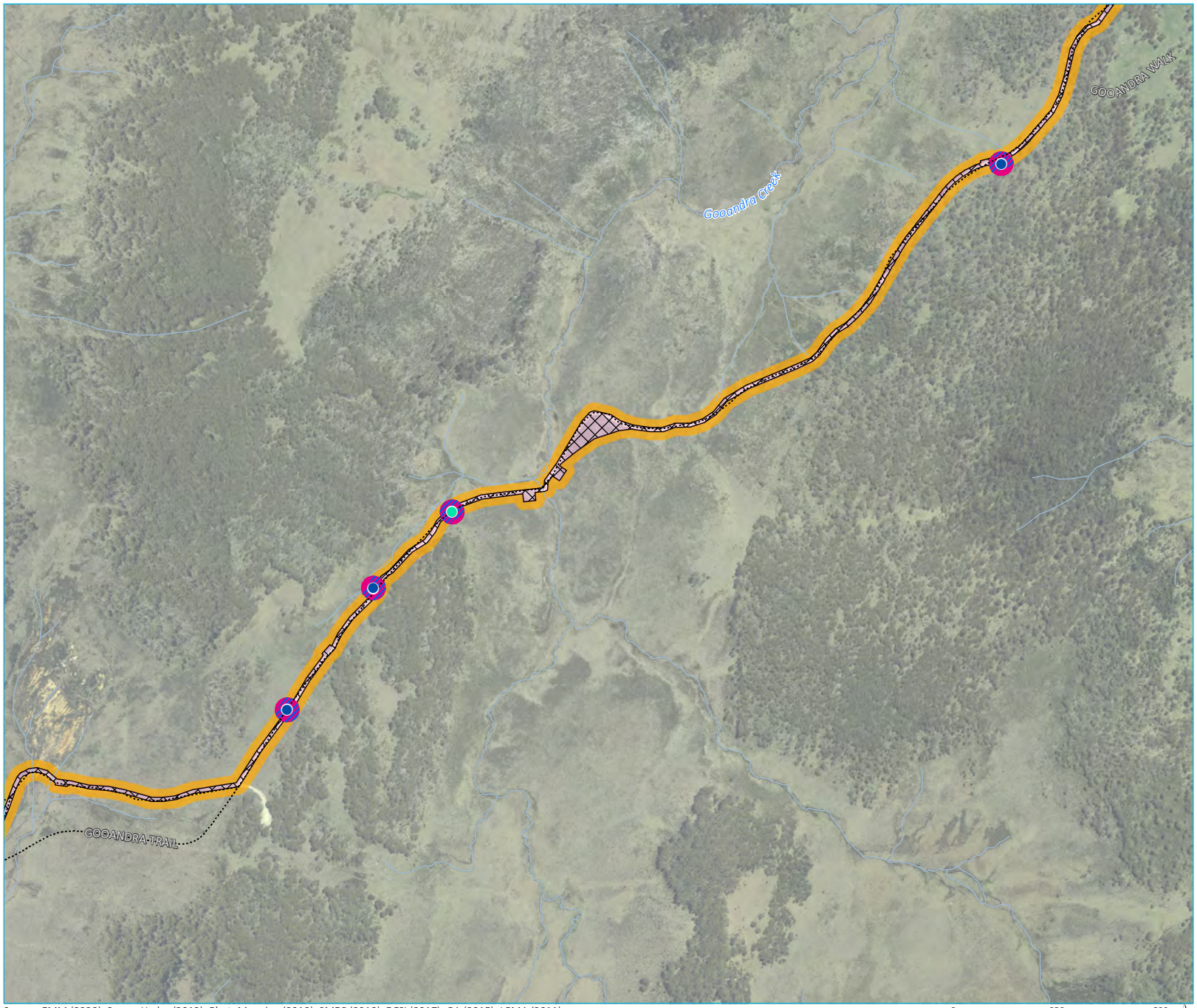
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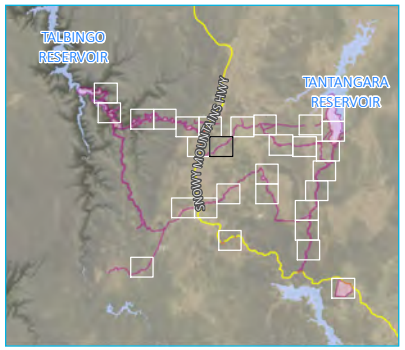
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.8

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Kiandra Leek Orchid
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

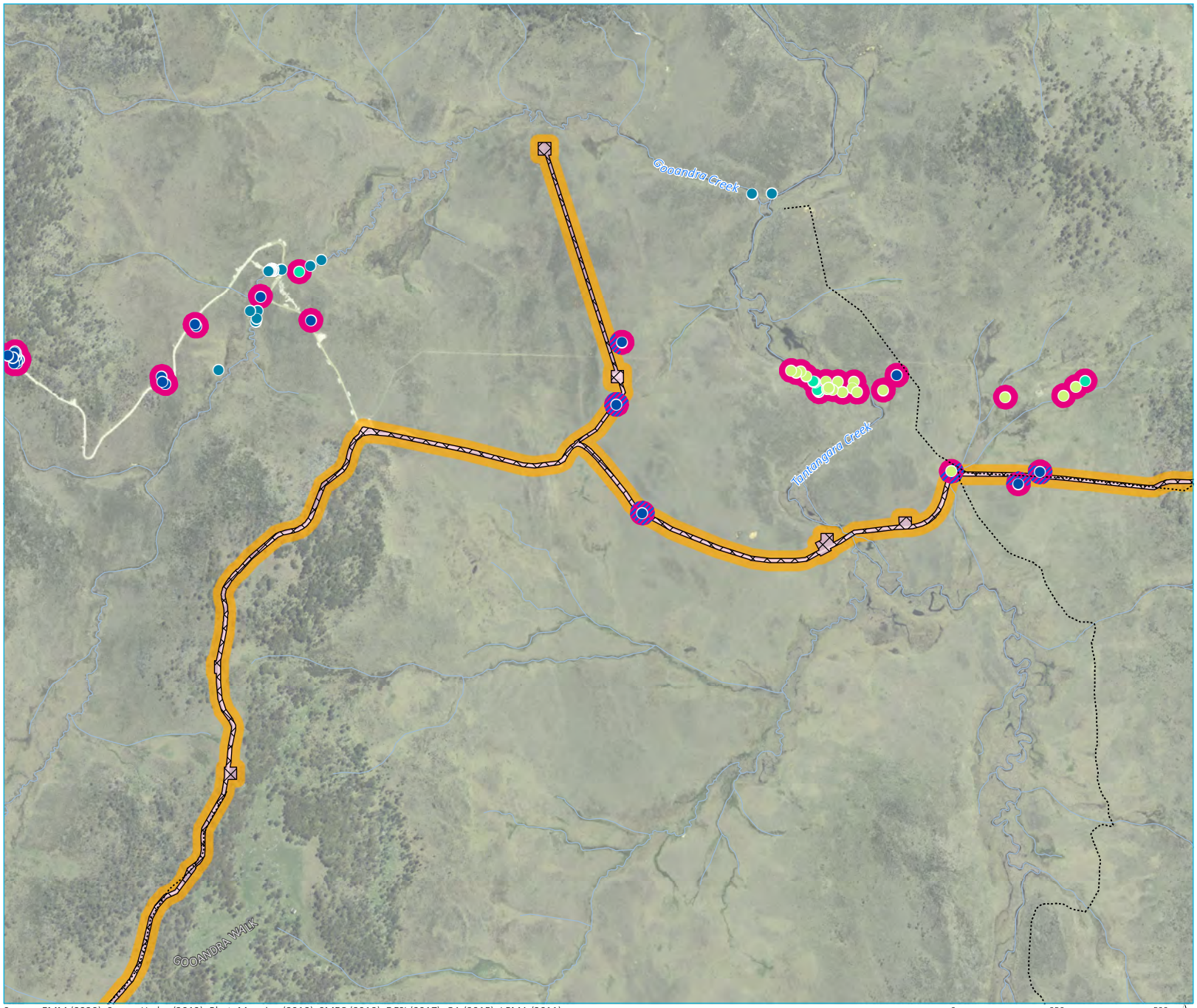
GDA 1994 MGA Zone 55

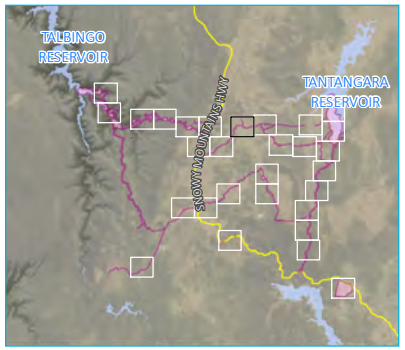
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.9





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Kiandra Leek Orchid
- Leafy Anchor Plant
- Mauve Burr-daisy
- Raleigh Sedge

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

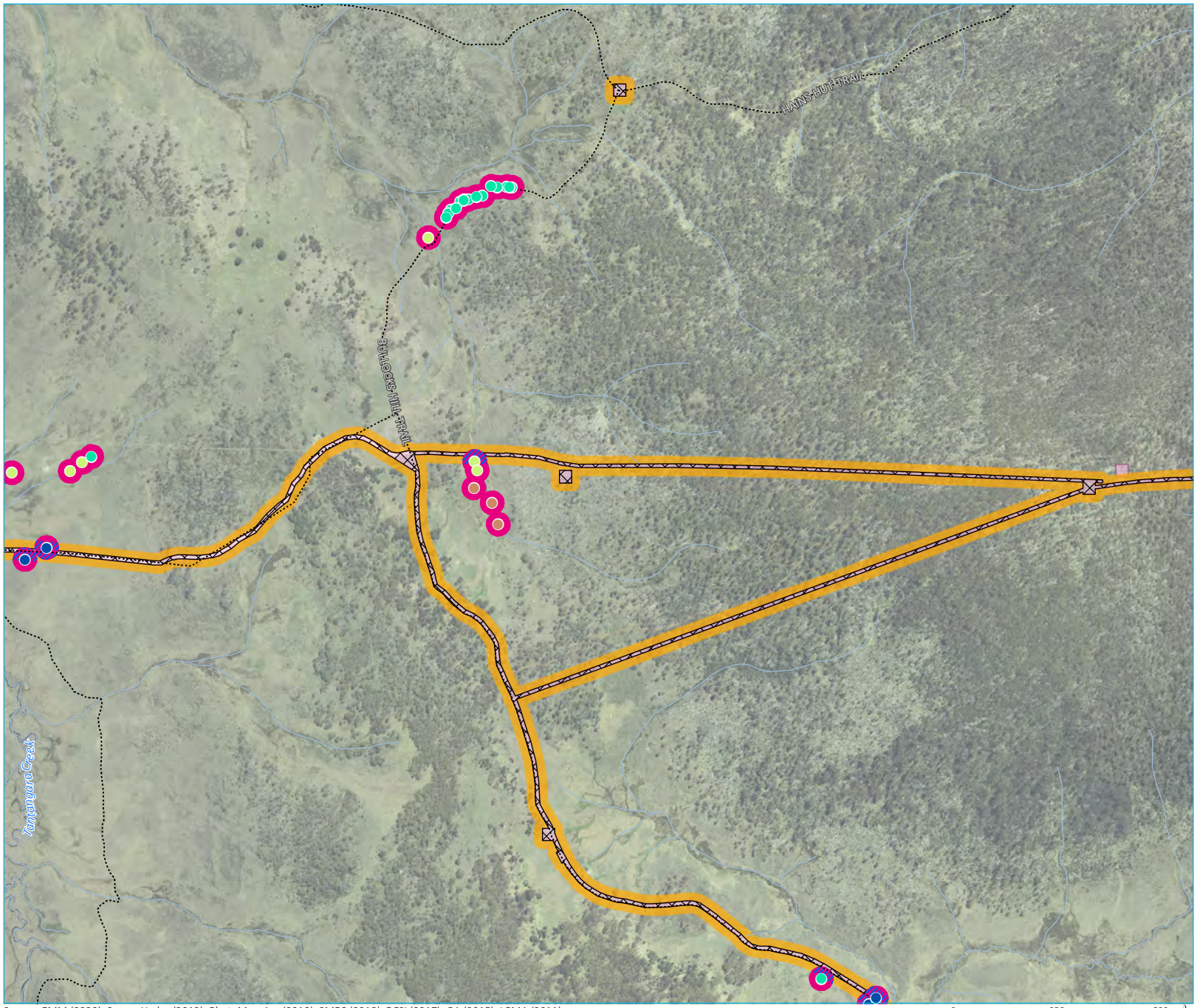
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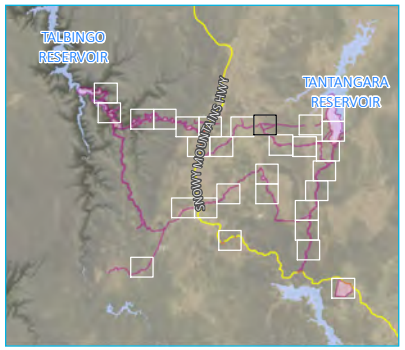
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.10

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Kiandra Leek Orchid
- Mauve Burr-daisy
- Raleigh Sedge
- *Prasophyllum innubum*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

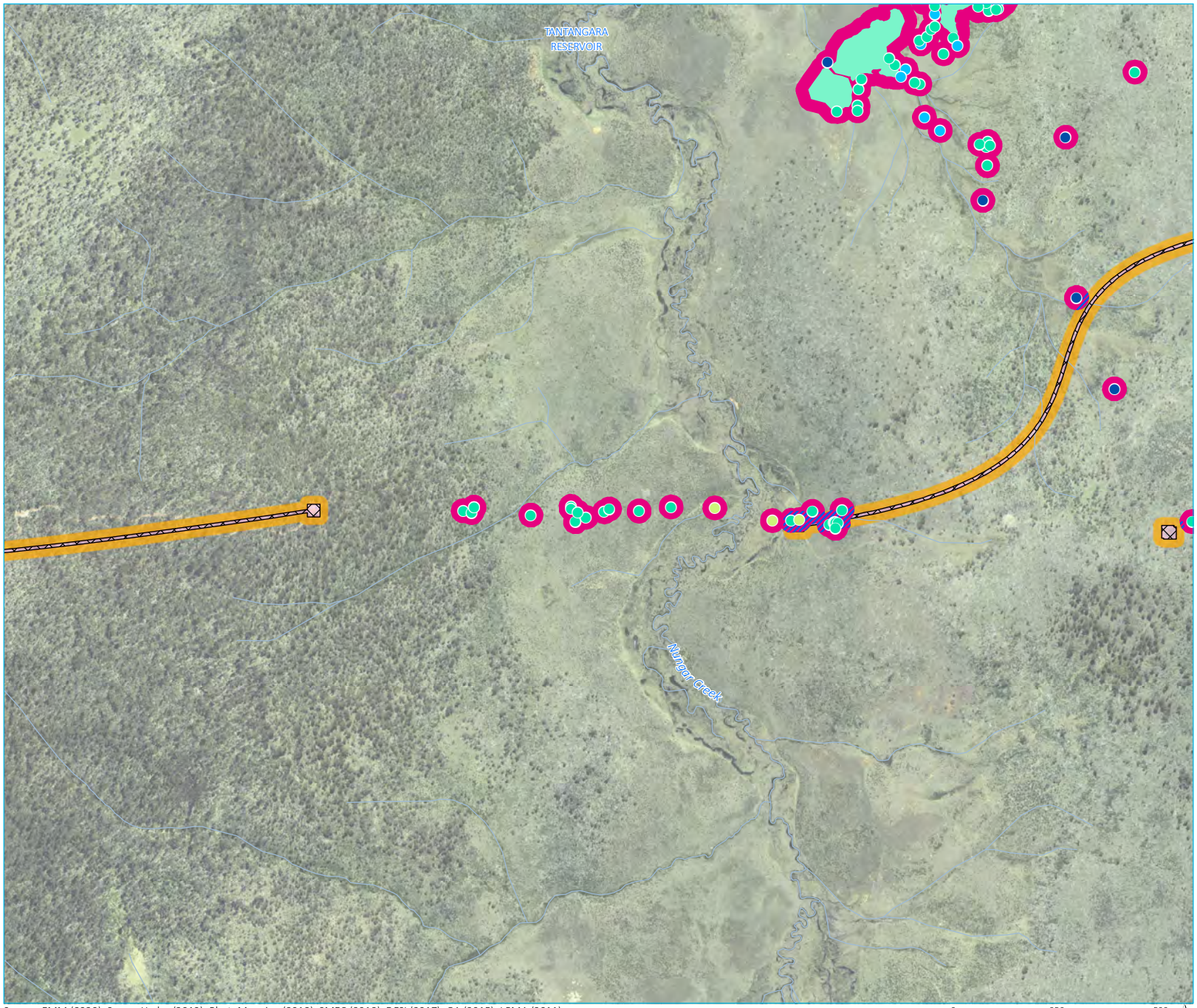
Flora survey results

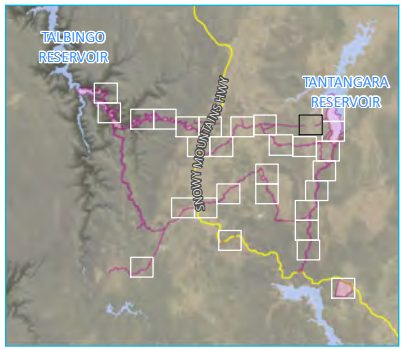
Snowy 2.0
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snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Kiandra Leek Orchid
- Max Mueller's Burr-daisy
- Mauve Burr-daisy
- Raleigh Sedge

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

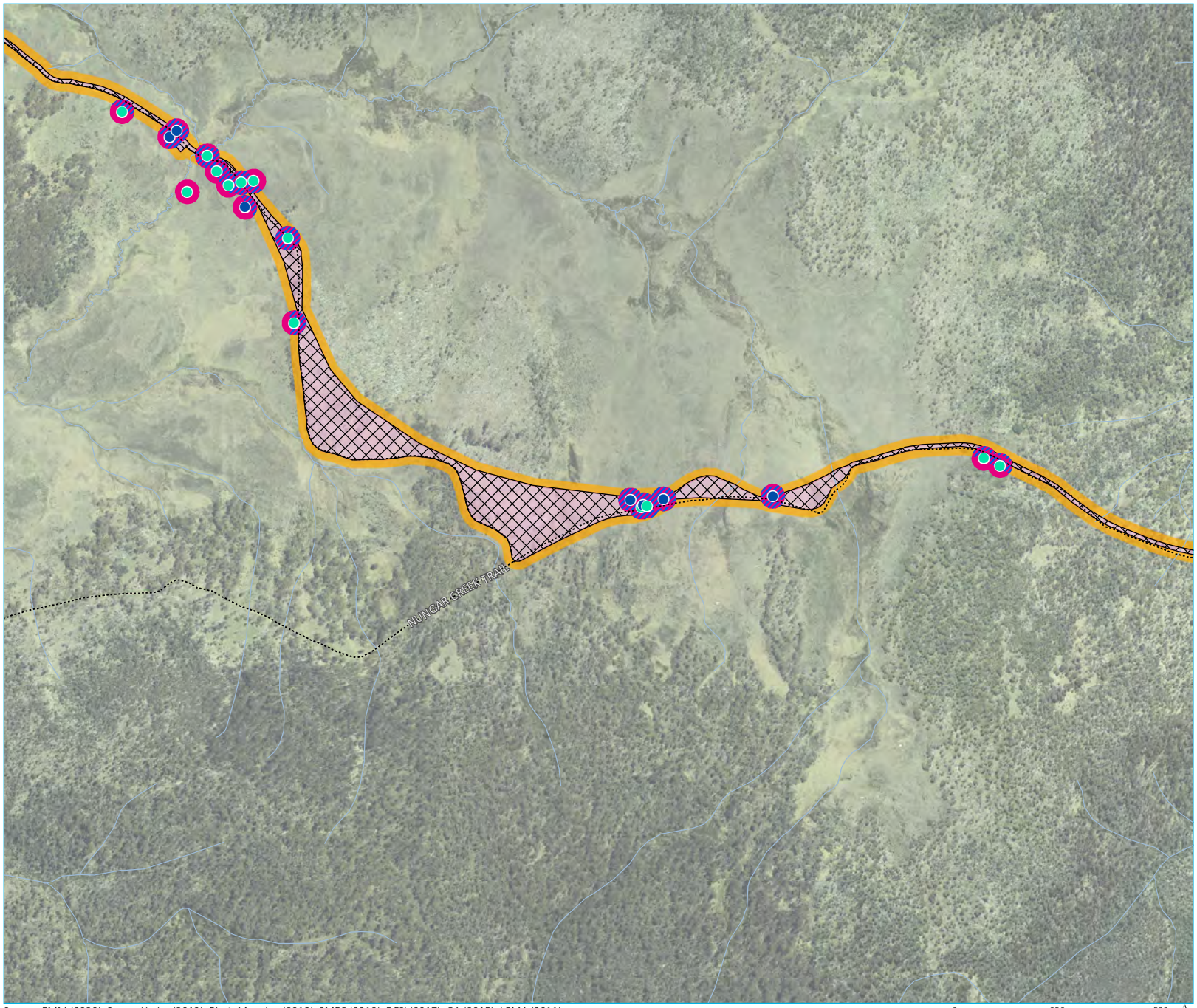
Flora survey results

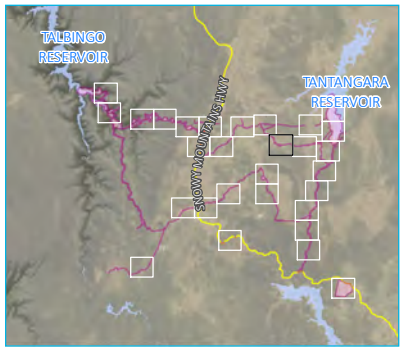
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.12

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Kiandra Leek Orchid
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

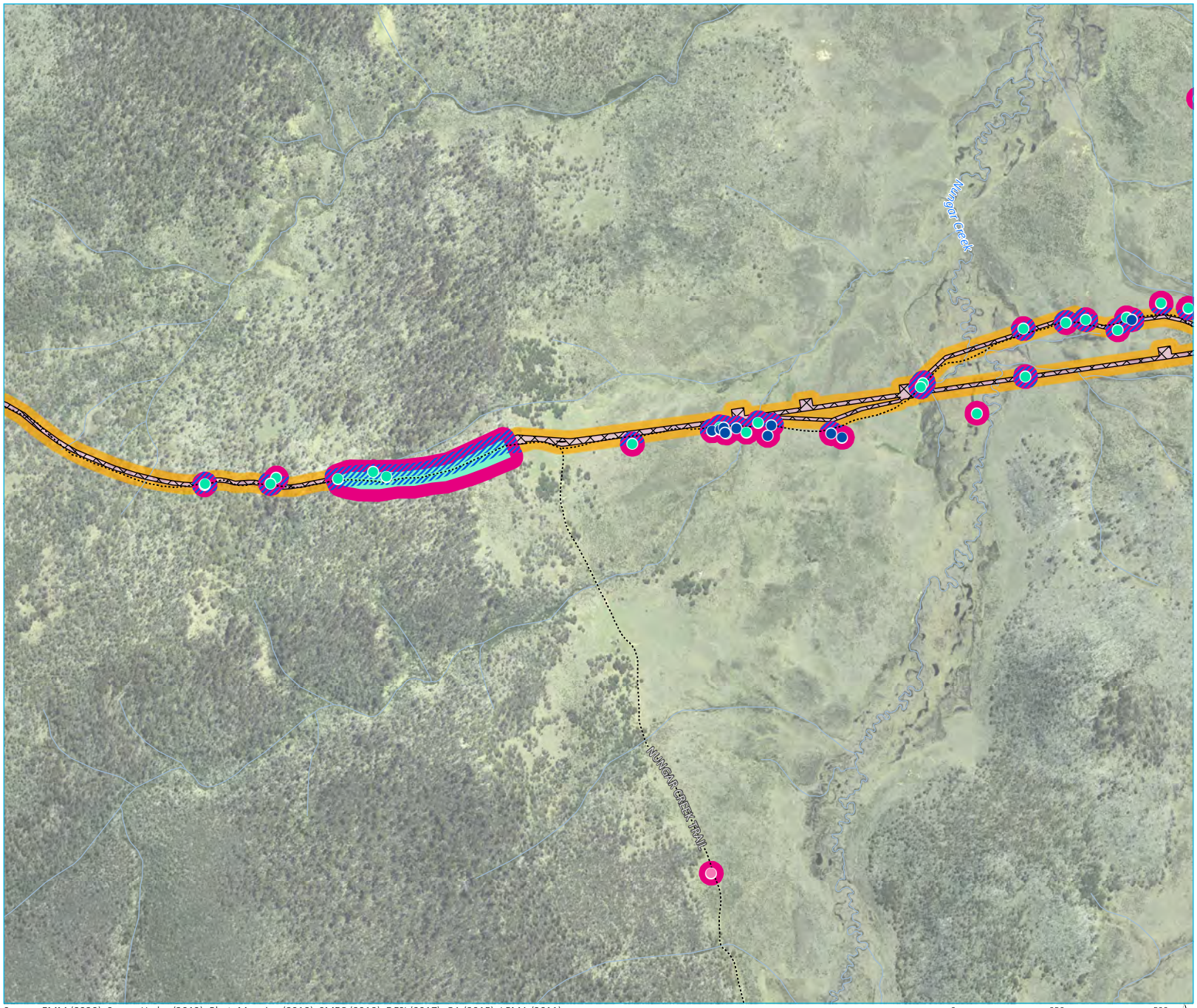
GDA 1994 MGA Zone 55

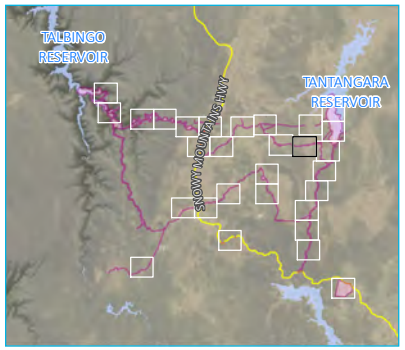
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.13





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Kiandra Leek Orchid
- Mauve Burr-daisy
- Monaro Golden Daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

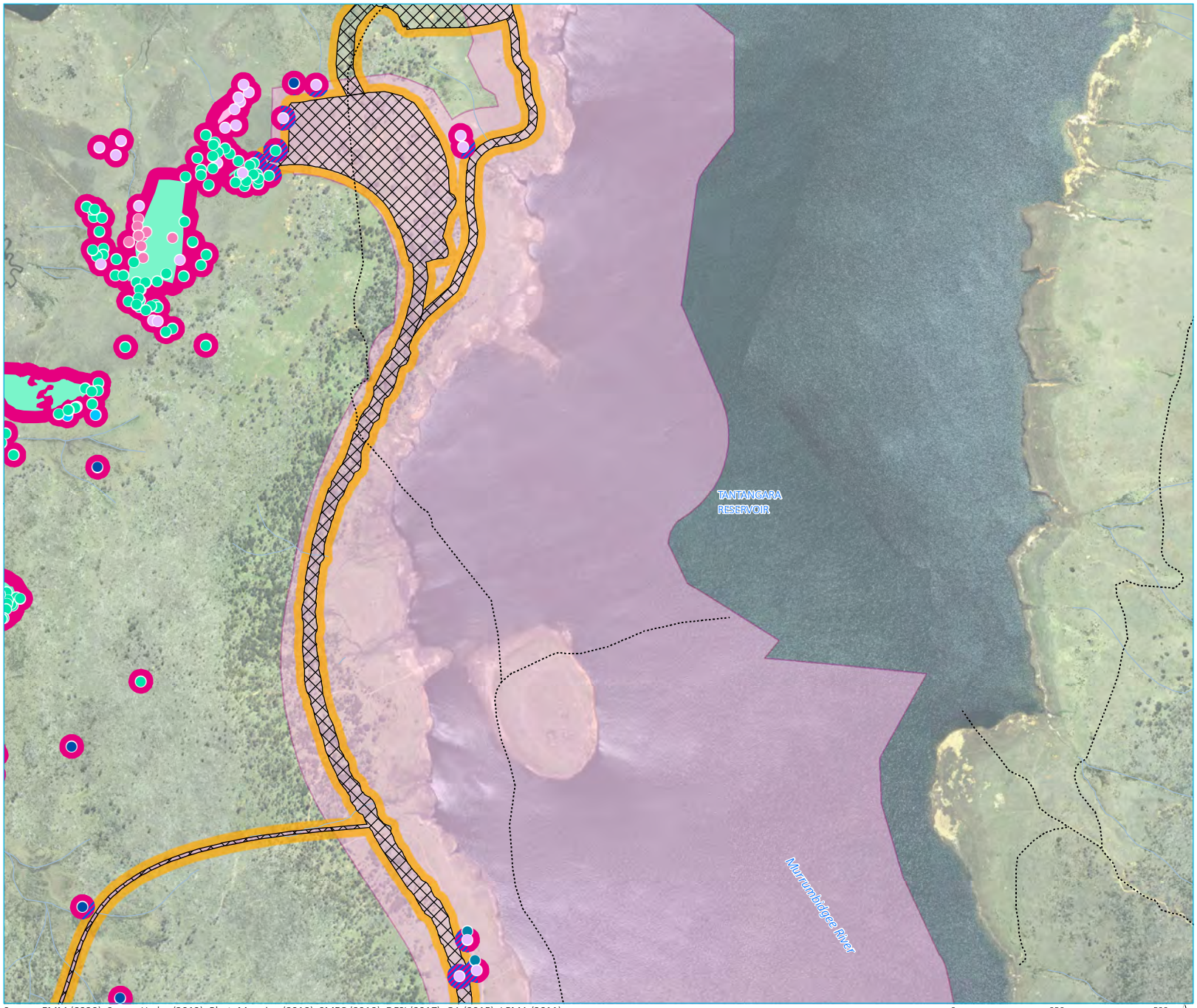
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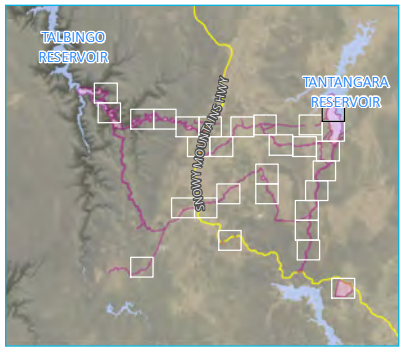
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.14

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Clover Glycine
- Mauve Burr-daisy

Threatened flora (point)

- Clover Glycine
- Kiandra Leek Orchid
- Leafy Anchor Plant
- Max Mueller's Burr-daisy
- Mauve Burr-daisy
- Monaro Golden Daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

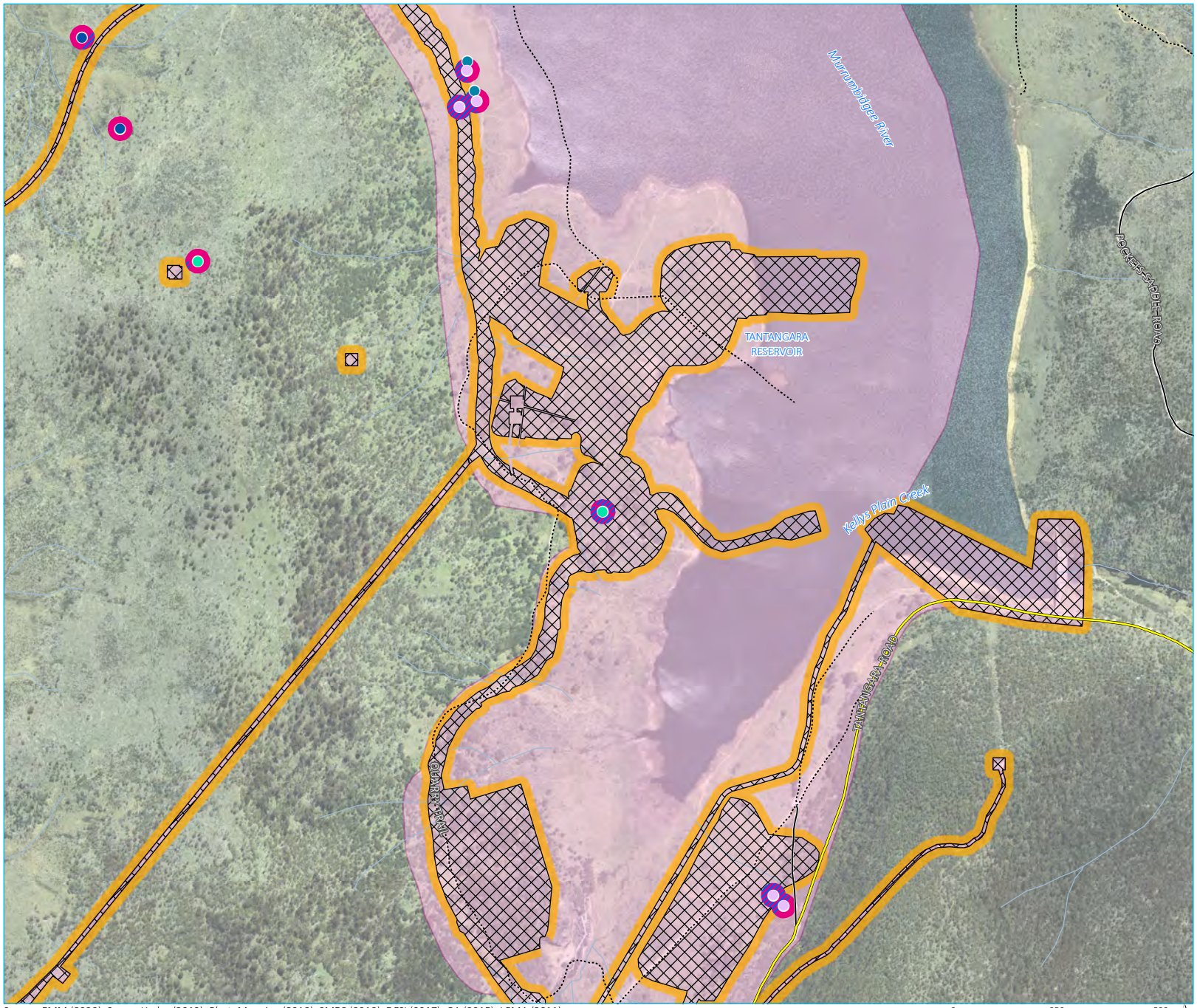
GDA 1994 MGA Zone 55

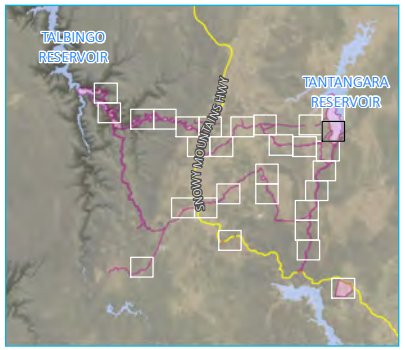
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.15





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Clover Glycine
- Kiandra Leek Orchid
- Leafy Anchor Plant
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

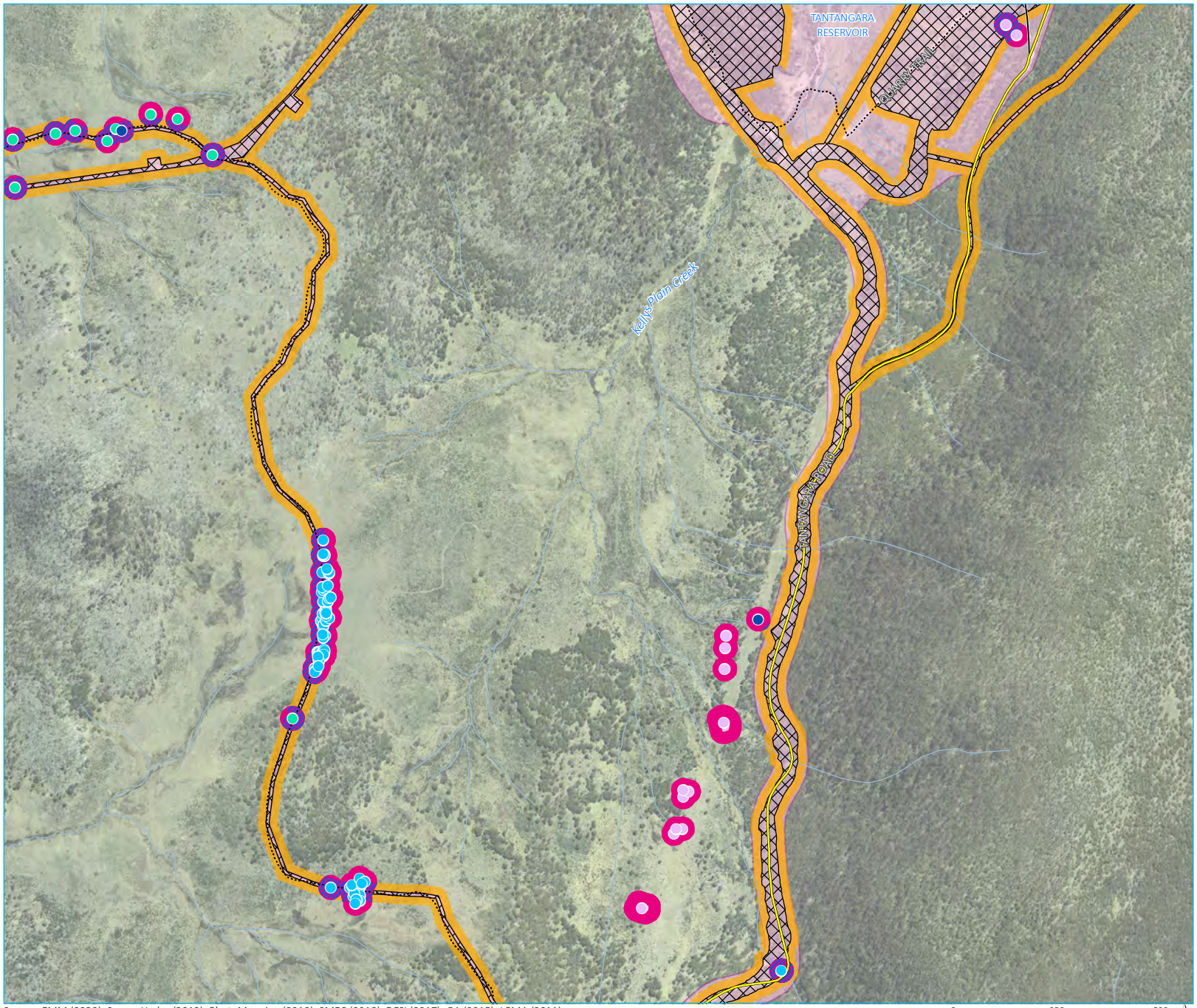
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.16

snowy 2.0

EMM creating opportunities



KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Clover Glycine

Threatened flora (point)

- Clover Glycine
- Kiandra Leek Orchid
- Max Mueller's Burr-daisy
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

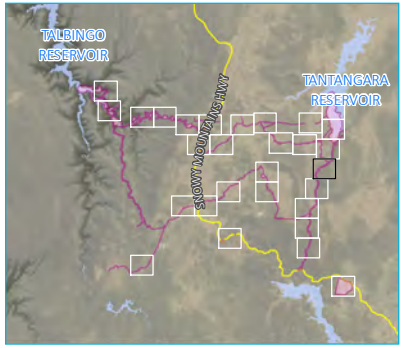
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\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR007_FloraSurveyResults_20200206_DDP_02.mxd 20/02/2020

Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.17





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Clover Glycine
- Mauve Burr-daisy

Threatened flora (point)

- Clover Glycine
- Kiandra Leek Orchid
- Max Mueller's Burr-daisy
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Flora survey results

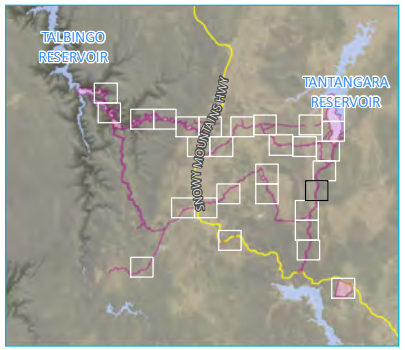
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.18

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Mauve Burr-daisy
- *Pterostylis alpina*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

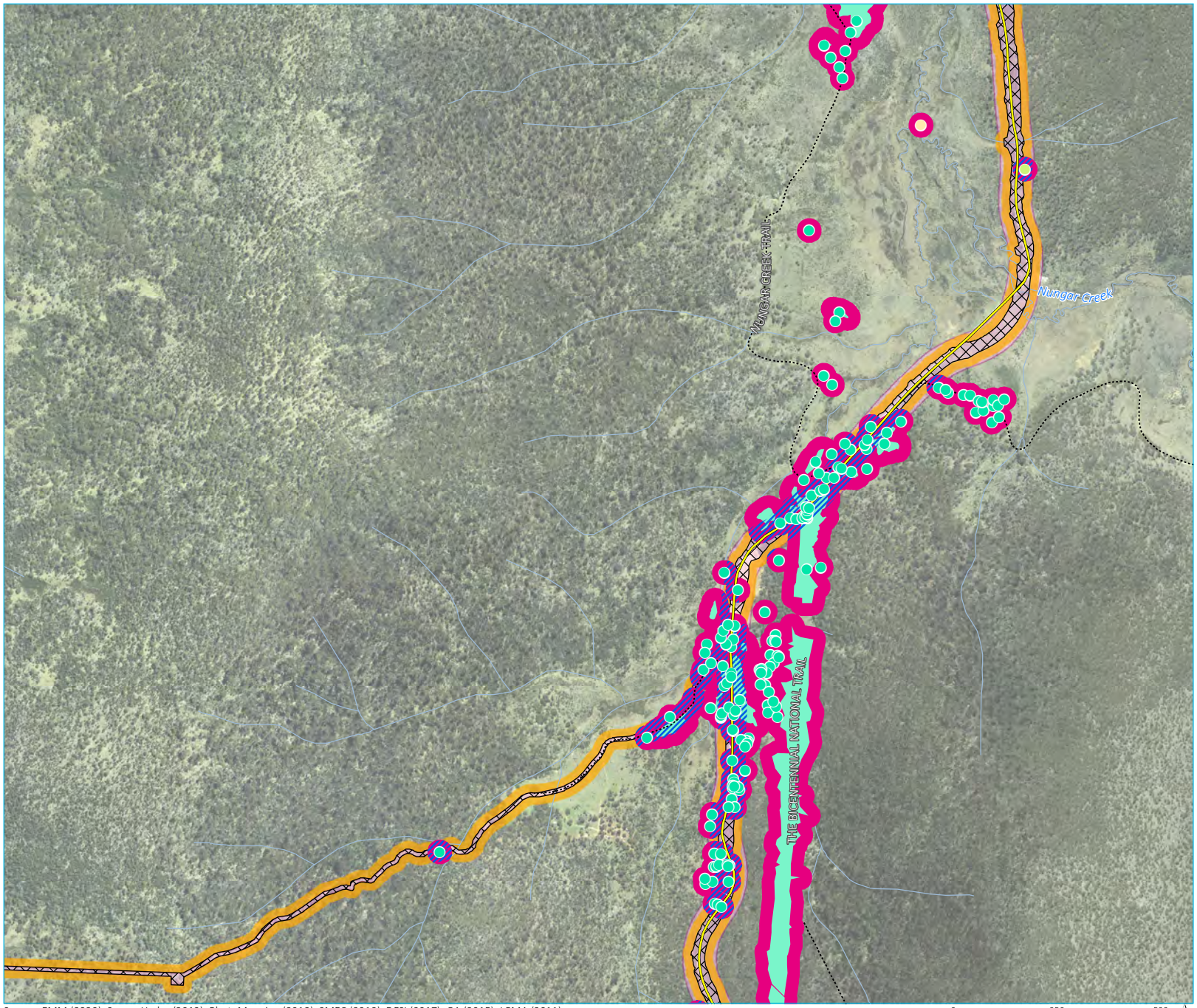
Flora survey results

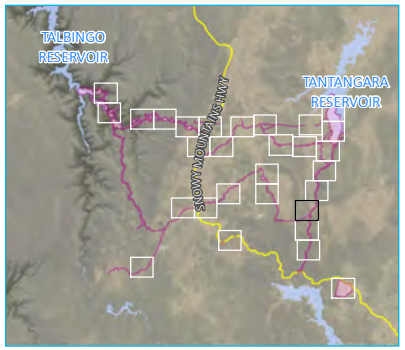
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.19

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Mauve Burr-daisy
- Raleigh Sedge
- *Pterostylis alpina*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

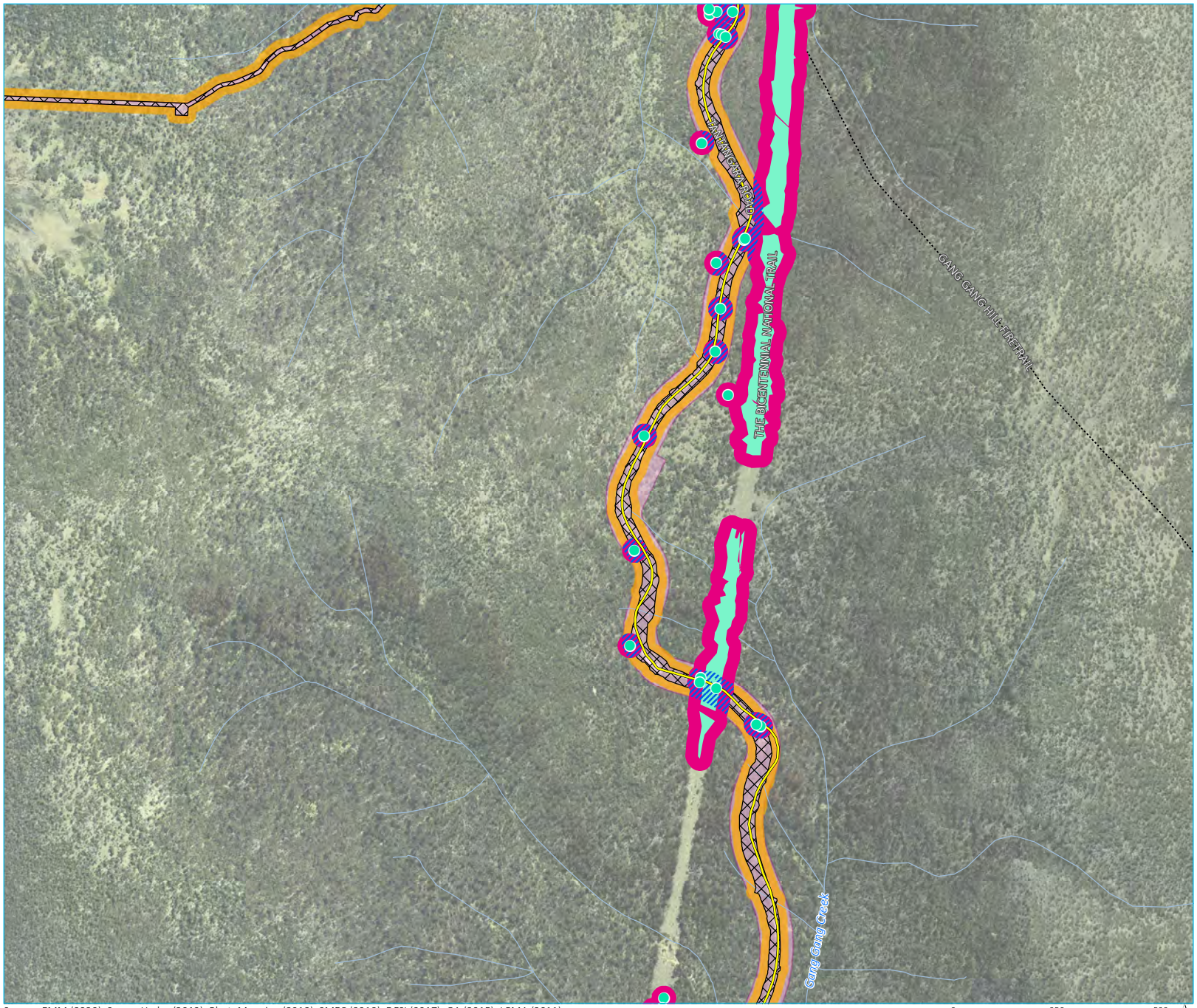
GDA 1994 MGA Zone 55

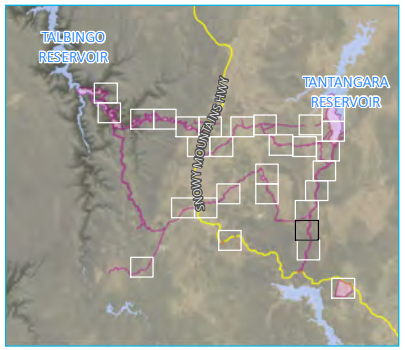
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.20





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR007_FloraSurveyResults_20200206_DDP_02.mxd 20/02/2020

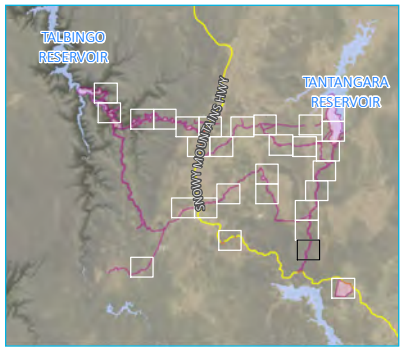
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.21

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Mauve Burr-daisy
- *Thelymitra alpicola*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Flora survey results

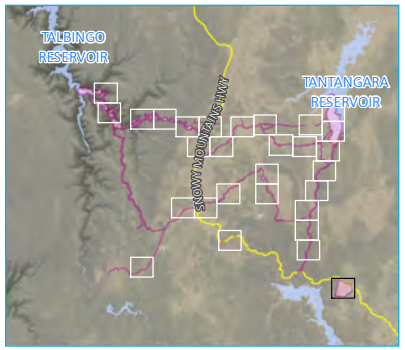
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.22

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR007_FloraSurveyResults_20200206_DDP_02.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Hoary Sunray
- Mauve Burr-daisy

Flora survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

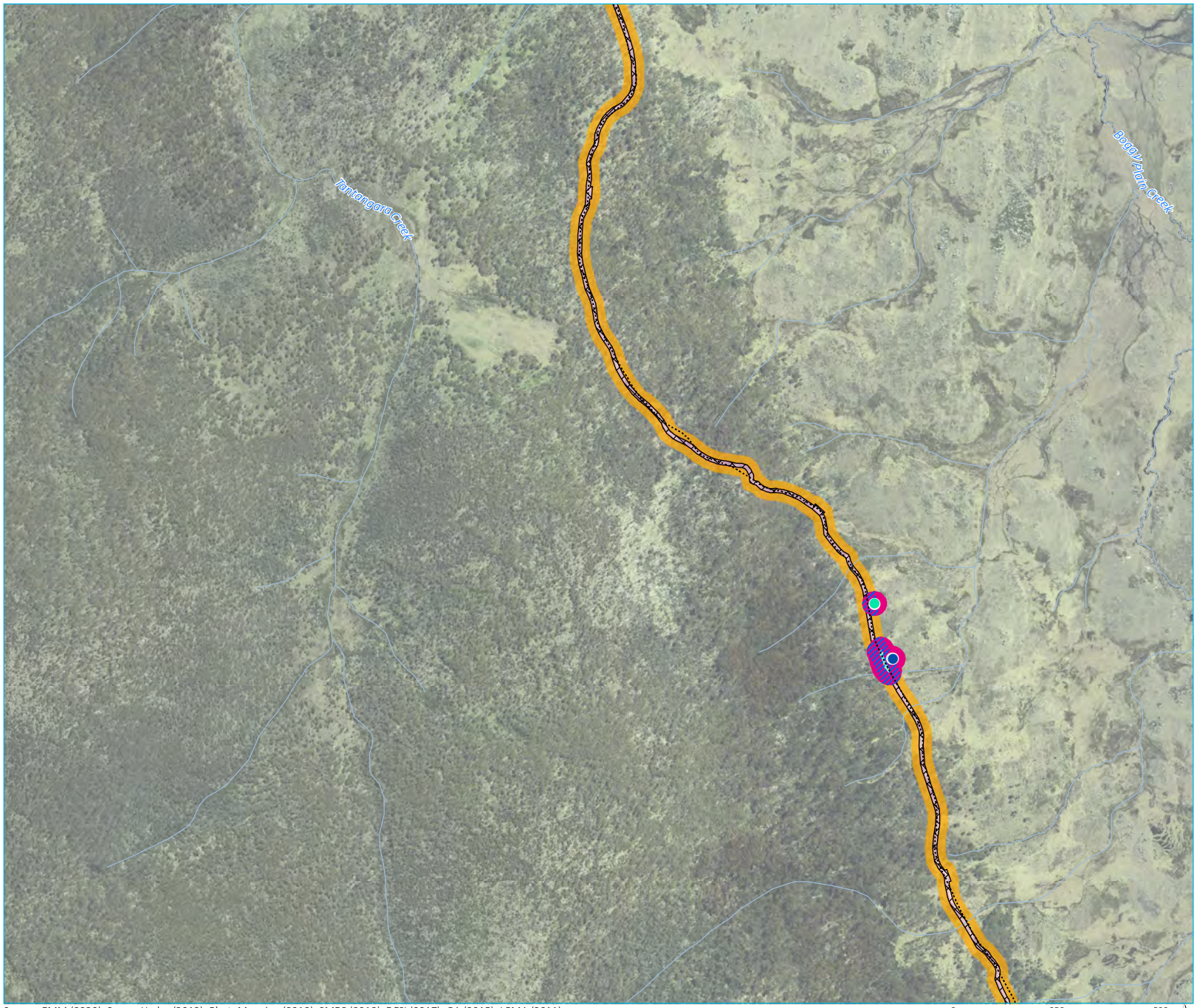
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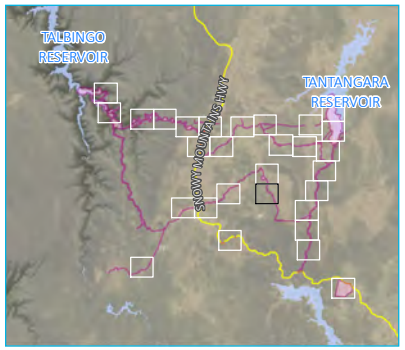
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.23

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Mauve Burr-daisy

Threatened flora (point)

- Kiandra Leek Orchid
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Flora survey results

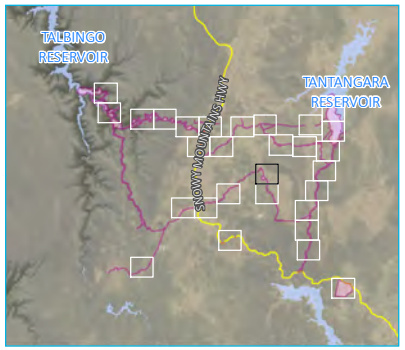
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.24

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (polygon)

- Leafy Anchor Plant
- Mauve Burr-daisy

Threatened flora (point)

- Clover Glycine
- Kiandra Leek Orchid
- Leafy Anchor Plant
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

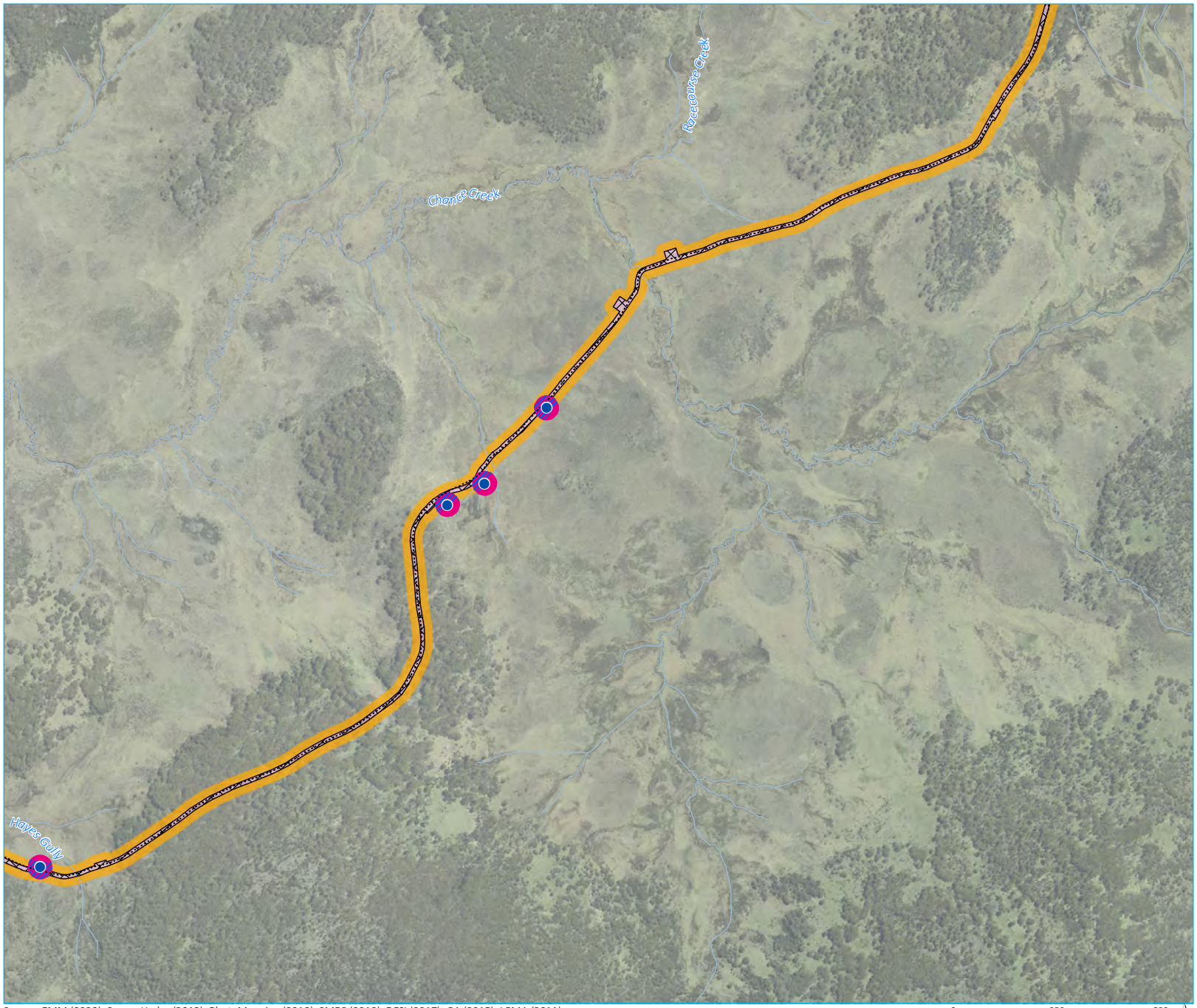
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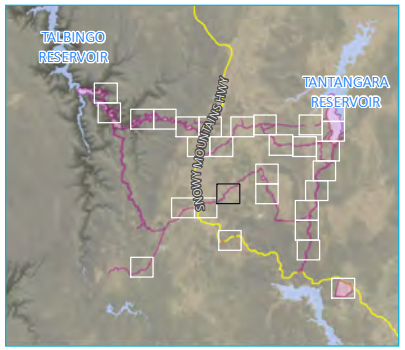
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.25

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Kiandra Leek Orchid

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

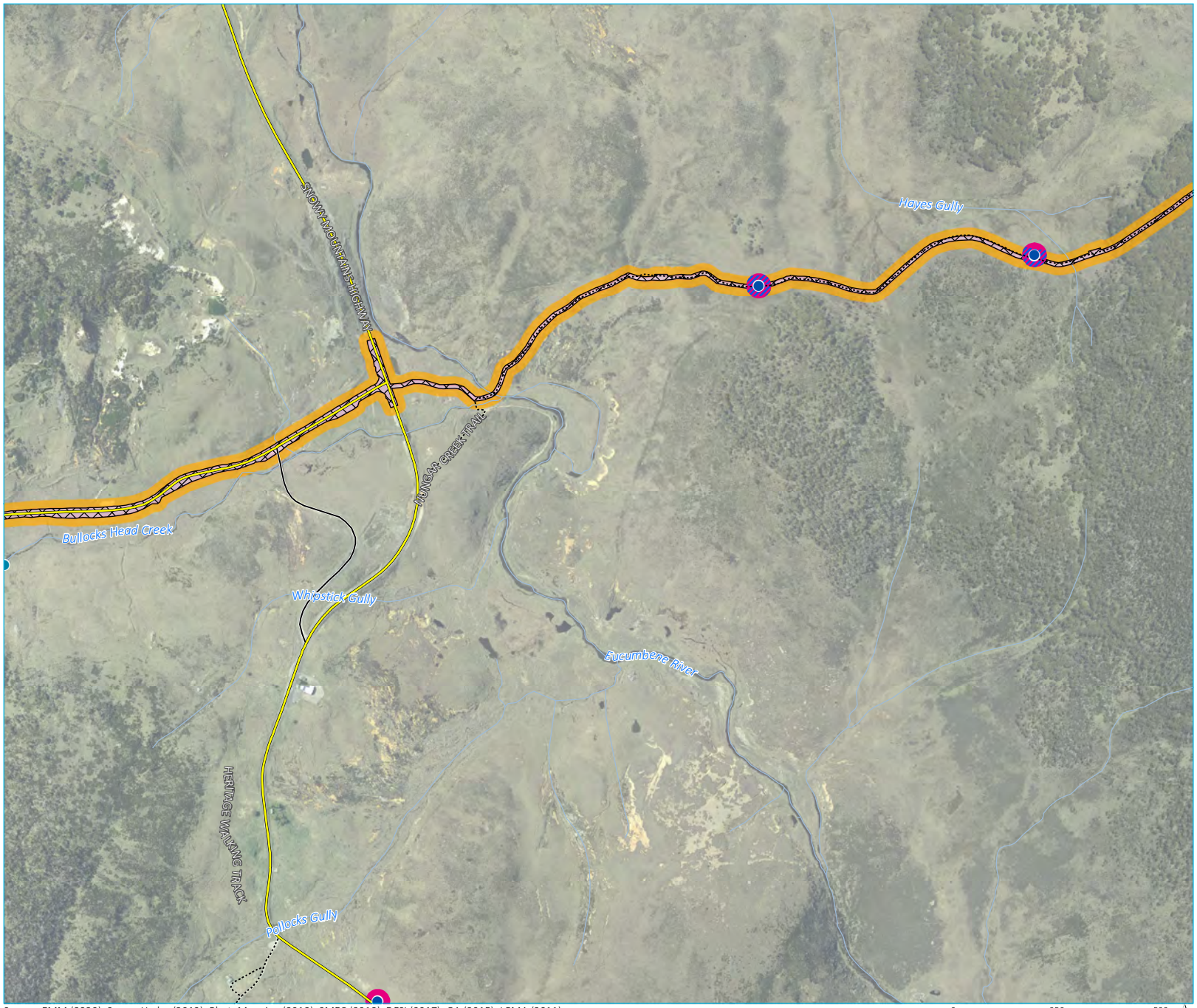
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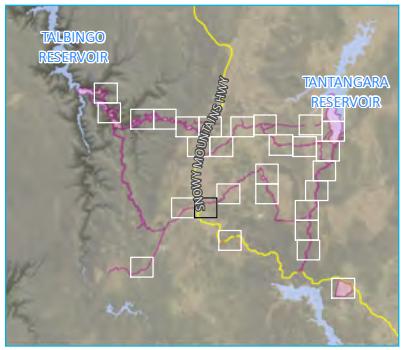
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.26

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- Kiandra Leek Orchid
- Leafy Anchor Plant

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Flora survey results

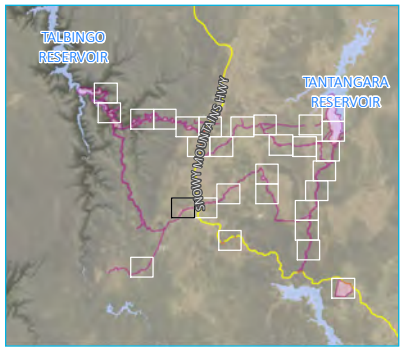
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.4.27

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened flora (point)

- Leafy Anchor Plant

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR007_FloraSurveyResults_20200206_DDP_02.mxd 20/02/2020

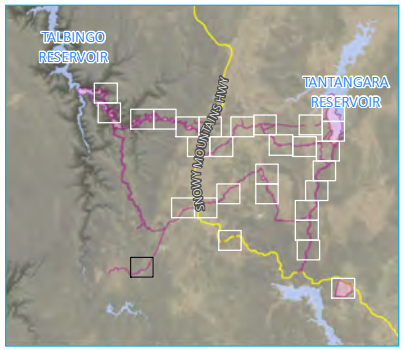
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.28

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened flora species polygon
- Threatened species habitat

Threatened flora (point)

- *Thelymitra alpicola*

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

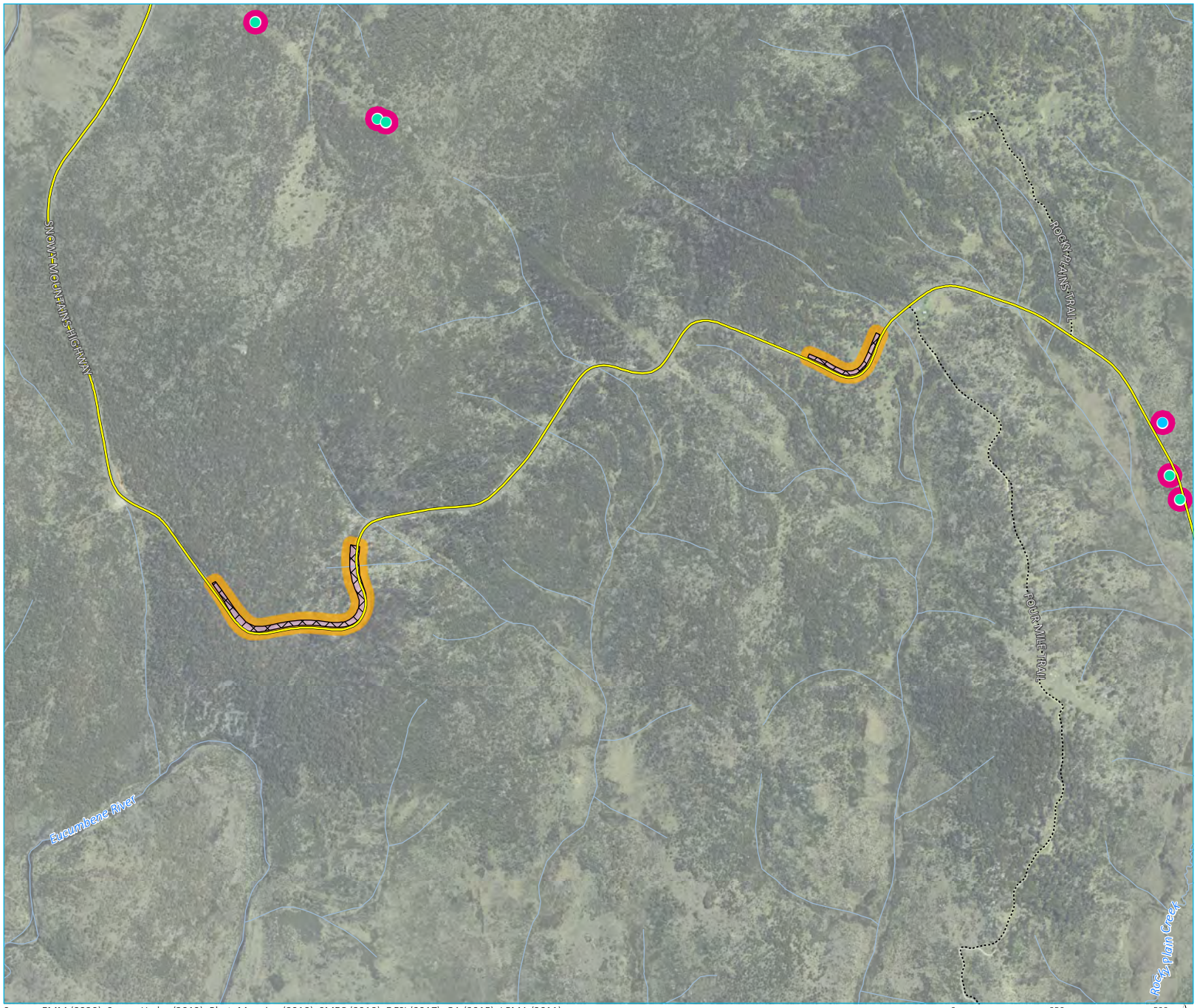
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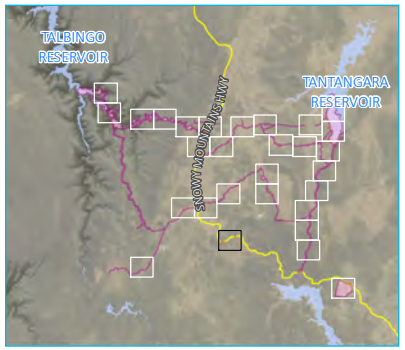
Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.29

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Threatened species habitat

Threatened flora (point)

- Max Mueller's Burr-daisy
- Mauve Burr-daisy

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

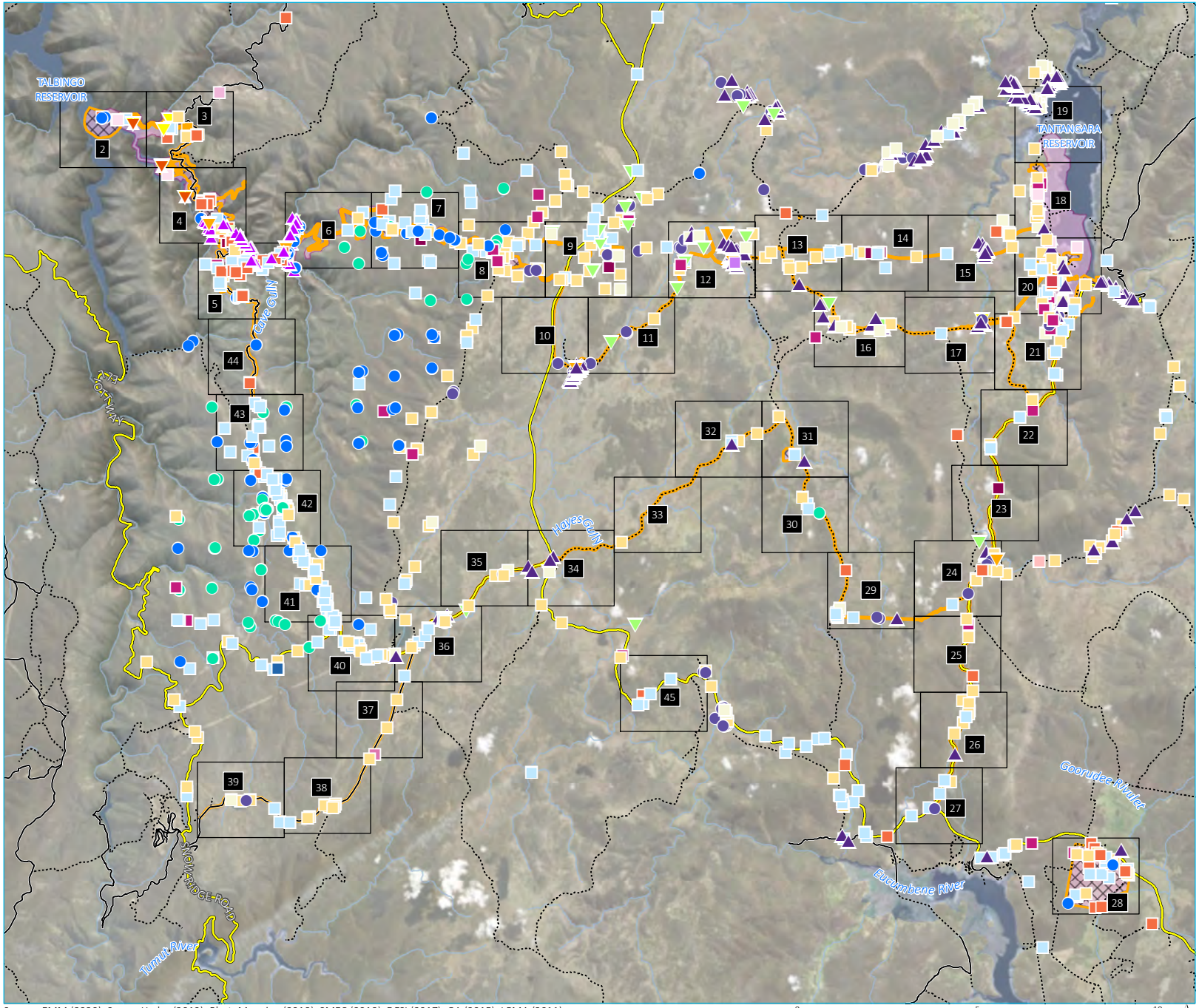
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Flora survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.4.30

snowy 2.0

EMM creating opportunities



KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Murray Crayfish
- Alpine Tree Frog
- Booroolong Frog
- Broad-toothed Rat
- Eastern Pygmy-possum
- Smoky Mouse
- Spotted-tailed Quoll
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis
- Brown Treecreeper
- Diamond Firetail
- Dusky Woodswallow
- White-throated Needletail
- Flame Robin
- Turquoise Parrot
- Powerful Owl
- Masked Owl
- Latham's Snipe
- Gang-gang Cockatoo
- Glossy Black-Cockatoo
- Olive Whistler
- Pink Robin
- Satin Flycatcher
- Scarlet Robin
- Square-tailed Kite
- Varied Sittella
- White-bellied Sea-Eagle
- Little Eagle
- White-fronted Chat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

N

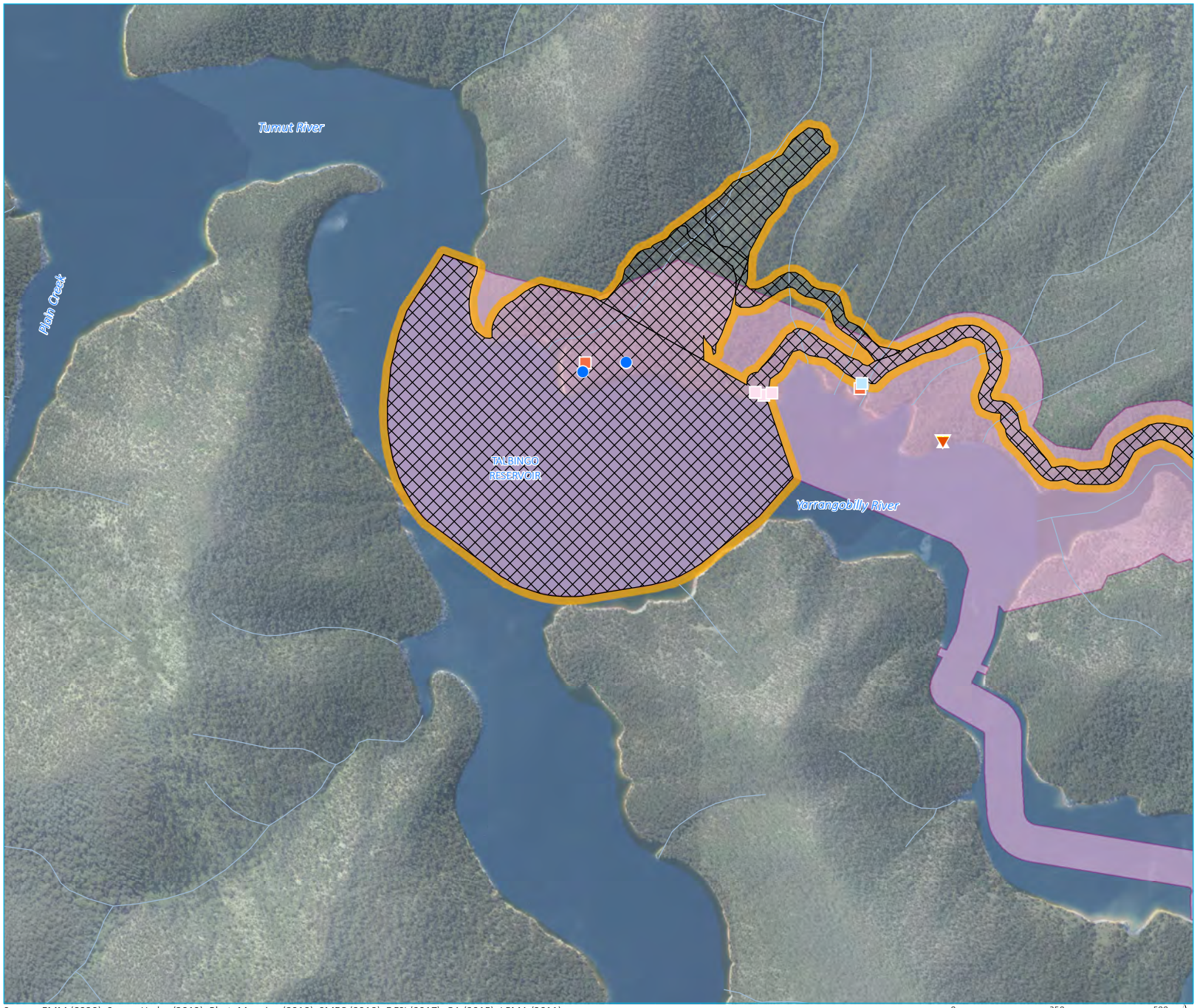
Threatened fauna overview - page index

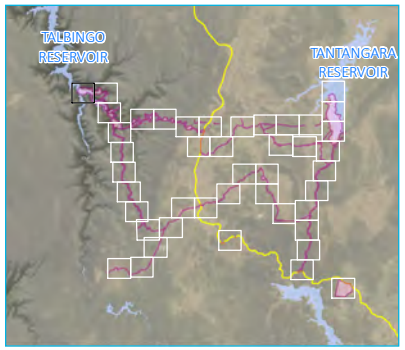
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.1

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Pygmy-possum
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis
- Dusky Woodswallow
- Gang-gang Cockatoo
- White-bellied Sea-Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

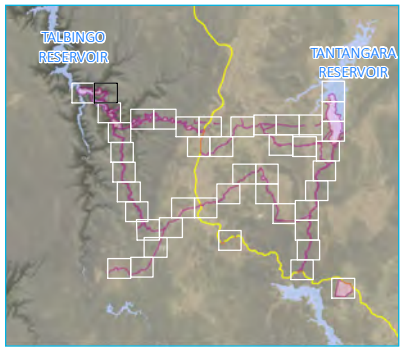
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.2





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis
- Dusky Woodswallow
- Flame Robin
- Turquoise Parrot
- Gang-gang Cockatoo
- Varied Sittella

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

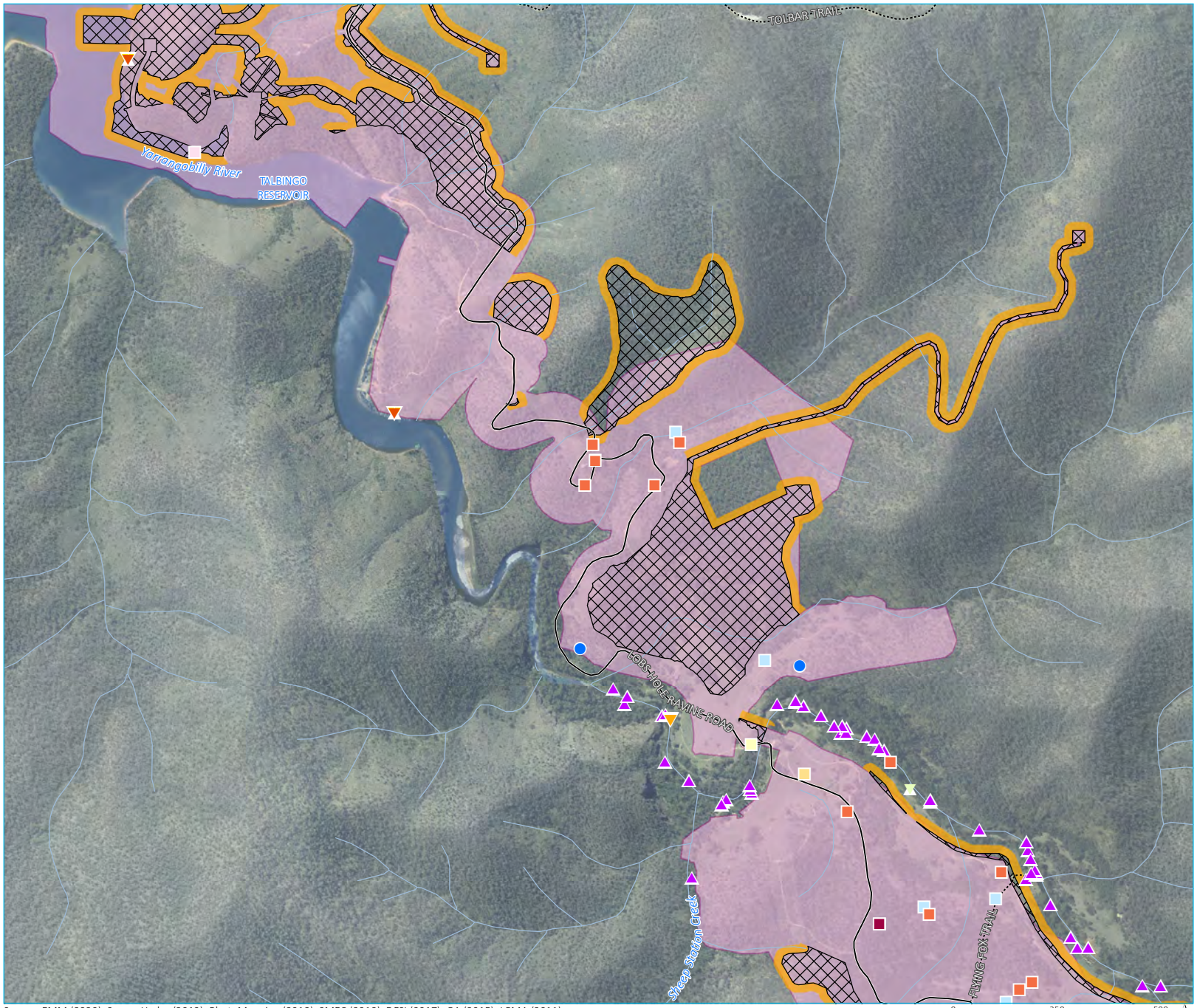
Threatened fauna overview

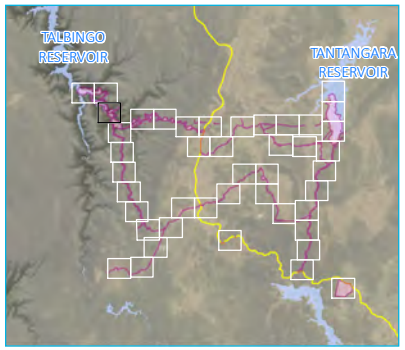
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.3

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR008_FaunaSurveyResults_20200206_DDP_01.mxd 21/02/2020





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Murray Crayfish
- Booroolong Frog
- Eastern Pygmy-possum
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis
- Brown Treecreeper
- Dusky Woodswallow
- Flame Robin
- Masked Owl
- Gang-gang Cockatoo
- White-bellied Sea-Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

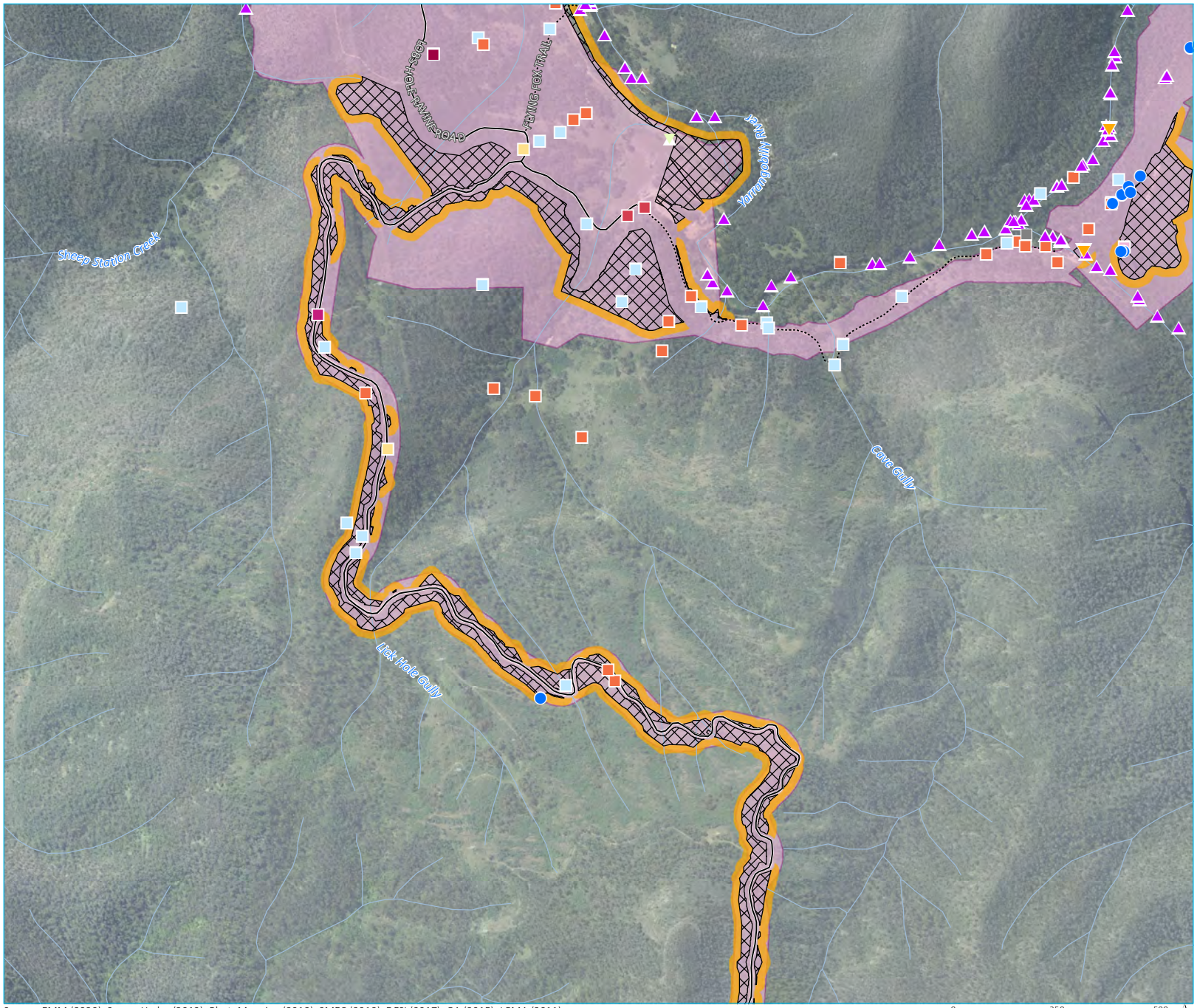
Threatened fauna overview

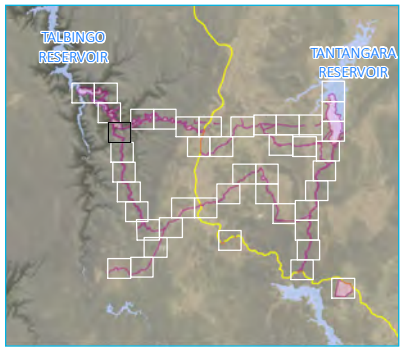
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.4

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Murray Crayfish
- Booroolong Frog
- Eastern Pygmy-possum
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Brown Treecreeper
- Diamond Firetail
- Dusky Woodswallow
- Flame Robin
- Powerful Owl
- Gang-gang Cockatoo
- Scarlet Robin
- Varied Sittella

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

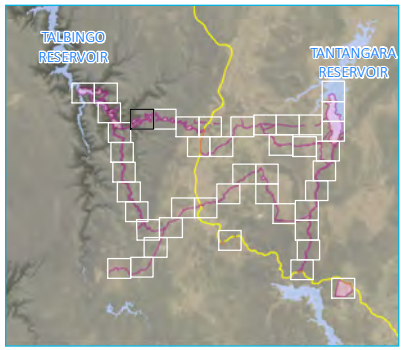
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.5

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Murray Crayfish
- Booroolong Frog
- Eastern Pygmy-possum
- Smoky Mouse
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Dusky Woodswallow
- Flame Robin
- Powerful Owl
- Gang-gang Cockatoo
- Varied Sittella

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

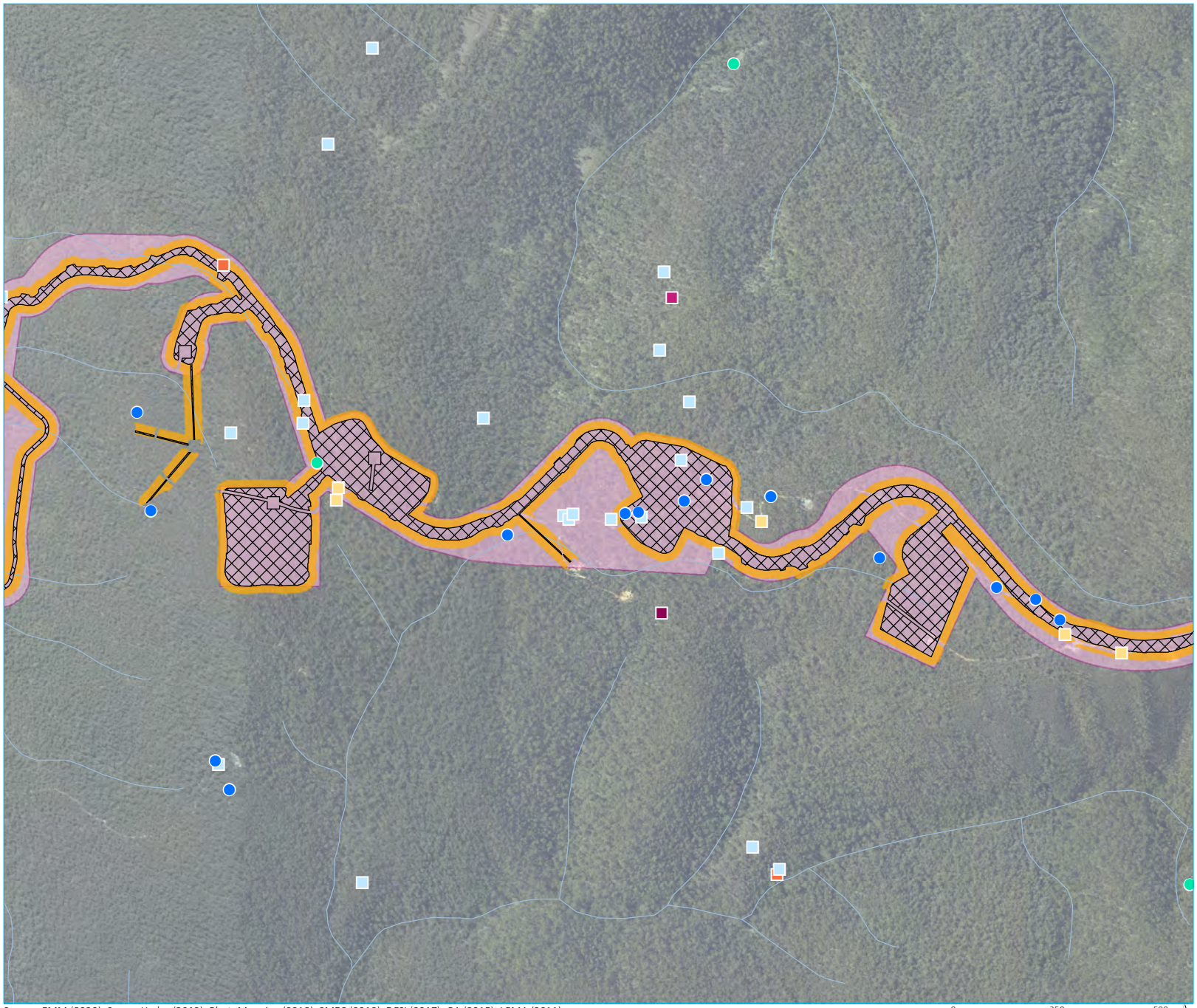
GDA 1994 MGA Zone 55

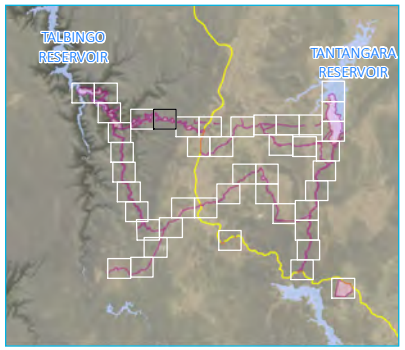
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.6





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Satin Flycatcher
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

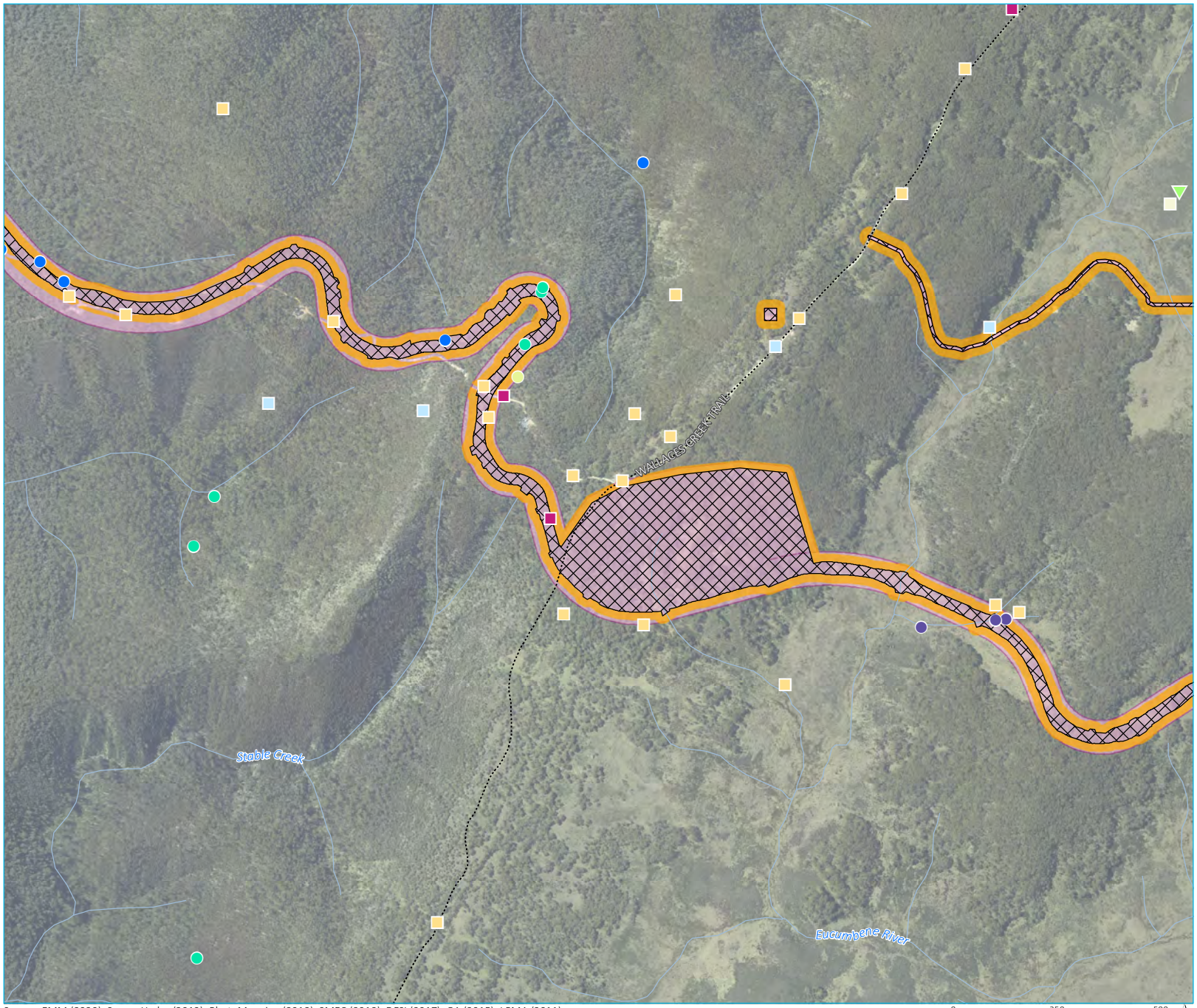
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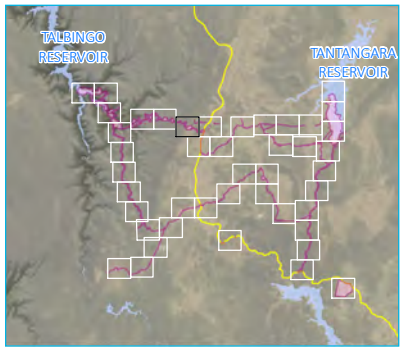
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.7

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Broad-toothed Rat
- Eastern Pygmy-possum
- Smoky Mouse
- Spotted-tailed Quoll
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

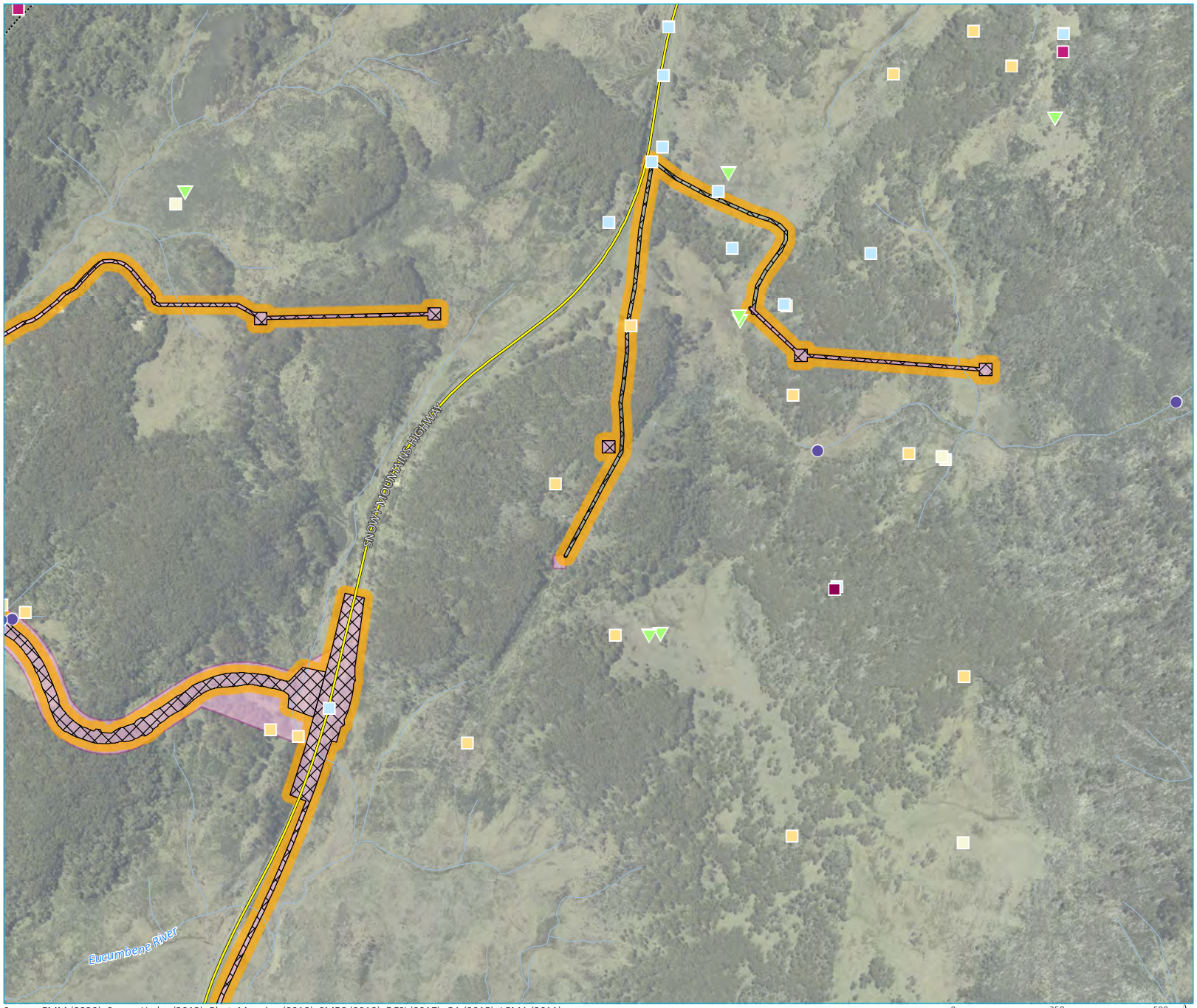
GDA 1994 MGA Zone 55

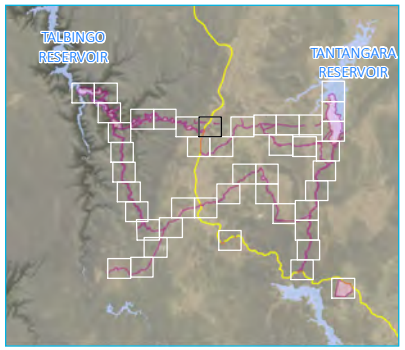
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.8





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Broad-toothed Rat
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Satin Flycatcher
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

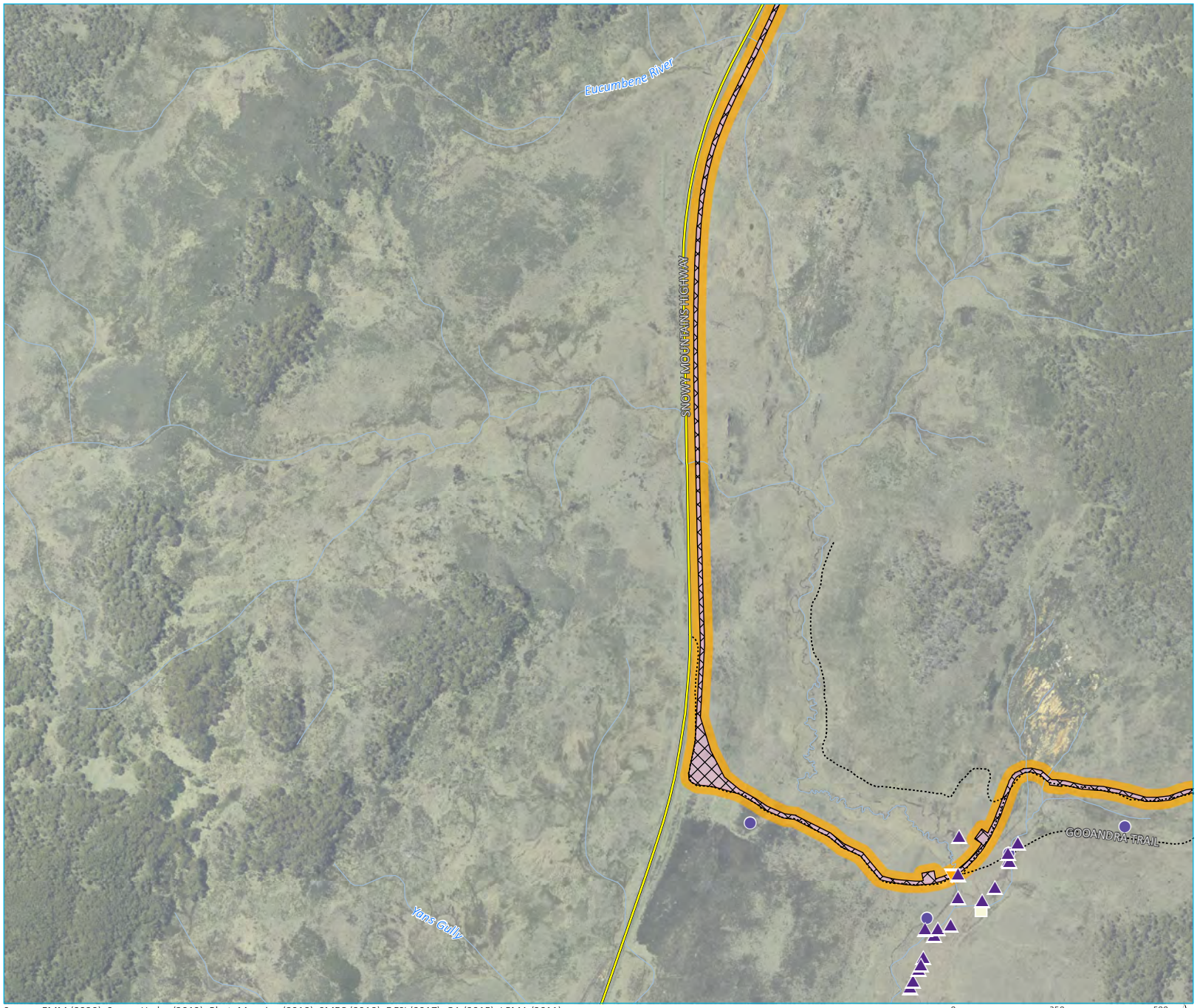
GDA 1994 MGA Zone 55

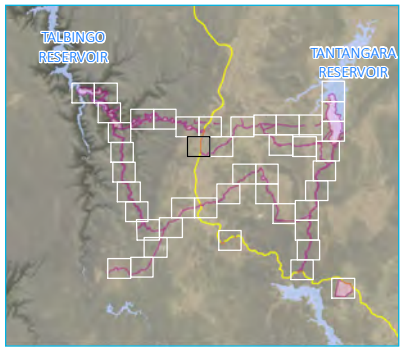
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.9





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Broad-toothed Rat
- Eastern False Pipistrelle
- Latham's Snipe

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

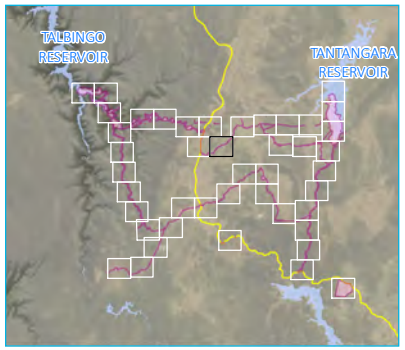
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.10

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Broad-toothed Rat
- Flame Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

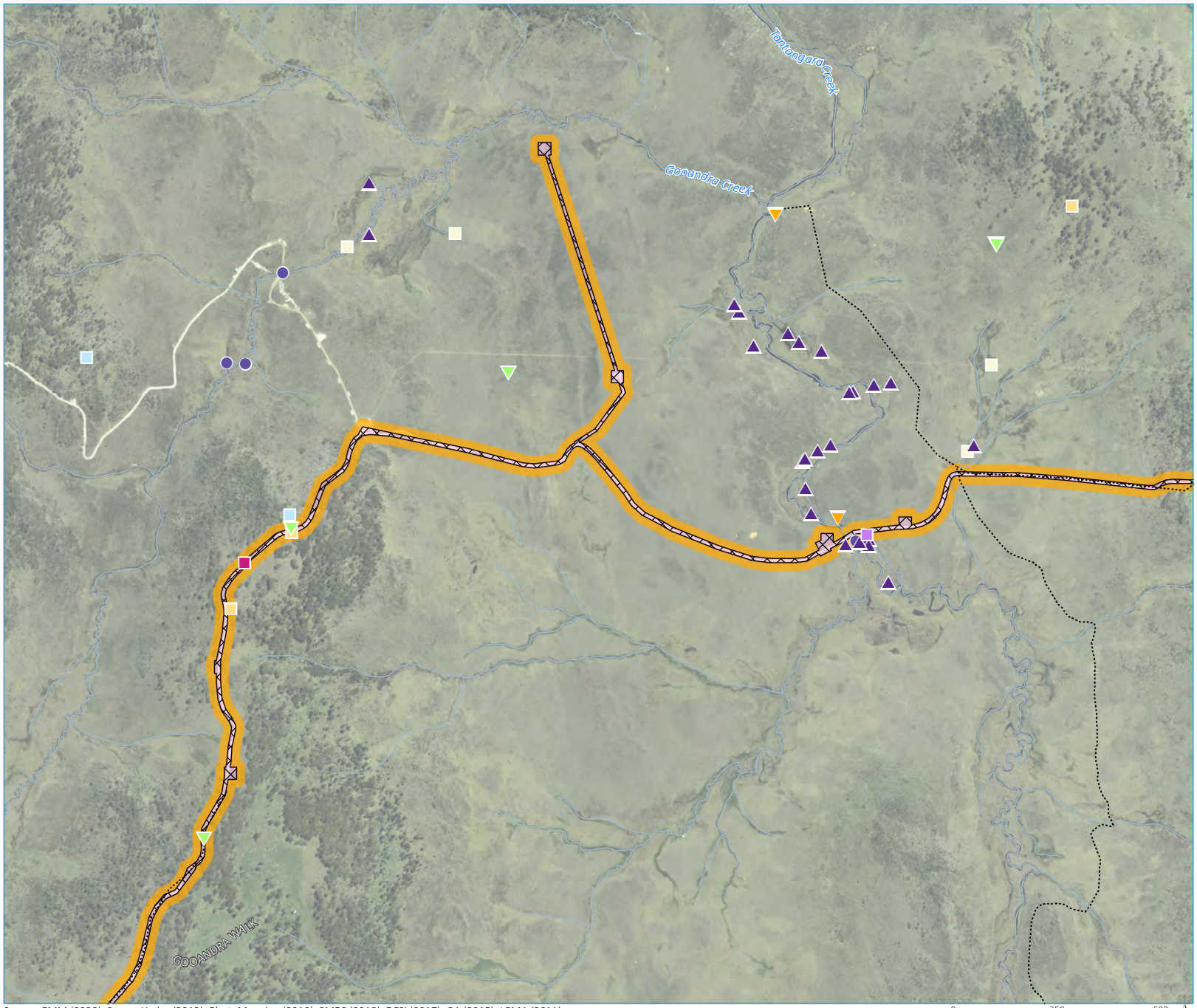
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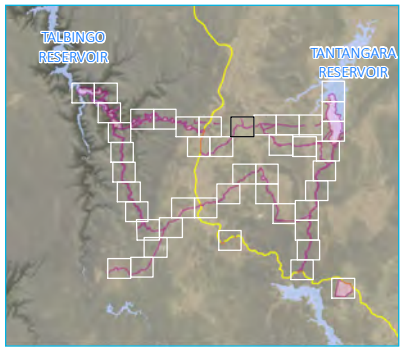
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.11

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Broad-toothed Rat
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Scarlet Robin
- Little Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

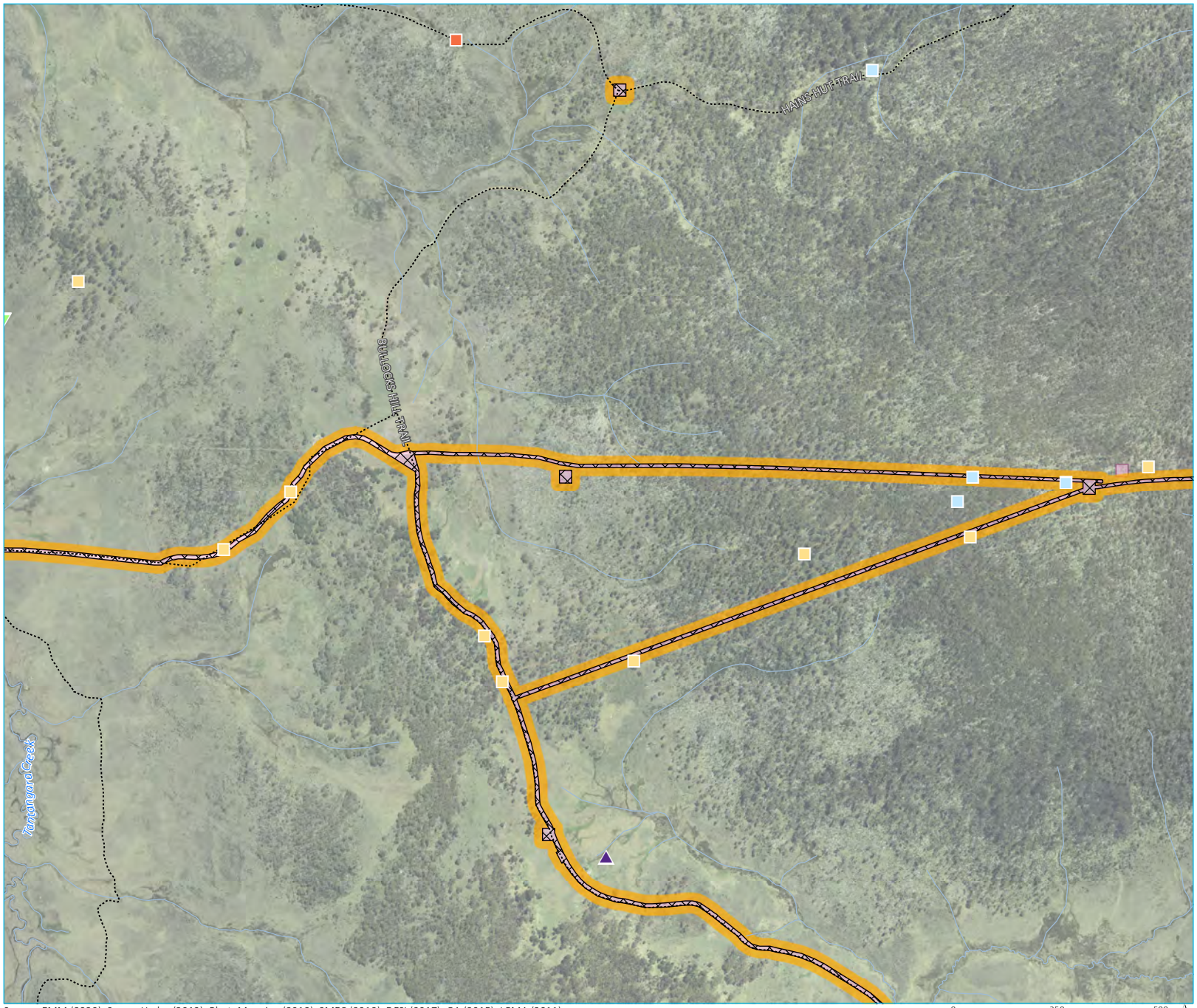
Threatened fauna overview

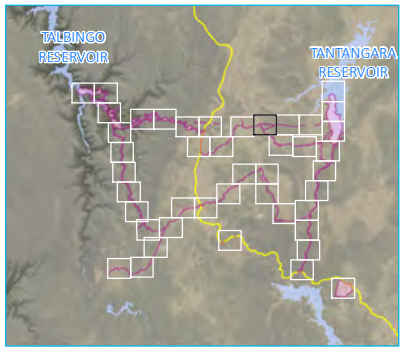
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.12

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Dusky Woodswallow
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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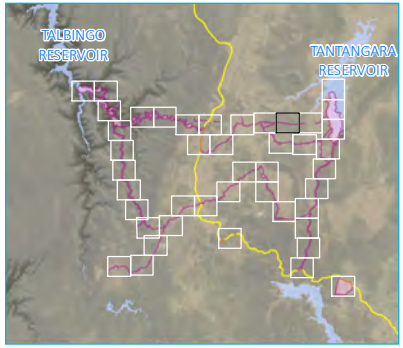
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.13

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Satin Flycatcher

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

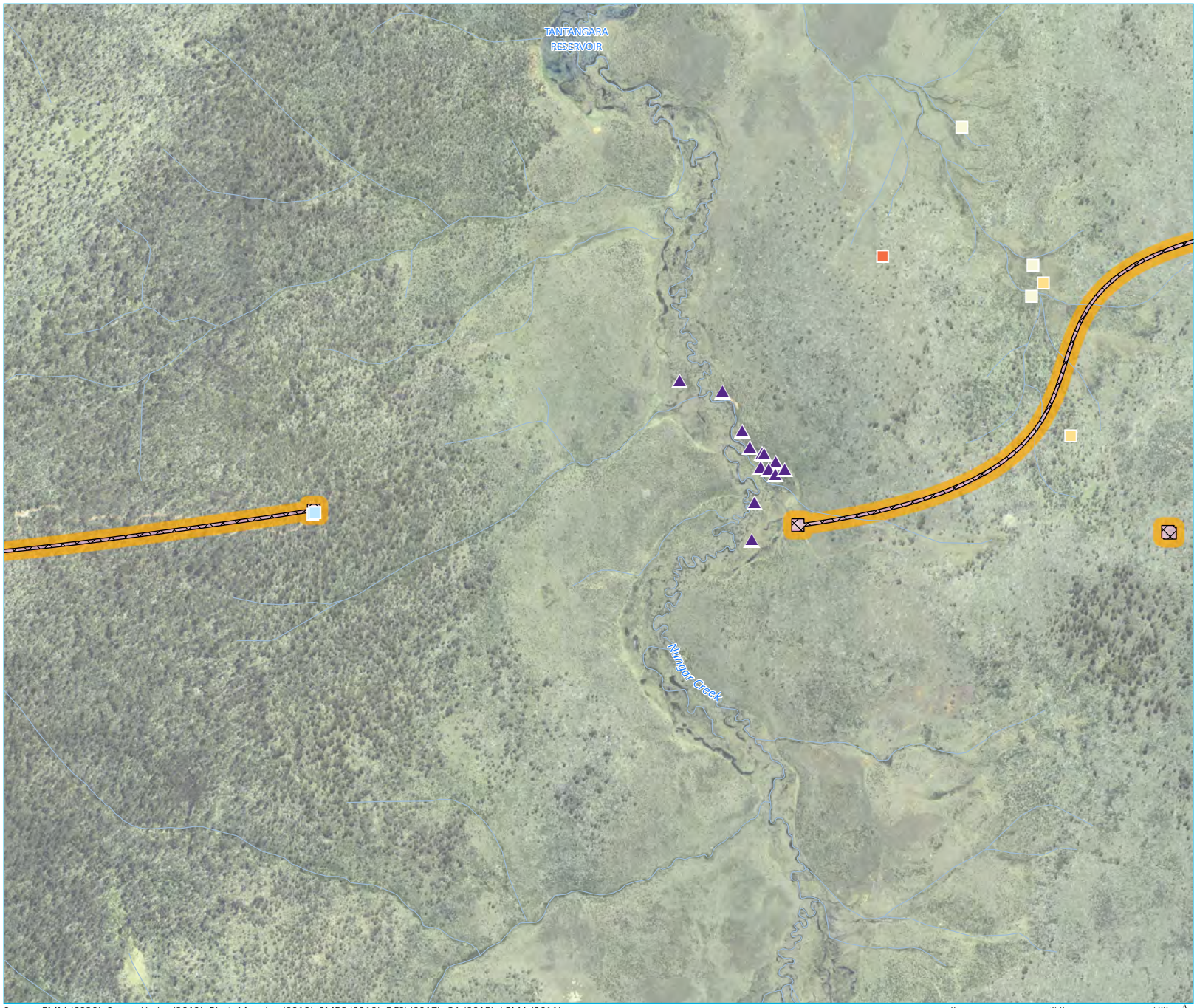
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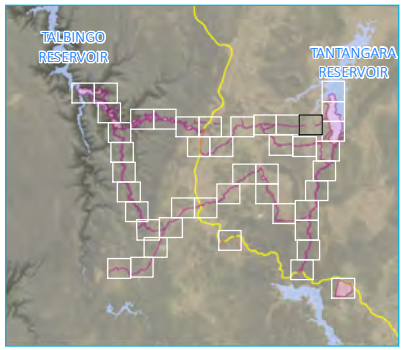
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.14

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Dusky Woodswallow
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

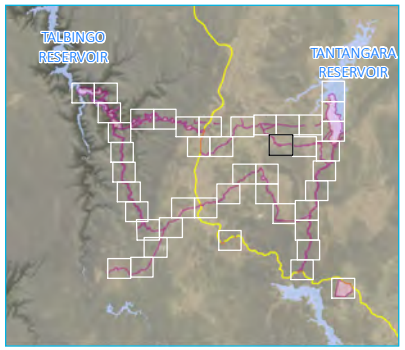
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.15

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Flame Robin
- Latham's Snipe
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

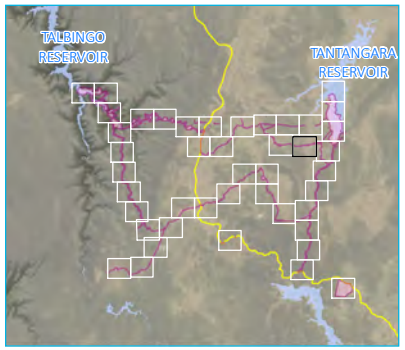
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.16





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Broad-toothed Rat
- Eastern Bentwing-bat
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

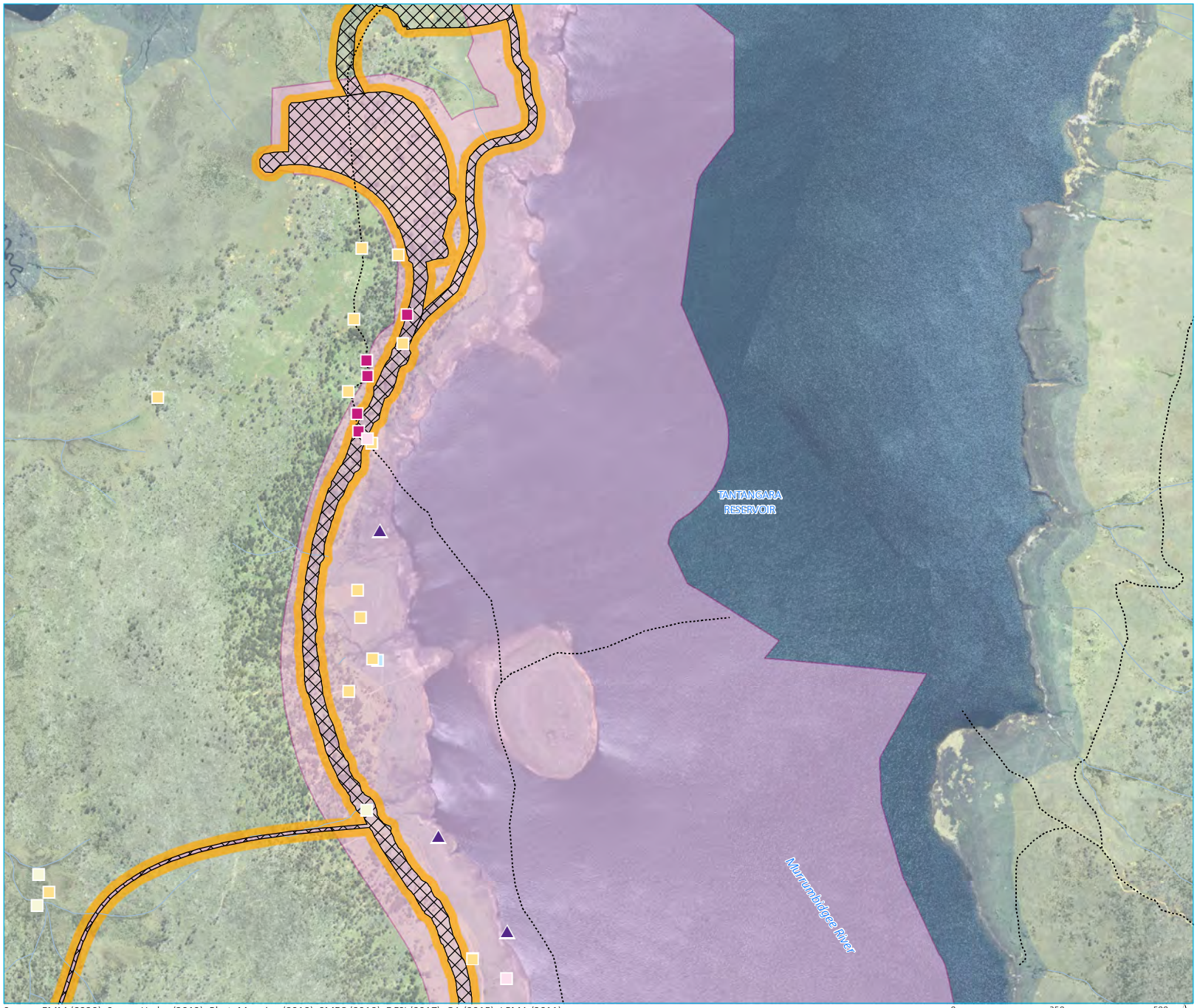
Threatened fauna overview

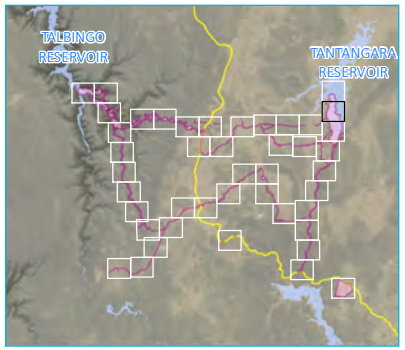
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.17

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Scarlet Robin
- White-bellied Sea-Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

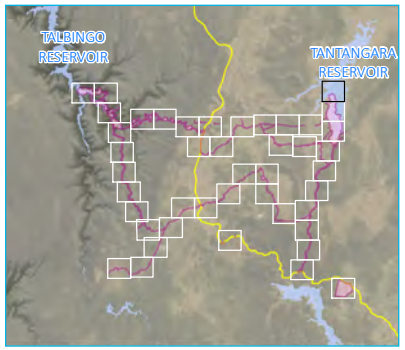
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.18

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Flame Robin
- Latham's Snipe

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

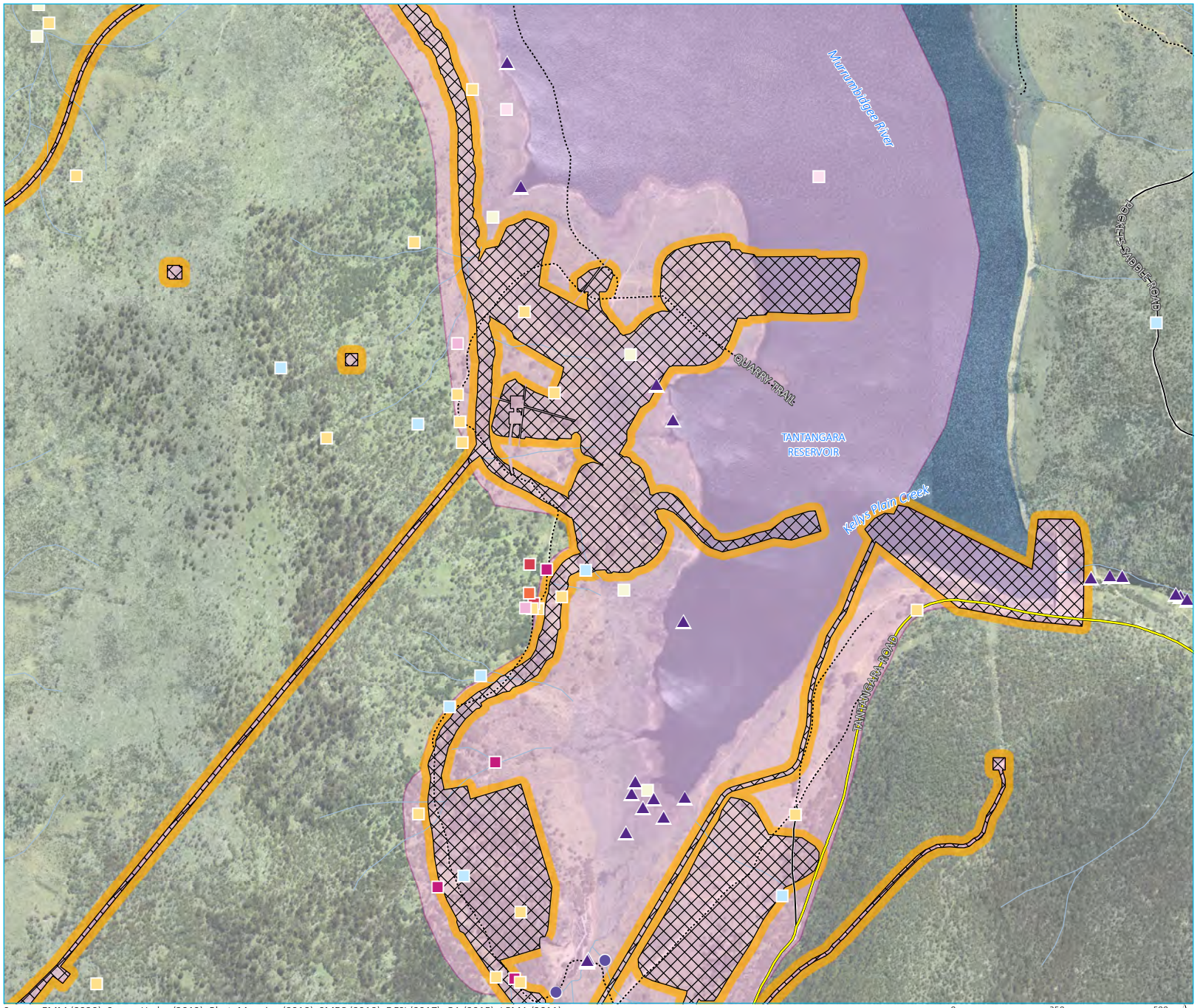
GDA 1994 MGA Zone 55

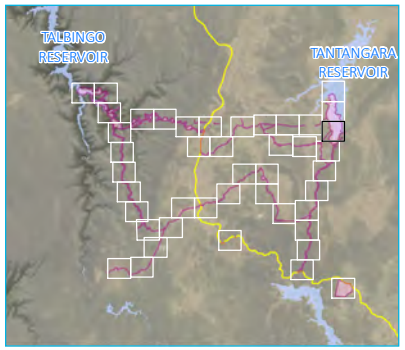
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.19





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Broad-toothed Rat
- Diamond Firetail
- Dusky Woodswallow
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Scarlet Robin
- Varied Sittella
- White-bellied Sea-Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

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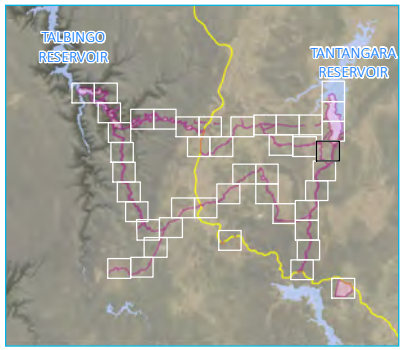
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.20

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Broad-toothed Rat
- Dusky Woodswallow
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

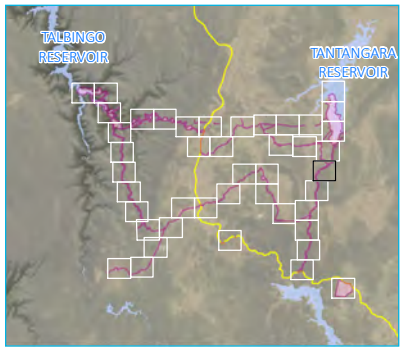
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.21





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

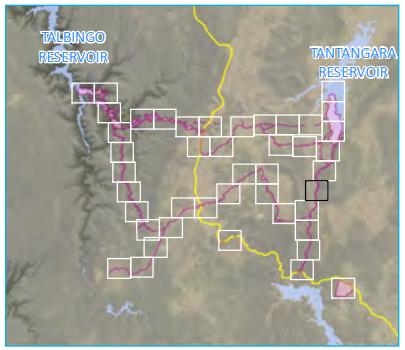
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.22





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Satin Flycatcher

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

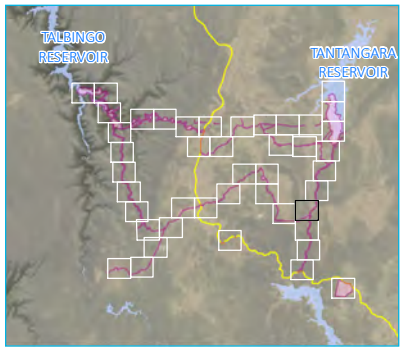
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.23

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Broad-toothed Rat
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

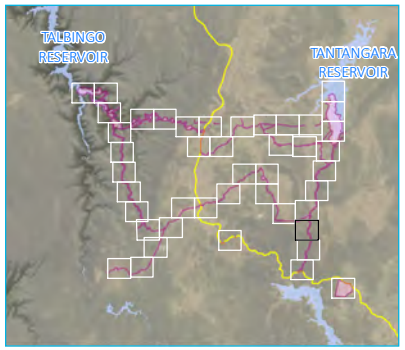
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.24





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

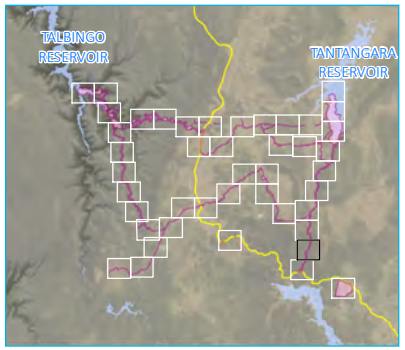
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.25





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

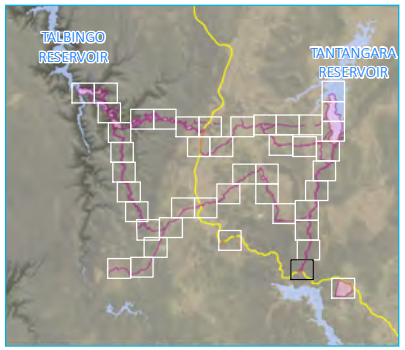
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.26





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Broad-toothed Rat
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

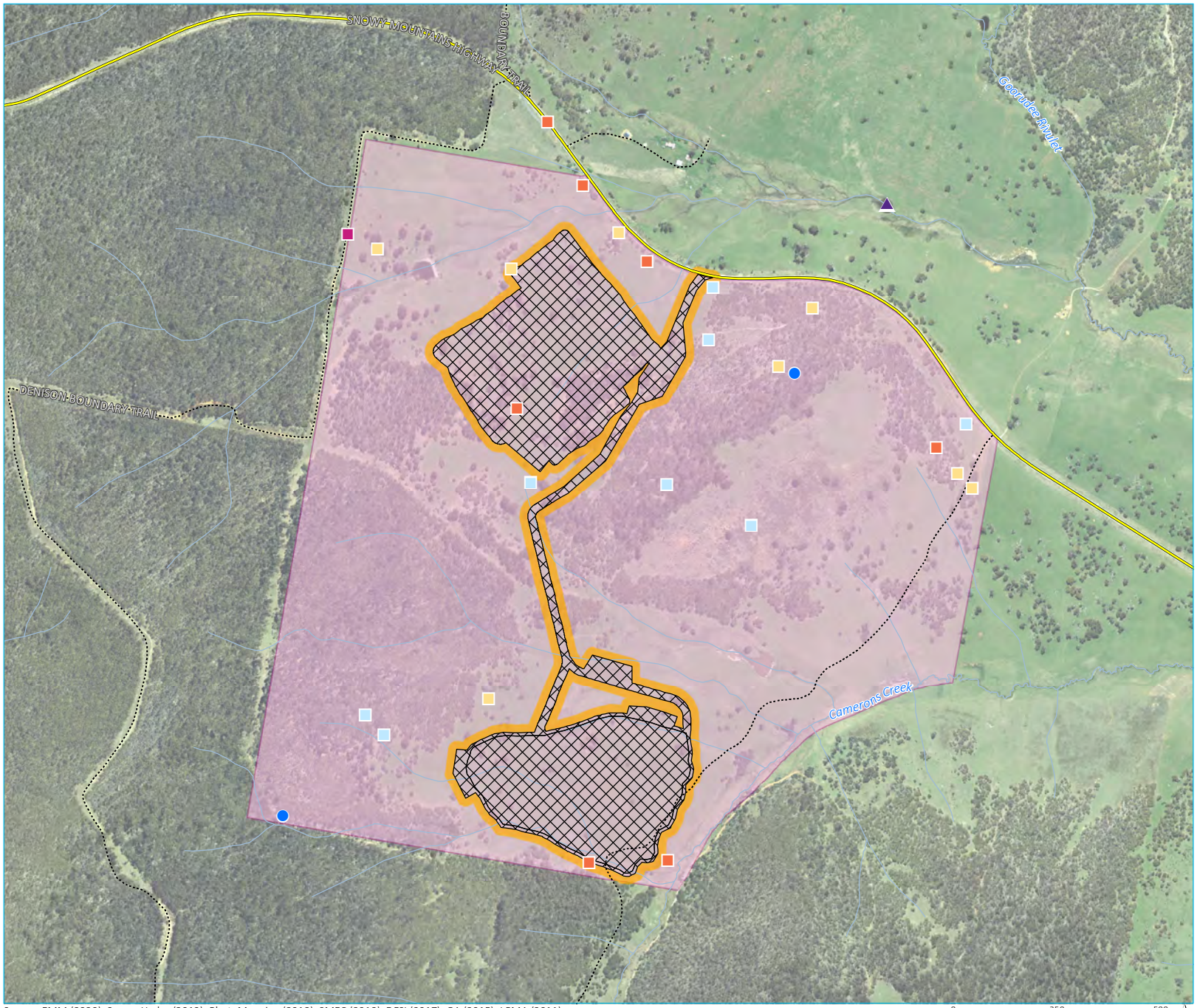
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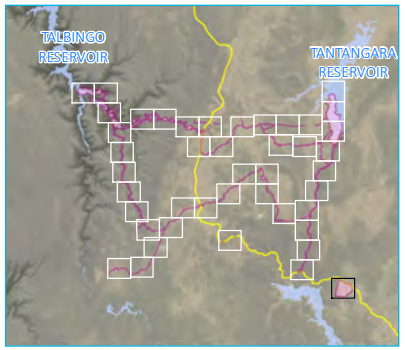
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.27

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Eastern Pygmy-possum
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR008_FaunaSurveyResults_20200206_DDP_01.mxd 21/02/2020

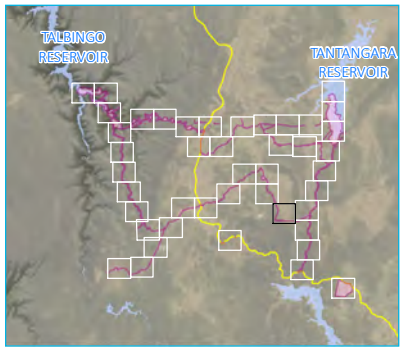
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.28

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Broad-toothed Rat
- Dusky Woodswallow
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

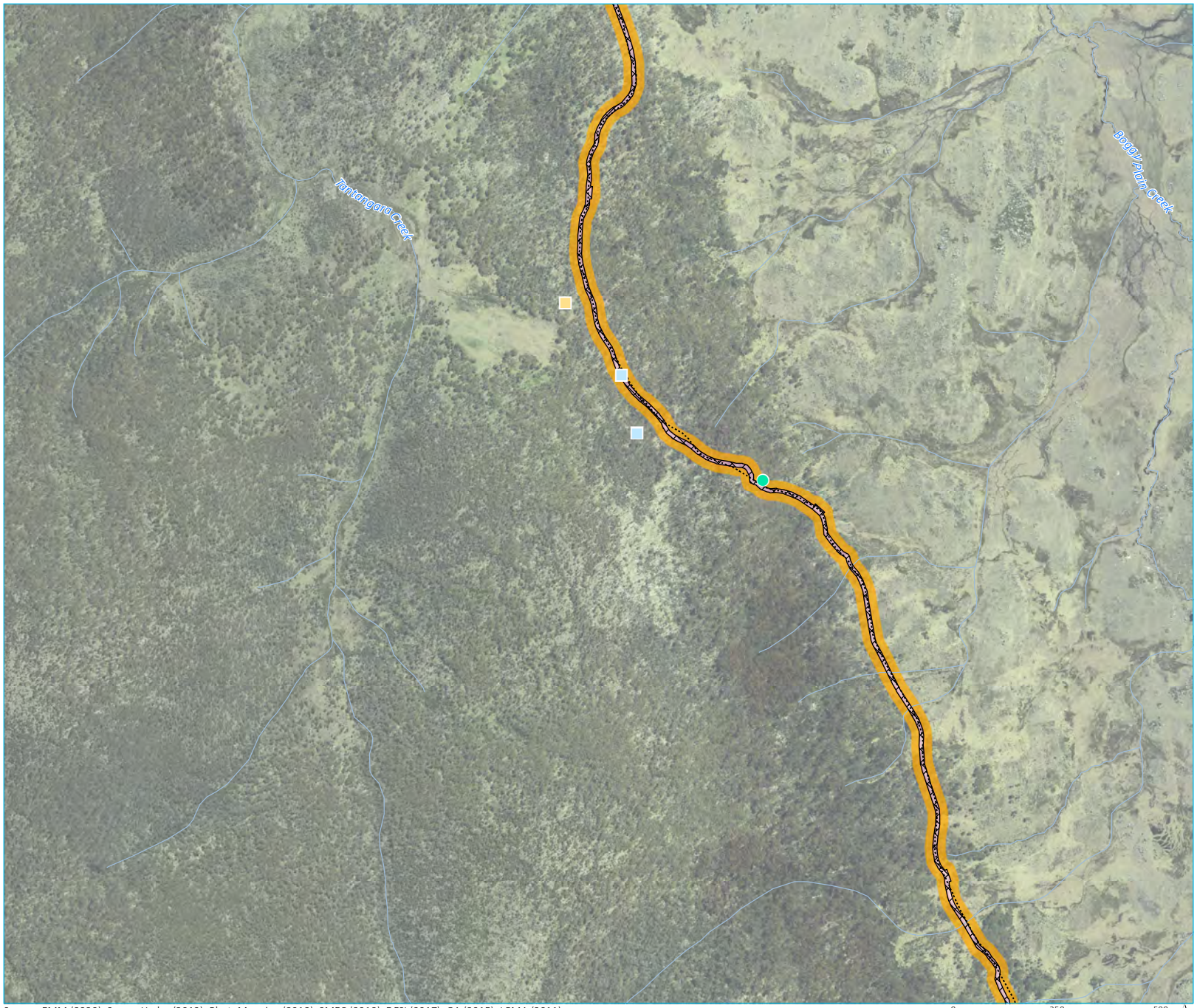
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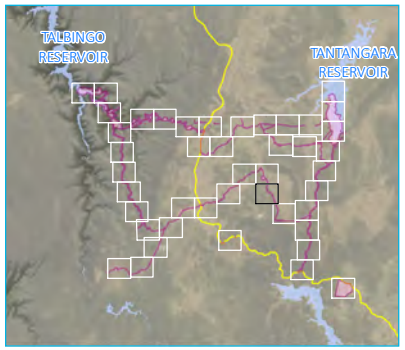
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.29

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Smoky Mouse
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

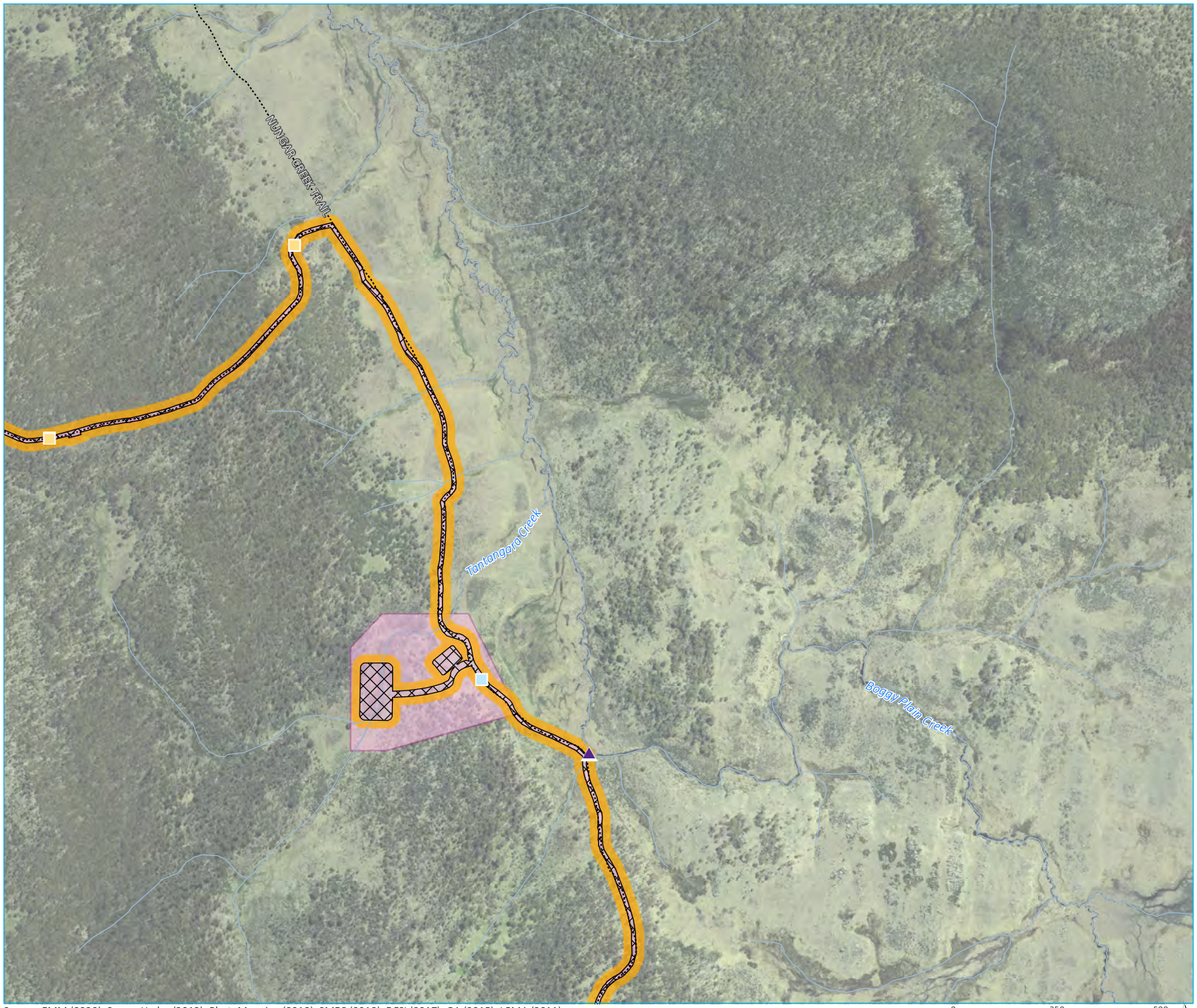
GDA 1994 MGA Zone 55

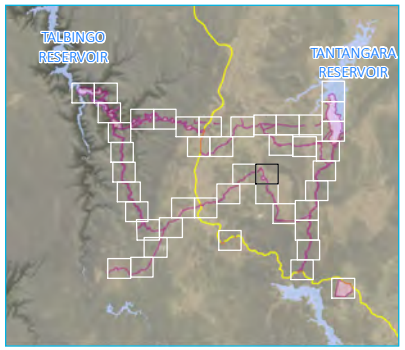
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.30





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

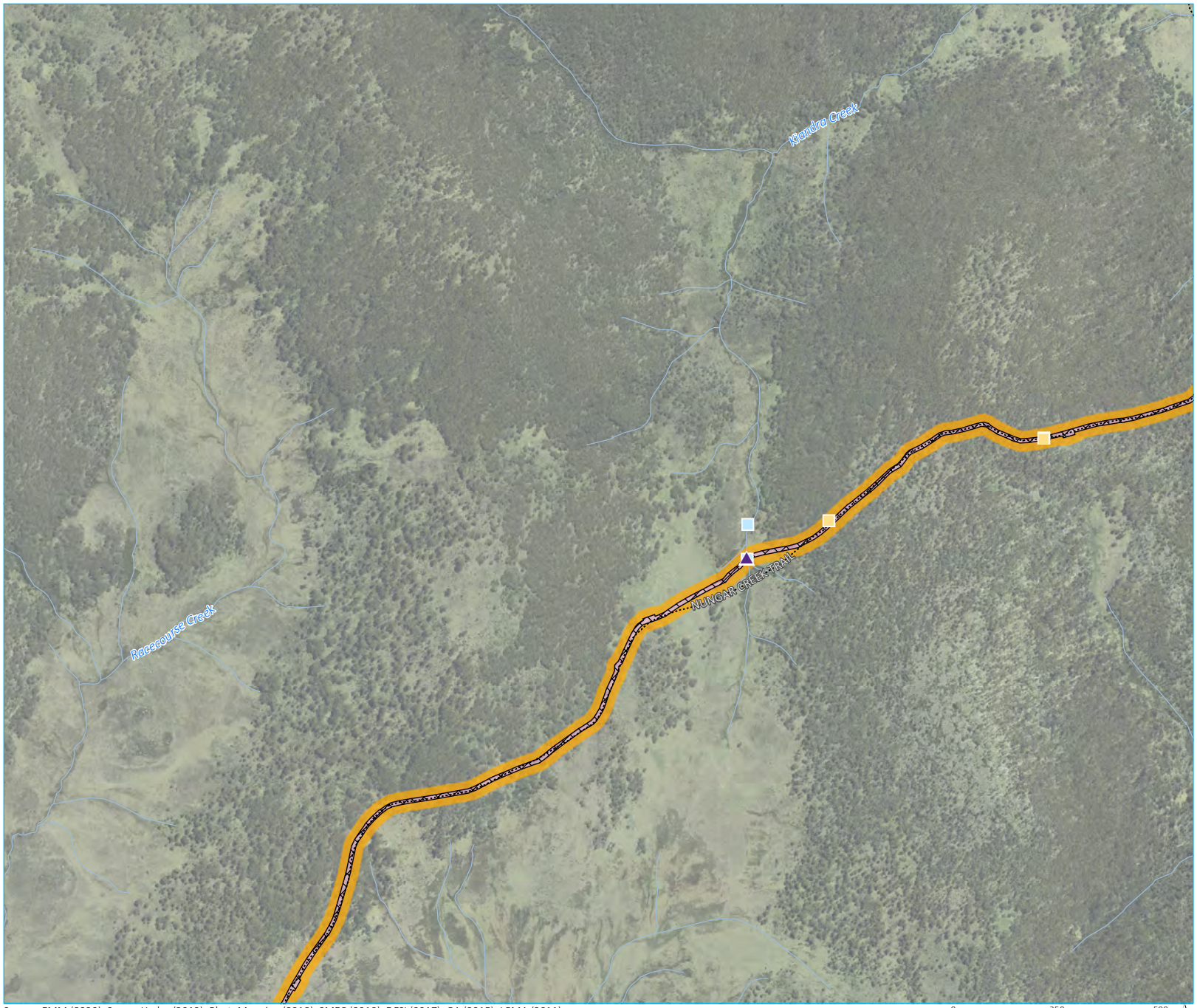
GDA 1994 MGA Zone 55

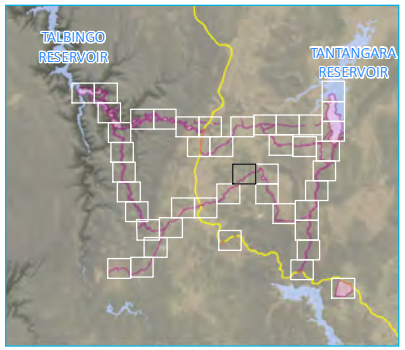
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.31





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

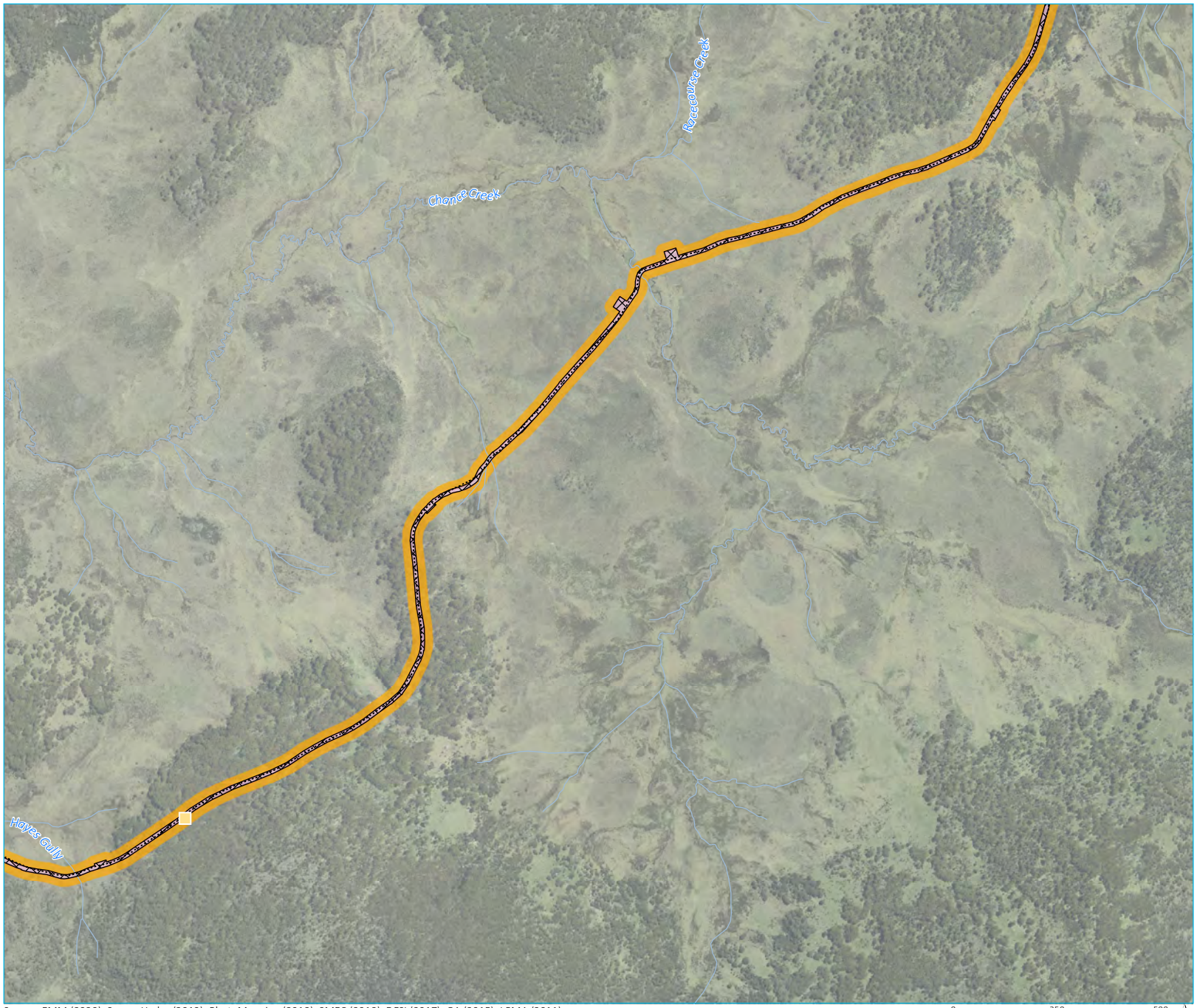
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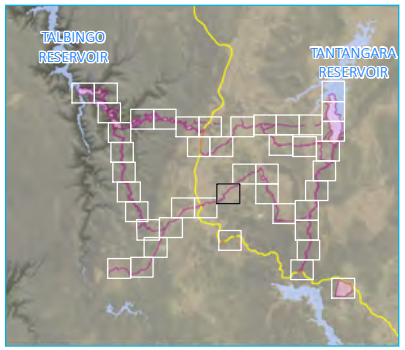
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.32

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

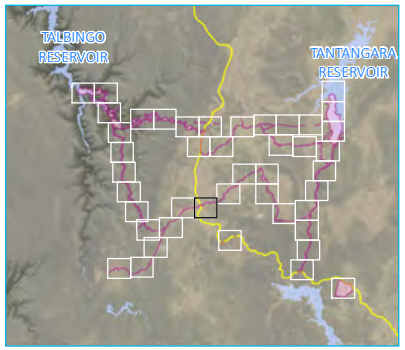
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.33

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Flame Robin
- Latham's Snipe

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

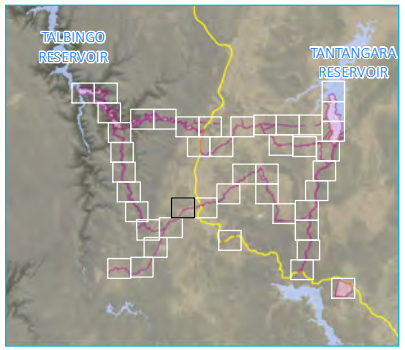
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.34

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Broad-toothed Rat
- Flame Robin
- Latham's Snipe

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

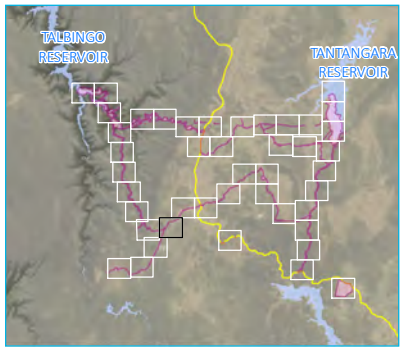
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.35





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink
- Alpine Tree Frog
- Broad-toothed Rat
- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR008_FaunaSurveyResults_20200206_DDP_01.mxd 21/02/2020

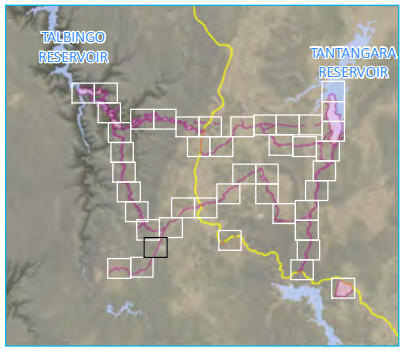
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.36

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Square-tailed Kite

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

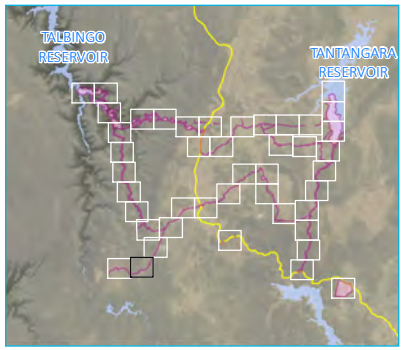
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.37

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Square-tailed Kite

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR008_FaunaSurveyResults_20200206_DDP_01.mxd 21/02/2020

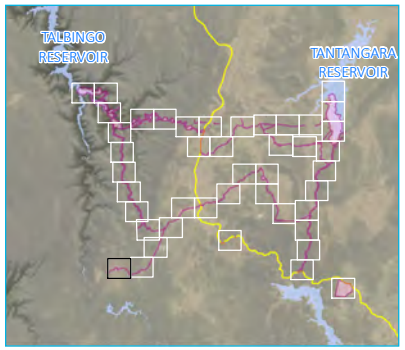
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.38

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Broad-toothed Rat
- Flame Robin
- Latham's Snipe
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

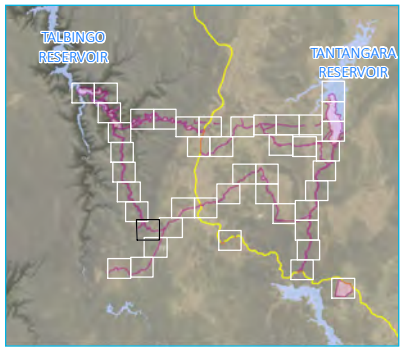
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.39





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Eastern Pygmy-possum
- Smoky Mouse
- Flame Robin
- Masked Owl
- Latham's Snipe
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

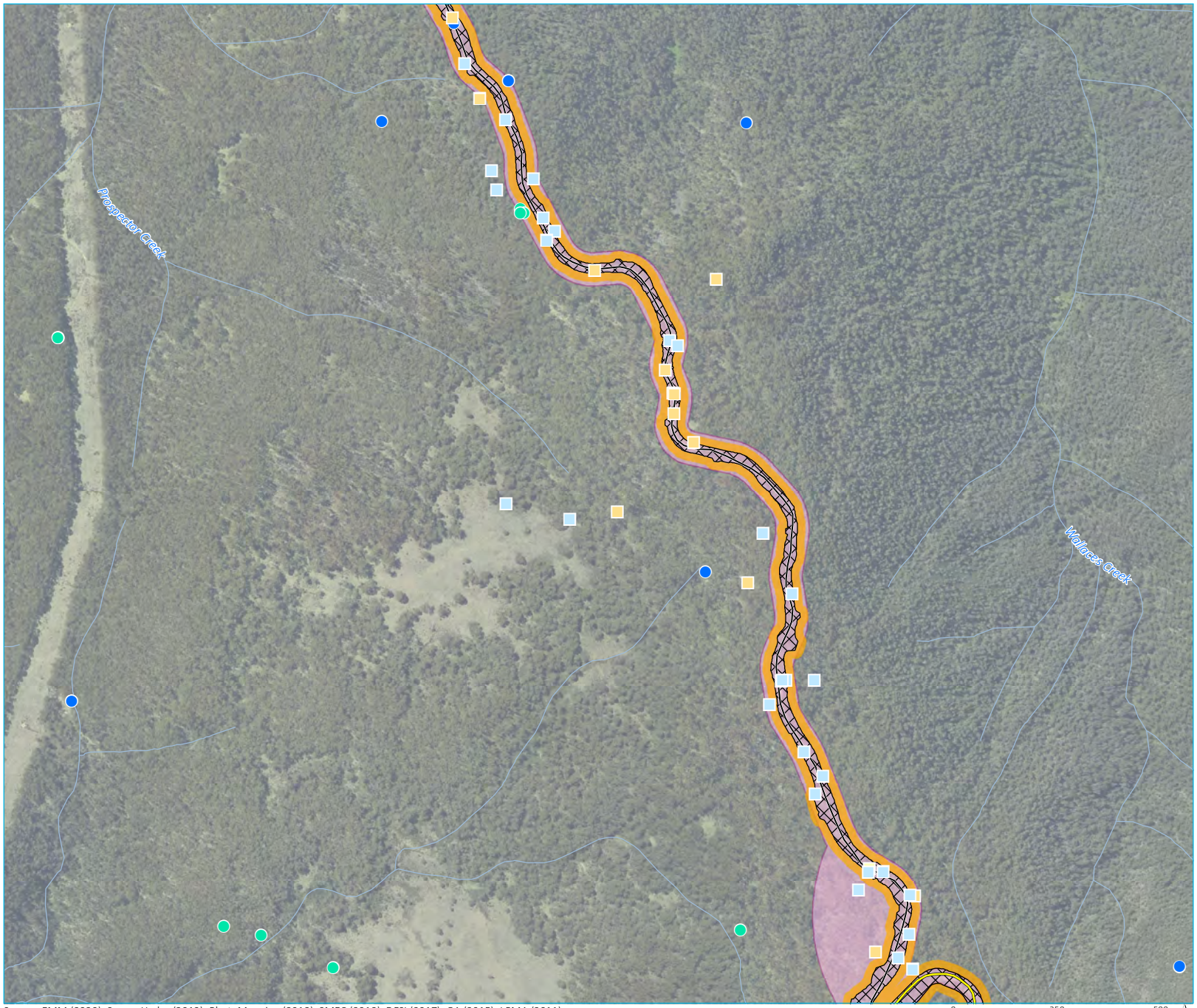
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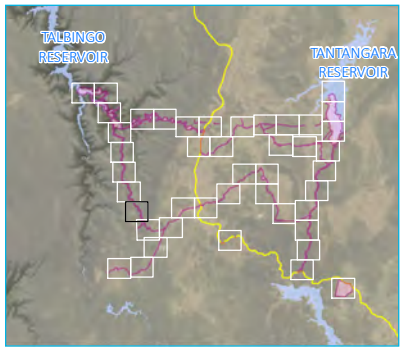
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.40

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse
- Flame Robin
- Masked Owl
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

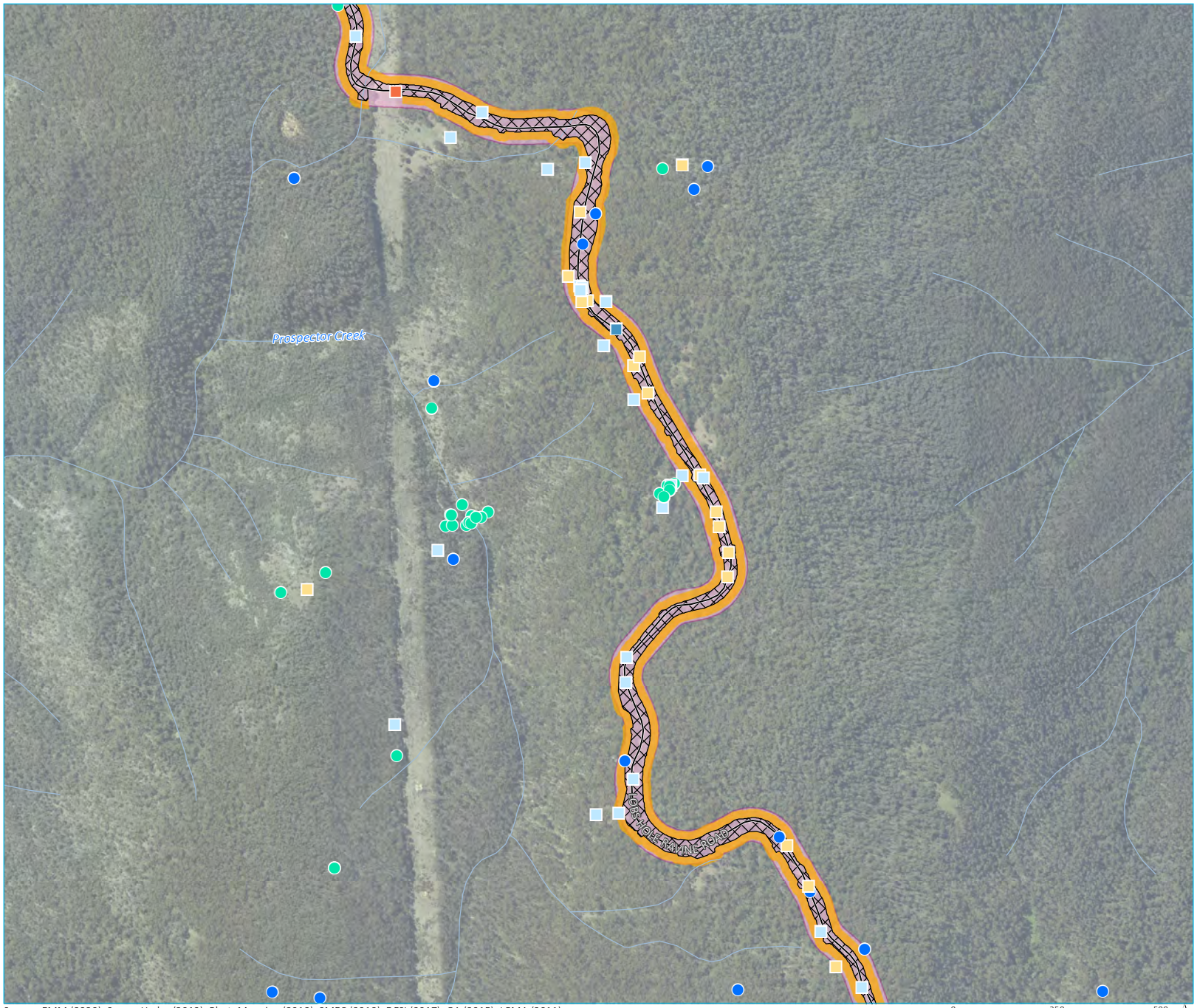
GDA 1994 MGA Zone 55

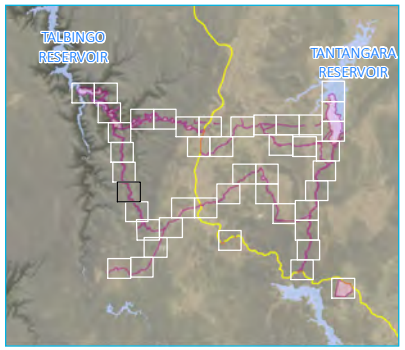
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.41





KEY

- Watercourse / drainage line
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Olive Whistler

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Threatened fauna overview

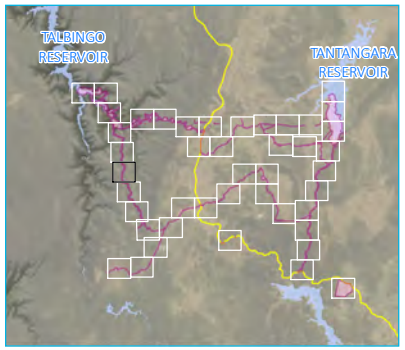
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.5.42

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

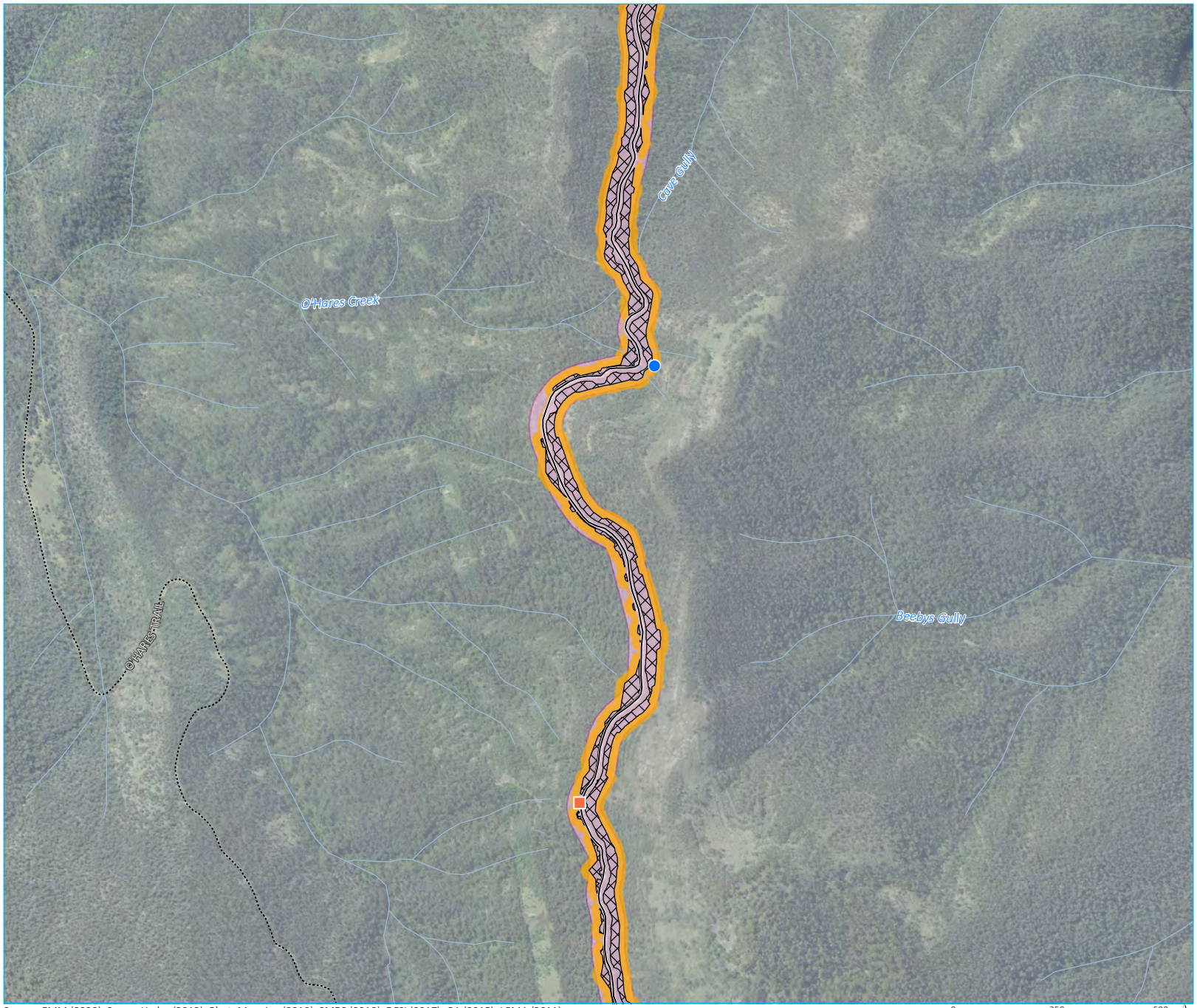
GDA 1994 MGA Zone 55

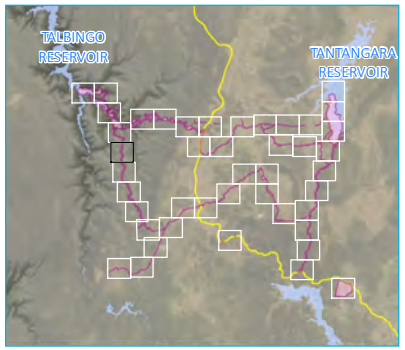
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.43





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Pygmy-possum
- Dusky Woodswallow

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

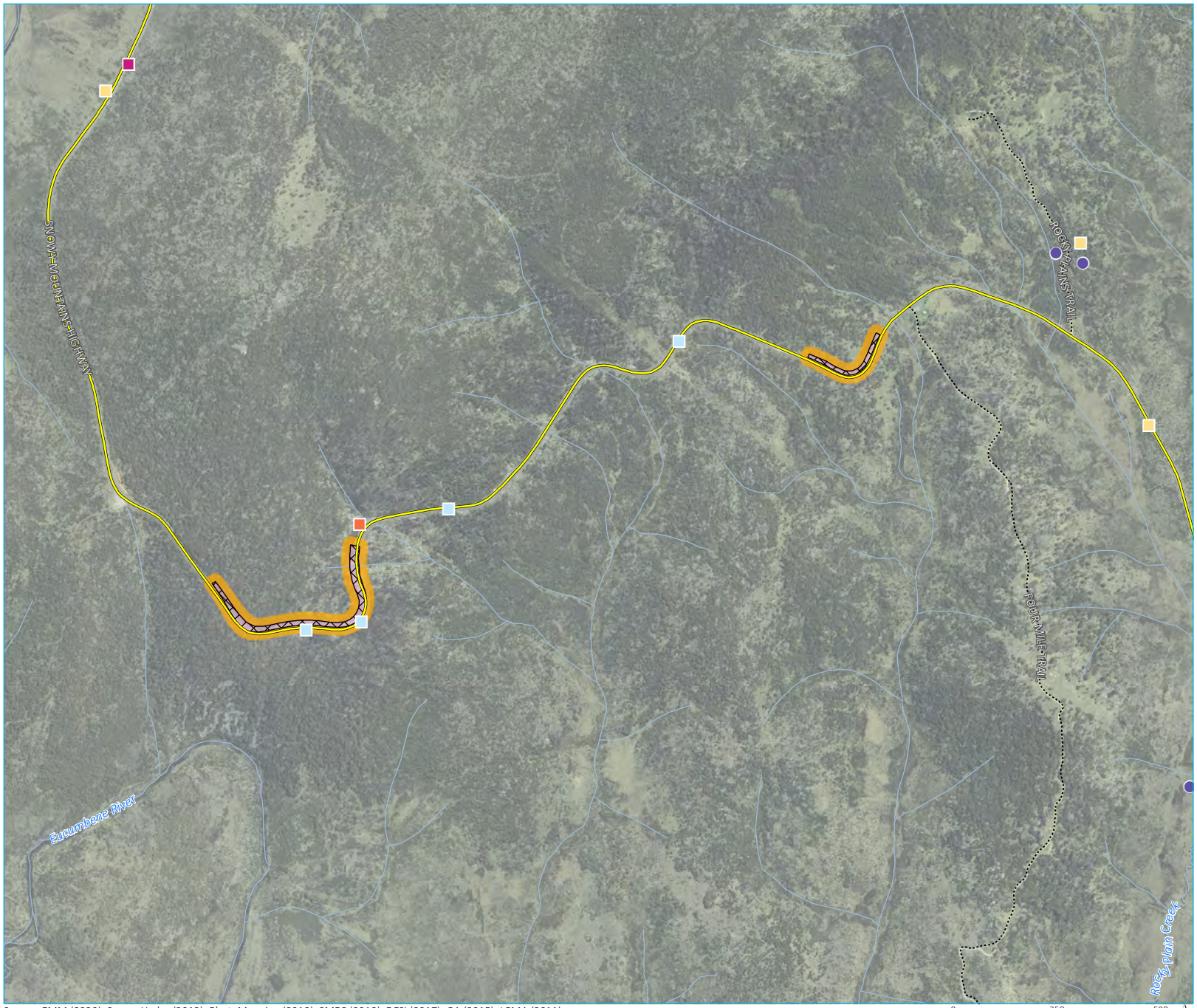
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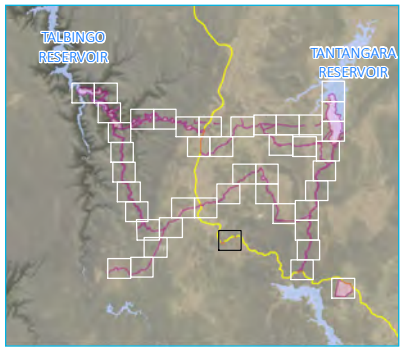
Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.44

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Broad-toothed Rat
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

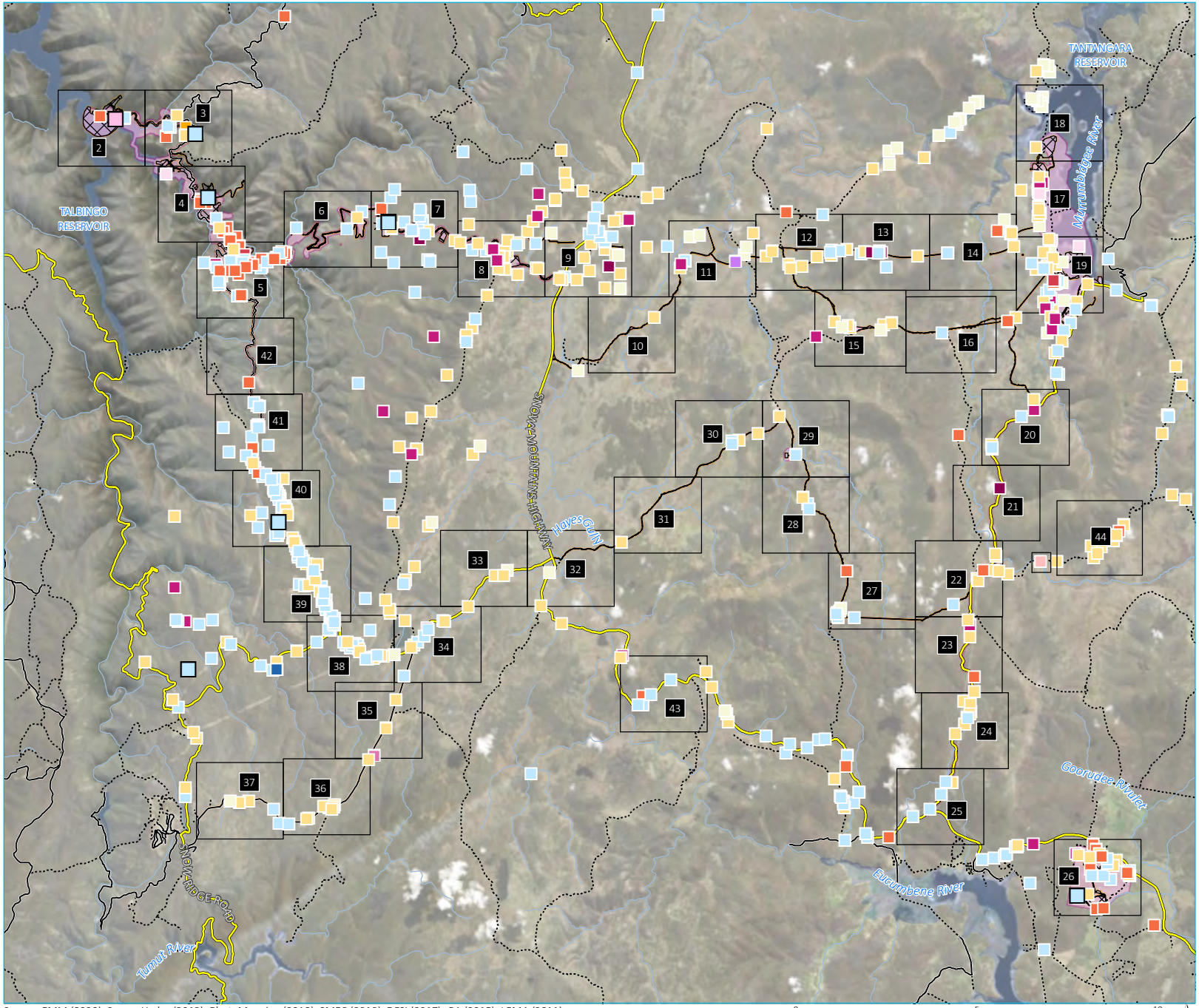
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Threatened fauna overview

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.5.45

snowy 2.0

EMM creating opportunities



KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Diamond Firetail
- Dusky Woodswallow
- White-throated Needletail
- Flame Robin
- Turquoise Parrot
- Latham's Snipe
- Gang-gang Cockatoo
- Glossy Black-Cockatoo
- Olive Whistler
- Pink Robin
- Satin Flycatcher
- Scarlet Robin
- Square-tailed Kite
- White-bellied Sea-Eagle
- Little Eagle
- White-fronted Chat
- Gang-gang Cockatoo breeding hollow
- White-bellied Sea-eagle nesting tree

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

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GDA 1994 MGA Zone 55

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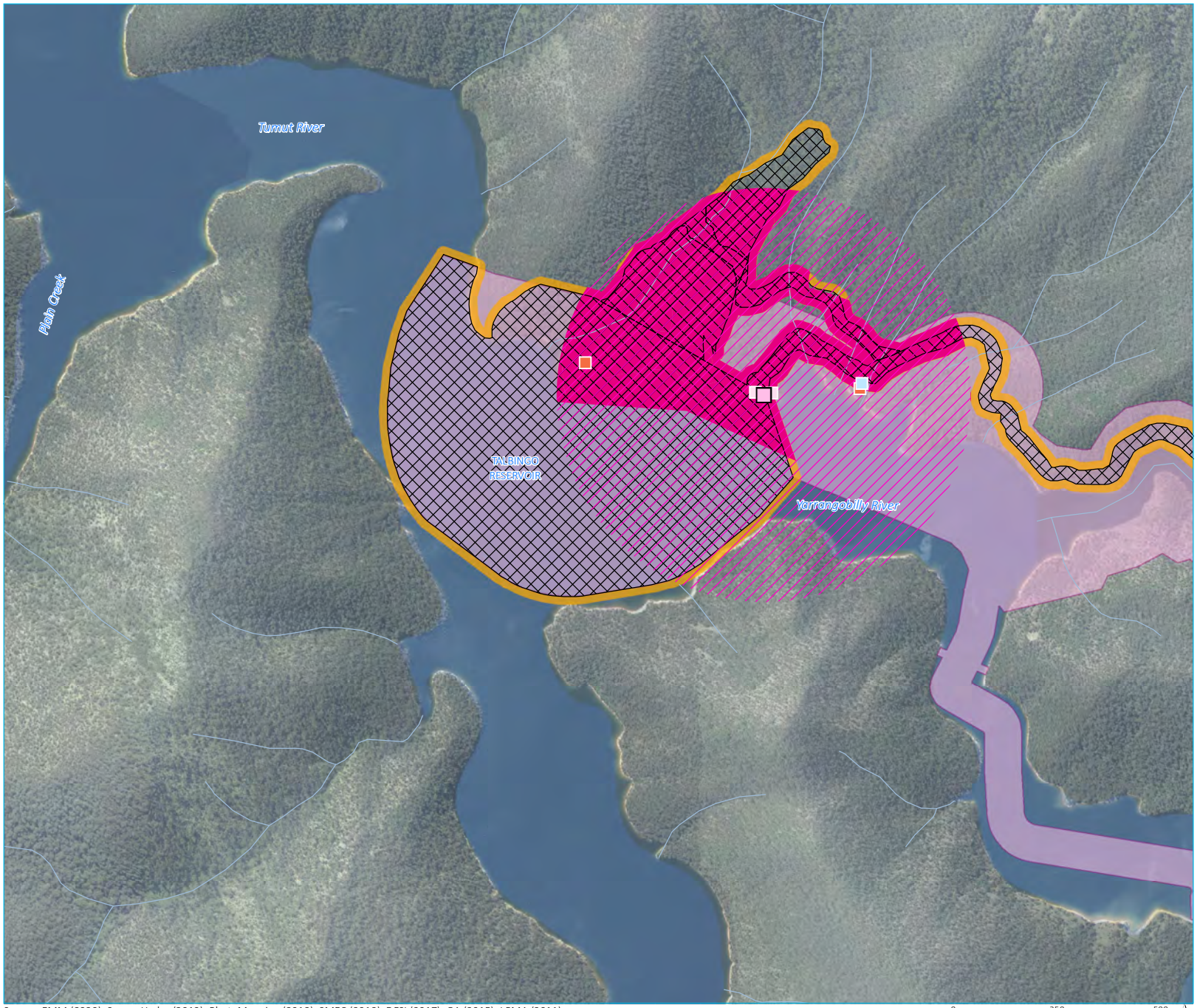
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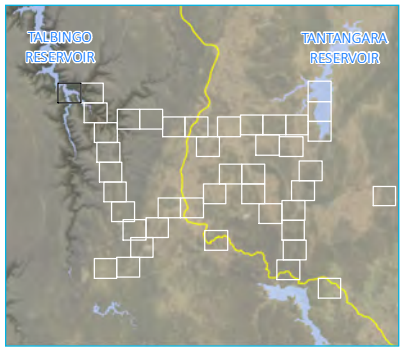
Diurnal bird survey results - page index

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.1

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- White-bellied Sea-Eagle habitat
- White-bellied Sea-Eagle species polygon

Threatened fauna

- Dusky Woodswallow
- Gang-gang Cockatoo
- White-bellied Sea-Eagle
- White-bellied Sea-eagle nesting tree

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

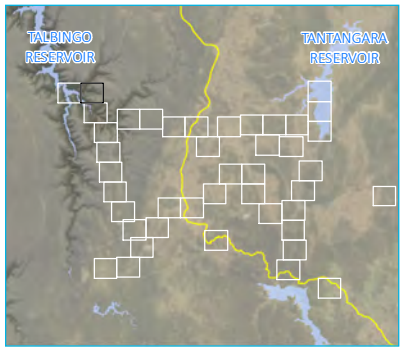
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.2





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Gang-gang Cockatoo habitat
- Gang-gang Cockatoo species polygon

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Turquoise Parrot
- Gang-gang Cockatoo
- Gang-gang Cockatoo breeding hollow

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

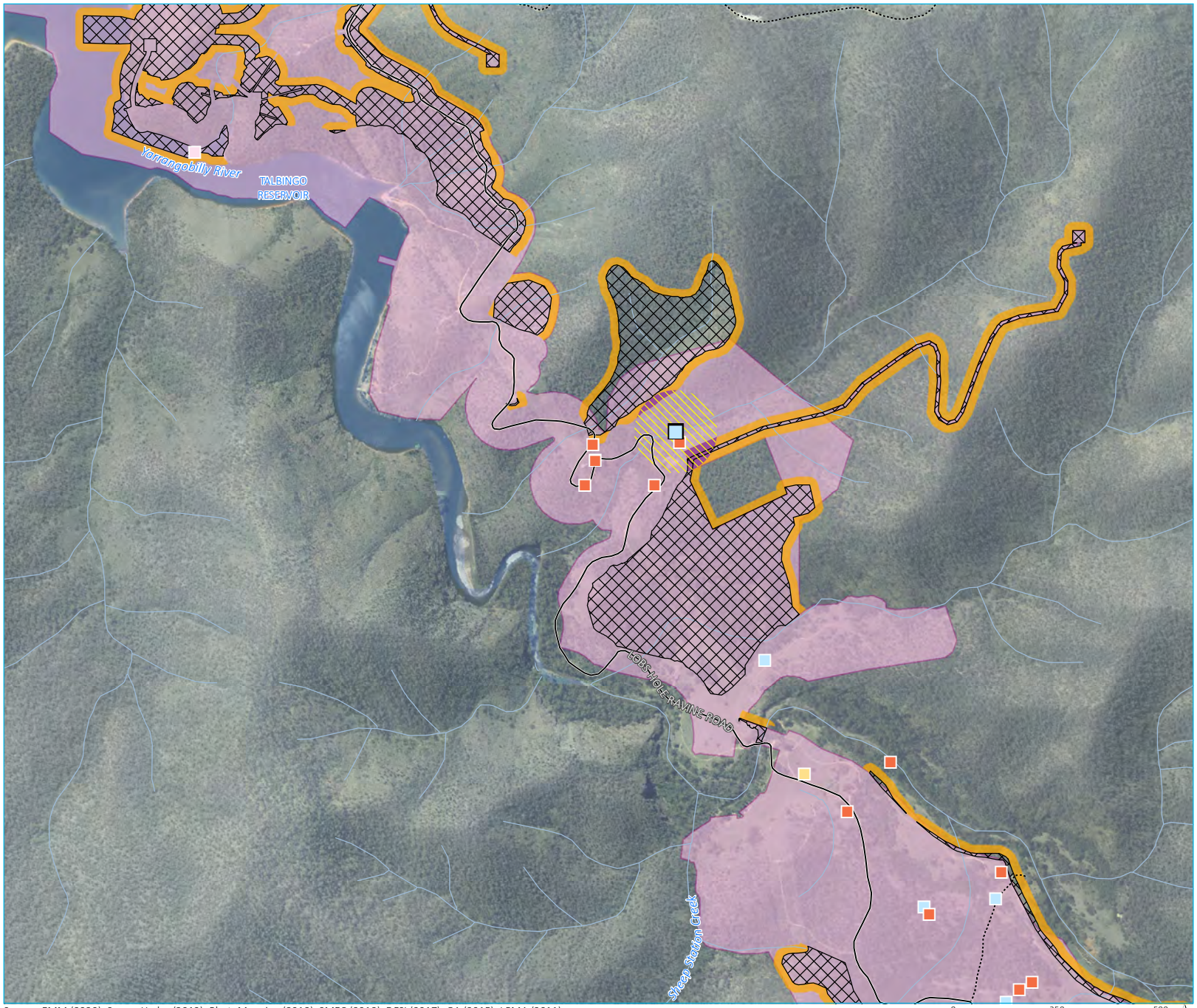
GDA 1994 MGA Zone 55

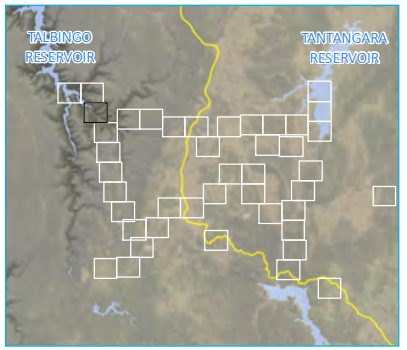
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.3





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Gang-gang Cockatoo habitat
- Gang-gang Cockatoo species polygon

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- White-bellied Sea-Eagle
- Gang-gang Cockatoo breeding hollow

Diurnal bird survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

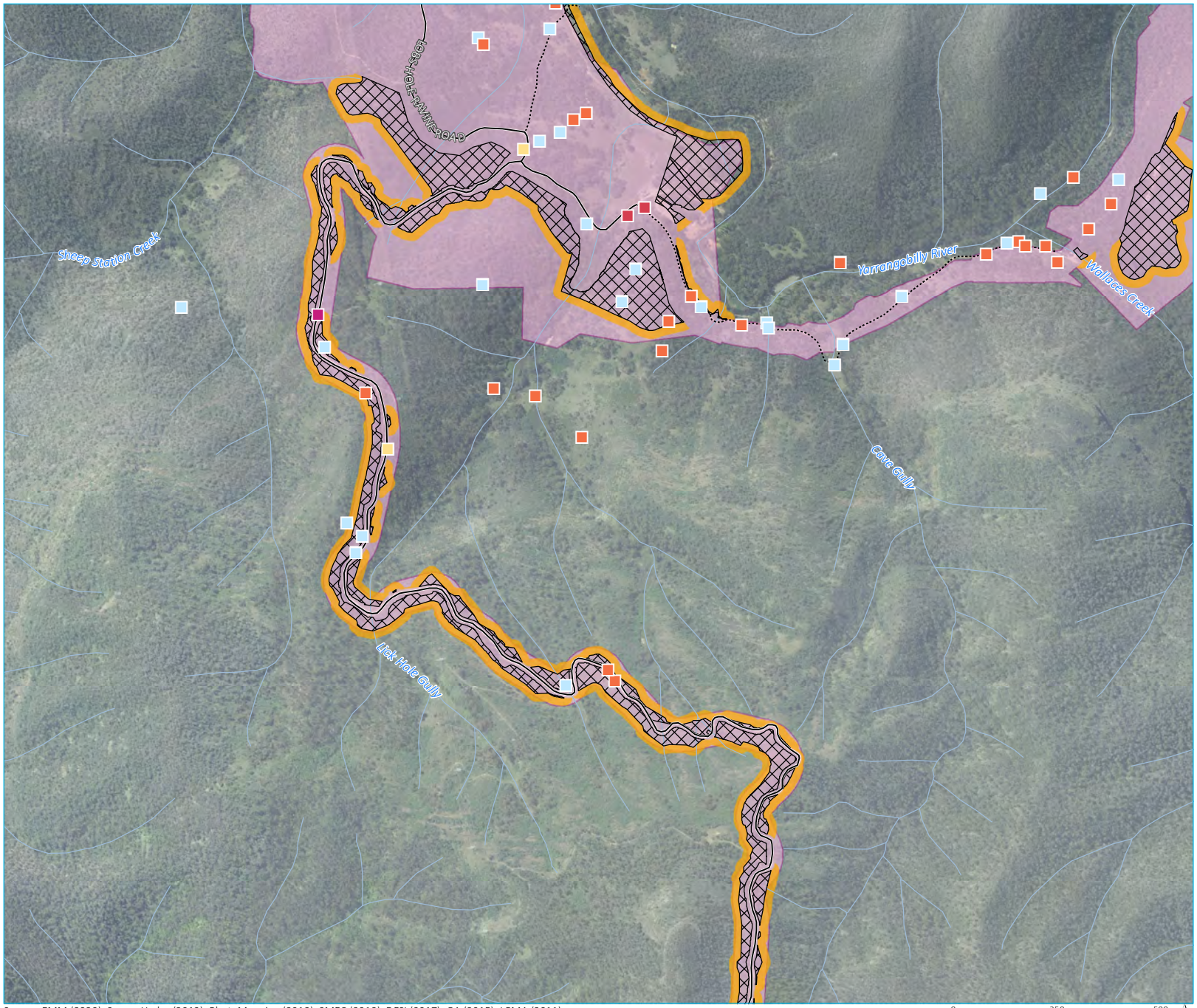
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Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.4

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Diamond Firetail
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

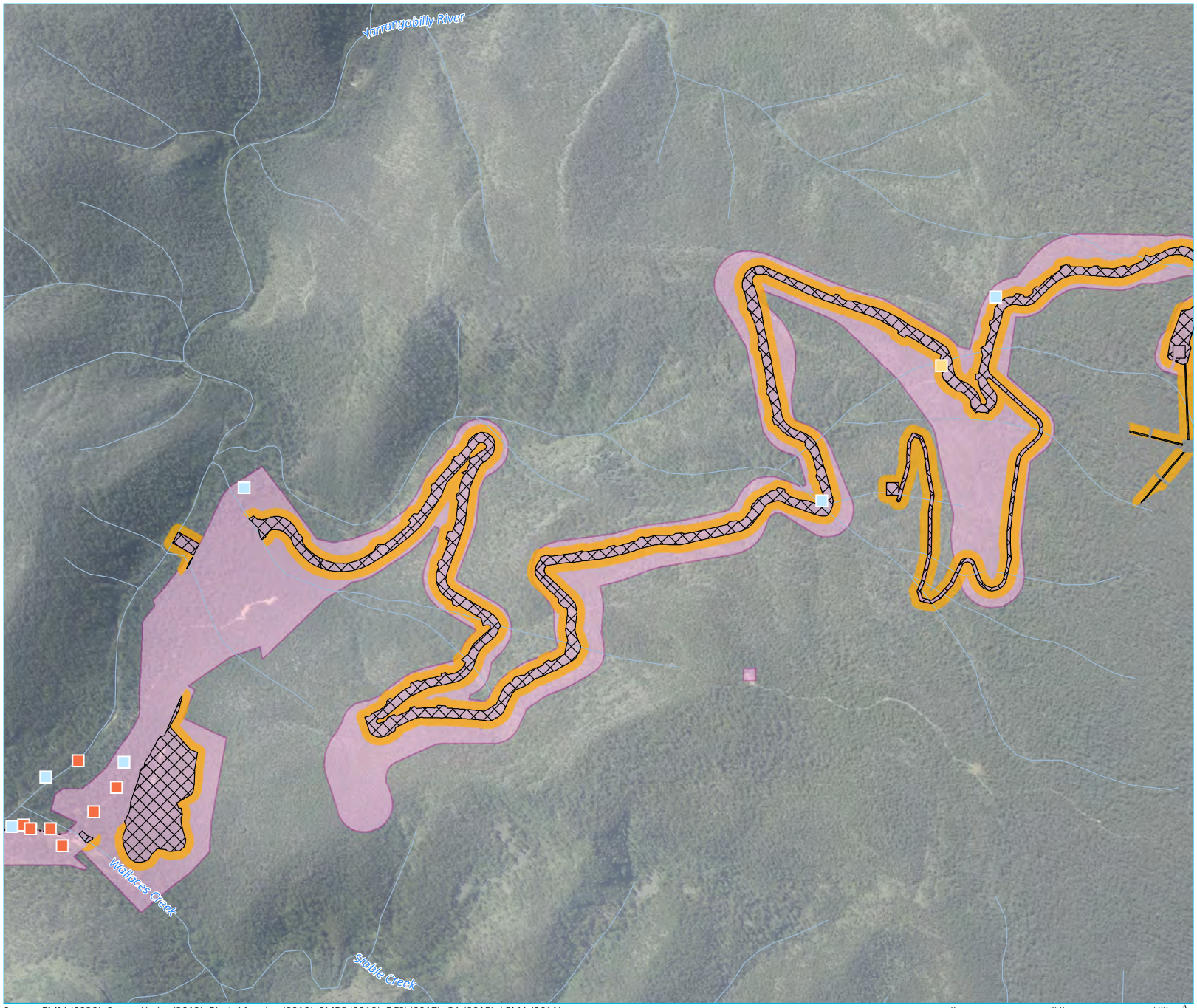
Diurnal bird survey results

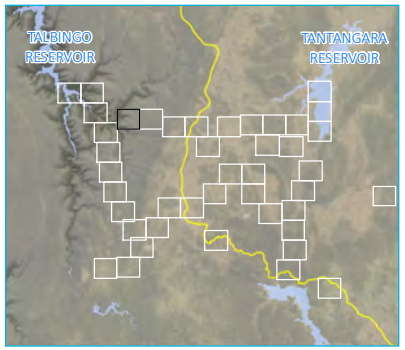
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.5

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

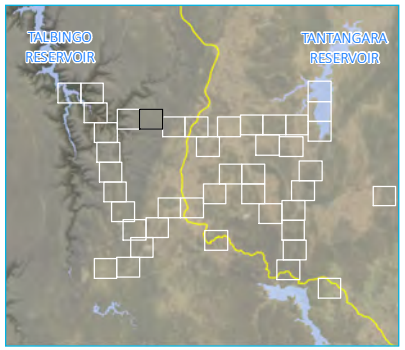
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.6





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Gang-gang Cockatoo habitat
- Gang-gang Cockatoo species polygon

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin
- Gang-gang Cockatoo breeding hollow

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

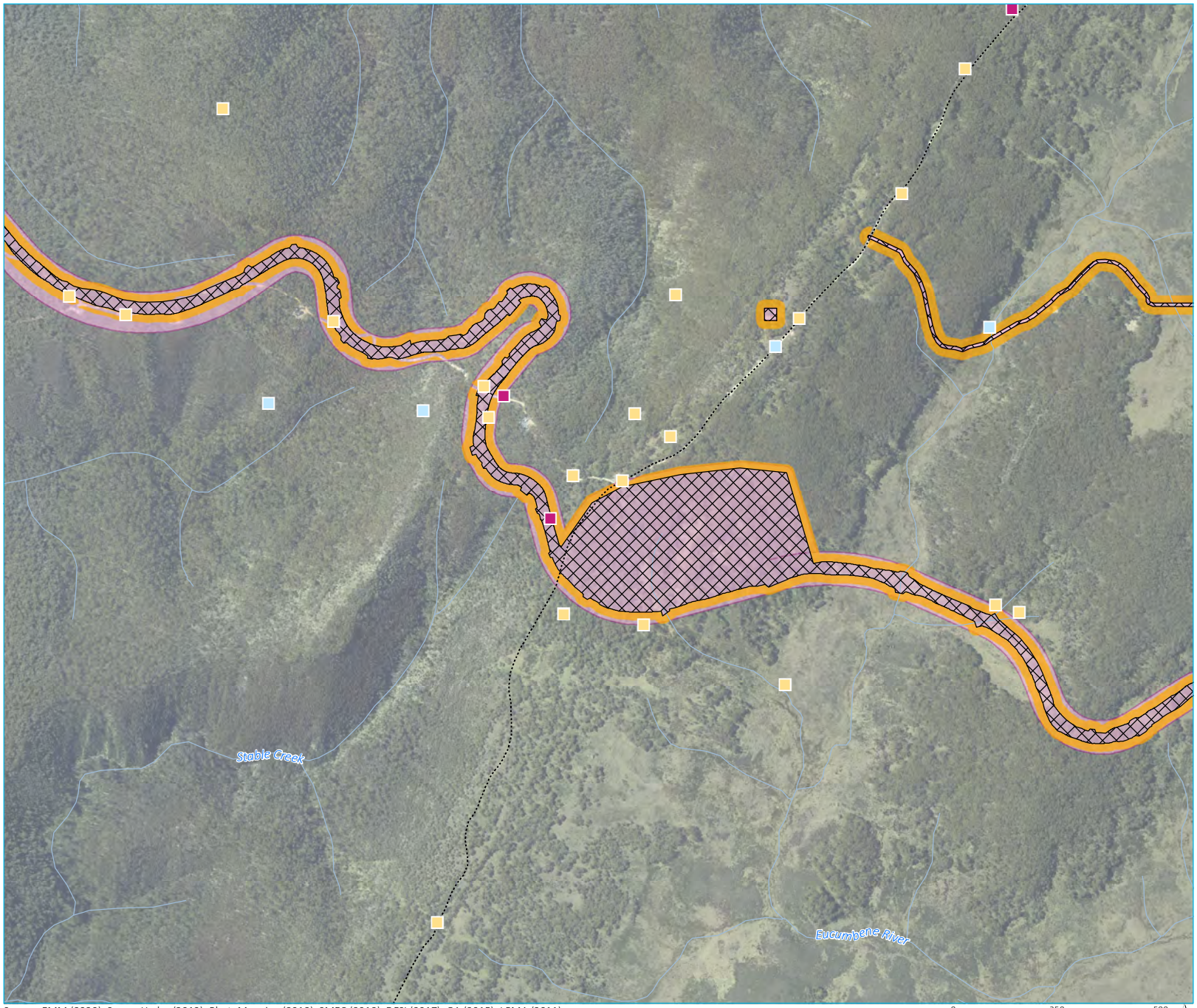
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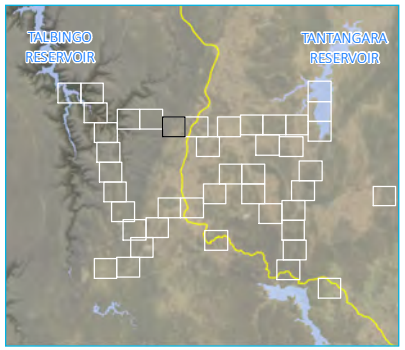
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.7

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

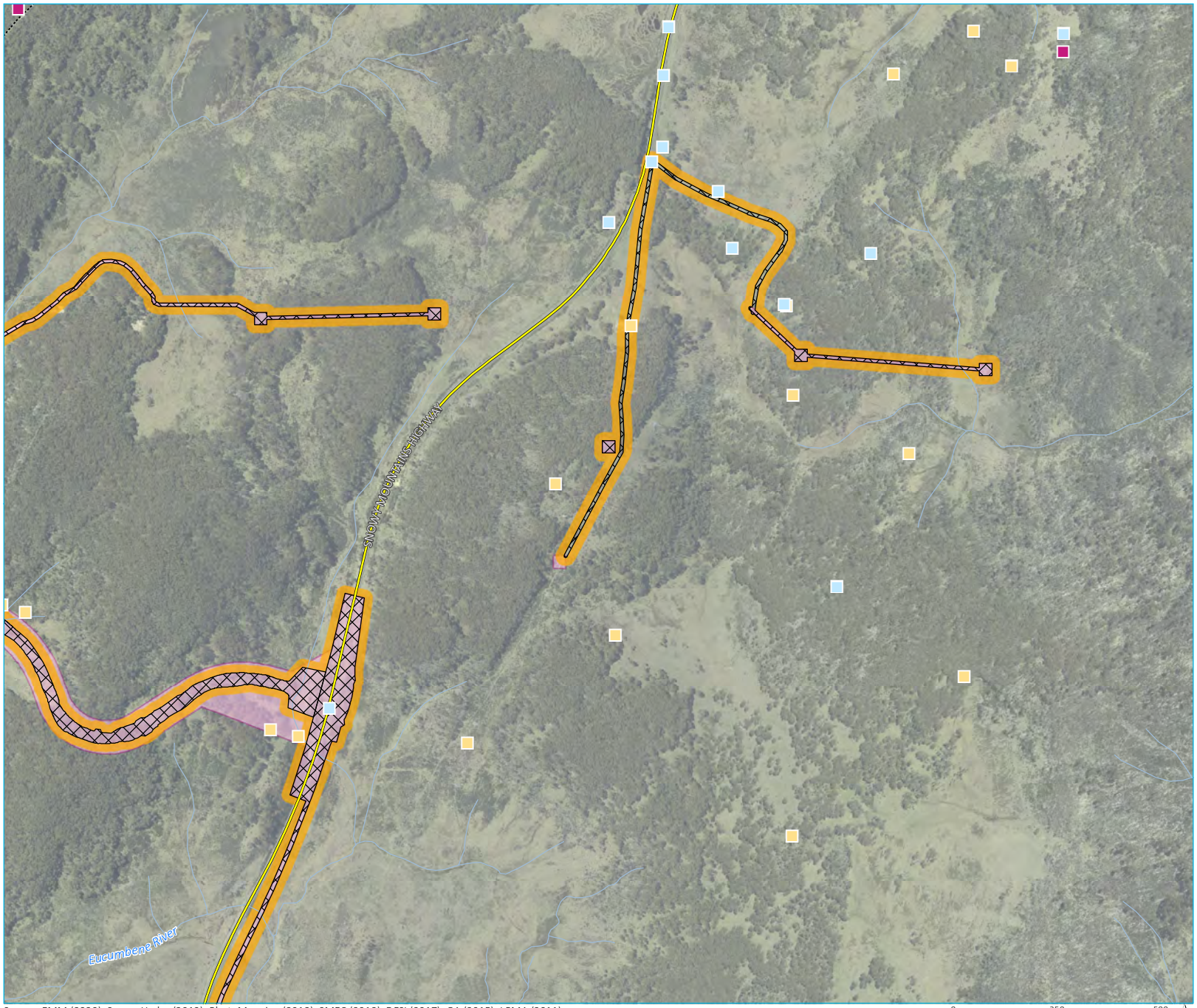
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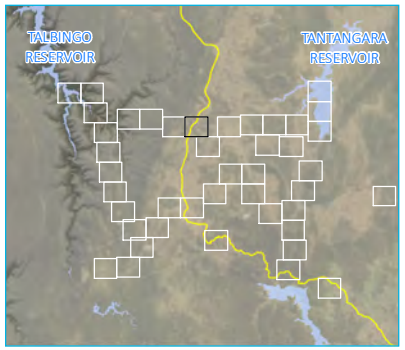
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.8

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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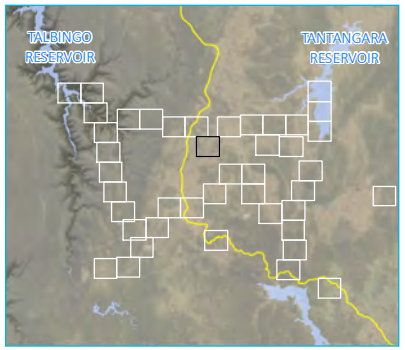
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.9

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

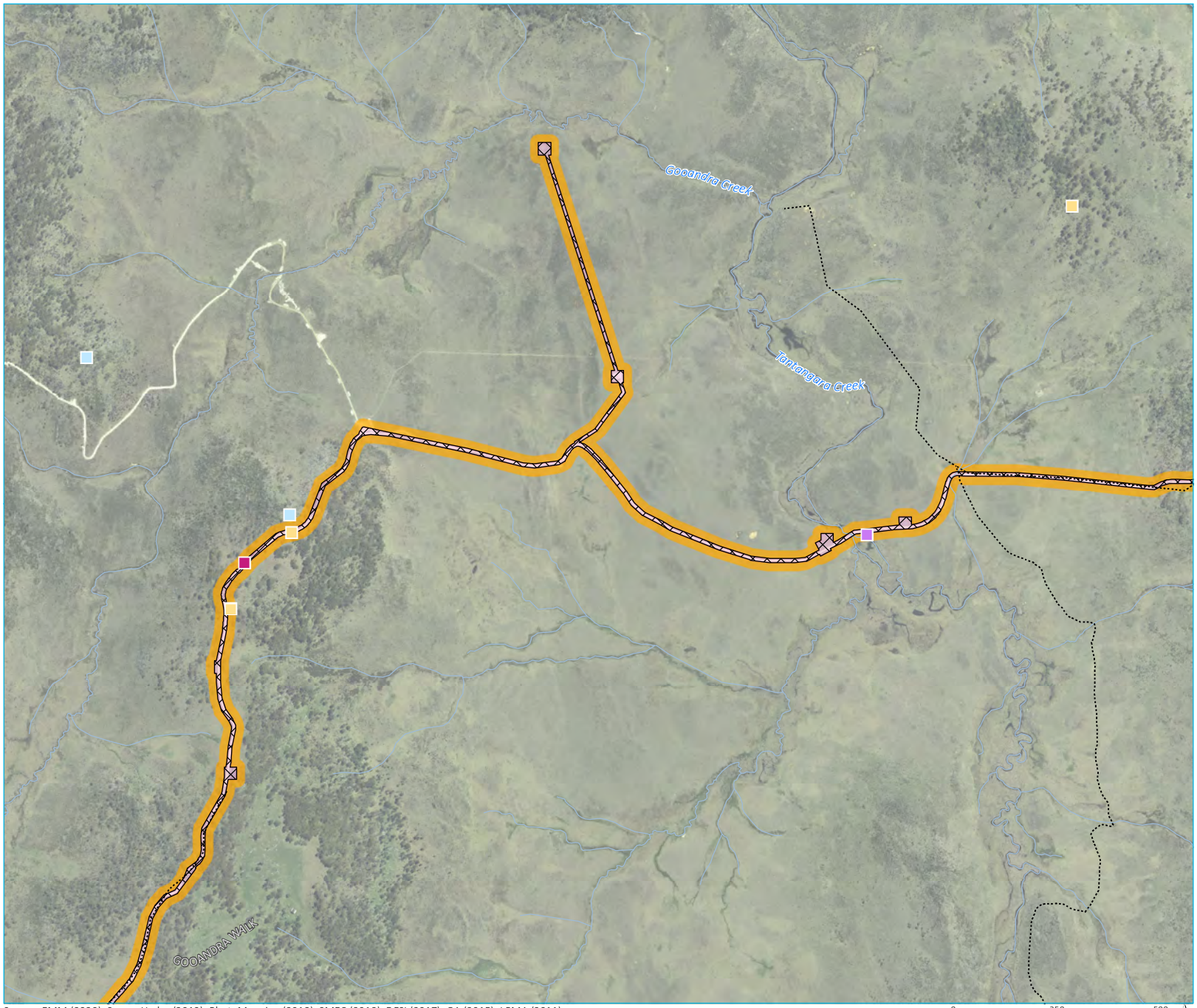
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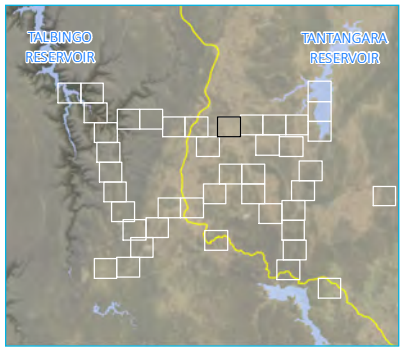
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.10

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin
- Little Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

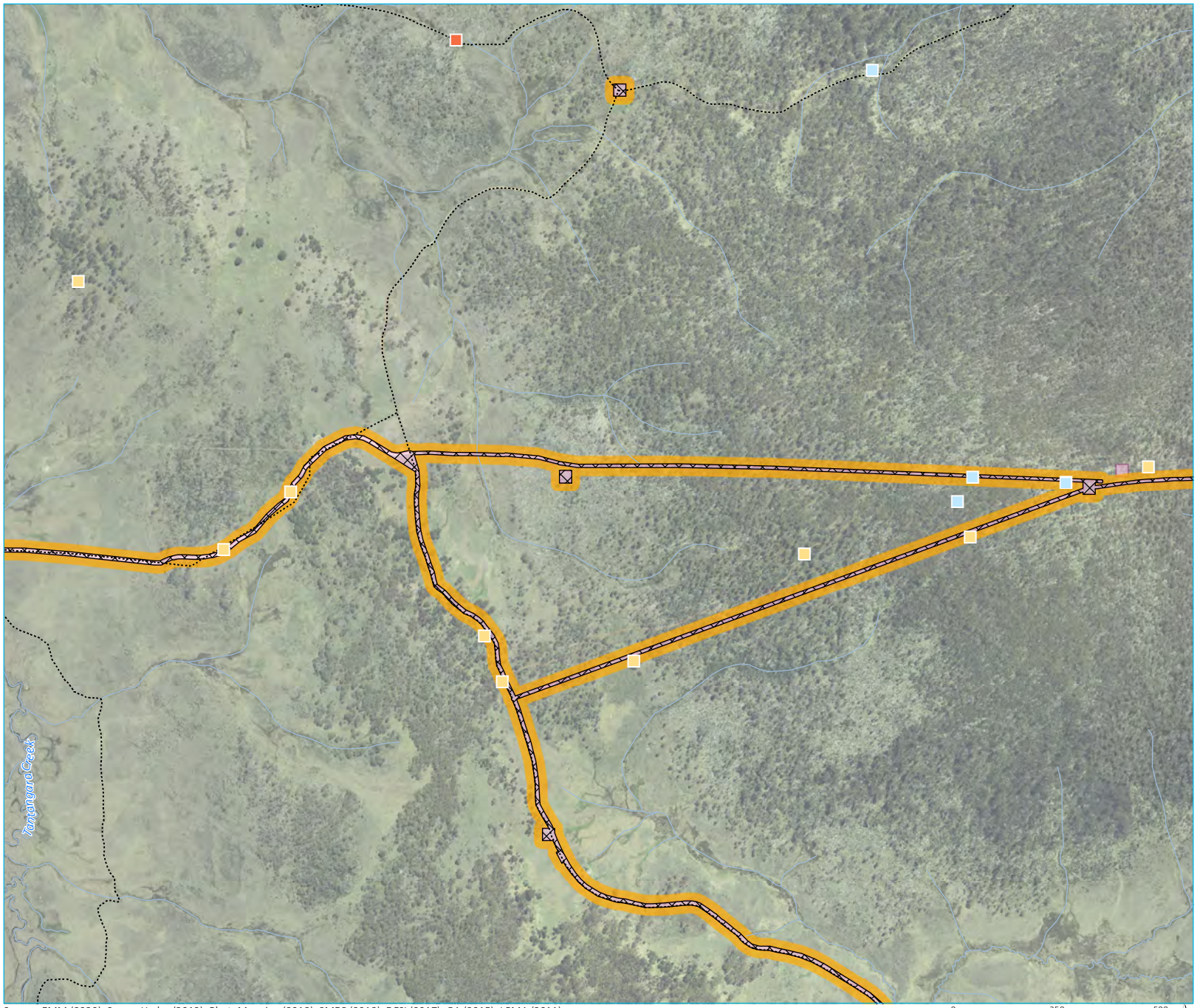
Diurnal bird survey results

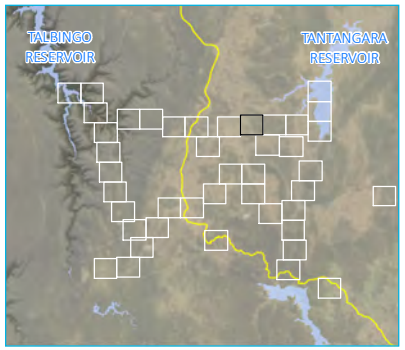
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.11

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

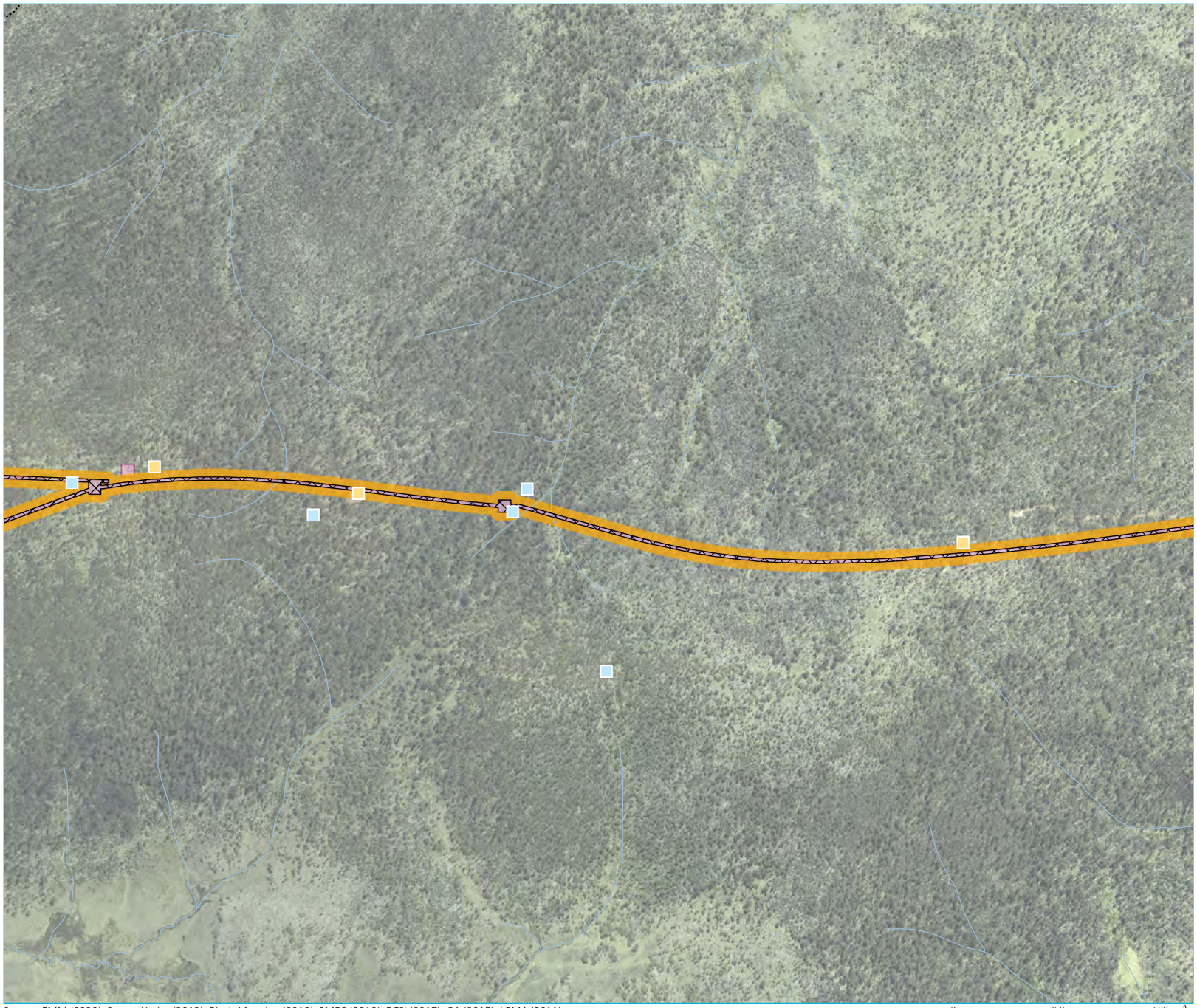
Diurnal bird survey results

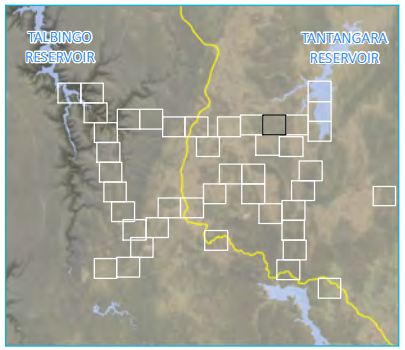
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.12

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

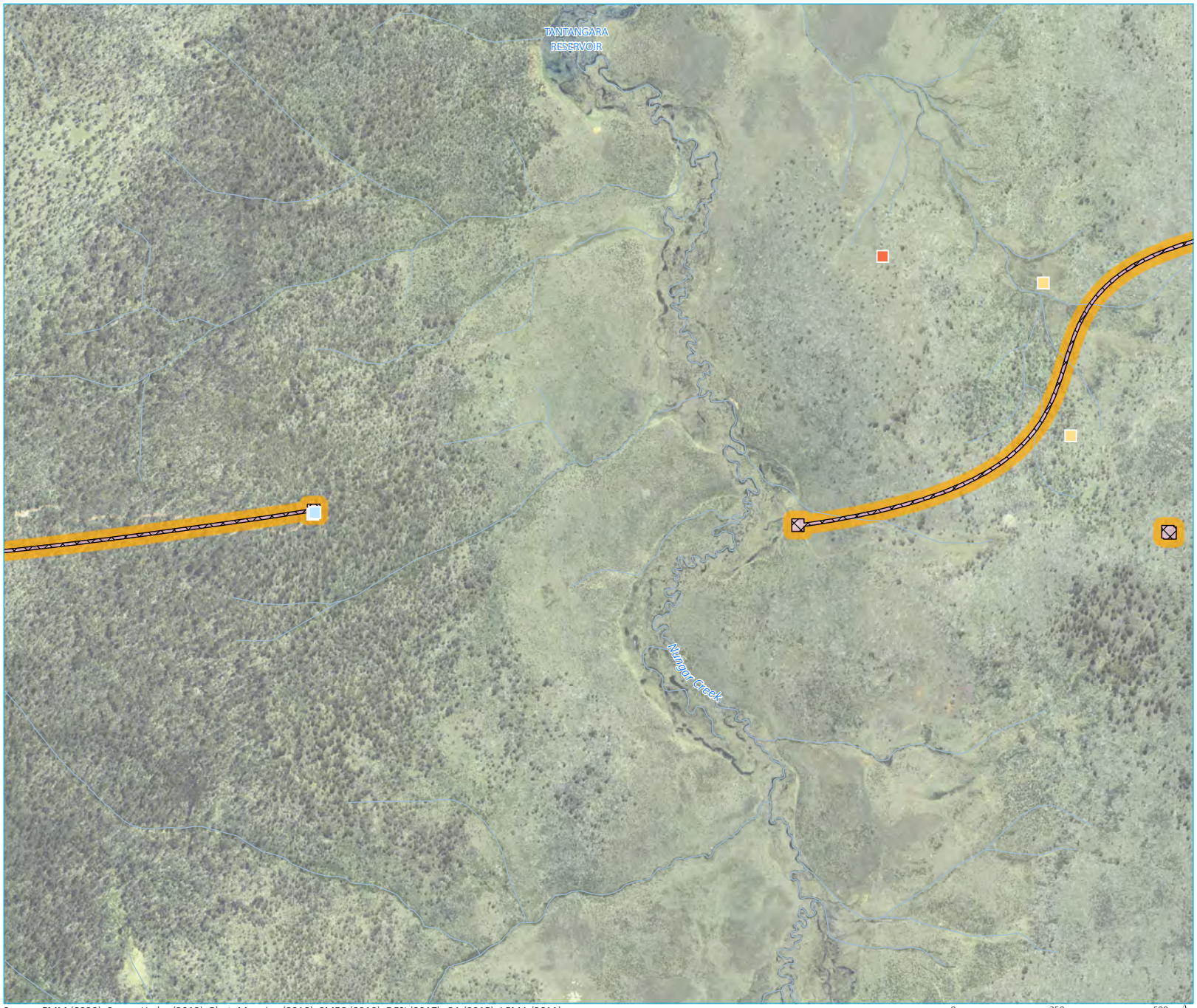
Diurnal bird survey results

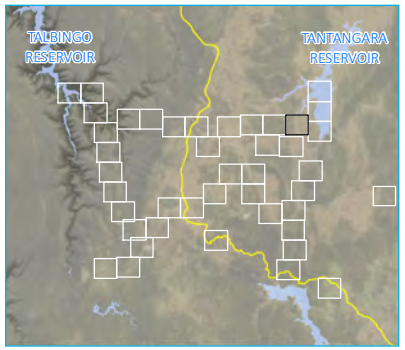
Snowy 2.0
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Figure 5.6.13

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020

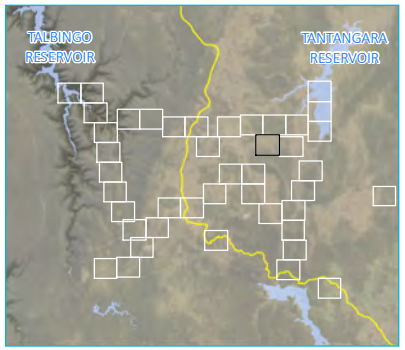
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.14

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

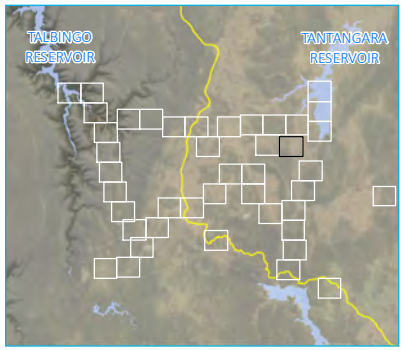
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.15

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

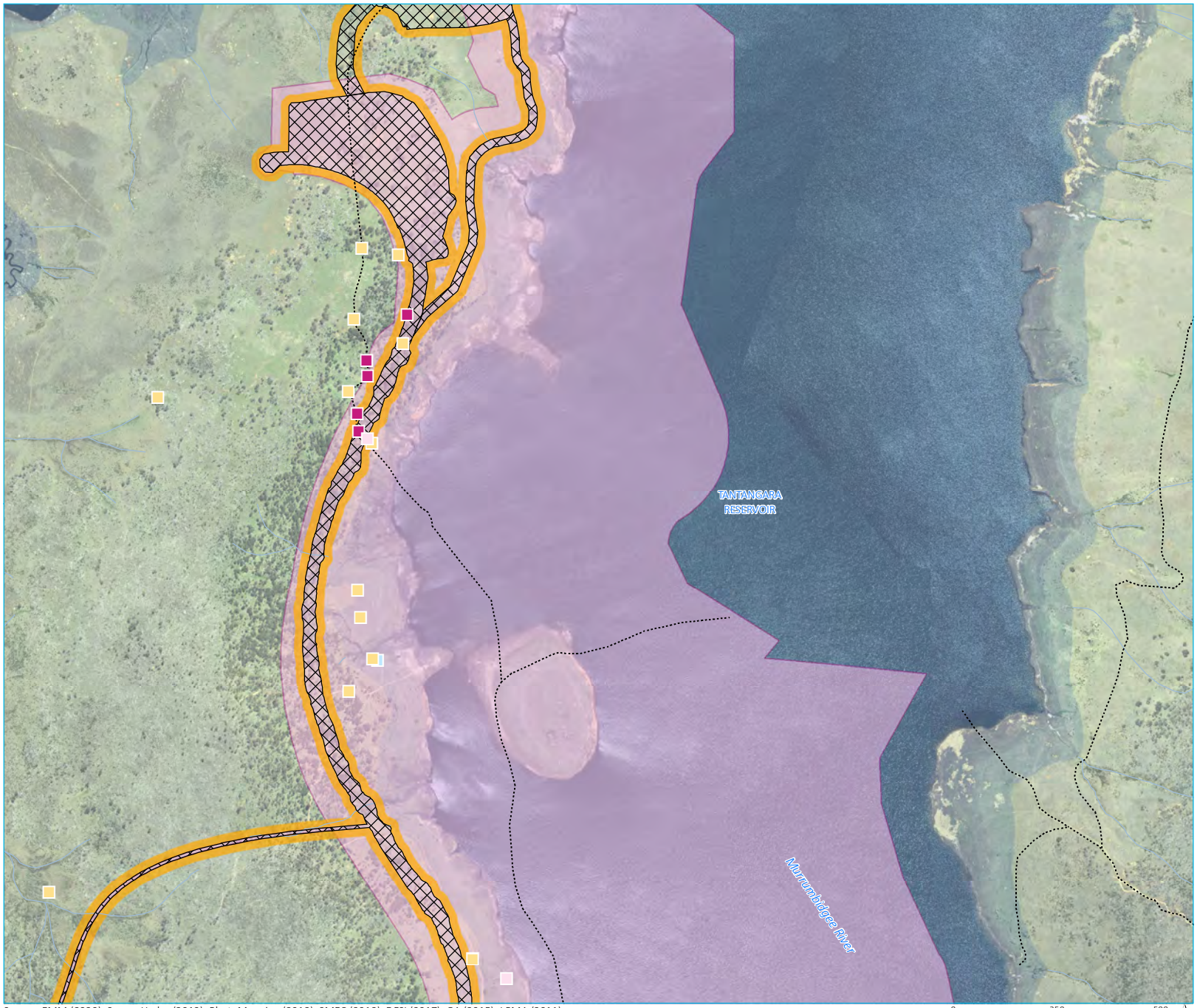
GDA 1994 MGA Zone 55

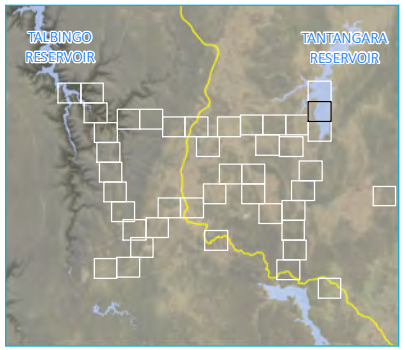
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.16





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin
- White-bellied Sea-Eagle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

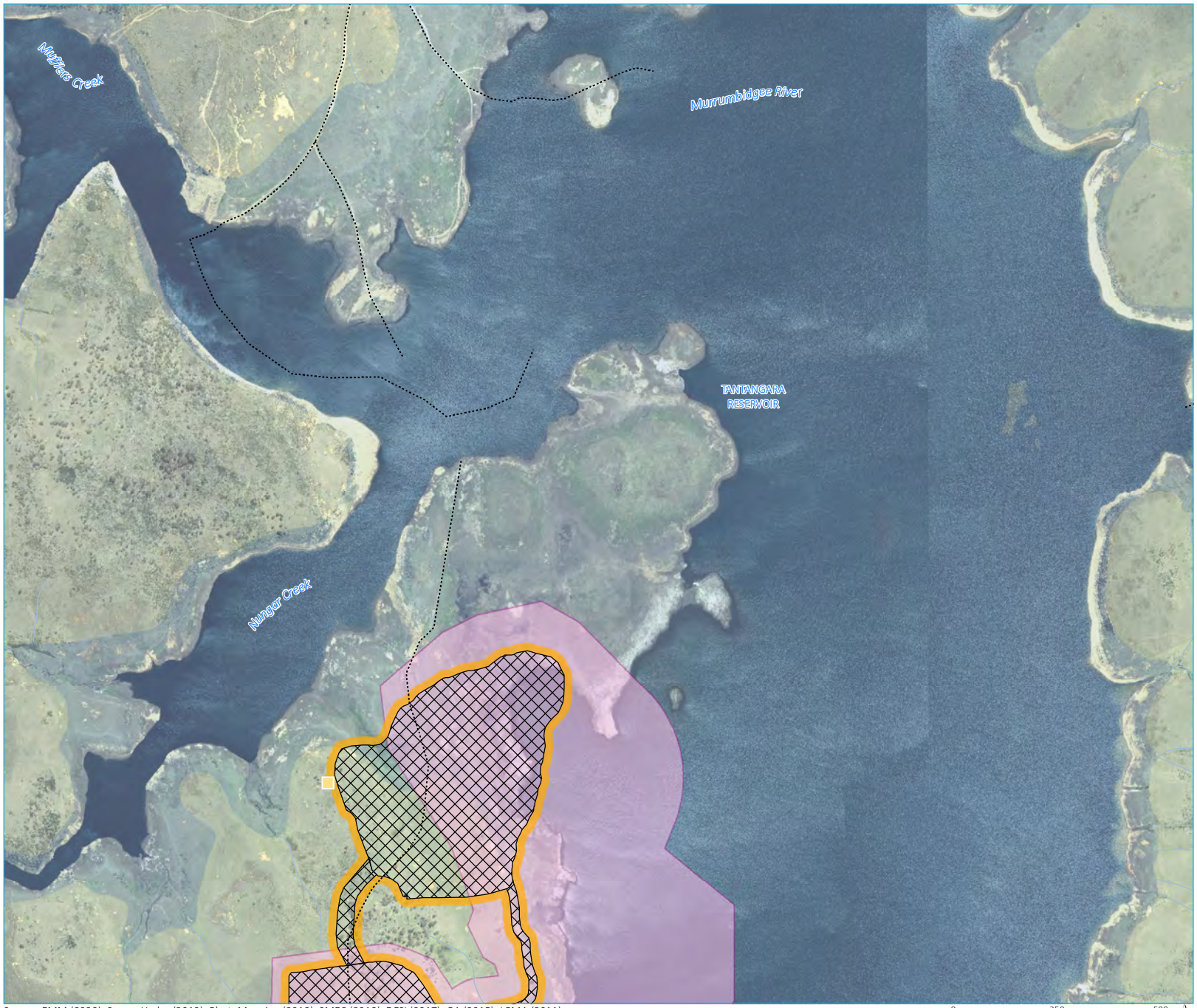
Diurnal bird survey results

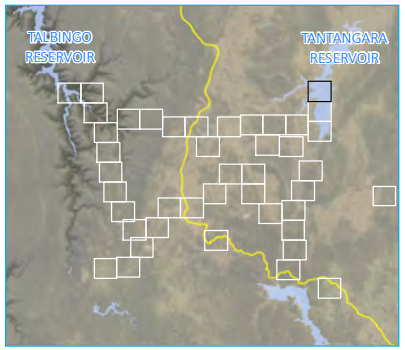
Snowy 2.0
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Figure 5.6.17

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin

Diurnal bird survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

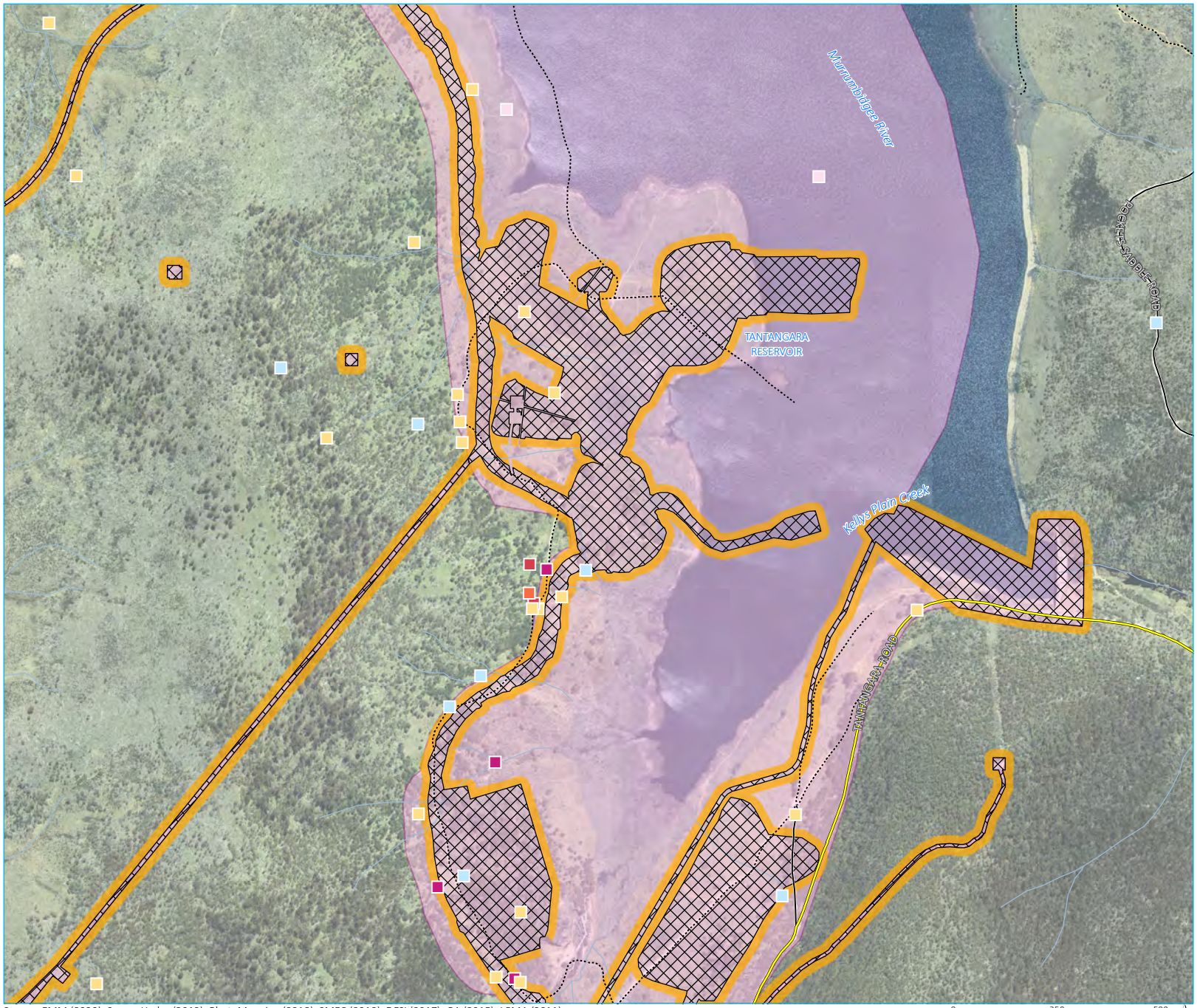
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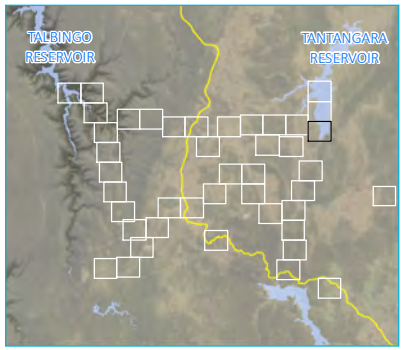
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.18

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Diamond Firetail
- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin
- White-bellied Sea-Eagle

Diurnal bird survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

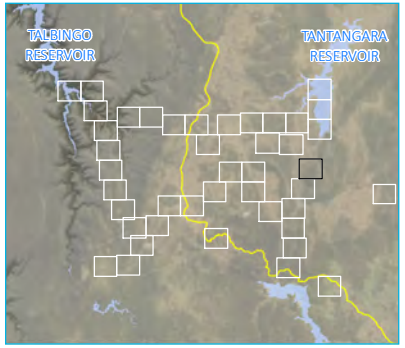
Snowy 2.0
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Figure 5.6.19

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

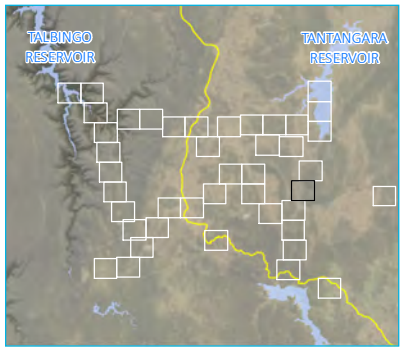
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Diurnal bird survey results

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Figure 5.6.20

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

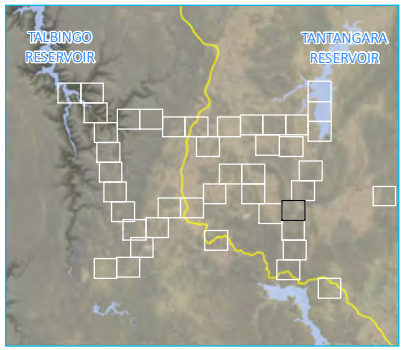
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.21

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

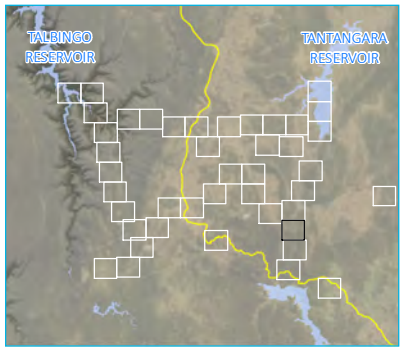
Snowy 2.0
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Figure 5.6.22

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

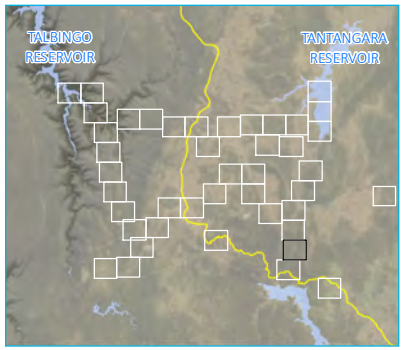
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.23





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

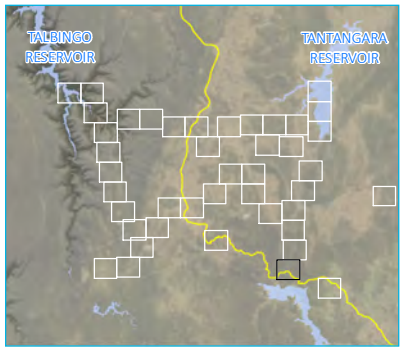
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.24

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

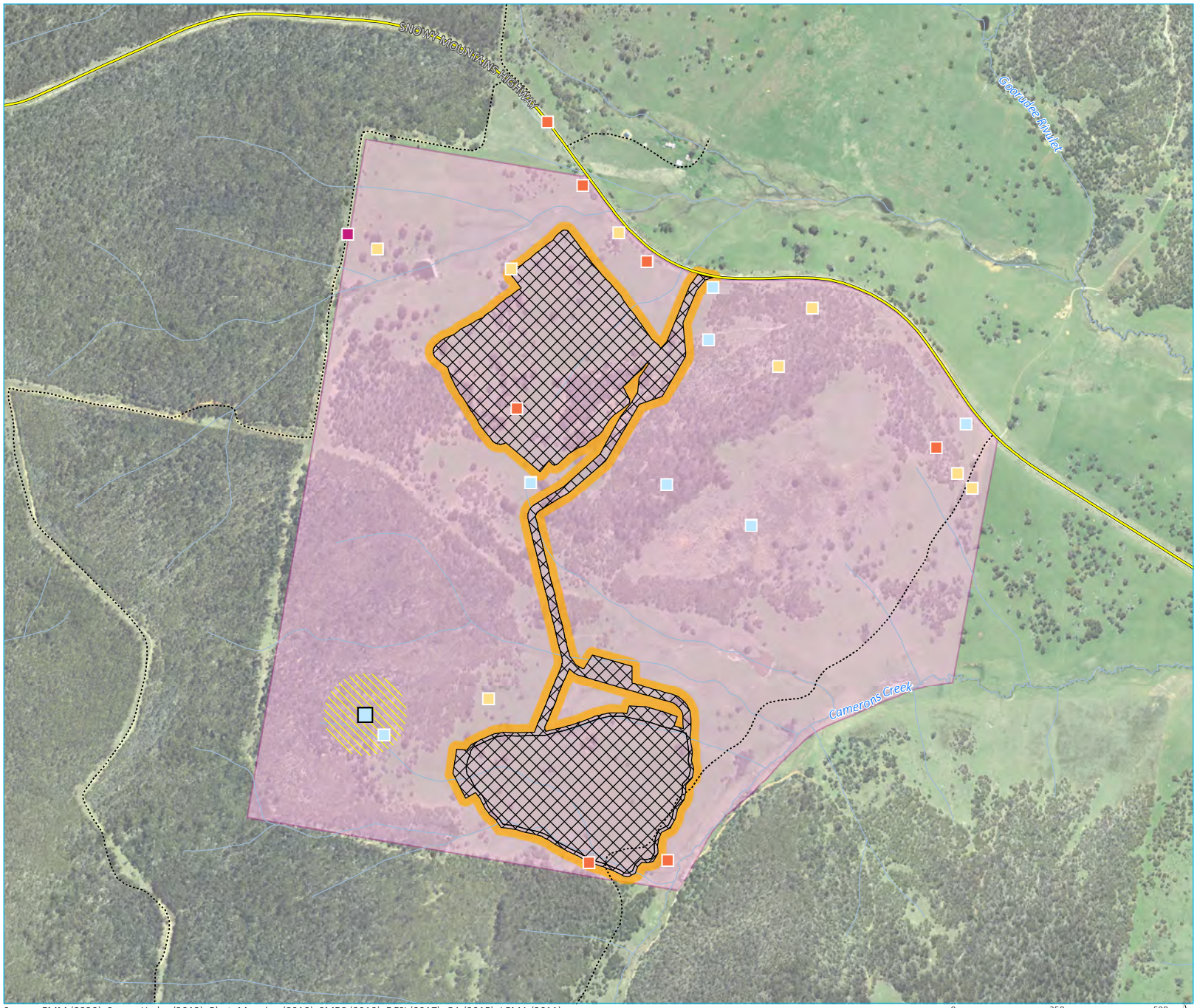
GDA 1994 MGA Zone 55

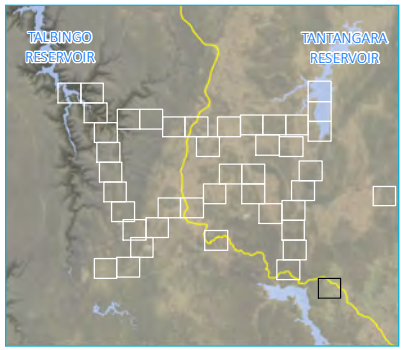
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.25





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Gang-gang Cockatoo habitat

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin
- Gang-gang Cockatoo breeding hollow

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020

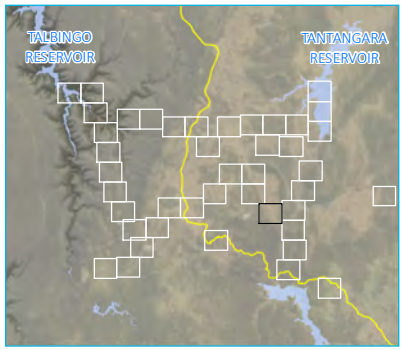
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.26

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.27

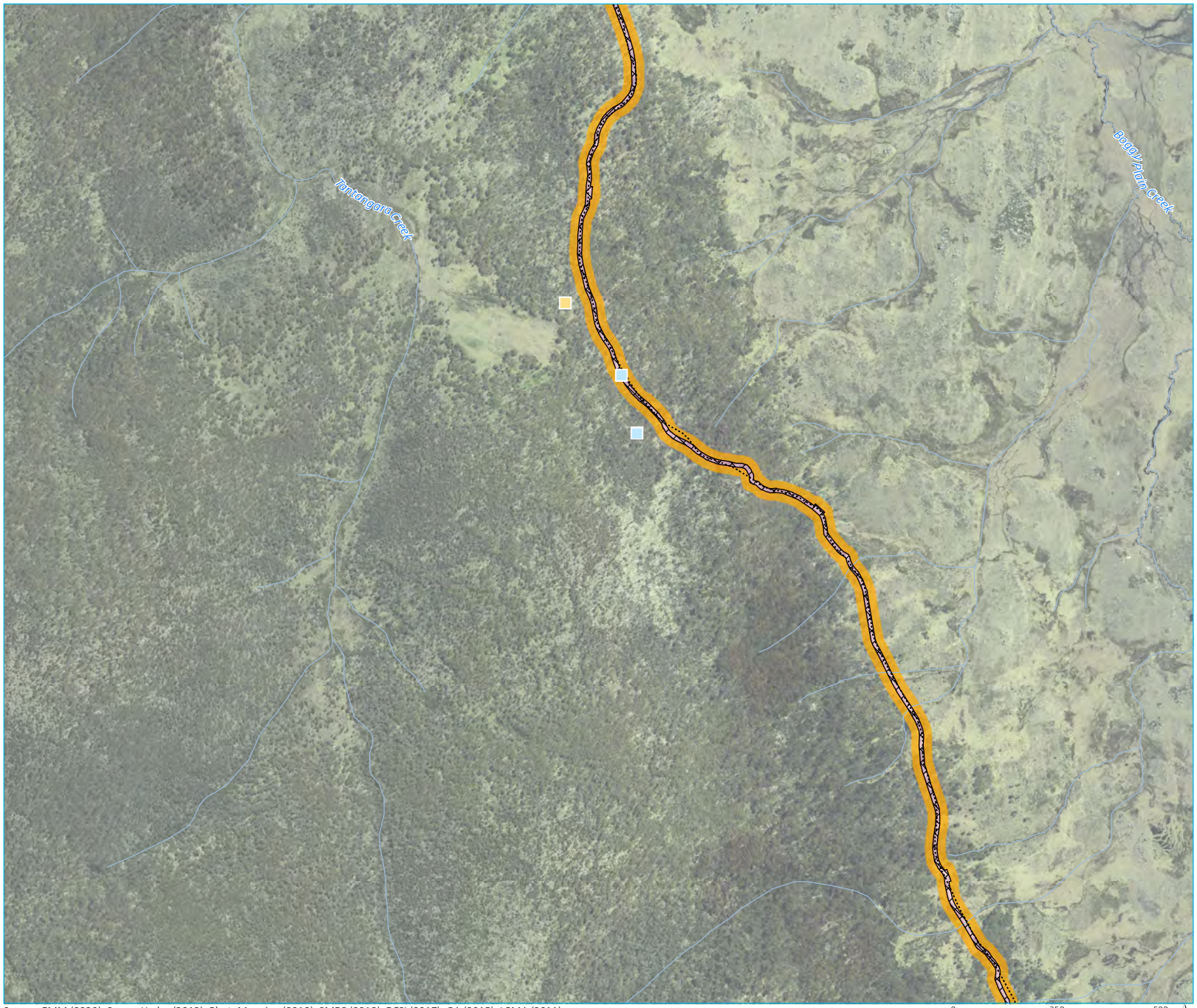
Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

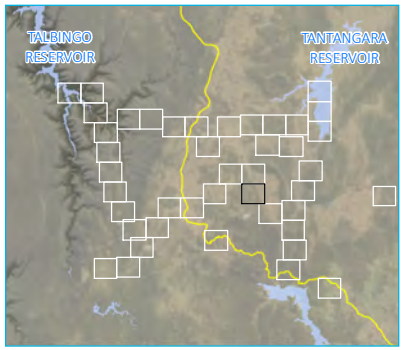
0 250 500 m

GDA 1994 MGA Zone 55

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

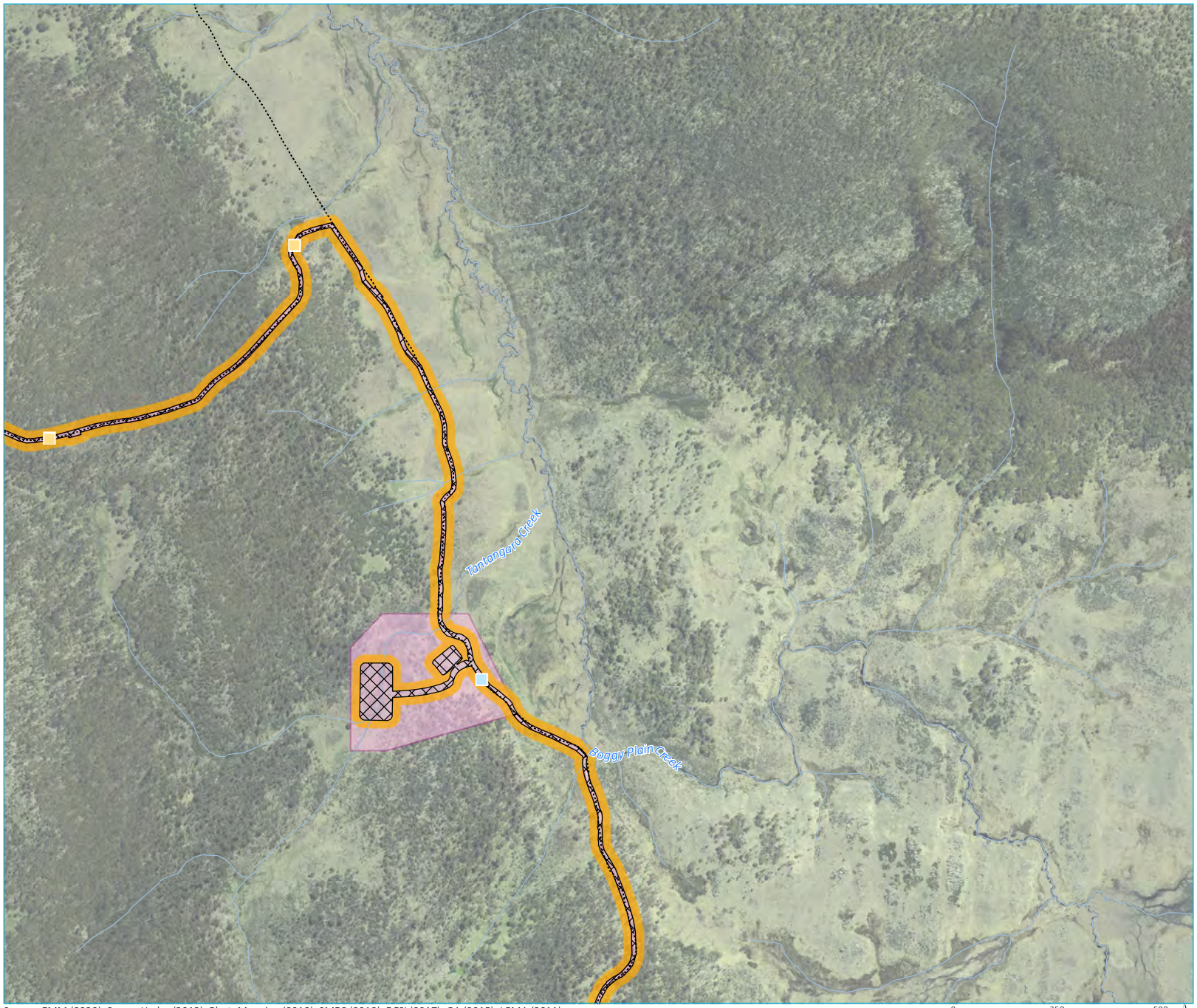
Diurnal bird survey results

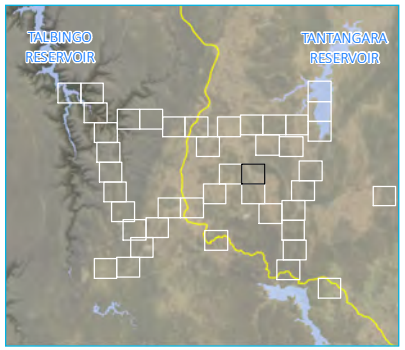
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.28

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

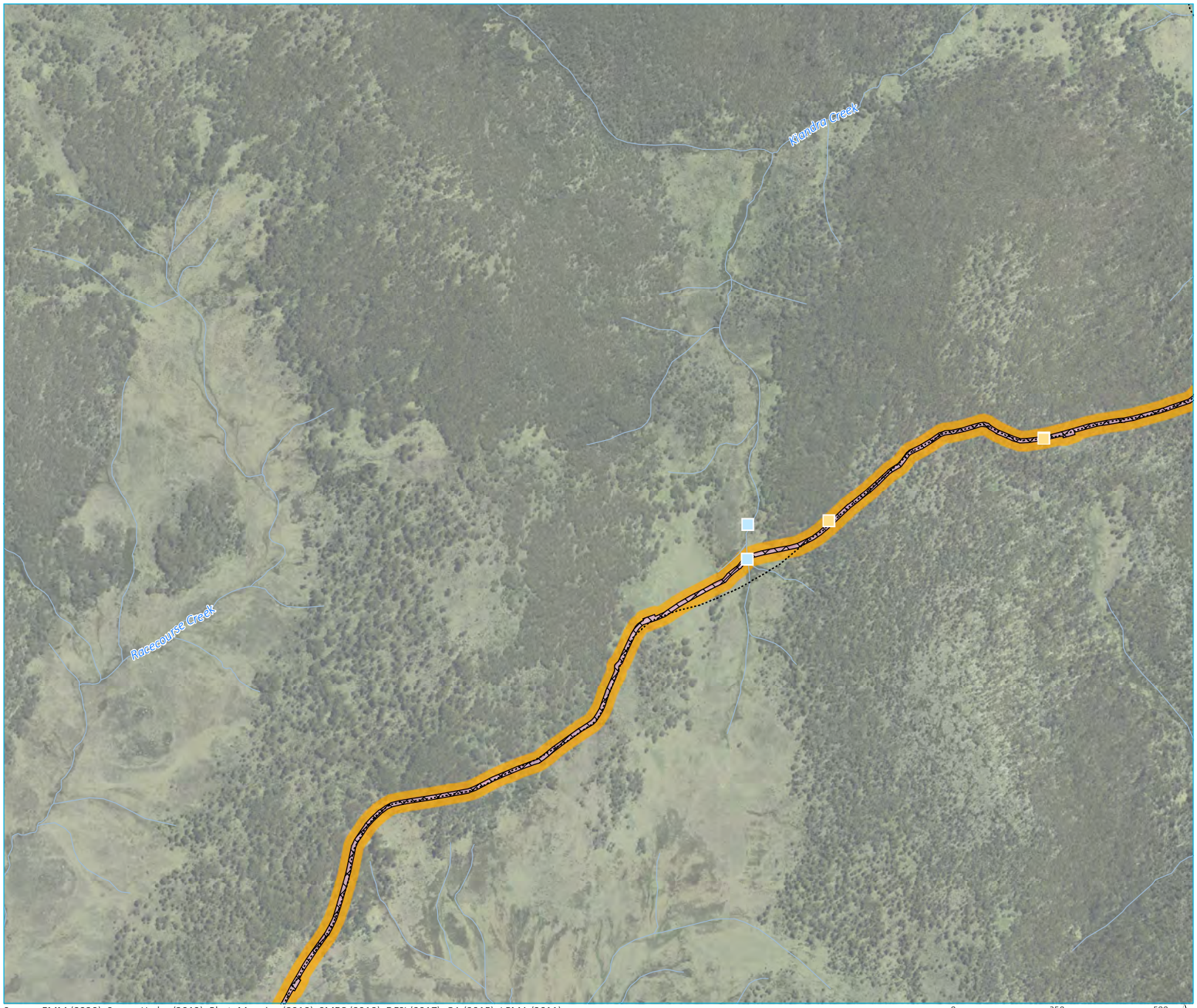
Diurnal bird survey results

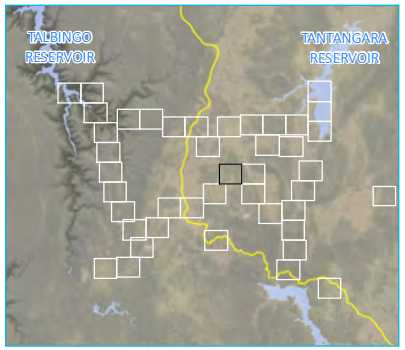
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.29

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

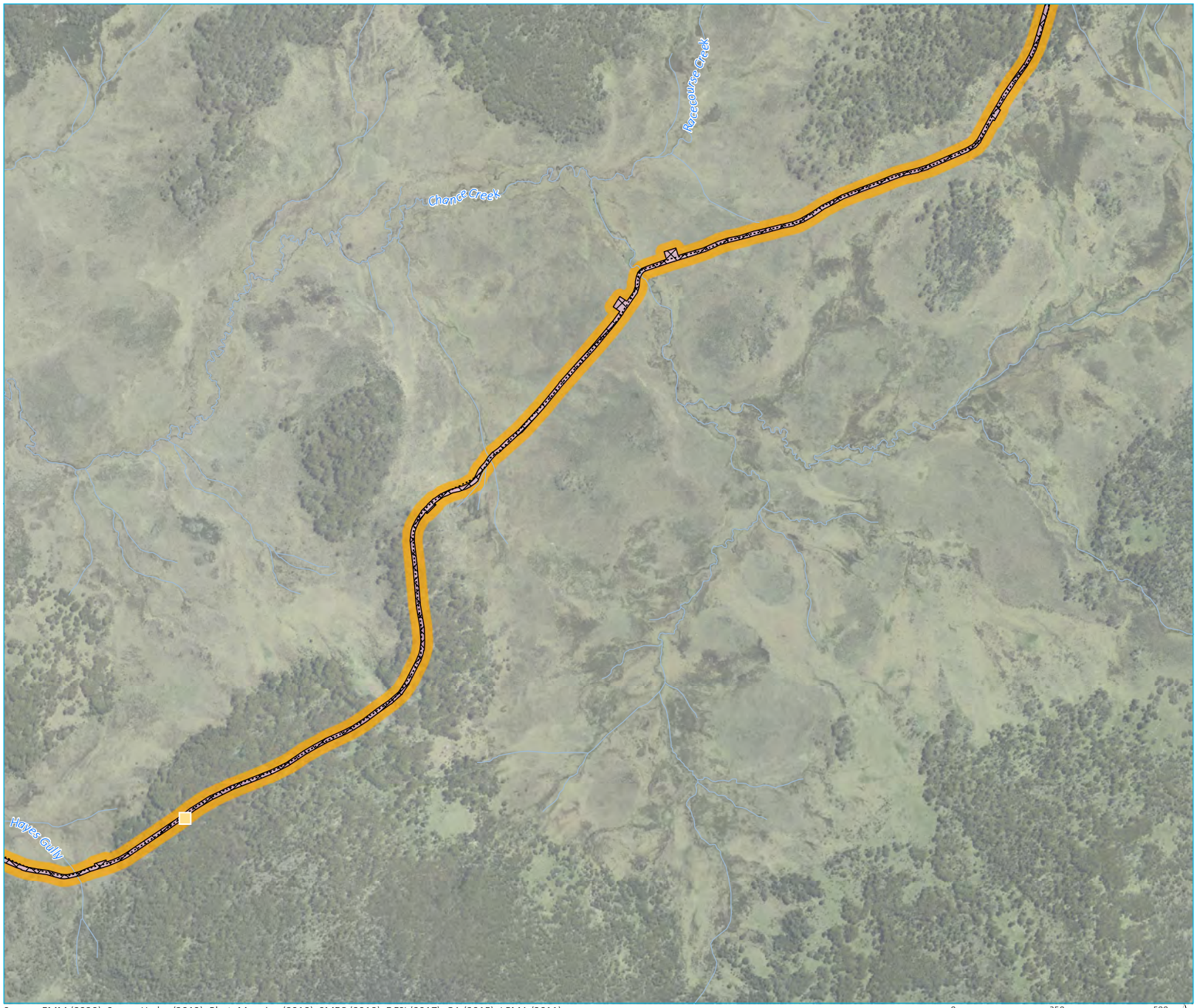
Diurnal bird survey results

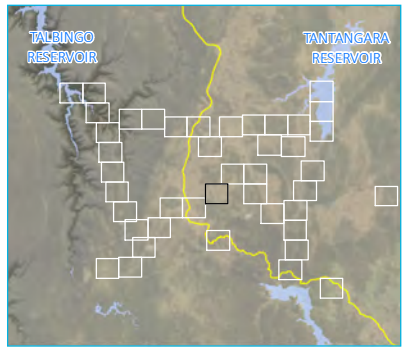
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.30

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

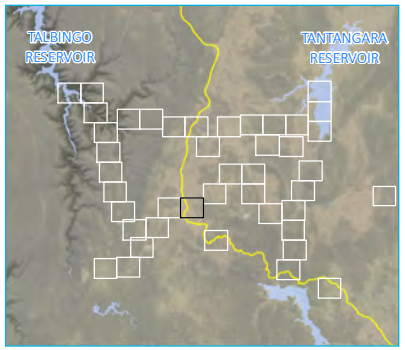
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.31

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\RtS\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

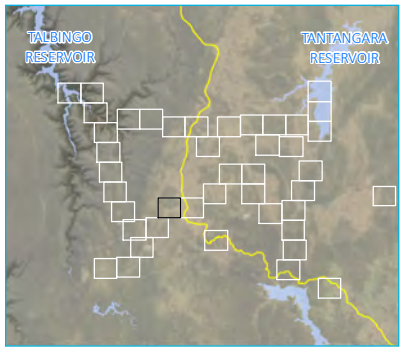
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.32

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

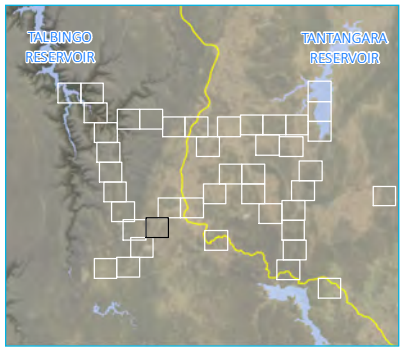
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.33

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

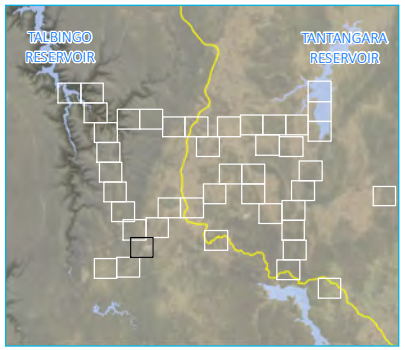
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.34





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Square-tailed Kite

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

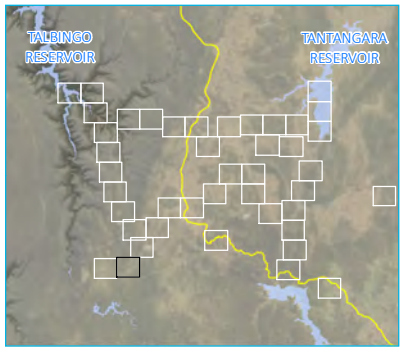
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.35

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo
- Square-tailed Kite

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

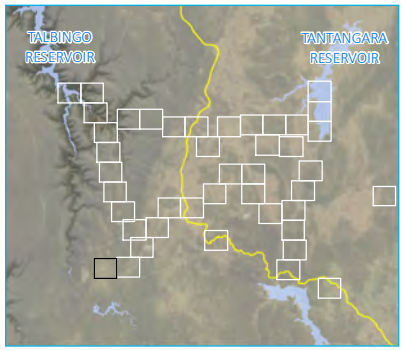
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.36

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020

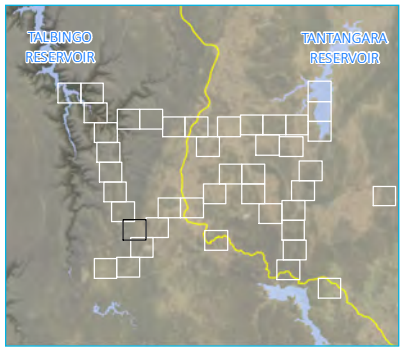
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.37

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

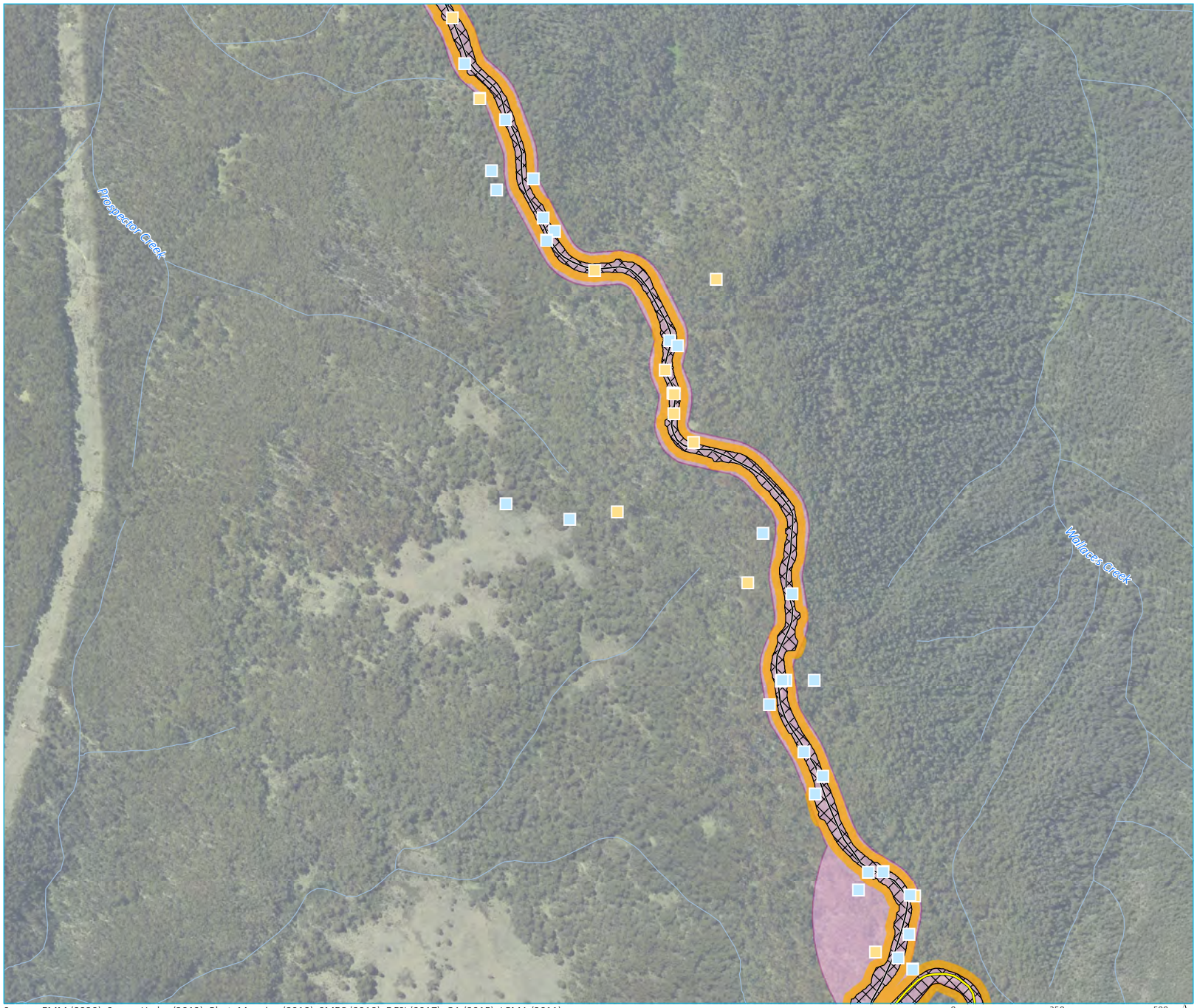
Diurnal bird survey results

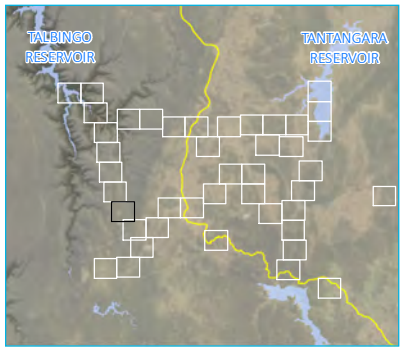
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.38

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

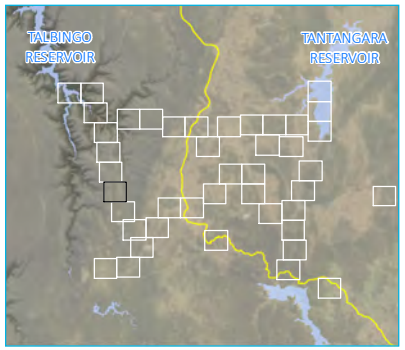
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.39

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Gang-gang Cockatoo habitat
- Gang-gang Cockatoo species polygon

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Olive Whistler
- Gang-gang Cockatoo breeding hollow

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Diurnal bird survey results

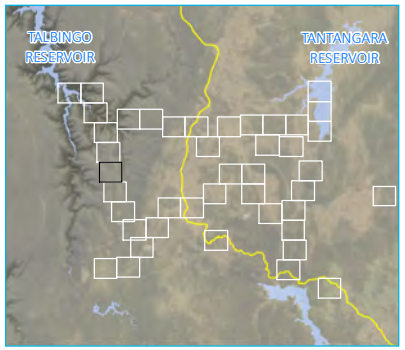
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.6.40

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020

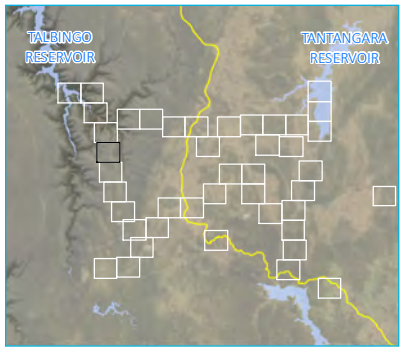
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.41

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow

Diurnal bird survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

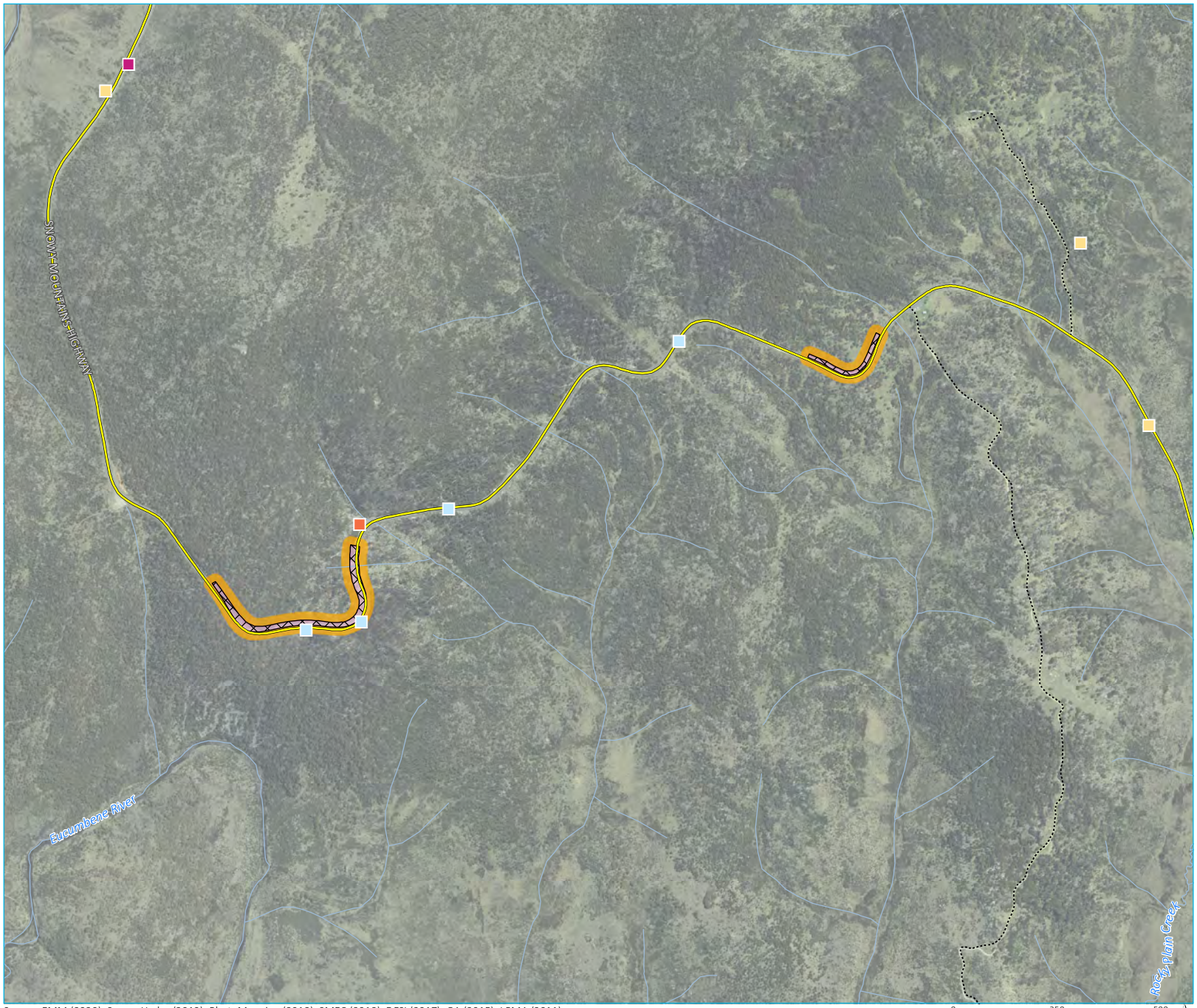
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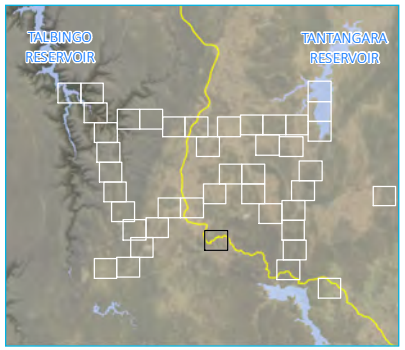
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.42

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR009_DiurnalBirdResults_20200206_DDP_01.mxd 20/02/2020





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Dusky Woodswallow
- Flame Robin
- Gang-gang Cockatoo
- Scarlet Robin

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

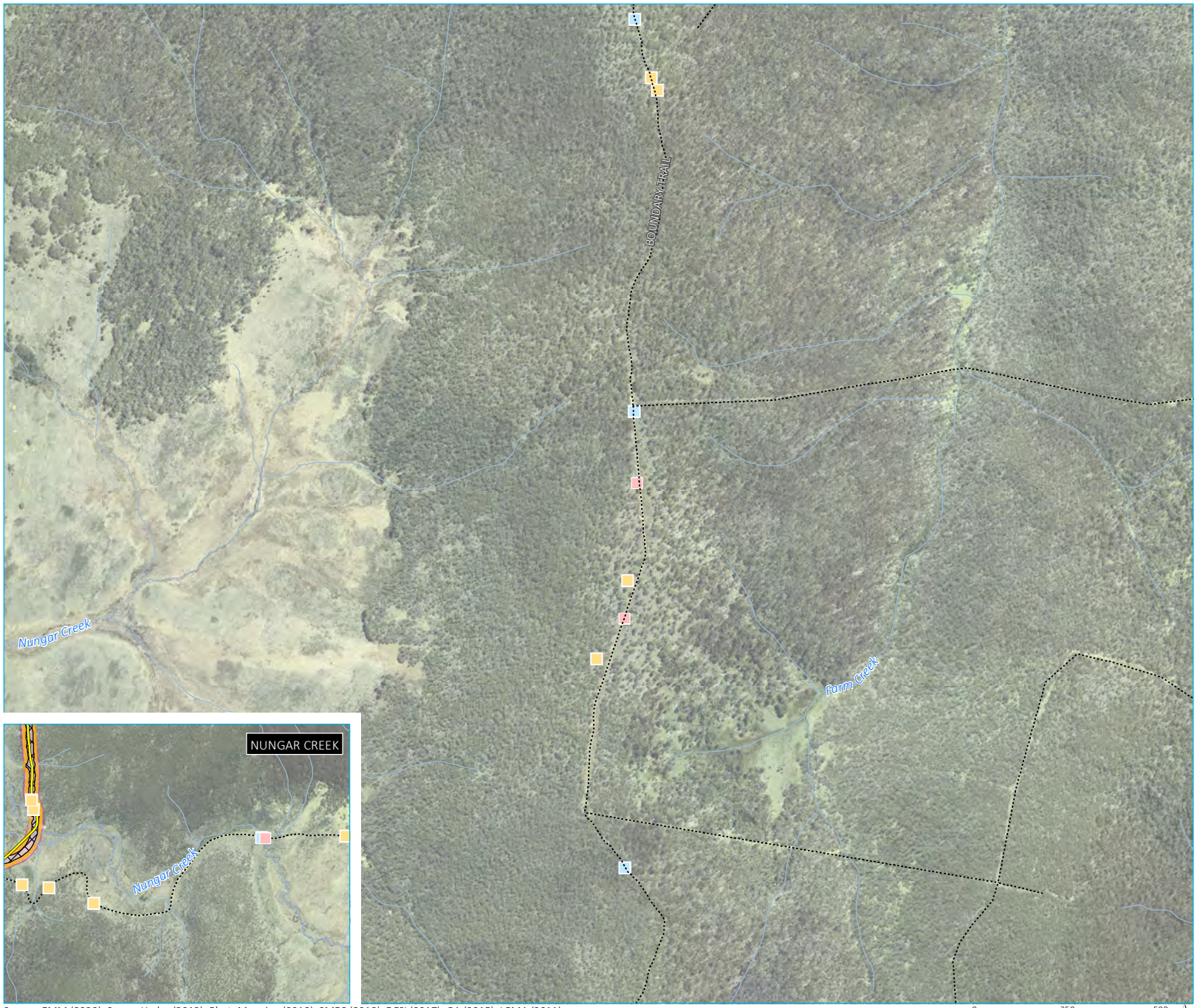
GDA 1994 MGA Zone 55

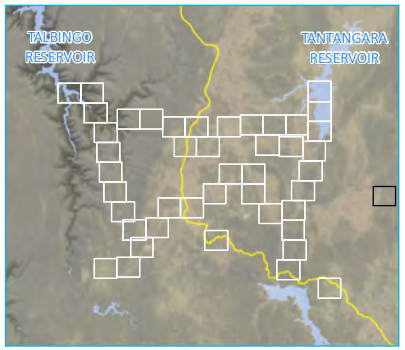
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Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.43





KEY

- Watercourse / drainage line
- Vehicular track
- Construction envelope

Threatened fauna

- White-throated Needletail
- Flame Robin
- Gang-gang Cockatoo

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

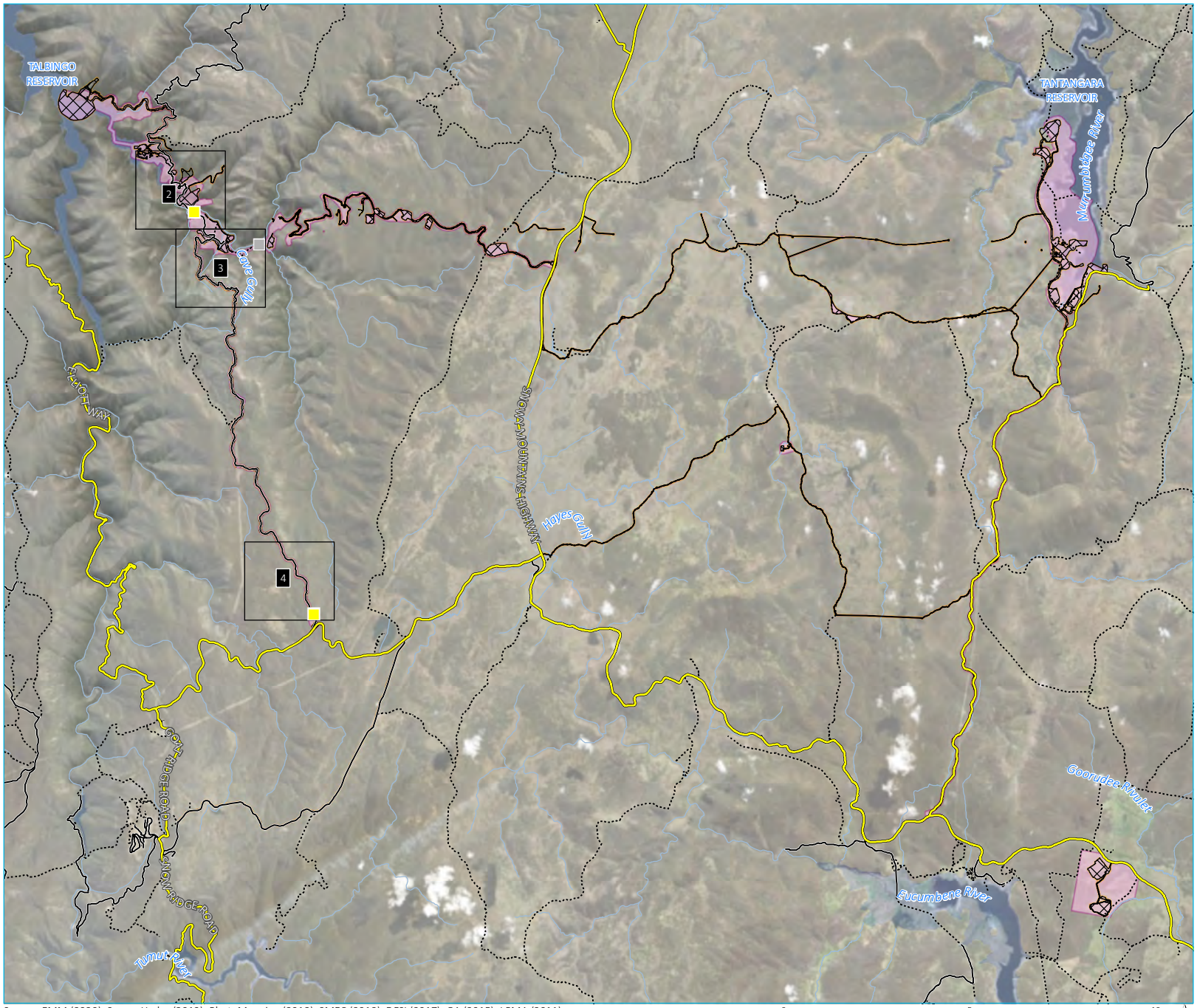
Diurnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.6.44

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Masked Owl
- Powerful Owl

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

N

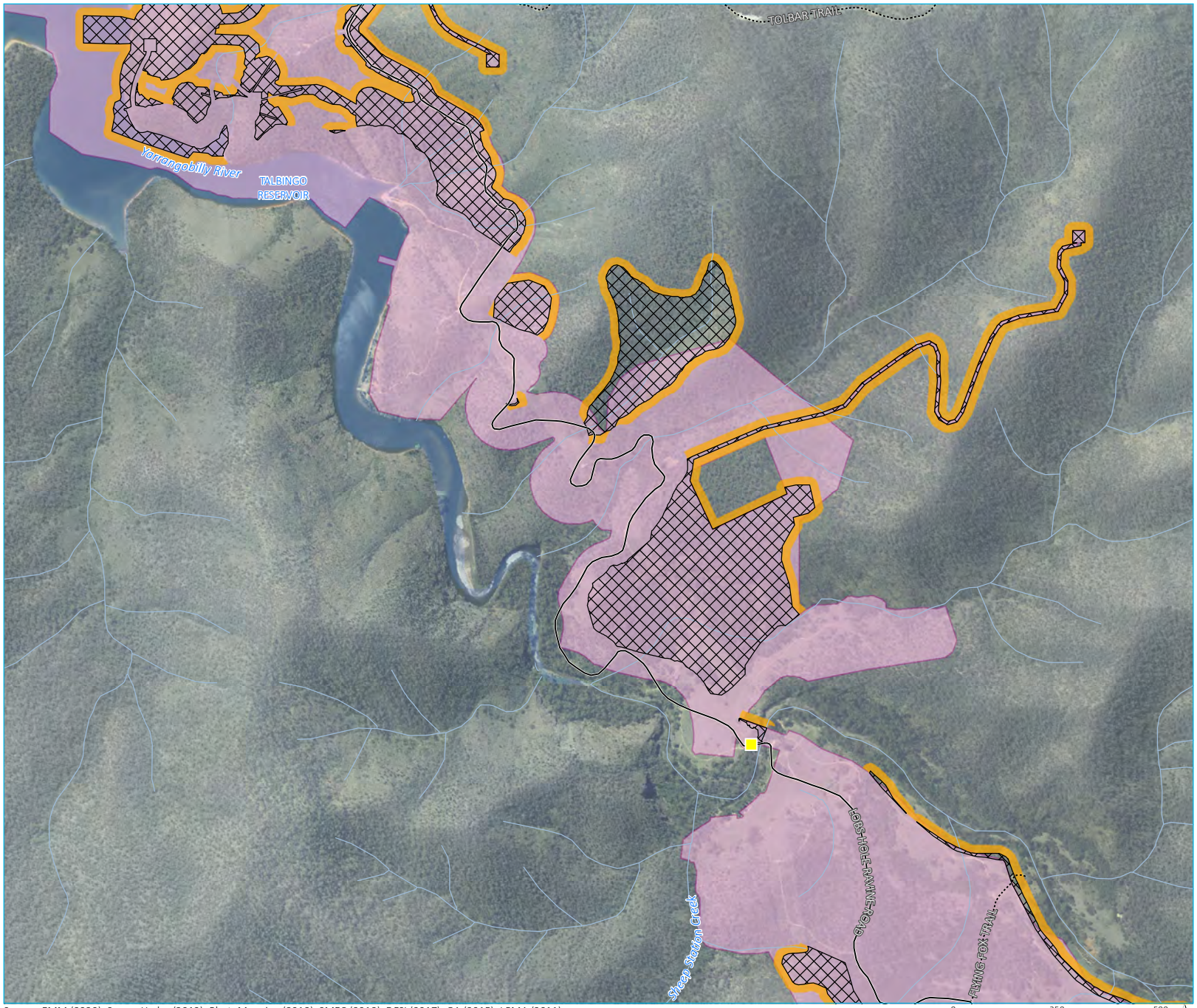
Nocturnal bird survey results
-page index

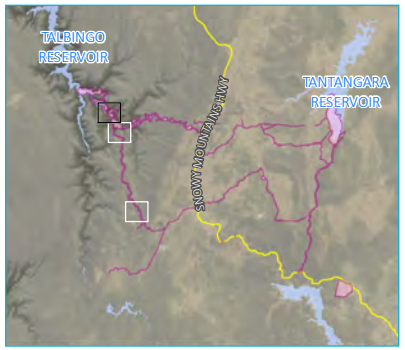
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.7.1

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR010_NocturnalBirdResults_20200206_OVERVIEW_01.mxd 19/02/2020





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Masked Owl

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

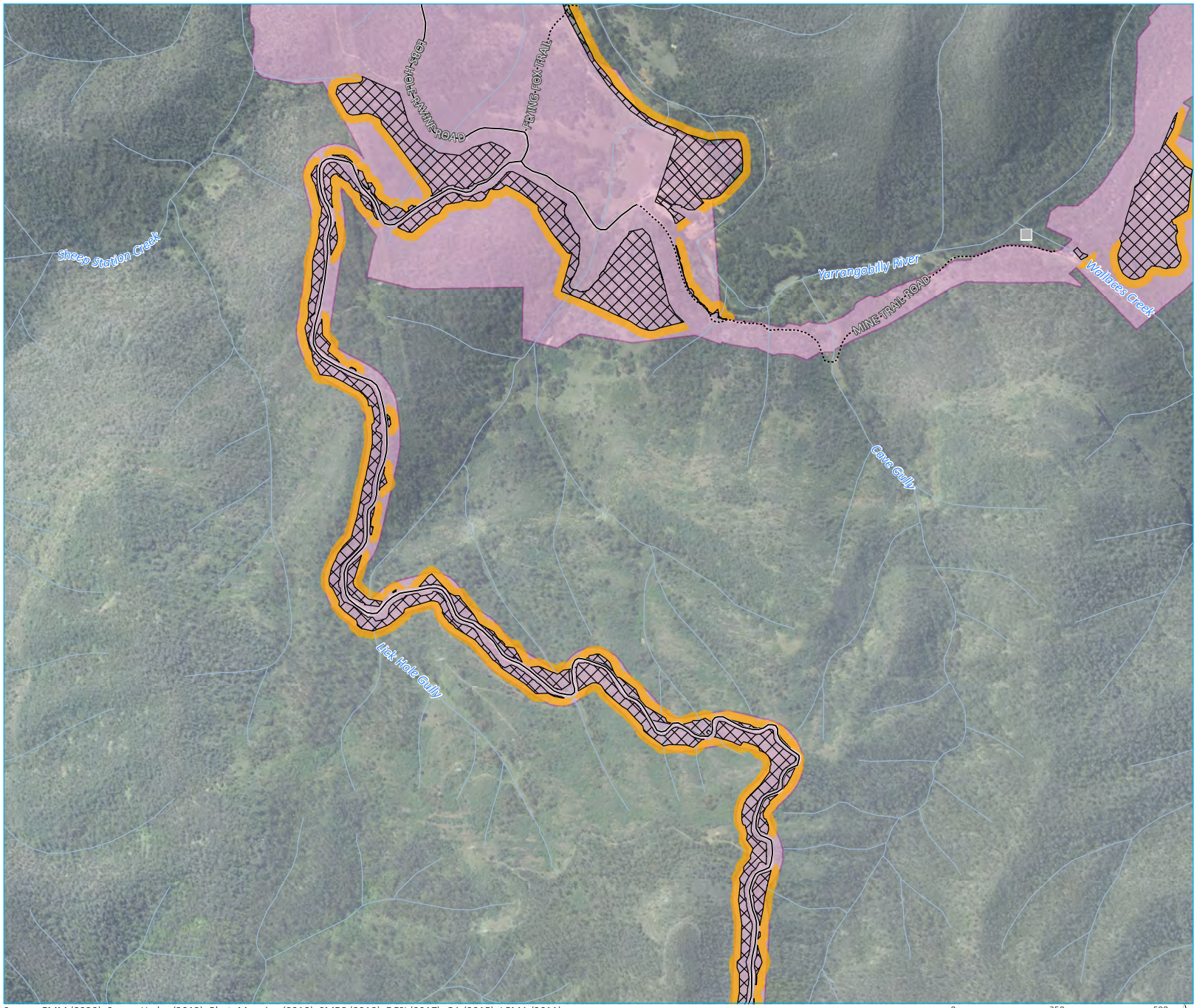
Nocturnal bird survey results

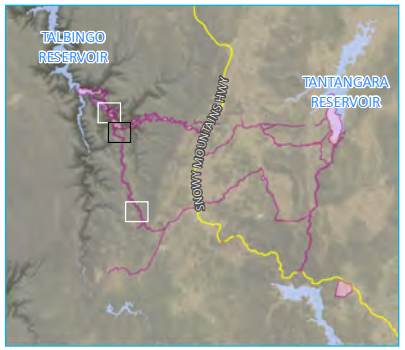
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 6.7.2

snowy 2.0

EMM creating opportunities

O:\17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\RtS\BDAR\BDAR010_NocturnalBirdResults_20200206_DDP_02.mxd 19/02/2020





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Powerful Owl

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

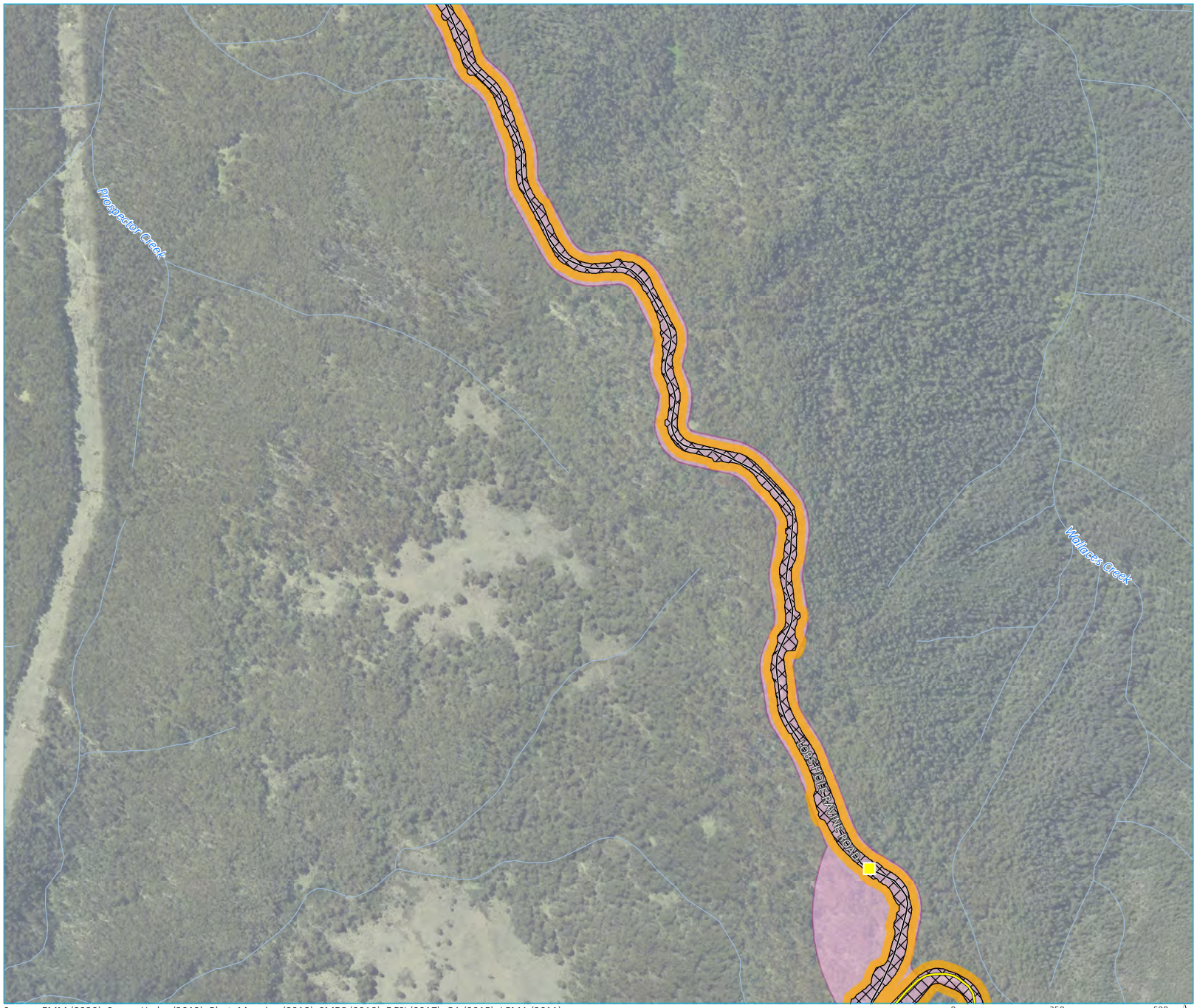
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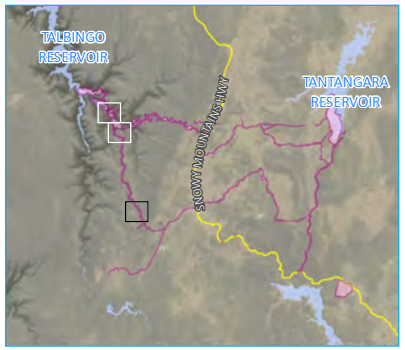
Nocturnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 6.7.3

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Masked Owl

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

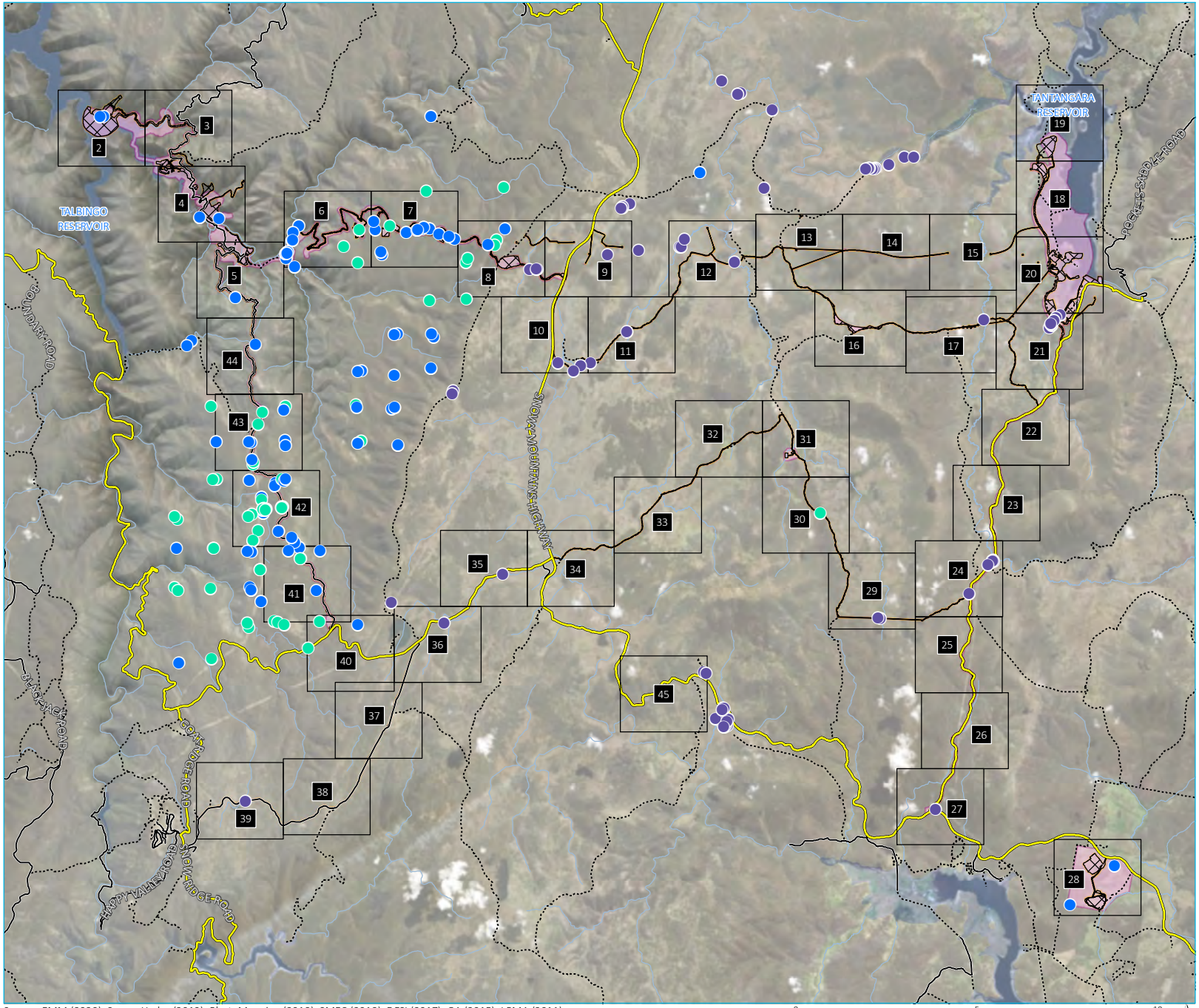
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Nocturnal bird survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 6.7.4

snowy 2.0

EMM creating opportunities



KEY

- Watercourse
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Broad-toothed Rat
- Eastern Pygmy-possum
- Smoky Mouse

Small terrestrial mammal survey results - page index

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

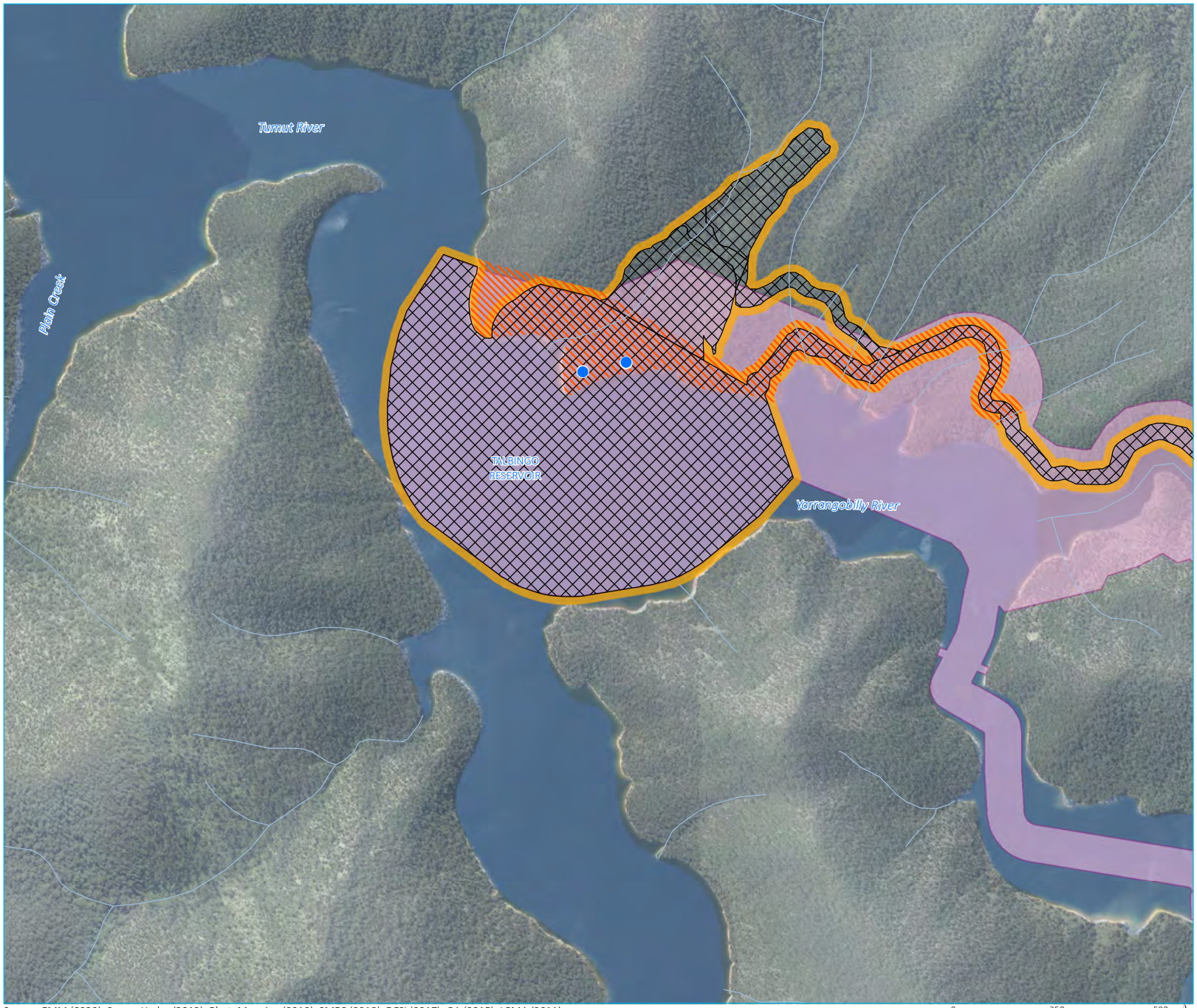
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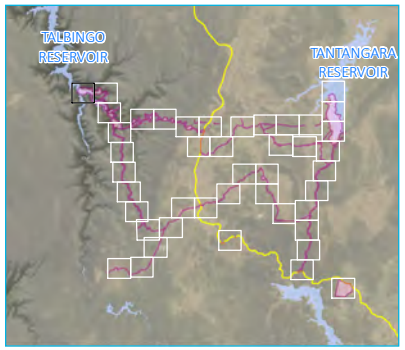
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.1

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR011_SmallMammalResults_20200206_OVERVIEW_01.mxd 21/02/2020





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon

Threatened fauna

- Eastern Pygmy-possum

Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.2

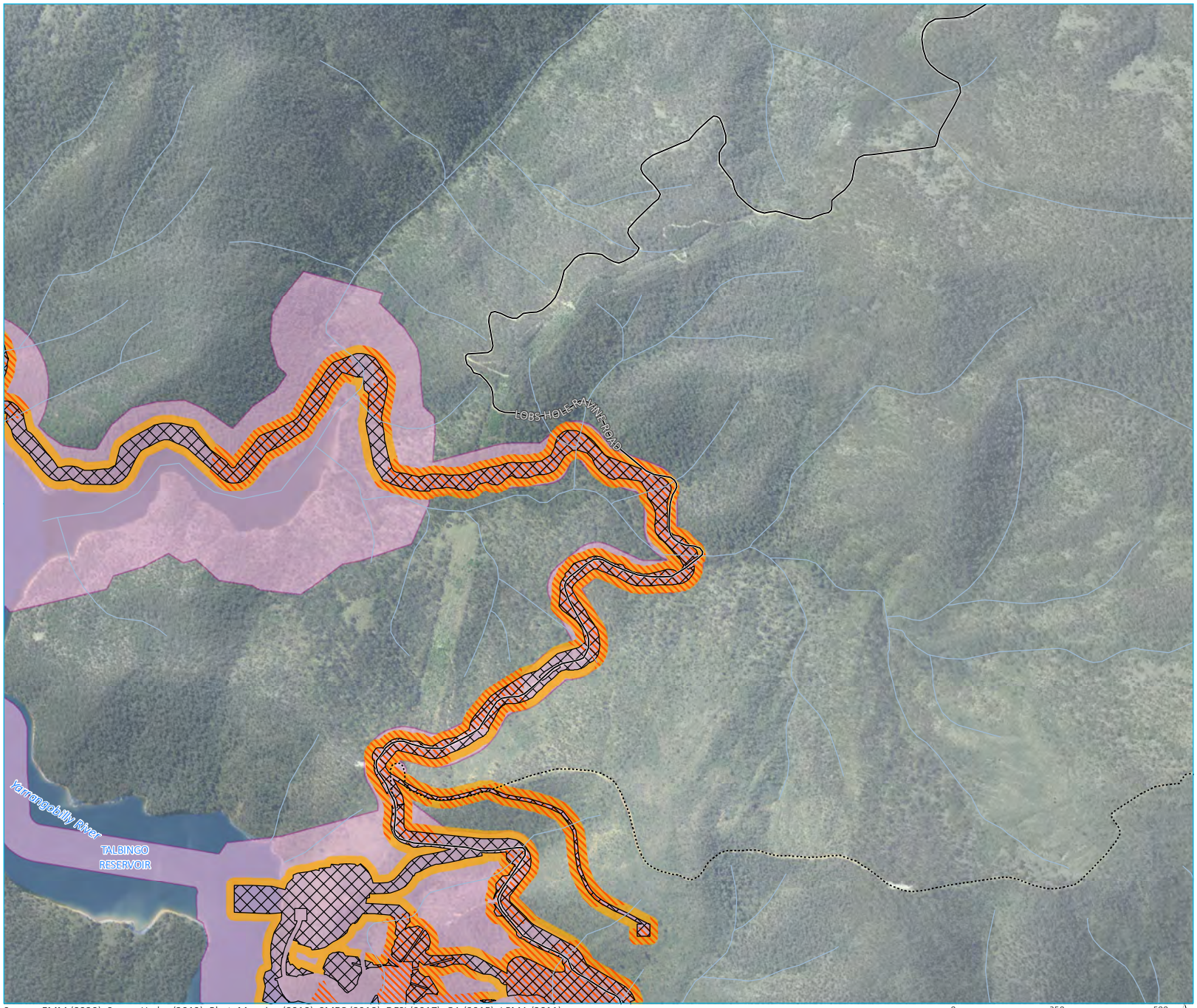
Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

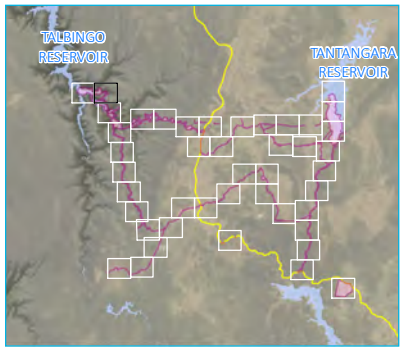
0 250 500 m

GDA 1994 MGA Zone 55

N

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

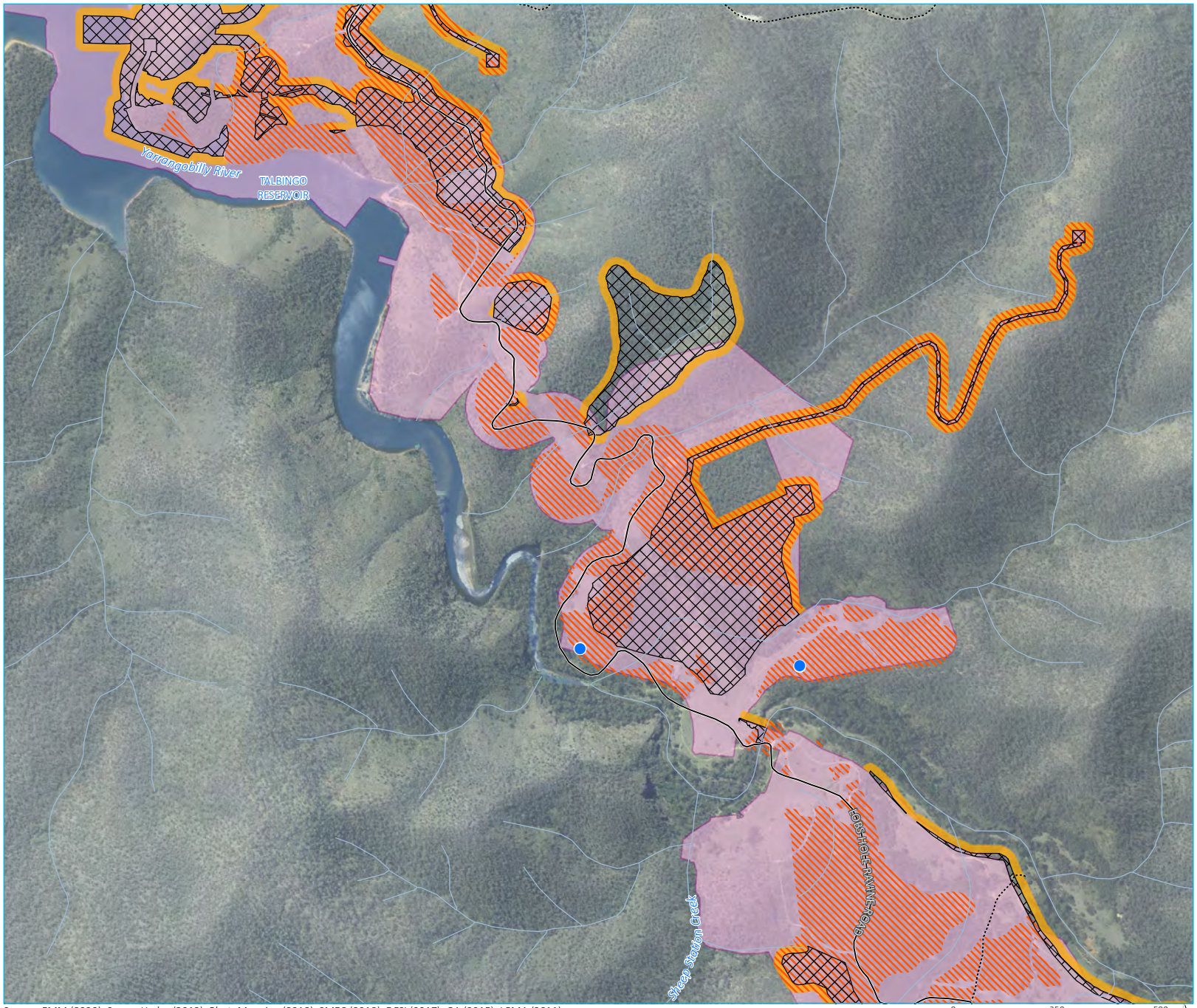
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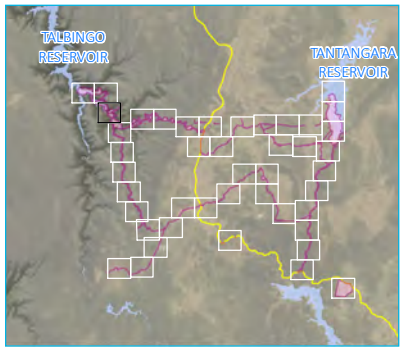
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.3

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon

Threatened fauna

- Eastern Pygmy-possum

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

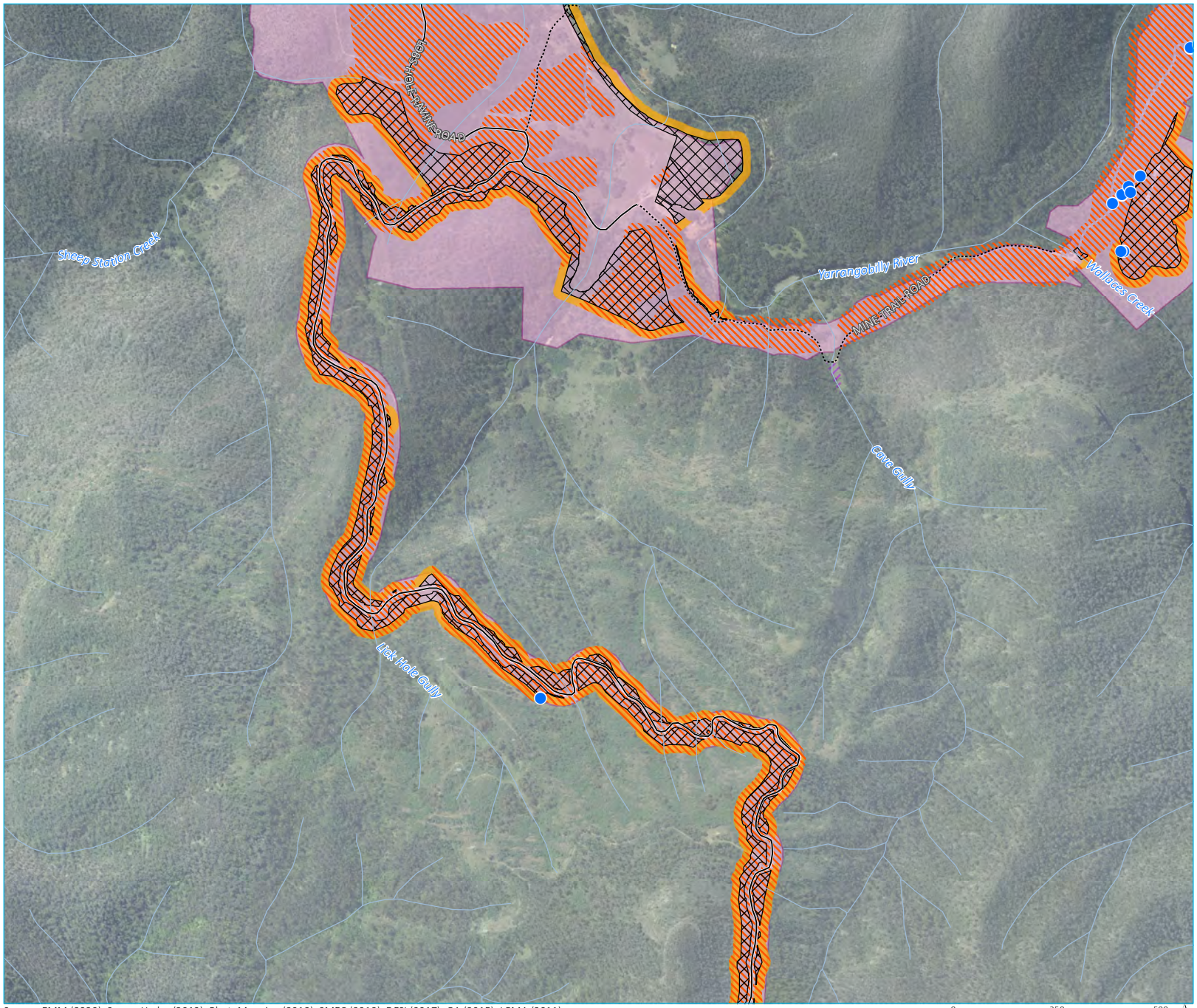
Small terrestrial mammal survey results

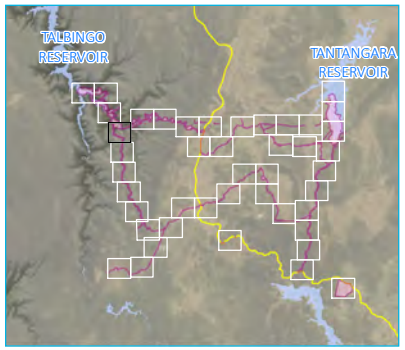
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.4

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Eastern Pygmy-possum

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Small terrestrial mammal survey results

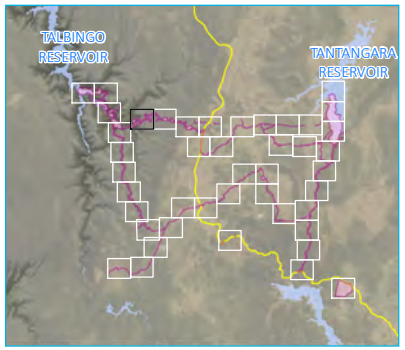
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.5

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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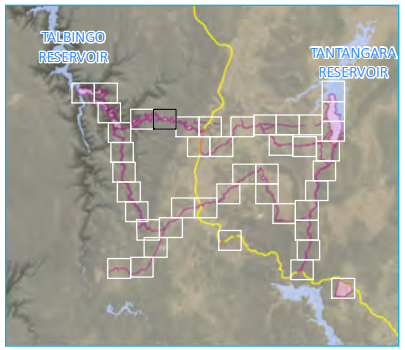
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.6

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

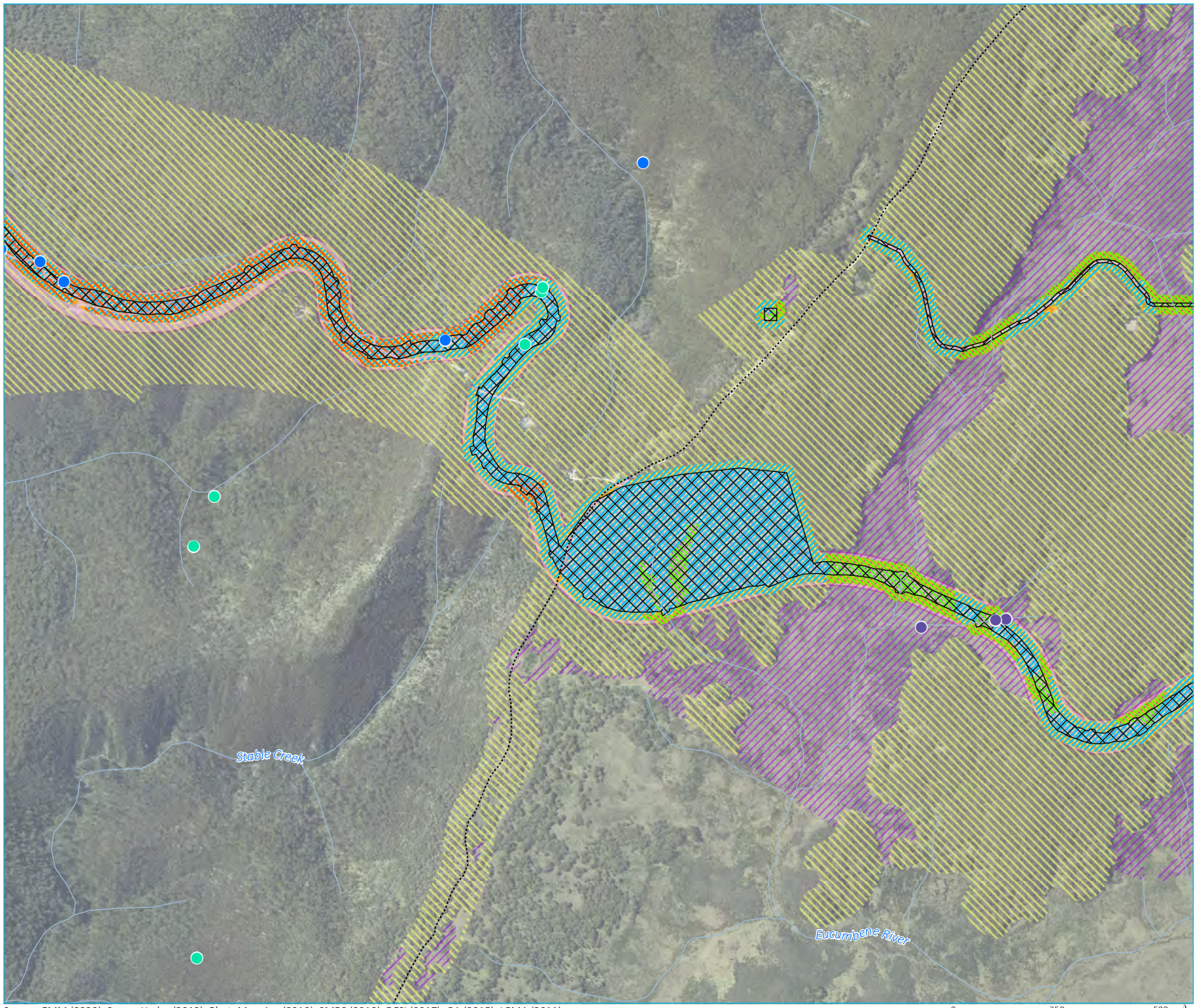
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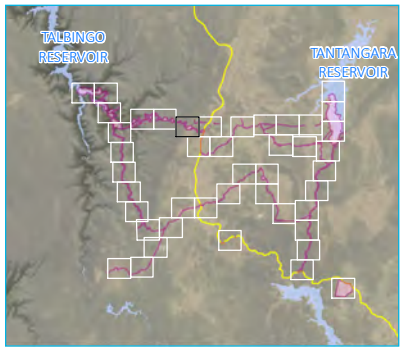
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.7

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat
- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

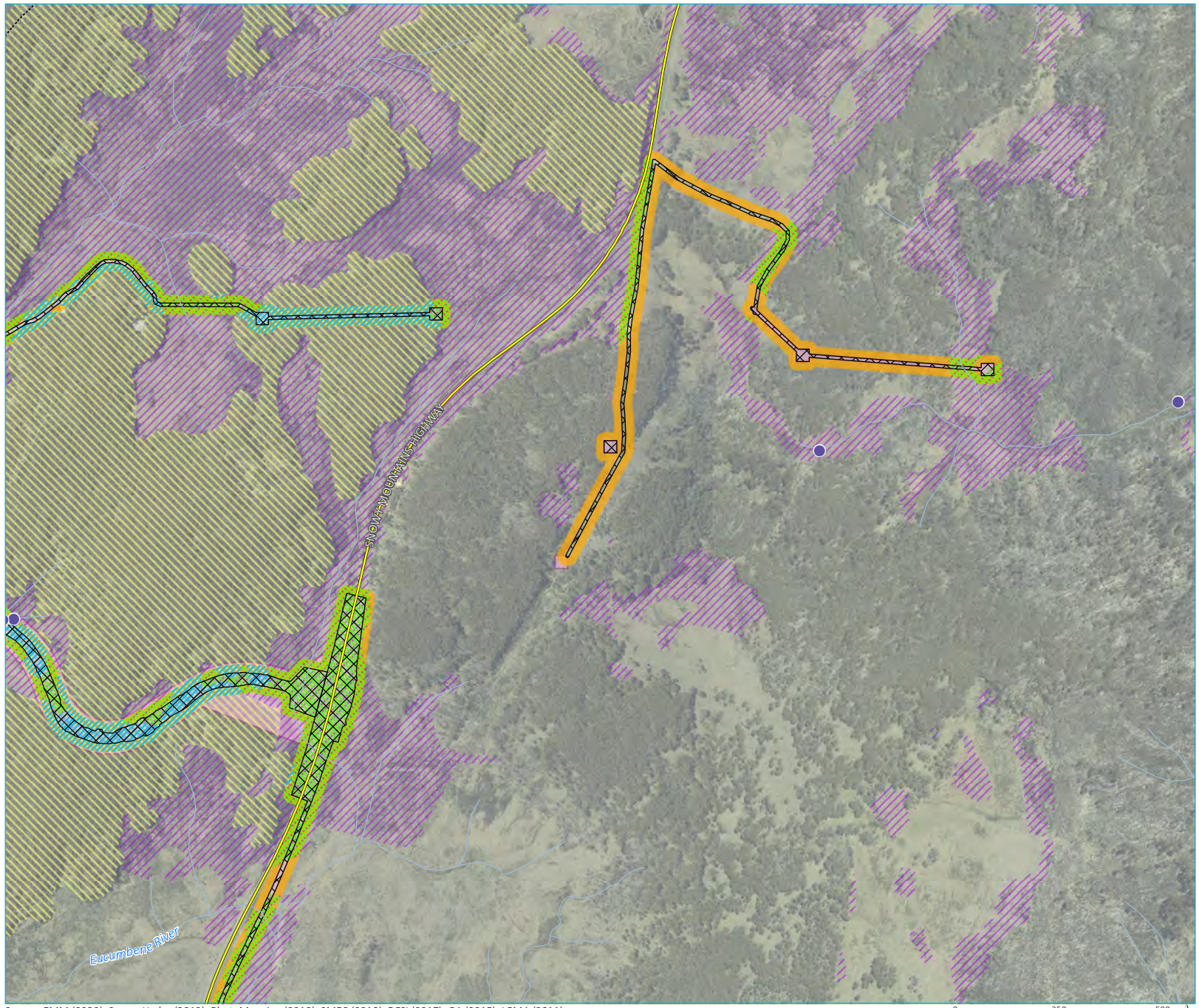
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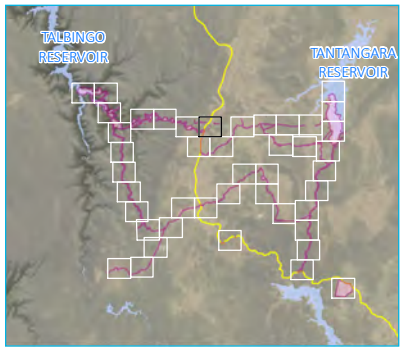
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.8

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

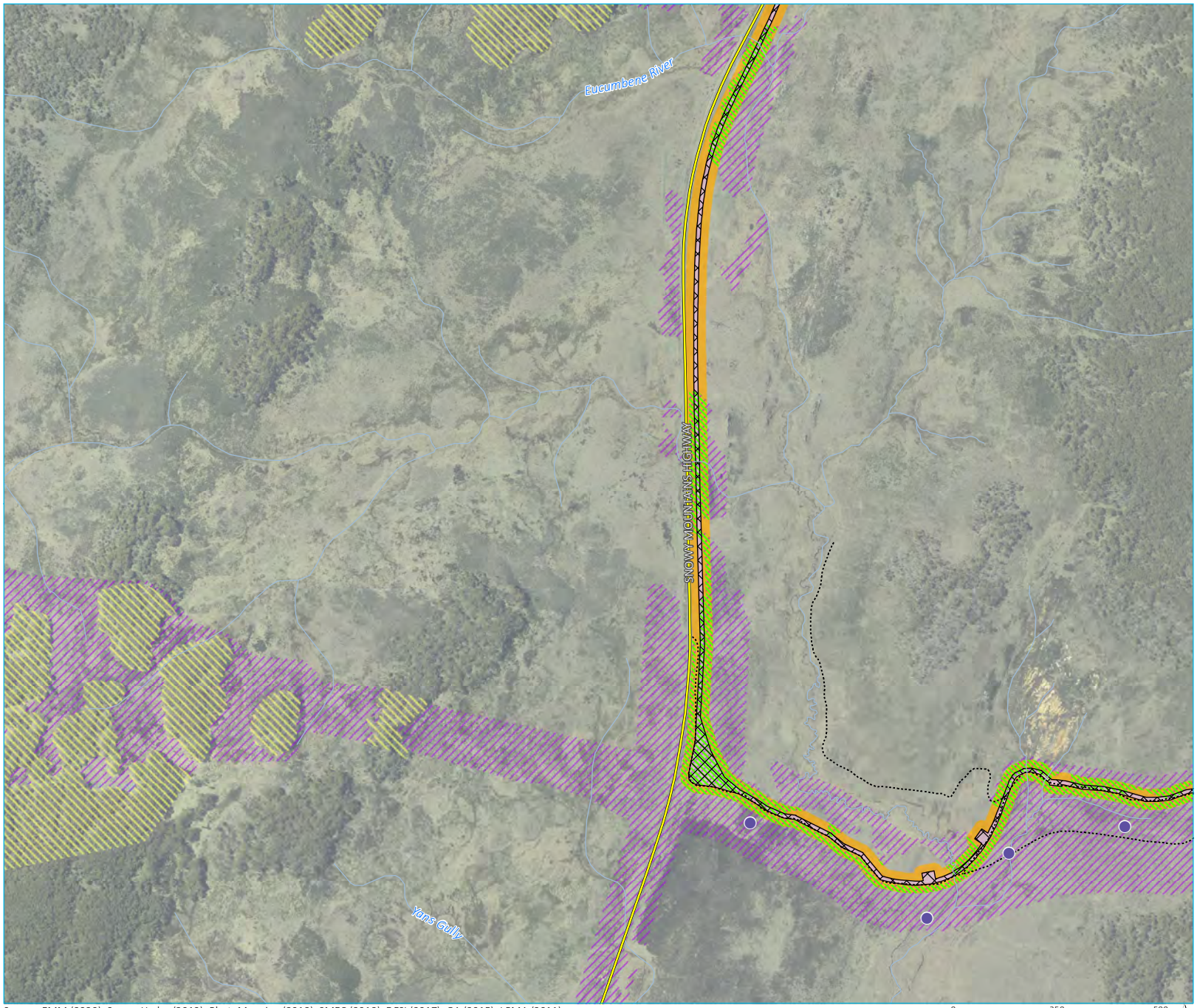
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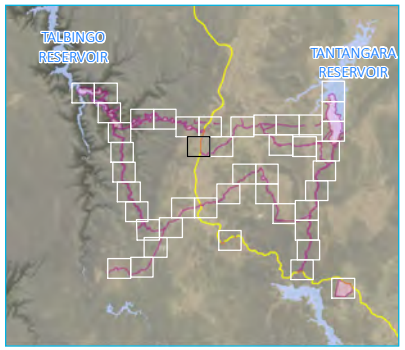
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.9

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

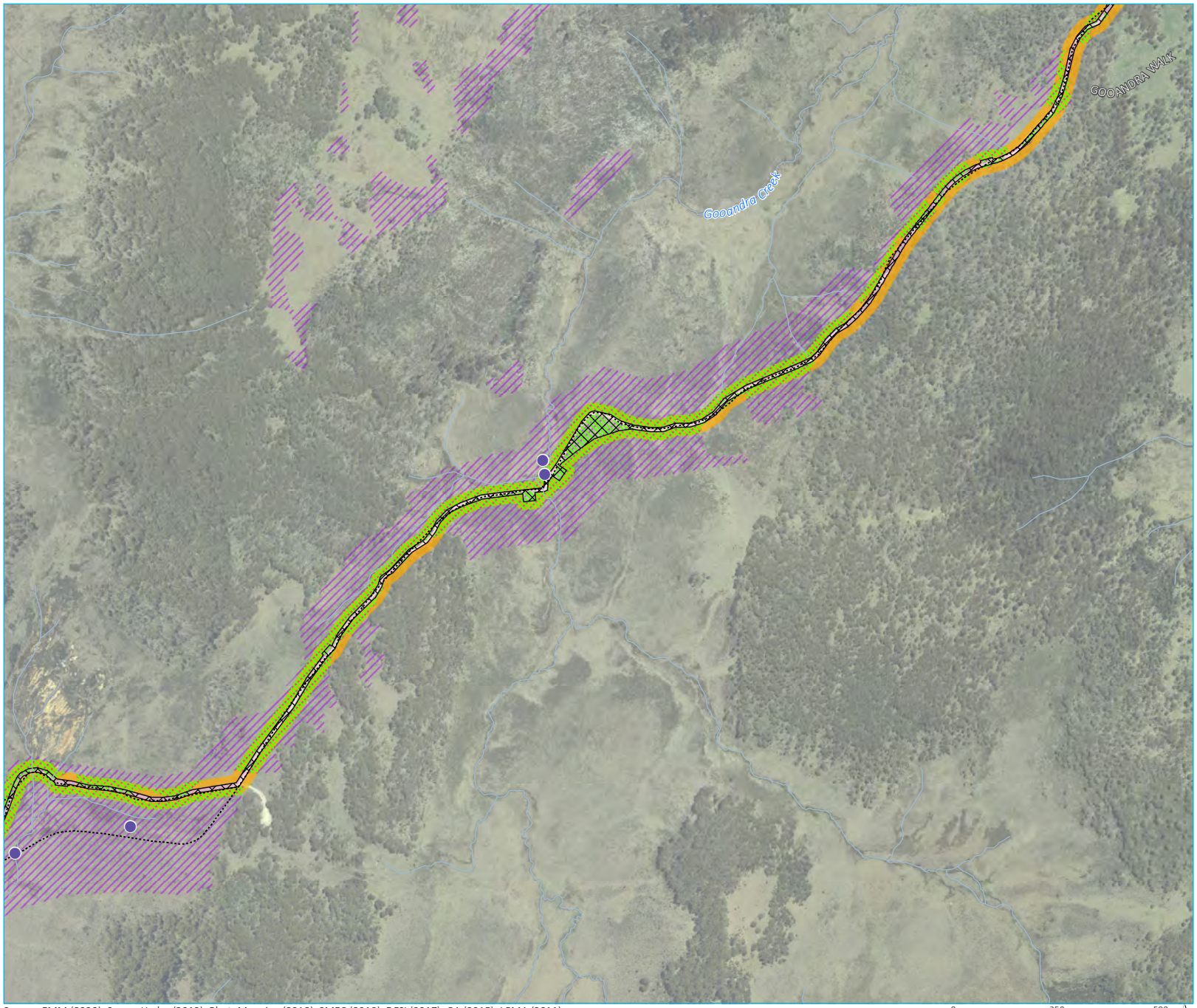
Small terrestrial mammal survey results

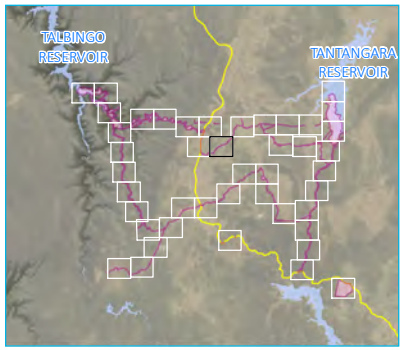
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.10

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

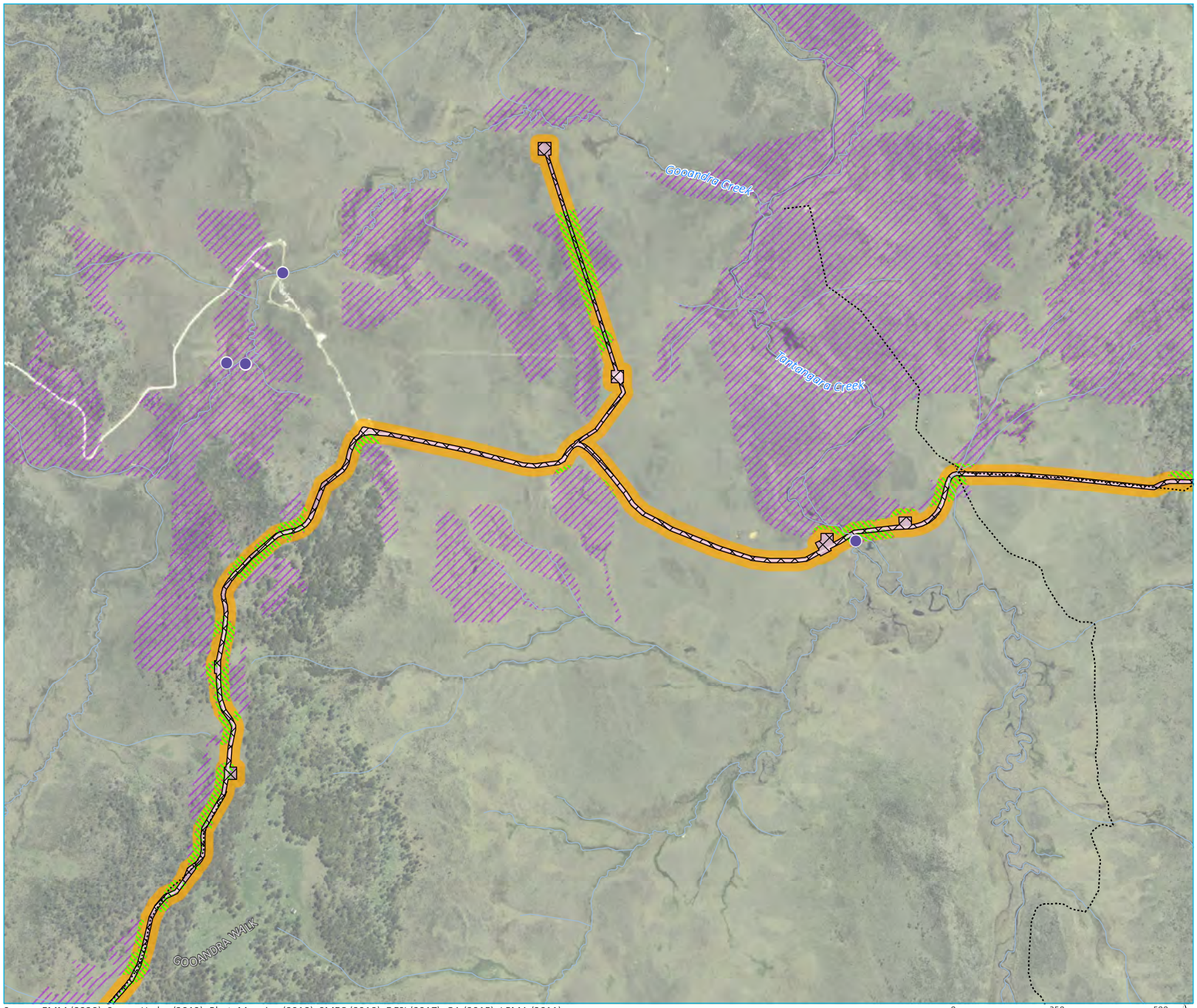
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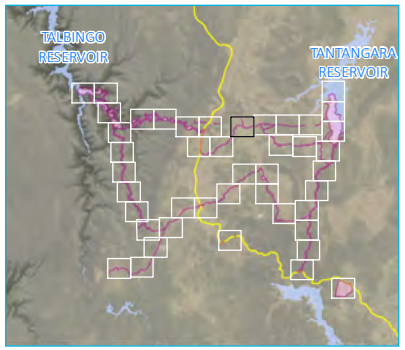
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.11

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

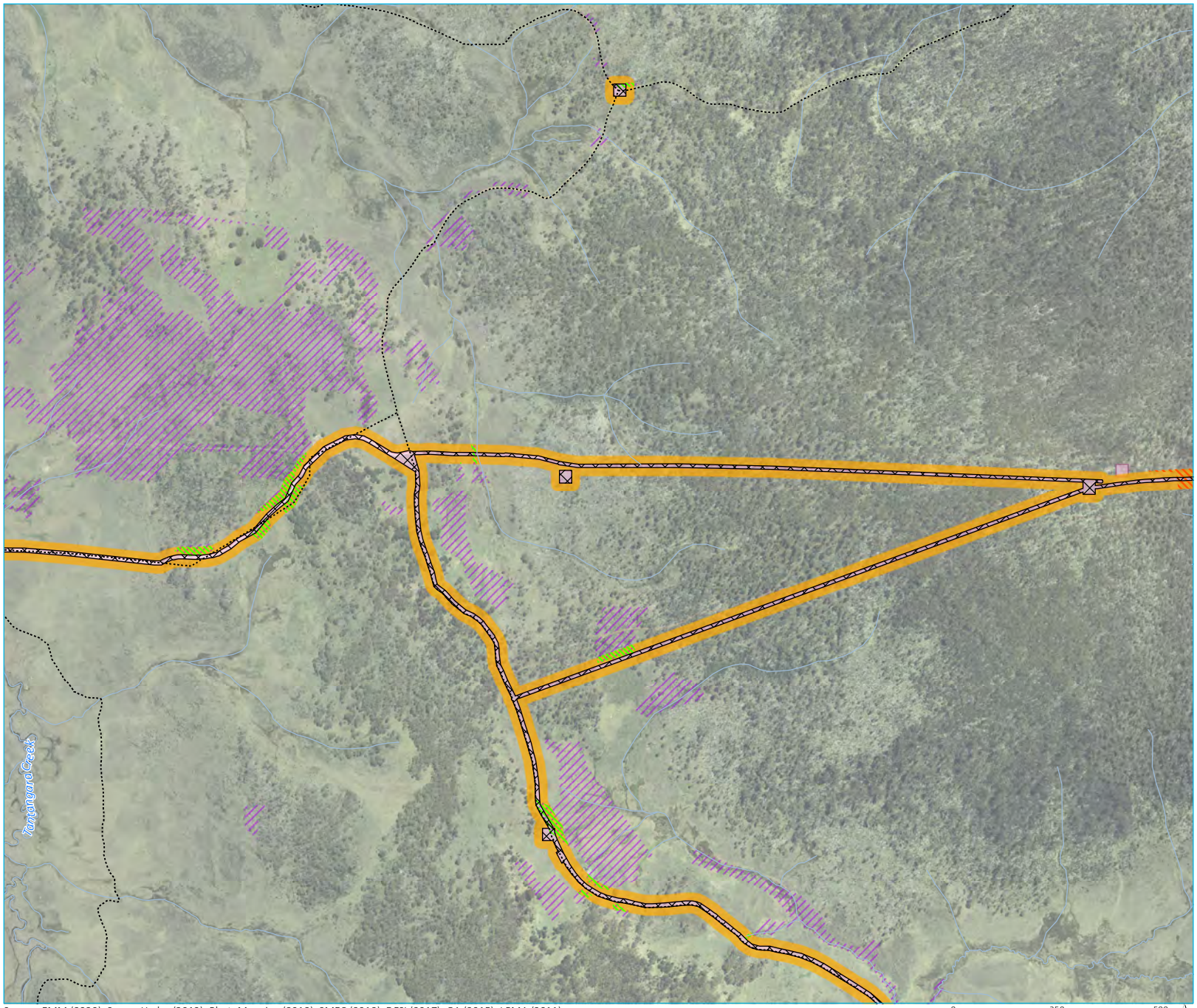
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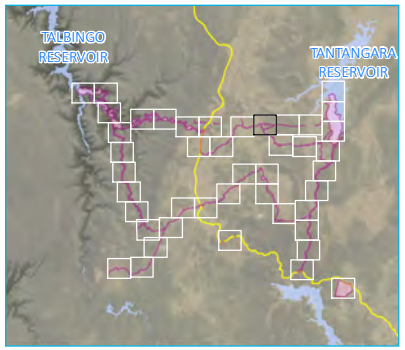
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.12

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

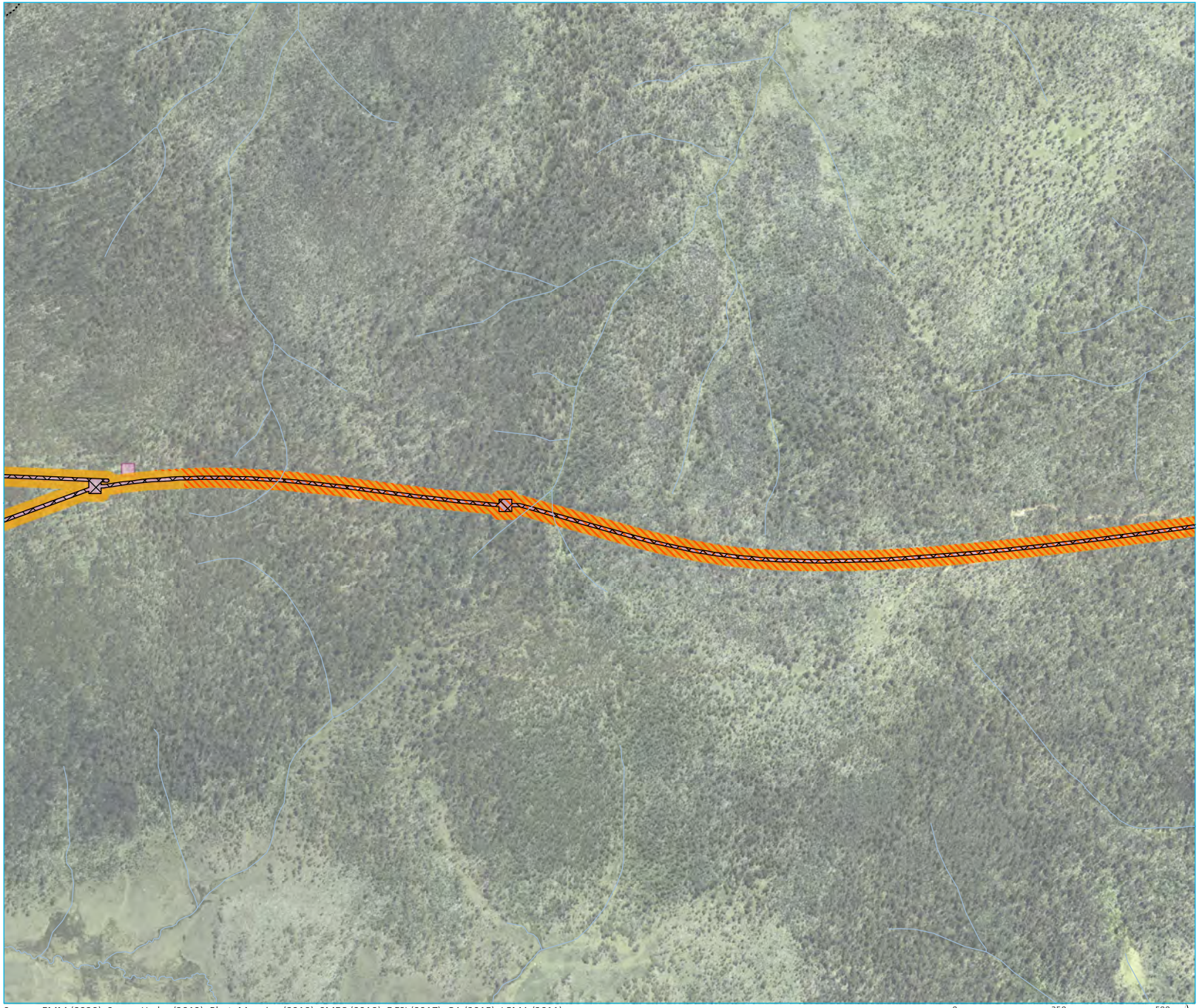
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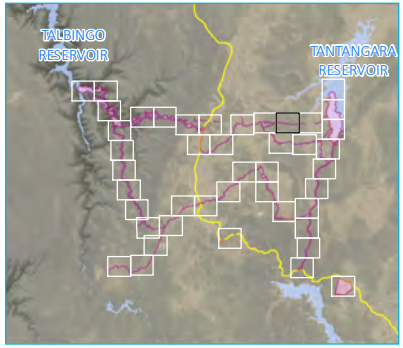
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.13

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

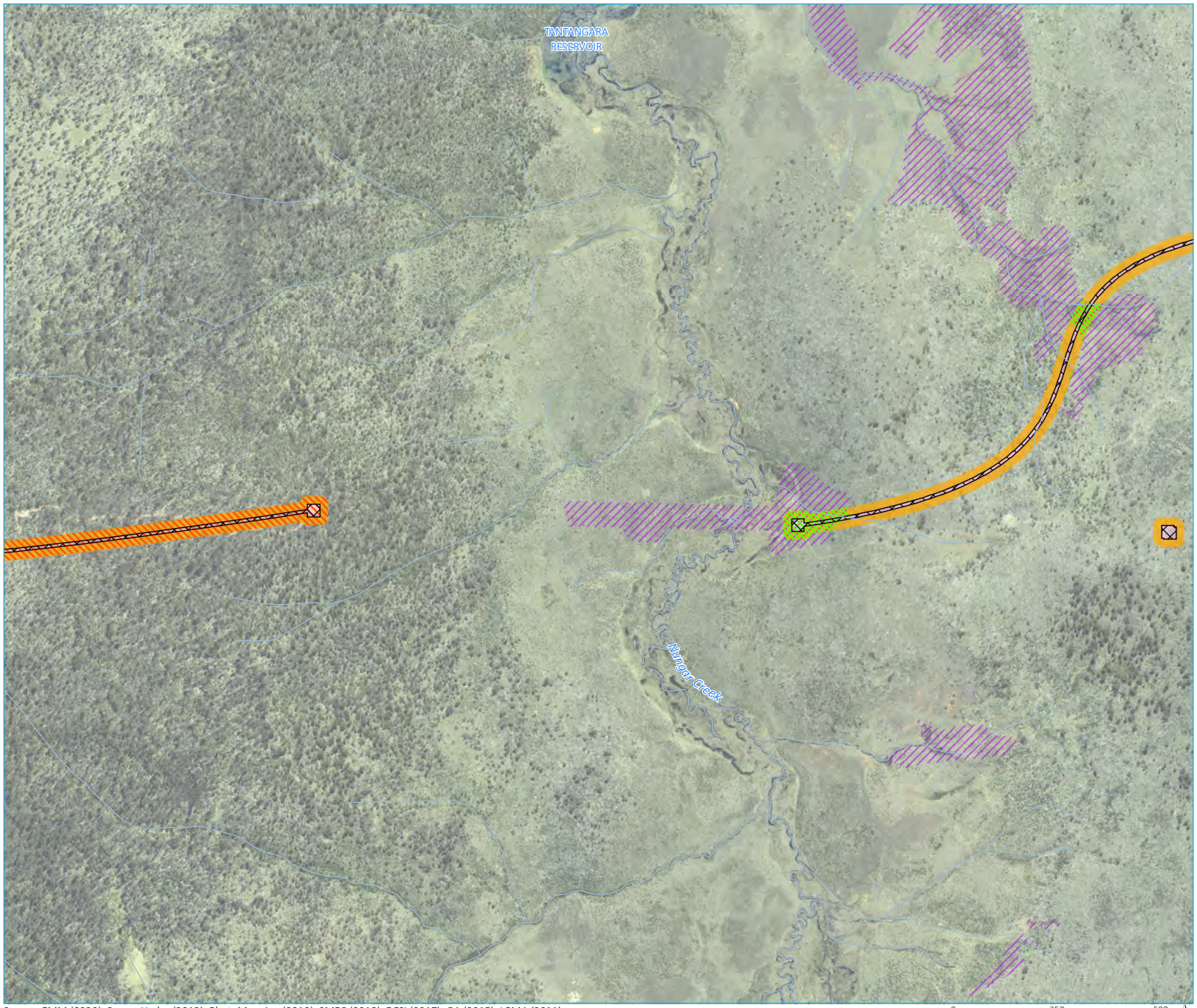
Small terrestrial mammal survey results

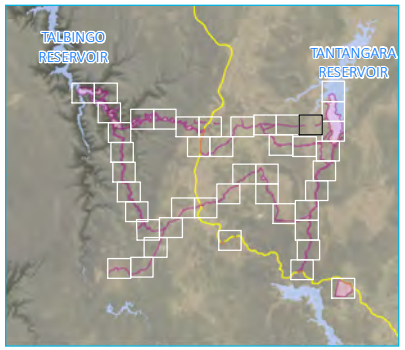
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.14

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

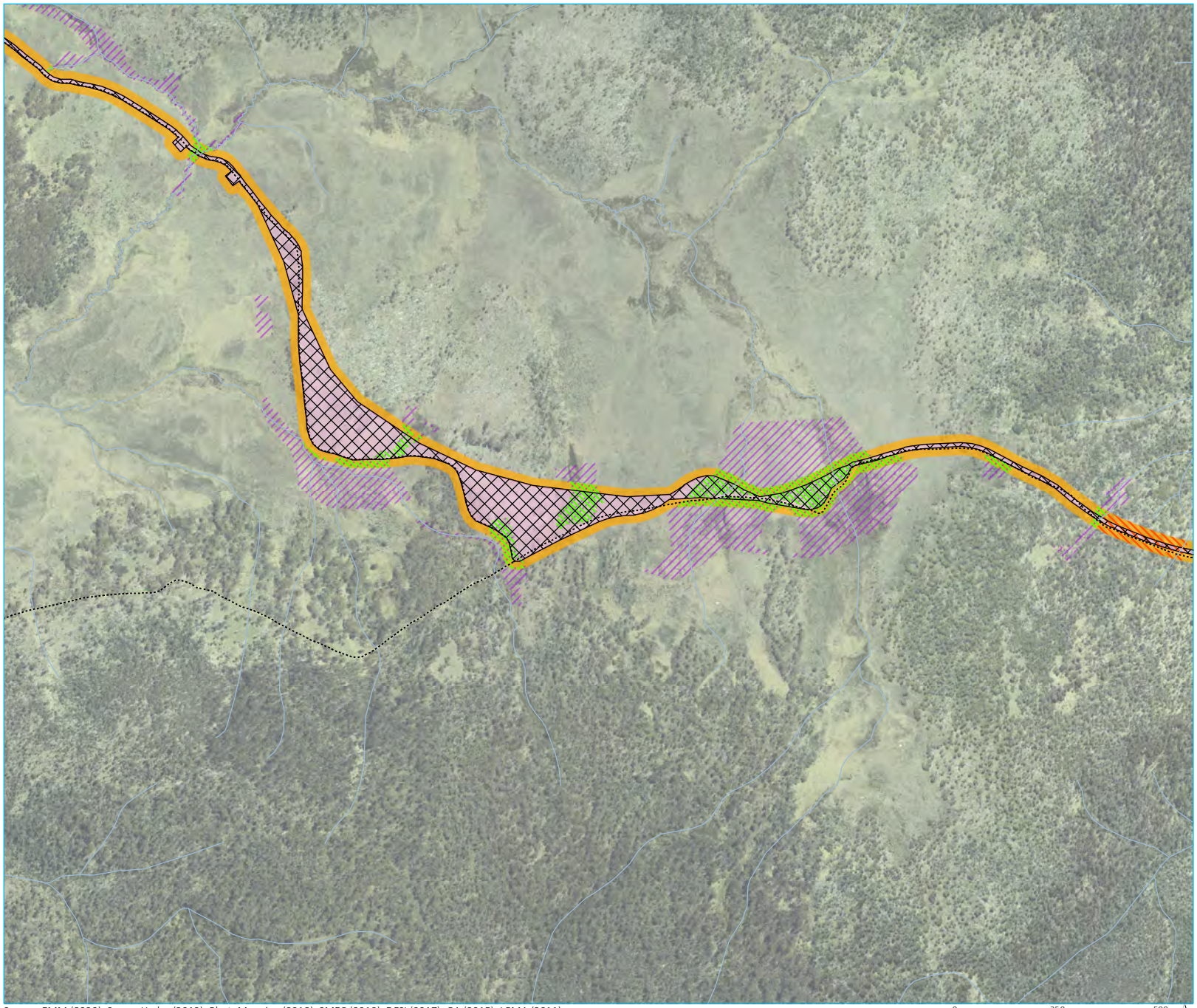
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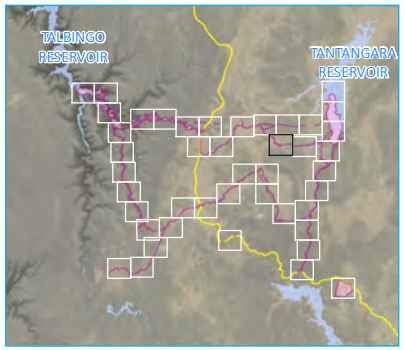
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.15

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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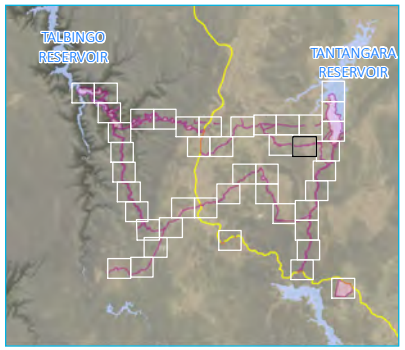
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.16

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR011_SmallMammalResults_20200206_DDP_02.mxd 21/02/2020

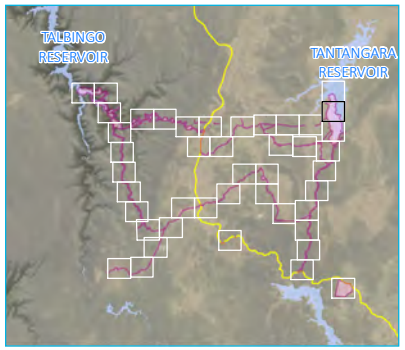
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.17

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

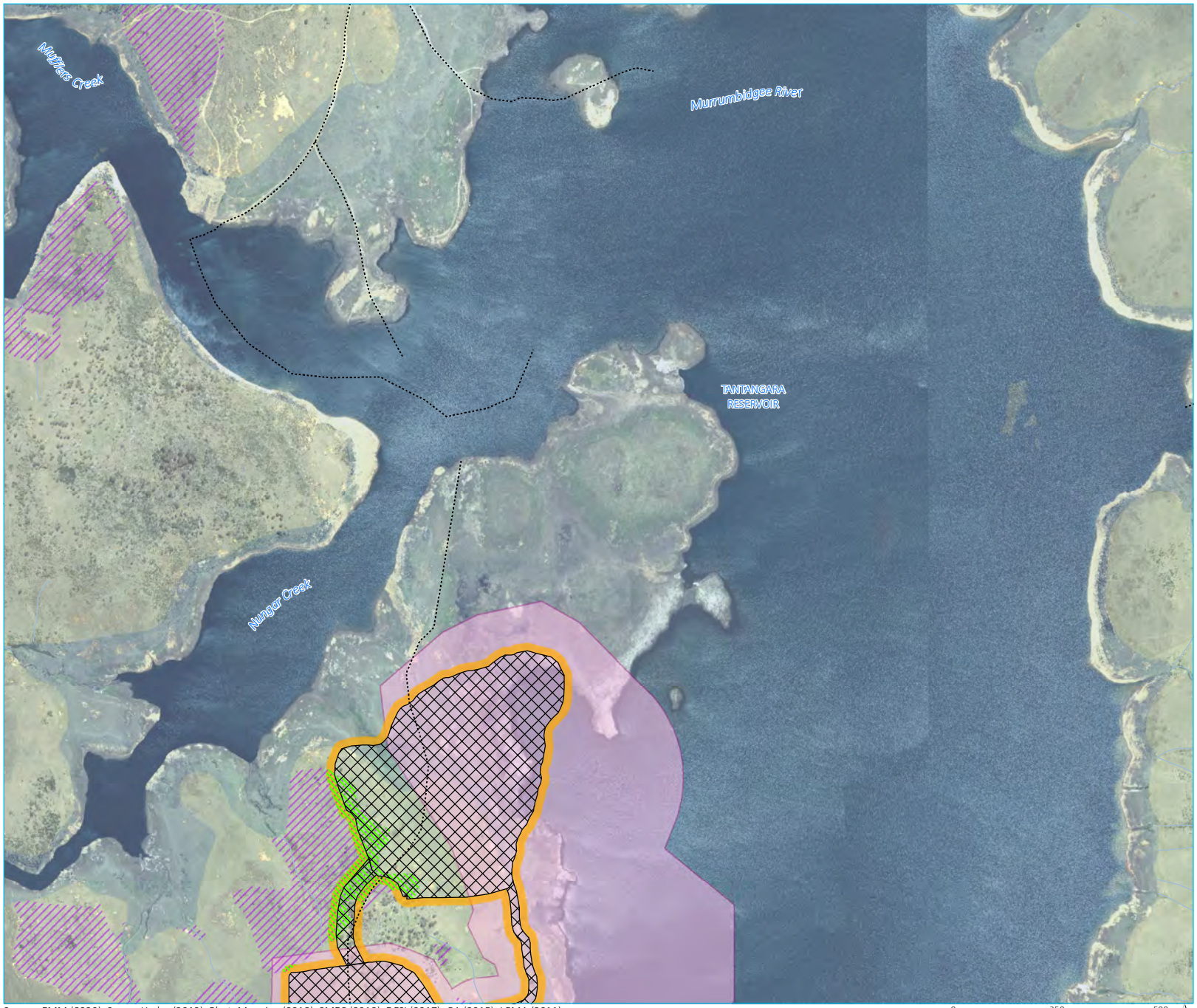
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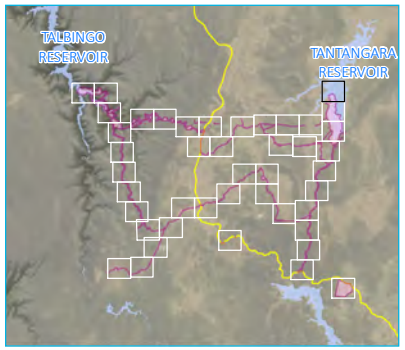
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.18

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

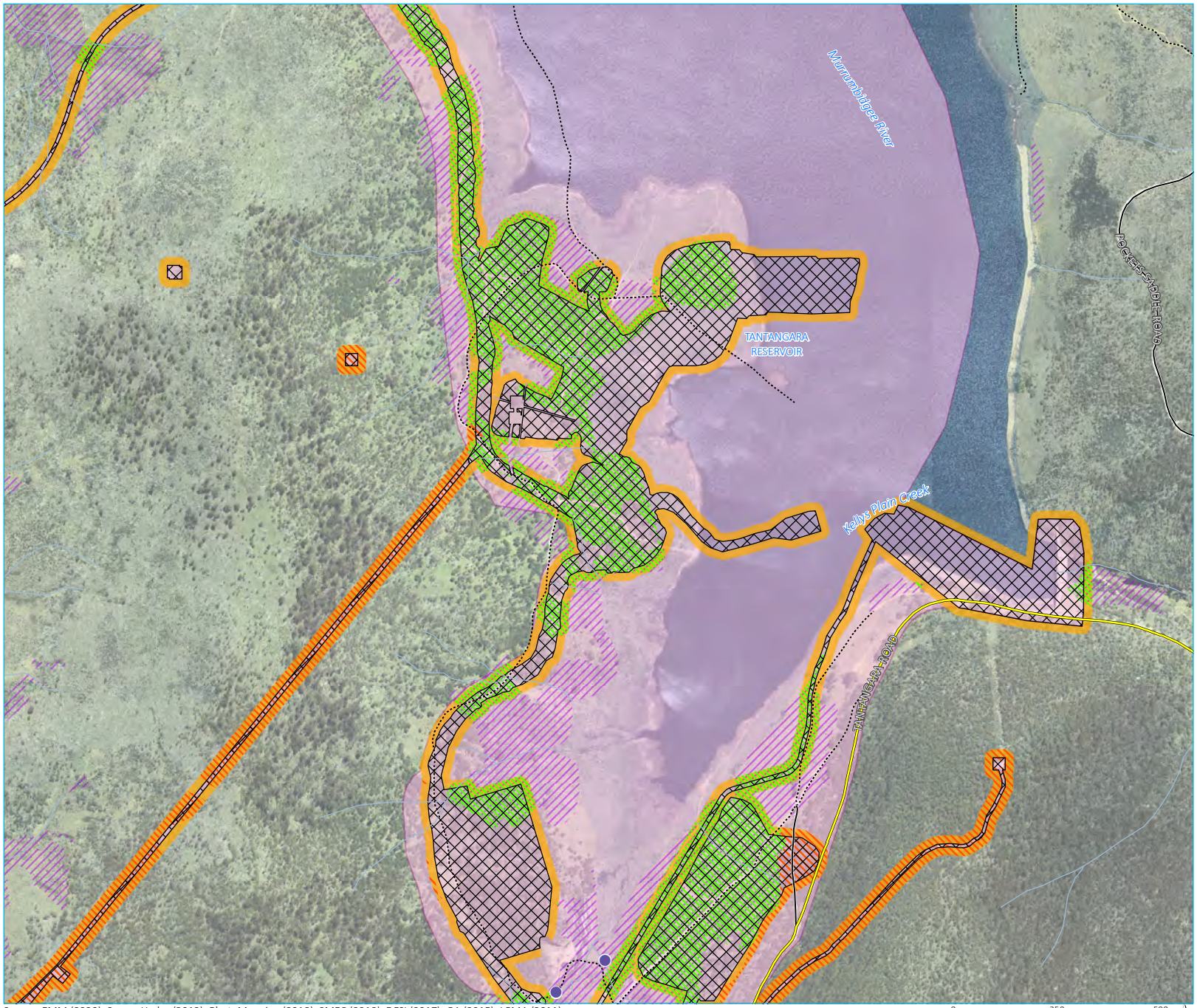
GDA 1994 MGA Zone 55

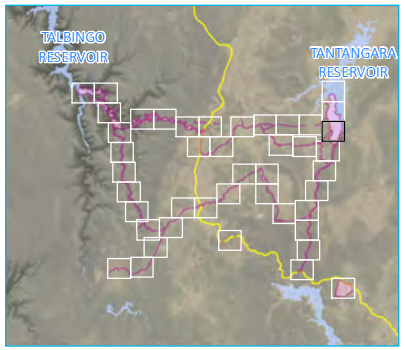
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.19





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

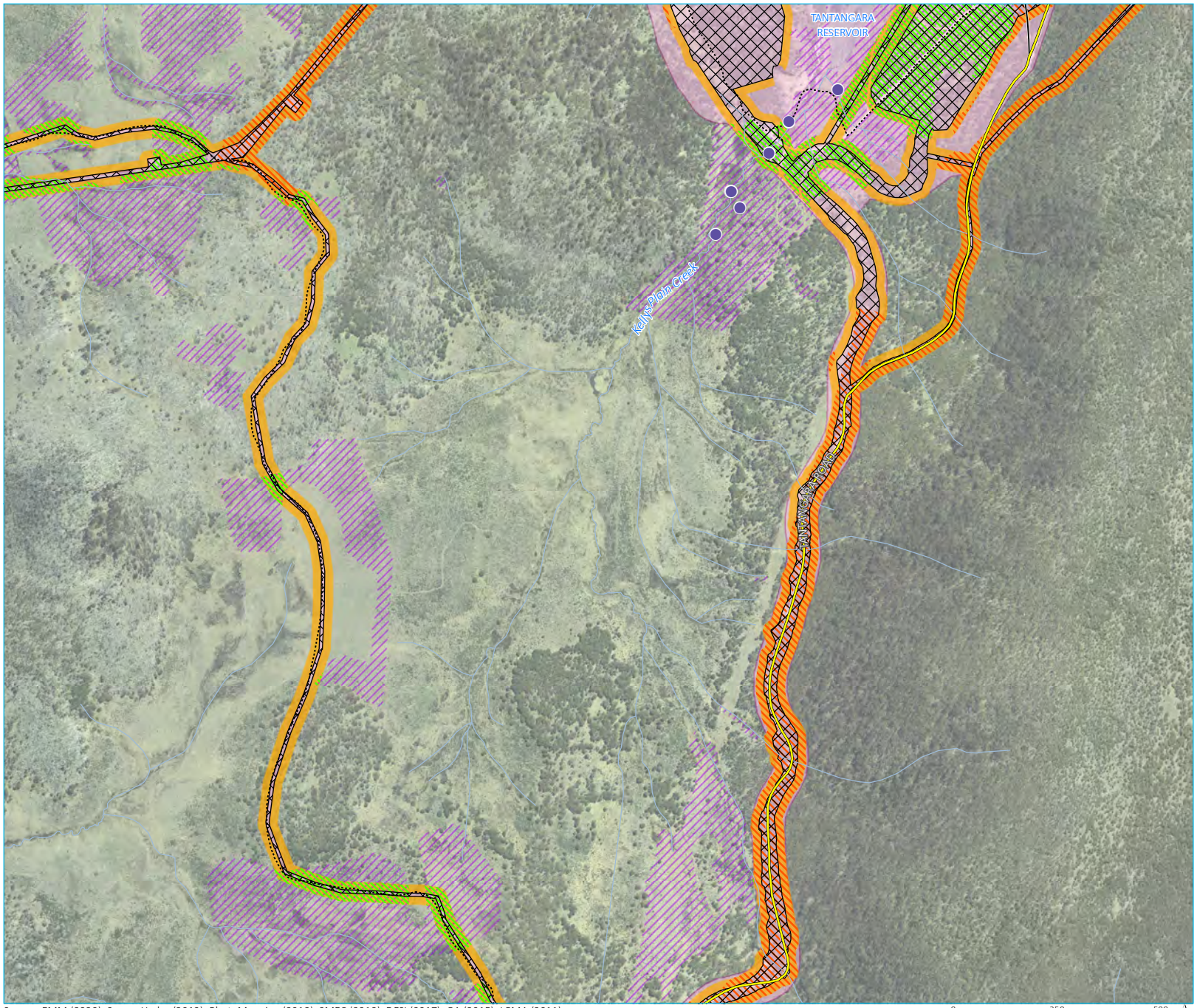
Small terrestrial mammal survey results

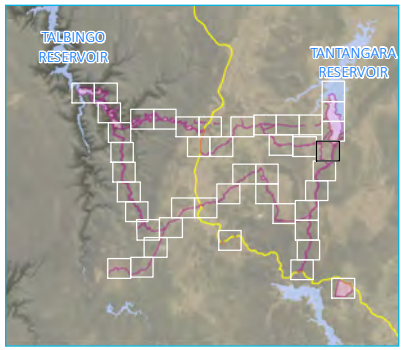
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.20

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\RtS\BDAR\BDAR011_SmallMammalResults_20200206_DDP_02.mxd 21/02/2020

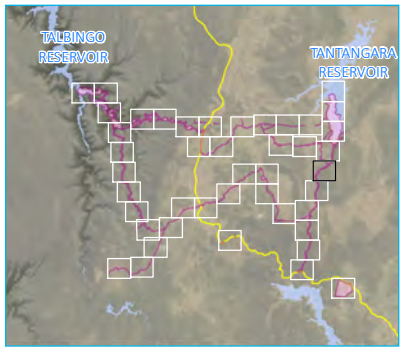
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.21

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

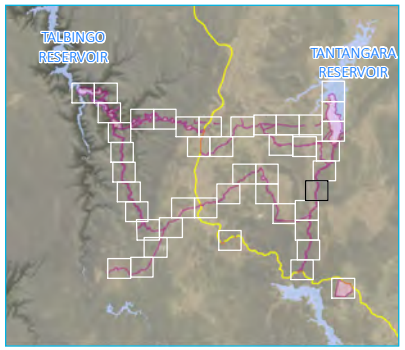
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.22





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

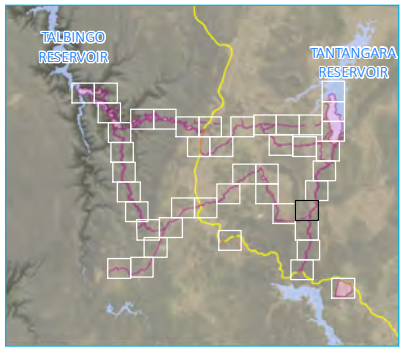
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\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR011_SmallMammalResults_20200206_DDP_02.mxd 21/02/2020

Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.23





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR011_SmallMammalResults_20200206_DDP_02.mxd 21/02/2020

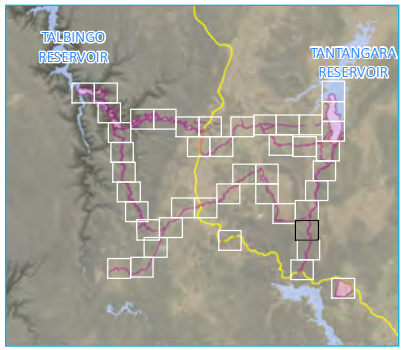
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.24

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

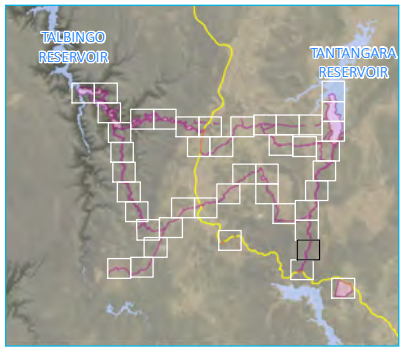
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.25





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

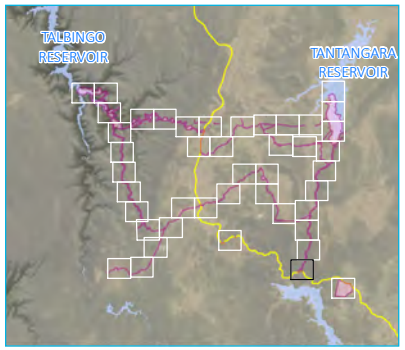
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.26





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

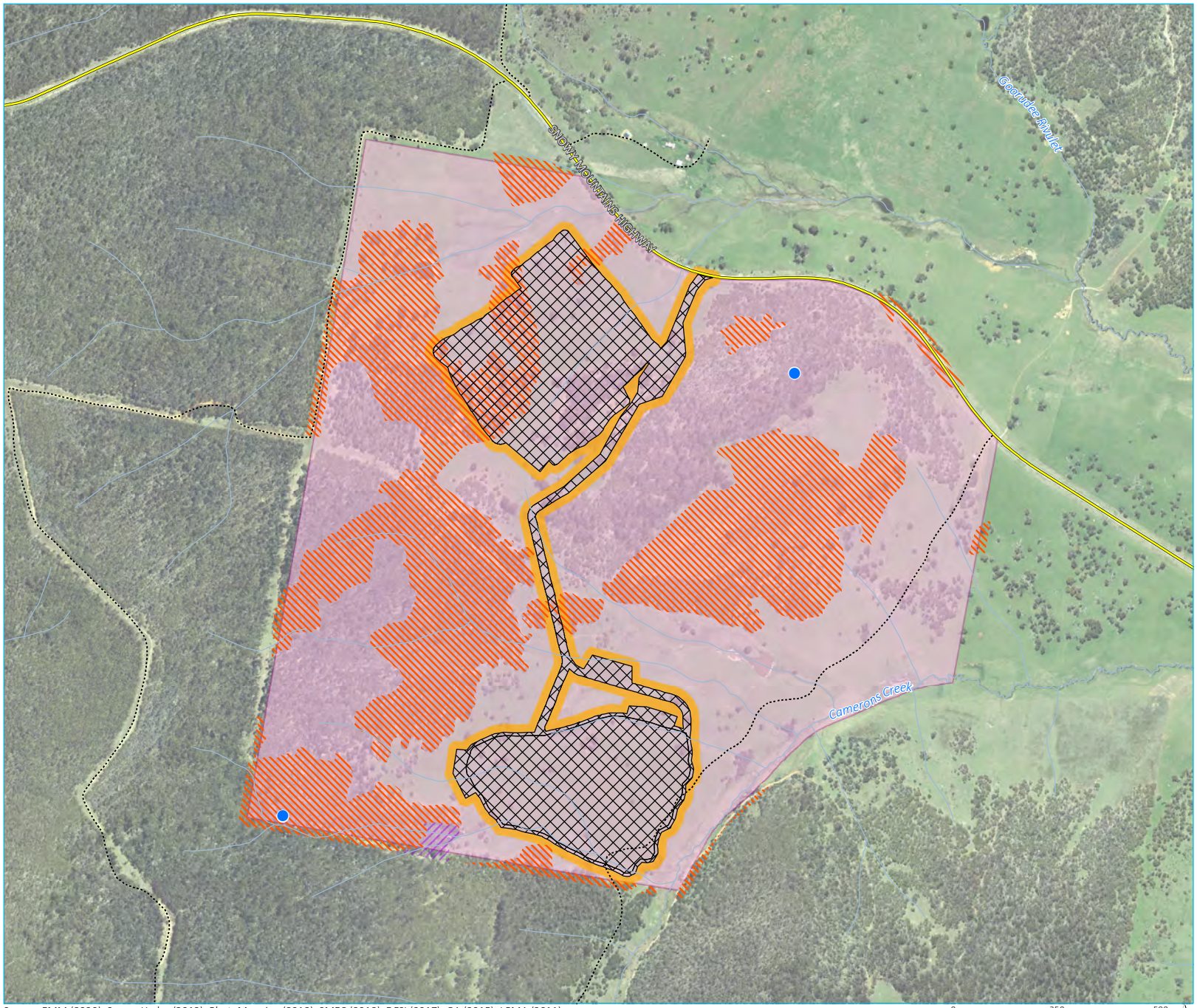
Small terrestrial mammal survey results

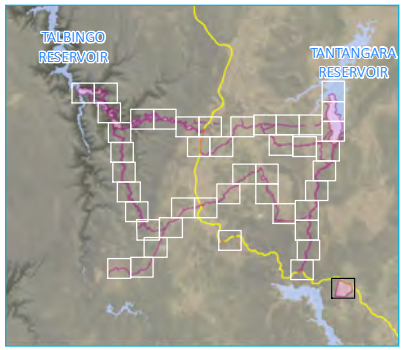
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.27

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Eastern Pygmy-possum

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

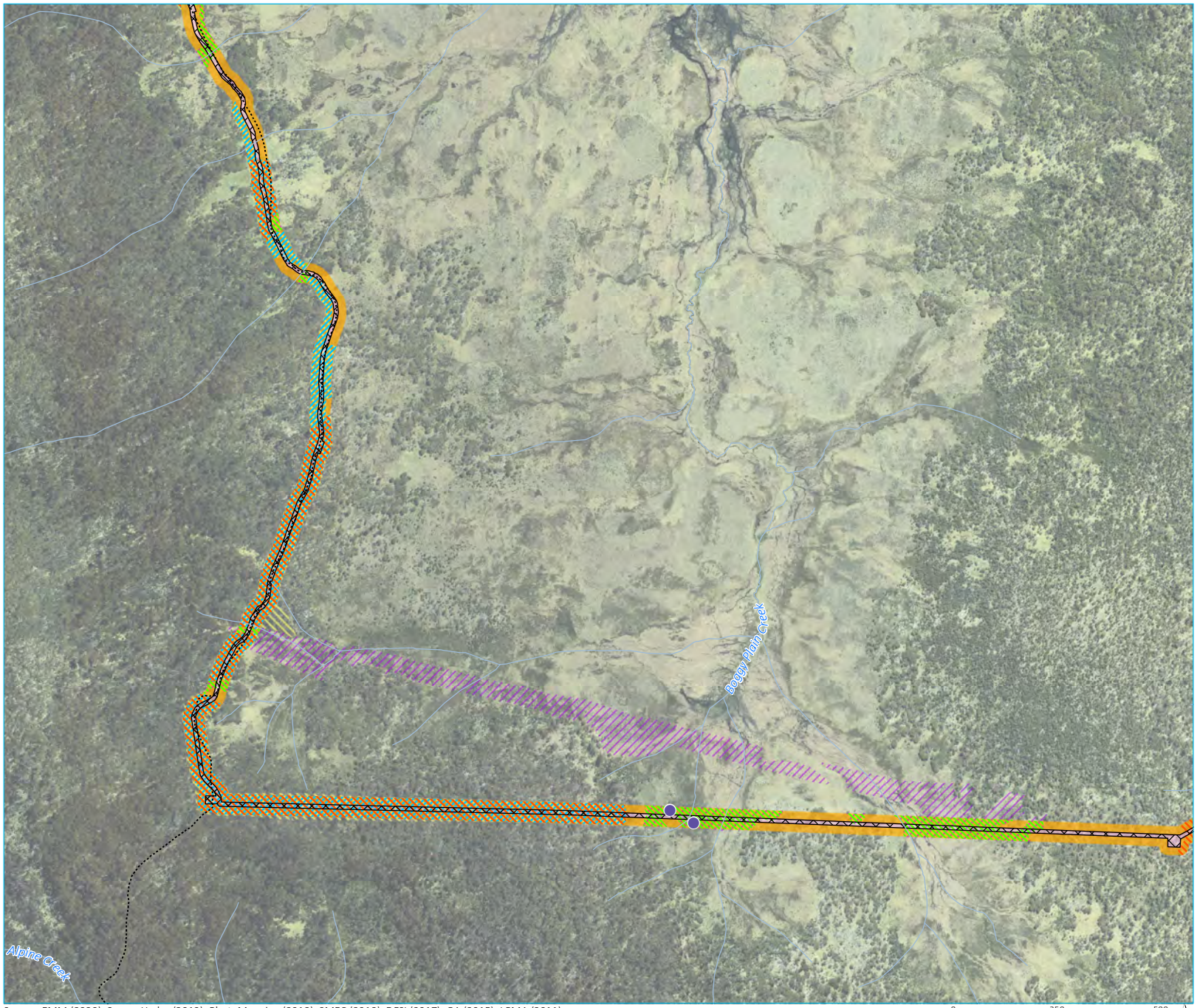
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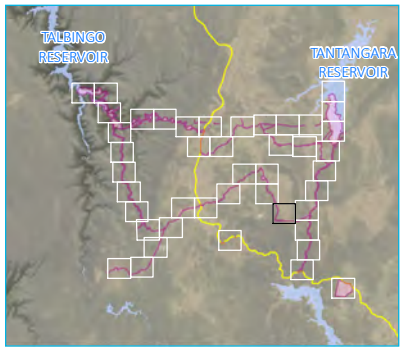
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.28

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

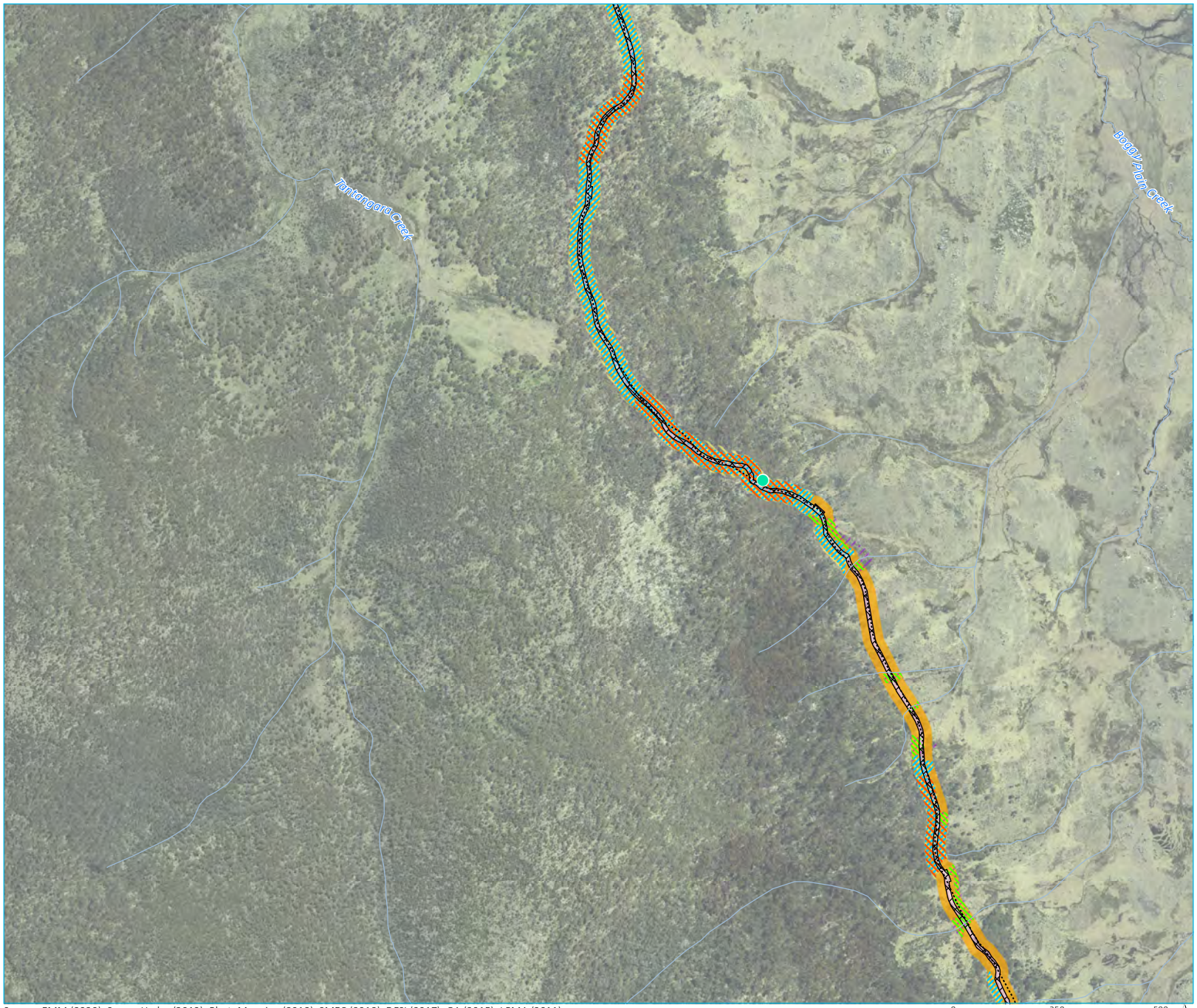
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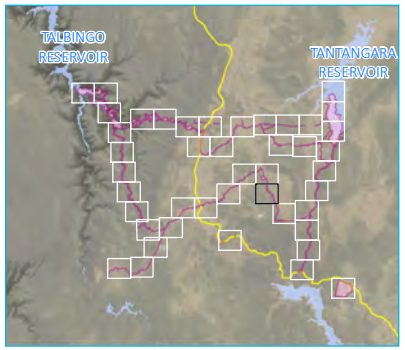
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.29

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

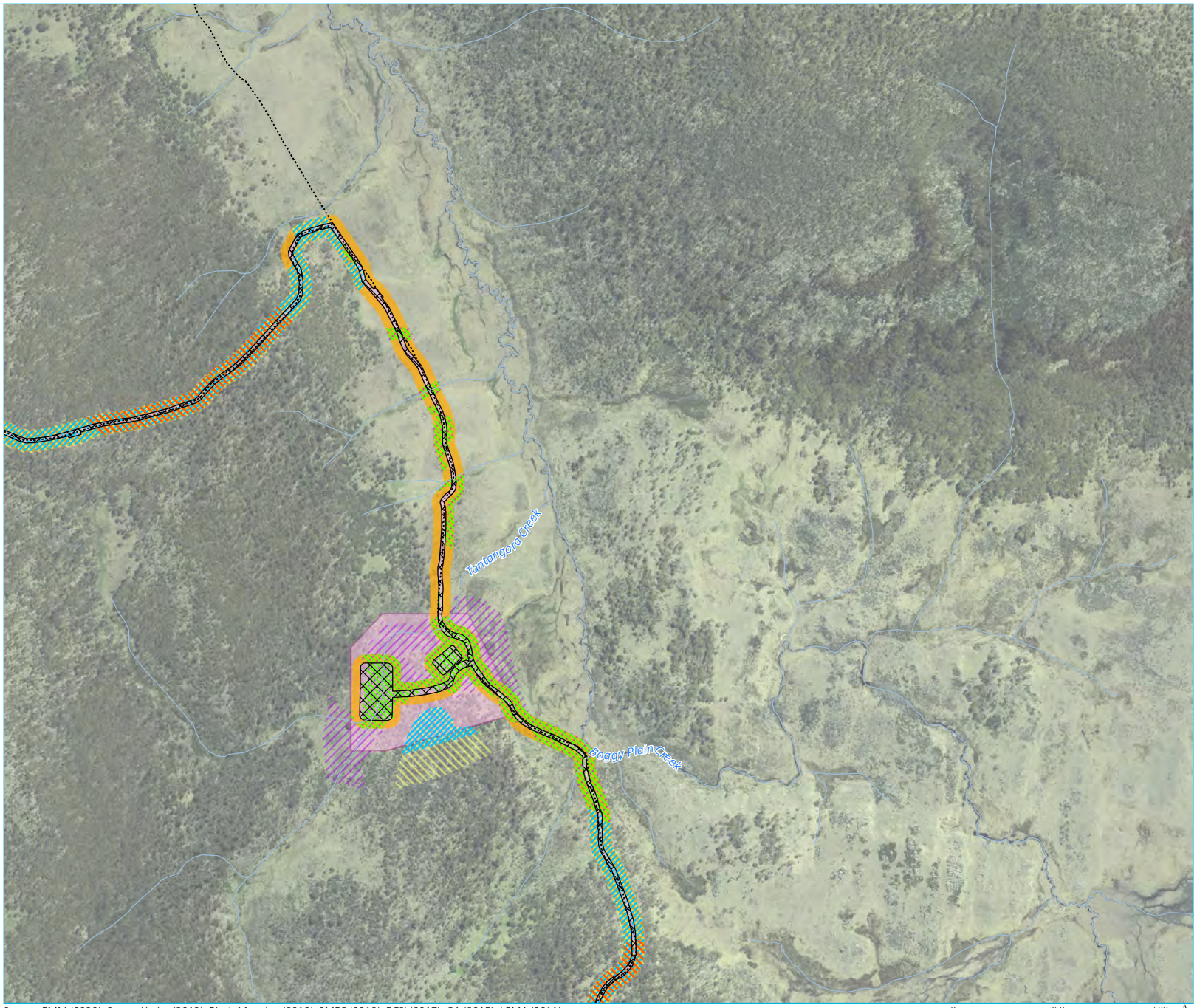
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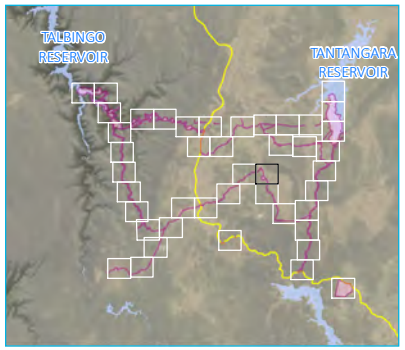
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.30

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

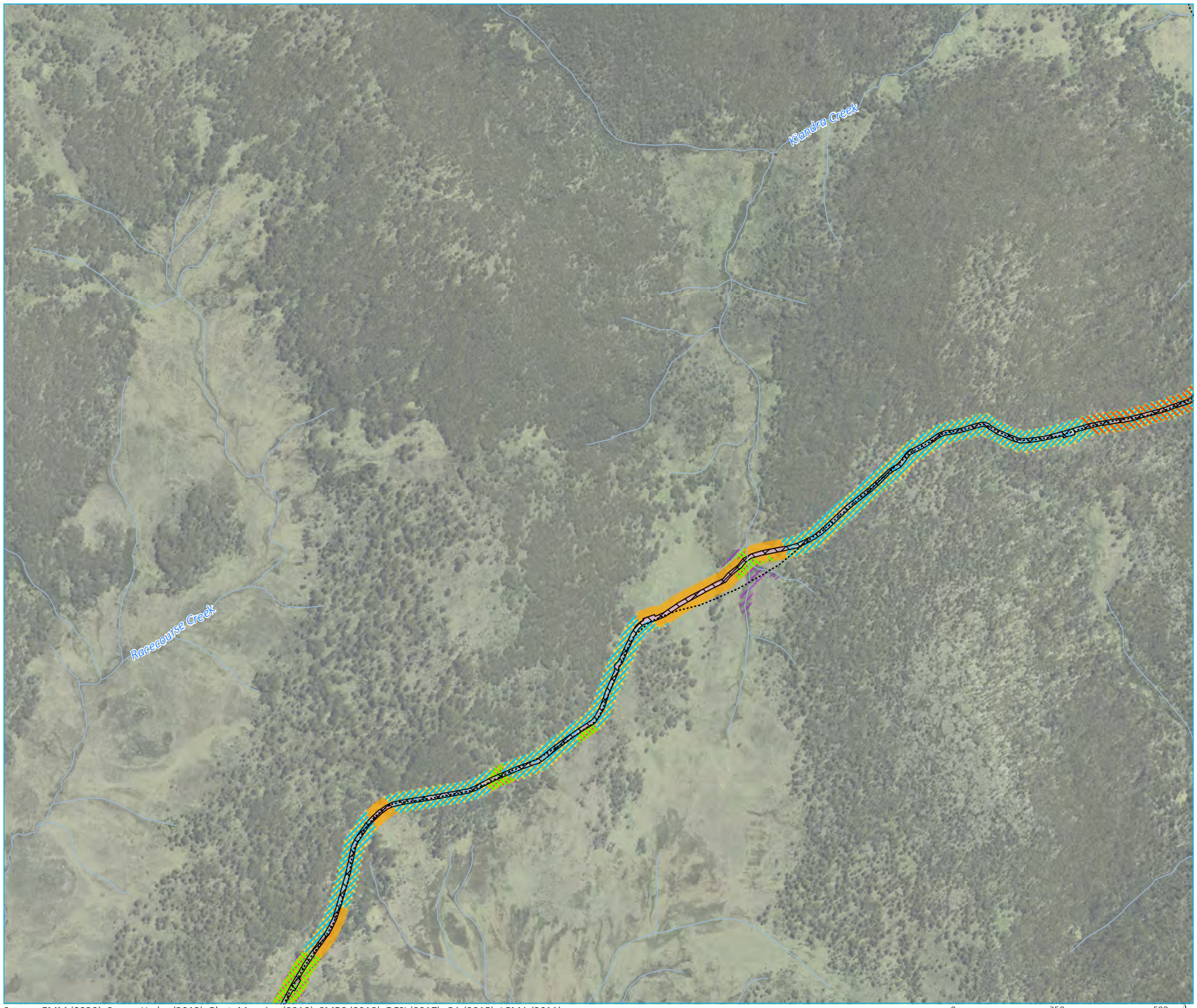
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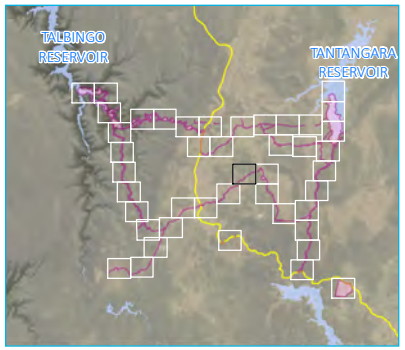
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.31

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

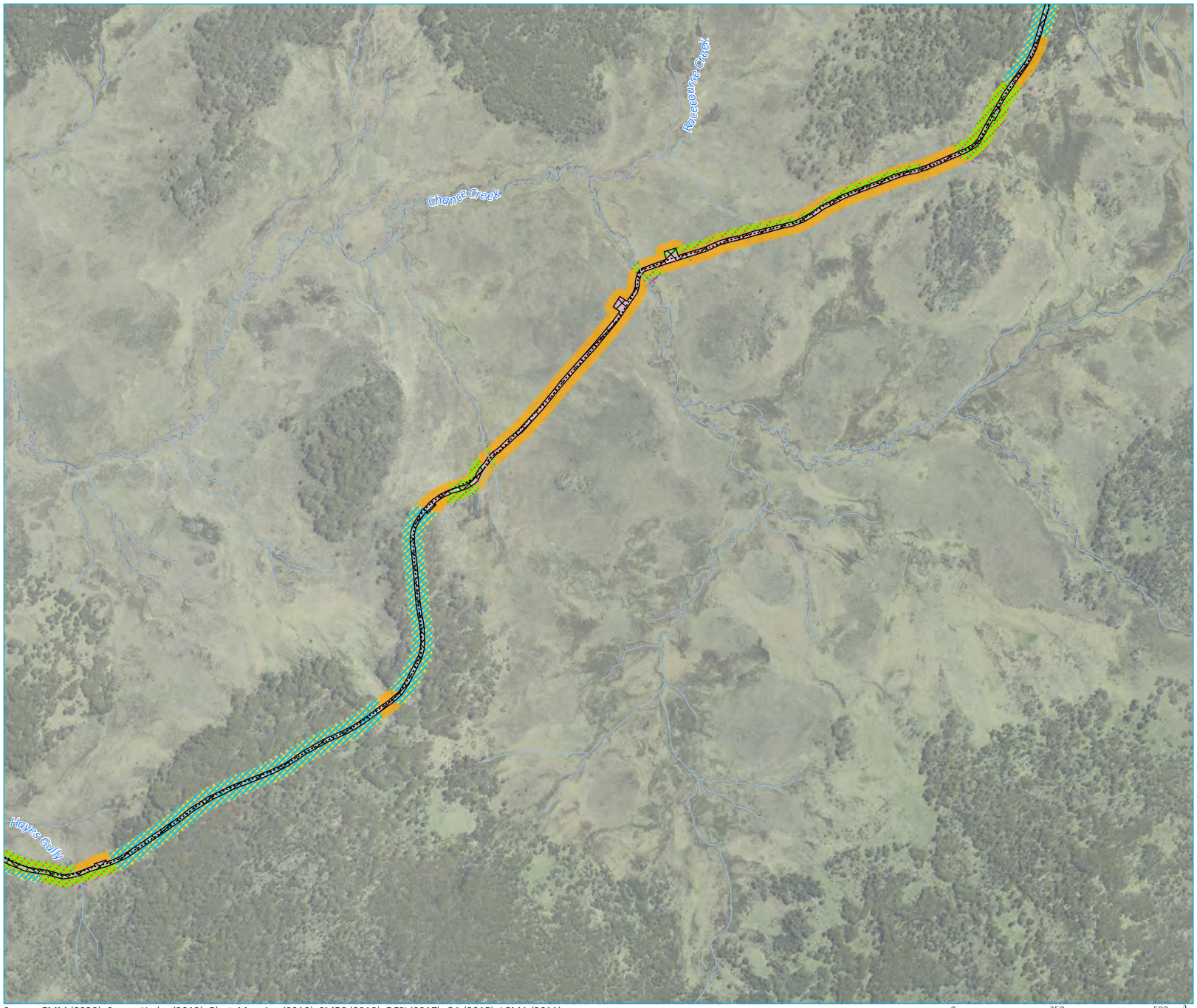
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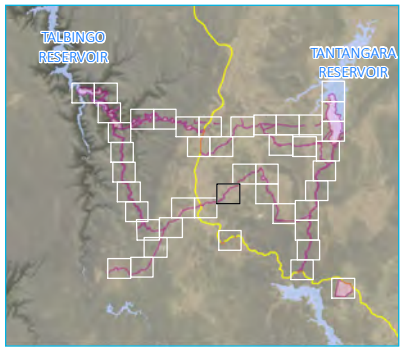
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.32

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.33

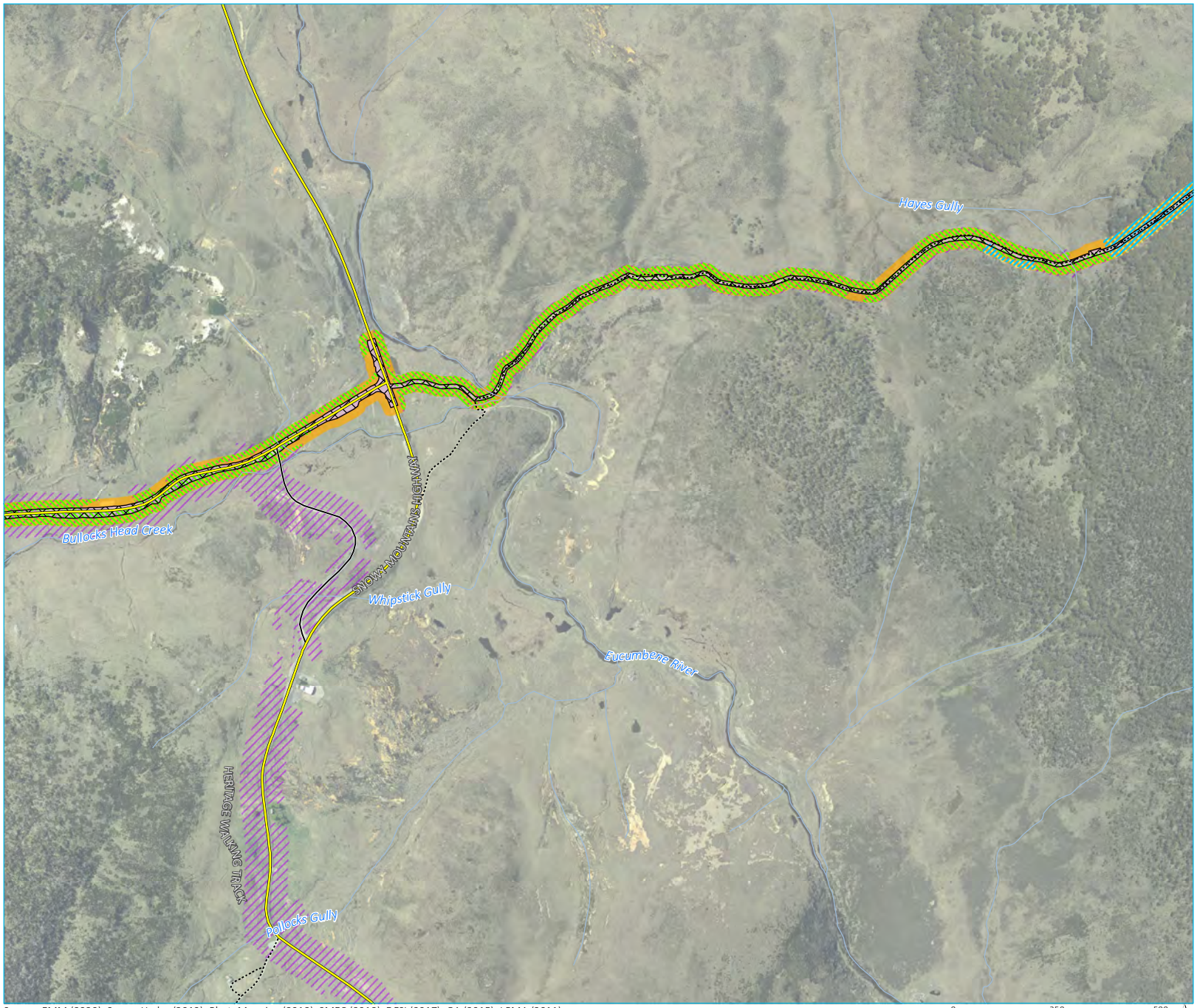
Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

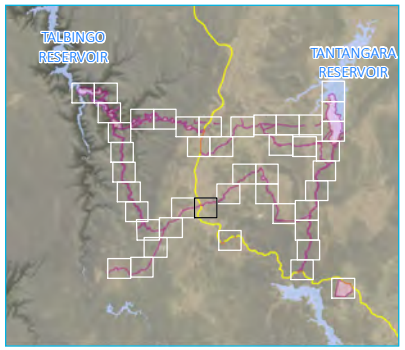
0 250 500 m

GDA 1994 MGA Zone 55

N

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

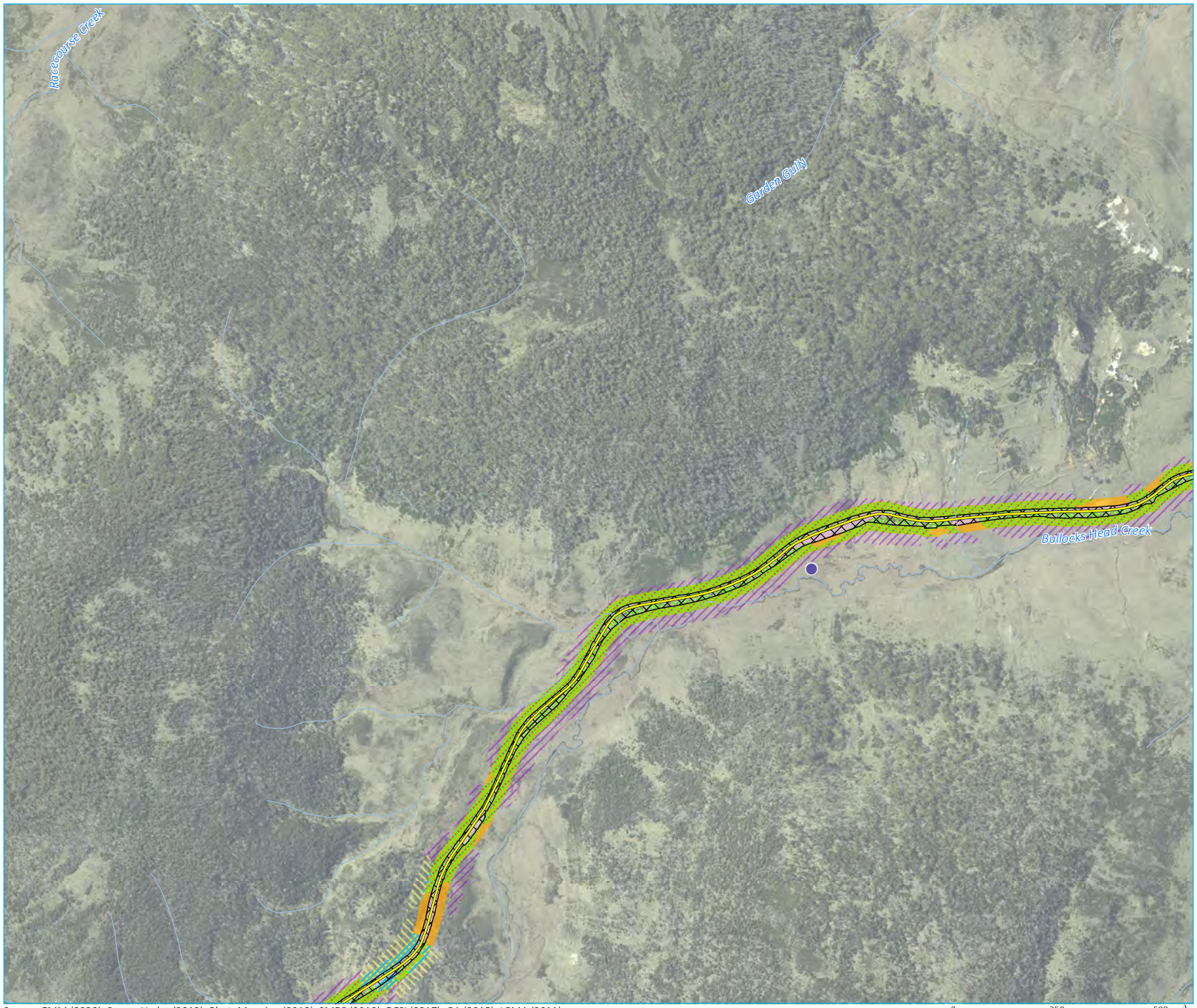
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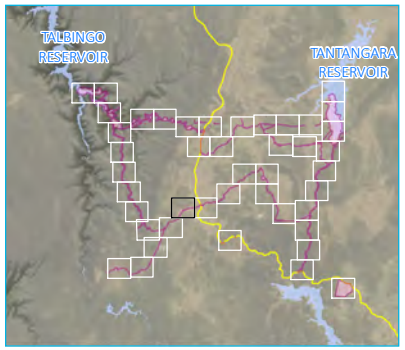
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.34

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

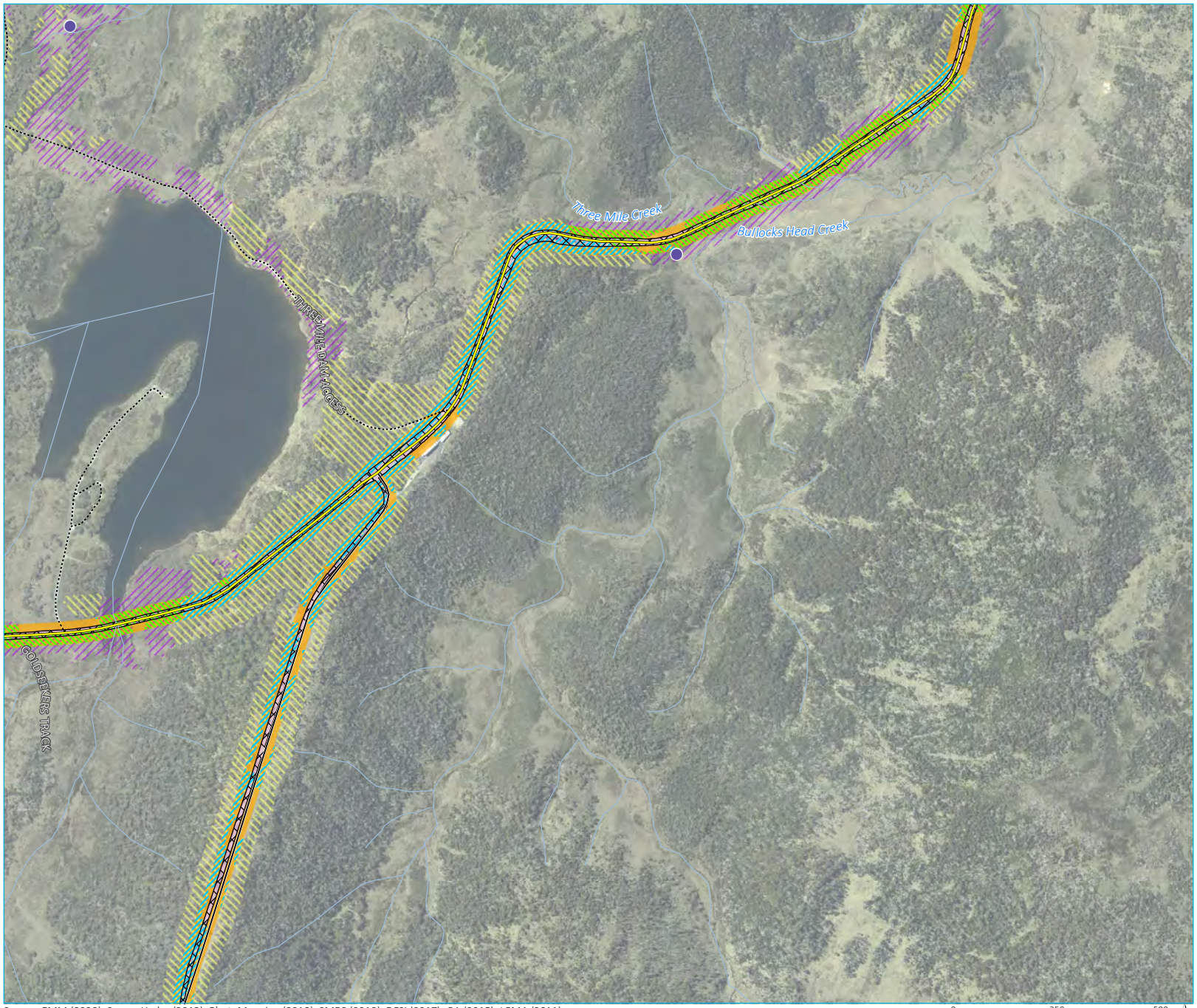
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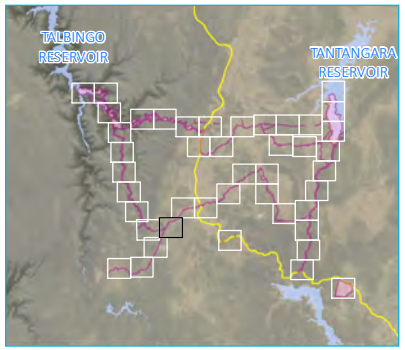
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.35

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

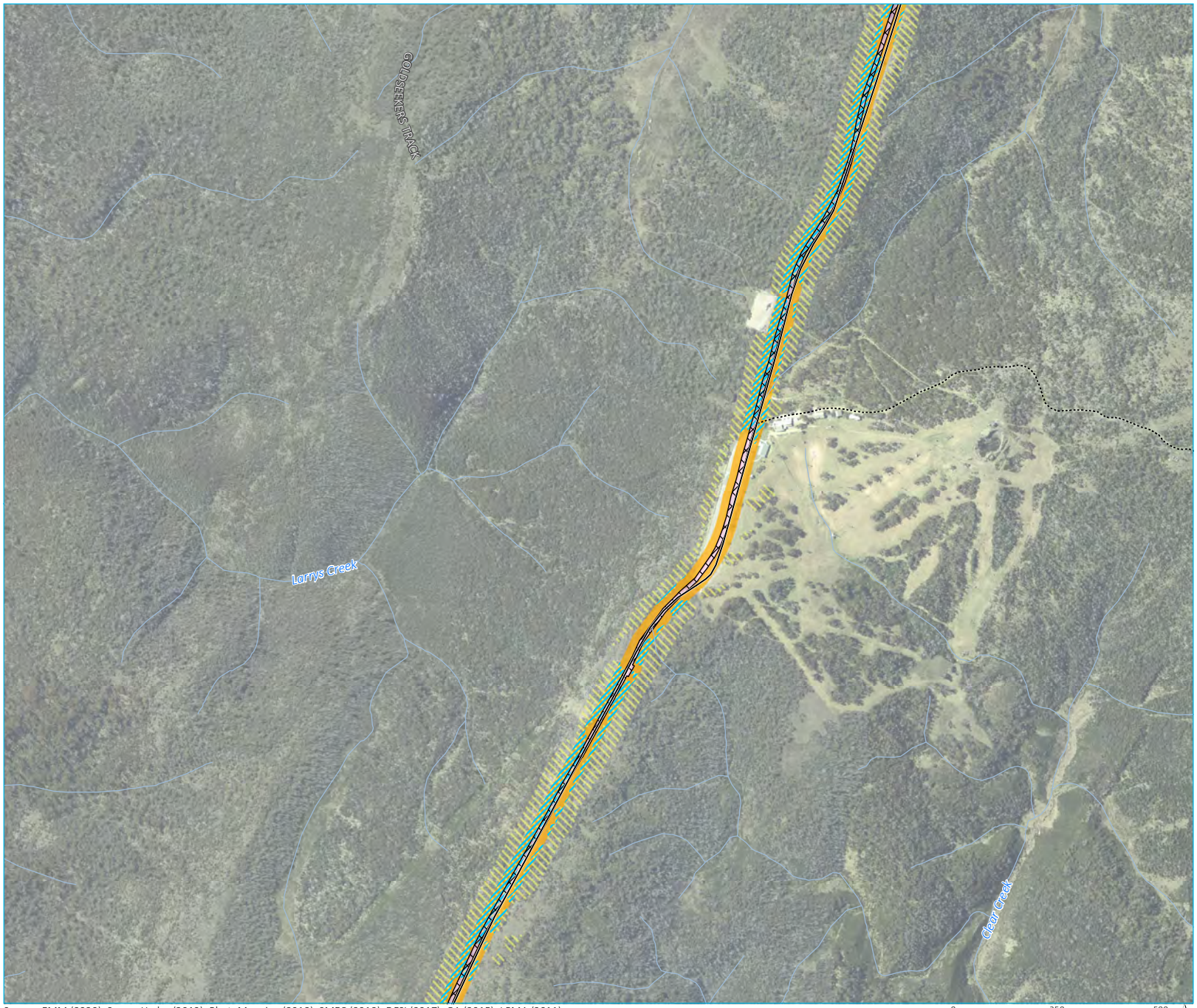
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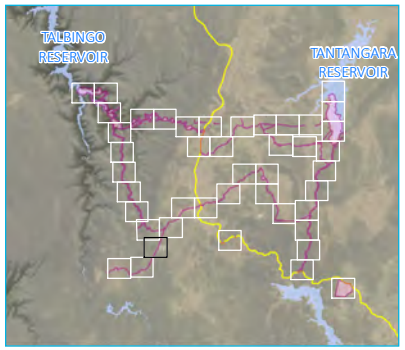
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.36

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Smoky Mouse species polygon
- Smoky Mouse habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

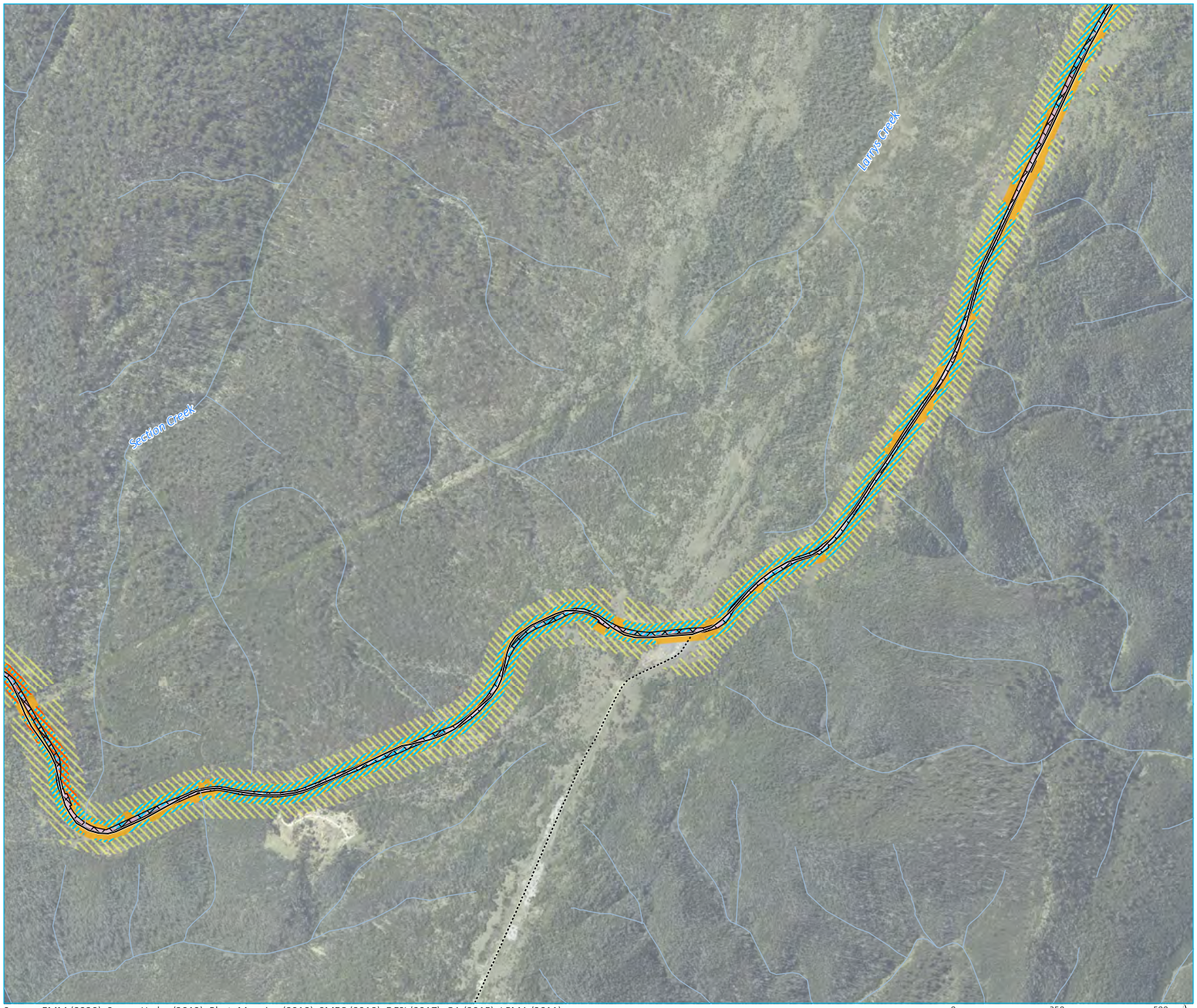
Small terrestrial mammal survey results

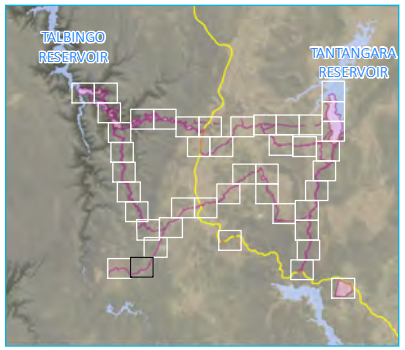
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.37

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Smoky Mouse habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

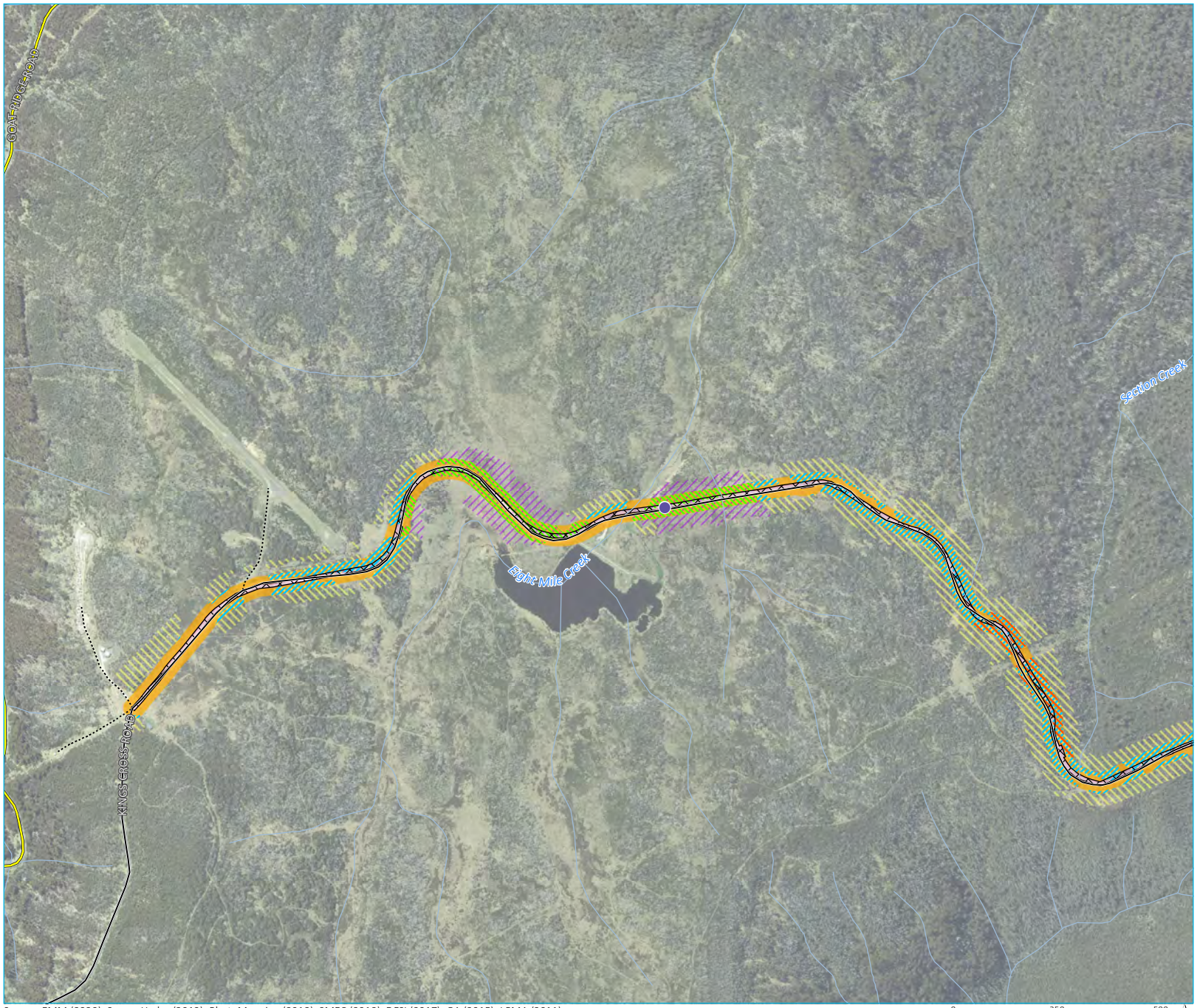
GDA 1994 MGA Zone 55

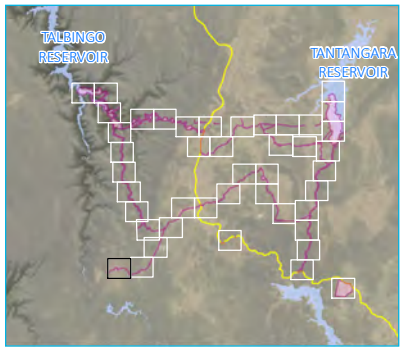
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.38





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

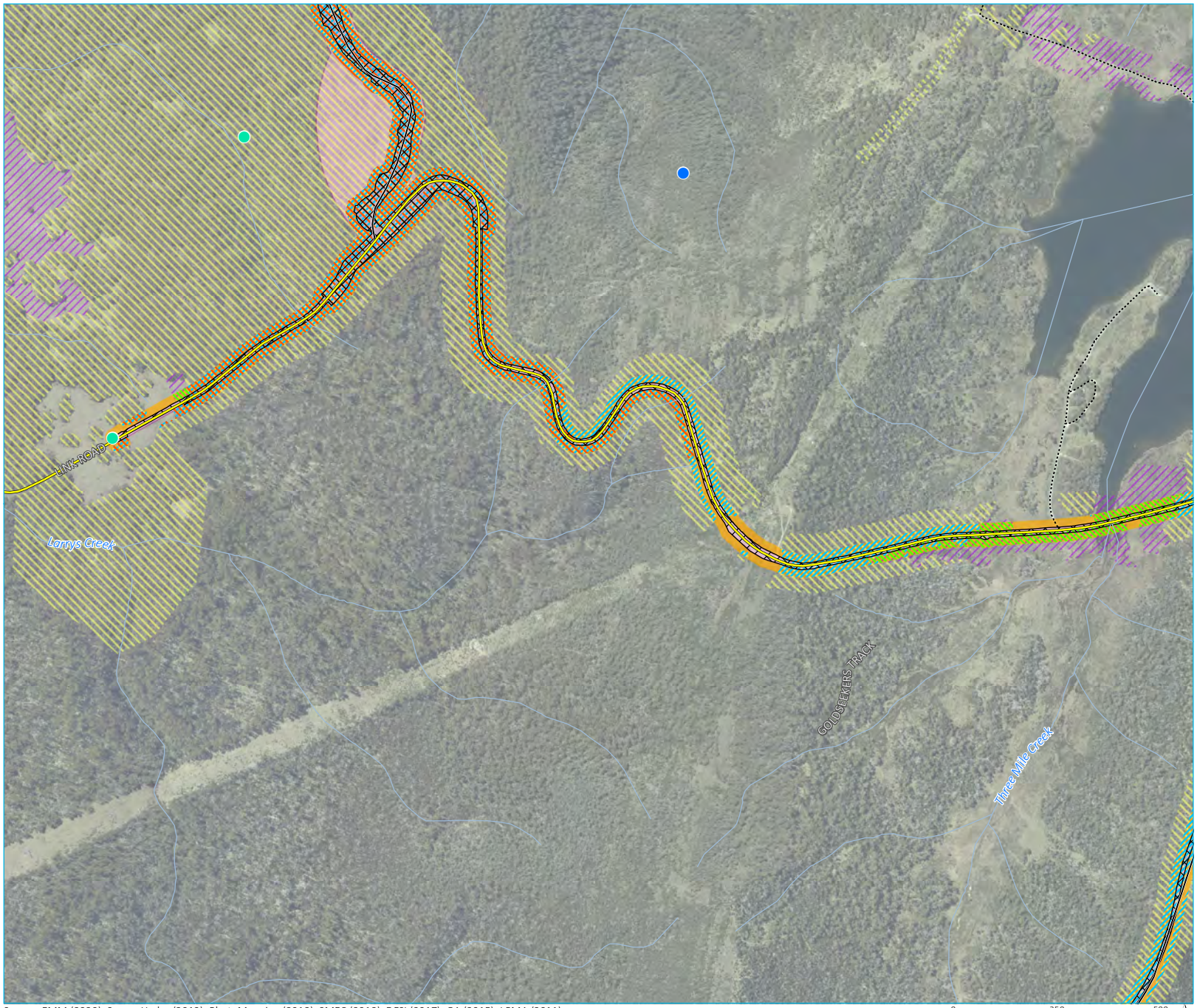
GDA 1994 MGA Zone 55

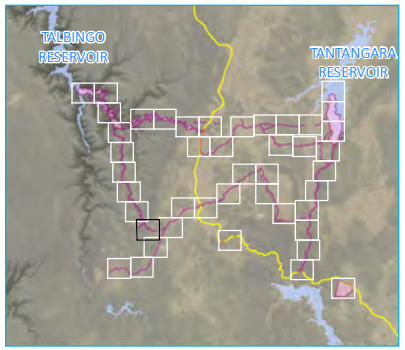
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.39





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Broad-toothed Rat species polygon
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

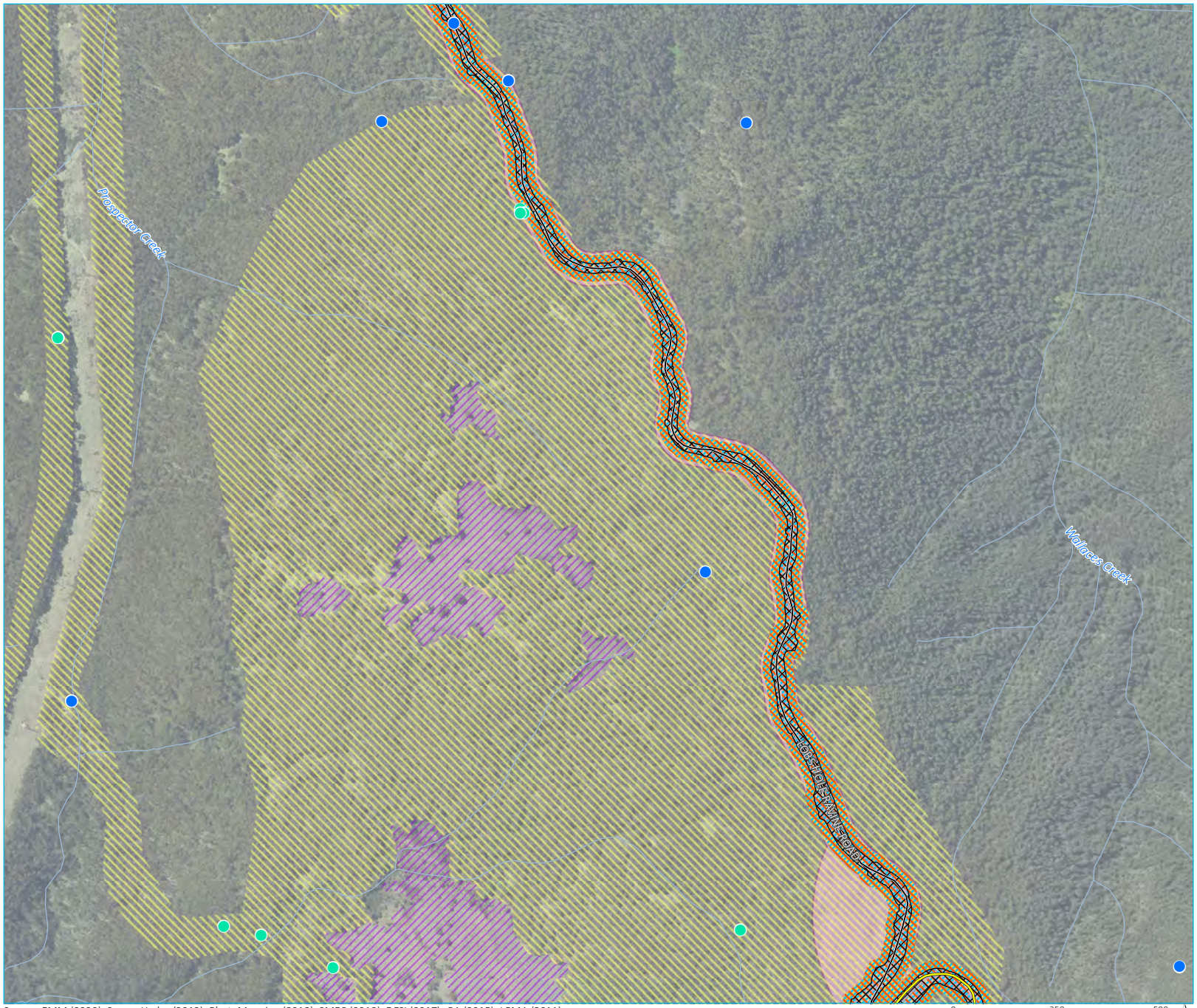
GDA 1994 MGA Zone 55

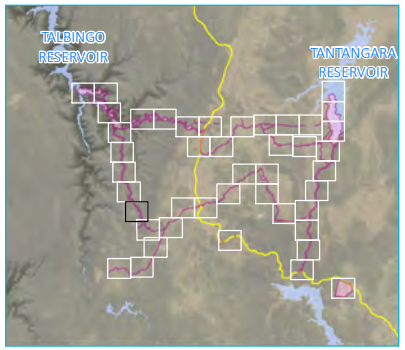
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.40





KEY

- Watercourse / drainage line
- Main road
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Broad-toothed Rat habitat
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

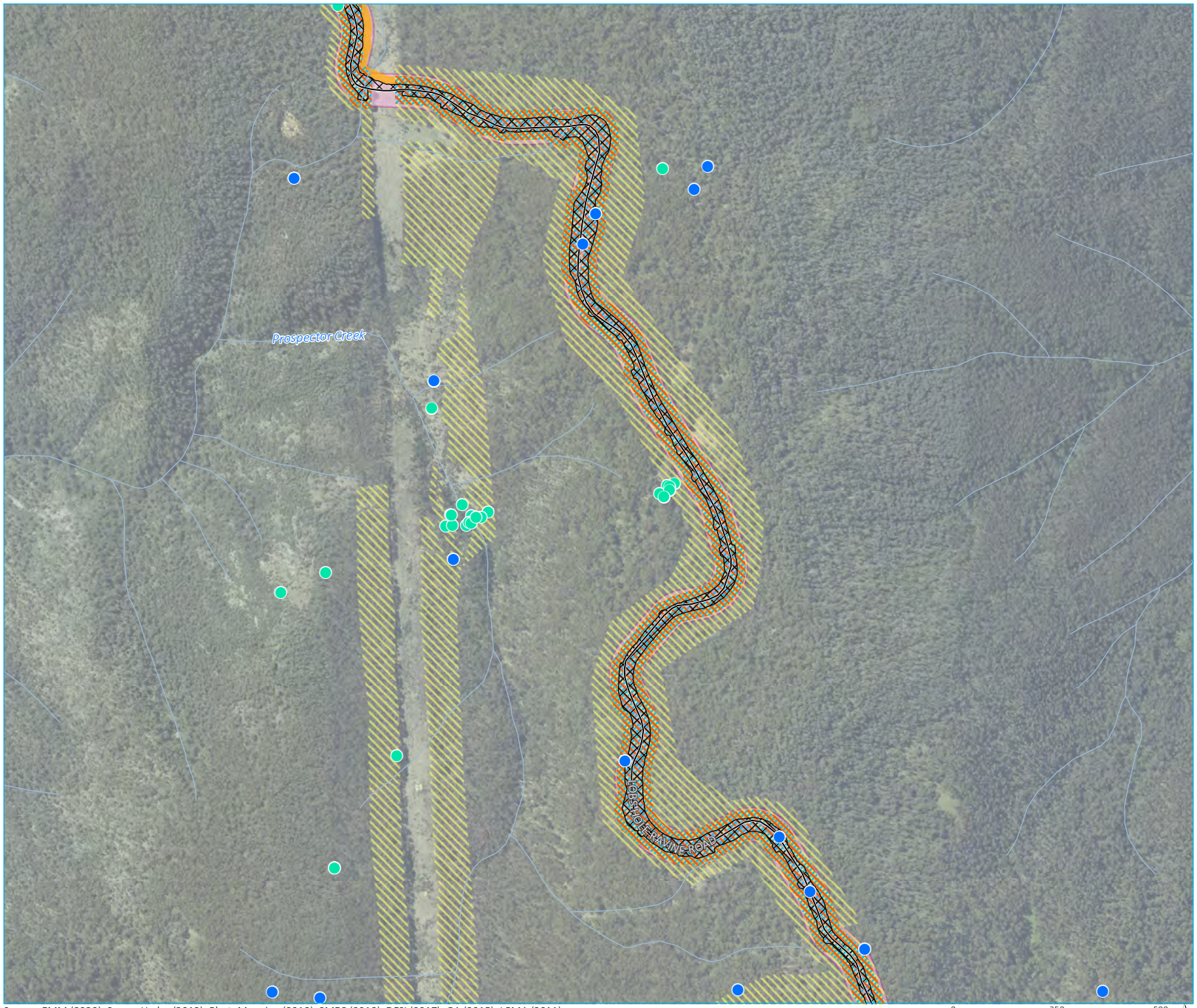
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.41

snowy 2.0

EMM creating opportunities



KEY

- Watercourse / drainage line
- Local road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

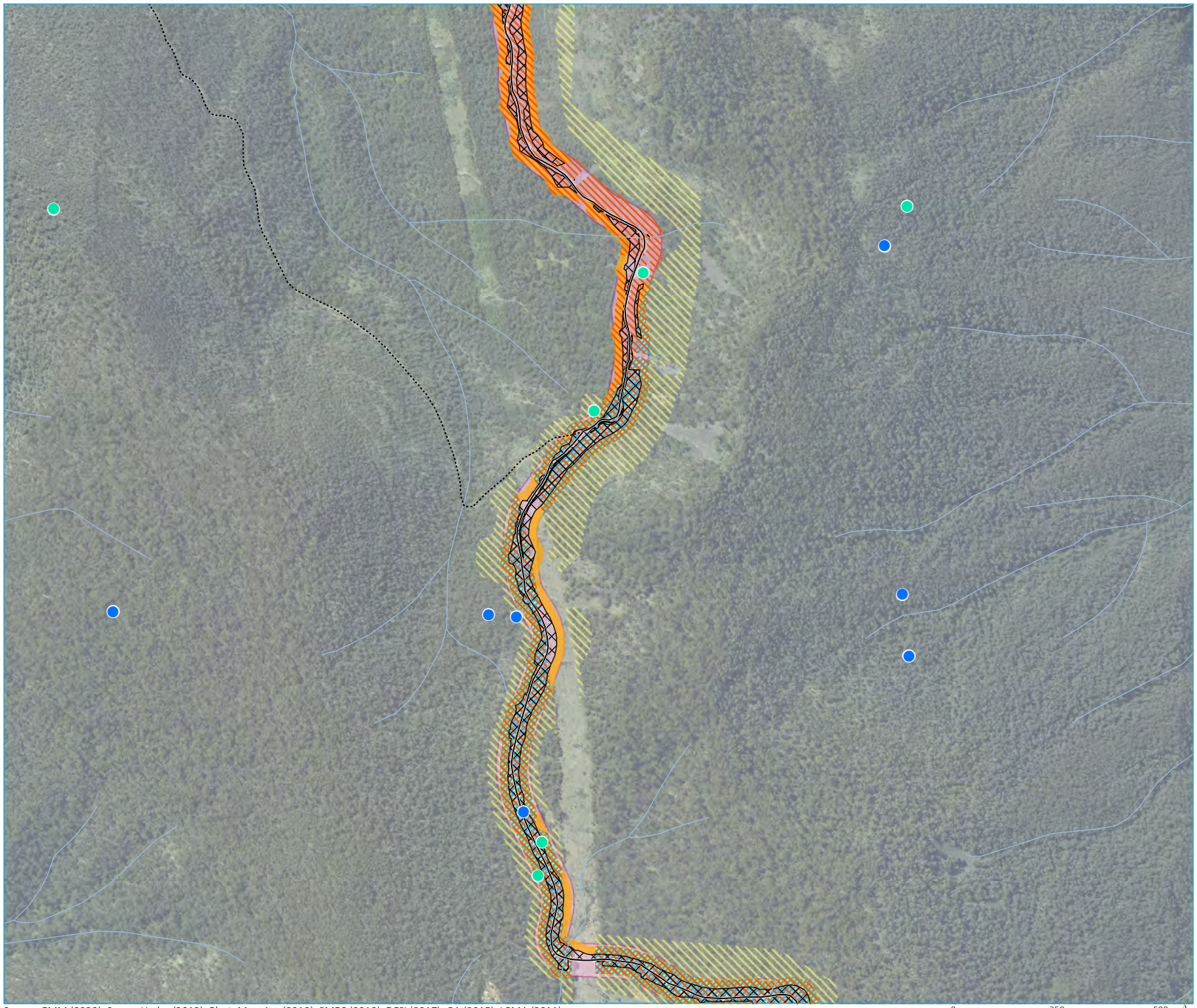
GDA 1994 MGA Zone 55

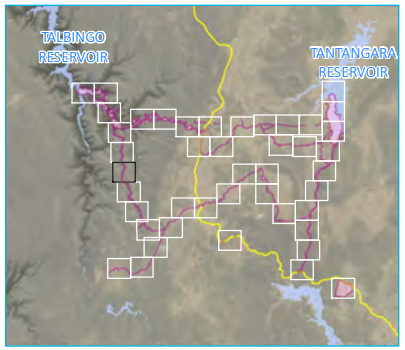
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Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.42





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Smoky Mouse species polygon
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum
- Smoky Mouse

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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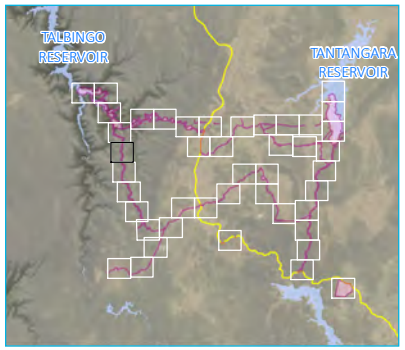
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.43

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Smoky Mouse habitat

Threatened fauna

- Eastern Pygmy-possum

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

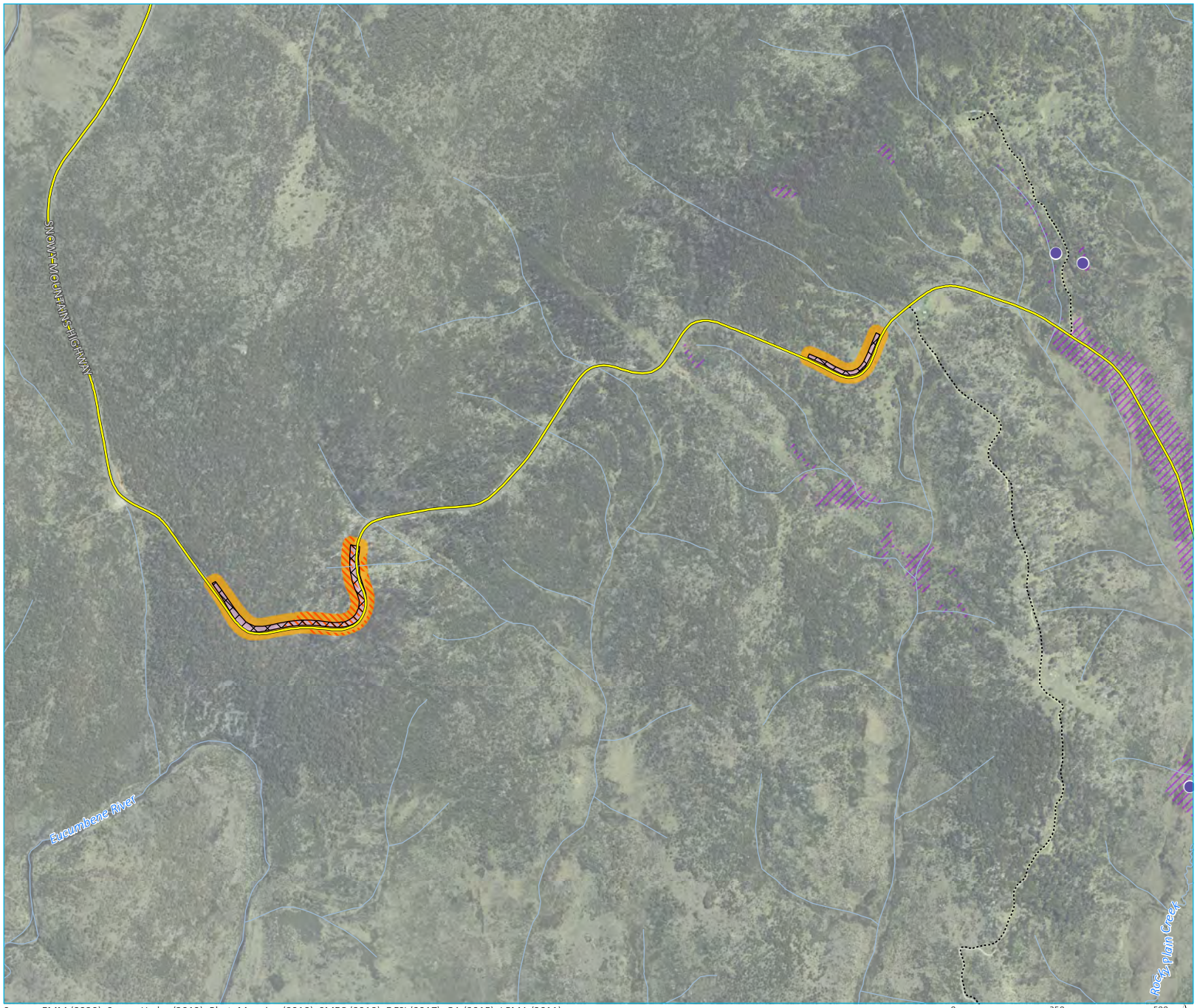
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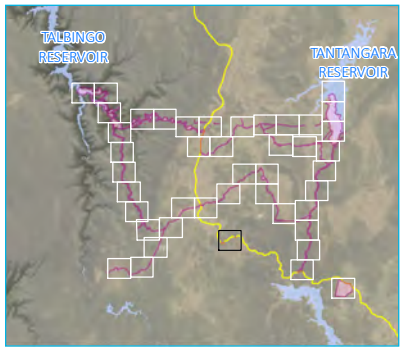
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.8.44

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Eastern Pygmy-possum species polygon
- Broad-toothed Rat habitat

Threatened fauna

- Broad-toothed Rat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

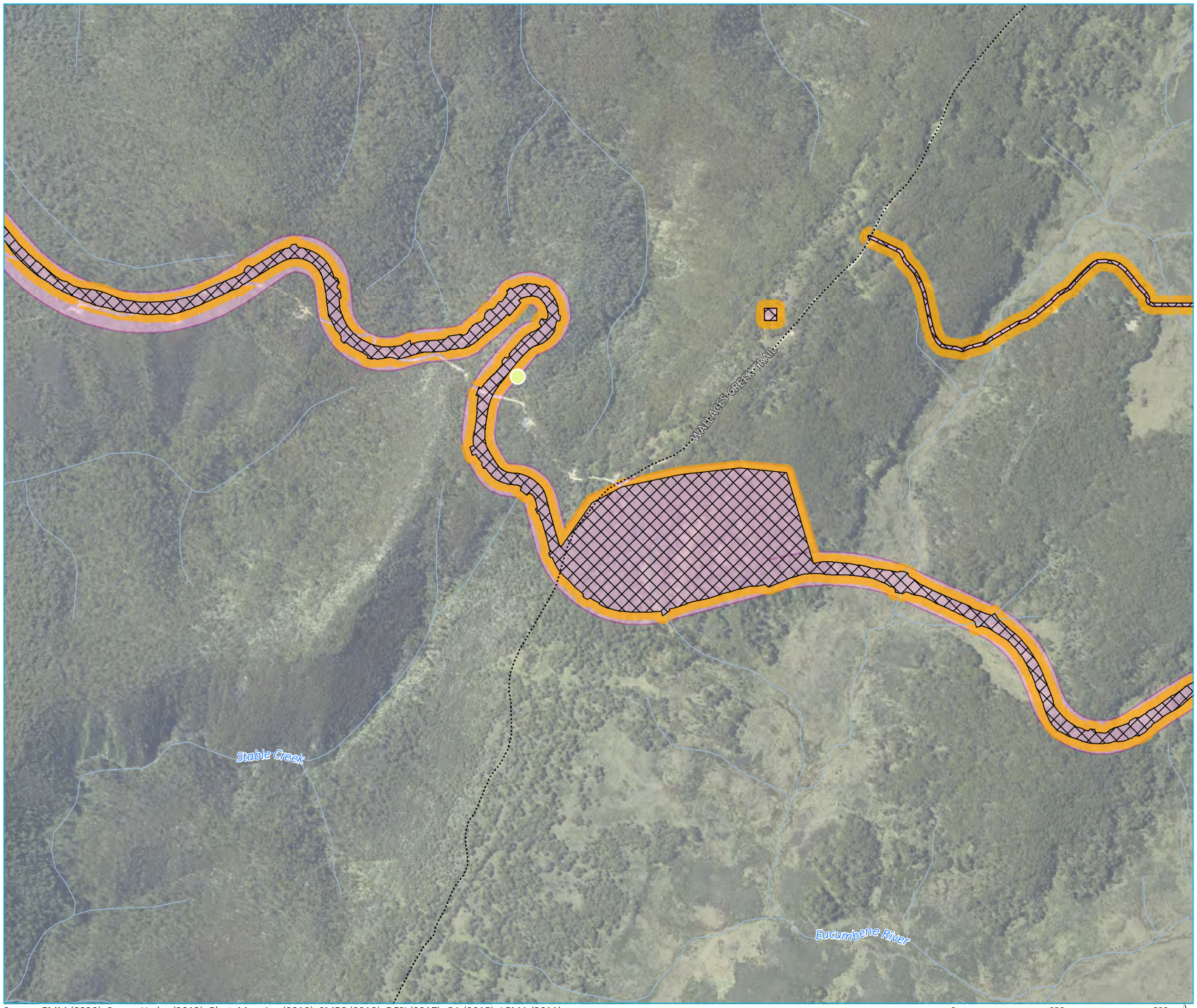
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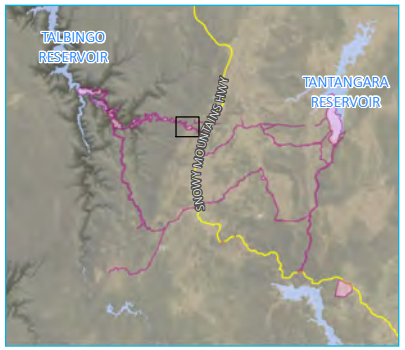
Small terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.8.45

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Spotted-tailed Quoll

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

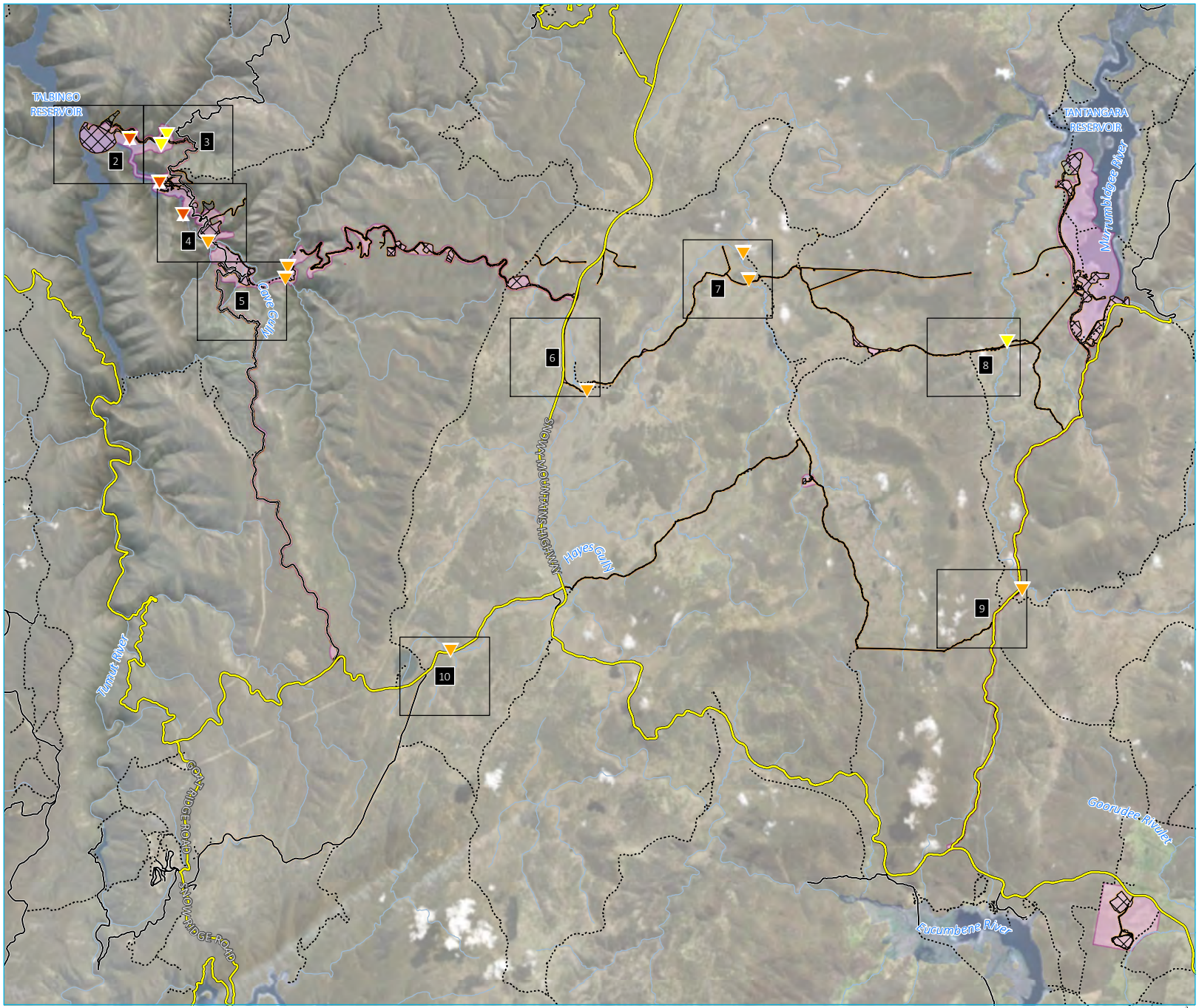
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Large terrestrial mammal survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.9

snowy 2.0

EMM creating opportunities



KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Construction envelope
- Indirect disturbance area

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

N

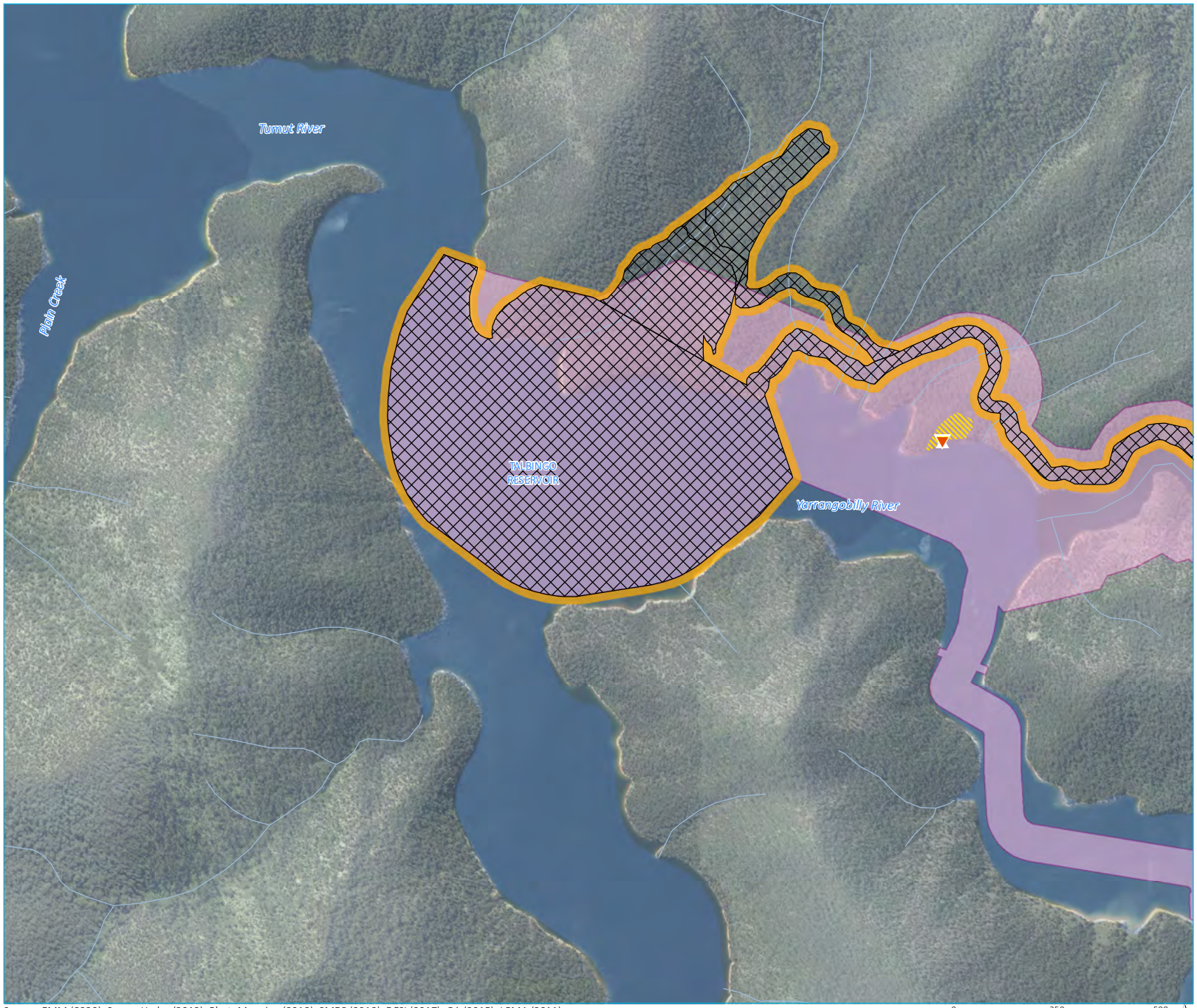
Microchiropteran bat survey results - page index

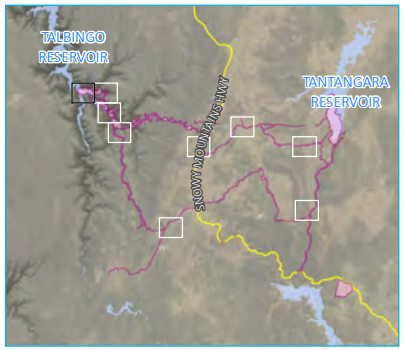
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.10.1

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Southern Myotis habitat

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

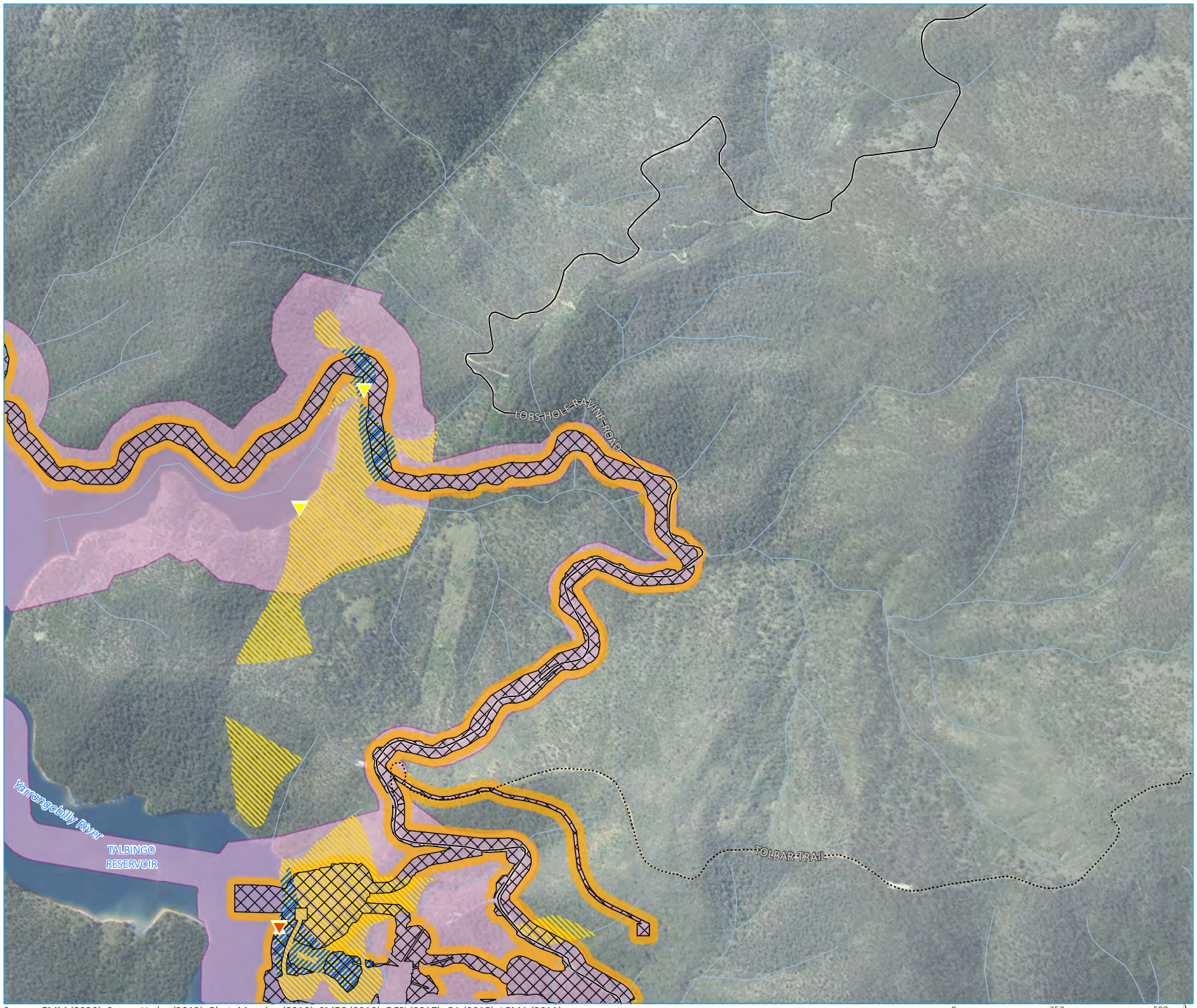
GDA 1994 MGA Zone 55

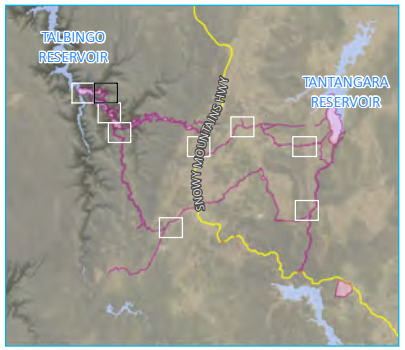
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Microchiropteran bat survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.10.2





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Southern Myotis species polygon
- Southern Myotis habitat

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Microchiropteran bat survey results

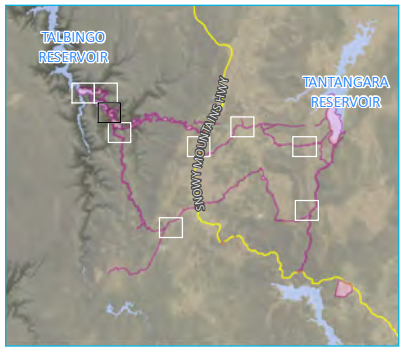
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.10.3

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Southern Myotis species polygon
- Southern Myotis habitat

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle
- Southern Myotis

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

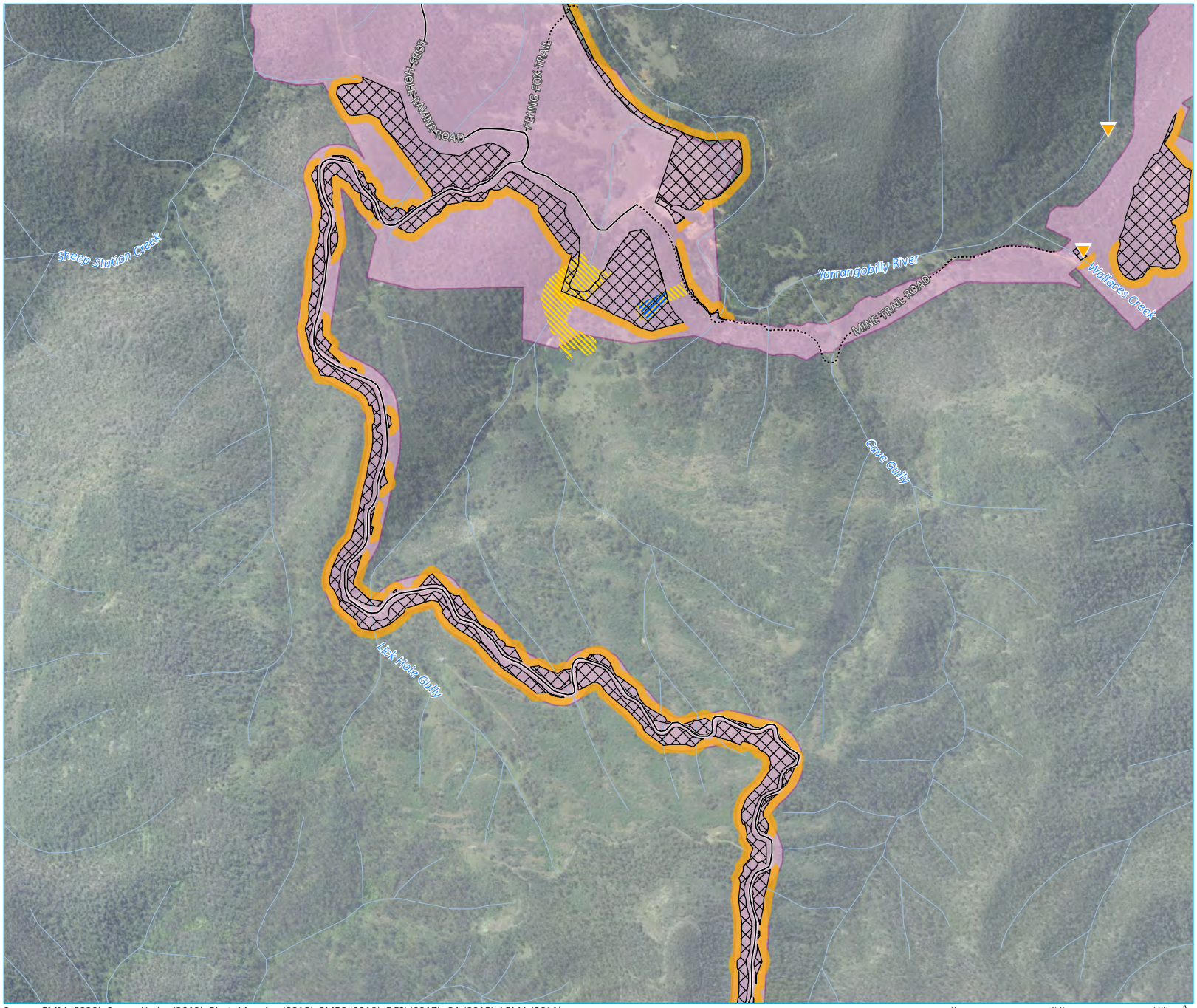
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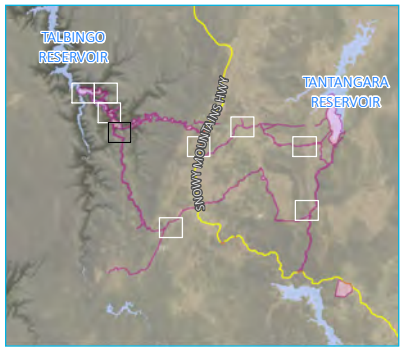
Microchiropteran bat survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.10.4

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Southern Myotis habitat

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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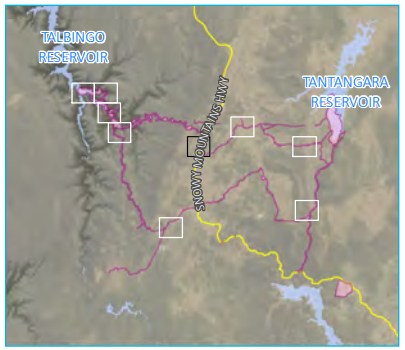
Microchiropteran bat survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.10.5

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern False Pipistrelle

Microchiropteran bat survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.10.6

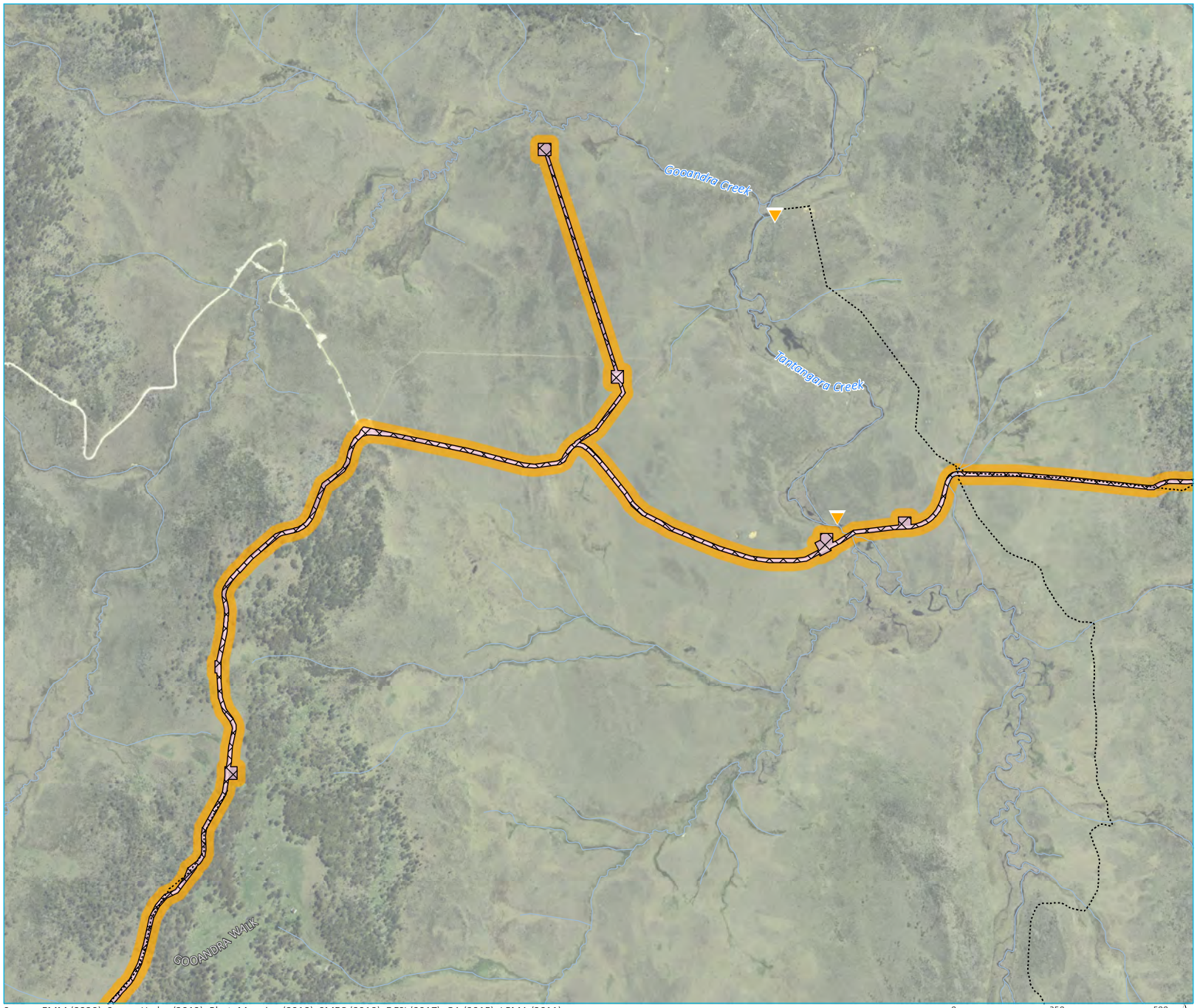
Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

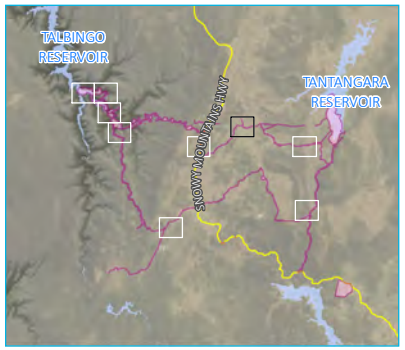
0 250 500 m

GDA 1994 MGA Zone 55

N

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle

Microchiropteran bat survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

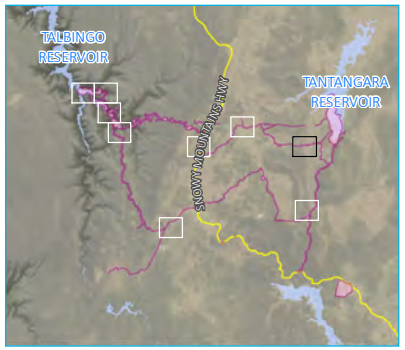
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.10.7

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Bentwing-bat

Microchiropteran bat survey results

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

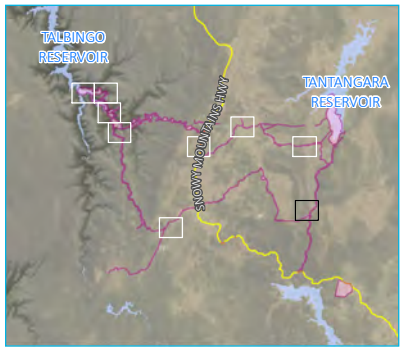
Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.10.8

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

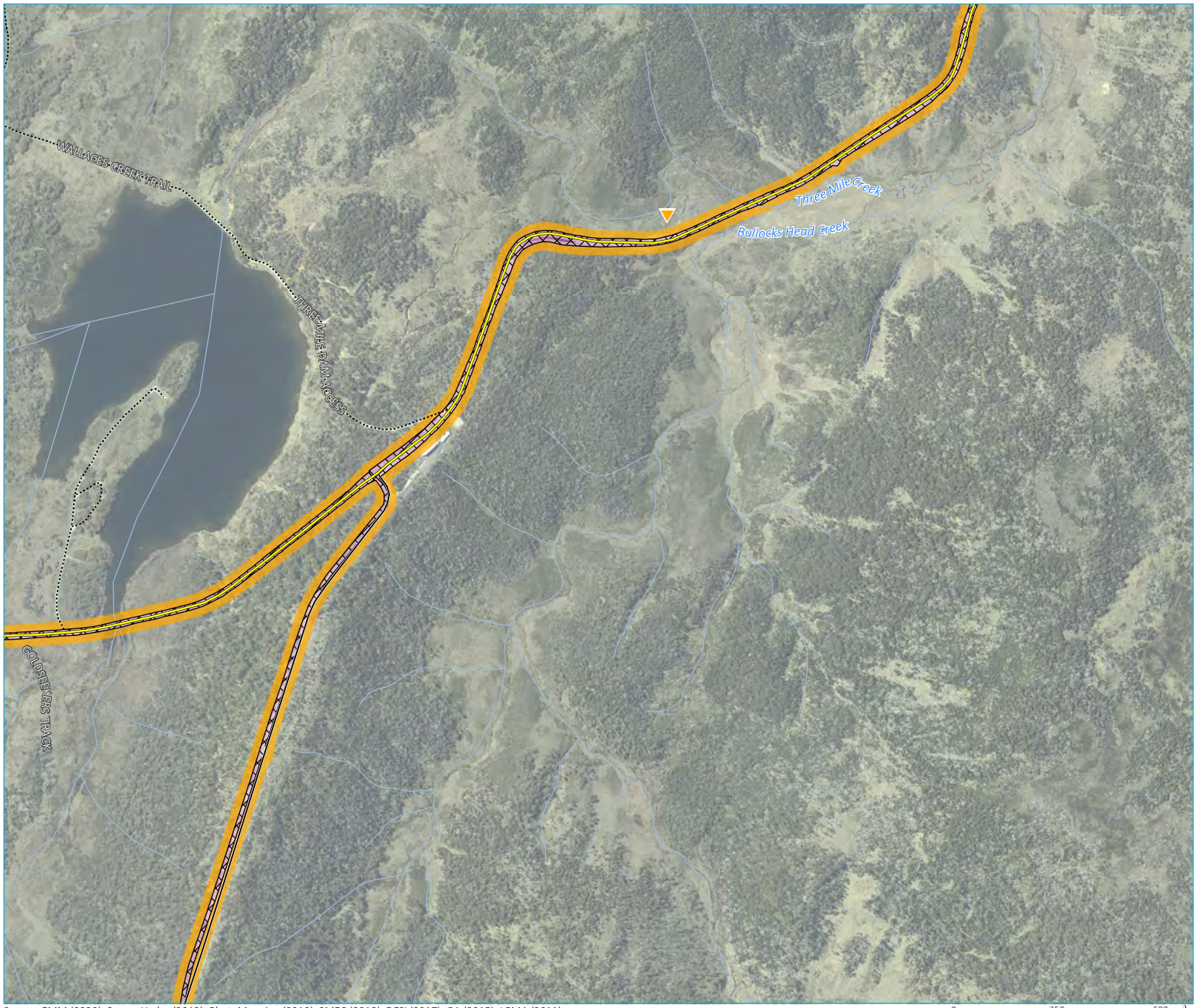
GDA 1994 MGA Zone 55

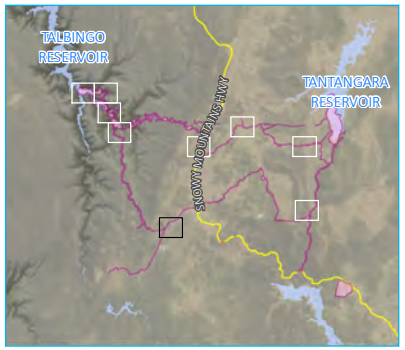
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Microchiropteran bat survey results

Snowy 2.0
Biodiversity Development Assessment Report
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Figure 5.10.9





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Eastern Bentwing-bat
- Eastern False Pipistrelle

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

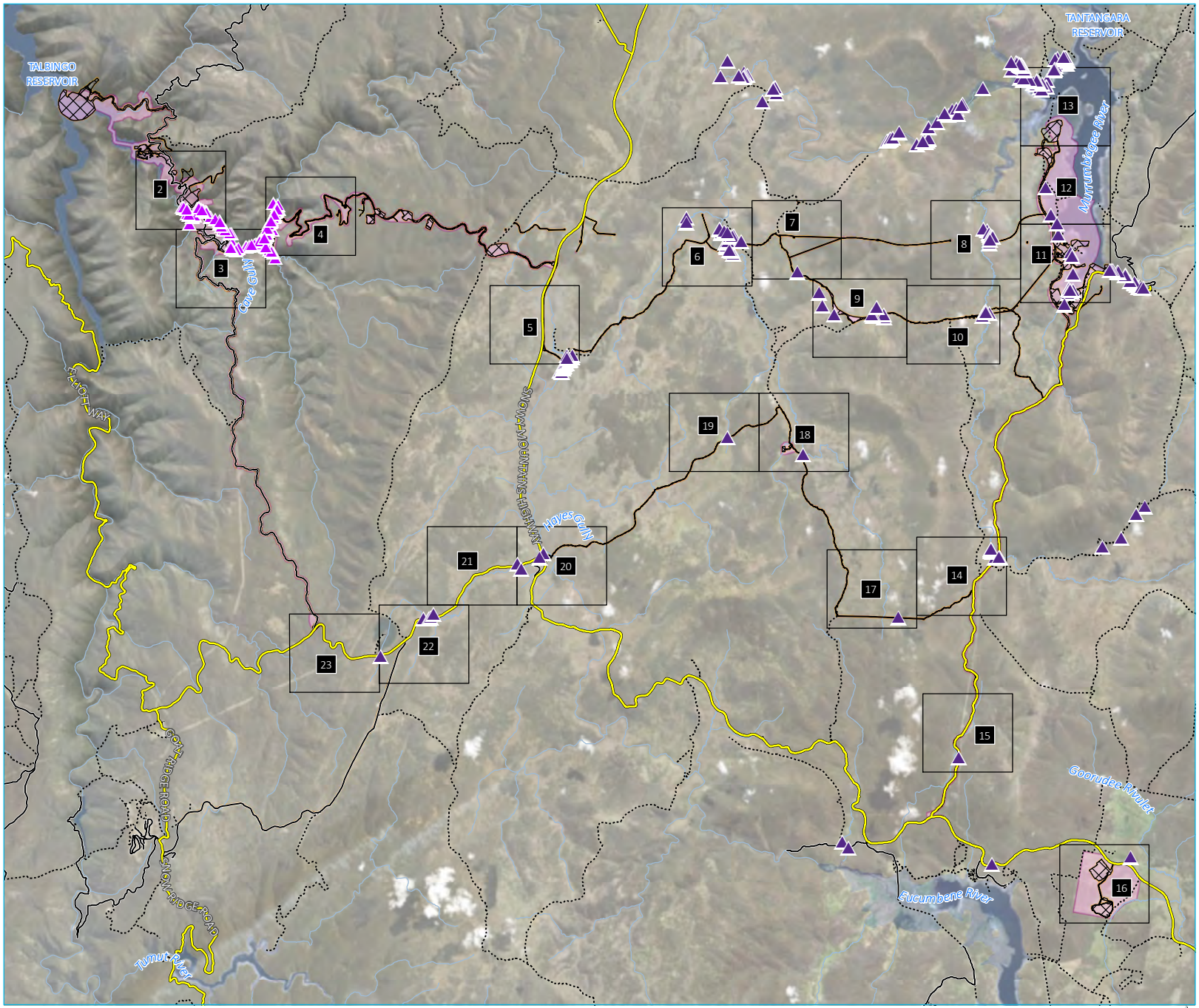
GDA 1994 MGA Zone 55

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Microchiropteran bat survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.10.10



KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog
- Booroolong Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

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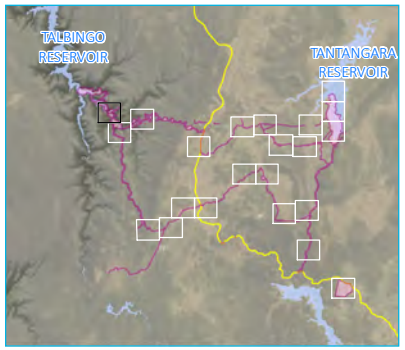
Amphibian survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.11.1

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Booroolong Frog species polygon
- Booroolong Frog habitat
- Full supply level

Threatened fauna

- Booroolong Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

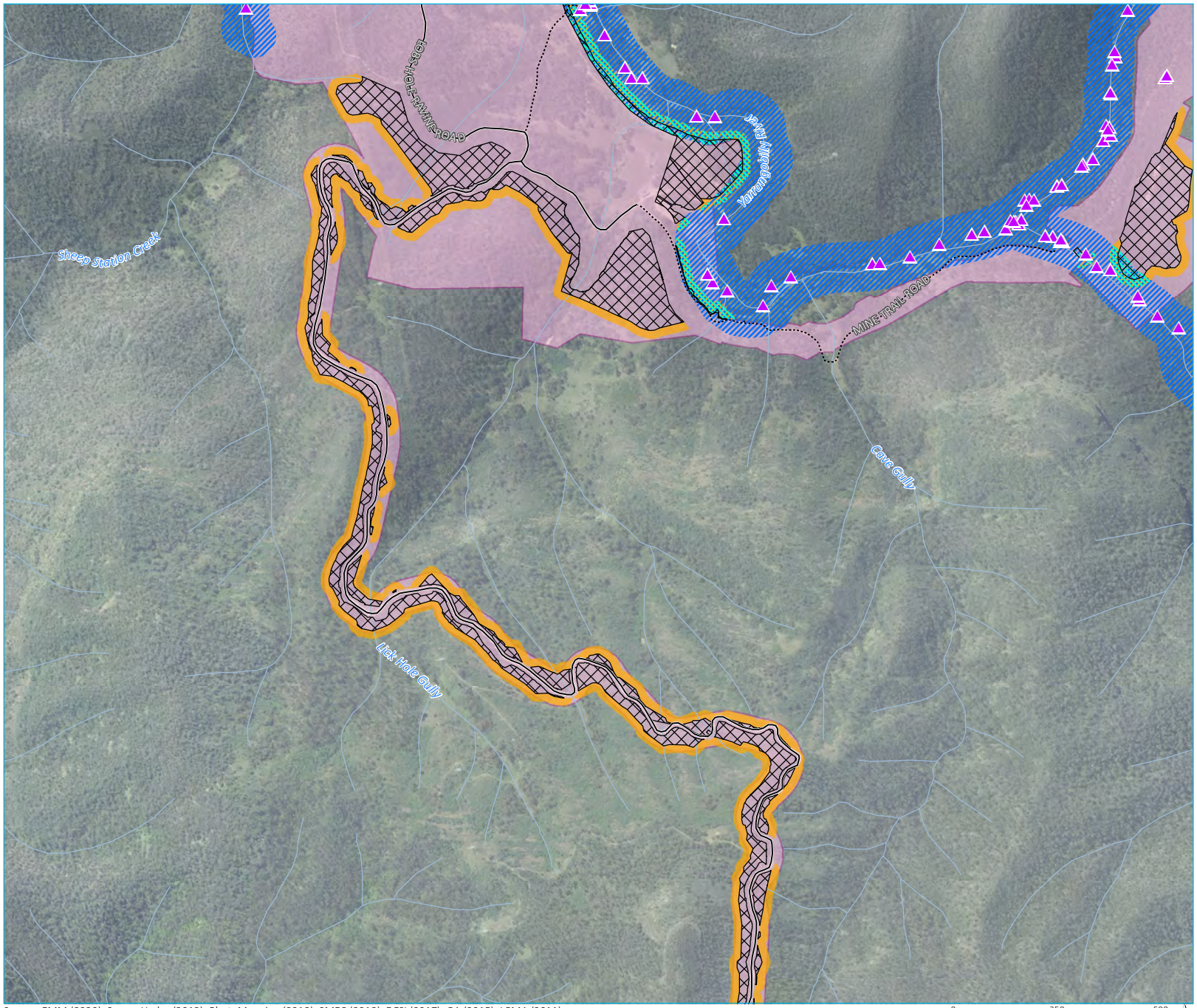
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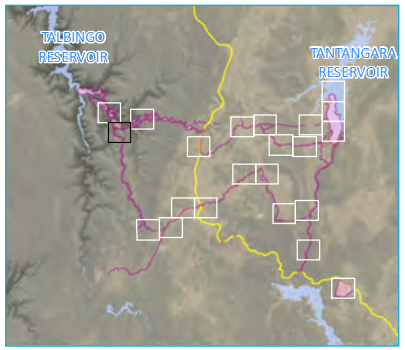
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.2

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Booroolong Frog species polygon
- Booroolong Frog habitat

Threatened fauna

- Booroolong Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

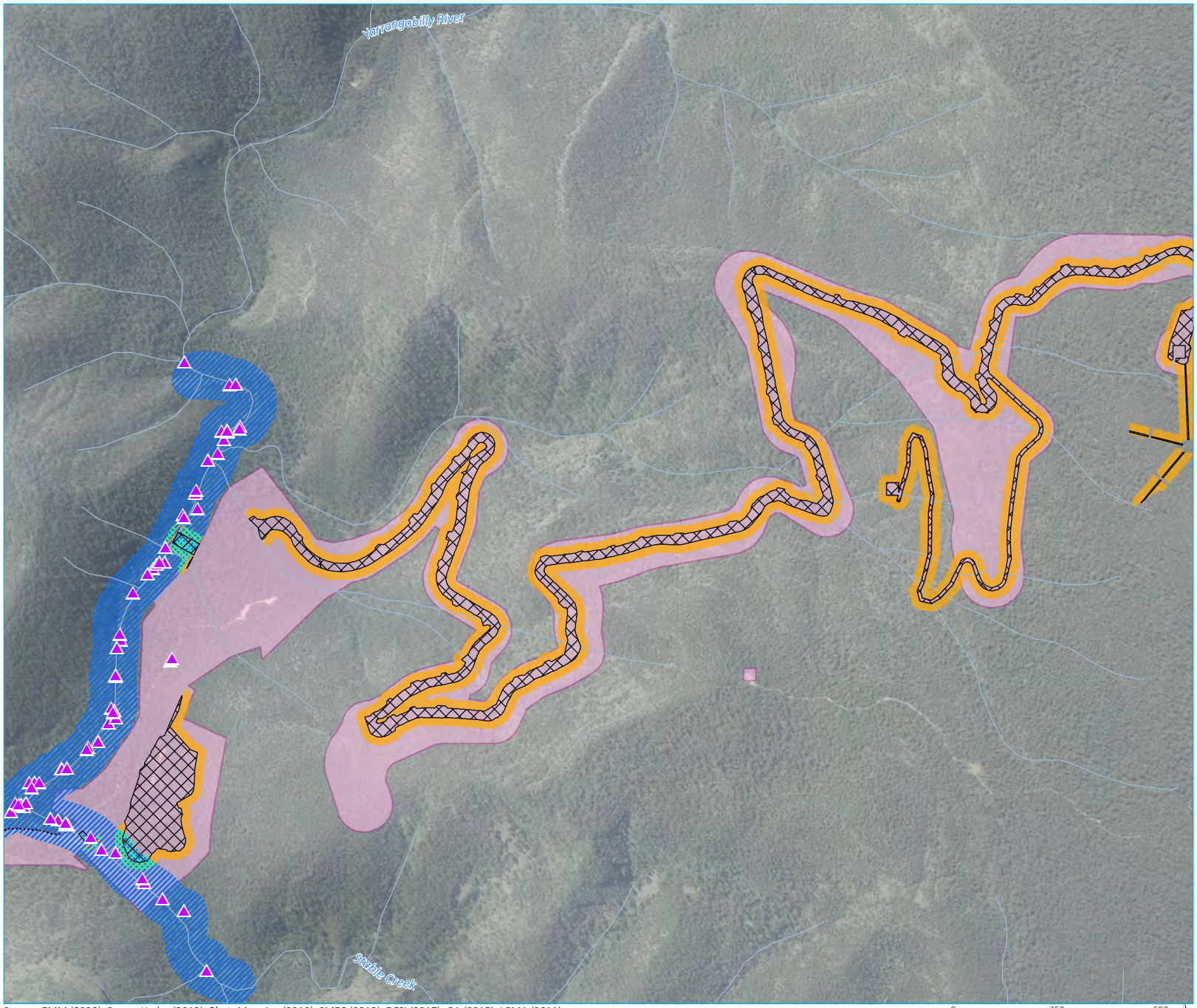
Amphibian survey results

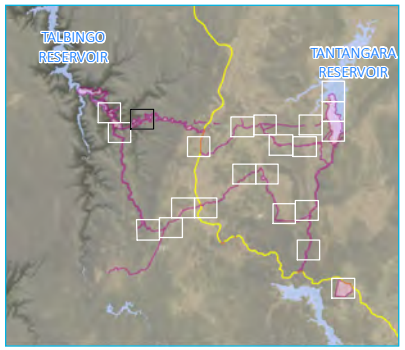
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.3

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Booroolong Frog species polygon
- Booroolong Frog habitat

Threatened fauna

- Booroolong Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

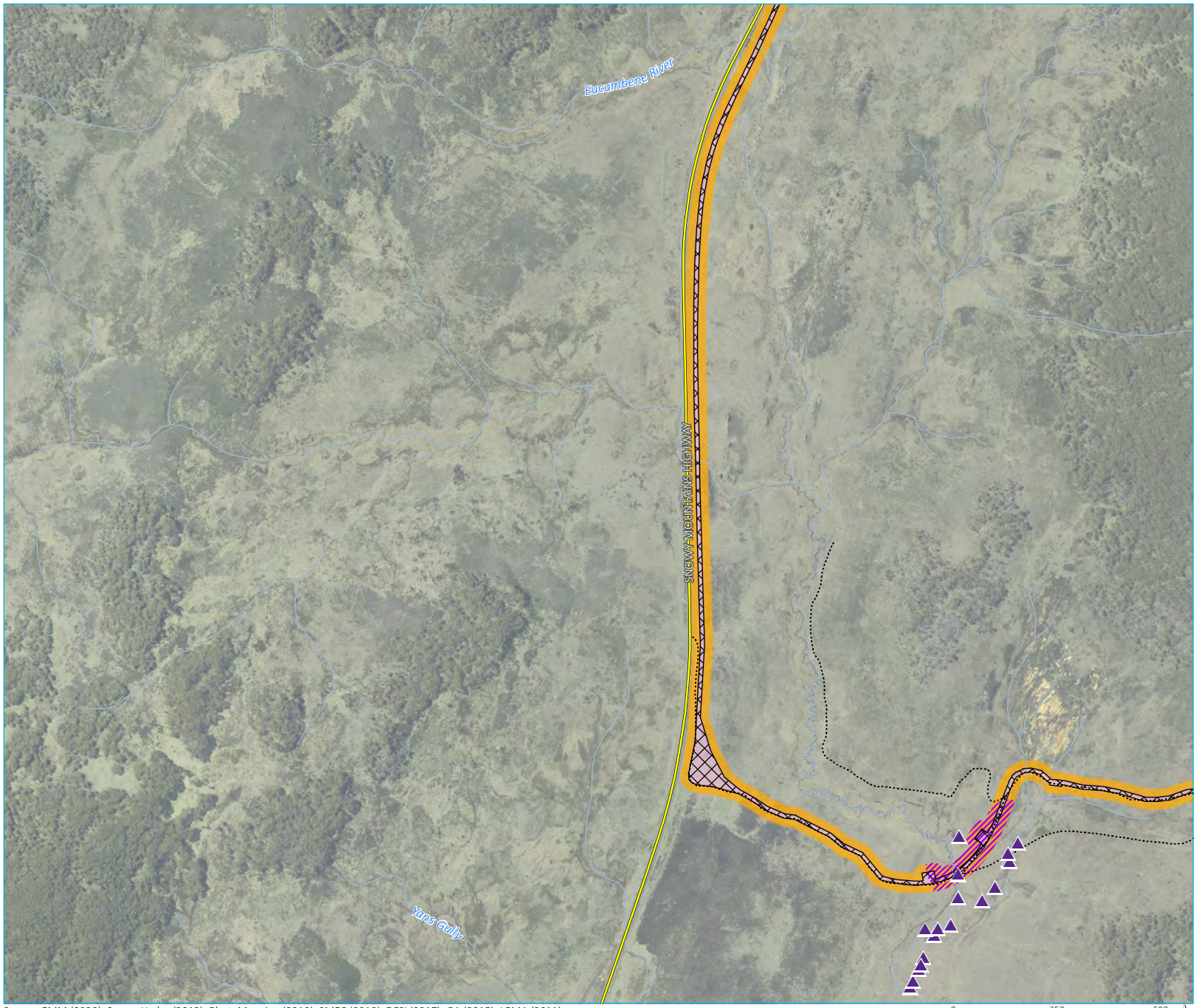
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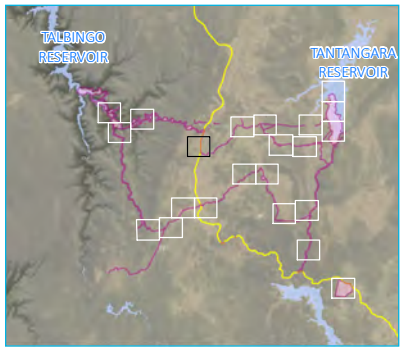
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.4

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

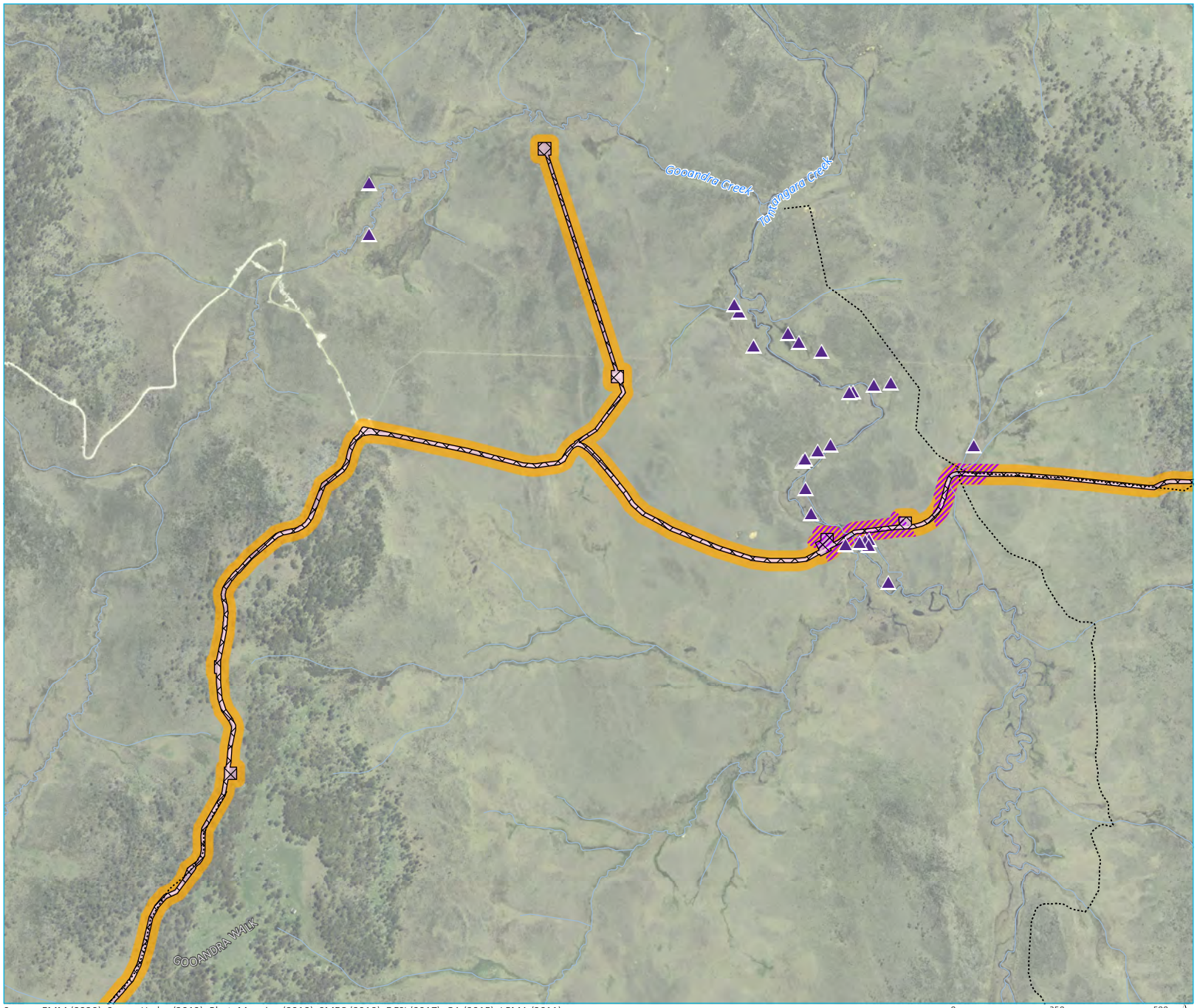
Amphibian survey results

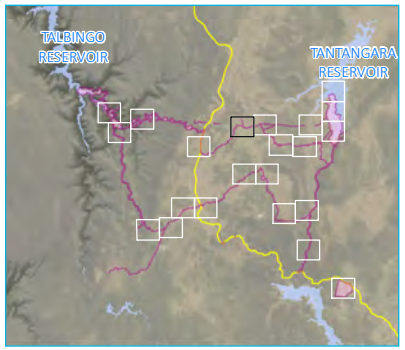
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.5

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

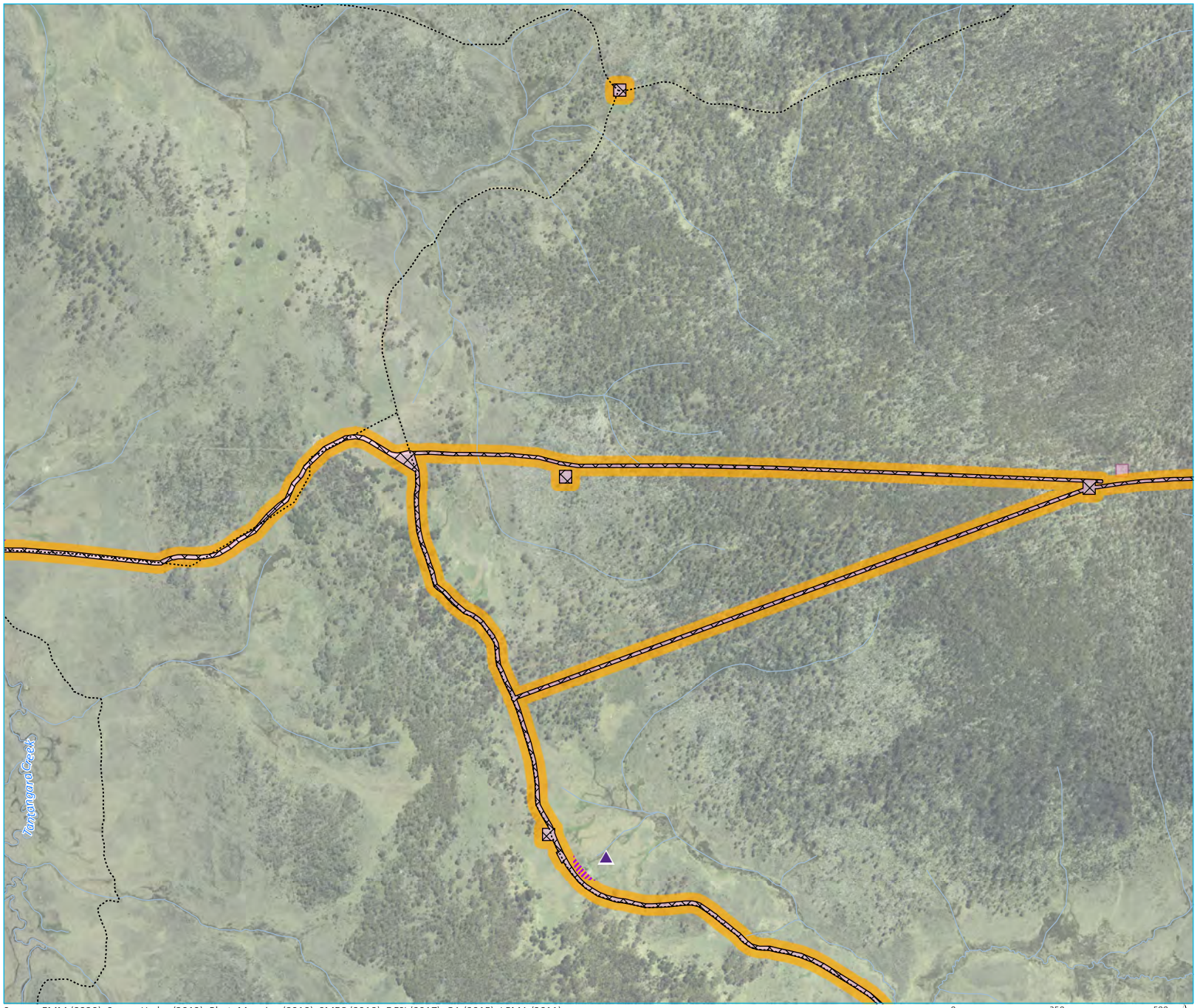
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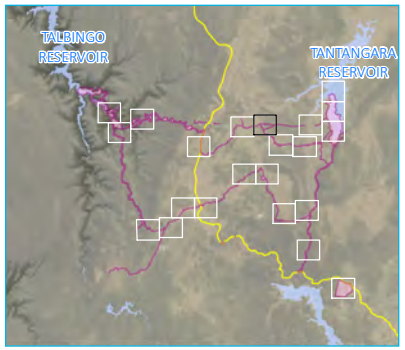
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.6

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

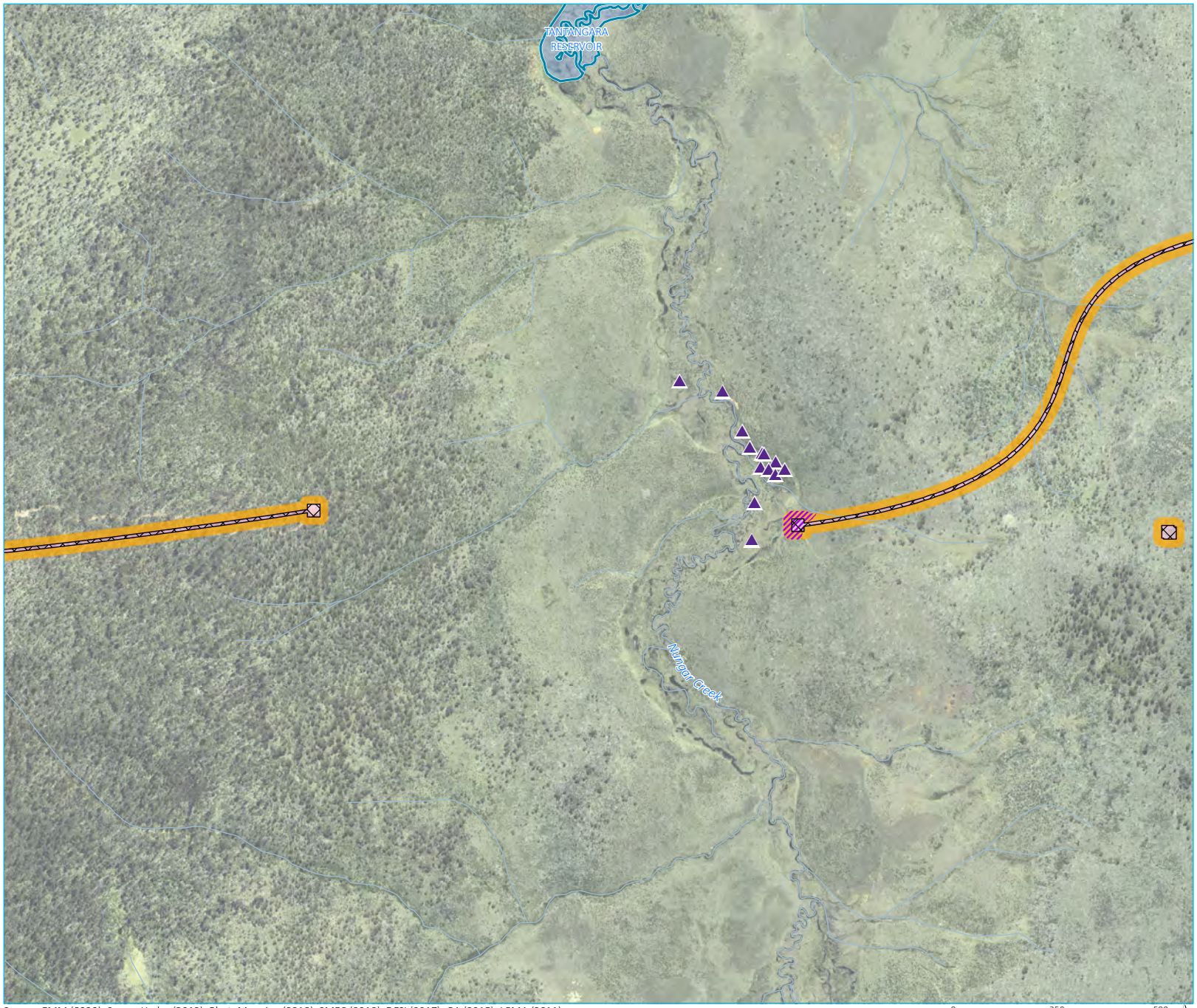
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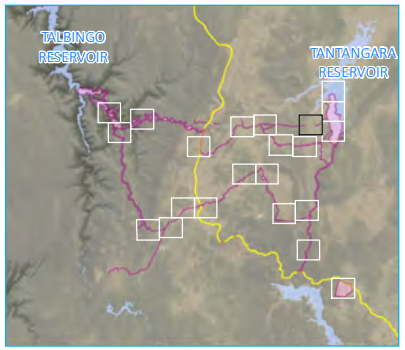
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.7

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon
- Full supply level

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

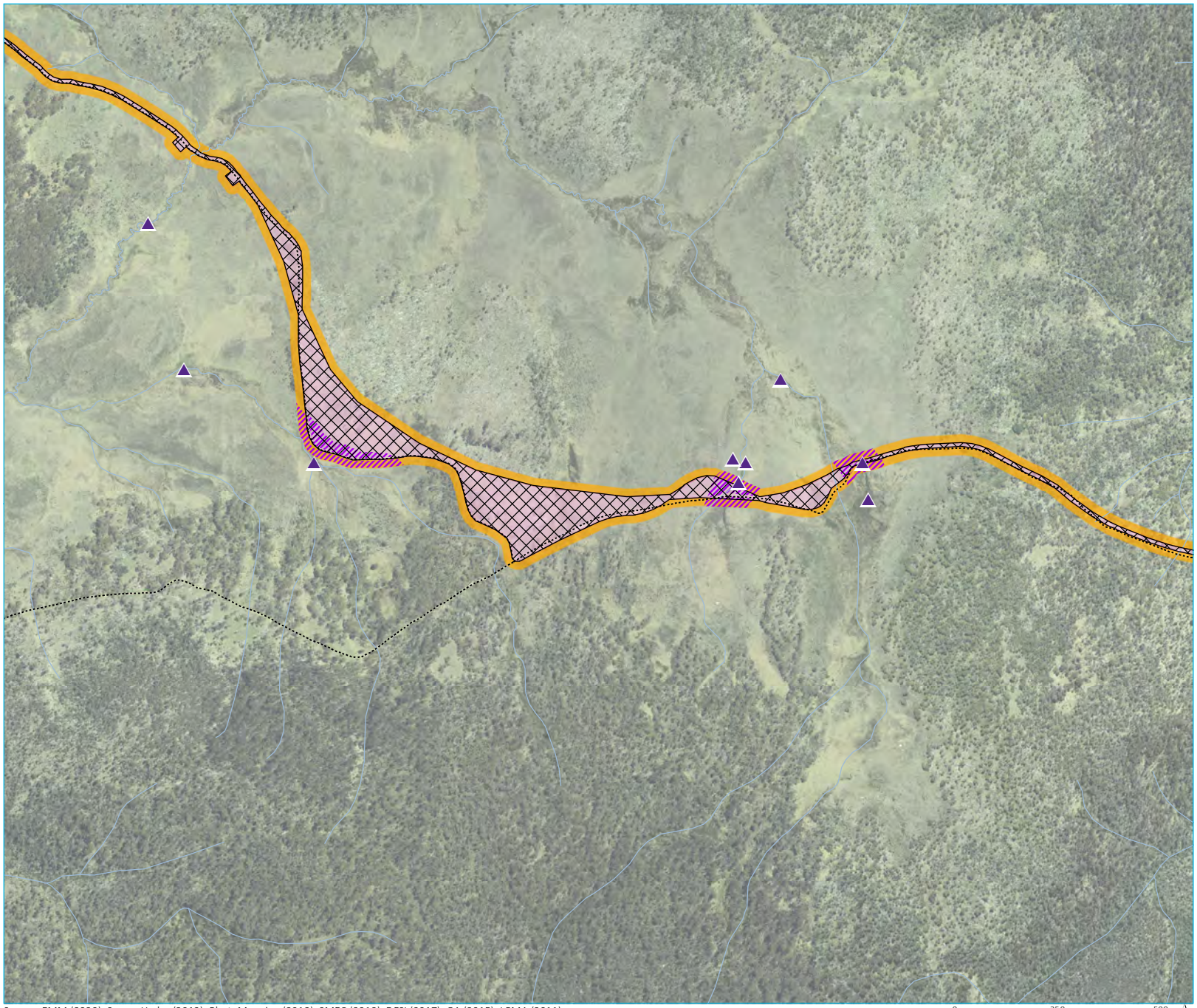
Amphibian survey results

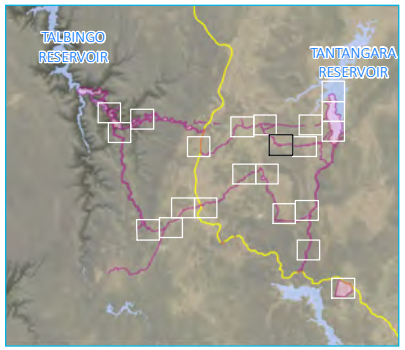
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.8

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Amphibian survey results

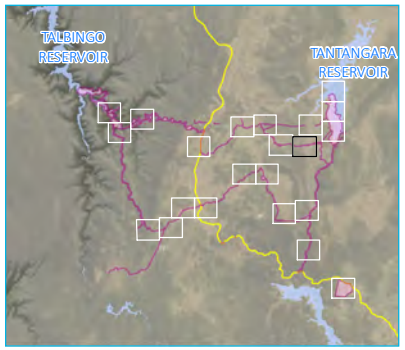
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

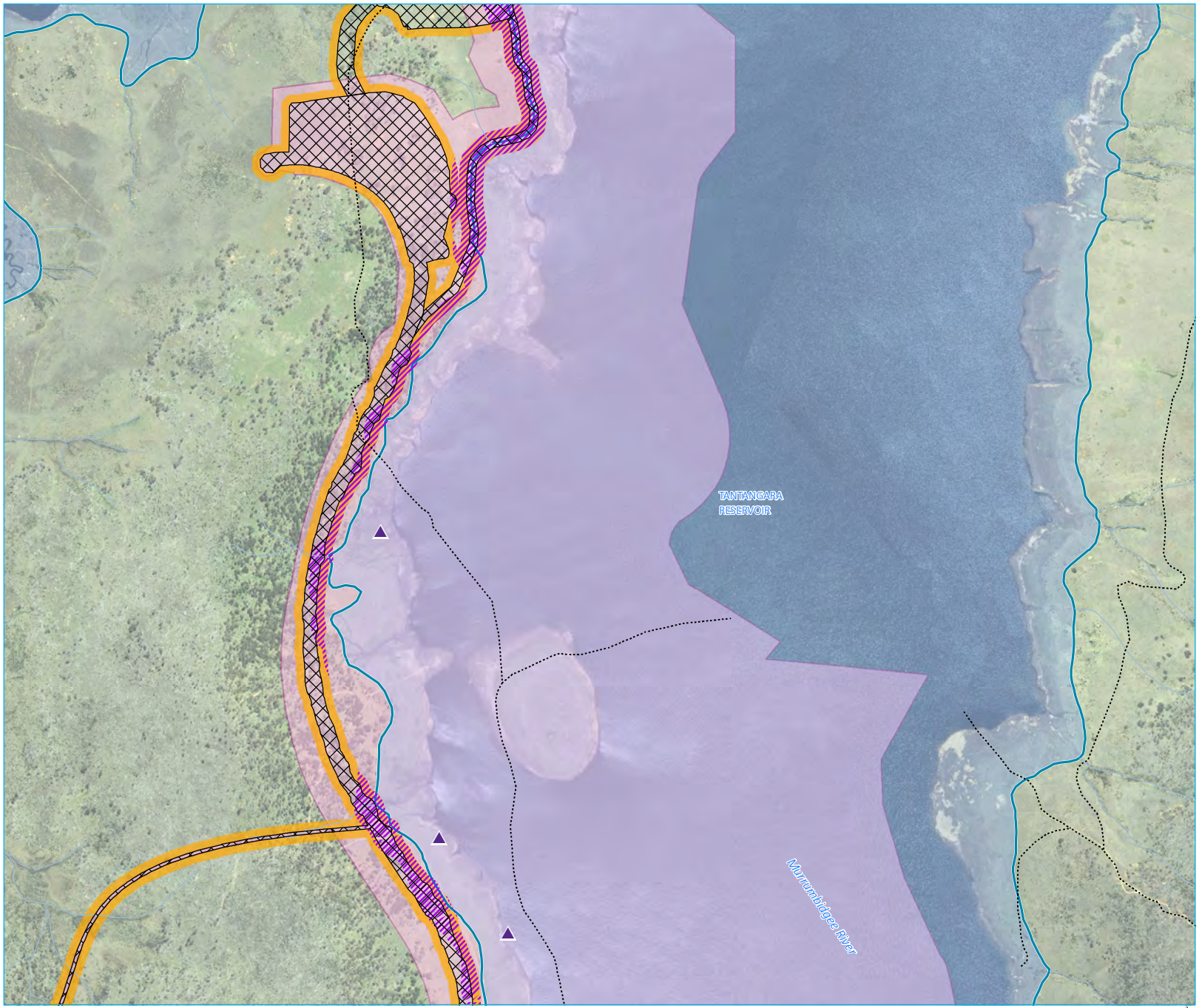
Amphibian survey results

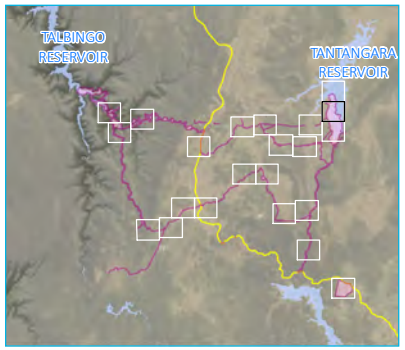
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon
- Full supply level

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

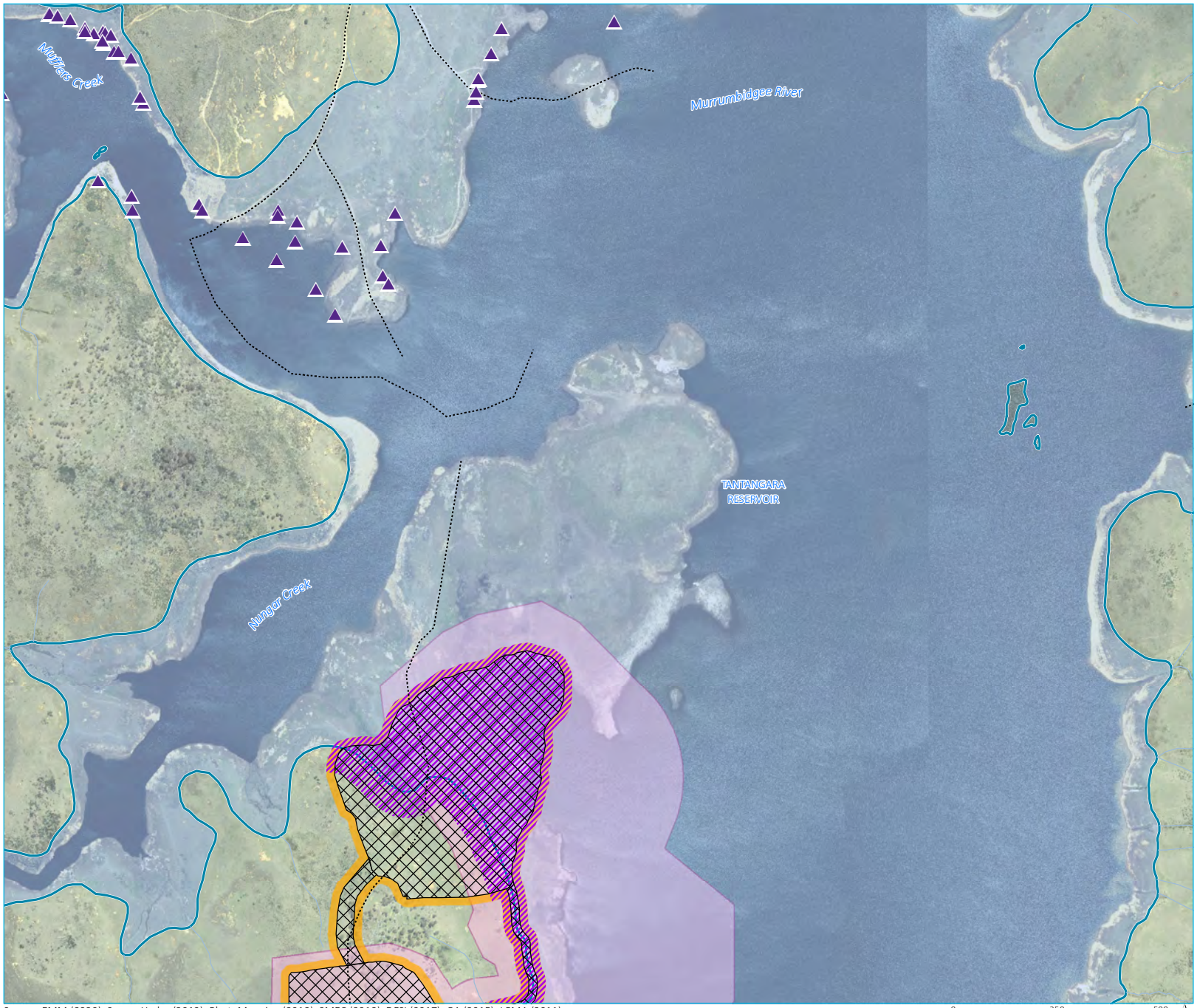
Amphibian survey results

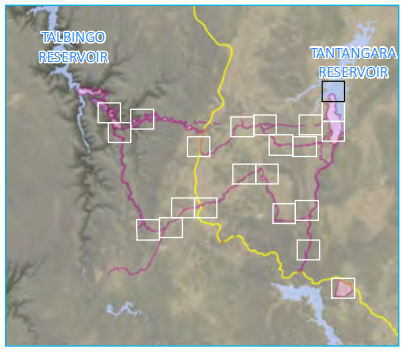
Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.12

snowy 2.0

EMM creating opportunities

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR014_AmphibianSurveyResults_20200206_DDP_02.mxd 21/02/2020





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon
- Full supply level

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

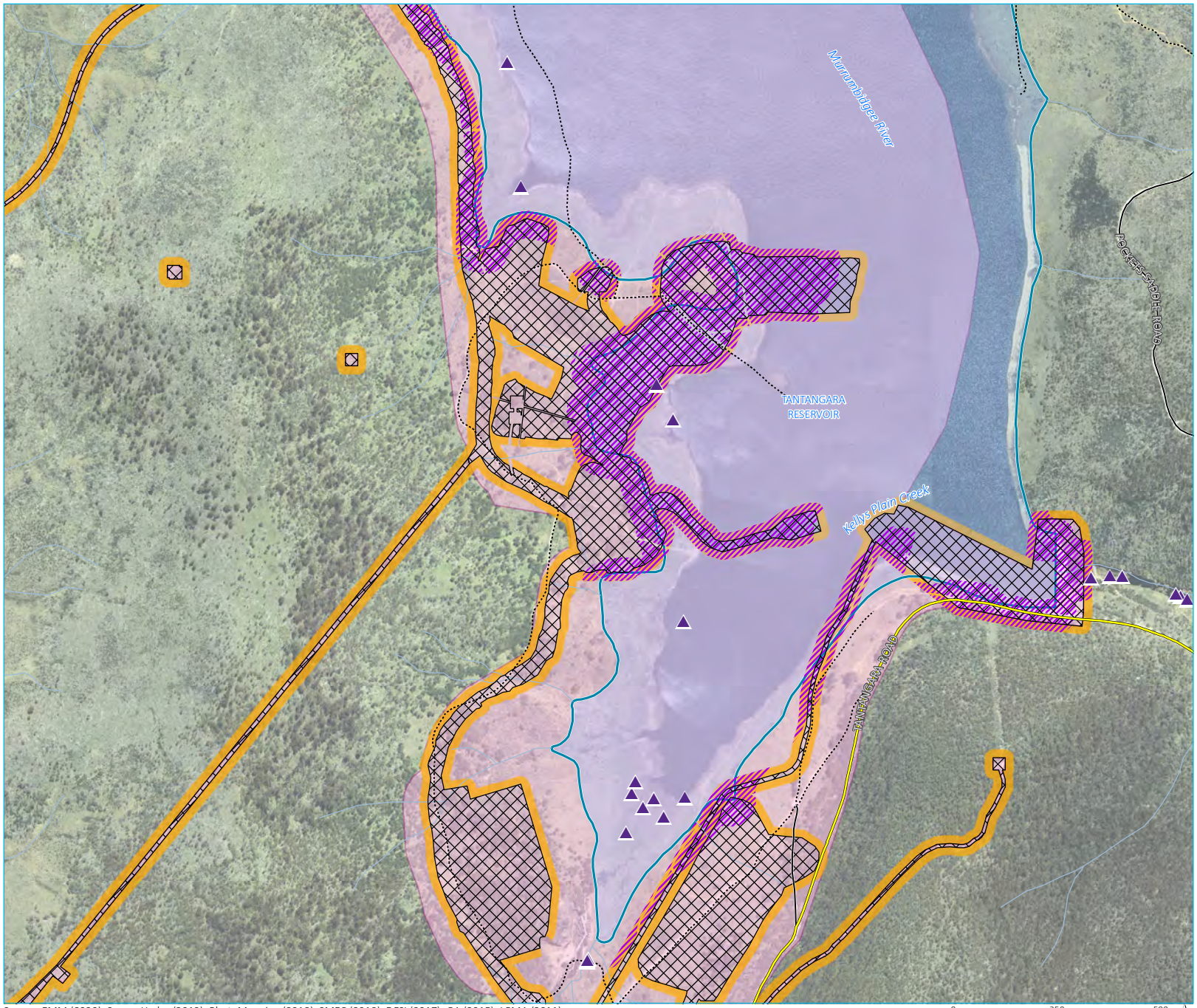
Amphibian survey results

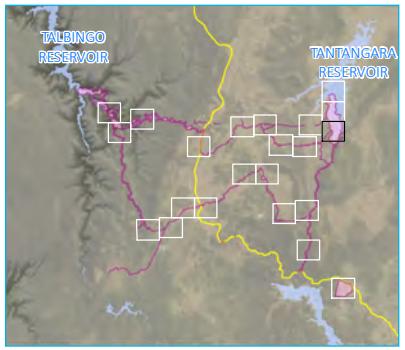
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.13

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon
- Full supply level

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

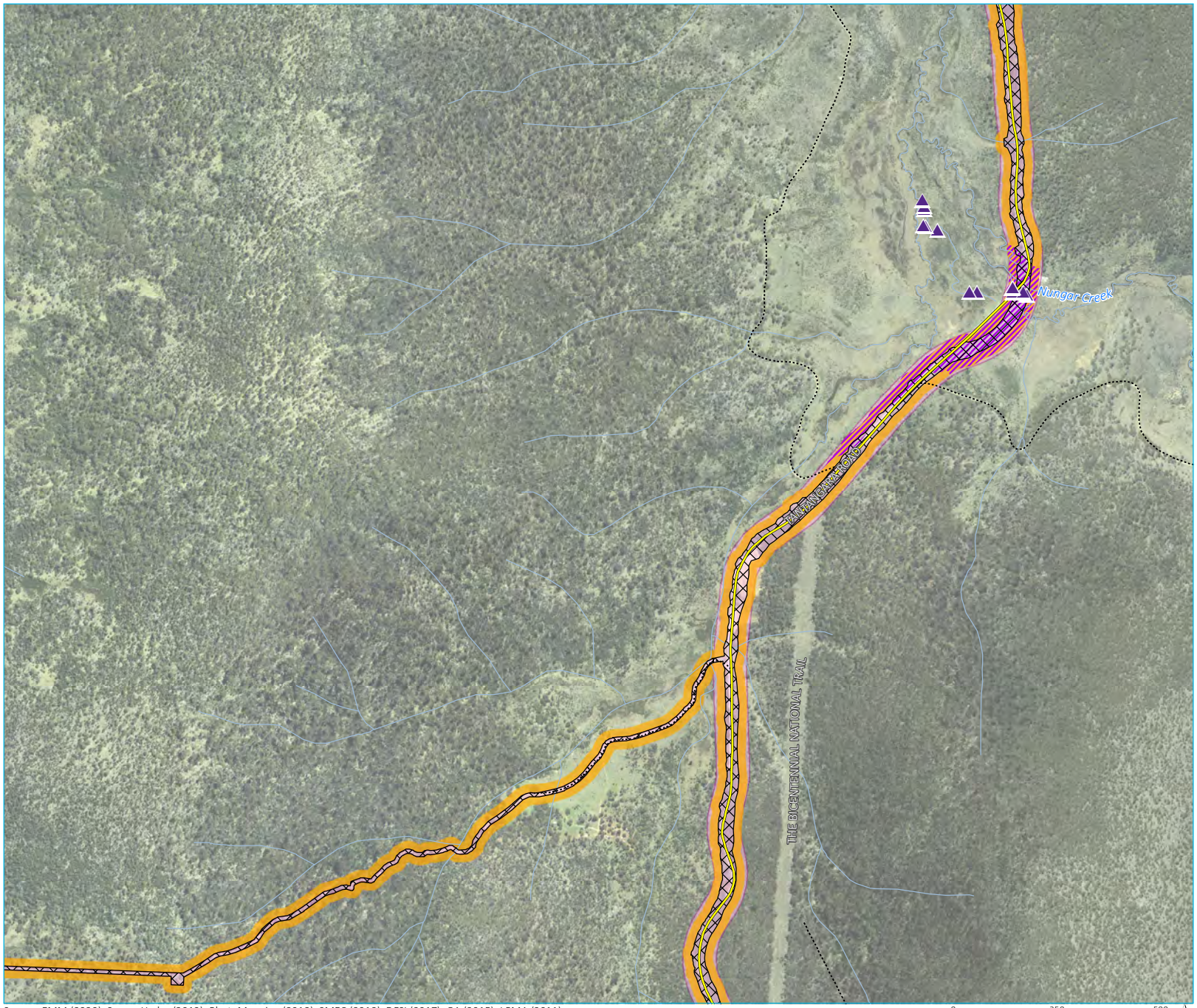
Amphibian survey results

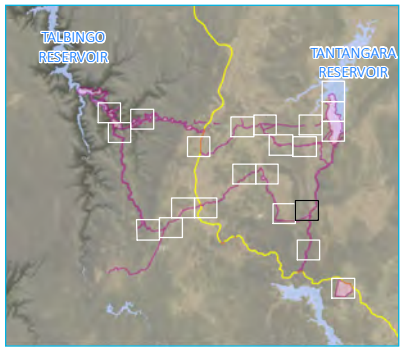
Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.11

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Amphibian survey results

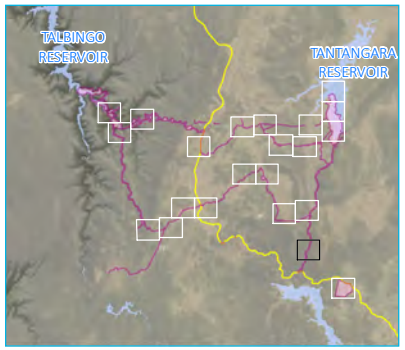
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.14

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

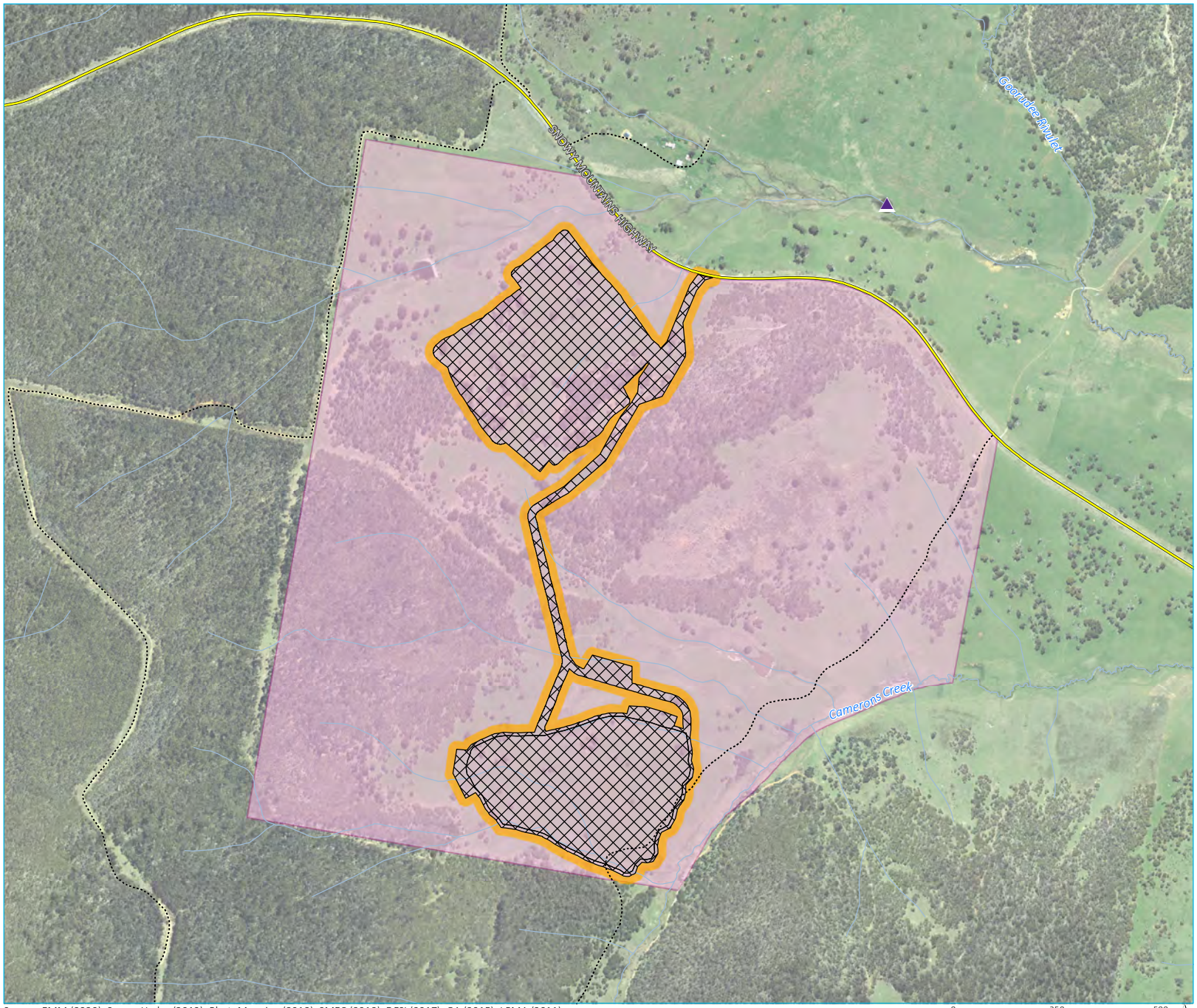
GDA 1994 MGA Zone 55

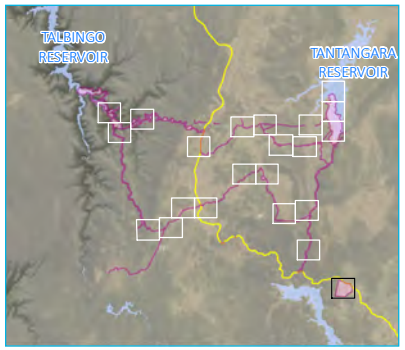
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Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.15





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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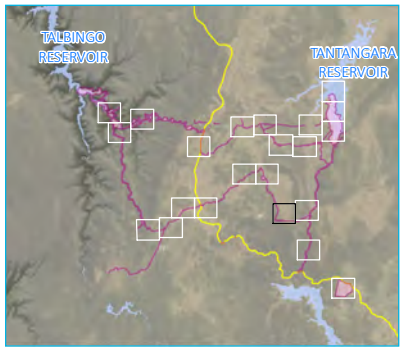
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.16

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

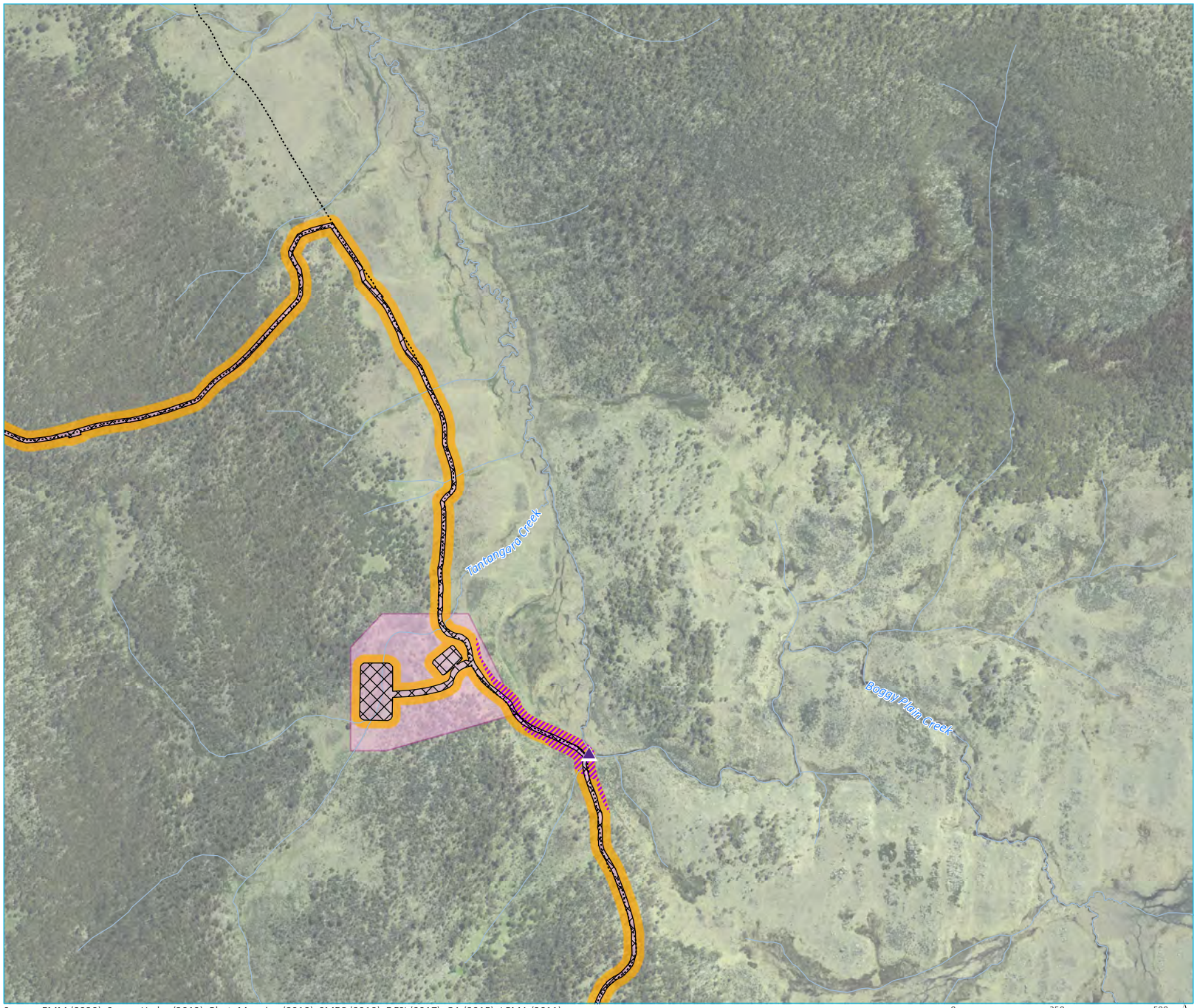
Amphibian survey results

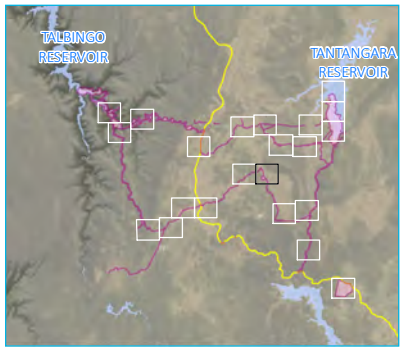
Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.17

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

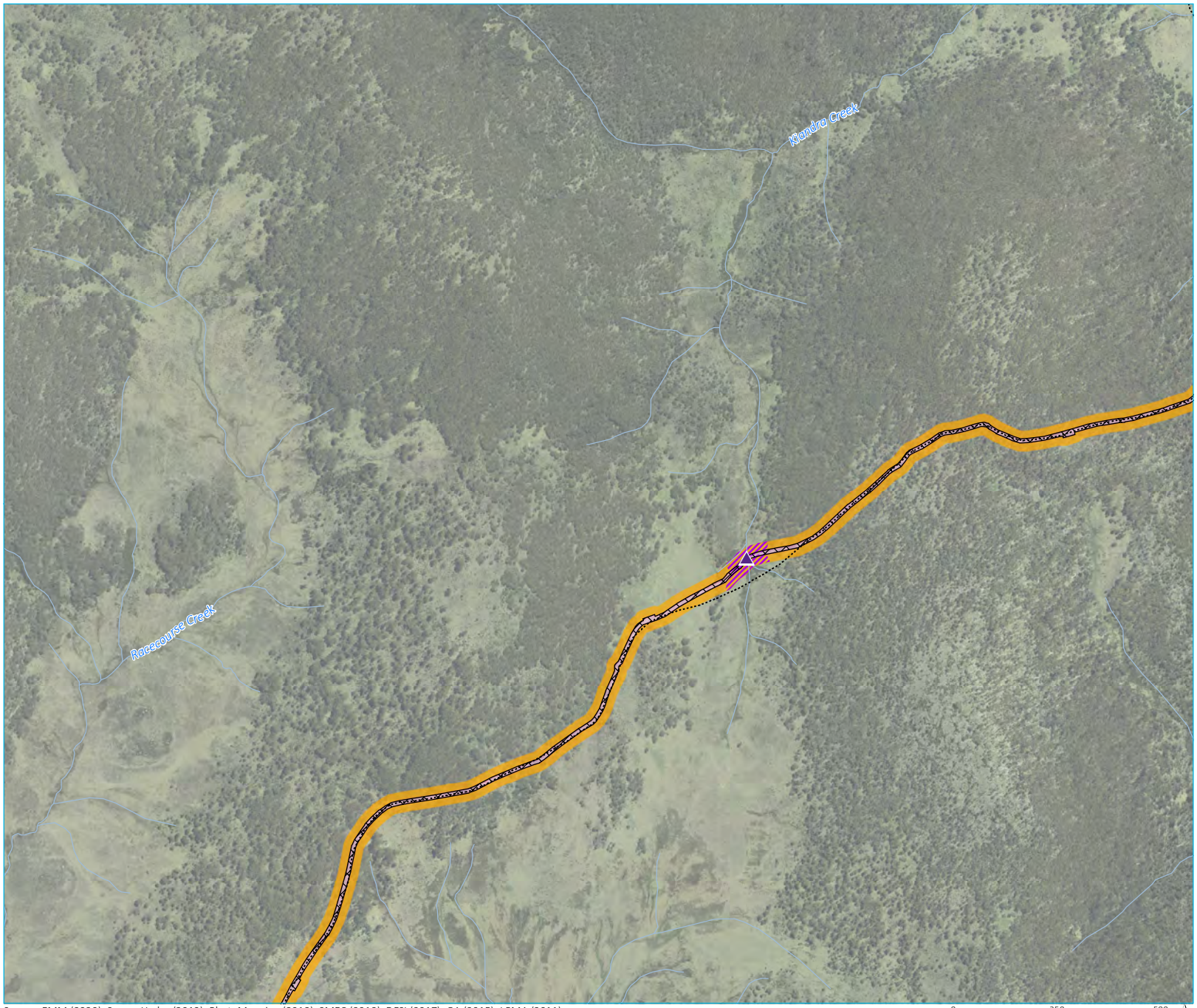
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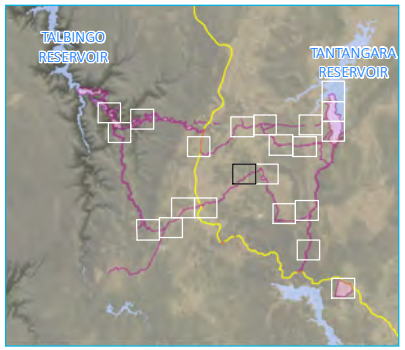
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.18

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

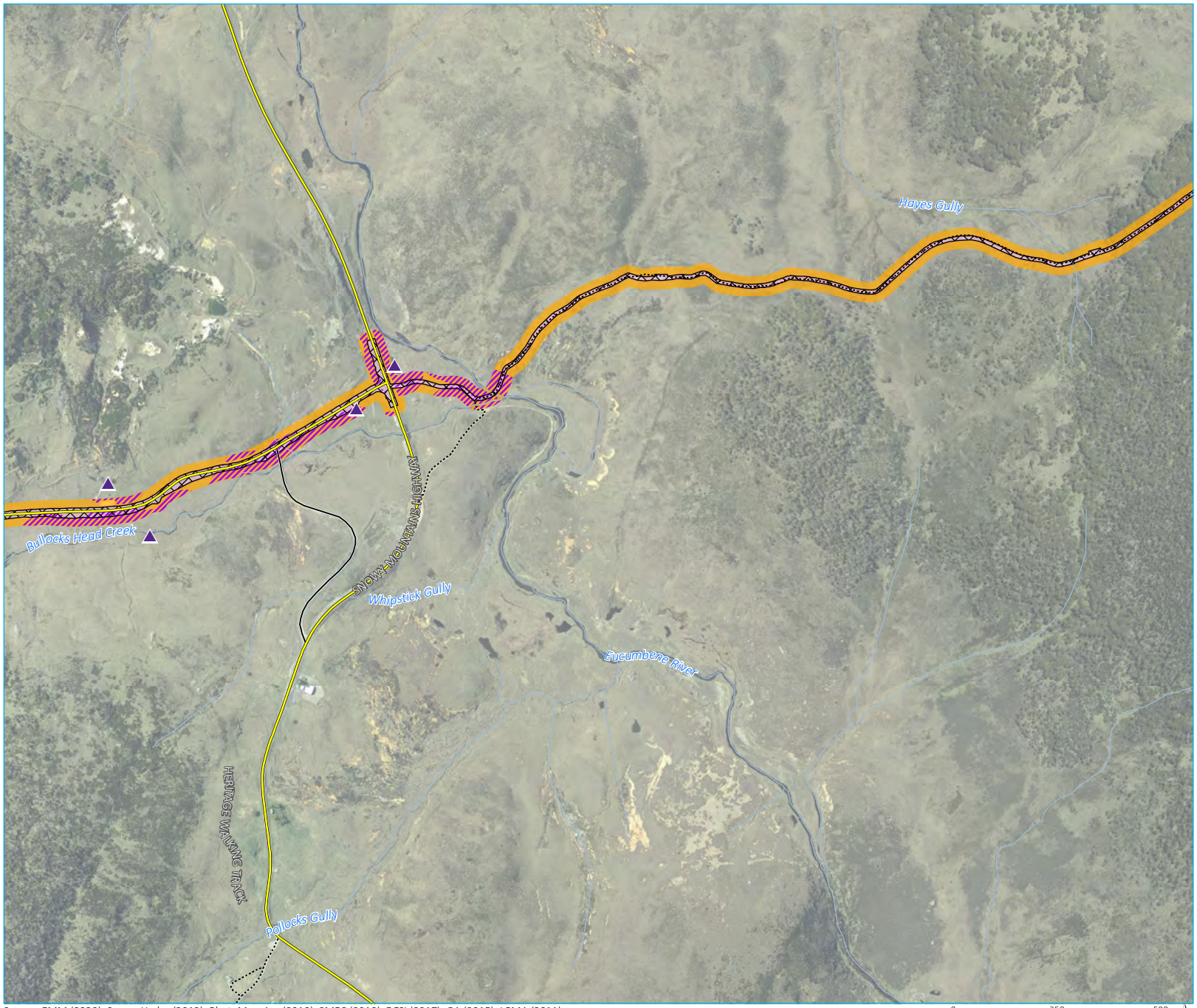
Amphibian survey results

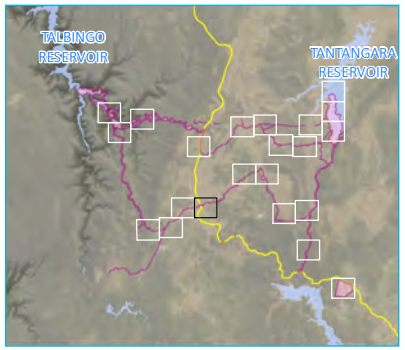
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.19

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Amphibian survey results

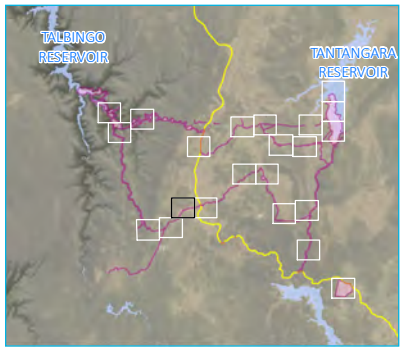
Snowy 2.0
Biodiversity DevelopmentAssessment Report
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Figure 5.11.20

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

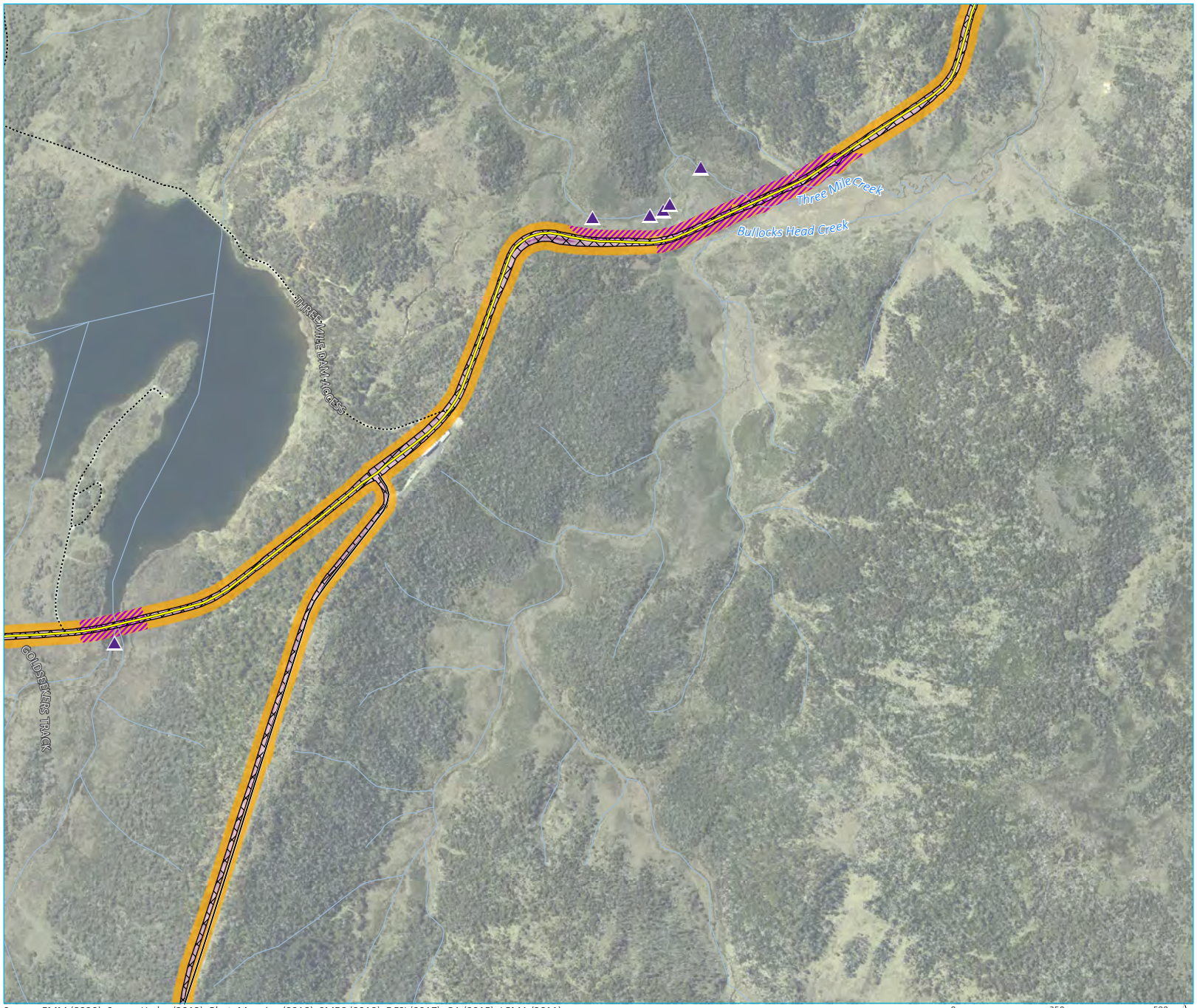
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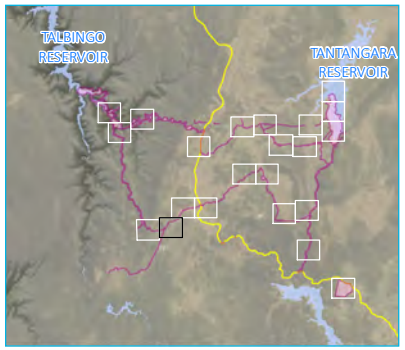
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.21

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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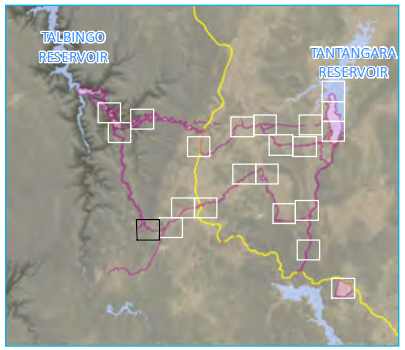
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.22

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine Tree Frog species polygon

Threatened fauna

- Alpine Tree Frog

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

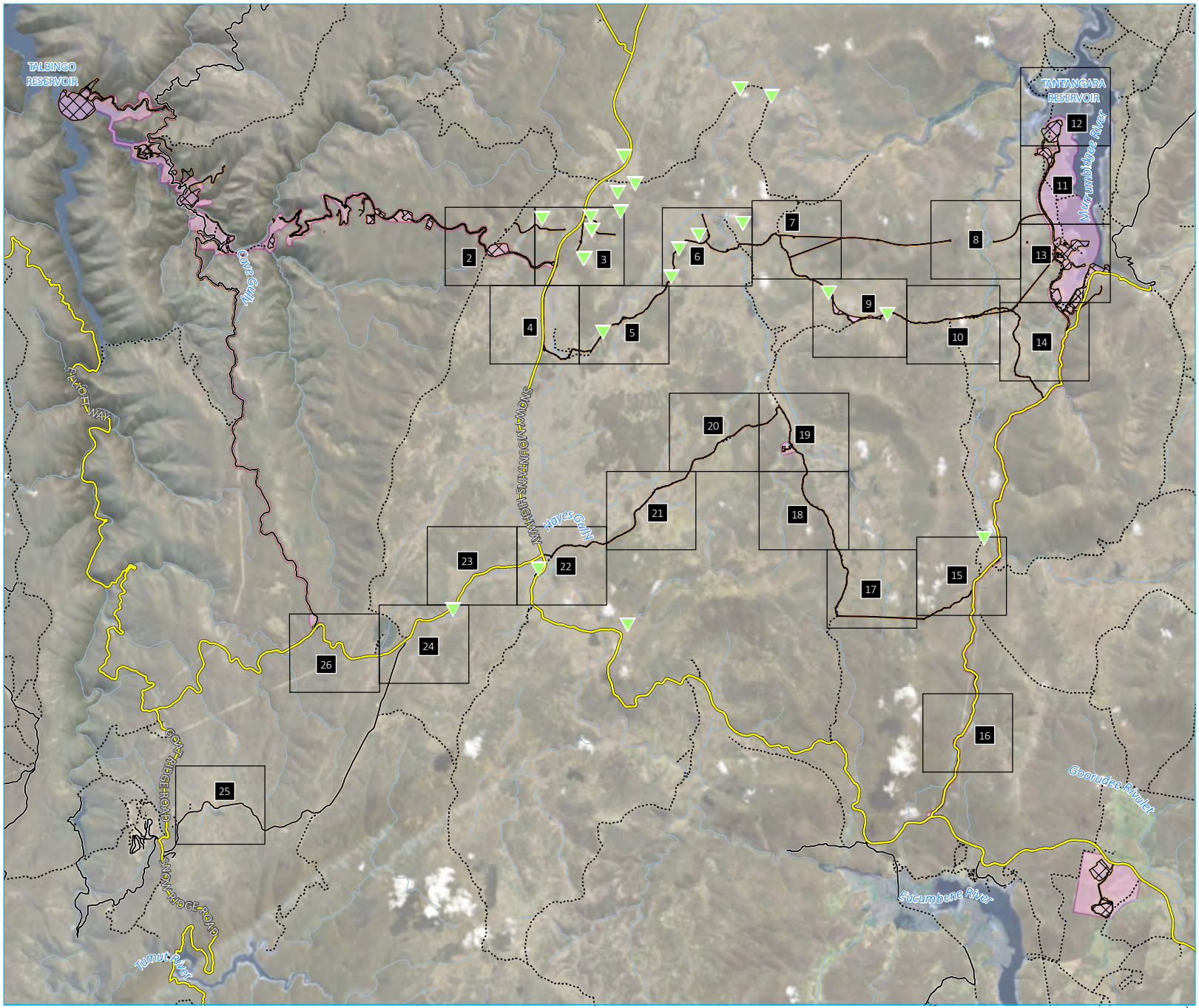
Amphibian survey results

Snowy 2.0
Biodiversity DevelopmentAssessment Report
Main Works
Figure 5.11.23

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Page index
- Disturbance area
- Indirect disturbance area
- Construction envelope

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 5 10 km

GDA 1994 MGA Zone 55

N

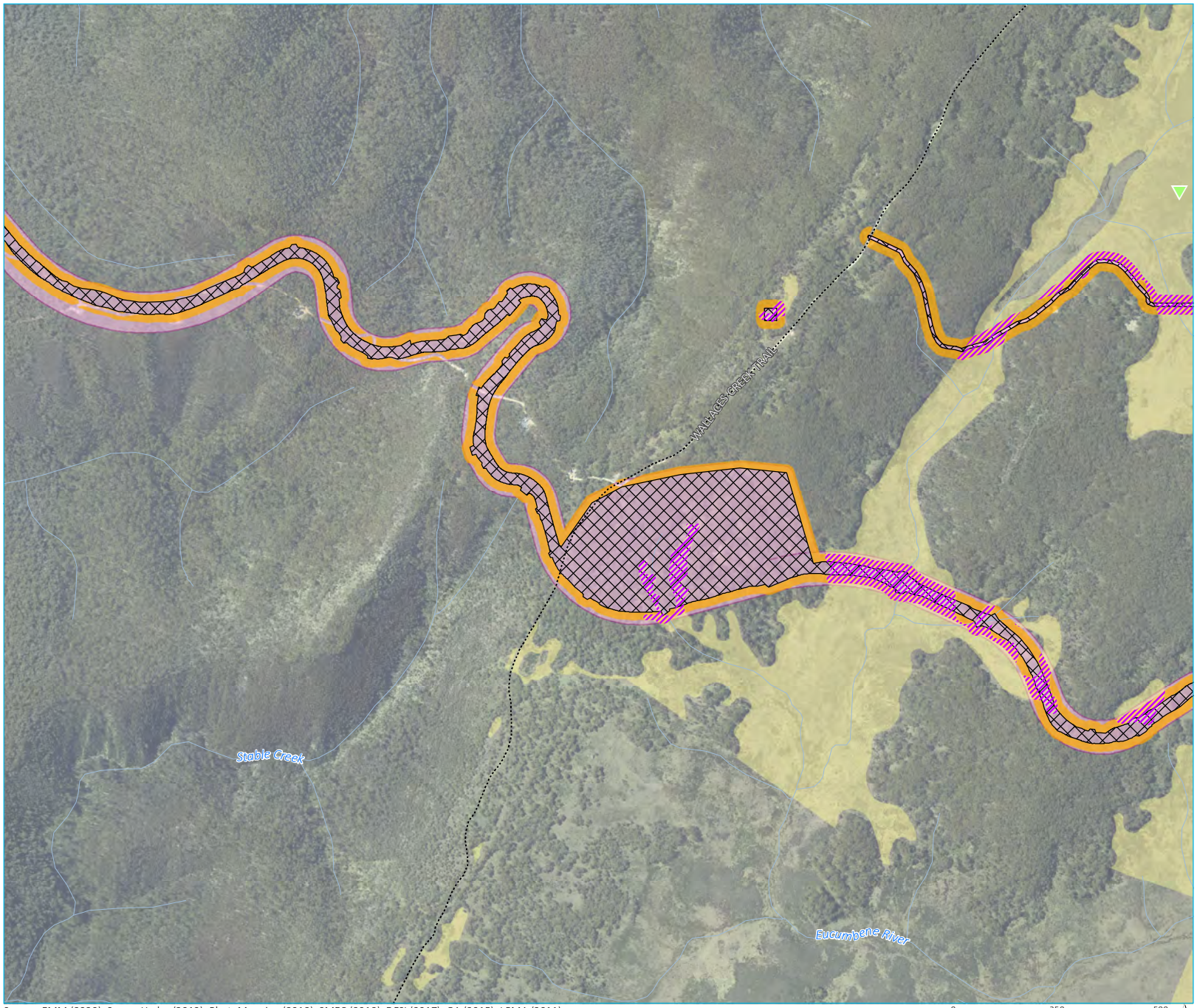
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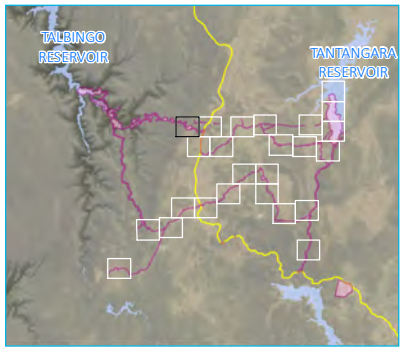
Reptile survey results - page index

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.1

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

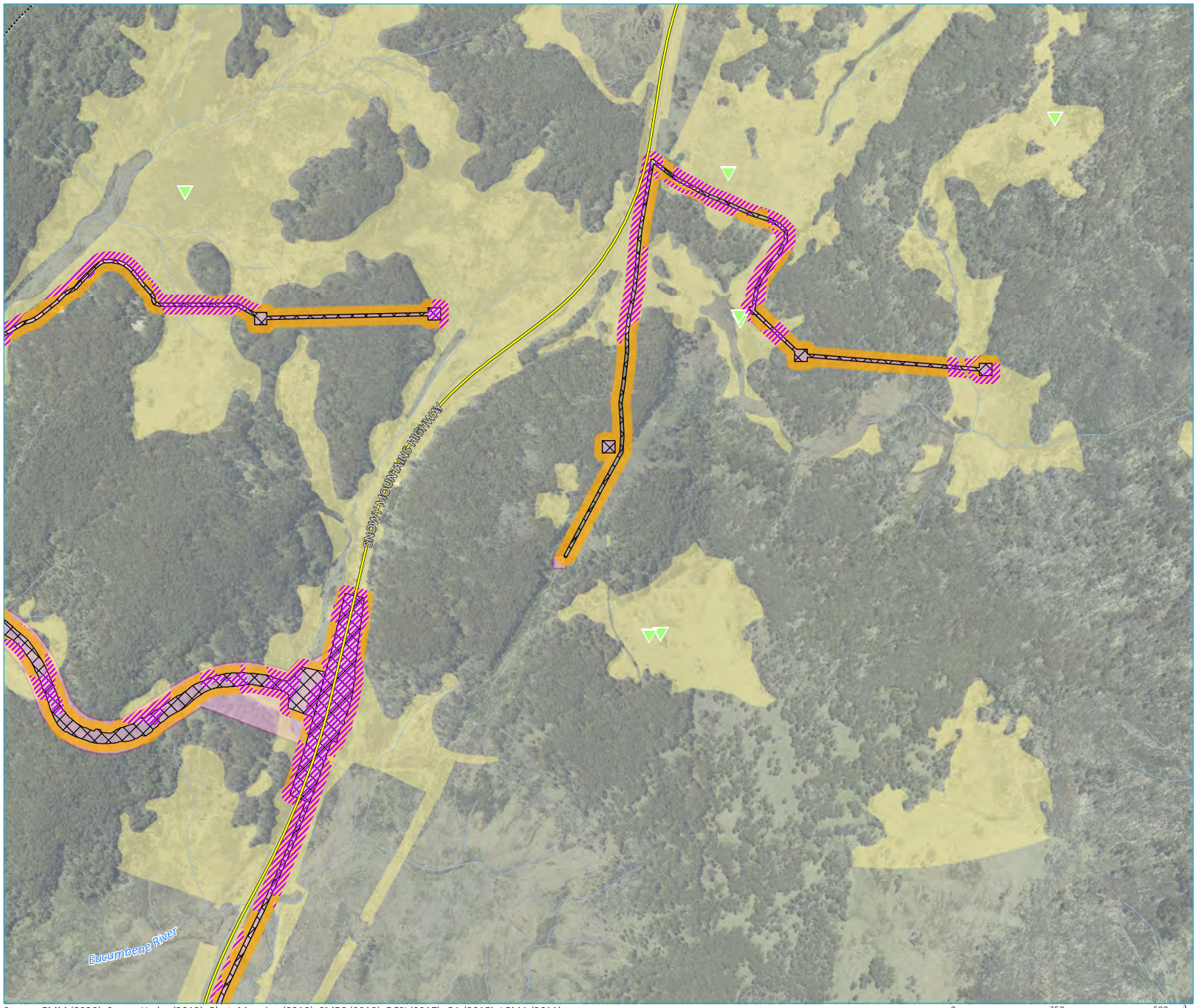
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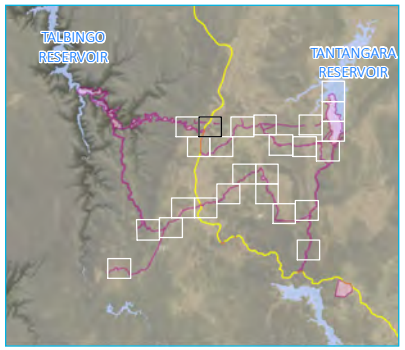
Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.2

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

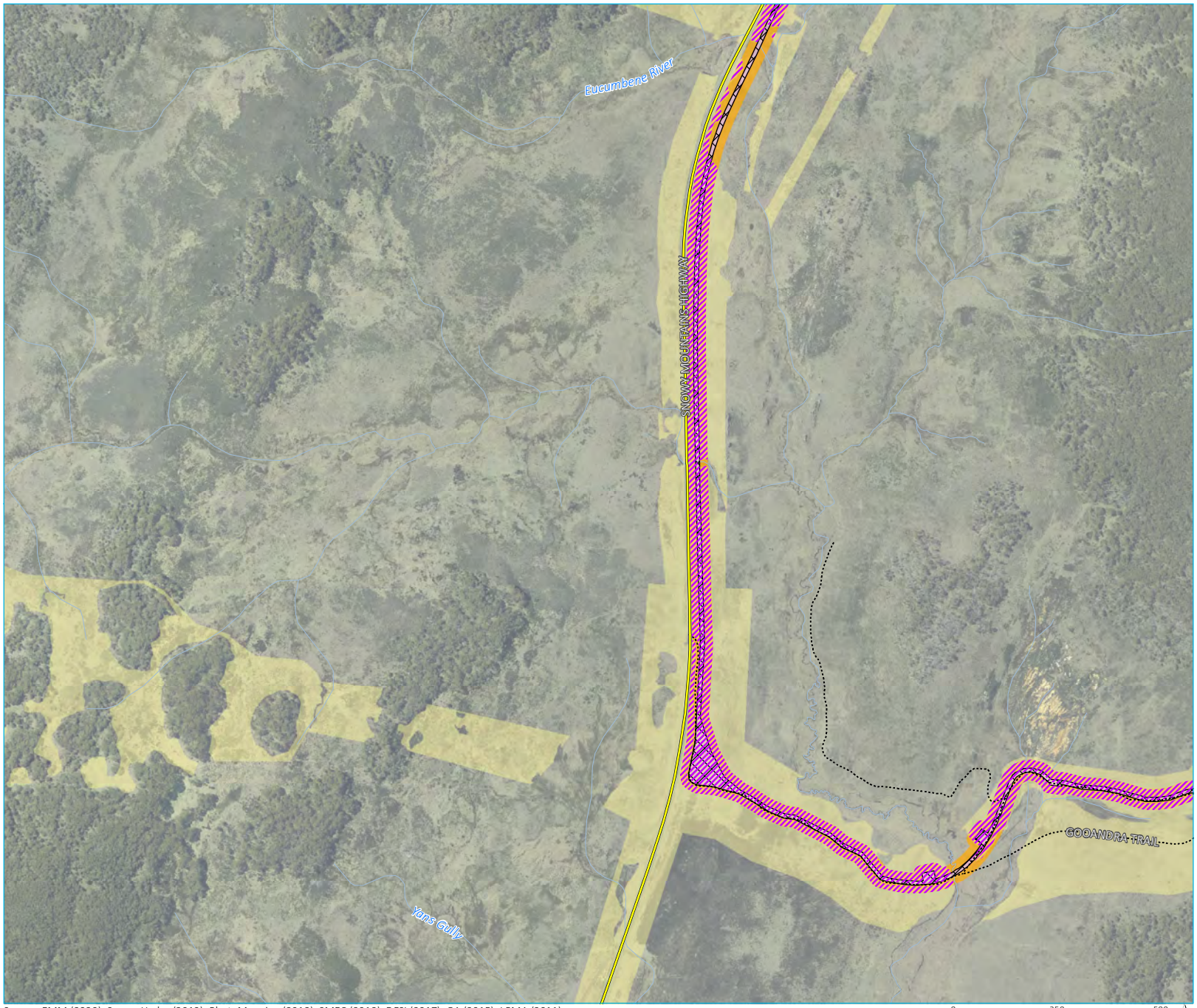
GDA 1994 MGA Zone 55

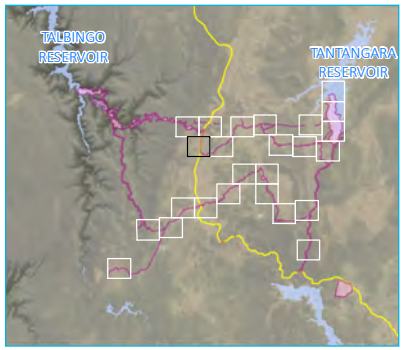
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.3





KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.4

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

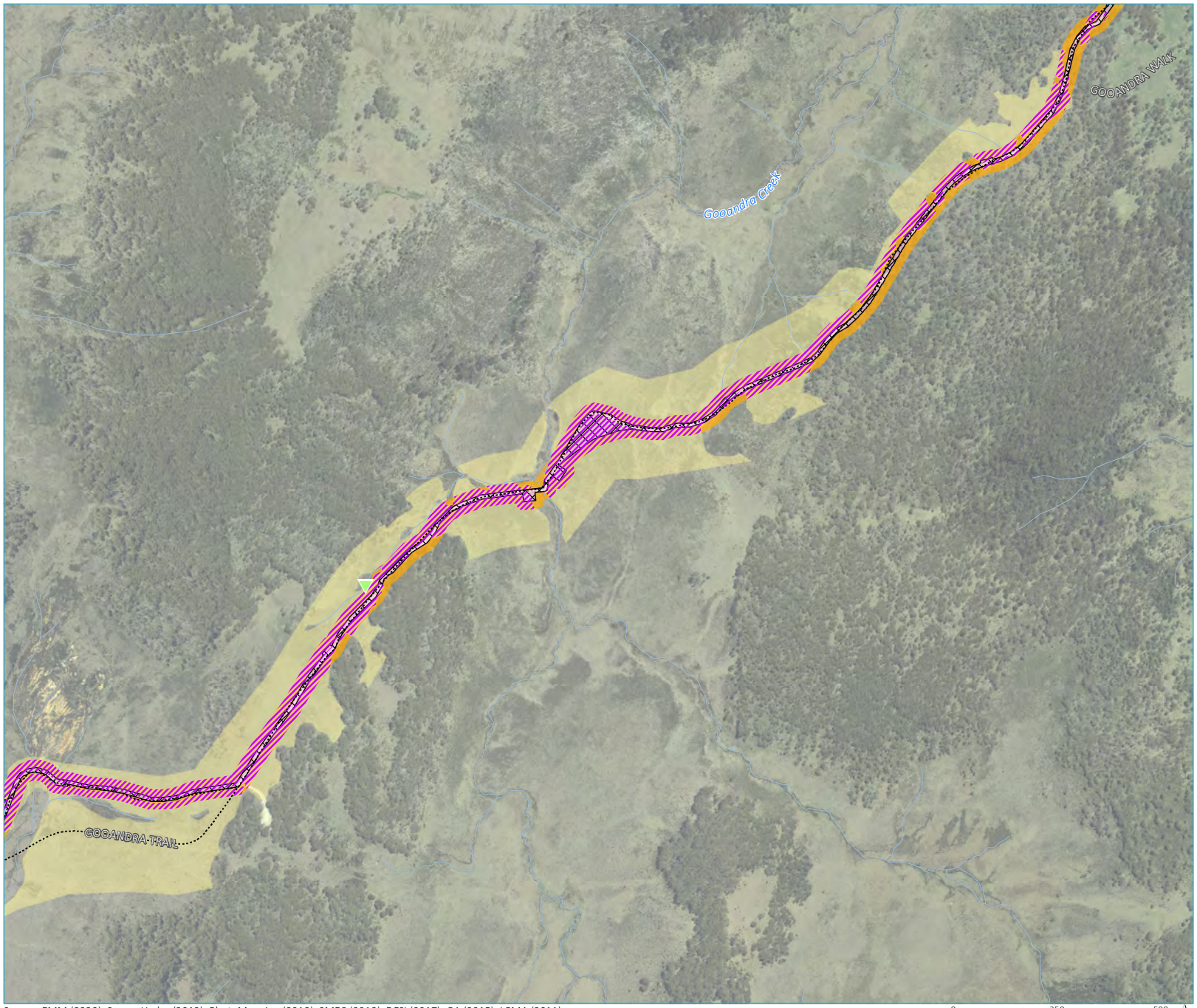
GDA 1994 MGA Zone 55

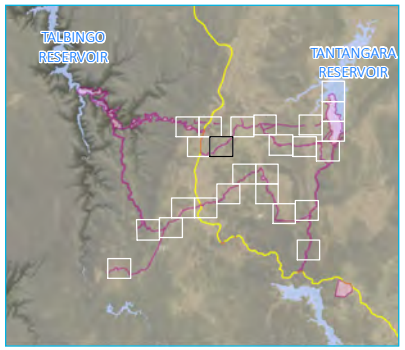
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snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

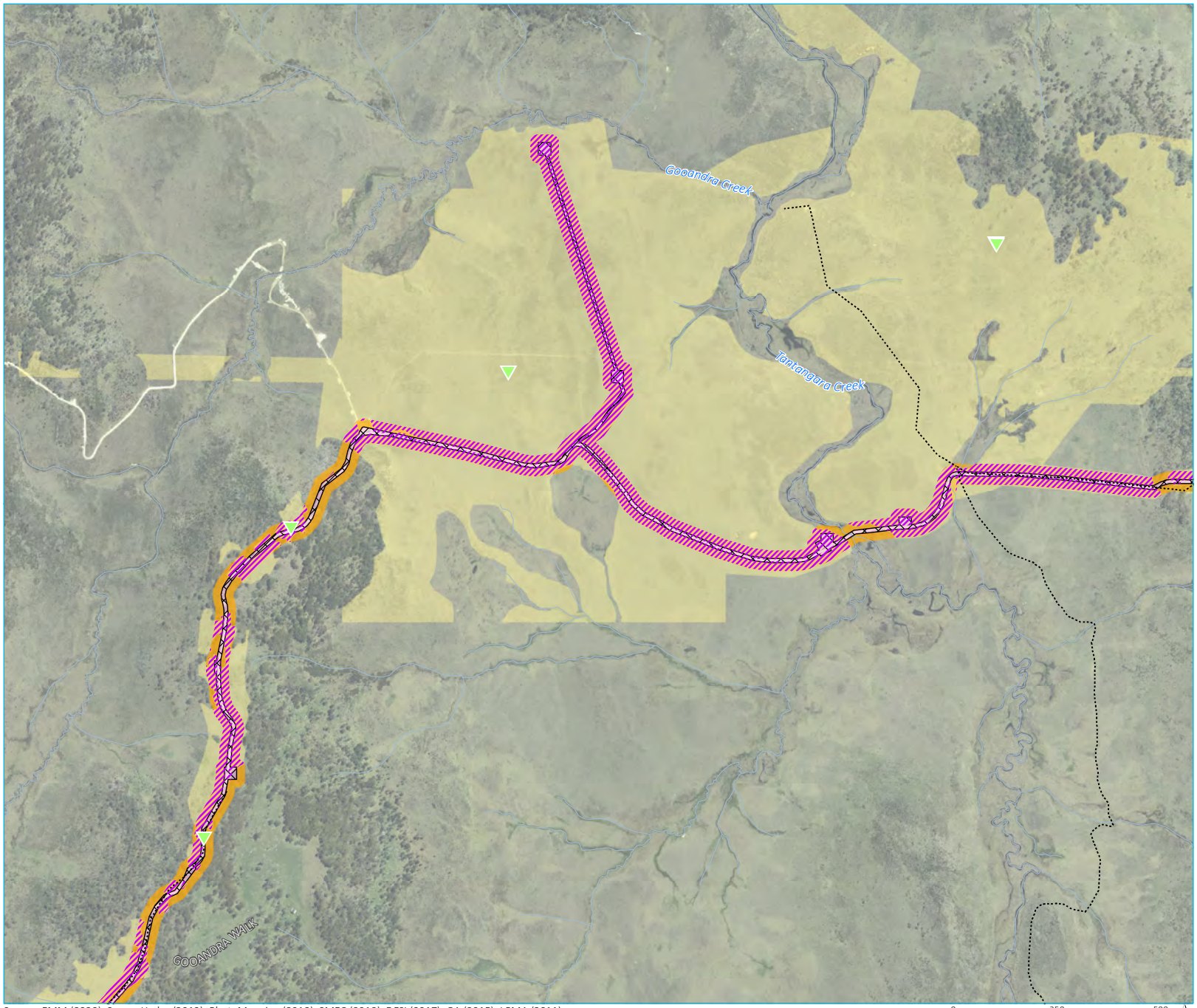
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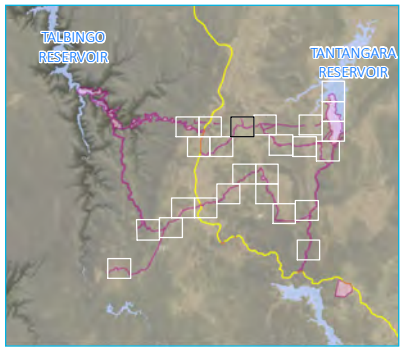
Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.5

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

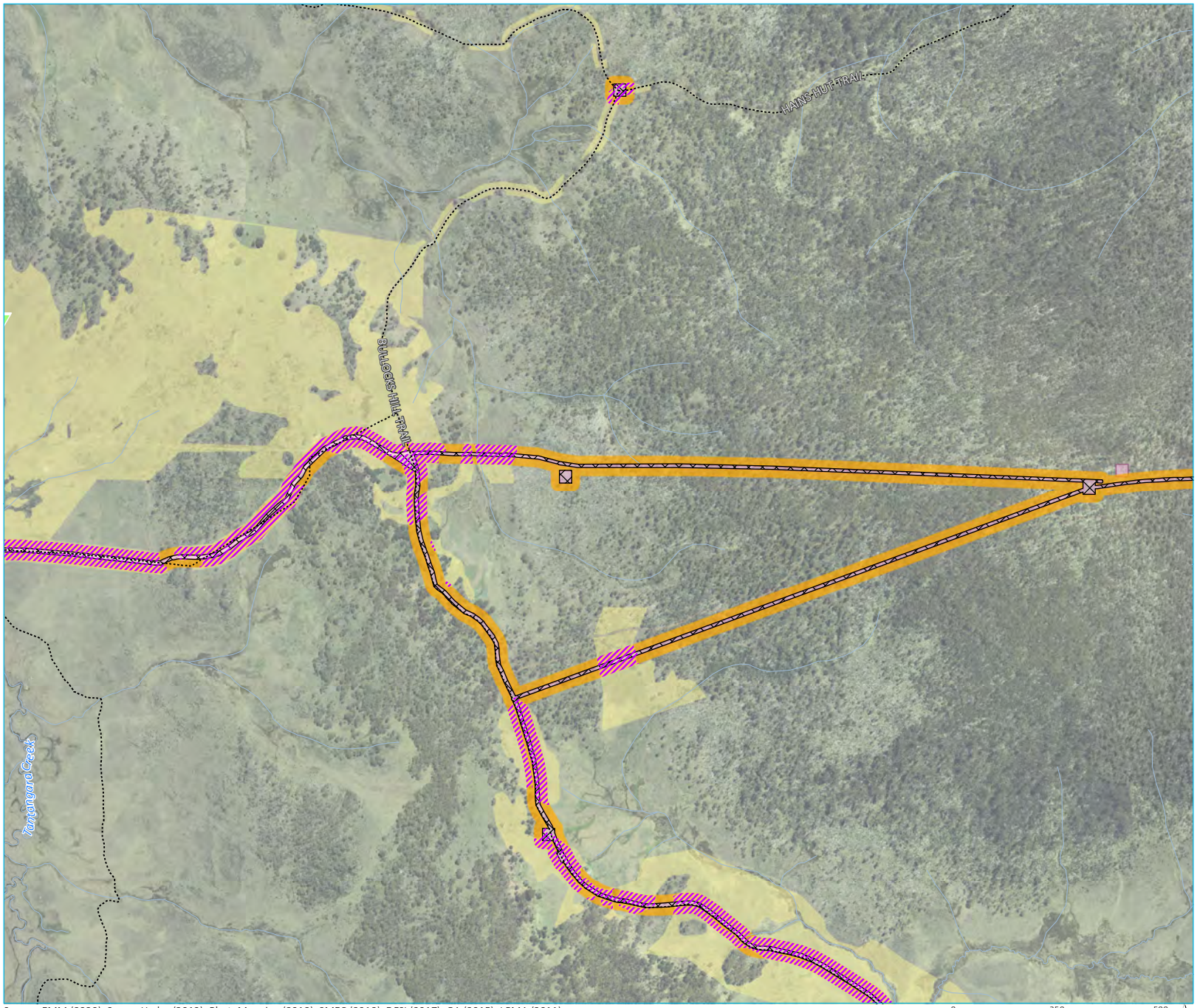
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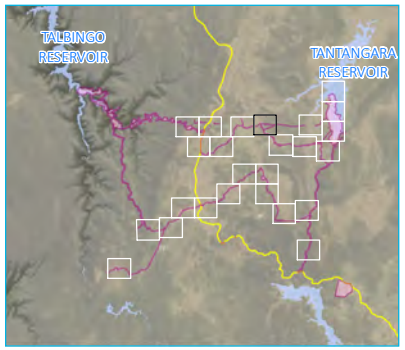
Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.6

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

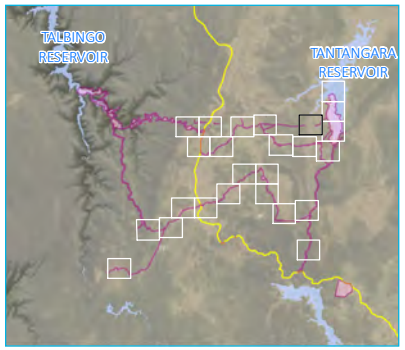
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.7





KEY

- Watercourse / drainage line
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

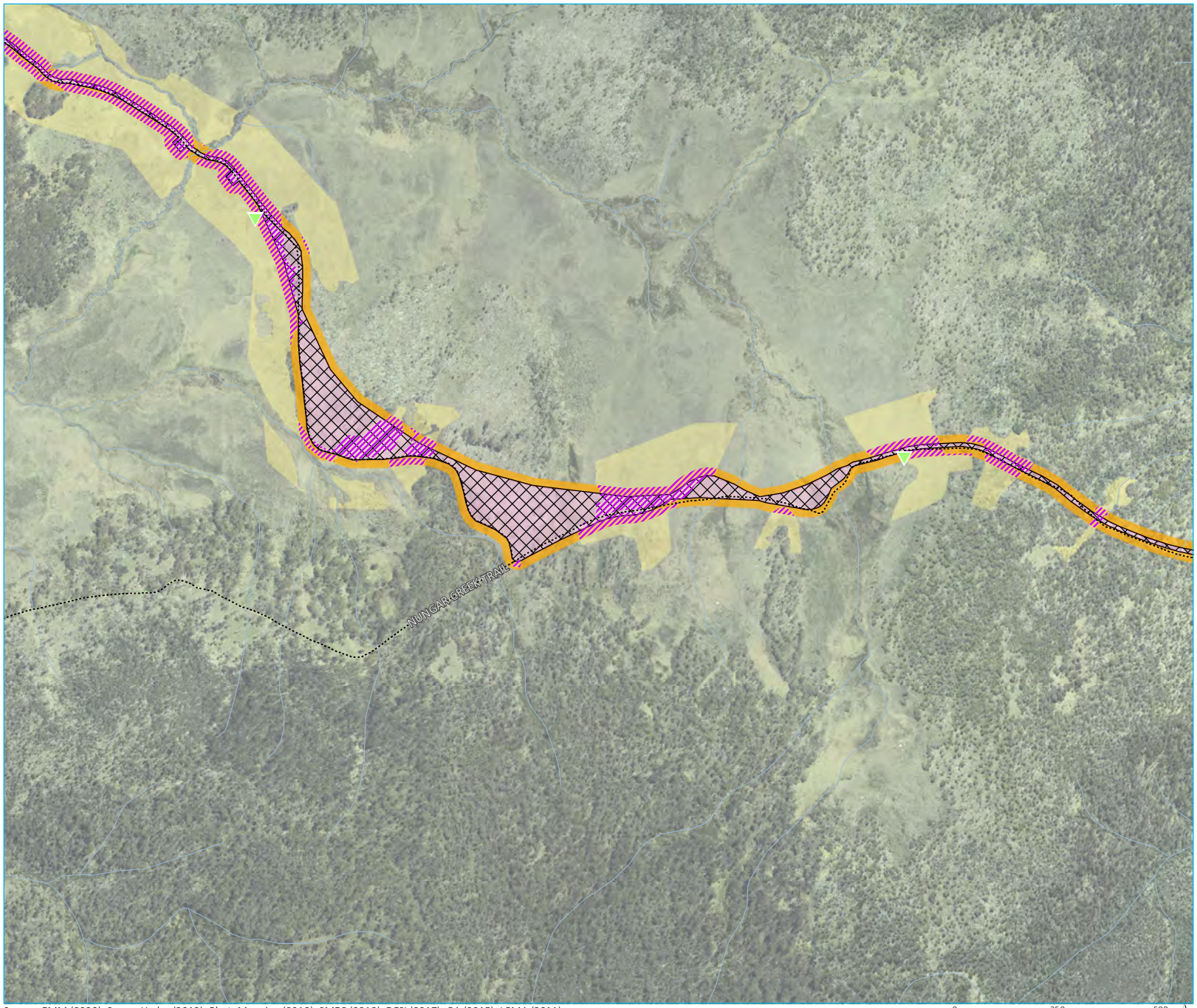
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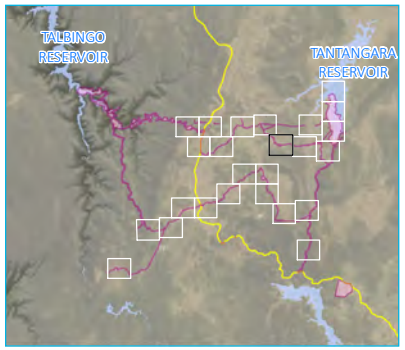
Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.8

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

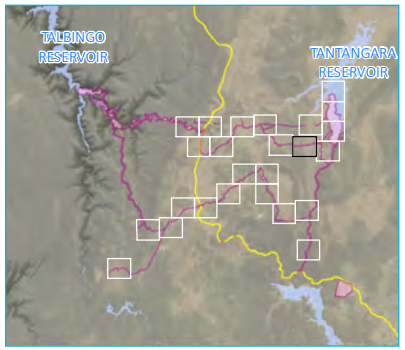
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\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR015_ReptileSurveyResults_20200206_DDP_02.mxd 21/02/2020

Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.9





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

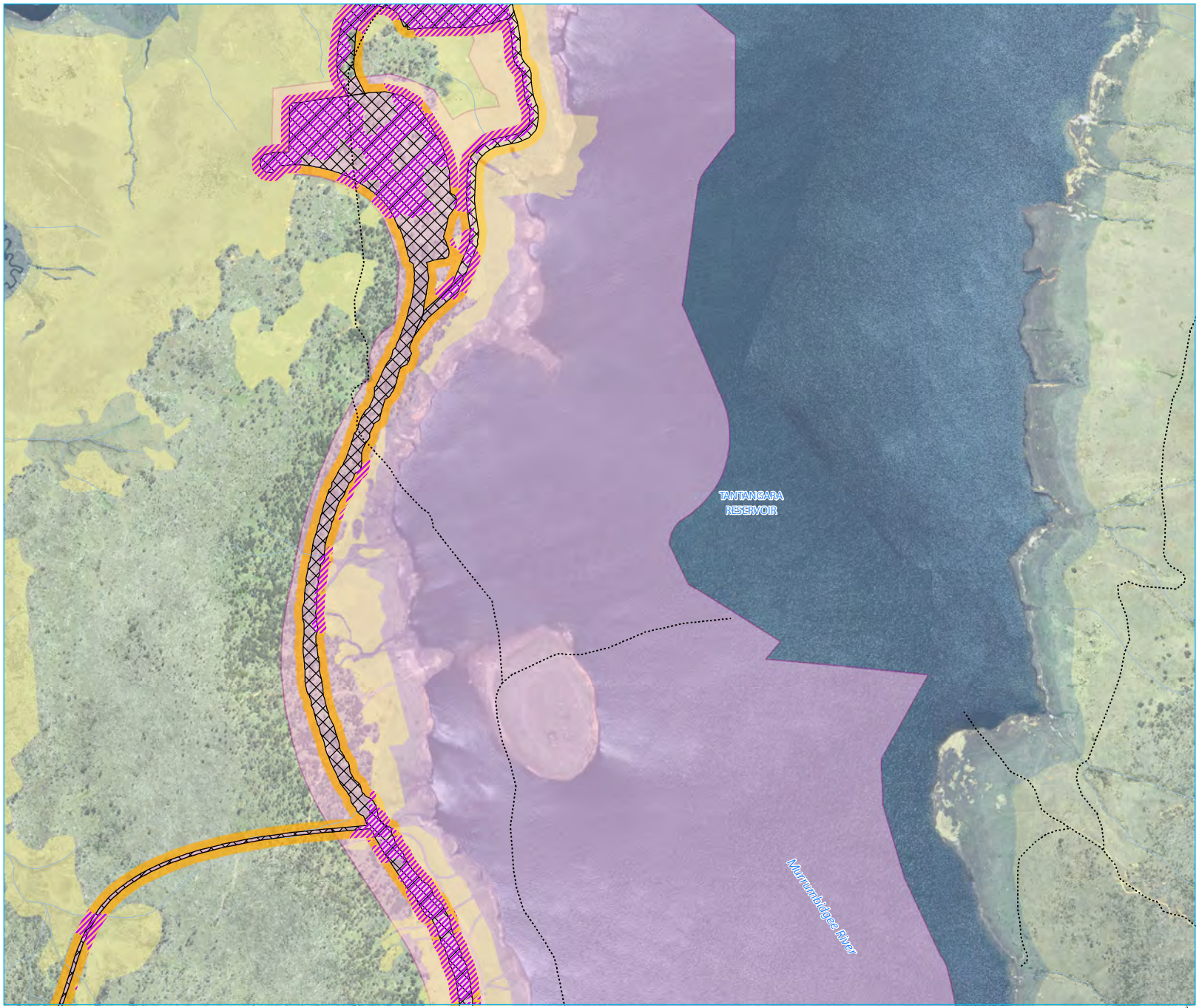
GDA 1994 MGA Zone 55

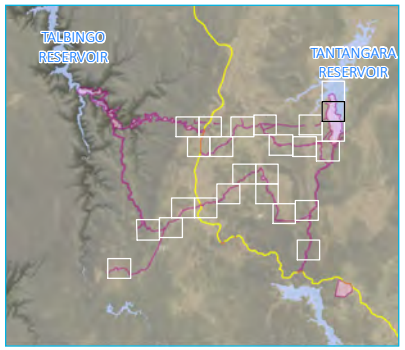
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.10





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_EIS_MW\Rts\BDAR\BDAR015_ReptileSurveyResults_20200206_DDP_02.mxd 21/02/2020

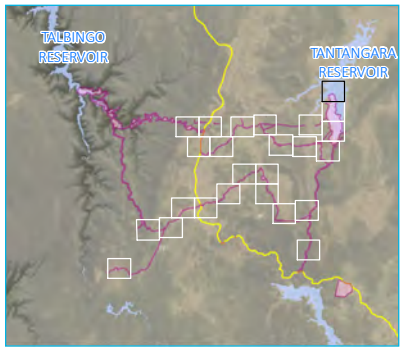
Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.11

snowy 2.0

EMM
creating opportunities





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

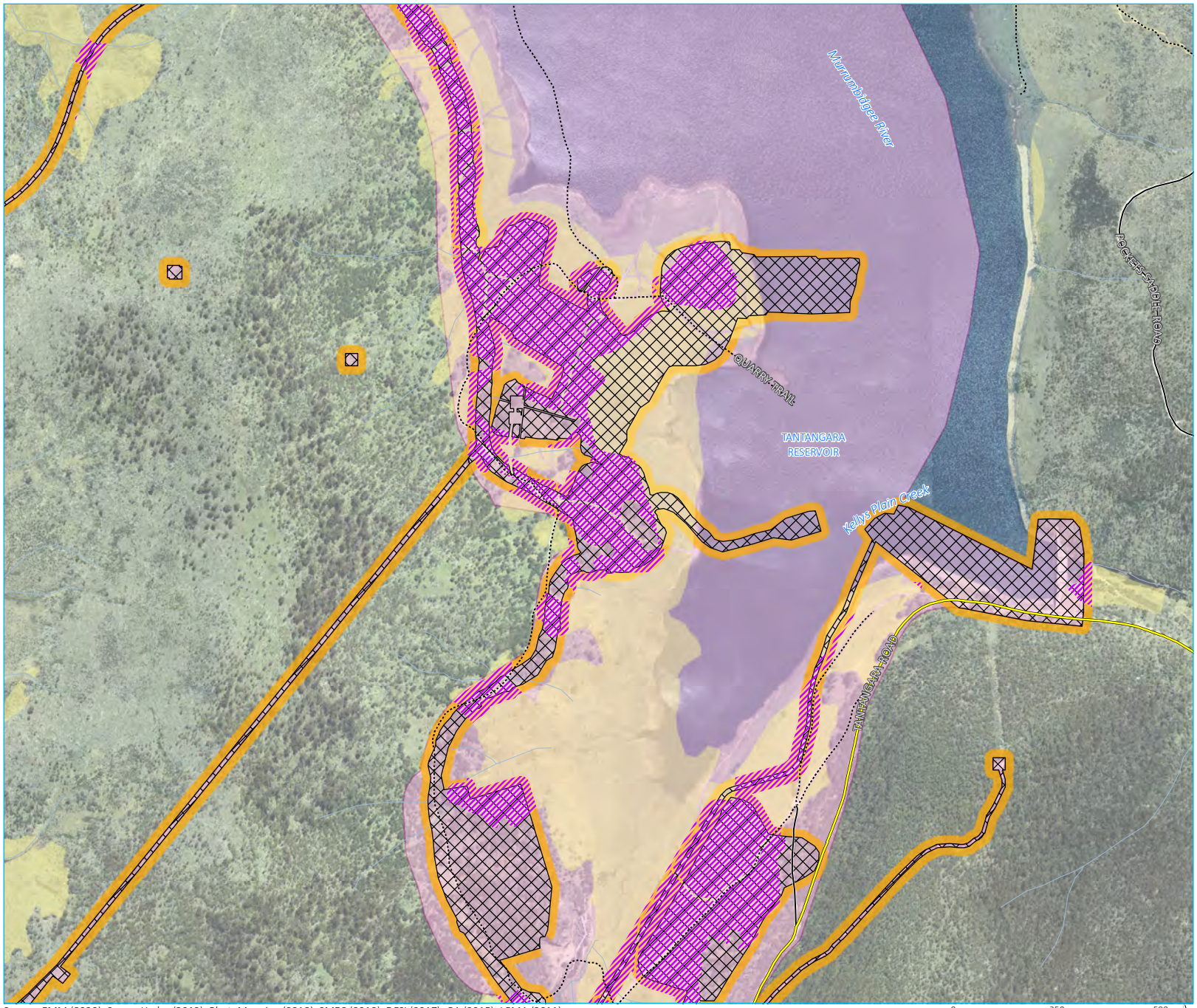
GDA 1994 MGA Zone 55

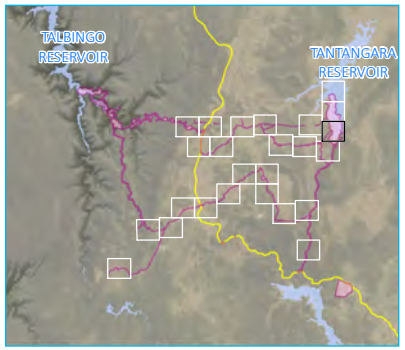
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.12





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

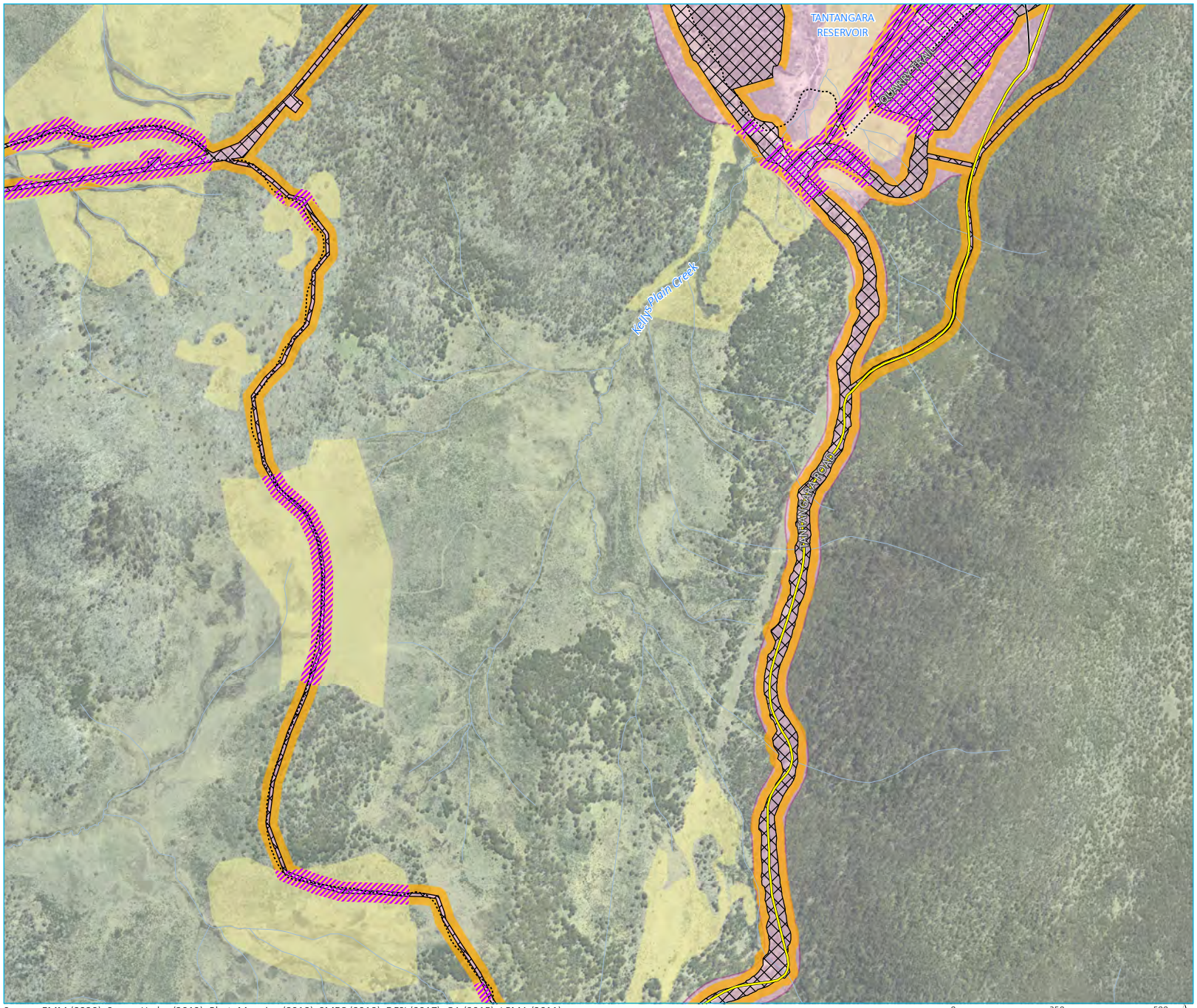
Reptile survey results

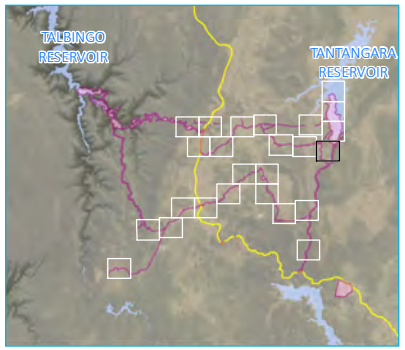
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.13

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

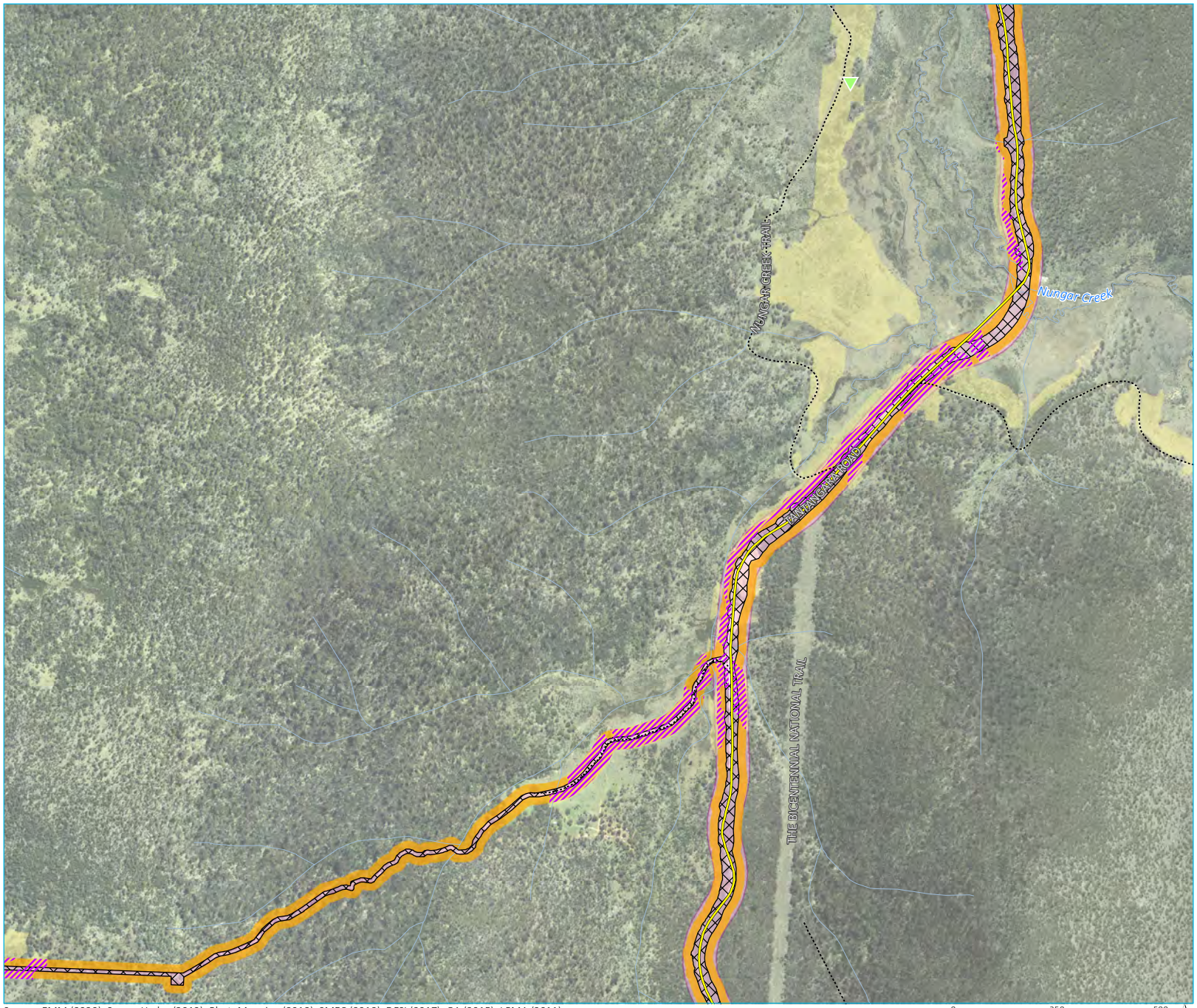
Reptile survey results

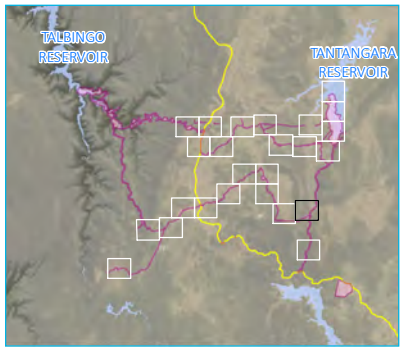
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.14

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

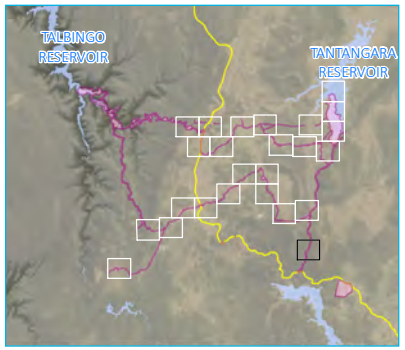
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.15





KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Reptile survey results

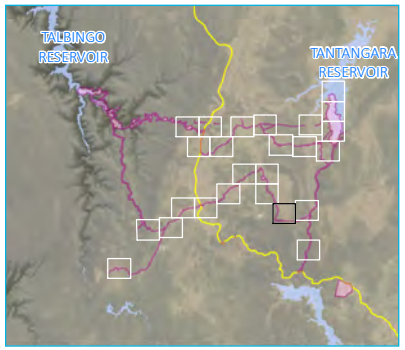
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.16

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Reptile survey results

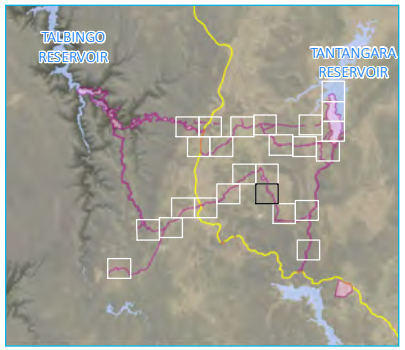
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.17

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

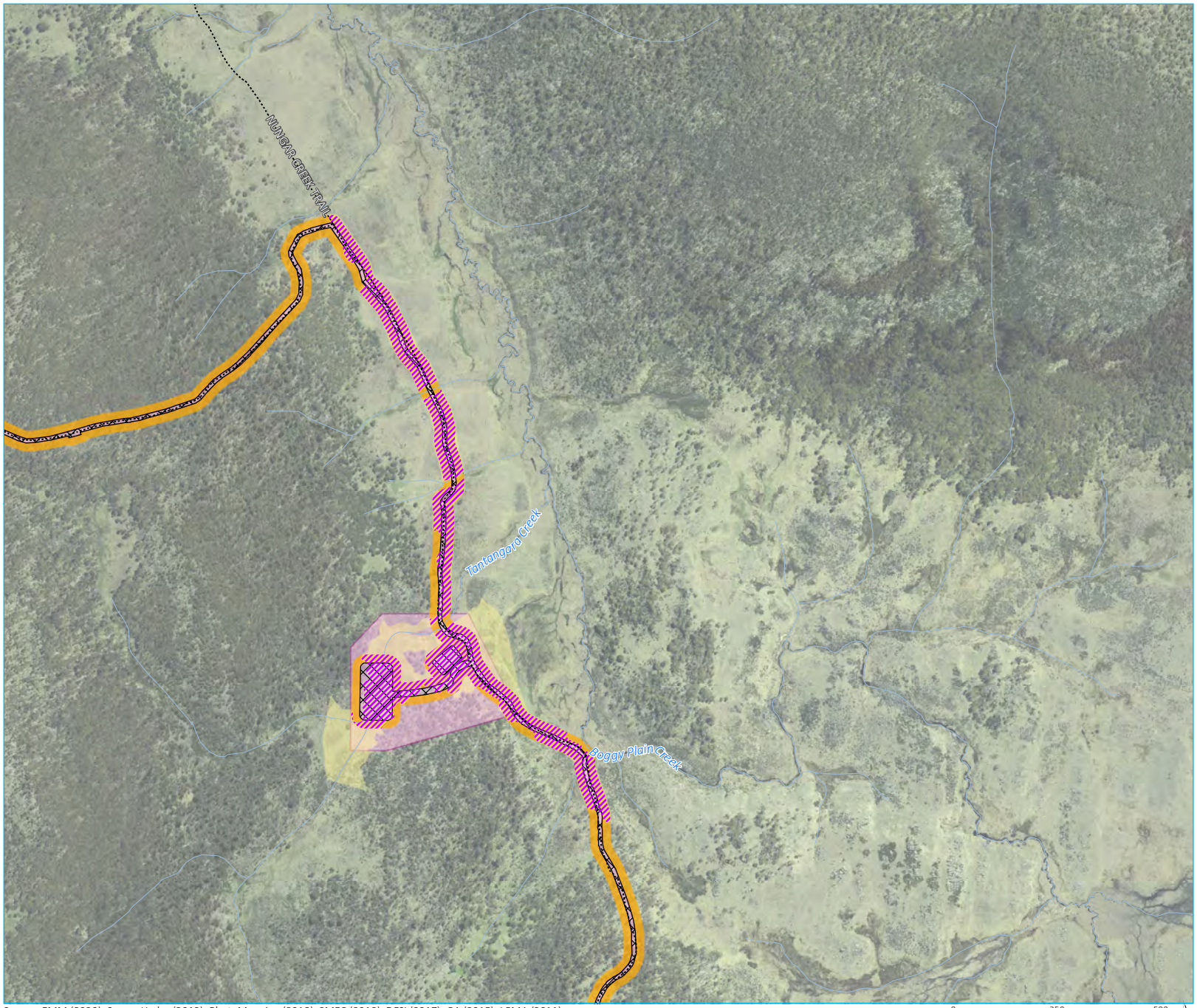
GDA 1994 MGA Zone 55

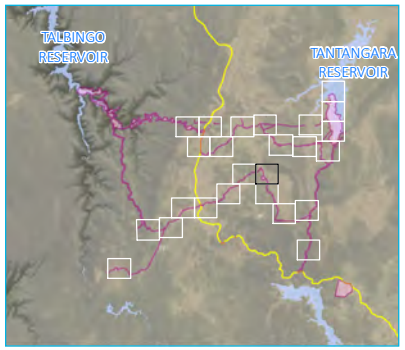
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.18





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

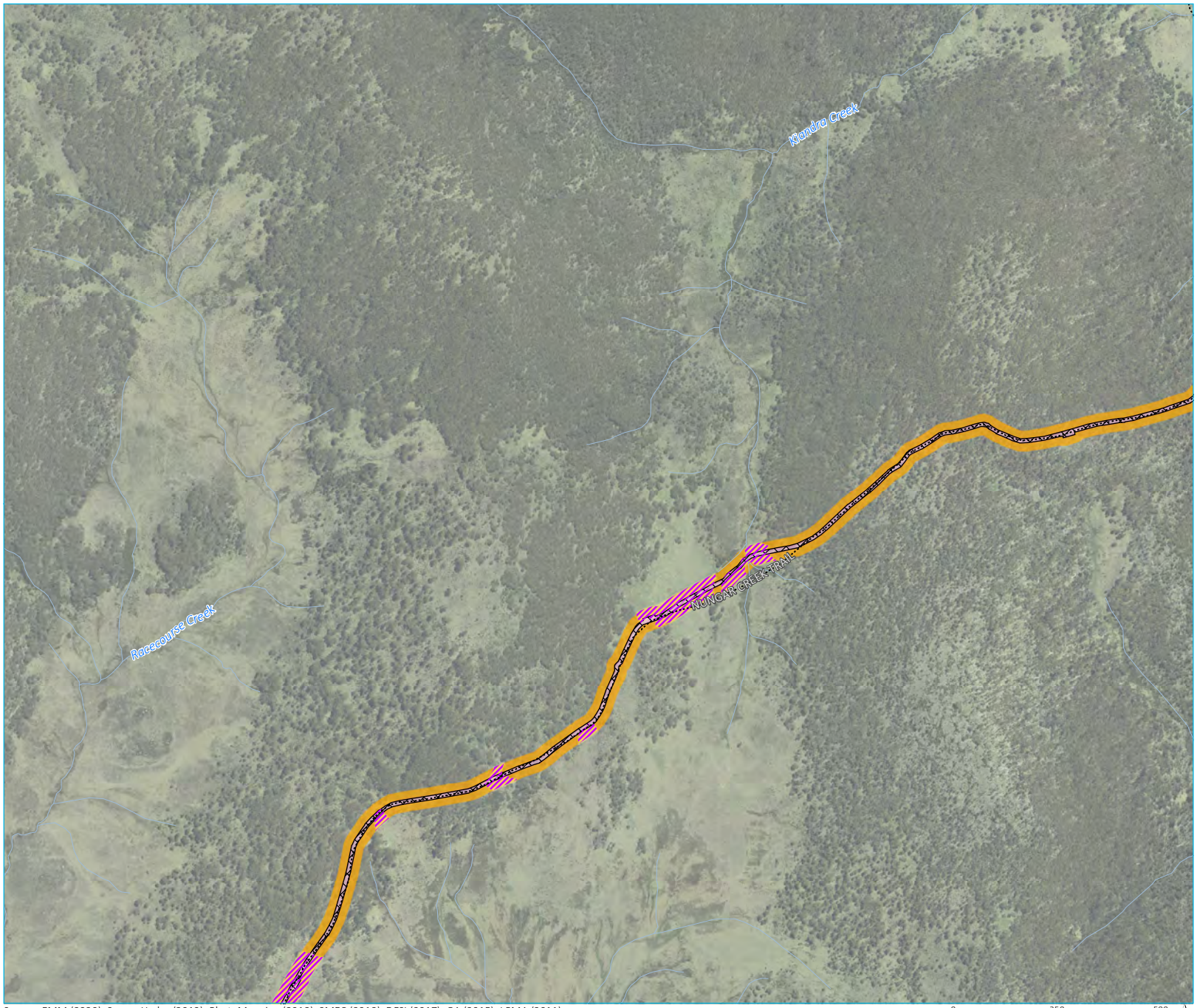
GDA 1994 MGA Zone 55

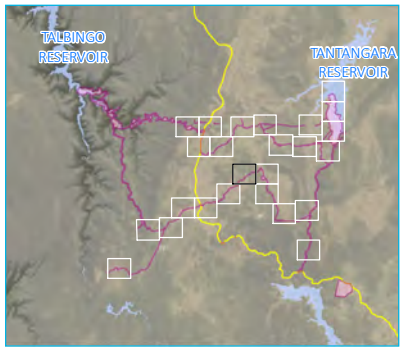
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.19





KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

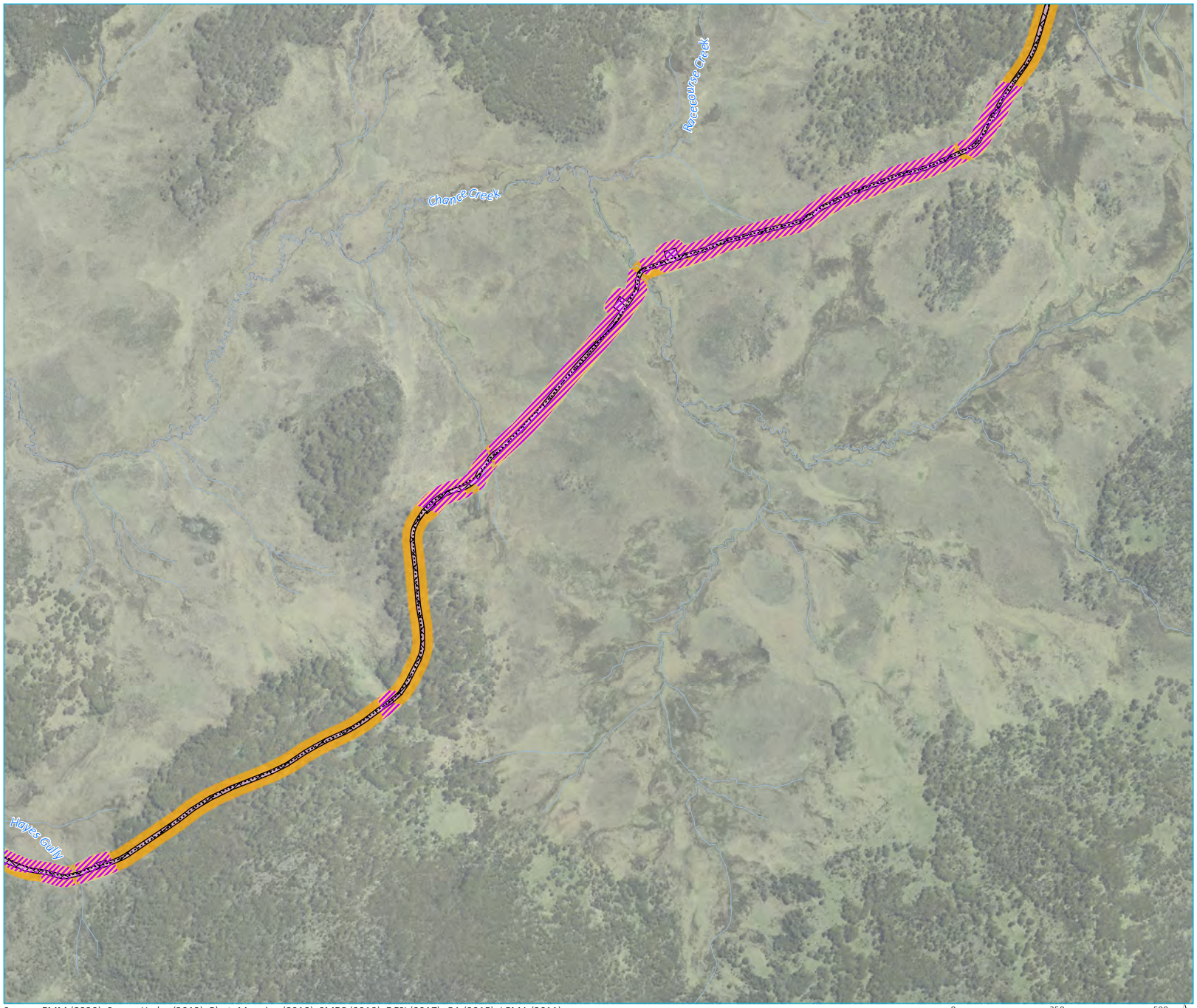
Reptile survey results

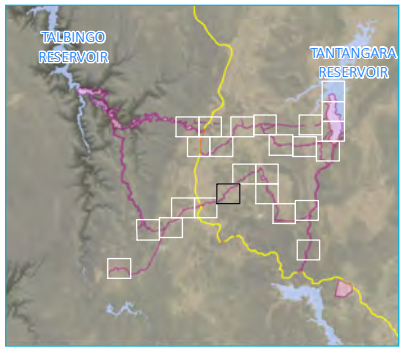
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.20

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

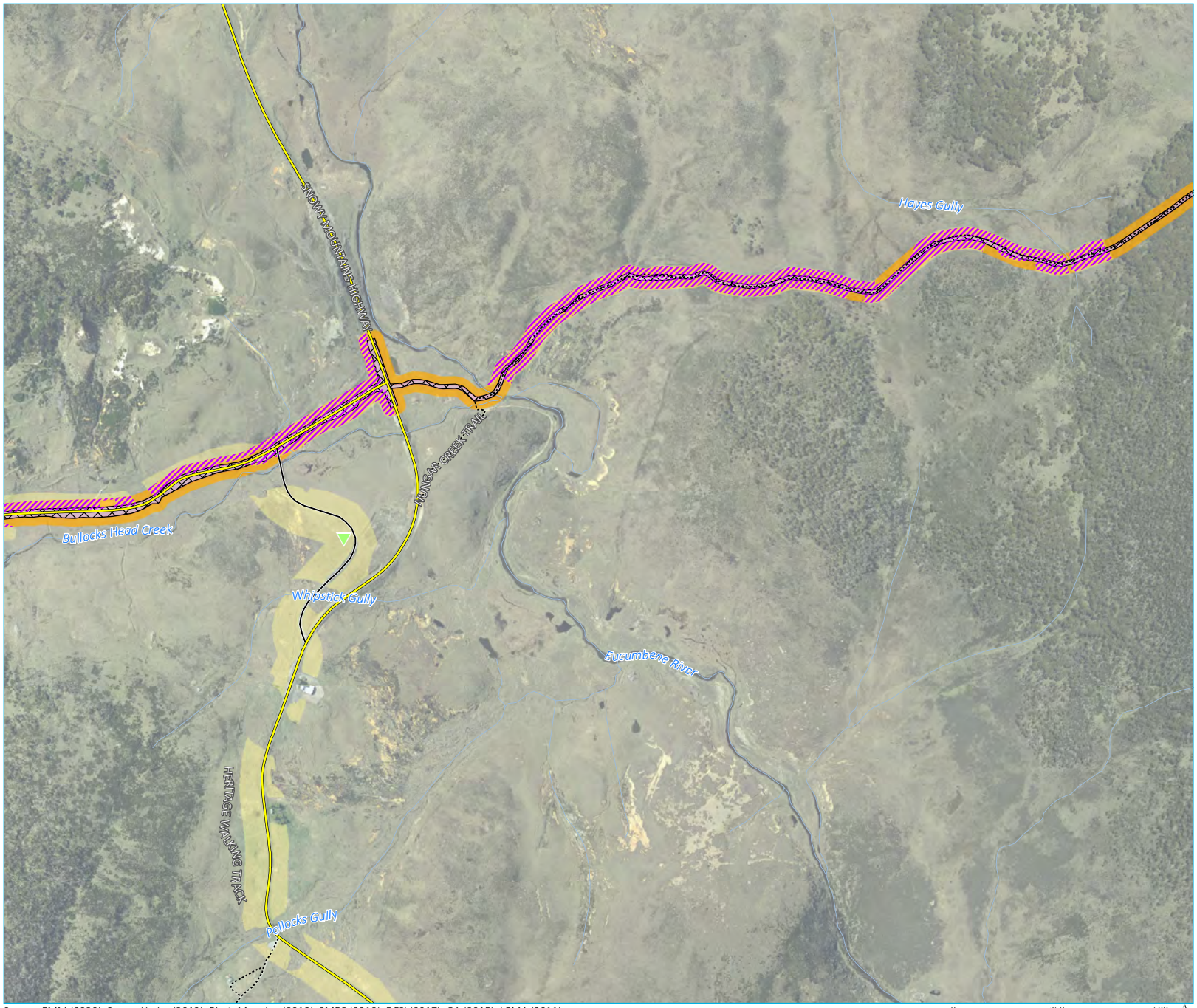
GDA 1994 MGA Zone 55

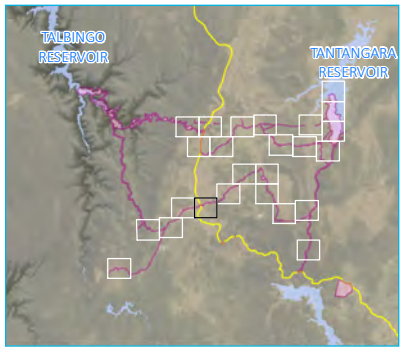
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.21





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

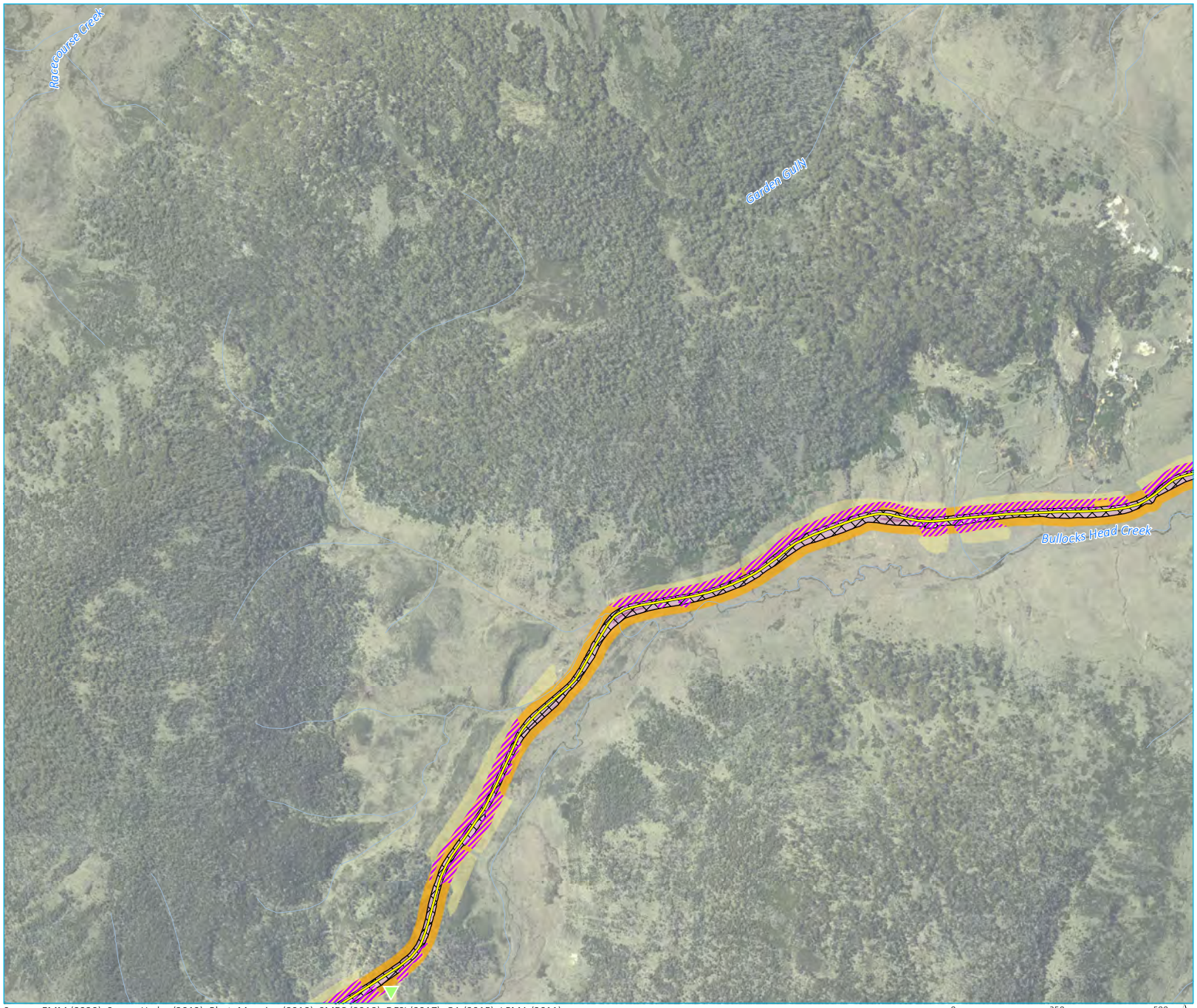
Reptile survey results

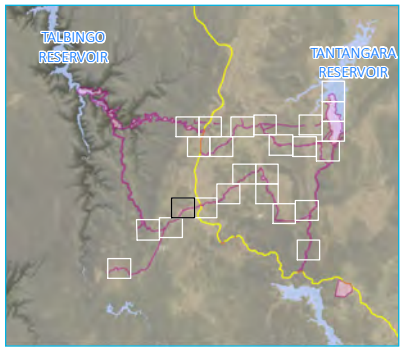
Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.22

snowy 2.0

EMM creating opportunities

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KEY

- Watercourse / drainage line
- Main road
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

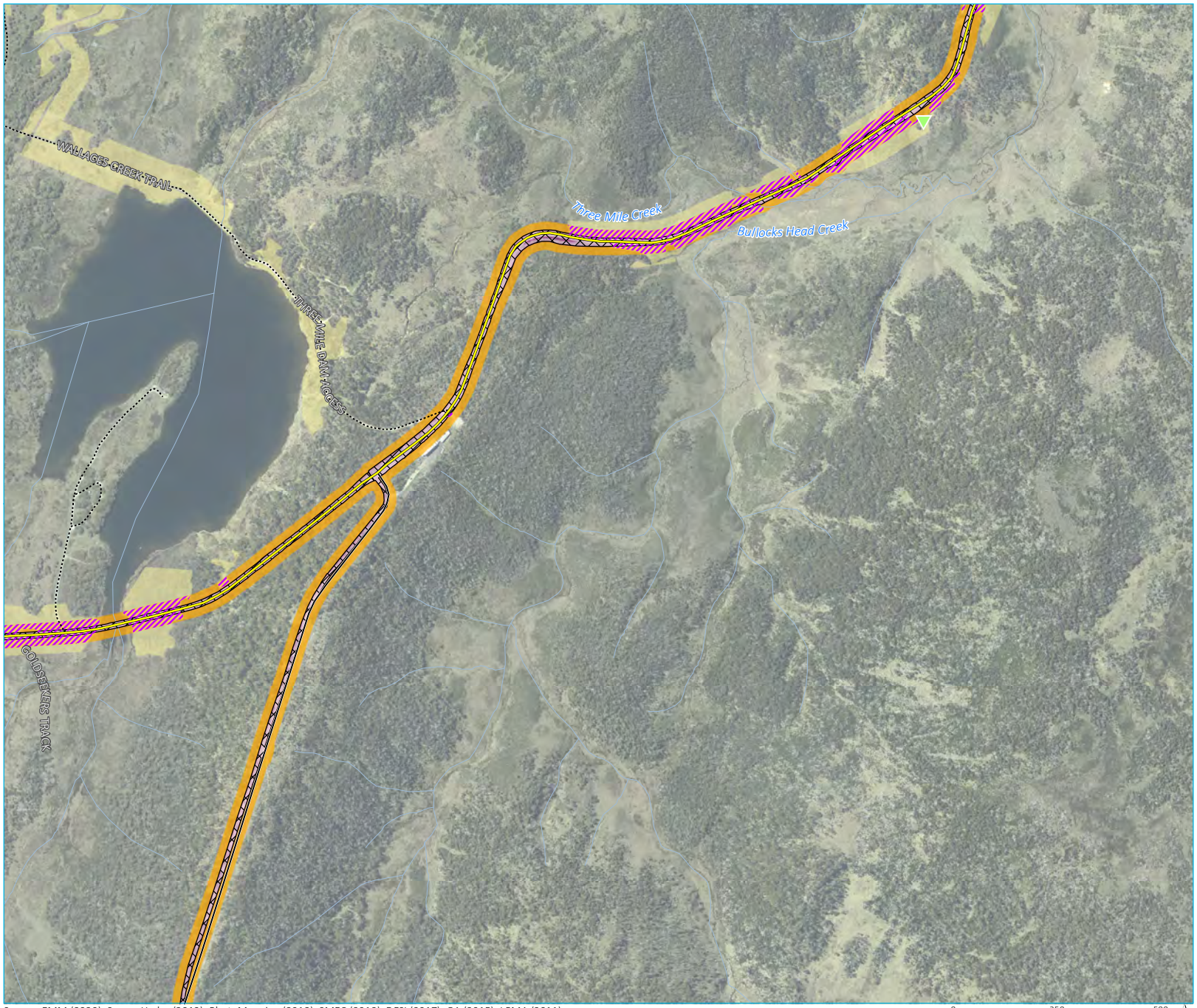
Reptile survey results

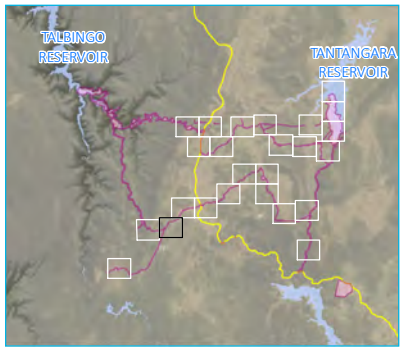
Snowy 2.0
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Main Works
Figure 5.12.23

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KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Threatened fauna

- Alpine She-oak Skink

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

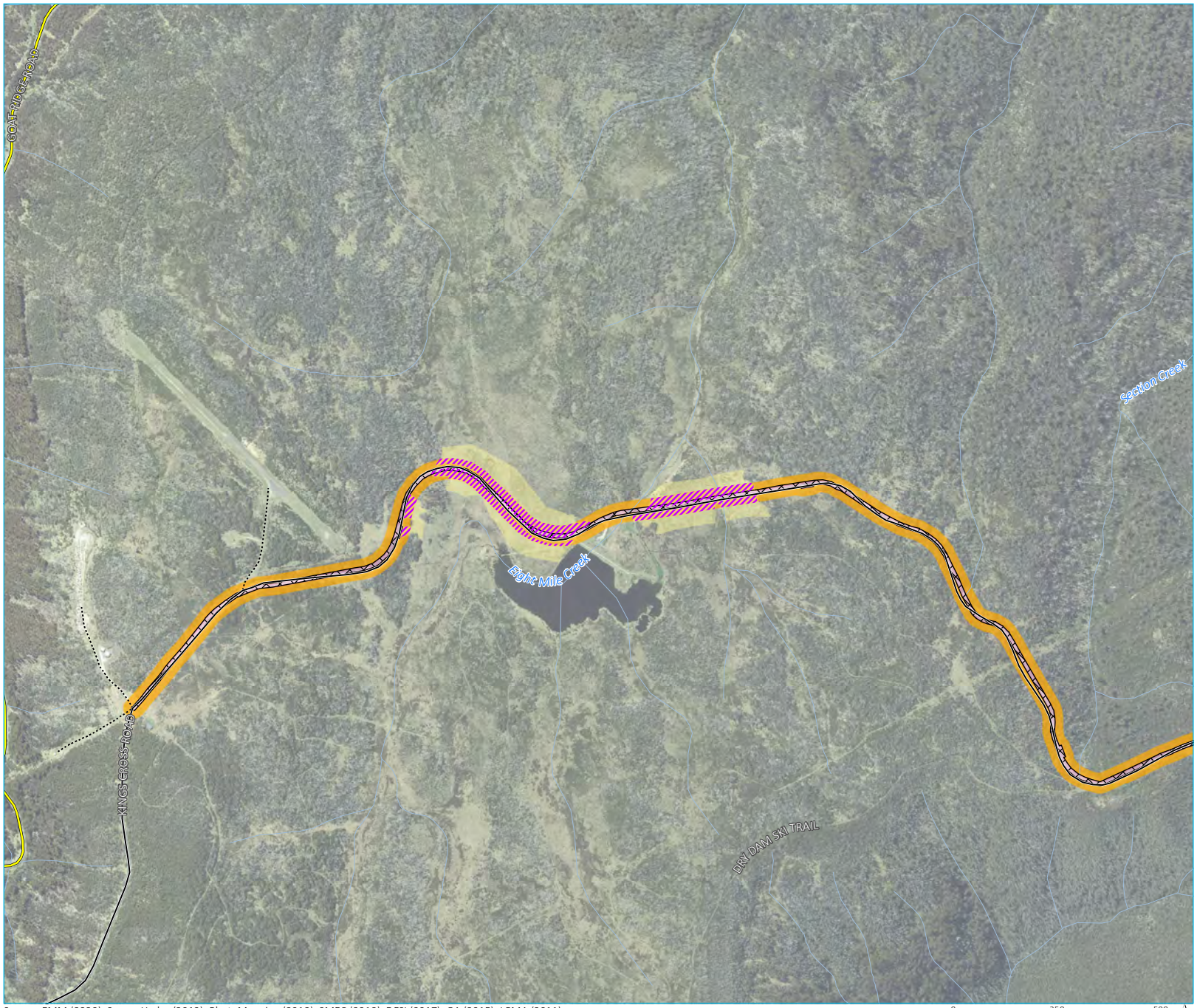
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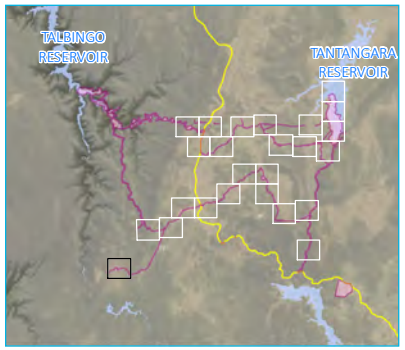
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Reptile survey results

Snowy 2.0
Biodiversity Development Assessment Report
Main Works
Figure 5.12.24





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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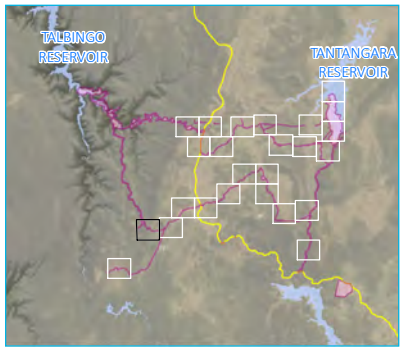
Reptile survey results

Snowy 2.0
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Figure 5.12.25

snowy 2.0

EMM creating opportunities





KEY

- Watercourse / drainage line
- Main road
- Local road
- Vehicular track
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Alpine She-oak Skink species polygon
- Alpine She-oak skink habitat

Source: EMM (2020); Snowy Hydro (2019); PhotoMapping (2018); SMEC (2018); DFSI (2017); GA (2015); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

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Reptile survey results

Snowy 2.0
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Main Works
Figure 5.12.26

5.3.5 Species credit species

A list of candidate species credit species predicted to occur within the Main Works disturbance footprint, along with an assessment of whether the species will be impacted by Main Works, is provided within Table 5.24.

Based on targeted surveys, the following species will be directly and indirectly impacted:

Table 5.23 Species credit species impacts within the study area

Species	Direct impacts (ha/individuals)	Indirect impacts (ha/individuals)	Total impacts (ha/individuals)
Caladenia montana	0.77	0.96	1.73
Clover Glycine	0.57	0.95	1.53
Kiandra Leek Orchid	1.45	4.66	6.12
Leafy Anchor Plant	40	5	45
Mauve Burr-daisy	7.80	14.10	21.90
Max Mueller's Burr-daisy	0.57	2.02	2.59
Raleigh Sedge	0.25	0.59	0.84
Slender Greenhood	0.28	-	0.28
Thelymitra alpicola	-	0.06	0.06
Gang-gang Cockatoo (breeding habitat only)	2.08	2.82	4.90
White-bellied Sea-Eagle (breeding habitat only)	17.53	5.60	23.13
Broad-toothed Rat	61.47	100.50	161.97
Eastern Pygmy-possum	197.95	249.13	447.08
Smoky Mouse	84.29	142.51	226.79
Southern Myotis	2.72	1.29	4.01
Booroolong Frog	1.33	3.56	4.89
Alpine Tree Frog	22.87	31.54	54.41
Alpine She-oak Skink	80.83	132.33	213.15

These species will require offsets in accordance with the BAM (OEH 2017a). Species polygons across the survey area are shown in Figure 5.4 to Figure 5.12.

Table 5.24 Species credit species, habitat suitability and targeted survey results

Scientific name	Common name	Biodiversity risk weighting	Habitat present within the Main Works disturbance footprint	Recorded during field surveys	Impacted by development	Justification
Flora						
Caladenia montana	-	1.50	Yes	Yes	Yes	
Calotis glandulosa	Mauve Burr-daisy	3.00	Yes	Yes	Yes	
Calotis pubescens	Max Mueller's Burr-daisy	2.00	Yes	Yes	Yes	
Carex raleighii	Raleigh Sedge	3.00	Yes	Yes	Yes	
Discaria nitida	Leafy Anchor Plant	2.00	Yes	Yes	Yes	
Euphrasia scabra	Rough Eyebright	3.00	Yes	No	No	Not recorded during targeted surveys.
Glycine latrobeana	Clover Glycine	3.00	Yes	Yes	Yes	
Pomaderris cotoneaster	Cotoneaster Pomaderris	2.00	Yes	No	No	Not recorded during targeted surveys.
Prasophyllum innubum	-	3.00	Yes	Yes	No	The species was recorded adjacent to the disturbance footprint and will not be impacted by development.
Prasophyllum retroflexum	Kiandra Leek Orchid	3.00	Yes	Yes	Yes	
Pterostylis alpina	-	2.00	Yes	Yes	No	The species was recorded adjacent to the disturbance footprint and will not be impacted by development.
Pterostylis foliata	Slender Greenhood	1.00	Yes	Yes	Yes	
Rutidosis leiolepis	Monaro Golden Daisy	2.00	Yes	Yes	No	The species was recorded adjacent to the disturbance footprint and will not be impacted by development.
Thelymitra alpicola	-	1.50	Yes	Yes	Yes	
Thesium australe	Austral Toadflax	1.50	Yes	No	No	Not recorded during targeted surveys.
Fauna						

Table 5.24 Species credit species, habitat suitability and targeted survey results

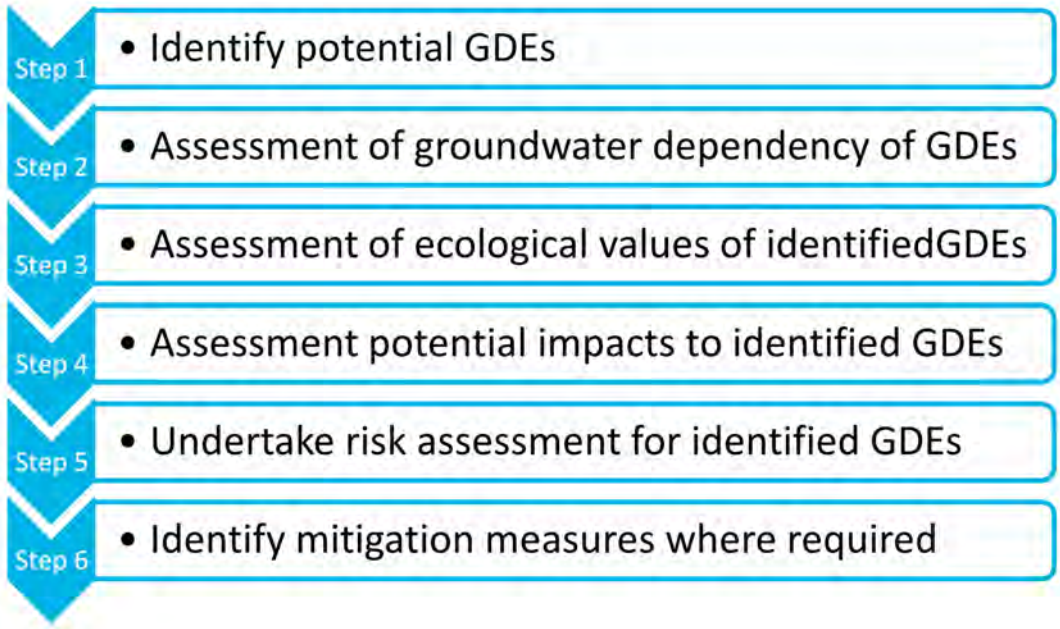
Scientific name	Common name	Biodiversity risk weighting	Habitat present within the Main Works disturbance footprint	Recorded during field surveys	Impacted by development	Justification
Callocephalon fimbriatum	Gang-gang Cockatoo (Breeding)	2.00	Yes	Yes	Yes	
Cercartetus nanus	Eastern Pygmy-possum	2.00	Yes	Yes	Yes	
Cyclodomorphus praealtus	Alpine She-oak Skink	2.00	Yes	Yes	Yes	
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	1.00	Yes	Yes	Yes	
Hieraaetus morphnoides	Little Eagle (Breeding)	1.50	Yes	No	No	One individual was recorded flying over. No Little Eagle nests were recorded during targeted surveys.
Litoria booroolongensis	Booroolong Frog	2.00	Yes	Yes	Yes	
Litoria verreauxii alpina	Alpine Tree Frog	2.00	Yes	Yes	Yes	
Lophoictinia isura	Square-tailed Kite (Breeding)	1.50	Yes	No	No	One individual was recorded flying over. No Square-tailed Kite nests were recorded during targeted surveys.
Mastacomys fuscus	Broad-toothed Rat	2.00	Yes	Yes	Yes	
Myotis macropus	Southern Myotis	2.00	Yes	Yes	Yes	
Ninox connivens	Barking Owl (Breeding)	2.00	Yes	No	No	Not recorded during targeted surveys.
Ninox strenua	Powerful Owl (Breeding)	2.00	Yes	No	No	Although a dead animal was recorded during surveys, no evidence of nesting was observed.
Petaurus norfolcensis	Squirrel Glider	2.00	Yes	No	No	Not recorded during targeted surveys.
Petroica rodinogaster	Pink Robin	2.00	Yes	Yes	No	One individual was recorded along Link Road, over 1 km from the project boundary. The species was not recorded within the disturbance footprint during targeted surveys and is not considered to be impacted by the development.

Table 5.24 Species credit species, habitat suitability and targeted survey results

Scientific name	Common name	Biodiversity risk weighting	Habitat present within the Main Works disturbance footprint	Recorded during field surveys	Impacted by development	Justification
Phascogale tapoatafa	Brush-tailed Phascogale	2.00	Yes.	No	No	Not recorded during targeted surveys.
Phascolarctos cinereus	Koala (Breeding)	2.00	Yes	No	No	Not recorded during targeted surveys.
Pseudomys fumeus	Smoky Mouse	3.00	Yes	Yes	Yes	
Pseudophryne pengilleyi	Northern Corroboree Frog	3.00	Yes	No	No	Not recorded during targeted surveys.
Tyto novaehollandiae	Masked Owl (Breeding)	2.00	Yes	No	No	The species was recorded twice within the disturbance footprint, however no breeding hollows were observed. Therefore, Masked Owl (Breeding) will not be impacted by development.

6 Groundwater-dependent ecosystems

A groundwater-dependent ecosystem (GDE) risk assessment has been completed in accordance with the NSW Government *Risk Assessment Guidelines for Groundwater Dependent Ecosystems* (Serov et al. 2012). This assessment follows the process detailed below:



6.1 Identification of potential GDEs

Ecosystems that could rely on either the surface or subsurface expression of groundwater within or surrounding the project area are those associated with:

- creeks and rivers across the project area where groundwater is discharging and provides baseflow;
- shallow (perched) and deeper regional groundwater systems; and
- springs associated with the steep escarpment in the transition between the Gooandra Volcanics and Ravine Beds geological formations.

GDEs considered in this assessment included:

- subsurface ecosystems such as:
  - karst and caves;
  - subsurface phreatic aquifer ecosystems;
  - baseflow stream hyporheic ecosystems;

- surface ecosystems such as:
    - groundwater-dependent wetlands;
    - baseflow streams (surface water ecosystems); and
    - groundwater-dependent terrestrial ecosystems (phreatophytes).

GDEs were classified into three categories according to their increasing dependence on groundwater:

- non-dependent;
- facultative:
    - opportunistic;
    - proportional;
    - highly dependent; and
- entirely dependent/obligate.

6.1.1 Subsurface GDEs

A stygofauna assessment was undertaken by Macquarie University (2019, Annexure F).

Stygofauna sampling was undertaken at 16 sites located within 2 km of the proposed pipeline (Figure 6.1). These include existing monitoring bores accessing fractured rock aquifers (subsurface phreatic aquifer ecosystems – 11 sites) at various depths, as well as colluvial aquifers associated with the alpine bogs and fens (baseflow stream hyporheic ecosystems – 5 sites).

Sampling was undertaken by pumping water from groundwater bores, with 100 L of water collected or 2 hours of pumping (whichever came first). For groundwater bores in which pumps were not installed, groundwater was sampled by dragging plankton nets (50 µm mesh) through the water to collect any fauna, or by lowering a bailer into the bore to collect 10 L of water. All samples collected were sieved through a 50 µm mesh sieve. The contents of the sieve were carefully transferred to sample jars and preserved in 100% undenatured ethanol.

Preserved samples were analysed in the laboratory and all invertebrates removed, identified and enumerated. All specimens collected were identified to the lowest practicable level using morphological traits and keys. Each specimen was classified based on the likelihood of it being an obligate groundwater organism. eDNA (environmental DNA) analysis of groundwater samples was also undertaken on groundwater collected from 11 groundwater bores (ie. not including piezometers in alpine bogs and fens).

The objective of the stygofauna assessment was to determine the presence or absence of stygofauna in aquifers and alpine bogs and fens. A complete description of the assessment method is provided in Macquarie University (2019, Annexure F).

6.1.2 Surface GDEs

Access to the groundwater is dependent on several factors with the core factor being the depth to the water table. As terrestrial vegetation communities are composed of a range of vegetation types, with a range of rooting depths and strategies there is a relationship between groundwater depth and the types and composition of the vegetation that can access it (Serov 2013).

Considerations in evaluating surface ecosystems and their potential dependency on groundwater included:

- association with groundwater levels across the region;
- the physiology of plant species that occur in that community and their likely dependence on water availability;
- a PCTs location in the landscape; and
- if the rooting depth of vegetation would be able to take up groundwater based on likely depth of the aquifer and soil characteristics.

To identify groundwater-dependent terrestrial ecosystems (phreatophytes), an analysis was undertaken documenting the association of the PCTs found within the project area with groundwater levels as modelled by the regional numerical groundwater flow model, referred to as SH4.0 (EMM 2019c). Groundwater levels across the project area are shown in Figure 6.2.

An intersection was undertaken in ArcGIS between PCTs mapped as a part of this assessment against groundwater levels in the following categories:

- 0 - 0.5 mbgl;
- 0.5 - 2 mbgl;
- 2 - 5 mbgl;
- 5 - 20 mbgl; and
- >20 mbgl.

The percentage of each PCT within these bands was determined, and the criteria listed in Table 6.1 was applied to provide an initial determination of the dependence of PCTs within the project area on groundwater. Ecological knowledge of the PCTs, along with knowledge of the floristics of each PCT were applied to confirm the results of this initial analysis, with some PCT amended based on this additional layer of assessment.

Table 6.1 Criteria used for determining groundwater dependence on PCTs

Dependence on groundwater	Criteria
Entirely/obligate	More than 50% of the PCT is mapped in areas with groundwater at 0.5 mbgl or less, or more than 75% of the PCT is mapped in areas with groundwater at 2 mbgl or less.
Facultative - high	More than 50% of the PCT is mapped in areas with groundwater at 2 mbgl or less, and more than 75% of the PCT is mapped in areas with groundwater at 5 mbgl or less.
Facultative - proportional	More than 75% of the PCT is mapped in areas with groundwater at 5 mbgl or less, but less than 50% of the PCT is mapped in areas with groundwater at 2 mbgl or less.
Facultative - opportunistic	More than 50% of the PCT is mapped in areas with groundwater at 5 mbgl or less, but less than 75% of the PCT is mapped in areas with groundwater at 5 mbgl and/or less than 50% of the PCT is mapped in areas with groundwater at 2 mbgl.
Non-dependent	Evenly distributed across groundwater levels, with generally less than 50% of the PCT mapped in areas with groundwater at 5 mbgl or less.

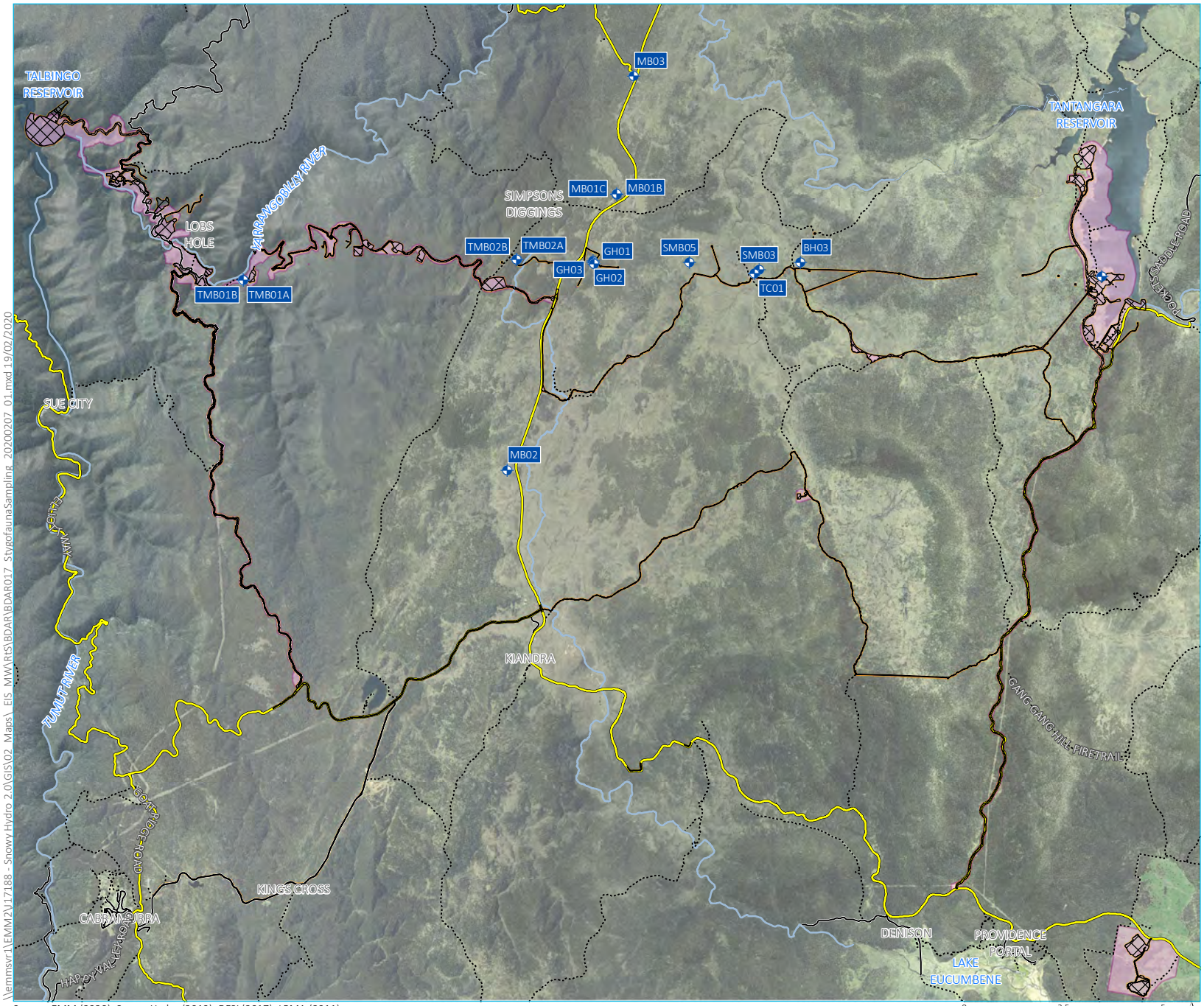
To identify potential groundwater-dependent riparian vegetation associated with baseflow streams, a field assessment was undertaken. The objective of the survey was to identify where groundwater expresses itself at the surface. Water Resources Engineers from EMM traversed each major drainage line and associated tributaries to identify the highest groundwater seep in each drainage line. Once identified, the location was tagged in Collector and categorised as follows (note the terminology can be updated):

- Type 1 – Contact/hillslope springs: springs displaying visible flow, typically on hillslopes. These were generally found in the upstream sections of more defined tributaries and occasionally in low lying areas.

- Type 2 – Lowland seeps: visible seeps into sediment storage (ie floodplains). These were typically found in low-lying areas adjacent to large watercourses and tributaries.

- Type 3 – Alpine bogs: boggy, wet ground, typically in depressions in the landscape. The most common discharge type across the survey area and generally occurred in the upstream section of smaller tributaries.

Surveys were undertaken in February and March 2019. Vegetation downslope of these points was deemed to have potential to be reliant on the surface expression of groundwater, and thus deemed to be groundwater-dependent riparian vegetation. It should be noted that in many instances the vegetation downslope of each of these points where groundwater expresses itself at the surface is indistinguishable from surrounding vegetation. In some instances, there was a small expression of mesic or hydric vegetation, such as *Sphagnum* sp. or *Leptospermum* sp.



KEY

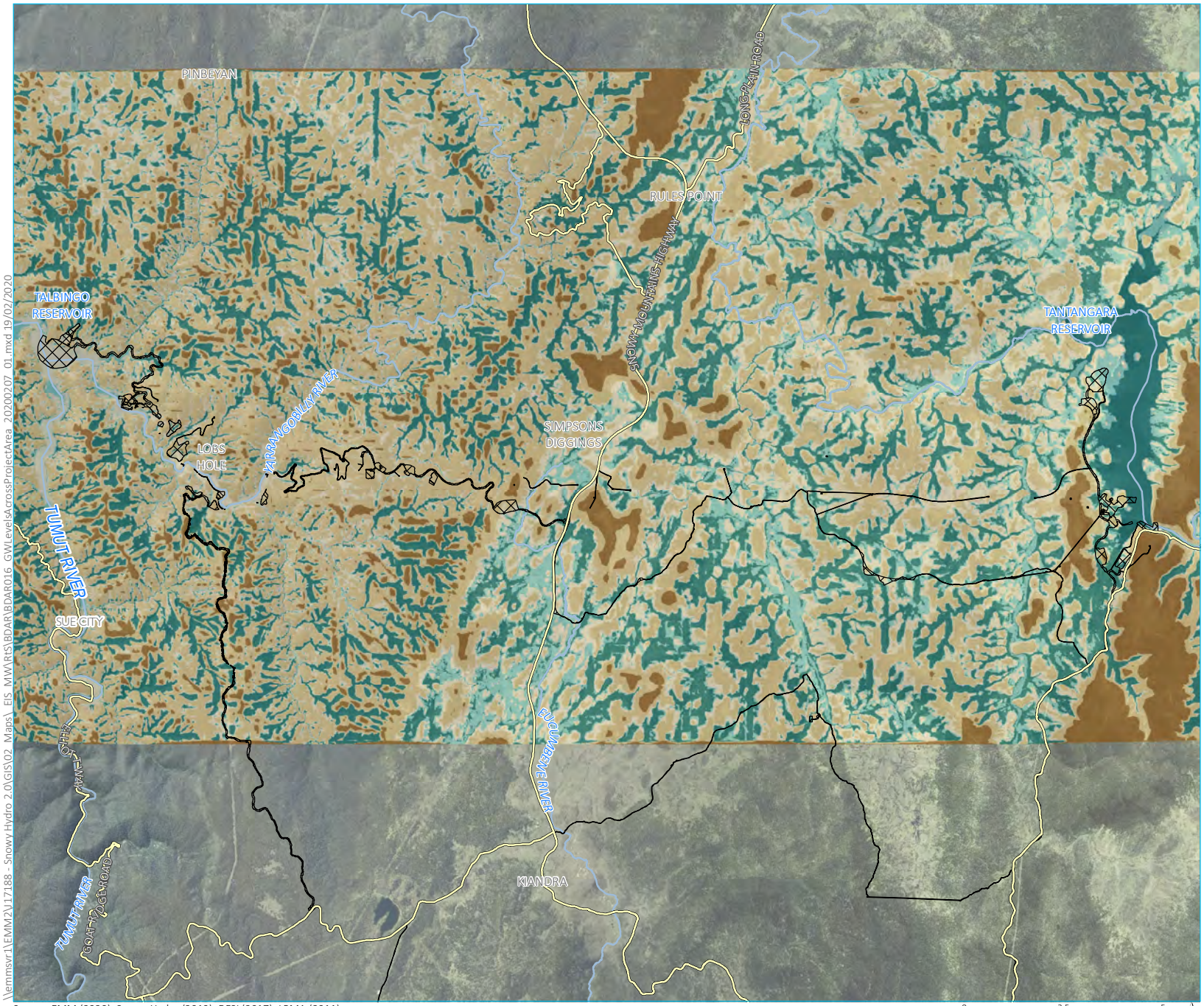
- Main road
- Local road
- Vehicular track
- Watercourse
- Disturbance area
- Indirect disturbance area
- Construction envelope
- Stygofauna sampling location

Source: EMM (2020); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

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Stygofauna sampling locations

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Main Works
Figure 6.1



KEY

- Watercourse
- Main road
- Disturbance area

Groundwater levels (m)

- 0 - 0.5
- 0.5 - 2.0
- 2.0 - 5.0
- 5.0 - 20
- > 20

Source: EMM (2020); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 2.5 5 km

GDA 1994 MGA Zone 55

N

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Groundwater levels across the project area

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Figure 6.2

6.2 Potential GDEs

6.2.1 Subsurface GDEs

A total of five specimens from two families, likely to be obligate stygofauna representatives, were collected from one of the 11 fractured rock sites (TMB02A) and two of the five Alpine bog and fen sites (GH01, GH02); a further 80 specimens from five groups, with potential to be obligate stygofauna representatives, were collected from four of the 11 fractured rock sites (TMB02A, MB01C, PB01 and SMB03) and four of the five Alpine bog and fen sites (GH01, GH02, GH03 and TC01) (Table 6.2). The family Parastenocarididae is a group of copepods in the order Harpacticoida, which display affinities with groundwater existence (Cottarelli et al. 2010). The family Canthocamptidae is also a group of copepods in the order Harpacticoida; however, representatives may comprise surface or groundwater taxa from freshwater or marine habitats (Pesce 2007). The specimens collected from the two Alpine bog and fen sites have the potential to be surface aquatic taxa, although Macquarie University (2019) indicated that they had the morphological traits typical of stygobiotic species, including lack of eyes and pigmentation and enhanced sensory appendages, and are likely to be obligate groundwater species. Parastenocarididae was unique to the fractured rock aquifers of the Gooandra Volcanics, while Canthocamptidae and Ostracoda were unique to the alpine bogs and fens.

The remaining specimens collected (Table 6.2) comprised representatives from Oligochaeta (Subclass), Acarina (Subclass), Ostracoda (Class), Rotifera (Phylum) and Nematoda (Phylum), with the oligochaetes, acari, rotifers and nematodes common to both aquifers. While the oligochaetes, rotifers and nematodes have the potential to be stygobiotic, it is considered difficult to determine their affinity with groundwater due to the wide variety of habitats in which they occur (Macquarie University 2019). Similarly, acari and ostracod taxa have stygobiotic potential; however, their taxonomy was not resolved (Macquarie University 2019).

Locations where likely and potential stygofauna species were recorded are shown in Table 6.2.

Table 6.2 Abundance of potential stygofauna specimens recorded

Species	Fractured rock aquifers sites				Alpine bog and fen sites			
	TMB02A	MB01C	PB01	SMB03	GH01	GH02	GH03	TC01
Stygofauna species								
Parastenocarididae sp.	2							
Canthocamptidae sp.					2	1		
Potential stygofauna species								
Oligochaeta sp.			1			1		
Acarina sp.			1		1	1		1
Ostracoda sp.					1	3		
Rotifera sp.		1		1			1	
Nematoda sp.	52	1	2		4	7	1	

The remaining specimens were either not considered to be stygobiotic (Hypogastruridae, Sminthuridae), or were too damaged to identify (Copepoda nauplii).

Limited stygofauna studies have been undertaken within fractured rock aquifers of the region, thus there is limited data for comparison. The stygofauna found in the aquifers in the Snowy 2.0 Project area are similar to those encountered in other fractured rock systems in NSW.

6.2.2 Surface GDEs

Twenty-one PCTs have been recorded within the GW model domain. A review of the Groundwater Dependent Ecosystems Atlas (BOM 2019) identified the majority of PCTs as having a low-high GDE potential. Two PCTs were identified as having a moderate-high (PCT 285) and high GDE potential (PCT 637):

- PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion; and
- PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion.

Analysis of the distribution of PCTs in relation to the simulated regional groundwater levels indicated several PCTs are strongly associated with shallow groundwater (Table 6.3).

Table 6.3 PCTs within the project area, association with simulated groundwater levels and derived GW dependence

Row Labels	0-0.5 mbgl	0.5-2 mbgl	2-5 mbgl	5-20 mbgl	>20 mbgl	Total to 2 mbgl	Total to 5 mbgl	GW dependency
PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	50%	46%	4%	0%	0%	96%	100%	Entirely / obligate
PCT 637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	69%	16%	12%	2%	0%	86%	98%	Entirely / obligate
PCT 285 - Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	11%	14%	67%	8%	0%	25%	92%	Facultative - proportional
PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	4%	16%	69%	11%	0%	20%	89%	Facultative - proportional
PCT 299 - Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	27%	19%	35%	19%	0%	46%	81%	Facultative - proportional
PCT 679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	58%	11%	26%	5%	0%	69%	95%	Facultative - opportunistic
PCT 303 - Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	32%	18%	30%	19%	1%	50%	80%	Facultative - opportunistic

Table 6.3 PCTs within the project area, association with simulated groundwater levels and derived GW dependence

Row Labels	0-0.5 mbgl	0.5-2 mbgl	2-5 mbgl	5-20 mbgl	>20 mbgl	Total to 2 mbgl	Total to 5 mbgl	GW dependency
PCT 300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	17%	8%	27%	40%	8%	25%	52%	Facultative - opportunistic
PCT 952 - Mountain Gum - Narrow-leaved Peppermint - Snow Gum dry shrubby open forest on undulating tablelands, southern South Eastern Highlands Bioregion	1%	5%	21%	60%	13%	6%	27%	Non-dependent
PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion	2%	2%	12%	78%	6%	4%	16%	Non-dependent
PCT 999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	3%	2%	20%	75%	1%	5%	24%	Non-dependent
PCT 1191 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	4%	6%	22%	67%	2%	10%	32%	Non-dependent
PCT 311 - Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	4%	3%	19%	72%	2%	8%	26%	Non-dependent
PCT 639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	5%	5%	14%	68%	7%	10%	24%	Non-dependent
PCT 644 - Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	5%	7%	25%	45%	18%	13%	38%	Non-dependent
PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	8%	5%	28%	56%	2%	13%	41%	Non-dependent
PCT 296 - Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	10%	4%	23%	60%	3%	15%	37%	Non-dependent
PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	14%	8%	19%	43%	17%	22%	41%	Non-dependent
PCT 1224 - Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	20%	27%	35%	16%	1%	48%	82%	Non-dependent
PCT 643 - Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	26%	8%	20%	46%	0%	34%	54%	Non-dependent

Two PCTs were identified as having an entirely/obligate dependence on groundwater (Figure 6.3):

- PCT 637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion.

These PCTs show strong associations with shallow groundwater (<2 mbgl), with 86% and 96% of the mapped extent of these PCTs occurring in areas of shallow groundwater. The floristic composition of these PCTs also show a number of mesic and hydric species which are not found outside of these shallow groundwater systems.

Three PCTs were identified as having a facultative proportional dependence on groundwater (Figure 6.3):

- PCT 285 - Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion;
- PCT 299 - Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion; and
- PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion.

Despite less than 50% of the community being mapped in areas of shallow groundwater (<2 mbgl), PCTs 285, 299 and 302 were deemed likely to have a facultative – proportional reliance on GW with 92%, 89% and 81% of these PCTs mapped in areas with groundwater at <5 mbgl, respectively. These PCTs occur in riparian zones and gullies where there is likely to be some near-surface expression of groundwater. In addition, the floristic composition of these communities supports a number of mesic species, as well as tree species that are likely to be accessing groundwater in unconsolidated alluvial and colluvial systems.

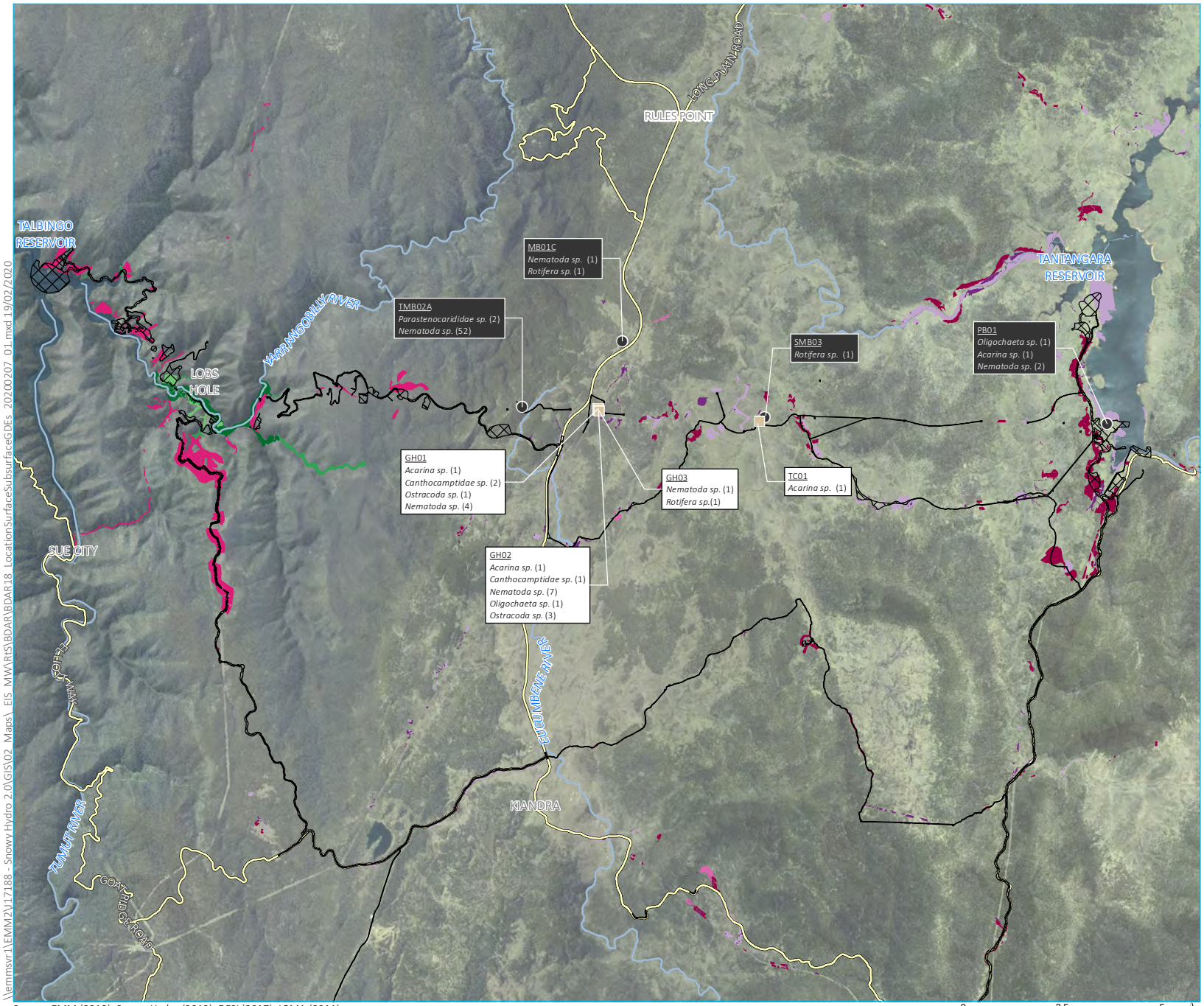
Three PCTs were identified as having a facultative – opportunistic dependence on groundwater (Figure 6.3):

- PCT 300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment;
- PCT 303 - Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion; and
- PCT 679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion.

PCT 300 occurs along drainage lines on mid slopes across the project area. This PCT shows some association with groundwater at up to 5 mbgl (52%) but also occurs in areas of deeper groundwater. This PCT may be accessing intermittent groundwater during periods of prolonged drought. Despite being associated with shallow groundwater systems, PCTs 303 and 679 are largely derived by their landscape position, occurring on the edges of frost hollows where cold air depressions restrict growth to robust and cold air tolerant species such as Black Sallee. Any relationship with groundwater is coincidental and derived by landscape position. Despite this, a conservative assessment has been undertaken with these communities assumed to have a facultative – opportunistic dependence on groundwater.

The remaining communities were considered non-dependent on groundwater. Two non-dependent communities show some association with shallow to intermittent groundwater. PCT 643 occurs in basalt boulderfields derived from periglacial activity. There is no association between this community and groundwater levels, as the community is largely devoid of flora species. PCT 1224 is mapped in areas with intermittent groundwater levels (<5 mbgl). Despite this, the community is considered unlikely to be accessing groundwater for survival, with flora species likely to have shallow roots and the floristic composition of the community does not show any association with mesic or hydric species.

A conceptual diagram, showing the interaction of potential surface GDEs with the groundwater table, is shown in Figure 6.4.



KEY

- Watercourse
- Main road
- Disturbance area

Entirely/obligate dependence

- PCT 637
- PCT 1225

Facultative - opportunistic

- PCT 303
- PCT 300
- PCT 679

Facultative - proportional

- PCT 302
- PCT 299
- PCT 285

BoreType

- Alpine bog and fen site
- Fractured rock aquifer site

Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

0 2.5 5 km

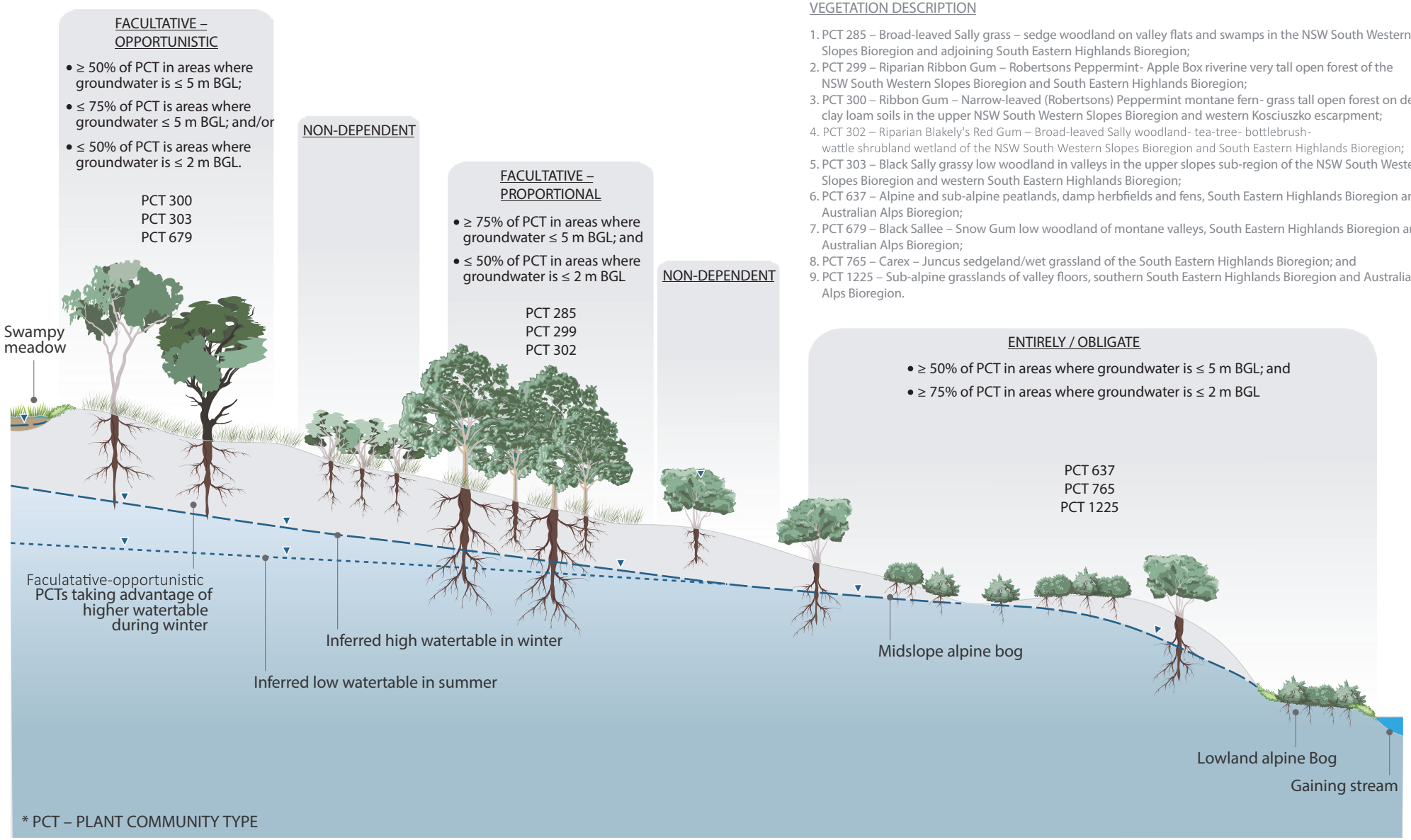
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\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02 Maps\ EIS MW\Rts\BDAR\BDAR18 LocationSurfaceSubsurfaceGDEs 20200207 01.mxd 19/02/2020

Location of surface GDEs and locations where likely and potential stygofauna species were recorded

Snowy 2.0
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Figure 6.3



VEGETATION DESCRIPTION

1. PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion;
2. PCT 299 – Riparian Ribbon Gum – Robertsons Peppermint- Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion;
3. PCT 300 – Ribbon Gum – Narrow-leaved (Robertsons) Peppermint montane fern- grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment;
4. PCT 302 – Riparian Blakely's Red Gum – Broad-leaved Sally woodland- tea-tree- bottlebrush-wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion;
5. PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion;
6. PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion;
7. PCT 679 – Black Sallee – Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion;
8. PCT 765 – Carex – Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion; and
9. PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion.

Conceptual diagram for surface GDEs

Snowy 2.0
Biodiversity Development Assessment Report
Figure 6.4

6.3 Ecological values of identified GDEs

GDEs within the survey area are deemed to have high ecological value, based on their occurrence with KNP, good water quality and quantity parameters, and aquifer structure given limited disturbance, patch size criteria given high levels of connectivity, and delivery of ecosystem services.

6.4 Assessment of predicted groundwater impacts

Predicted impacts to identified GDEs have been determined in accordance with the guidelines in Serov *et al*. (2012). Impact assessment has largely been restricted to predicted impacts to water quantity and biological integrity of GDEs and associated aquifers, as the project is predicted to have negligible impacts on water quality or the geological integrity of any aquifer.

EMM has received from FGJV and Snowy Hydro refined information relating to tunnel and lining parameters regarding ranges of inflows likely for the power waterway, based on the tunnel lining design and inflow mitigation measures to be employed in the excavation and construction. This information has been used to model groundwater drawdown (see EMM 2020a and 2020b, appended to the PIR-RTS). This has resulted in significant reduction in groundwater drawdown and associated surface impacts. The groundwater model predicts groundwater drawdown of up to 50 m in some area (Figure 6.5). This has been used to predict impacts to subsurface and surface GDEs.

6.4.1 Subsurface GDEs

The predicted impact to fractured rock aquifers will likely result in drawdown, reducing the extent of habitat available to stygofauna. It is likely that predicted impacts will be restricted to an area bounded by Tantangara Creek in the east and the boundary of the Gooandra Volcanics in the west. While survival of stygofauna in unsaturated zones is limited beyond 48 hours, drawdown of less than 20 m is considered unlikely to have a significant effect on many stygofauna species given the ability of these species to relocate within the saturated zone; drawdown of 5 m (for example) would be unlikely to have any significant effect.

As defined in Serov et al. (2012), stygofauna communities are considered to be at risk when considering predicted drawdown impacts. Only a small area (383 ha), greater than 20 m drawdown, is predicted to potentially impact these communities. However, if groundwater decline is slow or gradual in areas where predicted drawdown is greater than 20 m, it may present opportunities for stygofauna to migrate to saturated areas whilst drawdown is occurring.

6.4.2 Surface GDEs

To determine the predicted impacts to surface GDEs, the area of each GDE determined in Section 6.2.2 within the groundwater drawdown area (Figure 6.5) was determined. This data is presented in Table 6.4.

Table 6.4 Surface GDEs and the area of each GDE subject to drawdown

Row Labels	GW dependency	0.5–2 m	2-5 m	5-20 m	>20 m	Total
PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	Entirely / obligate	9.96	0.30	0.00	0.00	10.27
PCT 637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	Entirely / obligate	6.03	0.85	0.05	0.00	6.93

Table 6.4 Surface GDEs and the area of each GDE subject to drawdown

Row Labels	GW dependency	0.5–2 m	2-5 m	5-20 m	>20 m	Total
PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	Facultative - proportional	0.71	0.00	0.00	0.00	0.71
PCT 299 - Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	Facultative - proportional	0.96	0.82	0.12	0.00	1.89
PCT 679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Facultative - opportunistic	0.00	0.02	0.00	0.00	0.02
PCT 303 - Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	Facultative - opportunistic	14.02	5.73	4.95	0.00	24.70
PCT 300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	Facultative - opportunistic	3.71	2.17	0.49	0.00	6.38

PCTs 302, 299 and 679 will experience predicted impacts to less than 3 ha of the community, and/or will experience groundwater drawdown of less than 5 m. These GDEs are considered to be at a low risk of impacts.

PCT 303 will experience predicted impacts to 24.70 ha of the community, representing 6% of the 409 ha of the community mapped in the survey area, while PCT 300 will experience drawdown to 6.38 ha of the community, representing 2% of the 270 ha of the community mapped in the survey area. In addition, 14.02 ha of PCT303 and 3.71 ha of PCT 300 will experience drawdown of less than 2 m, and will be unlikely to have any noticeable effect on the ability of these communities to access groundwater during periods of stress, and is therefore unlikely to result in any significant changes in the biological integrity of the GDEs. It is predicted these GDE are at low risk of impact, as defined in Serov et al. (2012).

PCT 1225 will experience drawdown of >0.5 m to 10.27 ha of the community. Drawdown of more than 0.5 m may have some impact given the entirely/obligate dependence of this community on groundwater. While there is a high risk of predicted impact to some portion of the community, as defined in Serov et al. (2012), the predicted drawdown will impact on 3% of the 312 ha of this PCT mapped across the survey area, and larger patches of the community will be maintained on major watercourses such as Tantangara Creek and Nungar Creek. Overall impacts to community are expected to be low.

PCT 637, aligned with the Alpine bogs and fens, will experience drawdown of >0.5 m to 6.93 ha of the community. This community is entirely/obligate dependence on groundwater and has a large number of hydric and mesic species that do not occur outside of this, or other allied communities. The 6.93 ha that will be subject to drawdown represents 8% of the 86 ha mapped within the survey area, 0.08% of the mapped extent of the community in the Snowy Mountains (OEH 2012b) and 0.06% of the 11,100-ha mapped at a national scale (TSSC 2009). While there is a high risk of predicted impact to some portion of the community, as defined in Serov et al. (2012), the overall risk to the community and listed community is considered low.

Groundwater-dependent riparian vegetation, consisting of species adapted to mesic/hydric soils, are located along sections of creeks and waterways where groundwater is expressing at the surface. It is unlikely that drawdown of less than 5 m will impact on these areas, as some groundwater will continue to be expressed at the surface. In addition, not all groundwater will be diverted to regional aquifers, with an unknown proportion continuing to supply baseflow to these GDEs, maintaining biological integrity. Groundwater-dependent riparian vegetation is predicted to be at moderate risk of predicted impact due to groundwater drawdown.

6.5 Final risk assessment for identified GDEs

The GDE assessment, prepared in accordance with Serov et al. (2012), determined that all GDEs within the project area are considered as having high ecological value.

Since the submission of the EIS , which included a conservative, worst-case and unrealistic assessment of impacts to GDEs based on an unlined tunnel, EMM has received from FGJV and Snowy Hydro refined information relating to tunnel and lining parameters regarding ranges of inflows likely for the power waterway, based on the tunnel lining design and inflow mitigation measures to be employed in the excavation and construction. This information has been used to model groundwater drawdown (see EMM 2020a and 2020b, appended to the PIR-RTS). This has resulted in significant reduction in groundwater drawdown and associated surface impacts, and has been used to predict impacts to subsurface and surface GDEs.

Stygofauna communities are considered to be at high risk; however, given only a small area of habitat will be affected and the low species diversity found the overall predicted impact to stygofauna is predicted to be low.

Several PCTs are predicted to be at low risk of predicted impact (category A). This includes PCTs 765, 285, 302, 299, 679, 300 and 303. These areas will experience minimal to no drawdown and will not experience any changes in biological integrity.

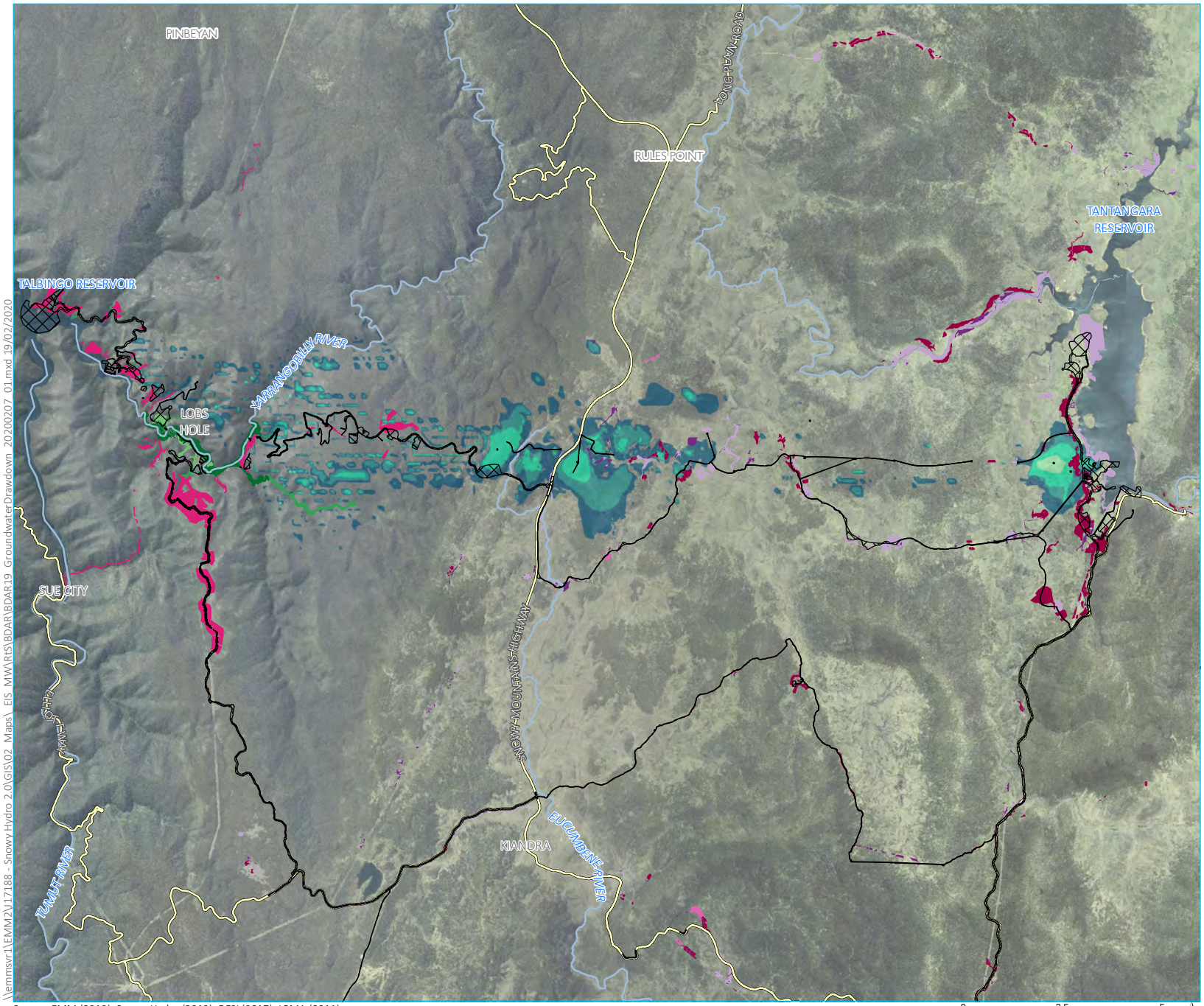
Groundwater-dependent riparian vegetation is predicted to be at moderate risk of predicted impact, as the GDE will experience some drawdown, but some level of baseflow is expected to be maintained to large areas and the community will only experience minor changes in species composition.

The initial risk assessment identified that PCTs 1225 and 637 may be at high risk of predicted impact given the level of drawdown, the entirely/obligate dependence of these communities on groundwater and possible changes in species composition. However, these impacts will occur to a small portion of these communities at a local, NSW and national scale and has been reduced based on revised modelling. Overall risk of impact is considered low.

The mitigation measures required by Serov et al. (2012) for GDEs at high risk include:

- protection of aquifer and GDE catchment / sub-catchments;
- monitoring to ensure no change to risk;
- mitigate impact and apply water sharing plan rules; and
- monitor effectiveness of mitigation strategy using appropriate indicators.

A monitoring program will be implemented to ensure actual impacts are within or less than predicted. If actual impacts are greater than predicted, adaptive management will be implemented. The monitoring program will be determined as a part of the Biodiversity and Groundwater Management Plans to be developed post-approval.



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Source: EMM (2019); Snowy Hydro (2019); DFSI (2017); LPMA (2011)

Groundwater drawdown

Snowy 2.0
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Figure 6.5

Part B

Stage 2: Impact Assessment

7 Impact assessment (biodiversity values)

7.1 Potential direct, indirect and prescribed impacts

7.1.1 Direct impacts

The main direct impacts of Main Works will be associated with impacts arising from the clearing works for construction of the project. Potential direct impacts that could arise from Main Works, prior to any measures to avoid, minimise or mitigate impacts, include:

- clearing of large areas of significant native vegetation;
- clearing of high-quality threatened species habitat;
- clearing of threatened ecological communities (TECs); and
- disturbance of river/creek beds and banks.

Offsets for direct impacts were calculated by setting composition, structure and function scores for all areas of direct impact to zero following development.

7.1.2 Indirect impacts

In addition to the direct impacts arising from this process, clearing of native vegetation has several indirect impacts. Indirect impacts that could occur as a result of Main Works, if unmitigated, include:

- increased noise, vibration and dust levels resulting in disturbance of fauna species, and consequent abandonment of habitat, or changes in behaviour (including breeding behaviour);
- lighting for night works, resulting in disturbance to fauna species and changes in occupancy or behaviour;
- increase in weeds and pathogens, resulting in degradation of retained native vegetation and habitat; and
- increase in predatory and pest animal species, resulting in increased predation and competition and a consequent reduction in populations.

Construction activities may result in increased levels of noise and vibration, particularly as a result of blasting activities during construction of the tunnel, and as a result of general construction activities. Noise has been observed to modify animal behaviour, including calling behaviour in frog species (Hoskin and Goosem 2010) and bird species. These activities may also result in increased dust levels, covering adjacent vegetation and inhibiting growth. Lighting for night works also has the potential to result in light spill into adjacent habitat areas, and ongoing disturbance to fauna species, with the potential for species to abandon habitat due to these impacts (Davies et al. 2014, Schroer et al. 2016). Noise levels of over 65 dB are predicted to occur during construction immediately adjacent to key areas of activity such as Lobs Hole, Tantangara and Marica. However, these levels drop to below 60 dB (normal conversation levels) outside of these construction zones. Noise levels are expected to be transient, occurring during construction. Operational noise is expected to be minimal, below 45dB and restricted to immediately surrounding operational elements at Tantangara and Talbingo intakes, the MAT and ECVT and the ventilation shaft.

Increased movement of vehicles and people into the area has the potential to transport weeds and pathogens into the study area. Weeds have the potential to result in degradation of retained vegetation and fauna habitat. Key weed species identified in DECC (2007) and recorded during flora surveys for Main Works include:

- African Lovegrass (*Eragrostis curvula*);
- Bird's-foot Trefoil (*Lotus* spp.);
- Blackberry;
- Browntop Bent (*Agrostis capillaries*);
- Cat's Ear/Flatweed (*Hypochaeris* spp.);
- Cocksfoot (*Dactylis glomerata*);
- Dandelion (*Taraxacum officinale*);
- Hawthorn (*Crataegus monogyna*);
- Mullein/Aarons Rod (*Verbascum thapsus* and *V. virgatum*).
- Musk Monkey Flower (*Mimulus moschatus*);
- Ox-eye Daisy (*Leucanthemum vulgare*);
- Patterson's Curse (*Echium plantagineum*);
- Sheep Sorrel;
- Spear Thistle;
- St John's Wort;
- Sweet Briar;
- Sweet Vernal Grass;
- Yarrow (*Achillea millefolium*); and

- Yorkshire Fog Grass.

Many of these species are prevalent in areas previously disturbed. Key weed species of concern, that currently do not occur or only occur in low numbers in KNP include African Lovegrass and Serrated Tussock (*Nasella trichotoma*). There is potential for these species to be transported into KNP during construction activities.

Infection of native plants by *Phytophthora cinnamomi* is listed as a key threatening process under the BC Act and EPBC Act. *P.cinnamomi* can lead to death of trees and shrubs, resulting in devastation of native ecosystems (DECC 2008a). Infection of susceptible communities with *P.cinnamomi* leads to:

- changes in the structure and composition of the native plant communities;
- a significant reduction in primary productivity and functionality; and
- habitat loss and degradation for dependent flora and fauna (DoE 2014b).

Impacts from *P.cinnamomi* has been identified as a key threat to the Smoky Mouse (DECC 2008a, Menkhorst and Broome 2008a, 2008b).

Chytrid fungus (*Batrachochytrium dendrobatidis*) is known to cause Chytridiomycosis, an infectious disease that affects amphibians worldwide (DSEWPaC 2013). This disease has been linked to extinction and declines in several frog species across Australia and is listed as a key threat to the Alpine Tree Frog (DoE 2014c) and Booroolong Frog (DEWHA 2007). The key risk is the spread of the fungus between infected and uninfected populations.

Increased human activity also has the potential to attract feral animals. Of key concern is an increase in feral Cat (*Felis catus*) and Red Fox (*Vulpes vulpes*) activity and consequent impacts on native animals. Predation by feral Cats and Red Foxes are listed as key threatening processes under the BC Act and EPBC Act (NPWS 2001, DEWHA 2008a, DoE 2015a) with impacts from feral Cats also listed as a key threat to the Smoky Mouse (Menkhorst and Broome 2008a, 2008b). Introduced predators are also considered a threat to the Eastern Pygmy-possum (NSWSC 2001).

Transportation of water between Talbingo Reservoir and Tantangara Reservoir also has the potential to result in translocation of undesirable fish species, particularly Redfin Perch (*Perca fluviatilis*) and Eastern Gambusia (*Gambusia holbrooki*), and represents a biosecurity issue. These species are known to predate on a variety of frog species, freshwater fishes and other aquatic organisms such as macro-invertebrates (NSWSC 1999). Eastern Gambusia and Redfin have been linked to declines in frog species, including the Green and Golden Bell Frog (*Litoria aurea*) and Yellow-spotted Tree Frog (*Litoria castanea*) (NSWSC 1999) and Booroolong Frog (Hunter 2007). Impacts may be experienced within Tantangara Reservoir and within some sections of the upstream reaches of the catchment. A summary of the assessment of options to prevent, eliminate or minimise the biosecurity risk and consequent environmental and social impacts is provided in Section 4.3.4 of the PIR-RTS. The impacts of predatory fish on freshwater fish and other aquatic organisms is discussed in Cardno (2019).

As a result of recent design changes to the Main Works disturbance footprint, there has been a significant reduction in direct impacts to native vegetation and threatened species. However, it is acknowledged that indirect impacts may arise out of the project, subsequently resulting in a reduction in the condition of retained areas of native vegetation. These indirect impacts have been assessed in accordance with the BAM (OEH 2017a) and credits have been calculated. It is assumed that all vegetation within 20 m of the disturbance footprint will result in indirect impacts as a result of the project. This assessment was based on assessment of data collected as a part of the biodiversity monitoring program for Exploratory Works, which shows a statistically significant difference in weed cover from 10 m to 50 m, but not from 10 m to 20 m or from 20 m to 50 m (BMP, EMM 2019e). To account for direct and indirect impact, vegetation zones were split into management zones based on whether they occurred within the direct impact footprint or the indirect impact footprint. Changes in vegetation integrity score (future vegetation integrity score) for indirect impacts were calculated based on the following:

- the structure (cover) scores for 'grass', 'forbs', 'ferns' and 'other' growth forms were reduced by 10%, leaving scores for all other growth forms at the current score; and
- functional score for litter cover was reduced by 5%.

7.1.3 Prescribed impacts

Main Works also has the potential to result in prescribed impacts. Prescribed impacts, as per Section 8.2.1.2 of the BAM (OEH 2017a), that could occur as a result of Main Works, include:

- impacts on connectivity of habitat, resulting in fragmentation of habitat or impacts to movement that maintains life-cycle stages;
- impacts to water quality and quantity, or hydrological processes, that sustain threatened species and TECs; and
- impacts of fauna vehicle strike through increased traffic.

Removal of native vegetation and threatened species habitat has the potential to result in fragmentation of fauna habitat, with resultant effects on fauna species movement, reproduction and gene flow (Bennett 1990, Keller and Largiadèr 2003, Dixo et al. 2009). Clearing can result in the inability of species to move between patches of suitable habitat and undertake important lifecycle processes, such as breeding. Ultimately, this can increase the vulnerability of flora and fauna populations to stochastic events and extinction (Bennett 1990, Smith and Hellmann 2002, Fischer and Lindenmayer 2007).

Construction activities have the potential to result in impacts to water quality in watercourses located adjacent to construction activities in the following ways:

- release of poor-quality water to watercourses. In particular, any sediment laden water that could arise on site following mobilisation of soils/sediments during inclement weather over disturbed soils and sediments in areas where vegetation has been cleared and/or soil and construction material has been stockpiled. If untreated surface water was released to watercourses it could be detrimental to aquatic habitat and biota;
- reduction in watercourse bank stability following any nearby construction and any clearing of riparian vegetation could also result in bank erosion and input of sediments into watercourses;
- increased release of water into watercourses, resulting in "flushing" of the systems and increased erosion due to increased flows;

- accidental release of chemicals and fuels (eg. oils, hydraulic fluids and fuel from construction equipment) could result in the input of hydrocarbon and metal contaminants into watercourses. The accidental release into watercourses of any pesticides, herbicides and sewage could also affect aquatic biota; and

- disturbance of riparian vegetation could have indirect impacts on aquatic habitat quality and influence abundance, distribution and health of aquatic biota.

Mobilisation of fine sediments into the watercourses located in the survey area is unlikely to result in long-term impacts to aquatic environments; these events will be pulse events and will be rapidly flushed out of the system resulting in negligible impacts to threatened species (Dave Hunter OEH pers. comm.). Likewise, short term reductions in water quality are unlikely to result in impacts to aquatic environments, as they will be rapidly flushed out of the system. The key mechanism for impacting on aquatic environments will be mobilisation of large amounts of sediment, which clog interstitial spaces providing key breeding habitat for the Booroolong Frog, or long-term negative changes to water quality.

Increased vehicle movements associated with the Main Works have the potential to result in increased fauna vehicle strikes, and associated fauna mortality (Taylor and Goldingay 2010). Rare or low-density populations, such as the Smoky Mouse, may be at risk of significant impacts if this impact is not managed appropriately (Hoskin and Goosem 2010).

7.1.4 Uncertain impacts

The construction of the tunnel transferring water between Tantangara Reservoir and Talbingo Reservoir has the potential to result in drawdown of groundwater across the project area, with consequent reduction in the availability of groundwater and impacts to GDEs (see Section 6).

As outlined in Section 6, drawdown of groundwater by up to 50 m has the potential to result in impacts to a number of GDEs identified. Since submission of the EIS, EMM has received from FGJV and Snowy Hydro refined information relating to tunnel and lining parameters regarding ranges of inflows likely for the power waterway, based on the tunnel lining design and inflow mitigation measures to be employed in the excavation and construction. This information has been used to model groundwater drawdown (see EMM 2020a and 2020b, appended to the PIR-RTS). This has resulted in significant reduction in groundwater drawdown and associated surface impacts.

7.2 Measures to avoid, minimise and mitigate impacts

Snowy Hydro, in consultation with EMM and the design team, have undertaken significant steps to avoid, minimise and mitigate impacts arising from the Main Works project.

A key focus of project design has been to avoid and minimise impacts to biodiversity values identified during the field surveys. In recognition of the location of the Snowy 2.0 project in the KNP, and associated biodiversity and other values of the Park, the project has undergone significant steps to avoid, minimise and mitigate impacts. The process below has been followed to ensure impacts are avoided and minimised to the greatest extent possible, within the design and other limitations of Snowy 2.0:

- identification of biodiversity values through comprehensive, rigorous and thorough biodiversity surveys;

- communication of identified values to the project team, including Snowy Hydro and the design team;

- consultation between the design team and project ecologists on various elements to consider both direct and indirect impacts and work through an iterative design process, with multiple iterations of design elements to achieve best practice outcomes;

- consultation with key government stakeholders, including DPIE and DoEE, and species experts and accountable officers within these departments, to seek input and discuss measures proposed to avoid, minimise and mitigate impacts;
- feedback of consultation into the design process; and
- finalisation of measures to avoid, minimise and mitigate impacts.

Measures undertaken to avoid, minimise and mitigate impacts that have arisen during the process outlined above are discussed below for each project element.

7.2.1 Design and construction of Snowy 2.0

i Talbingo Reservoir

Talbingo Reservoir and immediate surrounds will be the location of the following infrastructure elements:

- tailrace tunnel (subsurface);
- intake gate structures and buildings;
- portal construction compound;
- reservoir emplacement area;
- barge launch area; and
- associated access roads.

Opportunities to avoid and minimise impacts in this area are limited due to the need to site the intake gate and structures in a suitable location from an engineering and design perspective, related to the tunnel alignments.

a Tailrace tunnel (subsurface)

The tailrace tunnel will be located between the power station complex (below Marica) and Talbingo Reservoir. No impacts are predicted to arise from the tailrace tunnel, with limited drawdown of groundwater. No measures to avoid, minimise or mitigate impacts are recommended.

b Intake gate structures and buildings, barge launch area and portal construction compound

The intake gate structures and buildings, barge launch area and portal construction compound are located on the eastern shore of Talbingo Reservoir, north of where the Yarrangobilly River enters the Reservoir. Several alternatives were investigated for the location of the intake, with the location restricted by geotechnical and bathymetric engineering constraints, including the alignment of the tailrace tunnel, geological conditions to ensure constructability and deep water in Talbingo Reservoir to ensure sufficient water supply during pumping operations. The location of the portal construction compound is constrained by the location of the portal. As such, opportunities to avoid and minimise impacts are limited.

Impacts arising from the barge launch area were considered in Exploratory Works Modification 1. The impacts arising from this approved area are not considered in this report.

The intake gate structures and buildings, barge launch area and portal construction compound will remain as permanent infrastructure following completion of construction activities.

c Excavated rock management

Since the exhibition of the Main Works EIS, DPIE has requested that Snowy Hydro consider alternative options for management of excavated rock.

As a result, alternative excavated spoil management options compared to that articulated in the Main Works EIS and the updated design and methodology, are provided in Section 3.2.2 of the PIR-RTS.

d Access roads

A number of access roads will be constructed to provide access for construction traffic to the intake gate structures and buildings, barge launch area and portal construction compound as well as to permit access by truck and go to the proposed reservoir emplacement area for disposal for excavated material. In some areas these roads follow the existing Lobs Hole Ravine Road, while construction of a new road will be required to access the proposed reservoir emplacement area.

The design of these access roads has attempted to limit disturbance, as far as practicable, largely through the use of the existing road network, resulting in upgrades to existing roads rather than construction of new roads. This has limited the extent of disturbance required for these sections. Construction of the new road to access the proposed reservoir emplacement area has considered biodiversity values present, in conjunction with engineering requirements, to minimise impacts where possible.

Following completion of construction activities for Snowy 2.0 Main Works, the access roads form the intake gate structures and buildings, barge launch area and portal construction compound to the proposed reservoir emplacement area will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019). Access roads from Lobs Hole to the intake gate structures and buildings, barge launch area and portal construction compound will remain as permanent infrastructure following completion of construction activities.

ii Lobs Hole

Lobs Hole and surrounding areas are a key focus of activity for the project and will be used primarily for construction (including construction of the MAT and ECVT portals and tunnels to the underground power station and the headrace tunnel (and headrace tunnel surge shaft), and a temporary accommodation camp. The following project elements will be located in this area:

- Main Works camp;
- Exploratory Works camp (to be used during Main Works construction);
- Lobs Hole substation;
- Main Yard;
- excavated rock stockpiles;
- MAT and portal building;
- ECVT tunnel;
- cableyard; and
- access roads, including Lobs Hole Ravine Road and Mines Trail.

Much of the works associated with these project elements will have been completed as a part Exploratory Works. New elements have been sited to avoid and minimise impacts to biodiversity and other values as far as practicably possible.

a Main Works and Exploratory Works camps

The Main Works camp will be used to supplement the Exploratory Works camp during construction. The Exploratory Works camp was approved as a part of the Exploratory Works project. The siting of the Main Works camp included consideration of the biodiversity values in the area, with several locations initially considered. These initial areas were likely to have a much greater impact on restricted PCTs, and in a location closer to sensitive habitat along the Yarrangobilly River. The original camp designs also had a much larger footprint than the current design. Overall impacts have been reduced and impacts have been restricted to more widespread and ubiquitous PCTs.

The Main Works camp has potential to result in minor indirect impacts, including changes to runoff regimes due to impervious areas and increased concentrations of suspended sediment and nutrients in runoff from roof and road pavement areas. However, given the location of the accommodation camp remote from the Yarrangobilly River, and outside the 50 m buffer, impacts are expected to be minor. A series of controls will be implemented for the Main Works and Exploratory Woks camps to ensure negligible impacts to water quality and quantity; these include:

- Extraction from the Yarrangobilly River will be avoided for the Main Works. Where feasible, water will be sourced from Talbingo Reservoir.
- Where practical, the following source controls will be applied:
    - the storage and handling of chemicals that have potential to contaminate the stormwater system will be undertaken in bunded areas. Any liquid waste stream will be disposed to an appropriate facility;
    - pervious areas will be landscaped with endemic native vegetation;
    - runoff from roof areas will be captured in rainwater tanks. Captured water will be used for toilet flushing and other non-potable uses; and
    - runoff from road and other hardstand areas will be treated in vegetated swales.
- Runoff from accommodation camps will be managed by drainage systems that have a 20% AEP capacity. Overland flow paths will be provided as required.
- Runoff from accommodation camps will be treated in vegetated sedimentation or bioretention basins. The most appropriate control will be established at detailed design with consideration of topography, soil conditions and other relevant factors.

As a result of these controls being implemented, negligible impacts to water quantity or quality are expected to occur. A surface water monitoring program will be implemented to ensure run-off does not result in significant changes in water quality within the Yarrangobilly River.

There is potential for increased human activity associated with the camp to result in increased activity of predators, particularly feral Cats and Foxes, as these species are likely to be attracted to these areas for scavenging. To minimise the risk of increased predator activity, the controls outlined in Section vii will be implemented.

Following completion of all works, the Main Works accommodation camp will be decommissioned and rehabilitated. Rehabilitation will be undertaken in accordance with the rehabilitation strategy (SLR 2019). It is proposed to retain the Exploratory Works accommodation camp as a remote camping area for recreational use. During detailed design a masterplan will be developed for recreational areas in consultation with NPWS (SLR 2019).

b Lobs Hole substation

The construction of the substation at Lobs Hole was included in the application for Exploratory Works Modification 1. The impacts arising from the substation are not considered in this report.

The Lobs Hole substation will remain as permanent infrastructure following completion of construction activities.

c Main Yard

The Main Yard will be located within the Exploratory Works boundary. The impacts arising from the Main Yard are not considered in this report.

Following completion of construction activities for Snowy 2.0 Main Works, these areas will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019).

d Excavated rock stockpiles

Excavated material will be generated by Snowy 2.0 Main Works. The management of excavated material generation and disposal has been divided into two management systems based on the east (Tantangara) and west (Talbingo) sides of the Snowy 2.0 Main Works project area. Similarly, the predicted excavated material is categorised according to the main methods of tunnel excavation, TBM and drill and blast.

In the Talbingo side, excavated material will be stockpiled at several locations, including at a number of stockpile locations in Lobs Hole. Where feasible, excavated material will be re-used for purposes such as levelling of camps and construction pads, fill at various portal locations and for road works in the project area. There is also the possibility of NPWS using excavated material for road maintenance in KNP. Material to be re-used will be in a number of temporary stockpile locations around Lobs Hole.

During design, the location of the rock emplacement areas considered the biodiversity values of Lobs Hole. The rock emplacement areas have been sited in areas of low-quality vegetation. These areas have been partially cleared and consist largely of Low or Derived Grassland condition vegetation, areas subject to significant weed invasion and assigned to Poor condition class as well as generating vegetation assigned to the Other condition class.

The excavated rock stockpiles are generally located outside of the 50 m buffer zone to the Yarrangobilly River; thus, direct impacts to the River and Booroolong Frog habitat will be minimised. There is potential for indirect impacts as a result of run-off through mobilisation of sediment and rock, and run-off containing acid and metals. Designs controls and mitigation measures to avoid and minimise the risk of these impacts occurring are outlined below:

- Excavated material will be characterised and identified contaminated soils or PAF material will be managed separately.
- An erosion and sediment control plan (ESCP) will be prepared for each stockpile.

- All large temporary stockpiles will be removed during the construction phase of the project and the disturbed area will be rehabilitated in accordance with the relevant rehabilitation strategy.

Further detail is provided in the updated Water Management Report, provided as Appendix J to the PIR-RTS. These controls are expected to provide a high factor of safety, resulting in negligible risk of impacts to water quality in the Yarrangobilly River.

Following completion of construction activities for Snowy 2.0 Main Works, these areas will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019).

e Main Access Tunnel (MAT) and portal building

The MAT and portal building are almost entirely located with the Exploratory Works approval boundary. Only minor additional impacts will result from Snowy 2.0 Main Works. The impacts arising from the MAT are not considered in this report.

The MAT will remain as permanent infrastructure following completion of construction activities.

f Emergency Egress, Cable and Ventilation tunnel (ECVT) and Cableyard

The ECVT and Cableyard compound will comprise the tunnel portal, lay down areas, stockpile areas, fuel storage areas, concrete batching plants, workshops, water management facilities, access roads and parking. The compound will be constructed within steep terrain north of Wallace's Creek and east of the Yarrangobilly River, and will require substantial earthworks.

The ECVT and Cableyard have been sited to ensure sufficient slope to permit tunnelling. Several options for the portal were considered, including locations further east on Wallace's and Stable Creeks. These alternative locations, in steeper terrain, more remote from existing infrastructure and roads and in previously undisturbed areas would have resulted in much greater clearing of native vegetation and fauna habitat due to both the steepness of the terrain and the need to construct access roads through previously undisturbed areas. The current location of the ECVT and Cableyard has resulted in a significant reduction in clearing compared to these alternative options.

The majority of the disturbance footprint for the ECVT and Cableyard is to be located outside the 50 m buffer zone to the Yarrangobilly River and Wallace's Creek, minimising direct impacts to habitat for the Booroolong Frog. Some incursion into this buffer zone will occur around Wallace's Creek, for construction of an offtake point in the Yarrangobilly River near the MAT portal and for construction of the ECVT. Potential impacts to threatened species are limited to construction related run-off, as for roads, and potential for contamination of receiving waters due to accidental leaks and spills or fire water discharge. Erosion and sediment controls would be implemented as for the project (see Section vii).

A surface water monitoring program will be implemented to ensure run-off does not result in changes in water quality within the Yarrangobilly River. The surface water monitoring program will be developed post-approval as a part of the biodiversity and surface water management plans (see Section viig).

The ECVT and Cableyard will remain as permanent infrastructure following completion of construction activities. Adjacent areas no longer required will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019).

g Access roads, including Lobs Hole Ravine Road and Mines Trail

Road access is required from the Link Road to Lobs Hole via Lobs Hole Ravine Road. This road will provide the main access to construction areas in Lobs Hole and Talbingo Reservoir, and will require two-way access for construction vehicles, including access for the transportation of transformers to the MAT. Widening of the intersection at Link Road will also be required.

Since the initial identification of the Smoky Mouse along Lobs Hole Ravine Road (as well as a number of other threatened species), a number of options for the widening of Lobs Hole Ravine Road have been considered by the design team to avoid and minimise clearing in this area. These include:

- an alternative alignment along the upper sections of Lobs Hole Ravine Road, using Deadmans Firetrail, located to the west of Lobs Hole Ravine Road, allowing one-way movements in each direction. This would have limited upgrades to the upper sections of Lobs Hole Ravine Road;
- upgrade of the northern section of Lobs Hole Ravine Road, with construction access from the north (rather than from the south); and
- use of a barge, from Talbingo Reservoir dam wall to Lobs Hole, to bring in large and heavy construction equipment. This option limits the need to upgrade Lobs Hole Ravine Road to allow use by a truck and dog.

The species was recorded in vegetated areas adjacent to Deadmans Firetrail, negating the benefits of access though this alternative. Large-scale regional surveys undertaken for the Smoky Mouse (see Section 5.3.3c) recorded a significant regional population of the Smoky Mouse extending from Coppermine Firetrail in the north to Link Road in the south, and from Wallace's Creek Firetrail in the east to near Goat Ridge Road in the west. These regional surveys placed the original finding of Smoky Mouse on Lobs Hole Ravine Road in a broader regional context. This has negated much of the benefit of alternative options to widening of Lobs Hole Ravine Road.

The construction and widening of roads has the potential to result in fragmentation of habitat and loss of connectivity, particularly for threatened species. Lobs Hole Ravine Road provides the main access into Lobs Hole for construction traffic, with traffic volumes predicted to peak at just over 300 vehicle movement a day (SCT Consulting 2019).

Indirect impacts could occur due to fauna vehicle strike if vehicles are moving during the night-time when the Smoky Mouse and Eastern Pygmy-possum are active, or through the introduction of weeds or pathogens such as *P.cimmamomi*. Management measures to mitigate the potential impacts of fauna strike are currently being considered. These measures may include consideration of the following options:

- reduced speed limit along Lobs Hole Ravine Road and Marica Trail at night, when fauna species are likely to be most active;
- fencing of these roads to prevent access to the road surface;
- construction of fauna underpasses;
- a weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified along road verges; and
- wash-down stations will be constructed at a suitable location, with wash down for weeds as well as *P.cimmamomi*.

The adopted measures will be agreed in consultation with DPIE during detailed design.

Access roads, including Lobs Hole Ravine Road and Mines Trail, will remain as permanent infrastructure following completion of construction activities.

iii Marica

The Marica domain will support the following project elements:

- power station complex, pressure tunnels and draft tube and collector tunnels (subsurface)
- ventilation shaft;
- accommodation camp;
- surge shaft yard; and
- utilities and access roads.

Significant effort has been expended on minimising impacts in the Marica area.

a Power station complex, pressure tunnels and draft tube and collector tunnels (subsurface)

The power station complex will be located approximately 5 km west of the Snowy Mountains Highway and approximately 3.8 km west of Wallace's Creek Firetrail, deep underground. While the final location of the power station is to be the subject of further refinement as a result of the underground geotechnical drilling program (as described in the Exploratory Works EIS), the design and features of the power station are predominantly fixed.

Revisions to the design of the headrace tunnel and power station configuration and tunnel construction method have resulted in changes to the location of the power station complex, and associated surface infrastructure. Several options were considered during the feasibility assessment for the Snowy 2.0 project, including location of the power station complex in the plateau area, as well as location of the power station complex in the Marica area approximately 1.8 km further east.

The original plateau option for the power station complex included a launch site for a mid-shaft TBM, mid-race adit, ventilation shaft, surge shaft camp location and associated ancillary infrastructure. This design would have resulted in significant disturbance of sensitive habitats in the plateau area. Biodiversity surveys undertaken for Snowy 2.0 identified sub-alpine environment, particularly sub-alpine grassland and Alpine bogs and fens, as some of the most sensitive and restricted habitats in the project area, supporting a number of unique species including species endemic to these areas. The communication of this information to the project team has resulted in review of the location of the power station complex, and significant consideration of the impacts to these unique environments when weighing up options for construction. The choice to move the power station complex further west, to the Marica area, resulted in substantial and extremely significant reductions in impacts to biodiversity values.

The original design for the power station complex in the Marica area had the power station complex located approximately 1.8 km to the east of the current proposed location. This design included a launch site for a mid-shaft TBM, mid-race adit, ventilation shaft, surge shaft camp location and associated ancillary infrastructure. The footprint proposed for this option was much larger than the option currently being considered and would have resulted in much more significant clearing of native vegetation and fauna habitat. The proposal to shift the power station west, allowing use of a single TBM to construct an inclined (rather than vertical) shaft, has resulted in the ability to remove certain elements of the project from this area. This includes the mid-race adit and access for the TBM, as well as associated larger construction laydown area. The revised design significantly reduces the clearing required to construct in these areas.

b Ventilation shaft, surge shaft yard, accommodation camp and stockpile areas

The ventilation shaft, surge shaft yard and accommodation camp will be located in the Marica area immediately above and adjacent to the power station complex. As outlined above, a number of alternative options of the location of the power station complex would have resulted in more substantial disturbance in this area. Four key stockpile areas will also be constructed.

The ventilation shaft will be located largely within the disturbance area for a geotechnical investigation area approved under Exploratory Works Modification 1. Although some additional disturbance will be required to construct the ventilation shaft, siting of this infrastructure in disturbed areas will minimise impacts.

The Marica area provides habitat for the Smoky Mouse. Large-scale regional surveys undertaken for the Smoky Mouse (see Section 5.3.3c) recorded a significant regional population of the Smoky Mouse extending from Coppermine Firetrail in the north to Link Road in the south, and from Wallace's Creek Firetrail in the east to near Goat Ridge Road in the west. These regional surveys place the finding of Smoky Mouse in the Marica area in a broader regional context. Habitat of the species is ubiquitous in this area, and there is very little undisturbed land. Opportunities to avoid impacts to habitat are limited.

There is potential for increased human activity associated with the camp to result in increased activity of predators, particularly feral Cats and Foxes. To minimise the risk of increased predator activity, the controls outlined in Section vii will be implemented.

Following completion of construction activities for Snowy 2.0 Main Works the accommodation camp and stockpile areas will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019). The ventilation shaft and surge shaft will remain as permanent infrastructure following completion of construction activities.

c Utilities and access roads

A new access road will be constructed from the Snowy Mountains Highway to Lobs Hole, via the Marica area (Marica Trail). The main purpose of this road will be to allow direct access to construction areas for project-related traffic. However, extension of this road from the Marica area to Lobs Hole will permit direct access for light vehicles between Marica and Lobs Hole.

Consideration was given to utilising the Marica Trail between Marica and Lobs Hole for transportation of excavated material using truck and dog trailers. This would have required construction of a heavy haul road permitting two-wat traffic, resulting in substantial impacts given the steep terrain encountered. The current design for the western section of the Marica Trail is for light vehicle traffic only travelling in a single direction at any one time. As such, the road surface is limited to a width of approximately 4 m. This revision has resulted in a reduction in impacts in this area.

Indirect impacts could occur due to fauna vehicle strike if vehicles are moving during the night time when the Smoky Mouse and Eastern Pygmy-possum are active, or through the introduction of weeds or pathogens such as *P.cimmamomi*. Management measures to mitigate the potential impacts of fauna strike are currently being considered. These measures may include consideration of the following options:

- reduced speed limit along Lobs Hole Ravine Road and Marica Trail at night, when fauna species are likely to be most active;
- fencing of these roads to prevent access to the road surface;
- construction of fauna underpasses;
- a weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified along road verges; and
- wash-down stations will be constructed at a suitable location, with wash down for weeds as well as *P.cimmamomi*.

The adopted measures will be agreed in consultation with DPIE during detailed design.

Access roads in the Marica area will remain as permanent infrastructure following completion of construction activities.

iv Plateau

The plateau area will support the following project elements:

- headrace tunnel (subsurface);
- northern communications cable; and
- southern communications cable.

As outlined above, the original designs for the project included construction of the power station complex in the plateau area, including a number of ancillary facilities and impacts. The plateau area supports some of the most sensitive biodiversity values identified as a part of surveys for Snowy 2.0, including sub-alpine grasslands, Alpine bogs and fens and associated threatened flora and fauna species. The identification of these values to the project team resulted in a strong focus on trying to relocate project elements wherever possible, to avoid impacts to these significant values. This has resulted in a significant reduction in impacts, with only the communication cables to be located in this area. All other project elements have been removed and associated impacts will be avoided.

a Headrace tunnel

The headrace tunnel links the intake at Tantangara Reservoir with the power station complex. For most of this tunnel, impacts to surface features are unlikely to occur. However, groundwater drawdown of up to 50 m has potential to impact a number of GDEs identified in Section 6.

EMM has received from FGJV and Snowy Hydro refined information relating to tunnel and lining parameters regarding ranges of inflows likely for the power waterway, based on the tunnel lining design and inflow mitigation measures to be employed in the excavation and construction. This information has been used to model groundwater drawdown (see EMM 2020a and 2020b, appended to the PIR-RTS). This has resulted in significant reduction in groundwater drawdown and associated surface impacts.

b Communications cable

The routes for the communication cables have also been selected to avoid impacts. The two routes will both follow existing management tracks, apart from a small section on the southern route.

Initial route selection considered a number of alternative routes, including siting of the southern communications route adjacent to the Snowy Mountains Highway in uncleared land. This option would have resulted in clearing of native vegetation adjacent to the Highway, including habitat for a number of threatened species. This option would also have resulted in trenching or underboring across a number of creeks and waterways providing habitat for species such as the Alpine Tree Frog.

The southern communications cable follows Nungar Creek Firetrail from the Snowy Mountains Highway, before heading south on Alpine Creek Firetrail. At the southern end of Boggy Plain this communication cable route heads east under Boggy Plain. This section of the route was originally located further north, potentially impacting on Alpine bogs and fens, sub-alpine grasslands and associated habitat for threatened species. The proposed route was relocated further south to avoid these sensitive environments. This section may be underbored to Wares Yards to minimise surface impacts (subject to verification); however, impacts from excavation have been considered in case underboring is not feasible. From here the route will head east on the access road to Wares Yards to Tantangara Road where it will be co-located in the proposed road footprint.

The northern communications cable follows Gooandra Firetrail from the Snowy Mountains Highway. At the end of Gooandra Firetrail the communications cable route will follow a number of access tracks created for the existing Snowy 2.0 geotechnical program, providing a route from Gooandra Firetrail across Tantangara Creek to Bullocks Hill Firetrail. The communications cable follows Bullocks Hill Firetrail to Nungar Creek Firetrail and then to Tantangara Dam Firetrail. At Nungar Creek the Tantangara Dam Firetrail has become overgrown, and the proposed communications cable route will be underbored below Nungar Creek to the Tantagara Reservoir area (see below).

The communications cables will be installed entirely within the existing track surface, with cables buried at a depth that will allow ongoing maintenance of these firetrails. Impacts beyond the existing road surface will be minimised.

Following installation, the communications cable routes will be rehabilitated, in line with the rehabilitation strategy (SLR 2019).

v Tantangara Reservoir

Like Lobs Hole, Tantangara Reservoir and surrounding areas are a key focus of activity for the project and will be used primarily for construction. The following project elements will be located in this area:

- intake gate structures and building;
- water intake;
- portal and construction compound;
- barge launch area;
- Tantangara laydown area;
- accommodation camp;
- reservoir emplacement area;
- access roads and ancillary facilities for emplacement activities;
- utilities and access roads (Tantangara Road).

The area surrounding Tantangara Reservoir is significantly disturbed due to activities from the original Snowy Scheme, as well as recreational activities and impacts from weeds and feral Horse populations. This provided an opportunity for the project to maximise use of disturbed land for project purposes.

a Intake gate structures and building, water intake, portal and construction compound and barge launch area

The intake gate structures and buildings, water intake, portal construction compound and barge launch area are located on the western shore of Tantangara Reservoir. Their position takes advantage of a prominent headland jutting out into Tantangara Reservoir. This location provides excellent siting for the intake structure due to bathymetric conditions. It also provides a good location for the TBM access portal. Several alternatives were investigated for the location of the intake and TBM access portal; however, all were in the vicinity of the current location. As outlined above, the Tantangara area has been impacted by construction activities for the original Snowy project, resulting in degradation of land. Ongoing impacts are occurring as a result of recreational activities and ongoing issues with weeds such as the Ox-eye Daisy infestation in Kelly's Plain and feral Horse populations.

A large portion of the intake gate structures and buildings, water intake, portal construction compound and barge launch area are located within the existing FSL of Tantangara Reservoir. These areas are degraded due to fluctuating water levels in Tantangara Reservoir, with areas within FSL having lower vegetation integrity scores and lower species when compared to areas outside FSL (EMM 2019f).

The intake gate structures and buildings, water intake, portal construction compound and barge launch area will remain as permanent infrastructure following completion of construction activities.

b Tantangara laydown area

A laydown area will be constructed adjacent to Kelly's Plain, on the southern shore of Tantangara Reservoir. The laydown area will provide construction support facilities, such as concrete batching plants, water and wastewater treatment facilities, material storage, material testing and laboratory facilities, lay down areas, stockpiles and hardstand areas. Construction will require the areas to be cleared of vegetation and earthworks involving cut and fill to ensure a level site area.

The laydown area requires a large, relatively flat area for construction. Such an area is limited at Tantangara. As such, there is limited opportunities to avoid impacts.

The Tantangara laydown area will have direct and indirect impacts on Clover Glycine, with one plant located within the footprint and one immediately adjacent (~25 m). It is recommended that an environmental protection zone be established on the eastern boundary of the laydown area, and the individual plant located outside the direct impact footprint be monitored to establish whether indirect impacts result in mortality of this plant. This will also provide an indication of how this species responds to disturbance.

Kelly's Plain Creek and Tantangara Reservoir provide habitat for the Alpine Tree Frog. The species was recorded breeding between MOL and FSL within the Reservoir (Photograph 7.1) and is likely to utilise adjacent areas for refuge and foraging. Careful pre-clearing surveys will be required to ensure impacts from clearing are minimised. Ongoing controls will be required to ensure run-off from the laydown areas does not result in indirect impacts to water quality of Kelly's Plain Creek and Tantangara Reservoir. Controls include:

- All aggregate stockpiles will be bunded to minimise stormwater ingress. Runoff from these stockpiles will be treated in sediment wedge pits or other sediment controls to remove all coarse material. Sediment wedge pits will overflow into the drainage system.
- Runoff from construction pads will be treated in vegetated sedimentation basins.
- The basins will be designed to discharge when the stormwater treatment volume is full. Discharge will be via a low flow pipe that can be manually shut-off when containment is required.

Following completion of construction activities for Snowy 2.0 Main Works, the Tantangara laydown area will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019).



Photograph 7.1 Alpine Tree Frog in breeding amplexus, Tantangara Reservoir

c Accommodation camp

The Tantangara accommodation camp will be constructed west of Tantangara Reservoir and north of Kelly's Plain. A number of potential camp locations were considered, including locations remote from Tantangara Reservoir. These remote options were located in areas supporting sub-alpine grasslands and associated threatened species and would likely have resulted in impacts to highly sensitive environments. An alternative camp location was considered at Tantangara Reservoir, located to the west of the current camp location. This location was deemed high risk for bushfire impacts and was rejected.

The Tantangara camp has potential to result in indirect impacts to adjacent areas, particularly sensitive environments in Kelly's Plain, including habitat of the Alpine Tree Frog Alpine bogs and fens. Controls, similar to that required for the camps at Lobs Hole, will be employed. These include:

- Extraction from the Yarrangobilly River will be avoided for the Main Works. Where feasible, water will be sourced from Talbingo Reservoir.
- Where practical, the following source controls will be applied:

- the storage and handling of chemicals that have potential to contaminate the stormwater system will be undertaken in bunded areas. Any liquid waste stream will be disposed to an appropriate facility;

- pervious areas will be landscaped with endemic native vegetation;

- runoff from roof areas will be captured in rainwater tanks. Captured water will be used for toilet flushing and other non-potable uses; and

- runoff from road and other hardstand areas will be treated in vegetated swales.

- Runoff from accommodation camps will be managed by drainage systems that have a 20% AEP capacity. Overland flow paths will be provided as required.

- Runoff from accommodation camps will be treated in vegetated sedimentation or bioretention basins. The most appropriate control will be established at detailed design with consideration of topography, soil conditions and other relevant factors.

As a result of these controls being implemented, negligible impacts to water quantity or quality are expected to occur. A surface water monitoring program will be implemented to ensure run-off does not result in significant changes in water quality within Kelly's Plain Creek or Tantangara Reservoir.

There is potential for increased human activity associated with the camp to result in increased activity of predators, particularly feral Cats and Foxes. To minimise the risk of increased predator activity, the controls outlined in Section vii will be implemented.

It is proposed to retain the Tantangara accommodation camp as a remote camping area for recreational use. During detailed design a masterplan will be developed for recreational areas in consultation with NPWS (SLR 2019).

d Excavated rock management

Since the exhibition of the Main Works EIS, DPIE has requested that Snowy Hydro consider alternative options for management of excavated rock.

As a result, alternative excavated spoil management options compared to that articulated in the Main Works EIS and the updated design and methodology, are provided in Section 3.2.2 of the PIR-RTS.

e Utilities and access roads (Tantangara Road)

Road access is required from the Snowy Mountains Highway to Tantangara Reservoir. This road will provide the main access to construction area at Tantangara and will require two-way access for construction vehicles. Improvements to the intersection of Tantangara Road and Snowy Mountains Highway, including widening of the intersection, will be undertaken to facilitate access for construction traffic. Utilities for works undertaken at Tantangara will be co-located within the disturbance area.

The alignment for the access road will follow the existing Tantangara Road alignment. Tantangara Road currently provides two-way traffic, and as such only minimal additional disturbance will be required to upgrade this road. Given this, limited consideration was given to alternative options.

Indirect impacts could occur due to fauna vehicle strike if vehicles are moving during the night time when fauna species active, or through the introduction of weeds, such as Ox-eye Daisy, or pathogens, such as *P.cimmamomi*. To prevent this occurring the following controls will be implemented:

- a 40 km/h speed limit will be imposed on Tantangara Road at night when fauna species are likely to be most active;
- a weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified along road verges; and
- wash-down stations will be constructed at a suitable location, with wash down for weeds as well as *P.cimmamomi*. An additional wash-down station will be established at a suitable location along Tantangara Road for vehicles exiting the Kelly's Plain area to ensure suitable wash down to Ox-eye Daisy.

The current design for Tantangara Road includes a disturbance area that is much broader than is likely required to construct the project. It currently represents the maximum extent where construction works will be carried out. The disturbance area will be minimised as much as possible during detailed design.

Access roads, including Tantangara Road, will remain as permanent infrastructure following completion of construction activities.

vi Rock Forest

Rock Forest will consist of a logistics yard and access. The logistics yard will provide a laydown area, as well as a stockpile and staging area for materials and heavy vehicles and an excavated rock emplacement area. This is a private landholding under lease to Snowy Hydro.

Multiple locations have been considered for the siting of these handling facilities, including areas at the top of Lobs Hole Ravine Road, start of Tantangara Road and other areas within KNP. The siting of this infrastructure on private land, outside of KNP, that has been partially cleared will result in a reduction of impacts to native vegetation and threatened species habitat, as well as a reduction in impacts within KNP. Alternative locations for siting of infrastructure within Rock Forest were also considered, including a location to the south-east. The current location for siting of the logistics yard has taken into consideration advice on biodiversity and other values and minimises impacts to these values.

The current design for Rock Forest includes a disturbance area that is much larger than is required to support the logistics yard. It currently represents the maximum extent where construction works will be carried out and allows for placement of additional facilities in this area. The disturbance area will be minimised as much as possible during detailed design.

Following completion of construction activities for Snowy 2.0 Main Works, these areas will be landformed, reshaped and rehabilitated, in line with the rehabilitation strategy (SLR 2019).

vii All project elements

Several measures to avoid, minimise and mitigate impacts are relevant to all project elements.

a Detailed design

The detailed design for the project is ongoing. In recognition of the biodiversity values of KNP, and the unique native species and communities that it supports, the disturbance area will be minimised as much as possible during detailed design.

Native vegetation and fauna habitat will be retained wherever possible.

b Retention of vegetation, pre-clearing and clearing works

Site preparation works will require clearing of native vegetation and fauna habitat. These works have the potential to impact on fauna species, as well as have inadvertent impacts on retained vegetation and fauna habitat. To prevent this occurring, and minimise impacts to fauna species the following controls will be implemented:

- native vegetation and fauna habitat will be retained wherever possible, with clearing minimised to the extent required to construct and operate the project;
- exclusion zones around all areas of retained vegetation and fauna habitat will be set up. These areas will be fenced using appropriate fencing materials and designated and signed as 'No-go Zones' or 'Environmentally Sensitive Areas';
- where feasible, and required to protect significant vegetation, tree protection zones (TPZs) will be set up around all trees retained within and immediately adjacent to the disturbance footprint. If required, TPZs will be established in accordance with the Australian Standard AS 4970-2009 Protection of trees on development sites (Standards Australia Committee 2009);
- prior to undertaking vegetation clearing, pre-clearance inspections will be undertaken by appropriately qualified ecologists. The pre-clearing inspections will:
    - confirm the biodiversity values identified in this report;
    - check for the evidence of presence of flora and fauna species;
    - flag key habitat features, including (but not limited to) nests, hollow bearing trees or large logs;
    - identify nearby habitat suitable for the release of any that may be encountered during clearing works; and
    - contact a wildlife carer or veterinarian to inform them of vegetation clearing works upcoming.

Vegetation clearing works are to follow a two-staged process, as outlined below:

- Stage 1 will include the removal of all non-habitat vegetation (eg shrubs, regrowth, ground cover and non-habitat trees). The groundcover will be scalped to topsoil where appropriate. A minimum of 24 hours will be allowed between Stage 1 and Stage 2.
- Stage 2 will include the removal of all habitat vegetation:
    - nests and on-ground logs will be carefully inspected by an ecologist. Logs should be carefully rolled and inspection beneath the log undertaken;
    - habitat trees (trees with hollows or nests) will be carefully lowered to the ground with minimal impact and nests and hollows inspected by the ecologist; and
    - any fauna species are to be relocated to habitat identified during the pre-clearing process or, if injured, transported to a veterinarian or wildlife carer.

Native vegetation cleared should be mulched and stockpiled for re-use during rehabilitation works. Large hollow-bearing trees and limbs should be retained as hollows for placement into rehabilitated areas or retained native vegetation.

Where works are to be undertaken within the 50 m buffer zone along the Yarrangobilly River or around areas supporting the Alpine Tree Frog, all vegetation, rocks, logs and other shelter are to be carefully inspected for frog species:

- where works are undertaken during the active period for the species (October to March) any frogs found should be relocated to the nearest area of retained riparian habitat; or
- where works are undertaken outside of the active period outlined above frogs should be taken into care. Agreement with an appropriately qualified and licensed carer will be required.

These measures will be incorporated into a Construction Environmental Management Plan (CEMP).

c Weed control

Indirect impacts could occur due to the introduction and/or spread of weeds, such as African Lovegrass or Ox-eye Daisy, or pathogens such as *P.cimmamomi*. African Lovegrass is known to occur in the segment factory located in Cooma, with potential for transportation of concrete segments to line the tunnel into KNP resulting in the spread of this weed into the Park. Ox-eye Daisy is known to occur in the Kelly's Plain area near Tantangara Reservoir, and movement of vehicle sand machinery from this area into other areas has potential to result in spread of this species into other areas. These impacts could be significant for a number of flora and fauna species if they occur.

There is also potential for the spread of weeds already established in KNP to occur during construction activities, particularly clearing works, if weeds are not managed appropriately. Lobs Hole, given historical land use, is a key area for many weeds species, along with Kelly's Plain.

To prevent this occurring the following controls will be implemented:

- undertaking of weed control in key areas prior to construction works, to minimize the impacts of weeds during construction and to minimise the requirements for disposal and management of weeds on-site;
- appropriate management and disposal of weed species during clearing works, in accordance with the biodiversity management plan;
- active and intensive weed control will be undertaken within 50 m of the disturbance footprint, in areas where significant weeds are known to occur (eg Tantangara Reservoir) to reduce the cover of weeds adjacent to the construction activities, preventing the spread of weeds into other areas;
- wash-down stations to be constructed at a suitable location, with wash down for weeds as well as *P.cimmamomi*. An additional wash-down station will be established at a suitable location along Tantangara Road for vehicles exiting the Kelly's Plain area to ensure suitable wash down to Ox-eye Daisy;
- a weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified in the project area; and
- revegetation of cleared areas as quickly as possible following construction works in an area.

d Predator control

There is potential for increased human activity to result in increased activity of predators, particularly feral Cats and Foxes, which will increase pressure on native fauna. This has the potential to result in significant impacts to some threatened species, particularly species such as the Smoky Mouse.

To minimise the risk of increased predator activity, the following controls will be implemented across the project:

- waste will be stored appropriately in inaccessible bins and disposed off-site. No waste will be left outside in open areas accessible to feral animals;
- a monitoring program will be implemented using remote cameras to monitor feral animal activity; and
- a predator control program will be implemented, in conjunction with NPWS, to control feral animals.

Whilst these controls will be implemented broadly across the project area, key areas of focus will be where key activity is occurring, such as Lobs Hole, Marica, Tantangara Reservoir and Rock Forest. It is considered that these controls will avoid and minimise impacts from the project.

e Sediment control

Management of sedimentation will be a key measure to minimise and mitigate impacts. Road upgrades are expected to mobilise fine sediments, with potential for these to enter watercourses. Management measures will be put in place to control fine sediments. Following consultation with BCD, it was determined that the mobilisation of large amounts of coarse sediments into key habitat is the key impacts to frog species such as the Booroolong Frog that may arise during Snowy 2.0 Main Works. The key period for mobilisation of large amounts of coarse sediment will be during initial earthworks for the road upgrades. Key management measures to be implemented to manage this risk include:

- sediment controls will be put in place within the disturbance footprint, and shall be consistent with relevant standards, including:
  - Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom 2004);
  - Managing Urban Stormwater: Soils and Construction – Volume 2C – Unsealed roads (DECC 2008b); and
  - Managing Urban Stormwater: Soils and Construction – Volume 2D – Main road construction (DECC 2008c).
- an ESCP will be prepared for each construction zone;
- where practical, clean water will be diverted around, rather than through, construction areas;
- consider local soil characteristics, topography and environmental constraints and proposed construction methods and identify risks associated with proposed activities;
- apply clean water management controls as per:
  - WM 1.1 for clean water management during surface construction disturbance;
  - WM 2.1 for temporary watercourse diversions around temporary surface infrastructure; and
  - WM 3.1 for permanent watercourse diversions.
- all temporary drainage and sediment control measures will be designed to have non-erosive hydraulic capacity and be structurally sound for the design events specified in Table 6-1 in Managing Urban Stormwater: Soils and construction – Volume 2D – Main road construction (DECC 2008c);

- consider all practical erosion control and rehabilitation methods and apply the most appropriate method;
- consider all practical methods to stabilise small temporary stockpiles and apply the most appropriate method. Apply management controls as per WM 2.5 for the management of large temporary stockpiles;
- all temporary drainage, sediment control measures and spillways will be designed to have non-erosive hydraulic capacity and be structurally sound for the design events specified in Table 6-1 in Managing Urban Stormwater: Soils and construction – Volume 2D – Main road construction (DECC 2008c);
- where practical, all runoff from disturbance areas will be reticulated to sedimentation basins designed to capture the 85th percentile 5-day rainfall event. Captured water will be either harvested and used for dust suppression or treated and discharged following each rainfall event. Only water treatment chemicals that have low eco-toxicological risks will be used. Water will be treated to have similar water quality characteristics to receiving water quality in terms of pH and turbidity;
- apply enhanced erosion controls where significant risks are identified;
- include measures to manage the storage and handling of hydrocarbons and other chemicals that have potential to pollute receiving waters;
- include measures to manage accidental leaks and spills; and
- be progressively amended as required during construction.

More natural erosion controls incorporating organic materials and contour shaping shall be used in preference to engineered materials and controls. This is consistent with practices currently being used elsewhere within KNP.

Controls will also be put in place during operation of roads, following construction. Management principles are outlined below:

- Any existing access tracks that will no longer be required following the construction of the new access roads will be rehabilitated.
- All cut and fill batters will be stabilised as soon as practical following construction.
- Roads surfaces will be constructed and maintained with aggregate material to reduce soil loss rates and water quality risks. The use of material that presents elevated water quality risks relative to other material available for road construction and maintenance will be avoided.
- Where practical access roads will grade to table drains that are designed and constructed to have non-erosive hydraulic capacity for the 10% AEP event. Transverse (or cross drainage) will be constructed to have the following non-erosive hydraulic capacities:
- Primary roads – 1% AEP event;
- Maintenance roads – 2% AEP event; and
- Temporary access roads – 10% AEP event.
- Sediment traps or filters will be installed and maintained at all discharge locations to reduce coarse sediment in discharge.

If batters are at low risk of erosion, they will be left to regenerate naturally with the assistance of replacement organic matter where required. Batter stabilisation works will be undertaken where required, along with revegetation of cleared areas, construction of drainage swales and sedimentation control planting.

f Noise, vibration and lighting

Impacts from noise and vibration are expected to be limited to the construction period and will thus be transient. Noise levels of over 65 dB may be experience immediately adjacent to construction areas. Noise levels drop to below 60 dB (normal conversation) outside of these areas. Some impacts to fauna species may result but are expected to be limited. No impact mitigation measures are required.

Light spill from night works has the potential to reduce the suitability of retained habitat for some fauna species. To minimise this directional lighting will be used, minimising light spill as much as possible.

g Monitoring and adaptive management

A number of monitoring programs will be implemented to ensure Snowy 2.0 Main Works does not result in impacts greater than predicted in the EIS. While monitoring programs will be developed post-approval, as a part of the development of management plans of the project, the following monitoring is recommended:

- key threatened species, including:
  - Clover Glycine;
  - Alpine She-oak Skink;
  - Booroolong Frog;
  - Alpine Tree Frog;
  - Smoky Mouse;
- weed and pathogen monitoring;
- feral species monitoring;
- water quality monitoring in the Yarrangobilly River, Tantangara Reservoir and key watercourses providing habitat for the Alpine Tree Frog;
- monitoring of groundwater and GDEs, including:
  - monitoring of regional groundwater systems through a network of groundwater bores;
  - monitoring of groundwater in Alpine bogs and fens through installation of drivepoint piezometers; and
  - monitoring of vegetation and threatened species in Alpine bogs and fens, if changes in groundwater occurs.

The development of these management plans and monitoring programs will include triggers for adaptive management measures.

7.2.2 Key refinements since public exhibition

Snowy Hydro and its appointed EPC contractor, Future Generation Joint Venture (FGJV), continue to refine and improve the design for Snowy 2.0 as information is obtained from the geotechnical investigation program and Exploratory Works. In addition, matters raised by agencies and stakeholders during public exhibition of the Main Works EIS has necessitated refinements to key elements of the project. These are described in more detail in Section 3.2 of the Main Works response to submissions (PIR-RTS, EMM 2019f), however include:

- Considerable refinement of the disturbance area, which has reduced the overall disturbance area by 53% and therefore improved the project outcomes compared to previously predicted impacts in the EIS. As a consequence of the detailed design not yet being complete (as is normal for a major project at this stage of the process), the new concept of a larger "construction envelope" has been introduced and used in this report. The construction envelope represents the limits of where disturbance may occur during construction of the Main Works. The disturbance area is a smaller indicative area of impact inside the construction envelope. As detailed design continues, final siting of the infrastructure (ie the disturbance area) can move within the assessed construction envelope subject to recommended environmental management measures and provided it does not exceed the limits defined by the construction envelope.

- Reduced traffic volumes, which has improved the performance of the local and regional road network compared to previously predicted impacts.

- Refinement of the groundwater model to better represent the inflow mitigation that will occur from the segmental concrete lining of the power waterway. The refinement of the model to reflect this inflow restriction has reduced the quantity of groundwater predicted to flow into the excavated headrace tunnel across the plateau. This has reduced the predicted water table drawdown extents and interactions with bogs and fens, reduced streamflow impacts and reduced the quantity of process water to be discharged to Tantangara Reservoir.

Since the exhibition of the Main Works EIS, Snowy Hydro has considered alternative options for management of excavated rock. As a result, excavated spoil management options are proposed at Ravine Bay, GF01, Lobs Hole, Tantangara Peninsula and Rock Forest. A detailed description of the proposed excavated rock management is provided in Section 3.2.2 of the Main Works PIR-RTS (EMM 2019f).

The proposed excavated rock management locations have been selected to avoid impacts. Two initial options were investigated adjacent to Tantangara Reservoir, with one potential location directly impacting on almost 100 ha of native vegetation. These options would have resulted in clearing of native vegetation adjacent to the reservoir, including habitat for a number of threatened species including Clover Glycine, Mauve-burr Daisy and Kiandra Leek Orchid. These initial options were discounted on this basis.

The excavated rock emplacement at GF01 and Ravine Bay are largely avoiding direct impacts to threatened species. C*aladenia montana* was recorded adjacent to GF01 and will not be directly impacted. The excavated rock emplacement at Lobs Hole and Rock Forest are within the Main Works disturbance area which has been previously assessed in the revised BDAR (EMM 2020a).

Targeted species surveys have not been completed within Tantangara Peninsula. However, given the extensive surveys conducted across the survey area including adjacent vegetation, species such as the Alpine She-oak Skink, Broad-toothed Rat and Alpine Tree Frog have been assumed present based on associated PCTs and breeding habitat within Tantangara Reservoir for the Alpine Tree Frog.

The reduction of the disturbance area in Rock Forest has significantly reduced impacts on native vegetation and threatened species. The reduction has avoided direct impacts on a Gang-gang Cockatoo hollow and threatened flora species including Mauve Burr-daisy and EPBC listed Hoary Sunray.

The additional direct and indirect impacts associated with these additional areas have been assessed accordingly in this addendum. Credits generated from the revised disturbance area are included in Annexure H.

7.2.3 Operation of Snowy 2.0

Following completion of construction, impacts arising from the operation of Snowy 2.0 will be limited to key areas of ongoing operation. Potential operational impacts are expected to include:

- indirect impacts from noise, vibration and lighting;
- indirect impacts to retained habitat due to weeds and pathogens;
- indirect impacts to fauna species as a result of predatory and pest animal species;
- prescribed impacts to threatened species and communities due to groundwater drawdown; and
- prescribed impacts to fauna species due to vehicle strike.

The monitoring program outlined above will be used to determine whether these impacts continue to occur post-construction and the need and scope of any management required.

7.2.4 Summary of measures to avoid, minimise and mitigate impacts

A summary of impacts arising from the Main Works, and measures outlined above to avoid, minimise and mitigate impacts, is provided in Table 7.1.

Table 7.1 Summary of impacts, and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Removal of native vegetation and threatened species habitat. **Type:** direct impact. **Frequency:** once, during construction. **Intensity:** removal of 424.25 ha of native vegetation, including 1.03 ha of TECs, 482.76 ha of habitat and 40 individuals for 17 threatened species. **Duration:** initial stages of construction. **Consequence:** permanent removal of native vegetation and threatened species habitat.	• Investigation of alternative locations for key infrastructure during design works. • Siting of stockpiles for excavated materials in low-quality vegetation where possible. • Siting of the Exploratory Works camp in partially cleared areas. • Siting of the ECVT to minimise clearing due to terrain and access roads. • Avoidance of on-land emplacement options, which would have resulted in clearing of large areas of native vegetation. • Emplacement of excavated materials in Talbingo and Tantangara Reservoirs, minimising impacts to native vegetation and threatened species habitat. • Removal of out of park emplacement, negating the requirement for construction of the Tantangara East Road and associated impacts to native vegetation and threatened species habitat, particularly Clover Glycine. • Removal of plateau power station complex option, reducing impacts to sensitive habitats in the plateau area. • Change in power station complex location in the Marica area, including construction method, resulting in removal of elements and reduction in impacts. • Location of the Marica ventilation shaft in cleared areas. • Investigation of alternative locations for the communications cable routes, including removal of the southern	• Siting of infrastructure in areas subject to existing disturbance. • Siting of Tantangara intake on a disturbed headland and within FSL. • Siting of infrastructure at Rock Forest in partially cleared areas. • Use of the Marica to Lobs Hole road (Marica Trail) for light vehicle only, rather than construction traffic, resulting in a reduction in clearing in this area. • Re-use of excavated materials wherever possible, minimising the extent of excavated materials to be stockpiled and disposed of, minimising clearing of native vegetation. • Use of the existing road network to minimise requirement for removal of native vegetation. • Use of the Marica to Lobs Hole road (Marica Trail) for light vehicle only, rather than construction traffic, resulting in a reduction in clearing in this area. • Use of the existing road network to minimise requirement for removal of native vegetation. • Use of the existing firetrail network for installation of communications cables, to minimise requirement for removal of native vegetation. • Underboring, rather than open trenching, of the southern communication route beneath Boggy Plain. • Detailed design of the project, resulting in further minimisation of impacts to native vegetation. • Minimisation of clearing during construction, wherever possible.	• Establishment of exclusion zones around retained vegetation, including fencing and signage. • Targeted surveys for Alpine Tree Frog to be completed prior to construction within sections of the Plateau and Peninsula. • Targeted surveys for flora species to be completed within sections of the Plateau, the Peninsula and Ravine Bay prior to construction. • Pre-clearing surveys conducted prior to clearing, including translocation of fauna into areas of retained vegetation. • Vegetation clearing undertaken in accordance with the two-stage process. • Mulching and stockpiling of cleared native vegetation for use during rehabilitation. • Retention of hollows logs and limbs for placement within retained vegetation and reuse during rehabilitation. • Rehabilitation of approximately 60% of the total area impacted. • Landforming, reshaping and rehabilitation of all emplacement areas. • Completion of rehabilitation in accordance with the rehabilitation strategy (SLR 2019). • Regional surveys for the Smoky Mouse to demonstrate presence of a significant regional population. • Collection of native seeds and alpine sod for propagation. • Establishment of native plant nursery and propagation of endemic native species for use in rehabilitation works.

Table 7.1 Summary of impacts, and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
	communication route adjacent to the Snowy Mountains Highway. • Moving of the southern communications route south at Boggy Plain to avoid sensitive Alpine bogs and fens and sub-alpine grassland habitat. • Installation of the communications cable in existing firetrails. • Development of a 50 m buffer zone along the Yarrangobilly River and avoidance of works within this buffer. • Detailed design of the project, resulting in further avoidance of impacts to native vegetation. • Detailed design of excavated spoil management options, resulting in avoidance of key threatened flora habitat adjacent to Tantangara Reservoir.	• Detailed design refinement within Rock Forest, resulting in further minimisation of impacts to native vegetation and threatened species habitat.	• Design and implementation of a threatened species monitoring program to ensure impacts arising from clearing are within prediction.
Increase in weeds and pathogens. **Type:** indirect impact. **Frequency:** ongoing during construction and operation. **Intensity:** the reduction in habitat quality for 585.81 ha of native vegetation, including 4.41 ha of TECs, 689.06 ha of habitat and 5 individuals for 17 threatened species **Duration:** ongoing through construction phase. **Consequence:** potential to impact on threatened species habitat, resulting in decline in habitat quality.	• Not required	• Weed control prior to construction works being undertaken, where possible. • Appropriate disposal and management of weeds during clearing works; • Active weed control within 50 m of key infrastructure in areas where significant weeds occur, such as Tantangara Reservoir. • Construction of wash-down stations at a suitable location. • Washdown required for weeds as well as *P.cimmamomi*. • Re-vegetation of cleared areas as quickly as possible following construction. • Collection of native seed and alpine sod for propagation.	• Design and implementation of a weed and pathogen monitoring program. • Design and implementation of a threatened species monitoring program to ensure impacts arising from clearing are within prediction.

Table 7.1 Summary of impacts, and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Increase in predatory and pest species. **Type:** indirect impact. **Frequency:** ongoing during construction and operation. **Intensity:** significant increases in the number of predators and pest species. **Duration:** construction and operation. **Consequence:** increased predation and competition and a consequent reduction in populations.	• Not applicable.	• Waste to be stored appropriately in inaccessible bins and disposed off-site. • No waste will be left outside in open areas accessible to feral animals.	• Design and implementation of a pest and predator monitoring program to ensure Main Works does not result in a significant increase in numbers of pest and predatory species and impacts to threatened species remain within prediction. • Design and implementation of a threatened species monitoring program to ensure impacts arising from clearing are within prediction.
Light and noise pollution during night works. **Type:** indirect impact. **Frequency:** ongoing during construction. **Intensity:** unknown. **Duration:** ongoing during construction. **Consequence:** potential to result in noise impacts to retained vegetation and light spill into adjacent habitat areas, impacting on occupancy for some species.	• Not applicable.	• Siting of construction areas in disturbed areas wherever feasible. • Use of directional lighting to retain lighting within works areas as much as possible.	• Design and implementation of a threatened species monitoring program to ensure impacts arising from clearing are within prediction.

Table 7.1 Summary of impacts, and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Changes to runoff regimes. **Type:** prescribed impact. **Frequency:** ongoing during construction and operation. **Intensity:** potential to mobilise large amounts of sediment and significantly impact on breeding habitat for Alpine Tree Frog. **Duration:** initial stages of construction. **Consequence:** impact water quality, erosion and sedimentation in the area and breeding success.	• Development of a 50 m buffer zone along the Yarrangobilly River and avoidance of works within this buffer. • Siting of key infrastructure away from sensitive receiving environments.	• Management of sedimentation via sediment and erosion control plans for each construction zone. • Natural erosion controls incorporating organic materials, micro water capture and contour shaping. • Diversion of clean water around construction areas, rather than through them. • Stabilisation and rehabilitation of works areas as soon as practicable. • Siting of sediment basins to manage run-off from construction areas and use of captured water for dust suppression. • Siting of all camps distant from sensitive receiving environments in the Yarrangobilly River and Tantangara Reservoir. • No extraction of water from the Yarrangobilly River or Kelly's Plain Creek. • Landscaping of pervious surfaces using endemic species. • Collection of run-off from roof areas. • Treatment of run-off from camps in a bio-filtration system. • Separation of oil from water. • Treatment of wastewater using membrane filtration prior to disposal into Reservoirs	• Design and implementation of a surface water monitoring program to ensure run-off does not impact on sensitive receiving environments. • Design and implementation of a threatened species monitoring program to ensure impacts arising from clearing are within prediction.

Table 7.1 Summary of impacts, and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Fragmentation, resulting in reduction in connectivity. **Type:** prescribed impact. **Frequency:** ongoing during construction and operation. **Intensity:** potential to fragment populations of threatened species, resulting in decreased ability of animals to move and disperse, as well as reduced exchange of genetic material between and within populations. **Duration:** construction and operation. **Consequence:** reduced dispersal capacity as well as reduced fecundity long term.	• Reduction in the disturbance footprint, including width of access roads.	• Use of the existing road network to minimise requirement for removal of native vegetation, minimising fragmentation to existing areas. • Implementation of measures to avoid fragmentation, such as underpasses • Minimising construction of new roads, particularly in key habitat areas such as Marica.	• Design and implementation of a threatened species monitoring program to ensure impacts arising from clearing and fragmentation are within prediction.
Fauna vehicle strike **Type:** prescribed impact. **Frequency:** potential for daily impacts if unmitigated. **Intensity:** unknown. **Duration:** ongoing through construction. **Consequence:** potential to significantly impact local populations of threatened species, including Smoky Mouse.	• Not applicable	• Management measures to mitigate the potential impacts of fauna strike are currently being considered. These measures may include consideration of the following options: – reduced speed limit along access roads at night, when fauna species are likely to be most active; or – fencing of these roads to prevent access to the road surface; and – construction of fauna underpasses. The adopted measures will be agreed in consultation with DPIE during detailed design.	• Design and implementation of a threatened species monitoring program to ensure impacts arising from fauna vehicle strike are within prediction.

Table 7.1 Summary of impacts, and measures to avoid, minimise and mitigate

Impact	Impact avoidance	Impact minimisation	Impact mitigation
Groundwater drawdown, resulting in changes in hydrology of GDEs. **Type:** Uncertain impact. **Frequency:** ongoing, until recovery. **Intensity:** drawdown of up to 50 m predicted to occur. **Duration:** up to 20 years plus. **Consequence:** reduced water availability, resulting in changes to species composition of GDEs.	• Not applicable.	• Pre-grouting of the tunnel to reduce tunnel in-flows and associated groundwater drawdown. • Segmental lining of the tunnel to reduce tunnel in-flows and associated groundwater drawdown.	• Implementation of a groundwater and GDE monitoring program to ensure groundwater drawdown and associated impacts to GDEs are is within prediction.

7.3 Impact summary

7.3.1 Serious and irreversible impacts (SAII)

Three species recorded within the Main Works study area are identified as candidate species for serious and irreversible impacts (SAII), as per Section 6.5 of the BC Act. These include:

- Clover Glycine;
- Mauve Burr-daisy; and
- Smoky Mouse.

Information required by Section 10.2.3 of the BAM (OEH 2017a) is provided in Annexure G.

7.3.2 Impacts requiring offsets

This section provides an assessment of the impacts requiring offsetting in accordance with Section 10 of the BAM (OEH 2017a).

i Impacts on native vegetation

Impacts to native vegetation requiring offsets include:

- impacts on 5.39 ha of PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion;
- impacts on 38.62 ha of PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion;
- impacts on 1.54 ha of PCT 299 – Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands;
- impacts on 62.95 ha of PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment;
- impacts on 6.05 ha of PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion;
- impacts on 57.51 ha of PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion;
- impacts on 23.11 ha of PCT 311 – Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion;
- impacts on 5.41 ha of PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion;

- impacts on 23.4 ha of PCT 639 – Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- impacts on 191.31 ha of PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- impacts on 0.46 ha of PCT 679 – Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- impacts on 43.22 ha of PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion;
- impacts on 15.32 ha of PCT 953 – Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- impacts on 27.15 ha of PCT 999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion;
- impacts on 14.79 ha of PCT 1191 – Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion;
- impacts on 252.97 ha of PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion;
- impacts on 213.38 ha of PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion; and
- impacts on 22.95 ha of PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion.

A summary of ecosystem credits required for all vegetation zones, including changes in vegetation integrity score, are provided in Table 7.2. A total of 12,927 ecosystem credits are required to offset the residual impacts of Main Works. A credit report is provided in Annexure H.

Table 7.2 Ecosystem credits required for impacts to all vegetation zones for the Main Works

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
2	PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	285_Poor	0.47	26.7	3.4	-23.3	5
3	PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	285_Medium	4.78	36.9	0	-36.9	88
4	PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	285_High	0.14	56.7	0	-56.7	4
6	PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	296_DNG	0.42	41.2	0	-41.2	6
8	PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	296_Medium	21.69	71	16.6	-54.4	443
9	PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	296_High	16.51	54	29.3	-24.7	153
10	PCT 299 – Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands	299_Medium	0.19	65.4	30.9	-34.5	3
11	PCT 299 – Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands	299_High	1.35	65.4	19.8	-45.6	27
13	PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	300_Other	5.38	41.9	21.8	-20.1	40
14	PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	300_Medium	8.17	56.8	31.3	-25.5	78

Table 7.2 Ecosystem credits required for impacts to all vegetation zones for the Main Works

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
15	PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	300_High	49.4	61.6	26.4	-35.2	652
16	PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	302_Low	1.9	33.6	15	-18.6	15
17	PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	302_Other	2.4	53	28.5	-24.5	26
18	PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	302_Medium	1.41	66.4	42	-24.4	15
19	PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	302_High	0.34	64.9	42	-22.9	3
20	PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	303_DNG	4.29	19.3	9.5	-9.8	26
21	PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	303_Poor	0.1	55.5	55.2	-0.3	1
22	PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	303_Other	1.1	87.1	56.7	-30.4	21
23	PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	303_Medium	1.14	66.8	56.5	-10.3	7
24	PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	303_High	50.88	80.9	43	-37.9	1,206

Table 7.2 Ecosystem credits required for impacts to all vegetation zones for the Main Works

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
25	PCT 311 – Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	311_High	23.11	62.4	37.8	-24.6	213
27	PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	637_Medium	0.12	31.4	24.7	-6.7	1
28	PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	637_High	5.29	86	66.8	-19.2	44
29	PCT 639 – Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	639_DNG	0.48	69.2	7.2	-62	11
30	PCT 639 – Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	639_Other	0.65	79.5	43.5	-36	9
31	PCT 639 – Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	639_High	22.27	77.2	52	-25.2	210
33	PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	644_DNG	13.44	68.4	54.7	-13.7	69
34	PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	644_Poor	0.17	47.6	27.9	-19.7	1
35	PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	644_Other	18.32	65.6	39	-26.6	183
36	PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	644_Medium	1.91	67.6	56.2	-11.4	8
37	PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	644_High	157.47	74.1	50	-24.1	1,424

Table 7.2 Ecosystem credits required for impacts to all vegetation zones for the Main Works

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
38	PCT 679 – Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	679_Other	0.11	81.1	72	-9.1	1
39	PCT 679 – Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	679_High	0.35	54.5	49.5	-5	1
41	PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	729_DNG	0.98	22.7	11.2	-11.5	4
42	PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	729_Medium	6.43	76.9	21.2	-55.7	134
43	PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	729_High	35.81	73.8	41.7	-32.1	431
44	PCT 953 – Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion	953_DNG	1.49	32	20	-12	7
45	PCT 953 – Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion	953_High	13.83	88.5	41.1	-47.4	246
46	PCT 999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	999_Medium	4.31	46	22.9	-23.1	37
47	PCT 999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	999_High	22.84	73	40	-33	283
48	PCT 1191 – Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	1191_DNG	1.28	33.1	10.7	-22.4	18
49	PCT 1191 – Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	1191_Medium	1.14	43.8	7.9	-35.9	26
50	PCT 1191 – Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	1191_High	12.37	69.5	27.3	-42.2	326

Table 7.2 Ecosystem credits required for impacts to all vegetation zones for the Main Works

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
51	PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	1196_DNG	40.49	37.9	13.5	-24.4	370
52	PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	1196_Poor	0.07	58.1	57.2	-0.9	1
53	PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	1196_Other	0.27	58.7	47.6	-11.1	1
54	PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	1196_Medium	0.94	80.6	27.3	-53.3	19
55	PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	1196_High	211.2	96.3	59.8	-36.5	2,890
56	PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1224_Low	0.22	67.9	64.1	-3.8	1
57	PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1224_Poor	5.85	67	50	-17	37
58	PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1224_Medium	9.87	88.4	39.5	-48.9	181
59	PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1224_High	197.44	89.1	53	-36.1	2,671
61	PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1225_Poor	1.47	57.2	45.6	-11.6	6
62	PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1225_Medium	2.16	64.1	44.7	-19.4	16

Table 7.2 Ecosystem credits required for impacts to all vegetation zones for the Main Works

Vegetation zone number	PCT	Vegetation zone name	Area (ha)	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
63	PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1225_High	19.32	91.8	60.4	-31.4	228

Offsets will be provided in accordance with the Snowy 2.0 Main Works Revised Offset Strategy, appended to the PIR-RTS.

ii Impacts on threatened species

Impacts to threatened species habitat requiring offsets include:

- impacts on 1.6 ha of habitat for *Caladenia montana*;
- impacts on 1.52 ha of habitat for Clover Glycine;
- impacts on 6.04 ha of habitat for the Kiandra Leek Orchid;
- impacts on 45 individuals of the Leafy Anchor Plant;
- impacts on 21.84 ha of habitat for the Mauve Burr-daisy;
- impacts on 2.59 ha of habitat for Max Mueller's Burr-daisy;
- impacts on 0.8 ha of habitat for the Raleigh Sedge;
- impacts on 0.28 ha of habitat for the Slender Greenhood;
- impacts on 4.89 ha of breeding habitat for the Gang-gang Cockatoo;
- impacts on 23.13 ha of breeding habitat for the White-bellied Sea-Eagle;
- impacts on 161.83 ha of habitat for the Broad-toothed Rat;
- impacts on 446.96 ha of habitat for the Eastern Pygmy-possum;
- impacts on 226.79 ha of habitat for the Smoky Mouse;
- impacts on 4.01 ha of habitat for the Southern Myotis;
- impacts on 4.79 ha of habitat for the Booroolong Frog;
- impacts on 54.30 ha of habitat for the Alpine Tree Frog; and
- impacts on 213.16 ha of habitat for the Alpine She-oak Skink.

A summary of the species credits required for all vegetation zones occupied by the threatened species, including changes in vegetation integrity score, are provided in Table 7.5. A total of 22,283 species credits are required to offset the residual impacts of Main Works. A credit report is provided in Annexure H.

Offsets will be provided in accordance with the Snowy 2.0 Main Works Revised Offset Strategy provided as Appendix L to the PIR-RTS.

Table 7.3 Threatened species credits required for Main Works

Species	Vegetation zone name	Area (ha)/individual (HL)	Current habitat condition	Future habitat condition	Loss of habitat condition	Candidate SAII	Species credits required
Caladenia montana	300_High	0.35	61.6	26.4	-35.2	No	5
Caladenia montana	729_Medium	0.04	76.9	21.2	-55.7	No	1
Caladenia montana	729_High	0.55	73.8	41.7	-32.1	No	7
Caladenia montana	953_High	0.31	88.5	41.1	-47.4	No	6
Caladenia montana	999_High	0.15	73	40	-33	No	2
Caladenia montana	1191_Medium	0.2	43.8	7.9	-35.9	No	3
Gang-gang Cockatoo	296_Medium	0.31	71	16.6	-54.4	No	8
Gang-gang Cockatoo	300_High	0.57	61.6	26.4	-35.2	No	10
Gang-gang Cockatoo	729_High	1.2	73.8	41.7	-32.1	No	19
Gang-gang Cockatoo	953_High	0.9	88.5	41.1	-47.4	No	21
Gang-gang Cockatoo	1196_High	1.91	96.3	59.8	-36.5	No	35
Mauve Burr-daisy	303_Other	0.25	87.1	56.7	-30.4	Yes	6
Mauve Burr-daisy	303_High	1.31	80.9	43	-37.9	Yes	37
Mauve Burr-daisy	637_High	0.4	86	66.8	-19.2	Yes	6
Mauve Burr-daisy	644_Other	0.2	65.6	39	-26.6	Yes	4
Mauve Burr-daisy	644_High	0.86	74.1	50	-24.1	Yes	16
Mauve Burr-daisy	1196_DNG	0.9	37.9	13.5	-24.4	Yes	16
Mauve Burr-daisy	1196_High	8.87	96.3	59.8	-36.5	Yes	243
Mauve Burr-daisy	1224_High	8.55	89.1	53	-36.1	Yes	231
Mauve Burr-daisy	1225_High	0.5	91.8	60.4	-31.4	Yes	12

Table 7.3 Threatened species credits required for Main Works

Species	Vegetation zone name	Area (ha)/individual (HL)	Current habitat condition	Future habitat condition	Loss of habitat condition	Candidate SAII	Species credits required
Max Mueller's Burr-daisy	1196_High	0.24	96.3	59.8	-36.5	No	4
Max Mueller's Burr-daisy	1224_High	2.35	89.1	53	-36.1	No	42
Raleigh Sedge	644_High	0.21	74.1	50	-24.1	No	3
Raleigh Sedge	1224_High	0.55	89.1	53	-36.1	No	10
Raleigh Sedge	1225_High	0.04	91.8	60.4	-31.4	No	1
Eastern Pygmy-possum	296_Medium	21.69	71	16.6	-54.4	No	590
Eastern Pygmy-possum	296_High	16.51	54	29.3	-24.7	No	204
Eastern Pygmy-possum	300_Other	5.38	41.9	21.8	-20.1	No	54
Eastern Pygmy-possum	300_Medium	8.17	56.8	31.3	-25.5	No	104
Eastern Pygmy-possum	300_High	49.4	61.6	26.4	-35.2	No	869
Eastern Pygmy-possum	302_Other	2.4	53	28.5	-24.5	No	29
Eastern Pygmy-possum	302_Medium	1.41	66.4	42	-24.4	No	17
Eastern Pygmy-possum	302_High	0.34	64.9	42	-22.9	No	4
Eastern Pygmy-possum	311_High	23.11	62.4	37.8	-24.6	No	284
Eastern Pygmy-possum	639_Other	0.65	79.5	43.5	-36	No	12
Eastern Pygmy-possum	639_High	22.27	77.2	52	-25.2	No	280
Eastern Pygmy-possum	729_Medium	6.43	76.9	21.2	-55.7	No	179

Table 7.3 Threatened species credits required for Main Works

Species	Vegetation zone name	Area (ha)/individual (HL)	Current habitat condition	Future habitat condition	Loss of habitat condition	Candidate SAII	Species credits required
Eastern Pygmy-possum	729_High	35.81	73.8	41.7	-32.1	No	575
Eastern Pygmy-possum	953_High	13.83	88.5	41.1	-47.4	No	327
Eastern Pygmy-possum	999_Medium	4.31	46	22.9	-23.1	No	50
Eastern Pygmy-possum	999_High	22.84	73	40	-33	No	377
Eastern Pygmy-possum	1196_Other	0.27	58.7	47.6	-11.1	No	2
Eastern Pygmy-possum	1196_Medium	0.94	80.6	27.3	-53.3	No	25
Eastern Pygmy-possum	1196_High	211.2	96.3	59.8	-36.5	No	3,854
Alpine She-oak Skink	1224_Poor	5.85	67	50	-17	No	50
Alpine She-oak Skink	1224_Medium	9.87	88.4	39.5	-48.9	No	241
Alpine She-oak Skink	1224_High	197.44	89.1	53	-36.1	No	3,561
Leafy Anchor Plant	1224_High	1	89.1	53	-36.1	No	2
Leafy Anchor Plant	1225_High	44	91.8	60.4	-31.4	No	88
Glycine latrobeana	644_Other	0.16	65.6	39	-26.6	Yes	3
Glycine latrobeana	1196_High	0.1	96.3	59.8	-36.5	Yes	3
Glycine latrobeana	1224_Medium	0.08	88.4	39.5	-48.9	Yes	3
Glycine latrobeana	1224_High	1.18	89.1	53	-36.1	Yes	32
White-bellied Sea-Eagle	296_Medium	9.27	71	16.6	-54.4	No	252

Table 7.3 Threatened species credits required for Main Works

Species	Vegetation zone name	Area (ha)/individual (HL)	Current habitat condition	Future habitat condition	Loss of habitat condition	Candidate SAII	Species credits required
White-bellied Sea-Eagle	300_High	13.56	61.6	26.4	-35.2	No	238
White-bellied Sea-Eagle	729_High	0.3	73.8	41.7	-32.1	No	5
Booroolong Frog	300_High	0.55	61.6	26.4	-35.2	No	10
Booroolong Frog	302_Low	1.31	33.6	15	-18.6	No	12
Booroolong Frog	302_Other	1.43	53	28.5	-24.5	No	17
Booroolong Frog	302_Medium	1.18	66.4	42	-24.4	No	14
Booroolong Frog	302_High	0.32	64.9	42	-22.9	No	4
Alpine Tree Frog	303_High	3.27	80.9	43	-37.9	No	62
Alpine Tree Frog	637_High	1.84	86	66.8	-19.2	No	18
Alpine Tree Frog	644_DNG	0.34	68.4	54.7	-13.7	No	2
Alpine Tree Frog	644_Other	0.41	65.6	39	-26.6	No	5
Alpine Tree Frog	644_High	3.01	74.1	50	-24.1	No	36
Alpine Tree Frog	1224_Poor	1.52	67	50	-17	No	13
Alpine Tree Frog	1224_Medium	2.03	88.4	39.5	-48.9	No	50
Alpine Tree Frog	1224_High	29.19	89.1	53	-36.1	No	526
Alpine Tree Frog	1225_Low	0.26	13	8.1	-4.9	No	1
Alpine Tree Frog	1225_Poor	1.22	57.2	45.6	-11.6	No	7
Alpine Tree Frog	1225_Medium	0.27	64.1	44.7	-19.4	No	3
Alpine Tree Frog	1225_High	10.94	91.8	60.4	-31.4	No	172
Broad-toothed Rat	637_High	5.29	86	66.8	-19.2	No	51

Table 7.3 Threatened species credits required for Main Works

Species	Vegetation zone name	Area (ha)/individual (HL)	Current habitat condition	Future habitat condition	Loss of habitat condition	Candidate SAII	Species credits required
Broad-toothed Rat	1224_Poor	2.38	67	50	-17	No	20
Broad-toothed Rat	1224_Medium	3.47	88.4	39.5	-48.9	No	85
Broad-toothed Rat	1224_High	127.74	89.1	53	-36.1	No	2,304
Broad-toothed Rat	1225_Poor	1.47	57.2	45.6	-11.6	No	9
Broad-toothed Rat	1225_Medium	2.16	64.1	44.7	-19.4	No	21
Broad-toothed Rat	1225_High	19.32	91.8	60.4	-31.4	No	304
Southern Myotis	299_High	0.8	54	29.3	-45.6	No	18
Southern Myotis	1191_DNG	0.05	33.1	10.7	-22.4	No	1
Southern Myotis	1191_High	3.16	69.5	27.3	-42.2	No	67
Kiandra Leek Orchid	303_High	0.14	80.9	43	-37.9	No	3
Kiandra Leek Orchid	644_High	0.16	74.1	50	-24.1	No	2
Kiandra Leek Orchid	1224_High	5.49	89.1	53	-36.1	No	99
Kiandra Leek Orchid	1225_High	0.25	91.8	60.4	-31.4	No	4
Smoky Mouse	300_High	4.4	61.6	26.4	-35.2	Yes	116
Smoky Mouse	639_Other	0.65	79.5	43.5	-36	Yes	18
Smoky Mouse	639_High	19.26	77.2	52	-25.2	Yes	364
Smoky Mouse	644_Other	0.28	65.6	39	-26.6	Yes	6
Smoky Mouse	644_Medium	0.09	67.6	56.2	-11.4	Yes	1
Smoky Mouse	644_High	93.79	74.1	50	-24.1	Yes	1,696
Smoky Mouse	729_High	0.05	73.8	41.7	-32.1	Yes	1
Smoky Mouse	953_High	13.56	88.5	41.1	-47.4	Yes	482
Smoky Mouse	1196_High	94.71	96.3	59.8	-36.5	Yes	2,592
Slender Greenhood	1196_High	0.28	96.3	59.8	-36.5	No	5

iii Offset summary

A summary of the ecosystem credits required to offset the impacts of Snowy 2.0 Main Works is provided in Table 7.4.

Table 7.4 Summary of ecosystems credits required to offsets Snowy 2.0 Main Works

PCT	Sum of credits required
285 - Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	97
296 - Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	602
299 - Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	30
300 - Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	770
302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	59
303 - Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	1,261
311 - Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	213
637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	45
639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	230
643 - Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	0
644 - Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	1,685
679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	2
729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	569
953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion	253
999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	320
1191 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	370
1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	3,281
1224 - Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	2,890
1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	250
TOTAL	**12,927**

A summary of the species credits required to offset the impacts of Snowy 2.0 Main Works is provided in Table 7.5.

Table 7.5 Summary of species credits required to offset Snowy 2.0 Main Works

Species	Sum of credits required
Alpine She-oak Skink	3,852
Alpine Tree Frog	895
Booroolong Frog	57
Broad-toothed Rat	2,794
Caladenia montana	24
Clover Glycine	41
Eastern Pygmy-possum	7,836
Gang-gang Cockatoo	93
Kiandra Leek Orchid	108
Leafy Anchor Plant	90
Mauve Burr-daisy	571
Max Mueller's Burr-daisy	46
Raleigh Sedge	14
Slender Greenhood	5
Smoky Mouse	5,276
Southern Myotis	86
Thelymitra alpicola	0
White-bellied Sea-Eagle	495
TOTAL	**22,283**

7.3.3 Impacts not requiring offsets

A number of vegetation zones were found to be in degraded condition. In line with the requirements of Section 10.3 of the BAM (OEH 2017a) impacts to the vegetation zones and threatened species habitat in Table 7.6 and Table 7.7, and do not require offsets.

Additional areas not requiring assessment in accordance with Section 10.4 of the BAM (OEH 2017a) include:

- existing roads;
- cleared and highly disturbed land; and
- watercourses.

Table 7.6 Summary of impacts not requiring offsets – native vegetation

Vegetation zone number	PCT	Vegetation zone name	Area	Vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity score	Credits required
1	PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	285_DNG	1.51	0.6	0	-0.6	0
5	PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	296_Low	1.05	4	0.3	-3.7	0
7	PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	296_Poor	0.05	4.2	0	-4.2	0
12	PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	300_DNG	1.11	4.3	2.6	-1.7	0
26	PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	637_Poor	0.03	3.2	1.8	-1.4	0
32	PCT 643 - Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	643_Low	0.16	13	6.4	-6.6	0
40	PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	729_Low	0.01	6	5.7	-0.3	0
60	PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1225_Low	0.62	13	8.1	-4.9	0

Table 7.7 Summary of impacts not requiring offsets – threatened species

Species	Vegetation zone name	Area (ha)/individual (HL)	Current habitat condition	Future habitat condition	Loss of habitat condition	Candidate SAII	Species credits
Caladenia montana	729_DNG	0.09	22.7	11.2	-11.5	No	0
Caladenia montana	1191_High	0.03	69.5	27.3	-42.2	No	0
Gang-gang Cockatoo	296_High	0.01	54	29.3	-24.7	No	0
Mauve Burr-daisy	303_DNG	0.06	19.3	9.5	-9.8	Yes	0
Raleigh Sedge	637_High	0.04	86	66.8	-19.2	No	0
Eastern Pygmy-possum	296_Poor	0.05	4.2	0	-4.2	No	0
Eastern Pygmy-possum	1196_Poor	0.07	58.1	57.2	-0.9	No	0
Glycine latrobeana	637_Medium	0.01	31.4	24.7	-6.7	Yes	0
Booroolong Frog	285_Poor	0.01	26.7	3.4	-23.3	No	0
Booroolong Frog	296_Low	0.07	4	0.3	-3.7	No	0
Booroolong Frog	296_High	0.01	54	29.3	-24.7	No	0
Alpine Tree Frog	637_Poor	0.03	3.2	1.8	-1.4	No	0
Alpine Tree Frog	637_Medium	0.07	31.4	24.7	-6.7	No	0
Broad-toothed Rat	637_Poor	0.03	3.2	1.8	-1.4	No	0
Broad-toothed Rat	637_Medium	0.12	31.4	24.7	-6.7	No	0
Kiandra Leek Orchid	644_Other	0.02	65.6	39	-26.6	No	0
Kiandra Leek Orchid	679_Other	0.01	81.1	72	-9.1	No	0
Kiandra Leek Orchid	679_High	0.02	54.5	49.5	-5	No	0
Kiandra Leek Orchid	1196_High	0.02	96.3	59.8	-36.5	No	0
Thelymitra alpicola	637_High	0.01	86	66.8	-19.2	No	0
Thelymitra alpicola	644_High	0.04	74.1	50	-24.1	No	0
Thelymitra alpicola	1224_High	0.02	89.1	53	-36.1	No	0

7.3.4 Cumulative impacts

As outlined in Section 1.5, there are three other projects related to Snowy 2.0 Main Works:

- Snowy 2.0 Exploratory Works (SSI-9208) – a Snowy Hydro project with Minister's approval;
- Snowy 2.0 Transmission Connection Project (SSI-9717) – a project proposed by TransGrid; and
- Snowy 2.0 – Segment Factory (SSI-10034) – a project proposed by Snowy Hydro.

Table 7.8 provides a summary of the cumulative impacts arising from Exploratory Works, the Segment Factory and Main Works. The Transmission Connection Project is not included in this cumulative impact assessment as detailed designs and associated impacts are not currently available.

Table 7.8 Cumulative direct impacts to native vegetation and threatened species

Plant Community Types (PCTs)	Exploratory Works (including MOD2)	Segment Factory	Main Works (ha)	Cumulative
PCT 285 – Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	5.54	-	6.85	12.39
PCT 296 – Brittle Gum – Peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	48.37	-	25.60	73.97
PCT 299 – Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands	-	-	1.04	1.04
PCT 300 – Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	10.52	-	34.74	45.26
PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	12	-	2.83	14.83
PCT 303 – Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion	0.31	-	26.66	26.97
PCT 311 – Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	2.87	-	8.91	11.78
PCT 320 – Kangaroo Grass - Redleg Grass forb-rich temperate tussock grassland of the northern Monaro, ACT and upper Lachlan River regions of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	-	0.83	-	0.83
PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion	-	-	1.03	1.03
PCT 639 – Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	-	-	8.60	8.6

Table 7.8 Cumulative direct impacts to native vegetation and threatened species

Plant Community Types (PCTs)	Exploratory Works (including MOD2)	Segment Factory	Main Works (ha)	Cumulative
PCT 643 - Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion	0.18	-	0.08	0.26
PCT 644 – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	-	-	60.75	60.75
PCT 679 – Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	-	-	0.03	0.03
PCT 729 - Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	24.1	-	21.40	45.5
PCT 952 – Mountain Gum - Narrow-leaved Peppermint - Snow Gum dry shrubby open forest on undulating tablelands, southern South Eastern Highlands Bioregion	0.35	-	-	0.35
PCT 953 – Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion	1.41	-	7.98	9.39
PCT 999 - Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	1.28	-	12.40	13.68
PCT 1191 – Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion	0.55	-	9.24	9.79
PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	5.15	-	108.18	113.33
PCT 1224 – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	0.15	-	80.83	80.98
PCT 1225 – Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	<0.01	-	7.09	7.09
Alpine She-oak Skink	-	-	80.83	80.83
Alpine Tree Frog	0.03	-	22.87	22.9
Barking Owl	0.01	-	-	0.01
Booroolong Frog	2.49	-	1.33	3.82
Broad-toothed rat	-	-	61.47	61.47
Caladenia montana	-	-	0.77	0.77
Clover Glycine	-	-	0.57	0.57
Eastern Pygmy-possum	76.17	-	197.95	274.12
Gang-gang Cockatoo (breeding habitat only)	0.91	-	2.08	2.99
Kiandra Leek Orchid	-	-	1.45	1.45
Leafy Anchor Plant	-	-	40	40

Table 7.8 Cumulative direct impacts to native vegetation and threatened species

Plant Community Types (PCTs)	Exploratory Works (including MOD2)	Segment Factory	Main Works (ha)	Cumulative
Masked Owl	0.91	-	-	0.91
Mauve Burr-daisy	-	-	7.80	7.8
Max Mueller's Burr-daisy	-	-	0.57	0.57
Raleigh Sedge	-	-	0.25	0.25
Slender Greenhood	0.28	-	0.28	0.56
Smoky Mouse	1.9	-	84.29	86.19
Southern Myotis	-	-	2.72	2.72
Striped Legless Lizard	-	0.83	-	0.83
White-bellied Sea-Eagle	-	-	17.53	17.53

Part C

EPBC Act Assessment

8 Impacts to MNES

8.1 Candidate species and communities assessment

8.1.1 Desktop assessment

A detailed desktop assessment was completed, evaluating a range of information sources, to gather information on the biodiversity values across the survey area and identify a list of candidate threatened species and ecological communities and migratory species for further consideration and assessment. The desktop assessment included a review of the following information:

- DoEE Protected Matter Search Tool (PMST, Annexure I);
- BioNet, held and maintained by DPIE to access the following:
  - Atlas of NSW Wildlife;
  - Threatened Biodiversity Data Collection;
  - Threatened species profiles;
  - BioNet Vegetation Classification database;
- *South East Local Land Services Biometric vegetation map – VIS_ID 4211* (OEH 2015);
- *State Vegetation Type Map: Riverina Region Version v1.2 - VIS_ID 4469* (OEH 2016a); and
- *Interim Biographic Regionalisation for Australia* (IBRA) *version 7* (IBRA7) bioregions and subregions (DoEE2017A).

8.1.2 Candidate species assessment

A list of species and communities with potential to occur within the study area was generated following the desktop assessment. Three TECs (Table 8.1), 12 threatened flora, 27 threatened fauna species and 12 migratory species (Table 8.2) were considered to have potential to occur within the project area based on the desktop assessment.

Table 8.1 Threatened communities with potential to occur in the study area

Threatened community	EPBC Act status[1]	BC Act status[2]
Alpine Sphagnum Bogs and Associated Fens	EN	E3
Natural Temperate Grassland of the South Eastern Highlands	CE	-
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	E3

Notes: 1. EPBC Act status: CE- critically endangered, EN – endangered, VU – vulnerable
2. BC Act status: E4B – critically endangered, E3 – endangered, V2 - vulnerable

Table 8.2 Threatened and migratory species with potential to occur in the study area based on the desktop assessment

Scientific name	Common name	EPBC Act[1]	BC Act[2]/ FM Act[3]
Flora			
Calotis glandulosa	Mauve Burr-daisy	VU	-
Colobanthus curtisiae	Curtis' Colobanth	VU	-
Glycine latrobeana	Clover Glycine	VU	E4A
Leucochrysum albicans var. *tricolor*	Hoary Sunray	EN	-
Prasophyllum bagoense	Bago Leek-orchid	CE	E4A
Prasophyllum innubum	Brandy Marys Leek-orchid	CE	E4A
Prasophyllum petilum	Tarengo Leek Orchid	EN	E1
Pterostylis oreophila	Blue-tongued Orchid	CE	E4A
Rutidosis leiolepis	Monaro Golden Daisy	VU	V
Swainsona recta	Small Purple-pea	EN	-
Thesium australe	Austral Toadflax	VU	V
Xerochrysum palustre	Swamp Everlasting	VU	-
Birds			
Anthochaera phrygia	Regent Honeyeater	CE	E4A
Calidris ferruginea	Curlew Sandpiper	CE	E1
Grantiella picta	Painted Honeyeater	VU	V
Hirundapus caudacutus	White-throated Needletail	VU	-
Lathamus discolor	Swift Parrot	CE	E1
Numenius madagascariensis	Eastern Curlew	CE	-
Rostratula australis	Australian Painted Snipe	EN	E1
Mammals			
Burramys parvus	Mountain Pygmy-possum	EN	E1
Dasyurus maculatus	Spotted-tailed Quoll	EN	V
Mastacomys fuscus mordicus	Broad-toothed Rat	VU	V, E2
Petauroides volans	Greater Glider	VU	E2
Phascolarctos cinereus	Koala	VU	V, E2
Pseudomys fumeus	Smoky Mouse	EN	E4A
Pteropus poliocephalus	Grey-headed Flying-fox	VU	V
Amphibians			
Litoria booroolongensis	Booroolong Frog	EN	E1
Litoria castanea	Yellow-spotted Tree Frog	EN	E4A
Litoria raniformis	Southern Bell Frog	VU	E1
Litoria spenceri	Spotted Tree Frog	EN	E4A
Litoria verreauxii alpina	Alpine Tree Frog	VU	E1
Pseudophryne corroboree	Southern Corroboree Frog	CE	E4A
Pseudophryne pengilleyi	Northern Corroboree Frog	CE	E4A

Table 8.2 Threatened and migratory species with potential to occur in the study area based on the desktop assessment

Scientific name	Common name	EPBC Act[1]	BC Act[2]/ FM Act[3]
Reptiles			
Cyclodomorphus praealtus	Alpine She-oak Skink	EN	E1
Liopholis guthega	Guthega Skink	EN	E1
Fish			
Maccullochella macquariensis	Trout Cod	EN	E
Maccullochella peelii	Murray Cod	VU	-
Macquaria australasica	Macquarie Perch	EN	E
Migratory species			
Actitis hypoleaucos	Common Sandpiper	Mi	
Apus pacificus	Fork-tailed Swift	Mi	
Calidris acuminata	Sharp-tailed Sandpiper	Mi	
Calidris ferruginea	Curlew Sandpiper	Mi	
Calidris melanotos	Pectoral Sandpiper	Mi	
Gallinago hardwickii	Latham's Snipe	Mi	
Hirundapus caudacutus	White-throated Needletail	Mi	
Monarcha melanopsis	Black-faced Monarch	Mi	
Motacilla flava	Yellow Wagtail	Mi	
Myiagra cyanoleuca	Satin Flycatcher	Mi	
Numenius madagascariensis	Eastern Curlew	Mi	
Rhipidura rufifrons	Rufous Fantail	Mi	

An assessment of likelihood was completed for listed TECs, threatened flora and fauna, and migratory species predicted to occur in the region by the PMST search (Annexure J, Table J.1 to Table J.4). This assessment identified one TEC, nine threatened flora, 10 threatened terrestrial fauna species and three migratory species considered candidate species requiring further survey and assessment:

- threatened ecological communities:
  - Alpine Sphagnum Bogs and Associated Fens;
- threatened flora:
  - Austral Toadflax;
  - Blue-tongued Orchid;
  - Clover Glycine;
  - Curtis' Colobanth;
  - Hoary Sunray;
  - Mauve Burr-daisy;

- Monaro Golden Daisy;
- *Prasophyllum innubum*;
- Swamp Everlasting;

- threatened fauna:
  - Alpine She-oak Skink;
  - Alpine Tree Frog;
  - Booroolong Frog;
  - Broad-toothed Rat;
  - Greater Glider;
  - Koala;
  - Northern Corroboree Frog;
  - Smoky Mouse;
  - Spotted-tailed Quoll;
  - White-throated Needletail;
- migratory species:
  - Latham's Snipe;
  - Rufous Fantail; and
  - Satin Flycatcher;.

8.2 Survey methods

Surveys methods undertaken for detailed vegetation assessment and consideration of TECs is provided in Section 4.2. Survey methods undertaken for threatened species are provided in Section 5.3.3.

8.3 Survey results

8.3.1 Threatened ecological communities

Following detailed vegetation mapping, one TEC was recorded within the survey area and disturbance footprint. Approximately 85 ha of PCT 637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion, which is representative of the Alpine Sphagnum Bogs and Associated Fens, was recorded within the survey area.

Generally, the community is in high condition, with areas in poorer condition located adjacent to Tantangara Reservoir where impacts are occurring due to feral Horses and recreational users.

8.3.2 Threatened flora species

Following targeted surveys, three threatened flora species listed under the EPBC Act were recorded within the disturbance footprint:

- Mauve Burr-daisy;
- Clover Glycine; and
- Hoary Sunray.

Two additional species, Monaro Golden Daisy and *Prasophyllum innubum*, were recorded adjacent to the disturbance area. However, these species are considered a low likelihood of occurrence as extensive targeted surveys did not record the species within the disturbance footprint.

Mauve Burr-daisy was found to occur extensively across the survey area, with the species recorded colonising edges of management tracks within the surveys area. Over 44,000 individuals were estimated to occur within the survey area across 779 locations.

Prior to surveys for Snowy 2.0, Clover Glycine was known from just two locations in NSW; Tom Groggin and Kelly's Plain. The Kelly's Plain population was at severe threat due to Ox-eye Daisy. Surveys undertaken for Snowy 2.0 identified the species at a number of sites across the plateau area, with 892 records of the species across 418 locations. A large population was recorded on Gulf Plain, with over 600 individual plants recorded at this site.

The Hoary Sunray was recorded during recent surveys within Rock Forest and along the Snowy Mountains Highway. The species was recorded from 41 locations with over 900 individuals. No records were found within the disturbance area.

8.3.3 Threatened fauna species

Following targeted surveys, seven threatened fauna species listed under the EPBC Act were recorded within or adjacent to the disturbance footprint:

- White-throated Needletail;
- Broad-toothed Rat;
- Smoky Mouse;
- Spotted-tailed Quoll;
- Booroolong Frog;
- Alpine Tree Frog; and
- Alpine She-oak Skink.

The White-throated Needletail was recorded adjacent to the disturbance area on three separate occasions flying overhead. The species was not recorded nesting within the survey area during targeted surveys and is likely to only occur aerially across the study area.

The Broad-toothed Rat was recorded at a number of locations across the plateau area within or adjacent to the disturbance area; along Link Road, west of the Snowy Mountain Highway, and adjacent to Tantangara Reservoir. The species was found to occur in three PCTs with a dense and complex groundcover, likely to support a winter snow cover. The species was recorded at 80 locations within the survey area.

Prior to surveys undertaken for Snowy 2.0 the Smoky Mouse was known from four extant sites across NSW, with populations at several of these sites in decline (Linda Broome, DPIE, pers. comm.). The Smoky Mouse was initially recorded along Lobs Hole Ravine Road, to around 1,100 m AHD as apart of surveys for Exploratory Works. Regional surveys undertaken across approximately 8,000 ha (see Section 5.3.3c) resulted in the species being recorded at 78 locations across this area. The species distribution within the survey area is predominantly associated with tall forests dominated by Mountain Gum and Snow Gum, with a moderate to dense shrubby midstorey dominated by shrubs from the plant family Fabaceae (with some Epacridaceae and Mimosaceae), and dense groundcover with abundant sub-shrubs, logs and leaf litter along the upper reaches of Lobs Hole Ravine Road and in the Marica area, above 1,100 m. At around 1,100 m, vegetation transitions to drier communities dominated by Peppermint, Brittle Gum and Candlebark with a moderate to sparse midstorey and sparse grassy groundcover. Soils also become much rockier and may be less suitable for burrowing.

No Spotted-tail Quolls were recorded during targeted surveys within the disturbance footprint; however, an incidental record of a Quoll scat was recorded off Wallace's Creek Firetrail. The Spotted-tail Quoll is known to have home ranges of several hundred to several thousand hectares and occurs at low densities (DELWP 2016, DEWHA 2009a, DSE 2011a). The species is primarily forest-dependent, and occupies a wide range of habitat types, including rainforest, wet and dry sclerophyll forest, coastal heathland, scrub and dunes, woodland, heathy woodland, swamp forest, mangroves, on beaches and sometimes in grassland or pastoral areas adjacent to forested areas. Given this, the species has potential to occupy the Main Works disturbance footprint at low densities, with large areas of suitable habitat present throughout the locality; the species is likely to be wide ranging. All areas of the survey area are deemed to provide suitable habitat, with suitable denning sites focused on boulderfields on Lobs Hole Ravine Road, and areas with a high density of hollow logs in sub-alpine areas at the top of Lobs Hole Ravine Road and along the Yarrangobilly River.

The Booroolong Frog was recorded within the survey area along the Yarrangobilly River, from the FSL of Talbingo Reservoir to the upper reaches of the Yarrangobilly River, as well as along Wallace's Creek. It is likely that this population extends upstream to at least Blue Creek Firetrail (Dave Hunter, DPIE, pers. comm.). The Yarrangobilly River provides optimal breeding habitat for Booroolong Frog, with a series of cobble banks and bedrock structures along stream margins, with slow-flowing water. These areas are connected by larger, slow-flowing pools. Breeding habitat in Wallace's Creek is much more limited, with small sections providing suitable breeding habitat. It is likely this area provides sub-optimal breeding habitat as well as connective and dispersal habitat. Areas within 50 m of this breeding habitat has been identified as potential dispersal and refuge habitat.

The Alpine Tree Frog was recorded in various locations within and adjacent to the disturbance footprint, including near Tantangara Reservoir and along Nungar Creek Fire Trail. They will utilise natural and artificial wetlands for breeding. Non-breeding habitat and overwintering refuges are poorly known but are likely to include flat rocks, fallen logs, leaf litter and other ground debris. The species was recorded breeding in Tantangara Reservoir between minimum operating level (MOL) and FSL on several occasions as well as Nungar Creek, Eucumbene River and Tantangara Creek and associated tributaries. Breeding habitat is identified as the areas listed above, while dispersal, foraging and refuge habitat is identified as areas within 50 m of breeding habitat.

The Alpine She-oak Skink was recorded within the Main Works disturbance area and adjacent areas at 36 locations. The species is known to occur in temperate montane grasslands, favouring tree-less or very lightly treed areas containing tussock grasses, low heath or a combination of both. Records were found within PCT 1224 – Sub alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion using tile grid and transect surveys, resulting in a range extension for this species.

8.3.4 Migratory species

Following targeted surveys, three migratory species listed under the EPBC Act were recorded within and adjacent to the disturbance area:

- White-throated Needletail;
- Satin Flycatcher; and
- Latham's Snipe.

The Satin Flycatcher was recorded at five locations across the plateau and Marica area in tall montane forest (PCTs 953 and 1196) and grassy woodlands (PCT 644). These Eucalypt forest at high altitude are identified as important habitat for the species (DoE 2014d). The species was observed nesting at one location. Habitat for the species occurs over a large portion of the survey area and project area. Snowy 2.0 Main Works will directly impact on 329.56 ha of habitat for this species.

The Latham's Snipe was observed foraging in a number of wetlands across the Snowy 2.0 survey area, with 58 records of the species during surveys for Snowy 2.0. This usually occurred as single or pairs, foraging in areas of PCT 637 - Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion or PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion, as well as adjacent habitats. The species was found to be reasonably abundant within the survey area.

8.4 Impacts to MNES

This chapter discusses the potential direct and indirect impacts on threatened species and communities identified as occurring or having potential to occur within the disturbance area based on the outcomes of the field surveys outlined above. The impact assessment has also considered the impacts over different project phases, including construction, operation and decommissioning.

Potential direct and indirect impacts arising from the project are outlined extensively in Section 7.1, while measures to avoid, minimise and mitigate impacts are outlined in Section 7.2.

8.4.1 Residual impacts to MNES

Residual impacts to threatened species and communities and migratory species listed under the EPBC Act are outlined for the one community, three threatened flora species, seven threatened fauna species and two migratory species to occur within the Snowy 2.0 Main Works survey area and disturbance area below.

i Alpine Sphagnum Bogs and Associated Fens

As a result of the measures to avoid and minimise impacts, particularly removal of large sections of the project area across the plateau area, there has a been a significant reduction in impacts to this community. Snowy 2.0 Main Works will result in the removal of 1.03 ha of the community, representing less than 0.01 % of the national extent of the community. Indirect impacts are predicted to a further 4.41 ha located adjacent to the disturbance footprint.

A further 6.93 ha is mapped within the groundwater drawdown area (Section 6) and may be subject to impacts arising from changes in hydrology, representing 0.06 % of the national extent of the community. The scale and extent of these impacts are unknown and will be subject to ongoing monitoring.

ii Mauve Burr-daisy

The Mauve Burr-daisy was found to be ubiquitous throughout KNP, often growing on the margins of disturbed areas such as management tracks and firetrails. This has meant that measures to avoid and minimise impacts are challenging. The Snowy 2.0 Main Works project is expected to directly impact 3,714 individuals across 103 locations. This represents approximately 8% of the national population.

iii Clover Glycine

Significant measures were put in place to avoid impacts to this species when a large population was recorded along a proposed Tantangara East Road to access private property along the eastern edge of KNP. Surveys of this option identified significant biodiversity values along this proposed route, including sub-alpine grasslands and Alpine bogs and fens, and associated threatened species. This included a population of over 600 Clover Glycine, representing approximately 65% of the known population of the species in NSW. The removal of this option has resulted in a substantial and significant reduction in impacts to Clover Glycine.

Ten individuals will be directly impacted by Snowy 2.0, in the Tantangara Reservoir area. This represents 1% of the regional population of the species recorded during surveys undertaken for Snowy 2.0, and approximately 0.5% of the estimated national population (Carter and Sutter 2010), including records from Snowy 2.0 surveys.

iv Broad-toothed Rat

This species is strongly associated with complex habitats in the plateau area. Removal of key construction elements from this area has resulted in a significant reduction in impacts to habitat for this species. Snowy 2.0 Main Works will directly impact on 61.47 ha of habitat for this species.

There is potential for indirect impacts from fauna vehicle collisions, weeds and pathogens and increased predation to further impact this species if unmitigated. Monitoring and management measures will be included within a biodiversity management plan.

v Smoky Mouse

Regional surveys have contributed a significant amount of knowledge on the distribution of this species in northern KNP. These surveys recorded the species over a large area of suitable habitat. It is estimated that Snowy 2.0 Main Works will result in the removal of 84.29 ha of habitat for the species.

There is potential for indirect impacts from fragmentation, fauna vehicle collisions, weeds and pathogens and increased predation to further impact this species if unmitigated. Monitoring and management measures will be included within a biodiversity management plan.

vi Spotted-tailed Quoll

The Spotted-tail Quoll is predicted to occur within the project area at low densities, ranging over large areas. Snowy 2.0 Main Works will result in clearing of approximately 335.22 ha of habitat for the Spotted-tailed Quoll. Many of these areas are already disturbed due to past land use and human activity. Large areas of suitable habitat will remain in the locality.

The project will also result in indirect impacts to 432.29 ha of habitat for the Spotted-tailed Quoll. There may be some potential for residual, prescribed impacts. This is likely to be associated with activities that are required to occur and may cause some disruption to wildlife. This is lighting around buildings and works areas used at night, noise associated with construction and operational activities, and vibration from blasting. These may result in short term avoidance by the species; however, no long-term impacts are predicted.

vii Booroolong Frog

Direct impacts to Booroolong Frog have been minimised through the avoidance of works within the 50 m buffer zone where possible. Notwithstanding this, minor direct impacts to Booroolong Frog habitat will result where there are incursions into this buffer zone. Residual direct impacts include impact to 0.08 ha of breeding habitat and 1.33 ha of foraging habitat Booroolong Frog. It should be noted that these areas are currently significantly disturbed as a result of past land use and human activity.

Indirect impacts will be avoided, minimised and managed through the implementation of appropriate sediment controls. While short term transportation of fine sediments into watercourses may occur, these will not result in impacts to the Booroolong Frog. The controls to be implemented are considered to provide a high degree of confidence that long term changes to water quality will be avoided.

Following the implementation of the controls outlined above, it is considered that the risk of mobilising large amounts of coarse sediments during road construction or from the stockpile landform is negligible. Controls to be implemented around the spoil stockpile are expected to provide a high factor of safety, resulting in negligible risk of impacts to water quality in the Yarrangobilly River. In addition, treatment of existing mine discharge could result in a net improvement in water quality in the river.

There is potential for indirect impacts to result from construction noise, with noise levels of >65 dB likely to be experienced along the Yarrangobilly River and Wallace's Creek. This is equivalent to a normal conversation. These noise levels have the potential to impact on male calling behaviour and result in spatial displacement (Caorsi et al. 2018, Parris et al. 2009). These impacts will occur short-term, during construction only. Operational noise is expected to 29 dB (akin to a library or park) and be limited to immediately adjacent to the MAT and EVCT.

viii Alpine Tree Frog

Impacts to the Alpine Tree Frog have been reduced through removal of key project elements from the plateau area where the species occurs along a number of major and minor watercourses. The species was found to occur extensively over large areas of the plateau, occupying long stretches of watercourses such as Tantangara Creek, Nungar Creek and the Eucumbene River, as well as associated tributaries. Snowy 2.0 Main Works will directly impact on 22.87 ha of habitat for this species.

Unmitigated, indirect impacts may occur to this species through increased predation and changes in water quality. This will be avoided, minimised and managed through the implementation of appropriate sediment controls and implementation of a predator monitoring and control program, to be included in the biodiversity management plan.

ix Alpine She-oak Skink

Reduction of impacts in the plateau area, where the species occurs over large areas of suitable sub-alpine grassland habitat, have resulted in significant reduction in impacts. Based on the above, Snowy 2.0 Main Works will result in direct impacts to 80.83 ha of habitat for this species, representing approximately 3% of the suitable habitat mapped as a part of surveys for Snowy 2.0 and a very minor component of suitable habitat in the region.

There is potential for indirect impacts from fauna vehicle collisions, weeds and pathogens and increased predation to further impact this species if unmitigated. Monitoring and management measures will be included within a biodiversity management plan.

x Satin Flycatcher

The Satin flycatcher was recorded at five locations across the survey area, in Eucalypt forest and woodlands at high altitude. These areas are identified as important habitat for the species (DoE 2014d). Snowy 2.0 Main Works will impact on 329.56 ha of habitat for this species, based on the PCTs in which the species was recorded.

xi Latham's Snipe

The Latham's Snipe was recorded over large areas of Alpine bogs and fens and sub-alpine wet grasslands across the plateau area. Removal of project elements from these areas has resulted in a significant reduction in impacts to this species. The observation of 58 records of the species during surveys undertaken for Snowy 2.0 indicates these sub-alpine areas may support important habitat for the species, as they may support at least 0.1 per cent of the flyway population of this migratory shorebird species (DoEE 2017b). It is noted that no population estimate was obtained, so this is a conservative level of assessment. Snowy 2.0 Main Works will impact on 81.86 ha of habitat for this species.

8.4.2 Significant impact assessments

To support a determination as to whether Main Works are likely to have a 'significant impact' on threatened species the *Matters of National Environmental Significance – Significance Impact Guidelines 1.1* (DoE 2013b) have been applied.

A 'significant impact' is defined as "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" (DoE 2013b).

Consideration has been given to all threatened species and communities and migratory species with potential to occur within the survey area, with reference to DoE (2013b). Significant impact assessments have been completed for one TEC, three threatened flora species, seven threatened fauna species and two migratory species, considered to have potential to be impacted by the Main Works following the process outlined in this assessment report:

- Alpine Sphagnum Bogs and Associated Fens;
- Mauve Burr-daisy;
- Clover Glycine;
- Hoary Sunray;
- White-throated Needletail;
- Broad-toothed Rat;
- Smoky mouse;
- Spotted-tailed Quoll;
- Booroolong Frog;
- Alpine Tree Frog;

- Alpine She-oak Skink;
- Satin Flycatcher; and
- Latham's Snipe.

Significant impact assessments for the above community and species are provided in Annexure K.

These assessments concluded that a significant impact was likely to result to the Alpine Tree Frog and Smoky Mouse. The project will impact on 1.4% of the estimated habitat for the Smoky Mouse in the region. This habitat is considered critical to the survival of the Smoky Mouse, in accordance with DoE (2013b). The Snowy 2.0 Main Works project will result in direct impacts to 22.87 ha of habitat for the Alpine Tree Frog. Following the recent bushfires in the Snowy region, the majority of the habitat to be impacted is unburnt. Therefore, a precautionary assessment has been applied and it is concluded that the impacts arising from Snowy 20. Main Works will be significant for this species given removal of unburnt habitat.

Impacts to all other species and the community were not considered significant in the context of the findings of Snowy 2.0 biodiversity assessment and the areas of high-quality habitat in the region.

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Annexure A

Vegetation integrity assessment – datasheets

BAM Site – Field Survey Form

Plot ID:	7	**Date:**	18-12-17	**Survey Name:**	Lobs Hole Ravine Access Road	**Recorders:**	AM, SD
Zone:	55	**Easting:**	628780.9629	**Plot dimensions:**	20m x 50m	**Midline bearing:**	140
Datum:	GDA94	**Northing:**	6050388.025	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		679: Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	4
	Grasses etc.:	7
	Forbs:	18
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	6.4
	Grasses etc.:	27.8
	Forbs:	3.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	2	0	1
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	79		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	40	40	50	60	40	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	46					2					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Drainage depression	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Clay loam	**Soil Colour**	Brown	**Soil Depth**	Medium
Lithology (B)							
Slope	2	**Aspect**	South	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Historic clearing/logging
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Some old rabbit burrows in plot
Fire damage:	Moderate	3 to 10 yo	Regenerating shrubs and midstorey. Canopy largely unaffected
Storm damage:			No evidence
Weediness:	Light		Moderate density near track, low throughout most of the plot
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine Access Road				
Date:	18-12-17	**Plot ID:**	7	**Recorders:**	AM, SD

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	25	12		N	
Shrub (SG)	*Pimelea pauciflora*	5	50		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	0.3	10		N	
Shrub (SG)	*Brachyloma daphnoides*	0.3	5		N	
	Cirsium vulgare	0.1	5		E	
	Holcus lanatus	5	200		E	
	Sonchus oleraceus	0.2	30		E	
	Rubus anglocandicans	0.5	10		E	
Grass & grasslike	*Anthosachne scabra*	2	200		N	
Forb (FG)	*Geranium solanderi*	0.1	20		N	
	Acetosella vulgaris	0.1	20		HTE	
	Taraxacum officinale	0.1	10		E	
Forb (FG)	*Veronica subtilis*	0.1	20		N	
Forb (FG)	*Hydrocotyle laxiflora*	1	500		N	
Forb (FG)	*Asperula scoparia*	0.1	10		N	
Forb (FG)	*Viola betonicifolia*	0.1	10		N	
Forb (FG)	*Geranium antrorsum*	0.5	100		N	
Forb (FG)	*Stellaria pungens*	0.1	20		N	
	Cerastium glomeratum	0.1	20		E	
Grass & grasslike	*Themeda triandra*	5	500		N	
Grass & grasslike	*Poa sieberiana*	20	1000		N	
Grass & grasslike	*Schoenus apogon*	0.2	50		N	
Forb (FG)	*Oxalis perennans*	0.1	10		N	
Forb (FG)	*Myosotis australis*	0.1	10		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	10		N	
Forb (FG)	*Senecio quadridentatus*	0.2	10		N	
Grass & grasslike	*Poa helmsii*	0.2	20		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
Forb (FG)	*Microtis unifolia*	0.1	5		N	
Forb (FG)	*Acaena ovina*	0.1	10		N	
	Trifolium repens	0.2	20		E	
Shrub (SG)	*Hakea microcarpa*	0.1	2		N	
Grass & grasslike	*Rytidosperma penicillatum*	0.1	10		N	
	Rosa rubiginosa	0.3	10		HTE	
	Conyza canadensis var. canadensis	0.1	5		E	
Forb (FG)	*Galium gaudichaudii*	0.5	500		N	
Shrub (SG)	*Leptospermum myrtifolium*	1	1000		N	
Forb (FG)	*Bulbine bulbosa*	0.1	20		N	
Forb (FG)	*Leptorhynchos squamatus*	0.3	50		N	
Forb (FG)	*Stylidium graminifolium*	0.1	20		N	

BAM Site – Field Survey Form

Plot ID:	42	**Date:**	11-01-18	**Survey Name:**	Lobbs Hole Ravine Road north	**Recorders:**	DK
Zone:	55	**Easting:**	624854.5681	**Plot dimensions:**	20m x 50m	**Midline bearing:**	257
Datum:	GDA94	**Northing:**	6041940.321	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	6
	Shrubs:	14
	Grasses etc.:	6
	Forbs:	11
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	23.8
	Shrubs:	6.8
	Grasses etc.:	8.2
	Forbs:	2.3
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	2
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	17		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	70	30	60	70	80	2	50	20	2	0	20	0	15	40	0	1	0	15	0
Average of the 5 subplots:	50					30.8					15					3.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Gravelly loam	**Soil Colour**	Brown	**Soil Depth**	Medium
Lithology (B)							
Slope	29	**Aspect**	257	**Site Drainage**	Good	**Distance to nearest water & type**	dam

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Mostly even age regrowth
Cultivation (inc. pasture):			
Soil erosion:	Moderate	3 to 10 yo	Erosion from road above plus historic erosion from logging and grazing by stock and rabbits
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Moderate	3 to 10 yo	Fire scars
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs Hole Ravine Road north				
Date:	11-01-18	**Plot ID:**	42	**Recorders:**	DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus macrorhyncha*	15	10		N	
Tree (TG)	*Eucalyptus dives*	5	5		N	
Tree (TG)	*Eucalyptus mannifera subsp. mannifera*	2	5		N	
Shrub (SG)	*Cassinia longifolia*	2	8		N	
Shrub (SG)	*Daviesia mimosoides*	1	6		N	
Tree (TG)	*Acacia dealbata*	1	1		N	
Shrub (SG)	*Banksia canei*	1	4		N	
Shrub (SG)	*Dodonaea viscosa subsp. angustissima*	0.5	2		N	
Forb (FG)	*Dianella revoluta*	1	100		N	
	Medicago lupulina	0.1	10		E	
	Rosa rubiginosa	0.3	5		HTE	
	Hypericum perforatum	0.2	50		HTE	
Grass & grasslike	*Poa sieberiana var. sieberiana*	5	300		N	
Shrub (SG)	*Platylobium montanum*	0.5	20		N	
Shrub (SG)	*Indigofera australis*	0.2	20		N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	0.5	20		N	
Shrub (SG)	*Exocarpos strictus*	0.5	10		N	
Tree (TG)	*Eucalyptus robertsonii*	0.7	3		N	
Grass & grasslike	*Lomandra bracteata*	0.7	40		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	20		N	
Forb (FG)	*Geranium solanderi*	0.1	20		N	
	Rubus anglocandicans	0.1	1		E	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.2	20		N	
Shrub (SG)	*Pimelea linifolia*	0.1	10		N	
Other (OG)	*Glycine tabacina*	0.1	10		N	
	Centaurium erythraea	0.1	30		E	
Forb (FG)	*Asperula scoparia*	0.3	20		N	
Forb (FG)	*Acaena ovina*	0.1	10		N	
Shrub (SG)	*Pimelea curviflora*	0.1	10		N	
Grass & grasslike	*Lomandra filiformis subsp. filiformis*	0.2	30		N	
Forb (FG)	*Hypericum gramineum*	0.1	40		N	
Shrub (SG)	*Dillwynia phylicoides*	0.1	2		N	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	1		N	
Forb (FG)	*Viola betonicifolia*	0.1	1		N	
Shrub (SG)	*Bursaria spinosa*	0.1	1		N	
Forb (FG)	*Plantago gaudichaudii*	0.1	10		N	
Forb (FG)	*Stellaria pungens*	0.1	5		N	
Grass & grasslike	*Themeda triandra*	2	200		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.2	20		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	1		N	
Tree (TG)	*Acacia melanoxylon*	0.1	1		N	
Forb (FG)	*Galium binifolium*	0.1	10		N	
Grass & grasslike	*Rytidosperma spp.*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	45	**Date:**	10-02-18	**Survey Name:**	Murrumbidgee floodplain downstream of Haines Hut	**Recorders:**	DK, CW
Zone:	55	**Easting:**	646276.0993	**Plot dimensions:**	20m x 50m	**Midline bearing:**	355
Datum:	GDA94	**Northing:**	6041689.278	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	5
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	23.5
	Forbs:	3.7
	Ferns:	0
	Other:	0
High Threat Weed cover:		30

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	0	1	10	2	5	2	0	5	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	12.6					2.4					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Alluvial loams and clays	**Soil Surface Texture**	Loam	**Soil Colour**	Black	**Soil Depth**	Deep
Lithology (B)							
Slope	0	**Aspect**	0	**Site Drainage**	Moderate	**Distance to nearest water & type**	50 river

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Moderate	less than 3yo	Horses, pigs, rabbit
Fire damage:			
Storm damage:			
Weediness:	Moderate	less than 3yo	Pasture weeds, forbs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Murrumbidgee floodplain downstream of Haines Hut				
Date:	10-02-18	**Plot ID:**	45	**Recorders:**	DK, CW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Forb (FG)	*Senecio quadridentatus*	1	200		N	
Forb (FG)	*Euchiton japonicus*	0.1	10		N	
	Conyza canadensis var. canadensis	0.1	3		E	
	Acetosella vulgaris	30	1000		HTE	
	Verbascum thapsus subsp. Thapsus	0.1	10		E	
	Taraxacum officinale	0.2	100		E	
	Holcus lanatus	0.3	80		E	
Forb (FG)	*Oxalis spp.*	2	500		N	
Grass & grasslike	*Carex inversa*	0.1	10		N	
Grass & grasslike	*Juncus sarophorus*	0.4	30		N	
	Viola arvensis	0.1	50		E	
Grass & grasslike	*Isolepis inundata*	20	500		N	
	Cirsium vulgare	0.1	5		E	
	Carex leporina	0.1	1		E	
Forb (FG)	*Geranium solanderi*	0.1	2		N	
Grass & grasslike	*Carex gaudichaudiana*	1	100		N	
Forb (FG)	*Hydrocotyle algida*	0.4	200		N	
Forb (FG)	*Rorippa laciniata*	0.1	1		N	
Grass & grasslike	*Hemarthria uncinata*	2	500		N	

BAM Site – Field Survey Form

Plot ID:	58	**Date:**	15-12-17	**Survey Name:**	Dabilo dreaming, proposed northern route	**Recorders:**	SD, SW
Zone:	55	**Easting:**	645454.2921	**Plot dimensions:**	20m x 50m	**Midline bearing:**	41
Datum:	GDA94	**Northing:**	6041030.134	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	1
	Grasses etc.:	3
	Forbs:	7
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.1
	Grasses etc.:	20.6
	Forbs:	1.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		70

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	30	25	65	15	2	2	2	2	4	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	33					2.4					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Alluvial plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Alluvial loams and clays	**Soil Surface Texture**	Loamy	**Soil Colour**	Dark brown to black	**Soil Depth**	At least 100mm
Lithology (B)							
Slope	Nil	**Aspect**	Nil	**Site Drainage**	Low	**Distance to nearest water & type**	45m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light	less than 3yo	Some evidence of feral pigs, brumbies and rabbits
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	greater than 10yo	Historical grazing
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Severe	less than 3yo	Exotic forbs
Other:	Severe	less than 3yo	Large number of Poa lab showing signs of dieback

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Dabilo dreaming, proposed northern route				
Date:	15-12-17	**Plot ID:**	58	**Recorders:**	SD, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa labillardierei var. labillardierei*	20	200		N	
	Acetosella vulgaris	70	1000		HTE	
	Viola arvensis	1	200		E	
	Trifolium repens	1	200		E	
Forb (FG)	*Oxalis perennans*	0.5	100		N	
	Cerastium glomeratum	0.2	50		E	
Forb (FG)	*Senecio gunnii*	0.5	150		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	5		N	
	Taraxacum officinale	0.2	20		E	
	Holcus lanatus	0.5	50		E	
	Cynara cardunculus	0.1	1		E	
Grass & grasslike	*Carex breviculmis*	0.5	100		N	
Forb (FG)	*Veronica serpyllifolia*	0.1	10		N	
Forb (FG)	*Cardamine robusta*	0.1	10		N	
	Verbascum thapsus subsp. Thapsus	0.5	50		E	
	Conyza canadensis var. canadensis	0.1	2		E	
	Prunella vulgaris	0.2	20		E	
Grass & grasslike	*Juncus spp.*	0.1	20		N	
	Sonchus oleraceus	0.1	10		E	
Shrub (SG)	*Hakea microcarpa*	0.1	1		N	
Forb (FG)	*Chrysocephalum apiculatum*	0.1	20		N	
	Cirsium vulgare	0.1	2		E	
Forb (FG)	*Euchiton japonicus*	0.1	5		N	

BAM Site – Field Survey Form

Plot ID:	70	**Date:**	06-02-18	**Survey Name:**	Talbingo			**Recorders:**	AM, DK
Zone:	55	**Easting:**	624594.6771	**Plot dimensions:**	20m x 50m			**Midline bearing:**	280
Datum:	GDA94	**Northing:**	6040562.586	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion			**Confidence:**	Medium	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	10
	Grasses etc.:	14
	Forbs:	12
	Ferns:	3
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	33
	Shrubs:	51
	Grasses etc.:	40.9
	Forbs:	3.4
	Ferns:	4.5
	Other:	0
High Threat Weed cover:		4.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	2	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	27		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	70	40	40	15	55	0	5	15	30	10	0	5	5	10	0	0	0	0	30	0
Average of the 5 subplots:	44					12					4					6				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Gully	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	15	**Aspect**	204	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Macropods
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Talbingo				
Date:	06-02-18	Plot ID:	70	Recorders:	AM, DK

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus viminalis*	25	3		N	
Tree (TG)	*Eucalyptus dives*	3	2		N	
Shrub (SG)	*Bursaria spinosa*	6	20		N	
Shrub (SG)	*Acacia pravissima*	25	30		N	
Shrub (SG)	*Dodonaea viscosa subsp. angustissima*	4	20		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	5	10		N	
Shrub (SG)	*Grevillea arenaria subsp. canescens*	5	20		N	
Shrub (SG)	*Exocarpos strictus*	3	10		N	
	Rubus fruticosus sp. agg.	2	10		HTE	
Grass & grasslike	*Rytidosperma penicillatum*	20	1000		N	
Grass & grasslike	*Dichelachne rara*	0.5	200		N	
Grass & grasslike	*Anthosachne scabra*	0.3	100		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	1	50		N	
	Hypericum perforatum	2	300		HTE	
	Centaurium erythraea	0.2	100		E	
	Rosa rubiginosa	0.1	5		HTE	
Forb (FG)	*Hydrocotyle sibthorpioides*	0.3	500		N	
	Petrorhagia nanteuilii	0.1	100		E	
Grass & grasslike	*Rytidosperma erianthum*	1	200		N	
Shrub (SG)	*Rubus parvifolius*	0.2	10		N	
	Crepis capillaris	0.1	50		E	
Fern (EG)	*Cheilanthes sieberi subsp. sieberi*	0.3	300		N	
Forb (FG)	*Dichondra repens*	2	1000		N	
Fern (EG)	*Adiantum aethiopicum*	4	1000		N	
	Acetosella vulgaris	0.1	50		HTE	
Shrub (SG)	*Cryptandra amara*	7	100		N	
Grass & grasslike	*Carex incomitata*	0.3	20		N	
Forb (FG)	*Daucus glochidiatus*	0.1	50		N	
Shrub (SG)	*Brachyloma daphnoides*	0.1	2		N	
Forb (FG)	*Wahlenbergia stricta subsp. stricta*	0.1	10		N	
Grass & grasslike	*Carex breviculmis*	0.1	20		N	
	Aira elegantissima	0.1	100		E	
	Holcus lanatus	0.2	20		E	
Grass & grasslike	*Microlaena stipoides var. stipoides*	5	500		N	
Forb (FG)	*Stellaria pungens*	0.2	100		N	
Grass & grasslike	*Echinopogon ovatus*	2	50		N	
	Cerastium glomeratum	0.1	20		E	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	10	300		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	20		N	
Forb (FG)	*Poranthera microphylla*	0.1	10		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	20		N	
	Conyza spp.	0.1	1		E	
Fern (EG)	*Asplenium flabellifolium*	0.2	100		N	
Grass & grasslike	*Dichelachne sieberiana*	0.3	200		N	
Shrub (SG)	*Dillwynia phylicoides*	0.5	10		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.2	5		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	30		N	

Grass & grasslike	*Poa sieberiana var. sieberiana*	0.2	30		N	
Grass & grasslike	*Luzula flaccida*	0.1	40		N	
Forb (FG)	*Cullen microcephalum*	0.1	2		N	
Grass & grasslike	*Poa sieberiana var. hirtella*	0.1	5		N	
Forb (FG)	*Euchiton japonicus*	0.1	5		N	
	Vulpia bromoides	0.1	30		E	
Forb (FG)	*Pimelea curviflora var. sericea*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	71	**Date:**	06-02-18	**Survey Name:**	Talbingo	**Recorders:**	AM, DK
Zone:	55	**Easting:**	624410.5326	**Plot dimensions:**	20m x 50m	**Midline bearing:**	260
Datum:	GDA94	**Northing:**	6040490.987	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	6
	Grasses etc.:	5
	Forbs:	9
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	5
	Shrubs:	37.8
	Grasses etc.:	20.6
	Forbs:	1.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		5.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	8		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	60	45	45	35	20	10	20	1	10	15	5	10	35	30	45	0	0	0	0	5
Average of the 5 subplots:	41					11.2					25					1				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Red-brown	**Soil Depth**	
Lithology (B)							
Slope	25	**Aspect**	175	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Scattered regenerating eucalyptus
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light		Very minor
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Macropods
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Severe		Exotic grasses and forbs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Talbingo						
		Date:	06-02-18	**Plot ID:**	71	**Recorders:**	AM, DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	5	3		N	
Shrub (SG)	*Acacia pravissima*	25	30		N	
Shrub (SG)	*Grevillea rosmarinifolia subsp. rosmarinifolia*	7	20		N	
Shrub (SG)	*Cassinia longifolia*	3	5		N	
Shrub (SG)	*Exocarpos strictus*	2	5		N	
Shrub (SG)	*Cryptandra amara var. amara*	0.5	5		N	
Grass & grasslike	*Rytidosperma penicillatum*	15	1000		N	
Grass & grasslike	*Dichelachne rara*	3	500		N	
	Hypericum perforatum	5	1000		HTE	
	Centaurium erythraea	2	1000		E	
	Trifolium arvense	0.2	200		E	
	Aira elegantissima	50	1000		E	
	Petrorhagia nanteuilii	0.1	100		E	
Forb (FG)	*Daucus glochidiatus*	0.1	100		N	
Forb (FG)	*Stellaria pungens*	0.3	500		N	
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	100		N	
	Crepis capillaris	0.2	200		E	
	Rubus fruticosus sp. agg.	0.5	5		HTE	
Forb (FG)	*Hypericum gramineum*	0.1	100		N	
Forb (FG)	*Wahlenbergia stricta subsp. stricta*	0.1	50		N	
Grass & grasslike	*Anthosachne scabra*	2	300		N	
	Vulpia bromoides	10	1000		E	
Shrub (SG)	*Rubus parvifolius*	0.3	10		N	
	Acetosella vulgaris	0.1	200		HTE	
Forb (FG)	*Acaena novae-zelandiae*	0.1	20		N	
Grass & grasslike	*Carex incomitata*	0.3	20		N	
Forb (FG)	*Oxalis perennans*	0.1	10		N	
Forb (FG)	*Poranthera microphylla*	0.1	5		N	
	Verbascum virgatum	0.1	2		E	
	Holcus lanatus	0.1	10		E	
Grass & grasslike	*Carex breviculmis*	0.3	50		N	
Forb (FG)	*Euchiton japonicus*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	72	**Date:**	06-02-18	**Survey Name:**	Talbingo	**Recorders:**	AM, DK
Zone:	55	**Easting:**	624717.9913	**Plot dimensions:**	20m x 50m	**Midline bearing:**	218
Datum:	GDA94	**Northing:**	6040446.547	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:	300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment			**Confidence:**	Low	**Photo #:**	
Vegetation Class:	Southern Tableland Wet Sclerophyll Forests			**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	10
	Grasses etc.:	9
	Forbs:	8
	Ferns:	2
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	10.1
	Shrubs:	40.3
	Grasses etc.:	37.6
	Forbs:	1
	Ferns:	0.7
	Other:	0
High Threat Weed cover:		6.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	4		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	25	40	10	55	30	50	5	10	0	20	5	20	30	30	25	0	5	40	0	0
Average of the 5 subplots:	32					17					22					9				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Red-brown	**Soil Depth**	
Lithology (B)							
Slope	20	**Aspect**	145	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Historic clearing
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Macropods
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Severe		Exotic grasses and forbs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Talbingo				
Date:	06-02-18	**Plot ID:**	72	**Recorders:**	AM, DK

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus robertsonii*	4	2		N	
Tree (TG)	*Eucalyptus viminalis*	0.1	1		N	
Shrub (SG)	*Bursaria spinosa*	20	50		N	
Shrub (SG)	*Grevillea rosmarinifolia subsp. rosmarinifolia*	5	20		N	
Shrub (SG)	*Acacia pravissima*	7	20		N	
	Rubus fruticosus sp. agg.	1	5		HTE	
Shrub (SG)	*Exocarpos strictus*	0.3	3		N	
Shrub (SG)	*Dodonaea viscosa subsp. angustissima*	1	8		N	
Grass & grasslike	*Rytidosperma penicillatum*	20	1000		N	
	Aira elegantissima	15	1000		E	
	Centaurium erythraea	0.2	300		E	
	Crepis capillaris	0.2	500		E	
Forb (FG)	*Stellaria pungens*	0.1	100		N	
Grass & grasslike	*Microlaena stipoides*	2	200		N	
Fern (EG)	*Cheilanthes sieberi subsp. sieberi*	0.5	100		N	
	Hypericum perforatum	5	500		HTE	
Forb (FG)	*Hydrocotyle sibthorpioides*	0.3	200		N	
Forb (FG)	*Euchiton japonicus*	0.1	10		N	
	Petrorhagia nanteuilii	0.1	30		E	
Grass & grasslike	*Poa sieberiana var. hirtella*	10	200		N	
Grass & grasslike	*Carex breviculmis*	0.2	40		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.2	20		N	
Grass & grasslike	*Carex incomitata*	0.1	3		N	
Fern (EG)	*Asplenium flabellifolium*	0.2	100		N	
Grass & grasslike	*Anthosachne scabra*	3	300		N	
Shrub (SG)	*Grevillea arenaria subsp. canescens*	6	20		N	
	Acetosella vulgaris	0.1	50		HTE	
Forb (FG)	*Viola betonicifolia*	0.1	30		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	10		N	
Grass & grasslike	*Dichelachne rara*	2	300		N	
	Vulpia bromoides	3	500		E	
Forb (FG)	*Oxalis perennans*	0.1	10		N	
Shrub (SG)	*Cassinia longifolia*	0.5	3		N	
Tree (TG)	*Eucalyptus dives*	5	4		N	
Shrub (SG)	*Cryptandra amara*	0.1	2		N	
Forb (FG)	*Hypericum gramineum*	0.1	50		N	
	Rosa rubiginosa	0.1	2		HTE	
Grass & grasslike	*Luzula flaccida*	0.1	20		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	10		N	
Shrub (SG)	*Leptospermum brevipes*	0.2	1		N	
Forb (FG)	*Wahlenbergia stricta*	0.1	10		N	
Tree (TG)	*Eucalyptus mannifera subsp. mannifera*	1	2		N	
	Holcus lanatus	0.1	10		E	
	Briza minor	0.1	200		E	
	Bromus molliformis	0.1	20		E	

BAM Site – Field Survey Form

Plot ID:	79	**Date:**	10-01-18	**Survey Name:**	Lobbs Hole Ravine Road north	**Recorders:**	DK
Zone:	55	**Easting:**	625587.6012	**Plot dimensions:**	20m x 50m	**Midline bearing:**	50
Datum:	GDA94	**Northing:**	6039630.298	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	13
	Grasses etc.:	8
	Forbs:	7
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	10
	Shrubs:	65.8
	Grasses etc.:	6.3
	Forbs:	2.7
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	2	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	19		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	80	100	70	100	100	5	0	5	0	0	100	10	20	10	30	0	0	0	0	0
Average of the 5 subplots:	90					2					34					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Loamy clay	**Soil Colour**	Brown	**Soil Depth**	Shallow
Lithology (B)							
Slope	7	**Aspect**	300	**Site Drainage**	Moderate	**Distance to nearest water & type**	40

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Regrowth
Cultivation (inc. pasture):			
Soil erosion:	Light	greater than 10yo	
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	greater than 10yo	
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs Hole Ravine Road north				
Date:	10-01-18	**Plot ID:**	79	**Recorders:**	DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus rubida*	10	20		N	
Shrub (SG)	*Acacia pravissima*	50	500		N	
Shrub (SG)	*Leptospermum continentale*	10	200		N	
Shrub (SG)	*Banksia canei*	0.5	1		N	
Grass & grasslike	*Schoenus apogon*	3	200		N	
Forb (FG)	*Gonocarpus tetragynus*	2	500		N	
Grass & grasslike	*Lomandra filiformis subsp. filiformis*	0.3	50		N	
Forb (FG)	*Stylidium graminifolium*	0.2	70		N	
Shrub (SG)	*Leucopogon attenuatus*	0.1	5		N	
Shrub (SG)	*Dillwynia rudis*	0.2	10		N	
Forb (FG)	*Hovea heterophylla*	0.1	10		N	
Shrub (SG)	*Acacia gunnii*	0.1	1		N	
Shrub (SG)	*Brachyloma daphnoides*	1	40		N	
Grass & grasslike	*Juncus usitatus*	0.1	10		N	
	Centaurium erythraea	0.1	5		E	
Grass & grasslike	*Carex appressa*	2	200		N	
	Aira elegantissima	0.1	5		E	
Grass & grasslike	*Themeda triandra*	0.5	50		N	
Forb (FG)	*Wahlenbergia stricta*	0.1	10		N	
Shrub (SG)	*Mirbelia oxylobioides*	0.5	20		N	
Forb (FG)	*Boronia nana var. hyssopifolia*	0.1	10		N	
Grass & grasslike	*Lomandra bracteata*	0.2	40		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	0.1	20		N	
Other (OG)	*Cassytha glabella*	0.1	10		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	10		N	
Forb (FG)	*Senecio quadridentatus*	0.1	1		N	
Other (OG)	*Billardiera scandens*	0.1	1		N	
Shrub (SG)	*Exocarpos strictus*	0.2	3		N	
Shrub (SG)	*Leptospermum brevipes*	1	20		N	
Shrub (SG)	*Acacia siculiformis*	2	50		N	
	Rubus anglocandicans	0.1	5		E	
Grass & grasslike	*Austrostipa spp.*	0.1	10		N	
	Hypericum perforatum	0.1	2		HTE	
Forb (FG)	*Hypericum japonicum*	0.1	10		N	
Shrub (SG)	*Leucopogon virgatus var. virgatus*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	80	**Date:**	10-01-18	**Survey Name:**	Lobbs Hole Ravine Road north	**Recorders:**	DK
Zone:	55	**Easting:**	625548.0978	**Plot dimensions:**	20m x 50m	**Midline bearing:**	20
Datum:	GDA94	**Northing:**	6039579.655	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	15
	Grasses etc.:	6
	Forbs:	6
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	15.5
	Shrubs:	9.8
	Grasses etc.:	5.4
	Forbs:	1.1
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	1
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	41		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	95	95	80	80	50	5	0	2	10	60	10	10	60	50	2	0	2	5	1
Average of the 5 subplots:	76					13.4					38					2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Clay	**Soil Colour**		**Soil Depth**	Shallow
Lithology (B)							
Slope	15	**Aspect**	West	**Site Drainage**	Moderate	**Distance to nearest water & type**	30

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Relatively young regrowth
Cultivation (inc. pasture):			
Soil erosion:	Severe	3 to 10 yo	Bare and eroding patches, historic grazing, rabbits
Firewood / CWD removal:			
Grazing (identify native/stock):	Moderate	greater than 10yo	Close to clearing and old settlement
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs Hole Ravine Road north				
Date:	10-01-18	**Plot ID:**	80	**Recorders:**	DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus rubida*	15	20		N	
Shrub (SG)	*Acacia pravissima*	0.2	2		N	
Shrub (SG)	*Brachyloma daphnoides*	5	100		N	
Shrub (SG)	*Pimelea linifolia*	0.1	20		N	
	Hypericum perforatum	0.1	10		HTE	
Grass & grasslike	*Themeda triandra*	2	50		N	
Grass & grasslike	*Deyeuxia quadriseta*	0.2	30		N	
	Centaurium erythraea	0.1	10		E	
Grass & grasslike	*Lomandra bracteata*	1	40		N	
Forb (FG)	*Stylidium graminifolium*	0.1	20		N	
Grass & grasslike	*Aristida ramosa*	2	200		N	
Shrub (SG)	*Calytrix tetragona*	2	40		N	
Shrub (SG)	*Exocarpos strictus*	0.5	5		N	
Shrub (SG)	*Leucopogon attenuatus*	0.3	5		N	
Forb (FG)	*Xerochrysum bracteatum*	0.2	10		N	
Shrub (SG)	*Pimelea curviflora*	0.2	20		N	
Fern (EG)	*Cheilanthes austrotenuifolia*	0.1	2		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.3	10		N	
Shrub (SG)	*Banksia canei*	0.1	1		N	
Grass & grasslike	*Rytidosperma spp.*	0.1	10		N	
Forb (FG)	*Euchiton japonicus*	0.1	10		N	
Forb (FG)	*Dianella revoluta*	0.1	1		N	
Forb (FG)	*Hovea heterophylla*	0.1	2		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.1	10		N	
Forb (FG)	*Gonocarpus tetragynus*	0.5	30		N	
Tree (TG)	*Eucalyptus dives*	0.5	1		N	
Shrub (SG)	*Olearia tenuifolia*	0.3	5		N	
Shrub (SG)	*Dillwynia sieberi*	0.3	5		N	
Shrub (SG)	*Daviesia leptophylla*	0.1	2		N	
Shrub (SG)	*Acacia siculiformis*	0.1	1		N	
Shrub (SG)	*Olearia myrsinoides*	0.2	1		N	
Shrub (SG)	*Mirbelia oxylobioides*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	94	**Date:**	22-11-17	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	SW, AM
Zone:	55	**Easting:**	626020.8127	**Plot dimensions:**	20m x 50m	**Midline bearing:**	187
Datum:	GDA94	**Northing:**	6038814.448	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	10
	Grasses etc.:	6
	Forbs:	15
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	43
	Shrubs:	39.7
	Grasses etc.:	40.2
	Forbs:	1.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	3
20 – 29 cm:	1	0	3
10 – 19 cm:	1	0	0
5 – 9 cm:	0	1	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	37		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	90	80	90	98	30	1	5	0	0	0	0	1	0	0	0	0	0	0	0
Average of the 5 subplots:	75.6					7.2					0.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay loam	**Soil Colour**	Brown	**Soil Depth**	At least 100mm
Lithology (B)							
Slope		**Aspect**	Northern	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	Very light severity
Storm damage:			No evidence
Weediness:	Light		Some small exotics present
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	22-11-17	**Plot ID:**	94	**Recorders:**	SW, AM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	40	20		N	
Tree (TG)	*Eucalyptus rubida*	3	2		N	
Shrub (SG)	*Calytrix tetragona*	15	100		N	
Shrub (SG)	*Brachyloma daphnoides*	5	50		N	
Shrub (SG)	*Dillwynia rudis*	2	20		N	
Grass & grasslike	*Themeda triandra*	10	200		N	
	Hypericum perforatum	0.5	50		HTE	
	Trifolium arvense	0.2	100		E	
Forb (FG)	*Leptorhynchos squamatus*	0.1	20		N	
	Centaurium erythraea	0.1	20		E	
Grass & grasslike	*Rytidosperma pilosum*	15	200		N	
Forb (FG)	*Gonocarpus tetragynus*	0.2	50		N	
	Aira elegantissima	0.1	50		E	
	Hypochaeris radicata	0.1	5		E	
Shrub (SG)	*Acacia pravissima*	0.2	3		N	
Forb (FG)	*Hypericum gramineum*	0.3	100		N	
Forb (FG)	*Hydrocotyle laxiflora*	0.1	50		N	
Shrub (SG)	*Banksia canei*	15	20		N	
Shrub (SG)	*Exocarpos strictus*	0.2	5		N	
Forb (FG)	*Cymbonotus preissianus*	0.1	5		N	
	Medicago lupulina	0.1	20		E	
Forb (FG)	*Geranium retrorsum*	0.2	50		N	
Shrub (SG)	*Bursaria spinosa*	0.2	50		N	
Grass & grasslike	*Poa sieberiana*	10	100		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	5		N	
Grass & grasslike	*Dichelachne rara*	2	20		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.2	10		N	
Shrub (SG)	*Leucopogon ericoides*	1	10		N	
	Rosa rubiginosa	0.1	1		HTE	
Forb (FG)	*Oxalis perennans*	0.1	5		N	
Forb (FG)	*Daucus glochidiatus*	0.1	10		N	
Forb (FG)	*Galium gaudichaudii subsp. gaudichaudii*	0.1	20		N	
Forb (FG)	*Wahlenbergia stricta subsp. stricta*	0.1	10		N	
Forb (FG)	*Euchiton japonicus*	0.1	20		N	
Shrub (SG)	*Acrotriche serrulata*	1	50		N	
Forb (FG)	*Acaena agnipila*	0.1	2		N	
	Petrorhagia nanteuilii	0.1	10		E	
Forb (FG)	*Pimelea curviflora var. sericea*	0.1	5		N	
Forb (FG)	*Hovea heterophylla*	0.1	2		N	
Grass & grasslike	*Anthosachne scabra*	3	50		N	
Forb (FG)	*Stackhousia monogyna*	0.1	2		N	

BAM Site – Field Survey Form

Plot ID:	104	**Date:**	27-11-17	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	EL, AM
Zone:	55	**Easting:**	626332.8708	**Plot dimensions:**	20m x 50m	**Midline bearing:**	290
Datum:	GDA94	**Northing:**	6038703.06	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	**Confidence:**	High	**Photo #:**	
Vegetation Class:			Upper Riverina Dry Sclerophyll Forests	**EEC:**		**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	2
	Grasses etc.:	7
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	15
	Shrubs:	3.2
	Grasses etc.:	36.4
	Forbs:	1.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		7.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	2	5	3	1	2	0	15	0	0	0	0	2	0	0	0	0	0	0	0	0
Average of the 5 subplots:	2.6					3					0.4					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Alluvial plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	Flat	**Aspect**	N/A	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Grazing by native herbivores
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	27-11-17	**Plot ID:**	104	**Recorders:**	EL, AM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus camphora subsp. humeana*	15	5		N	
	Rosa rubiginosa	3	20		HTE	
Grass & grasslike	*Themeda triandra*	25	500		N	
	Hypochaeris radicata	1	100		E	
Forb (FG)	*Asperula scoparia*	0.5	50		N	
	Acetosella vulgaris	1	200		HTE	
Forb (FG)	*Veronica subtilis*	0.2	50		N	
Grass & grasslike	*Carex iynx*	7	100		N	
	Poa pratensis	30	500		E	
Grass & grasslike	*Juncus sarophorus*	3	50		N	
	Plantago lanceolata	5	500		E	
Forb (FG)	*Acaena agnipila*	0.2	50		N	
	Hypericum perforatum	0.1	20		HTE	
	Cerastium glomeratum	0.1	20		E	
Grass & grasslike	*Carex inversa*	0.5	500		N	
	Cirsium vulgare	0.1	10		E	
	Potentilla recta	0.1	10		E	
Forb (FG)	*Oxalis perennans*	0.1	20		N	
	Rubus fruticosus sp. agg.	1	5		HTE	
Forb (FG)	*Geranium solanderi*	0.1	10		N	
	Dactylis glomerata	0.2	5		E	
Shrub (SG)	*Rubus parvifolius*	0.2	5		N	
Shrub (SG)	*Pimelea pauciflora*	3	10		N	
Grass & grasslike	*Poa helmsii*	0.3	2		N	
	Crataegus monogyna	2	2		HTE	
Grass & grasslike	*Carex appressa*	0.1	3		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	0.5	10		N	
	Bromus molliformis	3	50		E	
	Vulpia bromoides	2	200		E	
	Taraxacum officinale	0.1	20		E	
Forb (FG)	*Rumex brownii*	0.1	1		N	
	Myosotis discolor	0.1	10		E	
	Lysimachia arvensis	0.1	20		E	

BAM Site – Field Survey Form

Plot ID:	105	**Date:**	06-02-18	**Survey Name:**		**Recorders:**	SD, ACM
Zone:	55	**Easting:**	632918.5462	**Plot dimensions:**	20m x 50m	**Midline bearing:**	240
Datum:	GDA94	**Northing:**	6038713.795	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		639: Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Montane Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	10
	Grasses etc.:	4
	Forbs:	12
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	37
	Shrubs:	10.2
	Grasses etc.:	20.7
	Forbs:	5.2
	Ferns:	0
	Other:	0.3
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	75	80	40	85	70	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	70					1					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Loamy clay	**Soil Colour**	Brown	**Soil Depth**	Deep
Lithology (B)							
Slope	5	**Aspect**	Western	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Presumed logged
Cultivation (inc. pasture):			
Soil erosion:	Light	greater than 10yo	Presumed
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	greater than 10yo	Historical cattle
Fire damage:	Moderate	3 to 10 yo	Killed canopy - regrowth
Storm damage:	Moderate	3 to 10 yo	Much debris
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	06-02-18	**Plot ID:**	105	**Recorders:**	SD, ACM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus delegatensis subsp. Delegatensis*	35	20		N	
Tree (TG)	*Eucalyptus pauciflora*	2	1		N	
Shrub (SG)	*Daviesia ulicifolia subsp. ruscifolia*	1	40		N	
Shrub (SG)	*Platylobium montanum*	3	200		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	20	1000		N	
Forb (FG)	*Stellaria pungens*	0.4	80		N	
Forb (FG)	*Goodenia hederacea subsp. alpestris*	1	100		N	
Forb (FG)	*Arthropodium milleflorum*	2	300		N	
Shrub (SG)	*Tetratheca bauerifolia*	3	300		N	
Shrub (SG)	*Persoonia chamaepeuce*	1	40		N	
Forb (FG)	*Asperula scoparia*	0.8	100		N	
Forb (FG)	*Galium propinquum*	0.1	10		N	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	5		N	
Shrub (SG)	*Acacia obliquinervia*	0.5	10		N	
Shrub (SG)	*Cassinia aculeata*	0.4	3		N	
Forb (FG)	*Coronidium rutidolepis*	0.2	20		N	
Shrub (SG)	*Gompholobium huegelii*	0.6	40		N	
Grass & grasslike	*Lomandra longifolia*	0.5	20		N	
Shrub (SG)	*Pimelea linifolia*	0.1	10		N	
Forb (FG)	*Stylidium graminifolium*	0.1	10		N	
Other (OG)	*Clematis glycinoides*	0.3	30		N	
Forb (FG)	*Viola betonicifolia*	0.1	20		N	
Shrub (SG)	*Acacia verniciflua*	0.5	1		N	
Forb (FG)	*Brachyscome aculeata*	0.1	10		N	
Forb (FG)	*Senecio gunnii*	0.1	5		N	
	Hypochaeris radicata	0.1	1		E	
Shrub (SG)	*Olearia phlogopappa*	0.1	5		N	
Grass & grasslike	*Deyeuxia quadriseta*	0.1	5		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.1	5		N	
Forb (FG)	*Dianella tasmanica*	0.2	5		N	

BAM Site – Field Survey Form

Plot ID:	110	**Date:**	12-12-17	**Survey Name:**	Ravine early works			**Recorders:**	SD, EL
Zone:	55	**Easting:**	626313.1782	**Plot dimensions:**	20m x 50m			**Midline bearing:**	270
Datum:	GDA94	**Northing:**	6038411.25	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion			**Confidence:**		**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	7
	Grasses etc.:	9
	Forbs:	10
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	26.5
	Shrubs:	4.6
	Grasses etc.:	8.3
	Forbs:	1.4
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	3	0	3
30 – 49 cm:	5	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	63		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	40	35	30	40	20	10	5	4	0	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	33					4					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Fine sandy clay	**Soil Colour**	Brown	**Soil Depth**	Shallow
Lithology (B)							
Slope	10	**Aspect**	North	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Historical
Cultivation (inc. pasture):			No evidence
Soil erosion:	Moderate	greater than 10yo	Associated with access track adjacent to plot
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	greater than 10yo	Native and exotic herbivores
Fire damage:	Light	3 to 10 yo	
Storm damage:			No evidence
Weediness:	Light	less than 3yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Ravine early works						
		Date:	12-12-17	**Plot ID:**	110	**Recorders:**	SD, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus nortonii*	25	20		N	
Tree (TG)	*Eucalyptus rubida*	0.5	1		N	
Tree (TG)	*Acacia dealbata*	1	5		N	
Shrub (SG)	*Banksia canei*	1	2		N	
Shrub (SG)	*Exocarpos strictus*	1	7		N	
Shrub (SG)	*Cassinia longifolia*	1	8		N	
	Centaurium erythraea	0.1	10		E	
	Hypericum perforatum	0.1	20		HTE	
	Taraxacum officinale	0.1	2		E	
Grass & grasslike	*Themeda triandra*	5	500		N	
Shrub (SG)	*Brachyloma daphnoides*	0.5	10		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	1	100		N	
Shrub (SG)	*Acacia pravissima*	0.5	10		N	
	Aira elegantissima	0.1	30		E	
Forb (FG)	*Hypericum gramineum*	0.1	30		N	
Forb (FG)	*Geranium homeanum*	0.1	10		N	
Forb (FG)	*Gonocarpus teucrioides*	0.3	100		N	
Grass & grasslike	*Lomandra confertifolia*	0.5	50		N	
Forb (FG)	*Hydrocotyle laxiflora*	0.2	50		N	
Forb (FG)	*Plantago gaudichaudii*	0.2	30		N	
Grass & grasslike	*Rytidosperma caespitosum*	0.5	100		N	
Shrub (SG)	*Leucopogon attenuatus*	0.1	1		N	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	5		N	
Grass & grasslike	*Anthosachne scabra*	0.5	100		N	
Forb (FG)	*Euchiton sphaericus*	0.1	5		N	
Grass & grasslike	*Echinopogon ovatus*	0.1	1		N	
Other (OG)	*Desmodium varians*	0.1	5		N	
Forb (FG)	*Senecio quadridentatus*	0.1	1		N	
Shrub (SG)	*Calytrix tetragona*	0.5	20		N	
	Rosa rubiginosa	0.1	1		HTE	
Forb (FG)	*Dianella revoluta*	0.1	5		N	
Grass & grasslike	*Juncus usitatus*	0.1	2		N	
Forb (FG)	*Oxalis perennans*	0.1	5		N	
Grass & grasslike	*Aristida spp.*	0.5	100		N	
Grass & grasslike	*Austrostipa scabra*	0.1	50		N	

BAM Site – Field Survey Form

Plot ID:	132	**Date:**	27-11-17	**Survey Name:**	Plateau	**Recorders:**	AM, EL
Zone:	55	**Easting:**	636309.041	**Plot dimensions:**	20m x 50m	**Midline bearing:**	218
Datum:	GDA94	**Northing:**	6038309.976	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**		**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	5
	Grasses etc.:	3
	Forbs:	15
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	13.2
	Grasses etc.:	70.4
	Forbs:	6.7
	Ferns:	0
	Other:	0
High Threat Weed cover:		3.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	2	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	43		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	25	10	1	20	35	15	2	0	1	0	0	0	0	0	0	10	4	15	40	0
Average of the 5 subplots:	18.2					3.6					0					13.8				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**	North-east	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Maintained power line corridor
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light	less than 3yo	Slight damage (disturbance of ground veg) from horses
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Grazing by native herbivores and also pest species (rabbit and horse)
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Moderate		
Other:			Clearance associated with power line corridor. Abundant logs also associated with this. Evidence of exotic (rabbit

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plateau				
Date:	27-11-17	**Plot ID:**	132	**Recorders:**	AM, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Acacia obliquinervia*	2	8		N	
Shrub (SG)	*Pimelea pauciflora*	10	20		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	70	500		N	
	Acetosella vulgaris	3	500		HTE	
	Trifolium repens	5	500		E	
Forb (FG)	*Senecio gunnii*	0.1	10		N	
Forb (FG)	*Acaena agnipila*	0.4	50		N	
	Hypochaeris radicata	0.3	100		E	
Shrub (SG)	*Rubus parvifolius*	0.1	5		N	
Grass & grasslike	*Carex breviculmis*	0.3	50		N	
Forb (FG)	*Geranium antrorsum*	0.5	100		N	
	Taraxacum officinale	0.2	50		E	
Forb (FG)	*Asperula conferta*	2	200		N	
	Cerastium glomeratum	0.2	100		E	
Forb (FG)	*Epilobium gunnianum*	2	500		N	
Forb (FG)	*Acaena novae-zelandiae*	0.5	50		N	
Forb (FG)	*Stellaria pungens*	0.1	20		N	
Forb (FG)	*Celmisia costiniana*	0.3	50		N	
Forb (FG)	*Leucochrysum albicans*	0.2	100		N	
Shrub (SG)	*Daviesia ulicifolia*	1	10		N	
Forb (FG)	*Lobelia pedunculata*	0.1	20		N	
	Hypericum perforatum	0.2	20		HTE	
Shrub (SG)	*Acrothamnus hookeri*	0.1	1		N	
Forb (FG)	*Coronidium scorpioides*	0.1	10		N	
	Medicago lupulina	0.1	10		E	
	Tragopogon dubius	0.1	5		E	
Grass & grasslike	*Luzula flaccida*	0.1	20		N	
Forb (FG)	*Viola betonicifolia*	0.1	20		N	
Forb (FG)	*Arthropodium milleflorum*	0.1	5		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
Forb (FG)	*Swainsona spp.*	0.1	20		N	

BAM Site – Field Survey Form

Plot ID:	139	**Date:**	21-11-17	**Survey Name:**	Lobs Hole Ravine Road - alternate 139 location	**Recorders:**	ED, LH
Zone:	55	**Easting:**	625890.5683	**Plot dimensions:**	20m x 50m	**Midline bearing:**	160
Datum:	GDA94	**Northing:**	6038121.144	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		999: Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	11
	Grasses etc.:	4
	Forbs:	10
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	65
	Shrubs:	59.2
	Grasses etc.:	3.5
	Forbs:	1.3
	Ferns:	0
	Other:	0.8
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	18		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	90	85	85	70	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	85					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Course loam	**Soil Colour**	Red-brown	**Soil Depth**	
Lithology (B)							
Slope	Moderate	**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine Road - alternate 139 location				
Date:	21-11-17	**Plot ID:**	139	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Forb (FG)	*Thelymitra spp.*	0.1	30	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.8	50	Yes	N	
Shrub (SG)	*Boronia spp.*	1	100	Yes	N	
Forb (FG)	*Poranthera microphylla*	0.4	30	Yes	N	
Other (OG)	*Hardenbergia violacea*	0.3	15		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.8	30	Yes	N	
Grass & grasslike	*Dichelachne hirtella*	0.5	40	Yes	N	
Forb (FG)	*Senecio spp.*	0.1	5		N	
Shrub (SG)	*Brachyloma daphnoides*	3	80	Yes	N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	30		N	
Shrub (SG)	*Calytrix tetragona*	25	300	Yes	N	
Other (OG)	*Cassytha pubescens*	0.5	10	Yes	N	
Shrub (SG)	*Acacia buxifolia subsp. buxifolia*	1	10		N	
Shrub (SG)	*Mirbelia oxylobioides*	25	200	Yes	N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.2	15	Yes	N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	4	Yes	N	
Grass & grasslike	*Lomandra filiformis*	0.2	10	Yes	N	
Forb (FG)	*Diuris sulphurea*	0.1	2	Yes	N	
Forb (FG)	*Wahlenbergia gracilis*	0.1	10	Yes	N	
Forb (FG)	*Hypericum gramineum*	0.1	5	Yes	N	
Shrub (SG)	*Banksia canei*	1	2	Yes	N	
Shrub (SG)	*Cassinia longifolia*	1	1	No	N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	2	40	No	N	
Shrub (SG)	*Indigofera australis*	0.2	1	No	N	
Forb (FG)	*Stylidium graminifolium*	0.1	15		N	
Forb (FG)	*Wahlenbergia communis*	0.1	1		N	
Tree (TG)	*Eucalyptus nortonii*	20	15	Yes	N	
Tree (TG)	*Eucalyptus dives*	45	25	Yes	N	
Shrub (SG)	*Dillwynia rudis*	1	5		N	

BAM Site – Field Survey Form

Plot ID:	144	**Date:**	23-11-17	**Survey Name:**		**Recorders:**	ED, LH
Zone:	55	**Easting:**	626943.2775	**Plot dimensions:**	20m x 50m	**Midline bearing:**	10
Datum:	GDA94	**Northing:**	6038109.053	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Upper Riverina Dry Sclerophyll Forests		**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	1
	Grasses etc.:	5
	Forbs:	3
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	60
	Shrubs:	0.2
	Grasses etc.:	17.4
	Forbs:	0.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		86.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	11	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	4		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	3	10	20	35	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	15.6					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Alluvial plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Silty loam	**Soil Colour**	Dark brown	**Soil Depth**	Deep
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Small size class eucalypts
Cultivation (inc. pasture):			No
Soil erosion:			No
Firewood / CWD removal:			No
Grazing (identify native/stock):	Light		Deers
Fire damage:			
Storm damage:			
Weediness:	Severe	greater than 10yo	Extensive blackberry
Other:	Moderate	greater than 10yo	Deers tracks and droppings

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:						
	Date:	23-11-17	Plot ID:	144	Recorders:	ED, LH

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
	Rubus fruticosus sp. agg.	85	500		HTE	
	Rosa rubiginosa	0.5	1		HTE	
Grass & grasslike	*Carex gaudichaudiana*	5	20		N	
Grass & grasslike	*Carex inversa*	5	15		N	
Grass & grasslike	*Carex appressa*	2	40		N	
Forb (FG)	*Sonchus spp.*	0.2	10		N	
Grass & grasslike	*Juncus filicaulis*	0.4	15		N	
	Holcus lanatus	3	30		E	
Forb (FG)	*Acaena novae-zelandiae*	0.2	10		N	
	Prunella spp.	0.2	20		E	
	Trifolium repens	0.1	10		E	
	Trifolium spp.	0.1	10		E	
Grass & grasslike	*Carex breviculmis*	5	500		N	
	Agrostis capillaris	1	25		HTE	
Forb (FG)	*Veronica subtilis*	0.1	20		N	
	Centaurium erythraea	0.1	4		E	
Tree (TG)	*Eucalyptus camphora*	60	55		N	
Shrub (SG)	*Rubus parvifolius*	0.2	10		N	

BAM Site – Field Survey Form

Plot ID:	154	**Date:**	21-11-17	**Survey Name:**	Lobs Hole Ravine access	**Recorders:**	AM, SW
Zone:	55	**Easting:**	625887.332	**Plot dimensions:**	20m x 50m	**Midline bearing:**	210
Datum:	GDA94	**Northing:**	6037831.197	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		999: Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	8
	Grasses etc.:	6
	Forbs:	10
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	21
	Shrubs:	75.2
	Grasses etc.:	3.3
	Forbs:	1.1
	Ferns:	0.1
	Other:	0.3
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	2		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	96	30	15	85	15	3	30	40	0	40	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	48.2					22.6					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay loam	**Soil Colour**	Brown-red	**Soil Depth**	up to 100mm
Lithology (B)							
Slope		**Aspect**	NE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:			No evidence
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine access				
Date:	21-11-17	**Plot ID:**	154	**Recorders:**	AM, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus nortonii*	20	10	<Null>	N	
Shrub (SG)	*Calytrix tetragona*	60	500	<Null>	N	
Shrub (SG)	*Dodonaea viscosa subsp. angustifolia*	5	50	<Null>	N	
Shrub (SG)	*Hibbertia obtusifolia*	1	20	<Null>	N	
Shrub (SG)	*Brachyloma daphnoides*	5	100	<Null>	N	
Shrub (SG)	*Exocarpos strictus*	0.2	5	<Null>	N	
	Hypericum perforatum	0.1	20	<Null>	HTE	
Forb (FG)	*Wahlenbergia stricta subsp. stricta*	0.1	10	<Null>	N	
Other (OG)	*Hardenbergia violacea*	0.2	20	<Null>	N	
	Senecio_bathurstianus	0.1	3	<Null>		
Forb (FG)	*Geranium solanderi*	0.1	10	<Null>	N	
Fern (EG)	*Cheilanthes sieberi*	0.1	20	<Null>	N	
	Lysimachia arvensis	0.1	20	<Null>	E	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.1	1	<Null>	N	
	Aira elegantissima	0.2	500	<Null>	E	
	Rosa rubiginosa	0.1	1	<Null>	HTE	
Forb (FG)	*Chrysocephalum semipapposum*	0.2	20	<Null>	N	
Forb (FG)	*Acaena agnipila*	0.1	4	<Null>	N	
Grass & grasslike	*Rytidosperma caespitosum*	1	50	<Null>	N	
Forb (FG)	*Stylidium graminifolium*	0.1	20	<Null>	N	
Grass & grasslike	*Dichelachne hirtella*	1	100	<Null>	N	
	Petrorhagia nanteuilii	0.1	20	<Null>	E	
Forb (FG)	*Daucus glochidiatus*	0.1	10	<Null>	N	
Grass & grasslike	*Austrostipa scabra*	1	20	<Null>	N	
Shrub (SG)	*Dillwynia rudis*	1	20	<Null>	N	
Shrub (SG)	*Cassinia longifolia*	1	5	<Null>	N	
	Vulpia bromoides	1	50	<Null>	E	
	Bromus diandrus	0.1	20	<Null>	HTE	
Forb (FG)	*Gonocarpus tetragynus*	0.1	20	<Null>	N	
Forb (FG)	*Hydrocotyle laxiflora*	0.1	10	<Null>	N	
Forb (FG)	*Euchiton japonicus*	0.1	5	<Null>	N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	0.5	3	<Null>	N	
Shrub (SG)	*Bursaria spinosa*	2	20	<Null>	N	
Other (OG)	*Glycine clandestina*	0.1	3	<Null>	N	
Tree (TG)	*Eucalyptus dives*	0.5	2	<Null>	N	
Forb (FG)	*Stackhousia monogyna*	0.1	2	<Null>	N	
Grass & grasslike	*Austrostipa scabra*	0.1	5	<Null>	N	
Grass & grasslike	*Carex breviculmis*	0.1	10	<Null>	N	
	Hypericum perforatum	0.1	5	<Null>	HTE	

BAM Site – Field Survey Form

Plot ID:	156	**Date:**	21-11-17	**Survey Name:**	Lobs Hole Ravine Track - adjusted 156	**Recorders:**	ED, LH
Zone:	55	**Easting:**	626037.5875	**Plot dimensions:**	20m x 50m	**Midline bearing:**	171
Datum:	GDA94	**Northing:**	6037660.762	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	

Plant Community Type:	300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	**Confidence:**	Low	**Photo #:**	
Vegetation Class:	Southern Tableland Wet Sclerophyll Forests	**EEC:**	Yes	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	5
	Grasses etc.:	4
	Forbs:	8
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	45
	Shrubs:	74
	Grasses etc.:	4.5
	Forbs:	3.9
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		1.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	20		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	20	40	35	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	29					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam fine	**Soil Colour**	Brown-grey	**Soil Depth**	
Lithology (B)							
Slope	Steep	**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Large areas with trees removed
Cultivation (inc. pasture):			
Soil erosion:	Light	greater than 10yo	
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Light	greater than 10yo	Some herbaceous and shrubs weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine Track - adjusted 156				
Date:	21-11-17	**Plot ID:**	156	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Calytrix tetragona*	1	10	Yes	N	
Shrub (SG)	*Brachyloma daphnoides*	1	10	Yes	N	
Shrub (SG)	*Cassinia longifolia*	45	400		N	
Shrub (SG)	*Bursaria spinosa*	25	300		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	15	100		N	
Forb (FG)	*Chrysocephalum semipapposum*	3	100		N	
Grass & grasslike	*Dichelachne crinita*	2	50		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	2	60		N	
	Centaurium erythraea	0.1	10		E	
Forb (FG)	*Oxalis perennans*	0.1	5		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	10	Yes	N	
Forb (FG)	*Geranium solanderi*	0.2	50		N	
Shrub (SG)	*Exocarpos strictus*	2	6		N	
Forb (FG)	*Wahlenbergia stricta*	0.2	50	Yes	N	
Grass & grasslike	*Carex spp.*	0.1	10	Yes	N	
	Hypericum perforatum	0.4	50		HTE	
Grass & grasslike	*Dichelachne hirtella*	0.4	50	No	N	
	Petrorhagia nanteuilii	0.1	5	Yes	E	
	Trifolium arvense	0.6	80		E	
	Rosa rubiginosa	0.8	10		HTE	
	Rubus fruticosus sp. agg.	0.3	2		HTE	
Forb (FG)	*Daucus glochidiatus*	0.1	5	Yes	N	
Forb (FG)	*Senecio spp.*	0.1	5	Yes	N	
Forb (FG)	*Senecio spp.*	0.1	3	Yes	N	
	Trifolium campestre	1	200		E	
	Lysimachia arvensis	0.1	10		E	
Fern (EG)	*Cheilanthes spp.*	0.1	2		N	
Tree (TG)	*Eucalyptus viminalis*	20	8		N	
Tree (TG)	*Eucalyptus robertsonii*	5	3		N	
Tree (TG)	*Eucalyptus mannifera subsp. mannifera*	5	3		N	

BAM Site – Field Survey Form

Plot ID:	163	**Date:**	11-01-18	**Survey Name:**	Tantangara Dam Road east	**Recorders:**	DK
Zone:	55	**Easting:**	650021.9586	**Plot dimensions:**	10m x 40m x 50m	**Midline bearing:**	80
Datum:	GDA94	**Northing:**	6037377.824	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	4
	Grasses etc.:	2
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	1.7
	Grasses etc.:	2
	Forbs:	2.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		1.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	25		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	95	70	60	30	60	5	25	30	70	40	5	10	10	15	5	0	5	5	1	0
Average of the 5 subplots:	63					34					9					2.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Clay	**Soil Colour**	Red-brown	**Soil Depth**	Shallow
Lithology (B)							
Slope	45	**Aspect**	340	**Site Drainage**	Good	**Distance to nearest water & type**	70m dam

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Damaged by roads above and below
Cultivation (inc. pasture):			
Soil erosion:	Severe	greater than 10yo	Very steep road cutting plus grazingrabbits and digging by rabbits
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	less than 3yo	Rabbits
Fire damage:			
Storm damage:			
Weediness:	Severe	3 to 10 yo	Grasses and forbs plus some shrubs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Dam Road east				
Date:	11-01-18	**Plot ID:**	163	**Recorders:**	DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	15	20		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.5	30		N	
	Aira elegantissima	20	1000		E	
	Rubus anglocandicans	1	2		E	
	Ribes uva-crispa	0.7	1		E	
Forb (FG)	*Geranium solanderi*	0.2	40		N	
Forb (FG)	*Senecio quadridentatus*	1	300		N	
	Echium plantagineum	0.1	10		E	
	Hypericum perforatum	0.4	20		HTE	
	Cirsium vulgare	0.3	20		E	
	Dactylis glomerata	10	100		E	
Grass & grasslike	*Anthosachne scabra*	1	200		N	
Grass & grasslike	*Rytidosperma caespitosum*	1	200		N	
Shrub (SG)	*Bossiaea bracteosa*	0.2	10		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Shrub (SG)	*Pimelea pauciflora*	0.2	5		N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	20		N	
	Verbascum virgatum	0.1	30		E	
Forb (FG)	*Acaena ovina*	0.2	30		N	
Shrub (SG)	*Melicytus dentatus*	0.3	3		N	
	Acetosella vulgaris	1	500		HTE	
Shrub (SG)	*Daviesia mimosoides*	1	5		N	
	Hypochaeris glabra	0.1	40		E	
	Taraxacum officinale	0.1	20		E	
Forb (FG)	*Oxalis perennans*	0.2	20		N	
	Rosa rubiginosa	0.2	10		HTE	
	Holcus lanatus	0.5	100		E	
	Verbascum thapsus subsp. Thapsus	0.5	10		E	
	Sonchus oleraceus	0.2	5		E	
Forb (FG)	*Myosotis australis*	0.1	2		N	
	Centaurium erythraea	0.1	10		E	
Tree (TG)	*Eucalyptus lacrimans*	15	10		N	

BAM Site – Field Survey Form

Plot ID:	164	**Date:**	23-11-17	**Survey Name:**	Tantangara Dam south intake	**Recorders:**	ED, LH
Zone:	55	**Easting:**	649062.6036	**Plot dimensions:**	20m x 50m	**Midline bearing:**	117
Datum:	GDA94	**Northing:**	6037390.662	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	Yes	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	3
	Grasses etc.:	8
	Forbs:	5
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	2
	Shrubs:	27.2
	Grasses etc.:	23.5
	Forbs:	2.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.7

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	10	10	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	9					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Fine loam	**Soil Colour**	Dark brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No
Cultivation (inc. pasture):			No
Soil erosion:			No
Firewood / CWD removal:			
Grazing (identify native/stock):	Moderate	greater than 10yo	Horses and rabbits present. trampling is severe changing nsture and structure of landscape
Fire damage:			No
Storm damage:			No
Weediness:	Moderate	greater than 10yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Dam south intake				
Date:	23-11-17	**Plot ID:**	164	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	2	2		N	
Grass & grasslike	*Themeda triandra*	0.2	20		N	
Shrub (SG)	*Hakea microcarpa*	25	200		N	
Shrub (SG)	*Epacris breviflora*	2	20		N	
Grass & grasslike	*Juncus sarophorus*	4	50		N	
Forb (FG)	*Senecio gunnii*	0.5	40		N	
Forb (FG)	*Gonocarpus montanus*	0.1	20		N	
Forb (FG)	*Hydrocotyle laxiflora*	0.2	80		N	
	Cirsium spp.	0.1	3		E	
Forb (FG)	*Acaena novae-zelandiae*	1	40		N	
Forb (FG)	*Epilobium gunnianum*	0.3	50		N	
	Holcus lanatus	30	500		E	
	Acetosella vulgaris	0.7	10		HTE	
Grass & grasslike	*Carex breviculmis*	0.1	4		N	
Grass & grasslike	*Luzula flaccida*	0.1	5		N	
	Hypochaeris radicata	0.1	6		E	
Grass & grasslike	*Poa labillardierei var. labillardierei*	5	100		N	
	Anthoxanthum odoratum	40	1000		E	
Grass & grasslike	*Poa sieberiana*	10	300		N	
Grass & grasslike	*Empodisma minus*	4	80		N	
Shrub (SG)	*Epacris microphylla*	0.2	10		N	
Grass & grasslike	*Carex inversa*	0.1	5		N	

BAM Site – Field Survey Form

Plot ID:	167	**Date:**	23-11-17	**Survey Name:**	Tanatangara south intake	**Recorders:**	ED, LH
Zone:	55	**Easting:**	648817.4246	**Plot dimensions:**	20m x 50m	**Midline bearing:**	328
Datum:	GDA94	**Northing:**	6037148.006	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	Yes	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	4
	Grasses etc.:	6
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	12
	Shrubs:	7.3
	Grasses etc.:	45.4
	Forbs:	6.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	20		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	95	30	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	35					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Fine loam	**Soil Colour**	Dark brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No
Cultivation (inc. pasture):			
Soil erosion:			No
Firewood / CWD removal:			No
Grazing (identify native/stock):	Light	greater than 10yo	Rabbit hole and horse droppings
Fire damage:			No
Storm damage:			No
Weediness:	Light	greater than 10yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tanatangara south intake				
Date:	23-11-17	**Plot ID:**	167	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Themeda triandra*	5	100		N	
Forb (FG)	*Chrysocephalum semipapposum*	3	30		N	
Shrub (SG)	*Hakea microcarpa*	5	45		N	
Shrub (SG)	*Pimelea pauciflora*	1	10		N	
Forb (FG)	*Senecio gunnii*	2	100		N	
Tree (TG)	*Eucalyptus stellulata*	10	30		N	
Shrub (SG)	*Acrothamnus hookeri*	1	10		N	
Forb (FG)	*Acaena novae-zelandiae*	1	10		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.2	20		N	
Forb (FG)	*Stellaria pungens*	0.1	15		N	
Shrub (SG)	*Dillwynia prostrata*	0.3	30		N	
Forb (FG)	*Poranthera microphylla*	0.1	40		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
Tree (TG)	*Eucalyptus pauciflora*	2	1		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.1	5		N	
Grass & grasslike	*Carex breviculmis*	0.1	10		N	
Forb (FG)	*Epilobium gunnianum*	0.1	5		N	
	Hypochaeris radicata	0.1	4		E	
Grass & grasslike	*Luzula flaccida*	0.1	10		N	
	Anthoxanthum odoratum	50	1000		E	
Grass & grasslike	*Poa sieberiana*	40	1000		N	
Grass & grasslike	*Empodisma minus*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	169	**Date:**	20-11-17	**Survey Name:**	Lobs Hole Ravine access	**Recorders:**	AM, SW
Zone:	55	**Easting:**	626538.2111	**Plot dimensions:**	20m x 50m	**Midline bearing:**	170
Datum:	GDA94	**Northing:**	6037091.582	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	**Confidence:**	Low	**Photo #:**	
Vegetation Class:			Southern Tableland Wet Sclerophyll Forests	**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	3
	Grasses etc.:	3
	Forbs:	10
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	14
	Grasses etc.:	40
	Forbs:	1.9
	Ferns:	0.3
	Other:	0.1
High Threat Weed cover:		8.7

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	1	0
5 – 9 cm:	0	1	0
< 5 cm:	0	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	3		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	20	10	15	30	1	2	0	2	0	0	0	0	5	0	0	0	0	0	0
Average of the 5 subplots:	18					1					1					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay loam	**Soil Colour**	Light brown	**Soil Depth**	<100mm
Lithology (B)							
Slope		**Aspect**	Northern	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	Site is disturbed with regrowth
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Moderate		High number of exotic species present, more than 50% ground cover is exotic.
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine access				
Date:	20-11-17	**Plot ID:**	169	**Recorders:**	AM, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Acacia dealbata subsp. subalpina*	25	100	<Null>	N	
Shrub (SG)	*Exocarpos strictus*	10	50	<Null>	N	
Forb (FG)	*Oxalis perennans*	0.2	50	<Null>	N	
Grass & grasslike	*Dichelachne hirtella*	5	500	<Null>	N	
	Hypericum perforatum	0.5	50	<Null>	HTE	
	Taraxacum officinale	1	500	<Null>	E	
	Lysimachia arvensis	0.3	100	<Null>	E	
	Hypochaeris radicata	0.5	500	<Null>	E	
	Rubus fruticosus sp. agg.	3	50	<Null>	HTE	
Forb (FG)	*Chrysocephalum semipapposum*	0.2	50	<Null>	N	
Forb (FG)	*Daucus glochidiatus*	0.1	50	<Null>	N	
Forb (FG)	*Senecio quadridentatus*	0.1	50	<Null>	N	
Forb (FG)	*Geranium solanderi*	0.4	100	<Null>	N	
	Aira elegantissima	7	1000	<Null>	E	
Grass & grasslike	*Anthosachne scabra*	5	500	<Null>	N	
	Rosa rubiginosa	0.2	10	<Null>	HTE	
Forb (FG)	*Galium gaudichaudii subsp. gaudichaudii*	0.1	50	<Null>	N	
	Petrorhagia nanteuilii	0.1	10	<Null>	E	
	Vulpia bromoides	50	1000	<Null>	E	
	Medicago lupulina	0.1	20	<Null>	E	
	Trifolium arvense	0.5	1000	<Null>	E	
	Verbascum virgatum	0.1	20	<Null>	E	
	Bromus madritensis	10	500	<Null>	E	
	Sonchus oleraceus	0.1	20	<Null>	E	
	Acetosella vulgaris	5	1000	<Null>	HTE	
Shrub (SG)	*Cassinia longifolia*	2	10	<Null>	N	
	Plantago lanceolata	0.1	20	<Null>	E	
Forb (FG)	*Hydrocotyle laxiflora*	0.5	100	<Null>	N	
Fern (EG)	*Cheilanthes sieberi*	0.3	100	<Null>	N	
	Conyza spp.	0.1	20	<Null>	E	
Grass & grasslike	*Rytidosperma pilosum*	30	1000	<Null>	N	
	Dichopogon_fimbriatus	0.1	20	<Null>		
	Centaurium erythraea	0.1	10	<Null>	E	
Other (OG)	*Convolvulus angustissimus*	0.1	5	<Null>	N	
Forb (FG)	*Rumex brownii*	0.1	2	<Null>	N	
Shrub (SG)	*Bursaria spinosa*	2	10	<Null>	N	
	Cirsium vulgare	0.1	5	<Null>	E	
Forb (FG)	*Acaena agnipila*	0.1	20	<Null>	N	
Forb (FG)	*Bulbine bulbosa*	0.1	20	<Null>	N	

BAM Site – Field Survey Form

Plot ID:	172	**Date:**	20-11-17	**Survey Name:**	Lobs Hole Ravine Track	**Recorders:**	ED, LH
Zone:	55	**Easting:**	626846.609	**Plot dimensions:**	20m x 50m	**Midline bearing:**	60
Datum:	GDA94	**Northing:**	6034263.31	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	**Confidence:**	High	**Photo #:**	
Vegetation Class:			Southern Tableland Wet Sclerophyll Forests	**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	7
	Grasses etc.:	2
	Forbs:	7
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	60
	Shrubs:	96.1
	Grasses etc.:	70
	Forbs:	1.3
	Ferns:	0.8
	Other:	0.1
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	2
50 – 79 cm:	2	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	12		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	60	30	60	50	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	52					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Course loam	**Soil Colour**	Pink-brown	**Soil Depth**	1 m
Lithology (B)							
Slope	Steep	**Aspect**		**Site Drainage**	High	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Light	greater than 10yo	Charred logs
Storm damage:			
Weediness:			
Other:			Track side edge effects

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine Track				
Date:	20-11-17	**Plot ID:**	172	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Acacia dealbata subsp. subalpina*	5	20	Yes	N	
Shrub (SG)	*Cassinia longifolia*	60	150		N	
Shrub (SG)	*Cassinia aculeata*	4	10	No	N	
Shrub (SG)	*Exocarpos strictus*	10	15		N	
Shrub (SG)	*Daviesia latifolia*	1	4	Yes	N	
Shrub (SG)	*Dodonaea viscosa subsp. angustissima*	20	50	Yes	N	
Forb (FG)	*Plantago varia*	0.2	20	Yes	N	
Forb (FG)	*Geranium solanderi*	0.2	30		N	
Shrub (SG)	*Platylobium formosum subsp. formosum*	0.1	4		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.2	50	Yes	N	
Forb (FG)	*Hypericum gramineum*	0.2	40		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Fern (EG)	*Pteridium esculentum*	0.8	10		N	
Other (OG)	*Glycine clandestina*	0.1	30		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	60	1000	Yes	N	
Grass & grasslike	*Poa sieberiana*	10	200	Yes	N	
Tree (TG)	*Eucalyptus robertsonii subsp. robertsonii*	5	1	Yes	N	
Shrub (SG)	*Indigofera australis*	1	10	Yes	N	
Forb (FG)	*Asperula conferta*	0.1	10	Yes	N	
	Rubus fruticosus sp. agg.	0.1	2		HTE	
	Trifolium campestre	0.1	10	Yes	E	
	Galium palustre	0.1	5	Yes	E	
Tree (TG)	*Eucalyptus rubida*	20	5		N	
Tree (TG)	*Eucalyptus viminalis*	30	7		N	
Forb (FG)	*Senecio quadridentatus*	0.3	15		N	

BAM Site – Field Survey Form

Plot ID:	173	**Date:**	20-11-17	**Survey Name:**	Lobs Hole Ravine Track	**Recorders:**	ED, LH
Zone:	55	**Easting:**	627162.9974	**Plot dimensions:**	20m x 50m	**Midline bearing:**	84
Datum:	GDA94	**Northing:**	6033833.665	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		643: Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Alpine Heaths		**EEC:**	Yes	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	4
	Grasses etc.:	0
	Forbs:	2
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	4
	Shrubs:	8.2
	Grasses etc.:	0
	Forbs:	0.2
	Ferns:	1
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	1	0
< 5 cm:	0	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	17		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	75	5	10	10	0	0	0	0	0	15	0	0	0	0	75	25	85	90	90
Average of the 5 subplots:	22					0					3					73				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Basalt	**Soil Surface Texture**	Volcanic boulderfield	**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	Steep	**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Light	greater than 10yo	Charred logs
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine Track				
Date:	20-11-17	**Plot ID:**	173	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Fern (EG)	*Pteridium esculentum*	1	25		N	
Forb (FG)	*Stellaria pungens*	0.1	5		N	
	Rubus fruticosus sp. agg.	0.1	2		HTE	
Shrub (SG)	*Indigofera australis*	0.2	3		N	
Shrub (SG)	*Bedfordia arborescens*	2	2	Yes	N	
Shrub (SG)	*Cassinia longifolia*	5	10		N	
Tree (TG)	*Acacia melanoxylon*	1	3		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	2	5		N	
Tree (TG)	*Eucalyptus viminalis*	1	1		N	
	Galium aparine	0.1	2	Yes	E	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	3		N	
Shrub (SG)	*Polyscias sambucifolia subsp. leptophylla*	1	1		N	

BAM Site – Field Survey Form

Plot ID:	174	**Date:**	20-11-17	**Survey Name:**	Lobs Hole Ravine Track	**Recorders:**	ED, LH
Zone:	55	**Easting:**	626962.4218	**Plot dimensions:**	20m x 50m	**Midline bearing:**	110
Datum:	GDA94	**Northing:**	6036924.274	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Southern Tableland Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	2
	Grasses etc.:	6
	Forbs:	6
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	5
	Shrubs:	50
	Grasses etc.:	5.7
	Forbs:	0.9
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		29

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	2	10	15	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	8.2					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Grey	**Soil Depth**	Shallow
Lithology (B)							
Slope	Steep	**Aspect**		**Site Drainage**	High	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	No canopy present
Cultivation (inc. pasture):			
Soil erosion:	Moderate	greater than 10yo	
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Severe	greater than 10yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine Track				
Date:	20-11-17	**Plot ID:**	174	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Dodonaea viscosa subsp. angustissima*	30	100		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	5	50		N	
Shrub (SG)	*Exocarpos strictus*	20	150	No	N	
	Crataegus monogyna	1	1		HTE	
	Hypericum perforatum	25	1000		HTE	
	Trifolium arvense	25	1000		E	
	Trifolium campestre	15	1000		E	
	Petrorhagia dubia	2	150		E	
	Plantago lanceolata	0.3	20		E	
Grass & grasslike	*Carex spp.*	0.1	5	Yes	N	
	Centaurium erythraea	0.8	100		E	
	Rubus fruticosus sp. agg.	2	5		HTE	
	Rosa rubiginosa	1	4		HTE	
Grass & grasslike	*Austrostipa scabra*	2	50		N	
Grass & grasslike	*Dichelachne hirtella*	2	40		N	
	Conyza spp.	0.4	50		E	
Forb (FG)	*Geranium solanderi*	0.1	2		N	
Forb (FG)	*Acaena agnipila*	0.1	4	Yes	N	
Grass & grasslike	*Poa induta*	0.2	15	Yes	N	
	Bromus hordeaceus	0.5	30	Yes	E	
	Hypochaeris radicata	0.1	2		E	
Forb (FG)	*Rumex brownii*	0.1	2	Yes	N	
	Lysimachia arvensis	0.1	5		E	
	Aira elegantissima	0.5	50	Yes	E	
Forb (FG)	*Wahlenbergia communis*	0.1	20	Yes	N	
Fern (EG)	*Cheilanthes sieberi*	0.1	10	Yes	N	
Forb (FG)	*Bulbine bulbosa*	0.4	30		N	
Forb (FG)	*Sonchus spp.*	0.1	2		N	
	Bromus madritensis	0.3	50		E	
Grass & grasslike	*Dichelachne crinita*	0.6	40		N	
Grass & grasslike	*Deyeuxia spp.*	0.8	50		N	

BAM Site – Field Survey Form

Plot ID:	177	**Date:**	23-11-17	**Survey Name:**	Tantangara south intake	**Recorders:**	ED, LH
Zone:	55	**Easting:**	647788.411	**Plot dimensions:**	20m x 50m	**Midline bearing:**	143
Datum:	GDA94	**Northing:**	6033583.397	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	6
	Grasses etc.:	6
	Forbs:	17
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	55
	Shrubs:	3.2
	Grasses etc.:	70.5
	Forbs:	1.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	6	0	2
50 – 79 cm:	7	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	57		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	45	48	50	70	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	60.6					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Fine loam	**Soil Colour**	Dark brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No
Cultivation (inc. pasture):			No
Soil erosion:			No
Firewood / CWD removal:			No
Grazing (identify native/stock):	Light	greater than 10yo	Horse droppings
Fire damage:			No
Storm damage:			No
Weediness:	Light	greater than 10yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara south intake				
Date:	23-11-17	**Plot ID:**	177	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	15	20		N	
Tree (TG)	*Eucalyptus dalrympleana*	35	15		N	
Tree (TG)	*Eucalyptus stellulata*	5	5		N	
Forb (FG)	*Senecio quadridentatus*	0.1	20		N	
Forb (FG)	*Senecio gunnii*	0.1	10		N	
Forb (FG)	*Stellaria pungens*	0.2	100		N	
Forb (FG)	*Asperula scoparia*	0.1	30		N	
Shrub (SG)	*Acrothamnus hookeri*	2	30		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.1	3		N	
Grass & grasslike	*Luzula flaccida*	0.1	10		N	
Grass & grasslike	*Lomandra longifolia*	0.2	5		N	
	Hypochaeris radicata	0.1	4		E	
	Trifolium repens	0.1	15		E	
Forb (FG)	*Cymbonotus preissianus*	0.1	10		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	25		N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	40		N	
Forb (FG)	*Plantago varia*	0.1	8		N	
	Dactylis glomerata	4	20		E	
Shrub (SG)	*Pimelea pauciflora*	0.5	5		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.3	20		N	
Shrub (SG)	*Daviesia ulicifolia*	0.2	3		N	
Grass & grasslike	*Carex breviculmis*	0.1	4		N	
Forb (FG)	*Asperula conferta*	0.1	20		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
Forb (FG)	*Gonocarpus montanus*	0.1	30		N	
	Asparagus spp.	0.1	5		E	
Forb (FG)	*Rumex brownii*	0.1	5		N	
Forb (FG)	*Geranium solanderi*	0.1	8		N	
Grass & grasslike	*Poa sieberiana*	60	1000		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	10	200		N	
	Anthoxanthum odoratum	15	400		E	
Shrub (SG)	*Cassinia aculeata*	0.1	1		N	
Forb (FG)	*Chiloglottis spp.*	0.1	10		N	
Forb (FG)	*Veronica calycina*	0.1	5		N	
Shrub (SG)	*Pomaderris aspera*	0.1	5		N	
Forb (FG)	*Ajuga australis*	0.1	2		N	
Forb (FG)	*Lagenophora stipitata*	0.1	6		N	

BAM Site – Field Survey Form

Plot ID:	178	**Date:**	24-11-17	**Survey Name:**	Tantangara Road	**Recorders:**	SW, AM
Zone:	55	**Easting:**	647441.0498	**Plot dimensions:**	20m x 50m	**Midline bearing:**	179
Datum:	GDA94	**Northing:**	6032428.879	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	9
	Grasses etc.:	5
	Forbs:	11
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	1.1
	Shrubs:	12.4
	Grasses etc.:	85.3
	Forbs:	1.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	12		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	75	35	40	60	15	0	0	0	5	5	0	5	0	0	0	0	0	0	0
Average of the 5 subplots:	43					4					2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Brown	**Soil Depth**	at least 100mm
Lithology (B)							
Slope		**Aspect**	southern	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	less than 3yo	Poweline easement
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Native herbivores and pests
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Some exotic forbs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road				
Date:	24-11-17	**Plot ID:**	178	**Recorders:**	SW, AM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	1	8		N	
Shrub (SG)	*Hovea montana*	2	10		N	
Grass & grasslike	*Themeda triandra*	5	50		N	
Grass & grasslike	*Poa sieberiana*	80	500		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
	Poa pratensis	5	200		E	
Shrub (SG)	*Podolobium alpestre*	2	20		N	
	Hypochaeris radicata	0.3	50		E	
	Anthoxanthum odoratum	0.1	10		E	
	Achillea millefolium	0.1	2		HTE	
Shrub (SG)	*Grevillea lanigera*	5	20		N	
Tree (TG)	*Eucalyptus dalrympleana*	0.1	3		N	
Forb (FG)	*Coronidium scorpioides*	0.1	10		N	
Shrub (SG)	*Hakea microcarpa*	2	10		N	
Shrub (SG)	*Acrothamnus hookeri*	1	10		N	
Shrub (SG)	*Epacris breviflora*	0.1	2		N	
Grass & grasslike	*Luzula flaccida*	0.1	20		N	
	Hypericum perforatum	0.1	20		HTE	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Grass & grasslike	*Lomandra longifolia*	0.1	10		N	
Forb (FG)	*Leucochrysum albicans*	0.1	10		N	
Shrub (SG)	*Pimelea linifolia*	0.1	2		N	
Shrub (SG)	*Olearia myrsinoides*	0.1	5		N	
Forb (FG)	*Arthropodium milleflorum*	0.1	20		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	0.1	1		N	
	Trifolium repens	0.1	20		E	
	Acetosella vulgaris	0.1	20		HTE	
Forb (FG)	*Acaena novae-zelandiae*	0.1	20		N	
Forb (FG)	*Acaena agnipila*	0.1	5		N	
Shrub (SG)	*Daviesia ulicifolia*	0.1	2		N	
Forb (FG)	*Veronica calycina*	0.1	20		N	
	Holcus lanatus	0.1	5		E	
	Taraxacum officinale	0.1	3		E	
Forb (FG)	*Senecio gunnii*	0.1	5		N	
Forb (FG)	*Asperula scoparia*	0.3	50		N	
Forb (FG)	*Caladenia alpina*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	180	**Date:**	24-11-17	**Survey Name:**	Tantangara south intake	**Recorders:**	ED, LH
Zone:	55	**Easting:**	647633.5247	**Plot dimensions:**	20m x 50m	**Midline bearing:**	55
Datum:	GDA94	**Northing:**	6031827.276	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	Yes	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	7
	Grasses etc.:	6
	Forbs:	17
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	70
	Shrubs:	2.1
	Grasses etc.:	75.6
	Forbs:	8.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	3	0	3
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	45		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	75	35	60	65	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	60					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Fine loam	**Soil Colour**	Dark brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	Contour channel and bank
Cultivation (inc. pasture):			No
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	greater than 10yo	Wombat activity
Fire damage:			No
Storm damage:			No
Weediness:	Light	greater than 10yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara south intake				
Date:	24-11-17	**Plot ID:**	180	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Empodisma minus*	0.1	25		N	
Grass & grasslike	*Carex appressa*	0.1	10		N	
Shrub (SG)	*Daviesia ulicifolia*	0.5	20		N	
Shrub (SG)	*Podocarpus lawrencei*	0.8	4		N	
	Anthoxanthum odoratum	30	300		E	
Shrub (SG)	*Acrothamnus hookeri*	0.2	4		N	
Grass & grasslike	*Lomandra longifolia*	0.3	10		N	
Forb (FG)	*Diuris subalpina*	0.1	3		N	
Forb (FG)	*Chiloglottis spp.*	0.2	100		N	
Grass & grasslike	*Luzula flaccida*	0.1	12		N	
Forb (FG)	*Stellaria pungens*	0.4	50		N	
Forb (FG)	*Brachyscome decipiens*	0.1	6		N	
Forb (FG)	*Brachyscome spp.*	0.1	10		N	
Forb (FG)	*Cymbonotus preissianus*	0.2	25		N	
Forb (FG)	*Dianella tasmanica*	0.2	3		N	
Shrub (SG)	*Olearia erubescens*	0.1	2		N	
Forb (FG)	*Senecio gunnii*	0.5	50		N	
Forb (FG)	*Senecio quadridentatus*	0.3	20		N	
Forb (FG)	*Asperula scoparia*	0.1	25		N	
	Hypochaeris radicata	0.1	8		E	
Forb (FG)	*Viola betonicifolia*	0.1	10		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	15		N	
Shrub (SG)	*Leucopogon gelidus*	0.3	4		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	30		N	
Forb (FG)	*Veronica calycina*	0.1	10		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	5	50		N	
Grass & grasslike	*Poa sieberiana*	70	1000		N	
Tree (TG)	*Eucalyptus pauciflora*	60	55		N	
Tree (TG)	*Eucalyptus dalrympleana*	10	5		N	
Shrub (SG)	*Pimelea pauciflora*	0.1	1		N	
Forb (FG)	*Lagenophora stipitata*	5	300		N	
Forb (FG)	*Ajuga australis*	0.1	8		N	
Forb (FG)	*Arthropodium milleflorum*	0.5	30		N	

BAM Site – Field Survey Form

Plot ID:	183	**Date:**	11-12-17	**Survey Name:**	Lobs Hole Ravine			**Recorders:**	SW, SD
Zone:	55	**Easting:**	626501.0478	**Plot dimensions:**	20m x 50m			**Midline bearing:**	115
Datum:	GDA94	**Northing:**	6038370.566	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion			**Confidence:**	Low	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	3
	Grasses etc.:	5
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.5
	Shrubs:	0.5
	Grasses etc.:	70.7
	Forbs:	1.4
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	2	5	2	5	10	20	20	20	10	0	20	1	30	10	0	0	0	0	0
Average of the 5 subplots:	5.8					16					12.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Clay loam	**Soil Colour**	Light brown	**Soil Depth**	shallow
Lithology (B)							
Slope	0.06	**Aspect**	ESE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Canopy and mid storey removed
Cultivation (inc. pasture):			No evidence
Soil erosion:	Severe	less than 3yo	Eroded down to bedrock in one corner of plot the rest is skeletal
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			Native and feral herbivores
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Some exotic grasses and forbs
Other:	Severe	less than 3yo	High amount of rabbit activity, latrine observed.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	11-12-17	**Plot ID:**	183	**Recorders:**	SW, SD

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Themeda triandra*	70	1000		N	
	Centaurium erythraea	0.1	30		E	
Grass & grasslike	*Anthosachne scabra*	0.1	20		N	
	Trifolium arvense	0.1	5		E	
	Hypericum perforatum	0.1	20		HTE	
Forb (FG)	*Leptorhynchos squamatus*	0.5	100		N	
	Aira elegantissima	0.2	80		E	
Forb (FG)	*Stackhousia monogyna*	0.1	20		N	
Forb (FG)	*Gonocarpus teucrioides*	0.2	50		N	
Grass & grasslike	*Dichelachne inaequiglumis*	0.1	10		N	
Grass & grasslike	*Poa spp.*	0.3	50		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.2	50		N	
	Potentilla recta	0.1	1		E	
Forb (FG)	*Oxalis spp.*	0.1	10		N	
Forb (FG)	*Geranium spp.*	0.1	2		N	
	Conyza spp.	0.1	1		E	
Forb (FG)	*Acaena novae-zelandiae*	0.1	20		N	
	Hypochaeris radicata	0.1	10		E	
Shrub (SG)	*Banksia canei*	0.2	1		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
	Taraxacum officinale	0.1	10		E	
Tree (TG)	*Eucalyptus camphora*	0.4	3		N	
Forb (FG)	*Hypericum japonicum*	0.2	50		N	
Shrub (SG)	*Acacia pravissima*	0.2	5		N	
	Vulpia bromoides	0.1	20		E	
Shrub (SG)	*Exocarpos strictus*	0.1	1		N	
Tree (TG)	*Eucalyptus rubida*	0.1	1		N	
	Rosa rubiginosa	0.1	1		HTE	

BAM Site – Field Survey Form

Plot ID:	187	**Date:**	08-01-18	**Survey Name:**	Lobbs Hole Ravine Road north			**Recorders:**	DK
Zone:	55	**Easting:**	628142.3788	**Plot dimensions:**	20m x 50m			**Midline bearing:**	90
Datum:	GDA94	**Northing:**	6046952.08	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion			**Confidence:**	Medium	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	10
	Grasses etc.:	6
	Forbs:	6
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	2
	Shrubs:	10.8
	Grasses etc.:	7.2
	Forbs:	3.8
	Ferns:	60
	Other:	0.5
High Threat Weed cover:		1.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	84		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	60	98	100	40	90	20	5	5	60	5	0	20	10	70	40	0	0	0	0	0
Average of the 5 subplots:	77.6					19					28					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Clay	**Soil Colour**	Brown	**Soil Depth**	Medium
Lithology (B)							
Slope	17	**Aspect**	East	**Site Drainage**	Medium	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Poweline easement
Cultivation (inc. pasture):			
Soil erosion:	Moderate	greater than 10yo	Powerline clearing
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Light	3 to 10 yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs Hole Ravine Road north				
Date:	08-01-18	**Plot ID:**	187	**Recorders:**	DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Fern (EG)	*Pteridium esculentum*	60	1000		N	
Shrub (SG)	*Cassinia ochracea*	1	20		N	
Forb (FG)	*Asperula scoparia*	1	100		N	
Grass & grasslike	*Lomandra longifolia*	2	80		N	
Tree (TG)	*Acacia dealbata*	1	10		N	
Shrub (SG)	*Platylobium montanum*	0.7	40		N	
Shrub (SG)	*Daviesia latifolia*	1	30		N	
Forb (FG)	*Gonocarpus tetragynus*	0.5	40		N	
Other (OG)	*Cassytha glabella*	0.5	20		N	
	Hypericum perforatum	1	200		HTE	
Shrub (SG)	*Pimelea linifolia*	3	200		N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	3	200		N	
Grass & grasslike	*Deyeuxia quadriseta*	0.5	50		N	
Forb (FG)	*Stylidium graminifolium*	1	200		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	3	300		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.5	30		N	
Tree (TG)	*Eucalyptus dalrympleana*	0.5	2		N	
Tree (TG)	*Eucalyptus mannifera subsp. mannifera*	0.5	2		N	
Shrub (SG)	*Persoonia chamaepeuce*	0.2	5		N	
Forb (FG)	*Stellaria pungens*	1	100		N	
Shrub (SG)	*Tetratheca bauerifolia*	1	50		N	
Shrub (SG)	*Baeckea utilis*	0.1	10		N	
	Centaurium erythraea	0.3	30		E	
	Taraxacum officinale	0.5	50		E	
	Hypochaeris glabra	0.3	30		E	
Grass & grasslike	*Anthosachne scabra*	0.5	50		N	
Forb (FG)	*Scleranthus fasciculatus*	0.2	10		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.7	50		N	
	Aira elegantissima	0.2	20		E	
	Holcus lanatus	0.2	20		E	
Shrub (SG)	*Lomatia myricoides*	0.3	2		N	
	Agrostis capillaris	0.1	5		HTE	
Grass & grasslike	*Aristida ramosa*	0.5	30		N	
Forb (FG)	*Microtis unifolia*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	188	**Date:**	13-12-17	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	AM, SW
Zone:	55	**Easting:**	627887.1793	**Plot dimensions:**	20m x 50m	**Midline bearing:**	190
Datum:	GDA94	**Northing:**	6038242.868	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		999: Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	13
	Grasses etc.:	4
	Forbs:	5
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	35
	Shrubs:	119
	Grasses etc.:	10.2
	Forbs:	1.4
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	3
20 – 29 cm:	1	0	1
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	48		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	80	60	85	90	80	0	15	0	0	0	0	10	0	0	0	5	1	1	0	10
Average of the 5 subplots:	79					3					2					3.4				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam clay	**Soil Colour**	Brown	**Soil Depth**	Skeletal to shallow
Lithology (B)							
Slope		**Aspect**	Western	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:			No evidence
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	13-12-17	**Plot ID:**	188	**Recorders:**	AM, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	35	20		N	
Shrub (SG)	*Banksia canei*	60	200		N	
Shrub (SG)	*Acacia buxifolia subsp. buxifolia*	0.2	3		N	
Other (OG)	*Cassytha pubescens*	0.2	5		N	
Shrub (SG)	*Tetratheca bauerifolia*	2	100		N	
Forb (FG)	*Gonocarpus teucrioides*	1	200		N	
Forb (FG)	*Hovea heterophylla*	0.1	10		N	
Shrub (SG)	*Brachyloma daphnoides*	5	50		N	
Shrub (SG)	*Leucopogon attenuatus*	30	500		N	
Shrub (SG)	*Leucopogon virgatus*	1	30		N	
Forb (FG)	*Boronia nana var. hyssopifolia*	0.1	20		N	
Shrub (SG)	*Podolobium procumbens*	3	50		N	
Shrub (SG)	*Mirbelia oxylobioides*	5	30		N	
Shrub (SG)	*Monotoca scoparia*	0.5	10		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	5	100		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.1	10		N	
Shrub (SG)	*Dillwynia phylicoides*	10	100		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	10		N	
Forb (FG)	*Stylidium graminifolium*	0.1	10		N	
Grass & grasslike	*Rytidosperma pallidum*	5	50		N	
Shrub (SG)	*Calytrix tetragona*	2	20		N	
Forb (FG)	*Dianella revoluta var. revoluta*	0.1	3		N	
Shrub (SG)	*Daviesia ulicifolia*	0.1	2		N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	5		N	

BAM Site – Field Survey Form

Plot ID:	193	**Date:**	12-12-17	**Survey Name:**	Access Roads			**Recorders:**	SD, EL
Zone:	55	**Easting:**	626912.7351	**Plot dimensions:**	20m x 50m			**Midline bearing:**	347
Datum:	GDA94	**Northing:**	6036372.909	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion			**Confidence:**		**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	6
	Grasses etc.:	5
	Forbs:	11
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	5.5
	Shrubs:	28.1
	Grasses etc.:	0.7
	Forbs:	27.7
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	1
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	24		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	70	80	10	55	25	20	5	60	5	10	4	2	2	5	5	0	4	1	2	5
Average of the 5 subplots:	48					20					3.6					2.4				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Clay loam	**Soil Colour**	Dark brown	**Soil Depth**	Shallow
Lithology (B)							
Slope	28	**Aspect**	East	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Historic
Cultivation (inc. pasture):			
Soil erosion:	Light	3 to 10 yo	Associated with historical clearing
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			Not evident
Fire damage:	Moderate	3 to 10 yo	
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Forbs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Access Roads				
Date:	12-12-17	**Plot ID:**	193	**Recorders:**	SD, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Forb (FG)	*Cullen microcephalum*	0.1	5		N	
Shrub (SG)	*Bursaria spinosa*	10	200		N	
Shrub (SG)	*Dodonaea viscosa subsp. angustifolia*	5	200		N	
Shrub (SG)	*Acacia saliciformis*	10	200		N	
Shrub (SG)	*Cassinia longifolia*	1	20		N	
	Rosa rubiginosa	2	40		HTE	
Forb (FG)	*Chrysocephalum semipapposum*	25	200		N	
Fern (EG)	*Cheilanthes sieberi*	0.1	10		N	
Tree (TG)	*Eucalyptus rubida*	5	4		N	
Forb (FG)	*Acaena novae-zelandiae*	0.5	30		N	
	Centaurium erythraea	0.5	50		E	
Forb (FG)	*Geranium potentilloides*	1	200		N	
Forb (FG)	*Hypericum gramineum*	0.5	500		N	
	Hypericum perforatum	2	500		HTE	
Shrub (SG)	*Exocarpos strictus*	2	30		N	
Forb (FG)	*Gonocarpus teucrioides*	0.1	100		N	
Shrub (SG)	*Pimelea linifolia*	0.1	20		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	0.5	10		N	
Grass & grasslike	*Austrostipa scabra subsp. falcata*	0.2	20		N	
	Trifolium arvense	0.1	2		E	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	10		N	
Forb (FG)	*Microtis unifolia*	0.1	20		N	
Forb (FG)	*Euchiton sphaericus*	0.1	20		N	
Grass & grasslike	*Rytidosperma penicillatum*	0.2	50		N	
Grass & grasslike	*Carex breviculmis*	0.1	20		N	
Forb (FG)	*Senecio quadridentatus*	0.1	10		N	
Grass & grasslike	*Dichelachne rara*	0.1	20		N	
Forb (FG)	*Epilobium billardierianum subsp. Cinereum*	0.1	10		N	
Grass & grasslike	*Poa spp.*	0.1	5		N	
	Hypochaeris glabra	0.1	1		E	
	Linaria pelisseriana	0.1	10		E	

BAM Site – Field Survey Form

Plot ID:	196	**Date:**	13-12-17	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	AM, SW
Zone:	55	**Easting:**	627834.7844	**Plot dimensions:**	20m x 50m	**Midline bearing:**	180
Datum:	GDA94	**Northing:**	6038500.038	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	**Confidence:**	Low	**Photo #:**	
Vegetation Class:			Upper Riverina Dry Sclerophyll Forests	**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	7
	Grasses etc.:	3
	Forbs:	5
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	41
	Shrubs:	17.3
	Grasses etc.:	0.3
	Forbs:	0.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		85.9

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	6	0	2
30 – 49 cm:	1	0	1
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	54		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	95	95	95	95	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	95					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Other	**Lf Pattern (A)**	Alluvial plain	**Microrelief**	
		Lf Element (B)	River flat	**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam clay	**Soil Colour**	Dark brown	**Soil Depth**	At least 100mm
Lithology (B)							
Slope		**Aspect**	South	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Severe	less than 3yo	Blackberry infestation, 80% coverage
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	13-12-17	**Plot ID:**	196	**Recorders:**	AM, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus viminalis*	35	9		N	
Tree (TG)	*Eucalyptus stellulata*	3	3		N	
	Rubus fruticosus sp. agg.	85	1000		HTE	
Shrub (SG)	*Cassinia aculeata*	1	5		N	
Shrub (SG)	*Banksia canei*	0.5	5		N	
Shrub (SG)	*Acacia pravissima*	5	10		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	10		N	
	Hypericum perforatum	0.3	20		HTE	
Shrub (SG)	*Grevillea rosmarinifolia subsp. rosmarinifolia*	10	30		N	
Shrub (SG)	*Pomaderris aspera*	0.5	2		N	
	Rosa rubiginosa	0.5	5		HTE	
Grass & grasslike	*Carex appressa*	0.1	1		N	
	Centaurium erythraea	0.1	10		E	
	Acetosella vulgaris	0.1	20		HTE	
Forb (FG)	*Oxalis perennans*	0.1	5		N	
Grass & grasslike	*Luzula flaccida*	0.1	5		N	
Forb (FG)	*Poranthera microphylla*	0.1	10		N	
Forb (FG)	*Dichondra repens*	0.1	50		N	
Shrub (SG)	*Exocarpos strictus*	0.2	2		N	
Tree (TG)	*Eucalyptus robertsonii subsp. robertsonii*	3	2		N	
Forb (FG)	*Hydrocotyle laxiflora*	0.1	30		N	
	Aira elegantissima	0.1	10		E	
Grass & grasslike	*Microlaena stipoides var. stipoides*	0.1	30		N	
Shrub (SG)	*Pimelea pauciflora*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	207	**Date:**	16-01-18	**Survey Name:**	Tantangara Road	**Recorders:**	DK, Rowles
Zone:	55	**Easting:**	646746.161	**Plot dimensions:**	20m x 50m	**Midline bearing:**	80
Datum:	GDA94	**Northing:**	6026381.379	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	639: Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Montane Wet Sclerophyll Forests			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	9
	Grasses etc.:	3
	Forbs:	19
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	21.5
	Shrubs:	4.1
	Grasses etc.:	25.6
	Forbs:	7.2
	Ferns:	0
	Other:	0.3
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	6	0	1
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	110		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	100	100	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	100					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Loamy clay	**Soil Colour**	Brown	**Soil Depth**	Deep
Lithology (B)							
Slope	5	**Aspect**	80	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Historic logging. Some old mountain gum remaining but only those with poor form. All alpine ash are relatively yo
Cultivation (inc. pasture):			
Soil erosion:	Light	greater than 10yo	Some evidence of earthworks associated with road and drain
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	greater than 10yo	Historic
Fire damage:			
Storm damage:			
Weediness:	Light	3 to 10 yo	Pasture grasses downpipe of road and drain
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road				
Date:	16-01-18	**Plot ID:**	207	**Recorders:**	DK, Rowles

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dalrympleana*	10	4		N	
Tree (TG)	*Eucalyptus delegatensis subsp. Delegatensis*	10	11		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	0.5	5		N	
Shrub (SG)	*Leptospermum lanigerum*	0.5	5		N	
Shrub (SG)	*Cassinia aculeata*	1	10		N	
Forb (FG)	*Arrhenechthites mixta*	0.2	40		N	
Forb (FG)	*Stellaria pungens*	0.2	30		N	
Forb (FG)	*Lobelia pedunculata*	0.1	200		N	
Forb (FG)	*Senecio gunnii*	0.2	20		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	25	1000		N	
Other (OG)	*Glycine tabacina*	0.2	40		N	
Forb (FG)	*Arthropodium milleflorum*	0.2	30		N	
Tree (TG)	*Eucalyptus pauciflora*	1	10		N	
Shrub (SG)	*Podolobium alpestre*	1	10		N	
Forb (FG)	*Viola betonicifolia*	0.5	100		N	
Forb (FG)	*Asperula scoparia*	1	200		N	
Grass & grasslike	*Lomandra longifolia*	0.5	20		N	
Forb (FG)	*Coronidium rutidolepis*	3	500		N	
Forb (FG)	*Poranthera microphylla*	0.2	40		N	
Shrub (SG)	*Daviesia ulicifolia*	1	40		N	
	Anthoxanthum odoratum	0.2	50		E	
Grass & grasslike	*Luzula densiflora*	0.1	1		N	
Other (OG)	*Desmodium varians*	0.1	20		N	
	Hypochaeris glabra	0.1	5		E	
Forb (FG)	*Lagenophora stipitata*	0.5	80		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	60		N	
Forb (FG)	*Acaena novae-zelandiae*	0.3	50		N	
	Holcus lanatus	0.1	5		E	
Shrub (SG)	*Leucopogon lanceolatus var. lanceolatus*	0.2	10		N	
Shrub (SG)	*Olearia phlogopappa*	0.1	5		N	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	20		N	
Forb (FG)	*Cymbonotus lawsonianus*	0.1	5		N	
Forb (FG)	*Brachyscome spathulata*	0.1	10		N	
Forb (FG)	*Hypericum gramineum*	0.1	40		N	
Forb (FG)	*Euchiton japonicus*	0.1	5		N	
	Hypericum perforatum	0.1	10		HTE	
Forb (FG)	*Cotula australis*	0.1	40		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	2		N	
Shrub (SG)	*Brachyloma daphnoides*	0.1	2		N	
Forb (FG)	*Senecio quadridentatus*	0.1	10		N	
	Sonchus oleraceus	0.1	2		E	
	Trifolium repens	0.1	2		E	
Shrub (SG)	*Acacia obliquinervia*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	208	**Date:**	06-02-18	**Survey Name:**		**Recorders:**	SD, ACM
Zone:	55	**Easting:**	632676.8452	**Plot dimensions:**	20m x 50m	**Midline bearing:**	180
Datum:	GDA94	**Northing:**	6038494.46	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		639: Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Montane Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	11
	Grasses etc.:	3
	Forbs:	10
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	26.7
	Shrubs:	12.6
	Grasses etc.:	1.4
	Forbs:	1.8
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	165		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	90	90	90	30	60	10	15	10	70	40	0	0	1	1	1	0	0	1	0	0
Average of the 5 subplots:	72					29					0.6					0.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Loamy clay	**Soil Colour**	Brown	**Soil Depth**	> 10cm
Lithology (B)							
Slope	10	**Aspect**	South	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Presumed logged
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light	greater than 10yo	Presumed related to logging, grazing and fire
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	greater than 10yo	Presumed
Fire damage:	Moderate	3 to 10 yo	
Storm damage:	Moderate	3 to 10 yo	Lots of debris
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	06-02-18	**Plot ID:**	208	**Recorders:**	SD, ACM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus delegatensis subsp. Delegatensis*	25	40		N	
Tree (TG)	*Eucalyptus pauciflora*	1	6		N	
Shrub (SG)	*Acacia obliquinervia*	5	80		N	
Shrub (SG)	*Daviesia latifolia*	2	40		N	
Shrub (SG)	*Lomatia myricoides*	0.2	1		N	
Shrub (SG)	*Platylobium montanum*	2	80		N	
Grass & grasslike	*Lomandra longifolia*	0.2	10		N	
Shrub (SG)	*Pimelea linifolia*	0.8	100		N	
Forb (FG)	*Arthropodium milleflorum*	0.5	50		N	
Shrub (SG)	*Tetratheca bauerifolia*	0.7	50		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	1	100		N	
Forb (FG)	*Goodenia hederacea subsp. alpestris*	0.3	30		N	
Forb (FG)	*Brachyscome aculeata*	0.1	5		N	
Shrub (SG)	*Gompholobium huegelii*	0.5	40		N	
Forb (FG)	*Coronidium rutidolepis*	0.1	10		N	
Forb (FG)	*Asperula scoparia*	0.2	20		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.2	20		N	
Other (OG)	*Clematis glycinoides*	0.2	10		N	
Forb (FG)	*Stellaria pungens*	0.2	20		N	
Shrub (SG)	*Persoonia chamaepeuce*	0.2	20		N	
Shrub (SG)	*Cassinia aculeata*	0.1	2		N	
Forb (FG)	*Poranthera microphylla*	0.1	1		N	
Shrub (SG)	*Polyscias sambucifolia*	1	90		N	
Forb (FG)	*Viola betonicifolia*	0.1	2		N	
Forb (FG)	*Senecio quadridentatus*	0.1	1		N	
Forb (FG)	*Stylidium graminifolium*	0.1	10		N	
Tree (TG)	*Eucalyptus dalrympleana*	0.7	5		N	
Shrub (SG)	*Olearia phlogopappa*	0.1	5		N	

BAM Site – Field Survey Form

Plot ID:	210	**Date:**	16-01-18	**Survey Name:**	Tantangara Road	**Recorders:**	DK, Rowles
Zone:	55	**Easting:**	647404.3741	**Plot dimensions:**	20m x 50m	**Midline bearing:**	260
Datum:	GDA94	**Northing:**	6030026.995	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	6
	Grasses etc.:	5
	Forbs:	21
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	24.8
	Grasses etc.:	62.2
	Forbs:	4.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	9		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	98	100	100	95	100	2	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	98.6					1.4					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Clay loam	**Soil Colour**	Brown	**Soil Depth**	Moderate
Lithology (B)							
Slope	8	**Aspect**	260	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	Historic clearing or thinning for grazing
Cultivation (inc. pasture):			
Soil erosion:	Light	greater than 10yo	Run on from road above plus likely historic erosion from grazing
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	greater than 10yo	Historic
Fire damage:			
Storm damage:			
Weediness:	Light	3 to 10 yo	Minor pasture grass incursion but severe between plot and road in places
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road						
		Date:	16-01-18	**Plot ID:**	210	**Recorders:**	DK, Rowles

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	30	7		N	
Shrub (SG)	*Hakea microcarpa*	20	40		N	
Shrub (SG)	*Leptospermum myrtifolium*	0.1	1		N	
Shrub (SG)	*Hovea montana*	4	40		N	
Forb (FG)	*Senecio gunnii*	0.1	30		N	
Forb (FG)	*Acaena ovina*	0.1	10		N	
	Anthoxanthum odoratum	0.3	40		E	
Grass & grasslike	*Poa sieberiana var. sieberiana*	60	1000		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	1	1000		N	
Forb (FG)	*Arthropodium milleflorum*	0.2	40		N	
Forb (FG)	*Poranthera microphylla*	0.2	40		N	
Forb (FG)	*Stellaria flaccida*	0.1	10		N	
Shrub (SG)	*Pimelea linifolia*	0.2	40		N	
	Acetosella vulgaris	0.1	40		HTE	
Shrub (SG)	*Brachyloma daphnoides*	0.4	20		N	
	Hypochaeris glabra	0.1	10		E	
Forb (FG)	*Ranunculus lappaceus*	0.1	40		N	
Forb (FG)	*Pterostylis alpina*	0.1	1		N	
Forb (FG)	*Asperula scoparia*	0.5	100		N	
Forb (FG)	*Acaena novae-zelandiae*	0.5	100		N	
	Holcus lanatus	0.1	10		E	
Forb (FG)	*Senecio quadridentatus*	0.2	100		N	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	20		N	
Forb (FG)	*Coronidium rutidolepis*	0.4	50		N	
Grass & grasslike	*Anthosachne scabra*	0.1	30		N	
Forb (FG)	*Bulbine bulbosa*	0.2	40		N	
Forb (FG)	*Cymbonotus lawsonianus*	0.1	10		N	
Grass & grasslike	*Dichelachne crinita*	0.1	10		N	
	Taraxacum officinale	0.1	40		E	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	10		N	
Forb (FG)	*Veronica subtilis*	0.2	50		N	
Forb (FG)	*Leptorhynchos squamatus*	0.3	100		N	
Grass & grasslike	*Themeda triandra*	1	50		N	
Forb (FG)	*Craspedia costiniana*	0.1	20		N	
	Tragopogon dubius	0.1	1		E	
	Cerastium vulgare	0.1	5		E	
	Trifolium repens	0.1	1		E	
Forb (FG)	*Podolepis jaceoides*	0.2	30		N	
Shrub (SG)	*Ozothamnus secundiflorus*	0.1	1		N	
Forb (FG)	*Stylidium graminifolium*	0.1	10		N	
	Agrostis capillaris	0.2	20		HTE	
	Dactylis glomerata	0.1	10		E	
Forb (FG)	*Hypericum gramineum*	0.2	50		N	
	Rubus anglocandicans	0.1	1		E	

BAM Site – Field Survey Form

Plot ID:	211	**Date:**	29-11-17	**Survey Name:**	Gooandra trail	**Recorders:**	SW, SD
Zone:	55	**Easting:**	638667.2543	**Plot dimensions:**	20m x 50m	**Midline bearing:**	256
Datum:	GDA94	**Northing:**	6037714.171	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	4
	Forbs:	17
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	20.5
	Shrubs:	4.4
	Grasses etc.:	70.7
	Forbs:	4.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	75		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	35	25	25	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	21					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary rock (unidentified)	**Soil Surface Texture**	Loam clay	**Soil Colour**	Brown	**Soil Depth**	at least 50mm
Lithology (B)							
Slope	2	**Aspect**	Eastern	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Horses
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Pasture weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Gooandra trail				
Date:	29-11-17	**Plot ID:**	211	**Recorders:**	SW, SD

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus lacrimans*	5	1		N	
Shrub (SG)	*Bossiaea foliosa*	1	20		N	
Shrub (SG)	*Pimelea pauciflora*	2	30		N	
Shrub (SG)	*Hovea montana*	1	30		N	
Forb (FG)	*Plantago euryphylla*	0.5	100		N	
Grass & grasslike	*Poa sieberiana*	70	1000		N	
Forb (FG)	*Senecio pinnatifolius var. alpinus*	0.1	5		N	
Forb (FG)	*Craspedia canens*	0.5	80		N	
	Ranunculus repens	0.2	50		HTE	
Forb (FG)	*Bulbine bulbosa*	2	200		N	
Grass & grasslike	*Poa meionectes*	0.5	100		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	10		N	
Forb (FG)	*Sonchus spp.*	0.1	10		N	
Forb (FG)	*Cymbonotus lawsonianus*	0.2	50		N	
Forb (FG)	*Leptorhynchos squamatus*	0.3	200		N	
Forb (FG)	*Poranthera microphylla*	0.2	200		N	
Forb (FG)	*Senecio gunnii*	0.1	20		N	
	Taraxacum officinale	0.1	20		E	
Forb (FG)	*Microseris lanceolata*	0.1	30		N	
Tree (TG)	*Eucalyptus pauciflora*	15.5	24		N	
Grass & grasslike	*Luzula flaccida*	0.1	30		N	
Forb (FG)	*Stellaria spp.*	0.1	50		N	
	Trifolium repens	0.1	10		E	
Forb (FG)	*Acaena ovina*	0.1	20		N	
Forb (FG)	*Geranium retrorsum*	0.1	30		N	
Grass & grasslike	*Poa costiniana*	0.1	20		N	
Forb (FG)	*Scleranthus fasciculatus*	0.1	30		N	
	Cerastium glomeratum	0.1	5		E	
	Anthoxanthum odoratum	0.3	50		E	
	Gomphocarpus physocarpus	0.1	20		E	
Forb (FG)	*Geranium neglectum*	0.1	20		N	
Shrub (SG)	*Olearia phlogopappa*	0.1	2		N	
Shrub (SG)	*Acrothamnus hookeri*	0.3	5		N	
	Acetosella vulgaris	0.1	2		HTE	
Forb (FG)	*Craspedia costiniana*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	212	**Date:**	12-01-18	**Survey Name:**	Tantangara east	**Recorders:**	DK
Zone:	55	**Easting:**	648509.2846	**Plot dimensions:**	20m x 50m	**Midline bearing:**	110
Datum:	GDA94	**Northing:**	6038412.135	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	8
	Grasses etc.:	2
	Forbs:	24
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	2.8
	Shrubs:	2.2
	Grasses etc.:	20.2
	Forbs:	9.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	202		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	80	60	80	70	30	5	40	20	5	70	20	5	5	10	5	0	0	0	0	0
Average of the 5 subplots:	64					28					9					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Silty clay loam	**Soil Colour**	Brown	**Soil Depth**	Medium
Lithology (B)							
Slope	7	**Aspect**	110	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Moderate	less than 3yo	Historic grazing but current horse and rabbit grazing
Fire damage:	Severe	3 to 10 yo	All adult trees dead
Storm damage:	Moderate	less than 3yo	Most dead trees felled
Weediness:	Light	3 to 10 yo	Sweet vernal grass extensive but cover mostly native
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara east				
Date:	12-01-18	**Plot ID:**	212	**Recorders:**	DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	2	30		N	
	Anthoxanthum odoratum	5	1000		E	
Grass & grasslike	*Poa sieberiana var. sieberiana*	20	1000		N	
Forb (FG)	*Arthropodium milleflorum*	1	300		N	
Forb (FG)	*Scleranthus biflorus*	0.5	50		N	
Forb (FG)	*Chrysocephalum semipapposum*	5	500		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	10		N	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	50		N	
	Trifolium repens	0.1	10		E	
Forb (FG)	*Hypericum gramineum*	0.1	1		N	
	Acetosella vulgaris	0.6	100		HTE	
	Centaurium erythraea	0.1	10		E	
Shrub (SG)	*Grevillea lanigera*	1	30		N	
Forb (FG)	*Epilobium billardierianum subsp. Cinereum*	0.1	40		N	
Forb (FG)	*Solenogyne gunnii*	0.4	50		N	
Forb (FG)	*Geranium antrorsum*	0.1	20		N	
Forb (FG)	*Dichondra repens*	0.1	50		N	
	Medicago lupulina	0.1	20		E	
	Holcus lanatus	0.2	40		E	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	10		N	
	Taraxacum officinale	0.6	500		E	
Forb (FG)	*Asperula scoparia*	0.5	100		N	
Forb (FG)	*Acaena novae-zelandiae*	0.5	100		N	
Forb (FG)	*Geranium solanderi*	0.2	40		N	
	Cirsium vulgare	0.1	5		E	
Grass & grasslike	*Themeda triandra*	0.2	50		N	
Forb (FG)	*Stylidium graminifolium*	0.1	10		N	
Forb (FG)	*Coronidium scorpioides*	0.1	10		N	
Shrub (SG)	*Daviesia ulicifolia*	0.2	10		N	
Shrub (SG)	*Cassinia aculeata*	0.3	1		N	
Tree (TG)	*Eucalyptus rubida*	0.3	1		N	
Forb (FG)	*Xerochrysum subundulatum*	0.1	10		N	
Forb (FG)	*Plantago gaudichaudii*	0.1	3		N	
Shrub (SG)	*Mirbelia oxylobioides*	0.2	10		N	
Shrub (SG)	*Hakea microcarpa*	0.2	2		N	
Forb (FG)	*Cymbonotus lawsonianus*	0.1	20		N	
Forb (FG)	*Senecio gunnii*	0.1	20		N	
	Cerastium vulgare	0.1	1		E	
Forb (FG)	*Myosotis australis*	0.1	1		N	
Tree (TG)	*Eucalyptus stellulata*	0.5	3		N	
Forb (FG)	*Bulbine bulbosa*	0.1	20		N	
Forb (FG)	*Stellaria pungens*	0.1	20		N	
Forb (FG)	*Calotis glandulosa*	0.1	1		N	
Shrub (SG)	*Olearia myrsinoides*	0.1	1		N	
Shrub (SG)	*Discaria pubescens*	0.1	1		N	
Forb (FG)	*Calotis scabiosifolia var. integrifolia*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	216	**Date:**	12-12-17	**Survey Name:**	Access Roads			**Recorders:**	SD, EL
Zone:	55	**Easting:**	627032.6318	**Plot dimensions:**	20m x 50m			**Midline bearing:**	211
Datum:	GDA94	**Northing:**	6033444.058	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			953: Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**		**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	6
	Shrubs:	7
	Grasses etc.:	5
	Forbs:	18
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	22.3
	Shrubs:	6.9
	Grasses etc.:	72.3
	Forbs:	4
	Ferns:	0
	Other:	0.3
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	1
50 – 79 cm:	3	0	3
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	43		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	45	25	50	10	2	20	0	20	5	0	0	0	0	0	0	4	0	4	0
Average of the 5 subplots:	28					9.4					0					1.6				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Metamorphic rock (unidentified)	**Soil Surface Texture**	Clay loam	**Soil Colour**	Brown	**Soil Depth**	Shallow
Lithology (B)							
Slope	28	**Aspect**	NW	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light		Associated with access track adjacent
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	greater than 10yo	Native and exotic herbivores
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Forbs
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Access Roads				
Date:	12-12-17	**Plot ID:**	216	**Recorders:**	SD, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	10	10		N	
Tree (TG)	*Eucalyptus rubida x dalrympleana*	5	5		N	
Tree (TG)	*Eucalyptus dalrympleana*	2	1		N	
Tree (TG)	*Acacia melanoxylon*	5	40		N	
Shrub (SG)	*Cassinia longifolia*	5	60		N	
Shrub (SG)	*Mirbelia platylobioides*	0.3	30		N	
Forb (FG)	*Plantago gaudichaudii*	0.7	200		N	
Grass & grasslike	*Poa sieberiana*	70	1000		N	
	Crepis capillaris	0.1	20		E	
Forb (FG)	*Gonocarpus teucrioides*	0.5	80		N	
Forb (FG)	*Cullen microcephalum*	0.3	30		N	
Forb (FG)	*Stackhousia monogyna*	0.1	20		N	
Shrub (SG)	*Exocarpos strictus*	1	20		N	
Other (OG)	*Desmodium varians*	0.2	40		N	
Forb (FG)	*Hydrocotyle laxiflora*	0.3	100		N	
	Trifolium arvense	0.1	20		E	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	20		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	0.2	3		N	
Forb (FG)	*Asperula conferta*	0.5	100		N	
Grass & grasslike	*Carex breviculmis*	0.1	20		N	
Grass & grasslike	*Themeda triandra*	2	100		N	
Forb (FG)	*Lotus australis*	0.4	30		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.2	20		N	
Forb (FG)	*Senecio quadridentatus*	0.1	10		N	
	Centaurium erythraea	0.1	5		E	
Tree (TG)	*Eucalyptus robertsonii*	0.1	10		N	
Forb (FG)	*Chrysocephalum apiculatum*	0.1	5		N	
Forb (FG)	*Viola betonicifolia*	0.1	10		N	
	Hypericum perforatum	0.2	50		HTE	
Forb (FG)	*Rumex brownii*	0.1	1		N	
Forb (FG)	*Cymbonotus lawsonianus*	0.1	10		N	
Forb (FG)	*Galium gaudichaudii*	0.1	10		N	
Grass & grasslike	*Lomandra micrantha subsp. Tuberculata*	0.1	10		N	
Forb (FG)	*Podolepis spp.*	0.1	1		N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	0.2	1		N	
Other (OG)	*Glycine tabacina*	0.1	10		N	
Forb (FG)	*Hypericum gramineum*	0.1	20		N	
Grass & grasslike	*Dichelachne spp.*	0.1	10		N	
Shrub (SG)	*Cassinia aculeata*	0.1	2		N	
Shrub (SG)	*Coprosma hirtella*	0.1	1		N	
Shrub (SG)	*Mirbelia oxylobioides*	0.2	1		N	
Forb (FG)	*Leptorhynchos squamatus*	0.1	30		N	

BAM Site – Field Survey Form

Plot ID:	218	**Date:**	12-12-17	**Survey Name:**	Access Roads			**Recorders:**	SD, EL
Zone:	55	**Easting:**	625998.1173	**Plot dimensions:**	20m x 50m			**Midline bearing:**	318
Datum:	GDA94	**Northing:**	6038194.426	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			999: Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	14
	Grasses etc.:	5
	Forbs:	9
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0.2
	Shrubs:	85.6
	Grasses etc.:	3.6
	Forbs:	3.3
	Ferns:	0.2
	Other:	1
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	40	10	10	10	30	25	25	35	10	15	0	0	0	20	4	10	10	4	4	4
Average of the 5 subplots:	20					22					4.8					6.4				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Silty clay	**Soil Colour**	Red	**Soil Depth**	Shallow
Lithology (B)							
Slope	20	**Aspect**	ENE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Historical. Single age class no old trees in adjacent community.
Cultivation (inc. pasture):			No evidence
Soil erosion:	Moderate	3 to 10 yo	Asssociated with removal of overstorey and also access road adjacent.
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Native and exotic herbivores
Fire damage:	Light	3 to 10 yo	Burnt logs
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Roadside weeds
Other:	Moderate	3 to 10 yo	Clearing associated with power line corridor.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Access Roads				
Date:	12-12-17	**Plot ID:**	218	**Recorders:**	SD, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Acacia buxifolia*	1	20		N	
Shrub (SG)	*Calytrix tetragona*	70	1000		N	
Shrub (SG)	*Leucopogon attenuatus*	1	30		N	
Shrub (SG)	*Acacia pravissima*	2	20		N	
Shrub (SG)	*Banksia canei*	0.1	3		N	
Other (OG)	*Cassytha glabella*	1	50		N	
	Hypericum perforatum	0.5	30		HTE	
Tree (TG)	*Eucalyptus nortonii*	0.1	1		N	
Grass & grasslike	*Rytidosperma caespitosum*	1	200		N	
Forb (FG)	*Stylidium graminifolium*	0.5	100		N	
	Rubus anglocandicans	0.5	10		E	
Tree (TG)	*Eucalyptus dives*	0.1	1		N	
Shrub (SG)	*Cassinia longifolia*	0.5	5		N	
	Centaurium erythraea	0.5	100		E	
Shrub (SG)	*Brachyloma daphnoides*	5	100		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	2	50		N	
Grass & grasslike	*Poa spp.*	0.2	20		N	
Forb (FG)	*Hypericum gramineum*	0.2	30		N	
Grass & grasslike	*Anthosachne scabra*	0.2	30		N	
Forb (FG)	*Oxalis perennans*	0.1	10		N	
Shrub (SG)	*Mirbelia oxylobioides*	3	30		N	
	Conyza canadensis var. canadensis	0.1	2		E	
Forb (FG)	*Hydrocotyle laxiflora*	1	200		N	
Forb (FG)	*Euchiton sphaericus*	0.1	10		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	5		N	
	Aira elegantissima	0.2	50		E	
Shrub (SG)	*Monotoca scoparia*	0.5	2		N	
Grass & grasslike	*Lomandra bracteata*	0.2	20		N	
Shrub (SG)	*Pimelea linifolia*	0.1	10		N	
Forb (FG)	*Gonocarpus teucrioides*	0.2	20		N	
Fern (EG)	*Cheilanthes sieberi*	0.2	20		N	
Shrub (SG)	*Bursaria spinosa*	2	10		N	
Forb (FG)	*Dianella revoluta*	1	30		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	10		N	
Forb (FG)	*Microtis unifolia*	0.1	1		N	
Shrub (SG)	*Podolobium alpestre*	0.1	2		N	
	Hypochaeris radicata	0.1	2		E	
Shrub (SG)	*Pimelea glauca*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	223	**Date:**	13-12-17	**Survey Name:**	Access Roads	**Recorders:**	SD, EL
Zone:	55	**Easting:**	627498.5243	**Plot dimensions:**	20m x 50m	**Midline bearing:**	155
Datum:	GDA94	**Northing:**	6031739.233	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	5
	Grasses etc.:	6
	Forbs:	18
	Ferns:	2
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	37
	Shrubs:	8.6
	Grasses etc.:	62.2
	Forbs:	11
	Ferns:	1.1
	Other:	4
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	1
50 – 79 cm:	7	0	2
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	277		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	40	40	15	45	60	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	40					1					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Basalt	**Soil Surface Texture**	Loam	**Soil Colour**	Brown	**Soil Depth**	Deep
Lithology (B)							
Slope	6	**Aspect**	NNW	**Site Drainage**	Medium	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Logging historic
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light	greater than 10yo	Associated with old logging
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	greater than 10yo	
Fire damage:	Light	3 to 10 yo	
Storm damage:	Light	3 to 10 yo	Snow damage
Weediness:	Light	less than 3yo	Forbs and blackberry
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Access Roads				
Date:	13-12-17	**Plot ID:**	223	**Recorders:**	SD, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dalrympleana*	30	15		N	
Shrub (SG)	*Lomatia myricoides*	5	30		N	
Shrub (SG)	*Cassinia aculeata*	2	20		N	
Tree (TG)	*Eucalyptus pauciflora*	3	30		N	
Tree (TG)	*Acacia dealbata*	2	15		N	
Forb (FG)	*Stellaria pungens*	5	500		N	
Tree (TG)	*Acacia melanoxylon*	2	5		N	
Other (OG)	*Glycine microphylla*	3	500		N	
Forb (FG)	*Hydrocotyle laxiflora*	1	100		N	
Grass & grasslike	*Lomandra longifolia*	0.5	10		N	
Forb (FG)	*Bulbine bulbosa*	1	100		N	
Shrub (SG)	*Rubus parvifolius*	0.5	10		N	
	Rubus anglocandicans	0.5	5		E	
Grass & grasslike	*Poa sieberiana*	60	1000		N	
Other (OG)	*Clematis aristata*	0.5	20		N	
Grass & grasslike	*Lepidosperma spp.*	0.5	10		N	
Shrub (SG)	*Daviesia ulicifolia*	1	20		N	
Forb (FG)	*Arrhenechthites mixta*	1	100		N	
Fern (EG)	*Polystichum proliferum*	1	10		N	
Forb (FG)	*Gastrodia sesamoides*	0.1	1		N	
Forb (FG)	*Viola betonicifolia*	0.2	20		N	
Other (OG)	*Desmodium varians*	0.5	40		N	
	Rosa rubiginosa	0.1	2		HTE	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.2	10		N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	20		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
Grass & grasslike	*Poa helmsii*	0.5	20		N	
Forb (FG)	*Pterostylis alpina*	0.2	20		N	
Forb (FG)	*Senecio spp.*	0.5	50		N	
Forb (FG)	*Coronidium scorpioides*	0.5	100		N	
Forb (FG)	*Arthropodium spp.*	0.2	20		N	
Forb (FG)	*Geranium neglectum*	0.3	30		N	
	Acetosella vulgaris	0.1	10		HTE	
Forb (FG)	*Ranunculus plebeius*	0.1	5		N	
Forb (FG)	*Galium binifolium*	0.2	20		N	
Forb (FG)	*Veronica calycina*	0.2	20		N	
Grass & grasslike	*Lomandra micrantha subsp. Tuberculata*	0.5	40		N	
Fern (EG)	*Pteridium esculentum*	0.1	5		N	
Shrub (SG)	*Exocarpos strictus*	0.1	2		N	
Forb (FG)	*Wahlenbergia gloriosa*	0.1	20		N	
Forb (FG)	*Cullen microcephalum*	0.1	2		N	

BAM Site – Field Survey Form

Plot ID:	225	**Date:**	29-11-17	**Survey Name:**	Access Roads	**Recorders:**	AM, EL
Zone:	55	**Easting:**	637691.0492	**Plot dimensions:**	20m x 50m	**Midline bearing:**	130
Datum:	GDA94	**Northing:**	6036232.519	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	6
	Grasses etc.:	3
	Forbs:	18
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	79.5
	Grasses etc.:	15.4
	Forbs:	2.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	4	2	4	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	3.4					0.8					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**	NW	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			None evident
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			Native and exotic herbivores
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Access Roads				
Date:	29-11-17	**Plot ID:**	225	**Recorders:**	AM, EL

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Hovea montana*	75	500		N	
Shrub (SG)	*Hakea microcarpa*	2	8		N	
Shrub (SG)	*Bossiaea foliosa*	2	10		N	
Shrub (SG)	*Epacris petrophila*	0.2	3		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	15	200		N	
	Anthoxanthum odoratum	3	50		E	
Forb (FG)	*Aciphylla simplicifolia*	0.1	10		N	
Forb (FG)	*Asperula conferta*	0.3	100		N	
Forb (FG)	*Ranunculus graniticola*	0.2	50		N	
	Hypochaeris radicata	0.1	20		E	
Forb (FG)	*Orchidaceae spp.*	0.1	5		N	
Forb (FG)	*Craspedia jamesii*	0.2	50		N	
	Acetosella vulgaris	0.1	10		HTE	
Forb (FG)	*Poranthera microphylla*	0.2	100		N	
Forb (FG)	*Aciphylla glacialis*	0.1	20		N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	50		N	
Shrub (SG)	*Epacris microphylla*	0.2	5		N	
Forb (FG)	*Leptorhynchos squamatus subsp. alpinus*	0.1	20		N	
	Cerastium glomeratum	0.1	20		E	
Forb (FG)	*Viola betonicifolia*	0.1	20		N	
Grass & grasslike	*Luzula flaccida*	0.2	100		N	
Forb (FG)	*Microseris lanceolata*	0.2	50		N	
Forb (FG)	*Asperula scoparia*	0.2	100		N	
Forb (FG)	*Hydrocotyle algida*	0.1	50		N	
Forb (FG)	*Oxalis perennans*	0.1	10		N	
Grass & grasslike	*Carex breviculmis*	0.2	20		N	
Shrub (SG)	*Pimelea linifolia subsp. caesia*	0.1	10		N	
	Tragopogon dubius	0.1	2		E	
Forb (FG)	*Senecio gunnii*	0.1	3		N	
	Taraxacum officinale	0.2	50		E	
Forb (FG)	*Geranium antrorsum*	0.1	10		N	
	Aster spp.	0.1	10		E	
Forb (FG)	*Epilobium gunnianum*	0.1	5		N	
	Trifolium repens	0.1	2		E	
Forb (FG)	*Brachyscome decipiens*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	300	**Date:**	15-12-19	**Survey Name:**	Plot 300 Rock Forrest			**Recorders:**	GS MP
Zone:	55	**Easting:**	650236	**Plot dimensions:**	20 x 50			**Midline bearing:**	103
Datum:	GDA94	**Northing:**	6020385	**IBRA region:**	South Eastern Highlands (Monaro)			**Zone ID:**	
Plant Community Type:			1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Subalpine Woodlands			**EEC:**	no	**Confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	2
	Forbs:	3
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	50
	Forbs:	0.4
	Ferns:	0
	Other:	0
High Threat Weed cover:		1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:			
20 – 29 cm:			
10 – 19 cm:			
5 – 9 cm:			
< 5 cm:			
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	50	50	50	50															
Average of the 5 subplots:	50					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley_flat	**Lf Pattern (A)**	Alluvial_plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Light brown	**Soil Depth**	
Lithology (B)							
Slope	2	**Aspect**	NE	**Site Drainage**	Moderate to good	**Distance to nearest water & type**	100 m drainage line/bog

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	severe	greaterthan10yo	
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	severe	lessthan3yo	
Fire damage:			
Storm damage:			
Weediness:	severe		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 300 Rock Forrest				
Date:	15-12-19	**Plot ID:**	300	**Recorders:**	GS MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Vulpia spp.	5	1000		E	
Grass & grasslike	*Bromus spp.*	25	4000		N	
	Trifolium arvense	10	2000		E	
	Hypochaeris radicata	0.5	500		E	
Forb (FG)	*Scleranthus brockiei*	0.2	200		N	
	Aira spp.	1	1000		E	
	Acetosella vulgaris	1	1000		HTE	
	Poaceae indeterminate	30	4000		E	
Grass & grasslike	*Rytidosperma spp.*	25	4000		N	
	Trifolium glomeratum	0.1	50		E	
	Cerastium glomeratum	0.1	30		E	
Forb (FG)	*Solenogyne gunnii*	0.1	10		N	
Forb (FG)	*Acaena agnipila*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	301	**Date:**	14-12-19	**Survey Name:**	Plot 301 Rock Forrest	**Recorders:**	GS MP
Zone:	55	**Easting:**	649850	**Plot dimensions:**	20 X 50	**Midline bearing:**	345
Datum:	GDA94	**Northing:**	6020667	**IBRA region:**	South Eastern Highlands (Monaro)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	high	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	no	**Confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	4
	Grasses etc.:	8
	Forbs:	29
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	76
	Shrubs:	0.5
	Grasses etc.:	57.5
	Forbs:	4.7
	Ferns:	0.1
	Other:	0.2
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1		
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	132		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	55	55	90	85	75															
Average of the 5 subplots:	72					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Gully	**Lf Pattern (A)**	Low_hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Light brown	**Soil Depth**	
Lithology (B)							
Slope	10	**Aspect**	N and S	**Site Drainage**	Moderate to good	**Distance to nearest water & type**	50 m to small dam

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:	light	3to10yo	
Grazing (identify native/stock):	light	lessthan3yo	
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 301 Rock Forrest				
Date:	14-12-19	**Plot ID:**	301	**Recorders:**	GS MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	60	60		N	
Tree (TG)	*Eucalyptus stellulata*	8	3		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	50	1000		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	6		N	
	Hypochaeris radicata	0.5	100		E	
Forb (FG)	*Senecio prenanthoides*	0.1	40		N	
	Trifolium repens	0.5	400		E	
Grass & grasslike	*Lomandra filiformis*	0.1	20		N	
Forb (FG)	*Scleranthus spp.*	0.1	20		N	
Forb (FG)	*Geranium potentilloides var. potentilloides*	0.4	100		N	
Forb (FG)	*Gonocarpus tetragynus*	0.2	200		N	
Forb (FG)	*Lobelia pedunculata*	0.3	2000		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	30		N	
Other (OG)	*Glycine clandestina*	0.2	300		N	
Grass & grasslike	*Anthosachne scabra*	5	1000		N	
Forb (FG)	*Poranthera microphylla*	0.2	200		N	
Forb (FG)	*Oxalis perennans*	0.1	100		N	
Forb (FG)	*Dichondra sp. A*	0.1	400		N	
Fern (EG)	*Pteridium esculentum*	0.1	3		N	
Forb (FG)	*Hovea heterophylla*	0.1	40		N	
Forb (FG)	*Cymbonotus spp.*	0.3	50		N	
Grass & grasslike	*Luzula densiflora*	0.2	500		N	
Forb (FG)	*Wahlenbergia stricta*	0.1	50		N	
	Holcus lanatus	1	40		E	
Shrub (SG)	*Daviesia ulicifolia*	0.2	7		N	
	Trifolium dubium	0.1	50		E	
Forb (FG)	*Hydrocotyle spp.*	0.1	80		N	
Forb (FG)	*Viola betonicifolia*	0.1	40		N	
	Acetosella vulgaris	0.1	40		HTE	
Forb (FG)	*Stylidium graminifolium*	0.1	30		N	
	Aira spp.	0.6	600		E	
	Vulpia spp.	1	1000		E	
Forb (FG)	*Euchiton involucratus*	0.2	200		N	
Forb (FG)	*Asperula conferta*	0.1	200		N	
Forb (FG)	*Euchiton spp.*	0.1	40		N	
Forb (FG)	*Coronidium monticola*	0.8	800		N	
Forb (FG)	*Cullen microcephalum*	0.2	200		N	
Forb (FG)	*Asteraceae indeterminate*	0.1	5		N	
Forb (FG)	*Galium spp.*	0.1	10		N	
Grass & grasslike	*Bromus spp.*	1	300		N	
Forb (FG)	*Plantago varia*	0.1	10		N	
Grass & grasslike	*Carex appressa*	0.1	30		N	
Forb (FG)	*Solenogyne gunnii*	0.1	4		N	
Forb (FG)	*Arthropodium milleflorum*	0.1	30		N	
	Taraxacum officinale	0.1	20		E	
Forb (FG)	*Lagenophora spp.*	0.1	40		N	
Forb (FG)	*Stellaria pungens*	0.1	20		N	

Grass & grasslike	*Microlaena stipoides*	1	100		N	
Tree (TG)	*Eucalyptus dalrympleana*	8	5		N	
	Dactylis glomerata	0.1	8		E	
Shrub (SG)	*Pimelea axiflora*	0.1	4		N	
Forb (FG)	*Hypericum gramineum*	0.1	40		N	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	6		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.1	20		N	
	Crepis capillaris	0.1	10		E	
	Centaurium erythraea	0.1	8		E	
Forb (FG)	*Wahlenbergia spp.*	0.1	15		N	

BAM Site – Field Survey Form

Plot ID:	306	**Date:**	09-12-19	**Survey Name:**	Plot 306 Rock Forrest	**Recorders:**	MP GS
Zone:	55	**Easting:**	649818	**Plot dimensions:**	20 X 50	**Midline bearing:**	342
Datum:	GDA94	**Northing:**	6021020	**IBRA region:**	South Eastern Highlands (Monaro)	**Zone ID:**	
Plant Community Type:			1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Subalpine Woodlands	**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	2
	Grasses etc.:	10
	Forbs:	15
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	40
	Shrubs:	0.2
	Grasses etc.:	39
	Forbs:	10.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:	1		
20 – 29 cm:	1		
10 – 19 cm:			
5 – 9 cm:			
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	13		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	85	10	5	40	10															
Average of the 5 subplots:	30					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Sedimentary_rock_unidentified_	**Soil Surface Texture**	Loam	**Soil Colour**	Light brown	**Soil Depth**	
Lithology (B)							
Slope	2	**Aspect**	Southerly	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	moderate	greaterthan10yo	
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	moderate		
Fire damage:			
Storm damage:			
Weediness:	moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 306 Rock Forrest				
Date:	09-12-19	**Plot ID:**	306	**Recorders:**	MP GS

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Anthoxanthum odoratum	8	1000		E	
	Trifolium arvense	1	600		E	
	Trifolium glomeratum	1	600		E	
	Cerastium glomeratum	0.1	30		E	
	Aira elegantissima	25	200		E	
	Vulpia spp.	1	100		E	
	Trifolium dubium	1	600		E	
	Hypochaeris glabra	0.2	100		E	
Forb (FG)	*Solenogyne gunnii*	2	1000		N	
	Hypochaeris radicata	0.5	250		E	
Grass & grasslike	*Carex spp.*	1	800		N	
Grass & grasslike	*Microlaena stipoides*	10	1000		N	
Forb (FG)	*Scleranthus biflorus*	3	100		N	
	Verbascum thapsus	0.1	2		E	
Grass & grasslike	*Luzula densiflora*	0.3	500		N	
	Holcus lanatus	1	100		E	
Forb (FG)	*Viola betonicifolia*	0.2	500		N	
Tree (TG)	*Eucalyptus pauciflora*	40	25		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	15	500		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.1	10		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.6	300		N	
Grass & grasslike	*Rytidosperma spp.*	1	100		N	
Forb (FG)	*Acaena agnipila*	0.4	40		N	
Forb (FG)	*Asperula scoparia*	1	100		N	
	Cirsium vulgare	0.1	1		E	
Forb (FG)	*Epilobium spp.*	0.1	15		N	
Shrub (SG)	*Pimelea axiflora*	0.1	5		N	
Grass & grasslike	*Bromus spp.*	1	200		N	
Forb (FG)	*Acaena novae-zelandiae*	1	200		N	
	Aphanes arvensis	0.1	10		E	
Forb (FG)	*Oxalis perennans*	0.1	40		N	
	Taraxacum officinale	0.1	4		E	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	4		N	
Forb (FG)	*Stellaria pungens*	0.2	50		N	
Forb (FG)	*Veronica subtilis*	0.1	4		N	
	Crepis capillaris	0.1	6		E	
Forb (FG)	*Geranium solanderi*	0.1	6		N	
Forb (FG)	*Veronica calycina*	0.1	60		N	
Forb (FG)	*Cymbonotus lawsonianus*	0.1	4		N	
Grass & grasslike	*Themeda triandra*	5	100		N	
Forb (FG)	*Euchiton involucratus*	2	2000		N	
Grass & grasslike	*Anthosachne scabra*	5	2000		N	
Forb (FG)	*Ajuga australis*	0.1	4		N	

BAM Site – Field Survey Form

Plot ID:	307	**Date:**	13-12-19	**Survey Name:**	Tantangara			**Recorders:**	RP, PR
Zone:	55	**Easting:**	648679	**Plot dimensions:**	20x50			**Midline bearing:**	119
Datum:	GDA94	**Northing:**	6040477	**IBRA region:**	Australian Alps (Snowy Mountains)			**Zone ID:**	
Plant Community Type:			1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Temperate Montane Grasslands			**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	0
	Grasses etc.:	7
	Forbs:	23
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	5
	Shrubs:	0
	Grasses etc.:	86.4
	Forbs:	4.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	2		
20 – 29 cm:	0		
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	17		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	25	10	50	25															
Average of the 5 subplots:	24					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	moderate	greaterthan10yo	Logging,
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	severe	lessthan3yo	horse grazing,
Fire damage:	moderate	greaterthan10yo	past fire damage
Storm damage:			
Weediness:	moderate	lessthan3yo	weed incursion,
Other:			suggest remapping the areas containing trees below and above the plot to PCT 644.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara						
		Date:	13-12-19	**Plot ID:**	307	**Recorders:**	RP, PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus lacrimans*	2	3		N	
Tree (TG)	*Eucalyptus stellulata*	3	4		N	
Grass & grasslike	*Themeda triandra*	30	1000		N	
Grass & grasslike	*Rytidosperma pilosum*	20	800		N	
Forb (FG)	*Cymbonotus preissianus*	0.2	120		N	
	Vulpia spp.	2	10000		E	
Grass & grasslike	*Poa sieberiana*	35	2000		N	
	Holcus lanatus	0.5	500		E	
Forb (FG)	*Geranium obtusisepalum*	0.2	1000		N	
Forb (FG)	*Scleranthus diander*	0.1	30		N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	25		N	
Forb (FG)	*Geranium retrorsum*	0.1	40		N	
	Trifolium campestre	0.1	200		E	
Forb (FG)	*Solenogyne gunnii*	0.3	800		N	
Forb (FG)	*Epilobium sarmentaceum*	0.2	2000		N	
Grass & grasslike	*Carex breviculmis*	1	800		N	
Forb (FG)	*Senecio prenanthoides*	0.2	80		N	
Grass & grasslike	*Luzula flaccida*	0.1	1600		N	
Forb (FG)	*Viola betonicifolia*	0.1	4		N	
Forb (FG)	*Euchiton sphaericus*	0.1	20		N	
Forb (FG)	*Geranium antrorsum*	0.3	300		N	
Grass & grasslike	*Carex appressa*	0.1	22		N	
	Trifolium repens	0.5	400		E	
Forb (FG)	*Veronica spp.*	0.1	8		N	
	Crepis capillaris	0.1	5		E	
Forb (FG)	*Stellaria pungens*	0.1	9		N	
	Acetosella vulgaris	0.1	50		HTE	
Forb (FG)	*Acaena agnipila*	0.1	20		N	
	Cirsium vulgare	0.1	2		E	
Forb (FG)	*Myosotis australis*	0.1	2		N	
Forb (FG)	*Bulbine bulbosa*	0.2	40		N	
Forb (FG)	*Epilobium spp.*	0.1	20		N	
Forb (FG)	*Lobelia pedunculata*	0.1	12		N	
	Hypericum perforatum	0.1	30		HTE	
Forb (FG)	*Oreomyrrhis spp.*	0.1	8		N	
Forb (FG)	*Chrysocephalum apiculatum*	0.1	1		N	
Forb (FG)	*Galium gaudichaudii*	0.1	2		N	
Grass & grasslike	*Anthosachne scabra*	0.2	50		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	7		N	
	Aira spp.	0.1	20		E	
	Anthoxanthum odoratum	1	2000		E	
Forb (FG)	*Euchiton spp.*	1	30		N	

BAM Site – Field Survey Form

Plot ID:	308	**Date:**	12-12-19	**Survey Name:**	Plot 308 Alpine creek trail			**Recorders:**	GS MP
Zone:	55	**Easting:**	641678	**Plot dimensions:**	20 x 50			**Midline bearing:**	45
Datum:	GDA94	**Northing:**	6032634	**IBRA region:**	Australian Alps (Snowy Mountains)			**Zone ID:**	
Plant Community Type:			1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	high	**Photo #:**	
Vegetation Class:			Temperate Montane Grasslands			**EEC:**	no	**Confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	5
	Grasses etc.:	7
	Forbs:	31
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	27.3
	Grasses etc.:	47.9
	Forbs:	16.7
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:			
20 – 29 cm:			
10 – 19 cm:			
5 – 9 cm:			
< 5 cm:			
Length of logs (m) (≥10 cm diameter, >50 cm in length)	2		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	40	10	20	20															
Average of the 5 subplots:	24					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Alluvial_plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Light to dark brown	**Soil Depth**	
Lithology (B)							
Slope	10	**Aspect**	SW	**Site Drainage**	Moderate	**Distance to nearest water & type**	20 m creek

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	light	greaterthan10yo	
Fire damage:			
Storm damage:			
Weediness:	moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 308 Alpine creek trail				
Date:	12-12-19	**Plot ID:**	308	**Recorders:**	GS MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Hovea montana*	12	100		N	
Shrub (SG)	*Hakea microcarpa*	10	70		N	
	Anthoxanthum odoratum	6	1000		E	
Forb (FG)	*Geranium antrorsum*	4	400		N	
Forb (FG)	*Brachyscome decipiens*	1	400		N	
Forb (FG)	*Scleranthus brockiei*	0.2	100		N	
Forb (FG)	*Craspedia coolaminica*	3	1000		N	
Forb (FG)	*Ranunculus lappaceus*	2	400		N	
	Trifolium repens	0.5	100		E	
Forb (FG)	*Scleranthus biflorus*	1	40		N	
Grass & grasslike	*Poa clivicola*	20	1000		N	
	Taraxacum officinale	0.5	200		E	
Forb (FG)	*Asperula scoparia*	1	2000		N	
Forb (FG)	*Plantago varia*	0.6	300		N	
Grass & grasslike	*Poa phillipsiana*	25	600		N	
Forb (FG)	*Galium gaudichaudii*	0.1	10		N	
	Acetosella vulgaris	0.5	600		HTE	
Grass & grasslike	*Luzula densiflora*	0.4	300		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	40		N	
Grass & grasslike	*Carex spp.*	1	200		N	
Forb (FG)	*Viola betonicifolia*	0.1	40		N	
Forb (FG)	*Wahlenbergia densifolia*	0.1	100		N	
	Hypochaeris radicata	0.1	30		E	
Forb (FG)	*Epilobium spp.*	0.1	50		N	
Shrub (SG)	*Acrothamnus hookeri*	5	100		N	
Grass & grasslike	*Carex appressa*	0.1	20		N	
Forb (FG)	*Solenogyne gunnii*	0.1	30		N	
Forb (FG)	*Cymbonotus spp.*	0.2	60		N	
Forb (FG)	*Acaena spp.*	0.2	200		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	50		N	
Forb (FG)	*Gingidia harveyana*	0.1	10		N	
Forb (FG)	*Veronica subtilis*	0.1	10		N	
Forb (FG)	*Microseris lanceolata*	1	300		N	
Shrub (SG)	*Pimelea biflora*	0.2	10		N	
Forb (FG)	*Craspedia costiniana*	0.1	10		N	
Forb (FG)	*Diuris monticola*	0.1	10		N	
Forb (FG)	*Senecio spp.*	0.2	40		N	
Forb (FG)	*Podolepis spp.*	0.4	80		N	
Forb (FG)	*Hypericum gramineum*	0.1	20		N	
Forb (FG)	*Erigeron bellidioides*	0.1	40		N	
Forb (FG)	*Oxalis perennans*	0.1	50		N	
	Cerastium glomeratum	0.1	40		E	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	20		N	
Forb (FG)	*Picris angustifolia subsp. merxmuelleri*	0.1	10		N	
Forb (FG)	*Euchiton involucratus*	0.1	40		N	
Grass & grasslike	*Rytidosperma spp.*	1	200		N	
Forb (FG)	*Taraxacum aristum*	0.2	40		N	

Grass & grasslike	*Themeda triandra*	0.4	80		N	
Forb (FG)	*Pterostylis spp.*	0.1	4		N	

BAM Site – Field Survey Form

Plot ID:	309	**Date:**	12-12-19	**Survey Name:**	Bullocks Fire Trail, Tantangara	**Recorders:**	RP, PR
Zone:	55	**Easting:**	643073	**Plot dimensions:**	20x50	**Midline bearing:**	39
Datum:	GDA94	**Northing:**	6036281	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	medium	**Photo #:**	
Vegetation Class:	Temperate Montane Grasslands			**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	4
	Grasses etc.:	8
	Forbs:	24
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	11.2
	Grasses etc.:	76.5
	Forbs:	17.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.7

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0		
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	40	80	30	80	70															
Average of the 5 subplots:	60					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			Horse grazing and trampling.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Bullocks Fire Trail, Tantangara				
Date:	12-12-19	**Plot ID:**	309	**Recorders:**	RP, PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Hovea montana*	10	300		N	
Grass & grasslike	*Poa phillipsiana*	35	5000		N	
Forb (FG)	*Ranunculus lappaceus*	5	800		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	1		N	
Forb (FG)	*Craspedia spp.*	8	1500		N	
Forb (FG)	*Craspedia costiniana*	0.1	10		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	100		N	
Forb (FG)	*Prasophyllum spp.*	0.1	2		N	
Forb (FG)	*Geranium antrorsum*	1	1000		N	
Forb (FG)	*Wahlenbergia spp.*	0.3	3000		N	
Grass & grasslike	*Luzula flaccida*	0.4	4000		N	
Forb (FG)	*Oreomyrrhis argentea*	0.1	20		N	
	Acetosella vulgaris	0.7	2000		HTE	
Forb (FG)	*Linum marginale*	0.1	80		N	
	Taraxacum officinale	0.1	2		E	
Grass & grasslike	*Carex spp.*	0.6	300		N	
	Cerastium glomeratum	0.1	150		E	
Forb (FG)	*Viola betonicifolia*	0.2	150		N	
	Poaceae indeterminate	0.2	1000		E	
Forb (FG)	*Microseris lanceolata*	0.4	500		N	
Forb (FG)	*Brachyscome spathulata*	0.4	400		N	
Forb (FG)	*Acaena spp.*	0.2	300		N	
Forb (FG)	*Podolepis jaceoides*	0.1	50		N	
Forb (FG)	*Scleranthus biflorus*	0.2	4		N	
Shrub (SG)	*Pimelea biflora*	0.1	2		N	
Forb (FG)	*Cardamine spp.*	0.1	1		N	
Shrub (SG)	*Hakea microcarpa*	1	9		N	
	Hypochaeris radicata	0.1	2		E	
Forb (FG)	*Diuris monticola*	0.1	8		N	
Forb (FG)	*Pterostylis spp.*	0.1	4		N	
Grass & grasslike	*Lachnagrostis spp.*	0.1	1		N	
Forb (FG)	*Stellaria pungens*	0.1	2		N	
Forb (FG)	*Caryophyllaceae indeterminate*	0.1	1		N	
Grass & grasslike	*Carex spp.*	0.1	100		N	
Grass & grasslike	*Poa sieberiana*	40	10000		N	
	Trifolium arvense	0.2	80		E	
	Poaceae indeterminate	0.1	3		E	
Forb (FG)	*Epilobium spp.*	0.1	1		N	
Forb (FG)	*Senecio spp.*	0.1	1		N	
Grass & grasslike	*Rytidosperma spp.*	0.2	200		N	
Forb (FG)	*Gingidia spp.*	0.1	1		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	100		N	
Grass & grasslike	*Carex spp.*	0.1	150		N	

BAM Site – Field Survey Form

Plot ID:	311	**Date:**	10-12-19	**Survey Name:**	Kings Cross Road	**Recorders:**	RP, PR
Zone:	55	**Easting:**	626627	**Plot dimensions:**	20x50	**Midline bearing:**	10
Datum:	GDA94	**Northing:**	6023086	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	high	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	no	**Confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	2
	Grasses etc.:	5
	Forbs:	9
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.2
	Grasses etc.:	1.7
	Forbs:	1
	Ferns:	0.2
	Other:	0
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0		
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	25	10	25	50	0															
Average of the 5 subplots:	22					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Gully	**Lf Pattern (A)**	Low_hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**	Poor (slow moving creek)	**Distance to nearest water & type**	0m, creek (dam nearby on other side of road)

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	severe	lessthan3yo	Dominated by exotic species.
Other:	light	greaterthan10yo	Downhill of road possibly impacted when dam across road was originally built.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Kings Cross Road				
Date:	10-12-19	**Plot ID:**	311	**Recorders:**	RP, PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Phalaris arundinacea	90	4000		E	
	Anthoxanthum odoratum	2	1500		E	
Grass & grasslike	*Carex gaudichaudiana*	0.5	100		N	
Forb (FG)	*Euchiton spp.*	0.1	10		N	
Grass & grasslike	*Carex spp.*	0.1	1		N	
Fern (EG)	*Blechnum penna-marina subsp. alpina*	0.2	50		N	
Forb (FG)	*Myriophyllum spp.*	0.1	20		N	
Forb (FG)	*Ranunculus spp.*	0.1	1		N	
	Hypericum perforatum	0.1	100		HTE	
Forb (FG)	*Hydrocotyle algida*	0.1	5		N	
Forb (FG)	*Epilobium gunnianum*	0.2	30		N	
Grass & grasslike	*Rytidosperma spp.*	0.1	1		N	
	Taraxacum officinale	0.1	20		E	
	Dactylis glomerata	0.1	20		E	
	Acetosella vulgaris	0.2	50		HTE	
	Rosa rubiginosa	0.1	1		HTE	
Forb (FG)	*Geranium spp.*	0.1	2		N	
Forb (FG)	*Senecio gunnii*	0.1	8		N	
	Medicago spp.	0.1	1		E	
	Trifolium arvense	0.1	1		E	
Forb (FG)	*Acaena novae-zelandiae*	0.1	1		N	
	Vulpia spp.	0.1	1		E	
Shrub (SG)	*Bossiaea foliosa*	0.1	1		N	
	Cerastium vulgare	0.1	1		E	
Shrub (SG)	*Epacris gunnii*	0.1	1		N	
Forb (FG)	*Hypericum japonicum*	0.1	1		N	
Grass & grasslike	*Poa helmsii*	0.5	20		N	
	Achillea millefolium	0.1	5		HTE	
Grass & grasslike	*Festuca asperula*	0.5	100		N	
	Collomia grandiflora	0.1	15		E	

BAM Site – Field Survey Form

Plot ID:	312	**Date:**	17-12-19	**Survey Name:**		**Recorders:**	Jb & Mp
Zone:	55	**Easting:**	635238	**Plot dimensions:**	20 x 50	**Midline bearing:**	150
Datum:	GDA94	**Northing:**	6029808	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	high	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	yes	**Confidence:**	low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	8
	Forbs:	16
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	34.8
	Forbs:	2.2
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	95	80	90	80															
Average of the 5 subplots:	70					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Lf Element (A)		Lf Pattern (A)		Microrelief	
		Lf Element (B)		Lf Pattern (B)			
Lithology (A)		Soil Surface Texture		Soil Colour		Soil Depth	
Lithology (B)							
Slope		Aspect		Site Drainage		Distance to nearest water & type	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	17-12-19	**Plot ID:**	312	**Recorders:**	Jb & Mp

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Anthoxanthum odoratum	15	1000	no	E	
Forb (FG)	*Acaena echinata*	0.2	300		N	
Forb (FG)	*Ranunculus millanii*	0.1	200		N	
	Cerastium glomeratum	0.1	50		E	
Grass & grasslike	*Poa labillardierei subsp. nervosa*	8	100		N	
	Acetosella vulgaris	0.1	100		HTE	
	Trifolium dubium	0.1	40		E	
Forb (FG)	*Geranium antrorsum*	0.2	150		N	
	Hypochaeris radicata	0.2	200		E	
	Cyperaceae indeterminate	35	4000		E	
Forb (FG)	*Chrysocephalum apiculatum*	0.1	50		N	
Grass & grasslike	*Poa induta*	0.1	30		N	
	Aira spp.	0.1	40		E	
Forb (FG)	*Euchiton spp.*	0.1	50		N	
Forb (FG)	*Stellaria pungens*	0.1	20		N	
Grass & grasslike	*Carex spp.*	5	100		N	
	Taraxacum officinale	0.1	20		E	
Grass & grasslike	*Luzula densiflora*	0.3	4000		N	
Forb (FG)	*Hypericum japonicum*	0.5	5000		N	
Grass & grasslike	*Juncus spp.*	0.4	200		N	
	Trifolium repens	0.2	800		E	
	Holcus lanatus	0.1	20		E	
Forb (FG)	*Acaena novae-zelandiae*	0.1	10		N	
Forb (FG)	*Asteraceae indeterminate*	0.1	8		N	
Grass & grasslike	*Festuca asperula*	10	300		N	
Forb (FG)	*Hydrocotyle spp.*	0.1	20		N	
Forb (FG)	*Epilobium spp.*	0.1	30		N	
Forb (FG)	*Dichondra sp. A*	0.1	50		N	
Fern (EG)	*Ophioglossum lusitanicum*	0.1	20		N	
Grass & grasslike	*Rytidosperma spp.*	1	200		N	
Forb (FG)	*Oxalis perennans*	0.1	200		N	
	Sphagnum_spp	2	200			
Forb (FG)	*Lobelia spp.*	0.1	10		N	
Forb (FG)	*Neopaxia australasica*	0.1	10		N	
Forb (FG)	*Veronica subtilis*	0.1	10		N	
Grass & grasslike	*Poa sieberiana*	10	200		N	

BAM Site – Field Survey Form

Plot ID:	313	**Date:**	11-12-19	**Survey Name:**	Plot 313 Snowy mt highway			**Recorders:**	GS MP
Zone:	55	**Easting:**	635245	**Plot dimensions:**	20 x 50			**Midline bearing:**	35
Datum:	GDA94	**Northing:**	6036864	**IBRA region:**	Australian Alps (Snowy Mountains)			**Zone ID:**	
Plant Community Type:			1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	high	**Photo #:**	
Vegetation Class:			Temperate Montane Grasslands			**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	3
	Grasses etc.:	9
	Forbs:	13
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	3.7
	Grasses etc.:	56.7
	Forbs:	2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:			
20 – 29 cm:			
10 – 19 cm:			
5 – 9 cm:			
< 5 cm:			
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	25	30	80	50	85															
Average of the 5 subplots:	54					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley_flat	**Lf Pattern (A)**	Alluvial_plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loamy	**Soil Colour**	Very dark brown to black	**Soil Depth**	
Lithology (B)							
Slope	<1	**Aspect**	97	**Site Drainage**	Poor	**Distance to nearest water & type**	20 m to stream

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	moderate	greaterthan10yo	
Cultivation (inc. pasture):			
Soil erosion:	light	3to10yo	
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 313 Snowy mt highway				
Date:	11-12-19	**Plot ID:**	313	**Recorders:**	GS MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa costiniana*	40	200		N	
Forb (FG)	*Ranunculus lappaceus*	0.5	60		N	
Grass & grasslike	*Luzula spp.*	1	150		N	
	Cerastium glomeratum	0.2	100		E	
	Acetosella vulgaris	0.1	30		HTE	
	Taraxacum officinale	0.2	50		E	
Grass & grasslike	*Juncus spp.*	0.3	50		N	
Forb (FG)	*Linum marginale*	0.2	50		N	
Forb (FG)	*Craspedia costiniana*	0.3	100		N	
Forb (FG)	*Geranium antrorsum*	0.1	18		N	
Forb (FG)	*Epilobium spp.*	0.1	30		N	
Forb (FG)	*Oreomyrrhis spp.*	0.1	10		N	
Grass & grasslike	*Carex breviculmis*	2	300		N	
Grass & grasslike	*Carex appressa*	1	50		N	
Shrub (SG)	*Epacris gunnii*	1.5	100		N	
	Poaceae indeterminate	30	300		E	
Grass & grasslike	*Poa labillardierei*	6	615		N	
Shrub (SG)	*Pimelea axiflora*	0.2	1		N	
Shrub (SG)	*Cassinia monticola*	2	50		N	
Forb (FG)	*Veronica subtilis*	0.1	50		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	30		N	
Forb (FG)	*Celmisia spp.*	0.1	20		N	
Forb (FG)	*Brachyscome decipiens*	0.1	30		N	
Forb (FG)	*Leptorhynchos squamatus subsp. Alpinus*	0.1	10		N	
Grass & grasslike	*Poa phillipsiana*	0.4	20		N	
Forb (FG)	*Epilobium spp.*	0.1	10		N	
Forb (FG)	*Veronica serpyllifolia*	0.1	10		N	
Grass & grasslike	*Carex spp.*	5	1000		N	
Grass & grasslike	*Baloskion spp.*	1	20		N	

BAM Site – Field Survey Form

Plot ID:	314	**Date:**	17-12-19	**Survey Name:**	Nungar Creek Fire Trail	**Recorders:**	RP, MP
Zone:	55	**Easting:**	643962	**Plot dimensions:**	20x50	**Midline bearing:**	70
Datum:	GDA94	**Northing:**	6036188	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	medium	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	6
	Grasses etc.:	8
	Forbs:	26
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	7.3
	Grasses etc.:	58.8
	Forbs:	3.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	75	25	60	40	50															
Average of the 5 subplots:	50					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley_flat	**Lf Pattern (A)**	Plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	severe	lessthan3yo	Horse grazing and trampling. 70 horses seen in the vicinity.
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Nungar Creek Fire Trail				
Date:	17-12-19	**Plot ID:**	314	**Recorders:**	RP, MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Epacris gunnii*	2	75		N	
Forb (FG)	*Stylidium graminifolium*	0.5	500		N	
Grass & grasslike	*Poa phillipsiana*	1	60		N	
Forb (FG)	*Diuris monticola*	0.1	100		N	
Grass & grasslike	*Poa costiniana*	6	500		N	
Forb (FG)	*Asperula pusilla*	0.1	200		N	
Forb (FG)	*Euphrasia collina subsp. paludosa*	0.2	400		N	
Shrub (SG)	*Cassinia monticola*	3	41		N	
Shrub (SG)	*Pultenaea polifolia*	1	200		N	
Forb (FG)	*Brachyscome scapigera*	0.2	400		N	
Forb (FG)	*Brachyscome decipiens*	0.1	100		N	
Forb (FG)	*Velleia montana*	0.1	20		N	
Forb (FG)	*Craspedia spp.*	0.2	200		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	60		N	
Shrub (SG)	*Hakea microcarpa*	0.4	10		N	
Grass & grasslike	*Poa spp.*	50	1000		N	
Forb (FG)	*Prasophyllum spp.*	0.1	30		N	
Forb (FG)	*Coronidium monticola*	0.3	400		N	
Forb (FG)	*Veronica subtilis*	0.1	20		N	
	Acetosella vulgaris	0.1	30		HTE	
Shrub (SG)	*Dillwynia prostrata*	0.8	100		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	100		N	
	Poaceae indeterminate	1	300		E	
Forb (FG)	*Microseris lanceolata*	0.1	20		N	
Grass & grasslike	*Carex breviculmis*	1	400		N	
Forb (FG)	*Erigeron bellidioides*	0.1	20		N	
Grass & grasslike	*Juncus spp.*	0.1	10		N	
	Hypochaeris radicata	0.2	250		E	
Forb (FG)	*Viola betonicifolia*	0.1	400		N	
Forb (FG)	*Gonocarpus micranthus*	0.1	10		N	
Forb (FG)	*Podolepis spp.*	0.1	60		N	
Forb (FG)	*Hypericum gramineum*	0.1	50		N	
Grass & grasslike	*Anthosachne scabra*	0.5	100		N	
Forb (FG)	*Hypoxis hygrometrica*	0.1	200		N	
Forb (FG)	*Geranium antrorsum*	0.1	30		N	
Grass & grasslike	*Agrostis venusta*	0.1	30		N	
Forb (FG)	*Senecio gunnii*	0.1	10		N	
Grass & grasslike	*Rytidosperma spp.*	0.1	20		N	
Forb (FG)	*Cotula alpina*	0.1	20		N	
Forb (FG)	*Orchidaceae indeterminate*	0.1	10		N	
Forb (FG)	*Acaena agnipila*	0.1	15		N	
Shrub (SG)	*Persoonia chamaepeuce*	0.1	4		N	
Forb (FG)	*Oreomyrrhis argentea*	0.1	4		N	

BAM Site – Field Survey Form

Plot ID:	316	**Date:**	19-12-19	**Survey Name:**	Tantangara dam firetrail	**Recorders:**	RP, MP
Zone:	55	**Easting:**	647014	**Plot dimensions:**	20x50	**Midline bearing:**	322
Datum:	GDA94	**Northing:**	6036326	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:			1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Temperate Montane Grasslands	**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	7
	Grasses etc.:	11
	Forbs:	27
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	11.2
	Grasses etc.:	39.9
	Forbs:	4.5
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	10	33	40	25															
Average of the 5 subplots:	27.6					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley_flat	**Lf Pattern (A)**	Plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	severe	lessthan3yo	Horse grazing and trampling
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara dam firetrail				
Date:	19-12-19	**Plot ID:**	316	**Recorders:**	RP, MP

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa costiniana*	30	2000		N	
Forb (FG)	*Ranunculus spp.*	0.2	100		N	
Grass & grasslike	*Luzula densiflora*	0.2	1000		N	
Forb (FG)	*Asperula pusilla*	0.1	400		N	
Forb (FG)	*Coronidium monticola*	0.5	600		N	
Forb (FG)	*Arthropodium milleflorum*	0.1	400		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	60		N	
Grass & grasslike	*Baloskion australe*	0.3	800		N	
	Acetosella vulgaris	0.2	400		HTE	
Grass & grasslike	*Carex spp.*	2	1000		N	
Forb (FG)	*Brachyscome decipiens*	0.3	200		N	
Forb (FG)	*Stylidium graminifolium*	0.2	800		N	
	Hypochaeris radicata	0.1	50		E	
	Vulpia spp.	0.1	300		E	
	Holcus lanatus	0.1	60		E	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	10		N	
Forb (FG)	*Craspedia costiniana*	0.5	100		N	
Shrub (SG)	*Pimelea bracteata*	0.1	2		N	
Forb (FG)	*Scleranthus biflorus*	0.1	50		N	
Forb (FG)	*Senecio quadridentatus*	0.1	20		N	
Forb (FG)	*Acaena ovina*	0.1	30		N	
Fern (EG)	*Botrychium australe*	0.1	4		N	
Shrub (SG)	*Olearia myrsinoides*	0.3	14		N	
Grass & grasslike	*Poa sieberiana*	3	400		N	
Shrub (SG)	*Epacris gunnii*	10	135		N	
Shrub (SG)	*Rhytidosporum alpinum*	0.1	20		N	
	Crepis capillaris	0.1	10		E	
Forb (FG)	*Podolepis spp.*	0.1	40		N	
Forb (FG)	*Brachyscome scapigera*	0.6	400		N	
Shrub (SG)	*Pultenaea polifolia*	0.5	200		N	
Forb (FG)	*Celmisia spp.*	0.1	20		N	
	Poaceae indeterminate	3	400		E	
Grass & grasslike	*Poa clivicola*	1	80		N	
Grass & grasslike	*Agrostis venusta*	2	600		N	
Forb (FG)	*Calotis glandulosa*	0.1	4		N	
Forb (FG)	*Veronica subtilis*	0.1	10		N	
Shrub (SG)	*Olearia algida*	0.1	4		N	
Shrub (SG)	*Hakea microcarpa*	0.1	4		N	
Forb (FG)	*Poranthera microphylla*	0.1	40		N	
	Cerastium glomeratum	0.1	30		E	
Forb (FG)	*Senecio gunnii*	0.1	4		N	
Forb (FG)	*Oxalis perennans*	0.1	50		N	
Forb (FG)	*Plantago euryphylla*	0.1	10		N	
Grass & grasslike	*Juncus spp.*	0.1	10		N	
Grass & grasslike	*Carex appressa*	0.1	10		N	
Grass & grasslike	*Poa labillardierei subsp. nervosa*	0.2	6		N	
Forb (FG)	*Epilobium spp.*	0.1	40		N	

Forb (FG)	*Brachyscome aculeata*	0.1	10		N	
	Taraxacum officinale	0.1	20		E	
Forb (FG)	*Lobelia spp.*	0.1	4		N	
Grass & grasslike	*Rytidosperma spp.*	1	100		N	
Forb (FG)	*Gonocarpus montanus*	0.1	30		N	
Forb (FG)	*Orchidaceae indeterminate*	0.1	10		N	
Forb (FG)	*Deyeuxia spp.*	0.2	60		N	

BAM Site – Field Survey Form

Plot ID:	319	**Date:**	11-12-19	**Survey Name:**	Rock Forest			**Recorders:**	RP, PR
Zone:	55	**Easting:**	650587	**Plot dimensions:**	20x50			**Midline bearing:**	197
Datum:	GDA94	**Northing:**	6020380	**IBRA region:**	South Eastern Highlands (Monaro)			**Zone ID:**	
Plant Community Type:			303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion			**Confidence:**	high	**Photo #:**	
Vegetation Class:			Southern Tableland Grassy Woodlands			**EEC:**	no	**Confidence:**	low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	4
	Grasses etc.:	5
	Forbs:	16
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	50
	Shrubs:	0.4
	Grasses etc.:	1.5
	Forbs:	2.2
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	2		2
50 – 79 cm:	2		
30 – 49 cm:	8		
20 – 29 cm:	1		
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	0		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	96		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	10	30	15	2															
Average of the 5 subplots:	13.4					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	moderate	lessthan3yo	Shrub and groundcover damaged by stock
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Rock Forest				
Date:	11-12-19	**Plot ID:**	319	**Recorders:**	RP, PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	50	43		N	
Grass & grasslike	*Agrostis spp.*	1	800		N	
	Dactylis glomerata	0.5	500		E	
	Lolium perenne	12	10000		E	
	Trifolium hirtum	0.2	20		E	
	Vulpia bromoides	0.3	400		E	
	Trifolium campestre	0.1	50		E	
Forb (FG)	*Asperula gunnii*	0.3	100		N	
Forb (FG)	*Stellaria pungens*	0.4	80		N	
	Trifolium arvense	0.2	20		E	
	Bromus molliformis	0.2	200		E	
	Holcus lanatus	8	4000		E	
	Cirsium vulgare	0.2	40		E	
Forb (FG)	*Oxalis perennans*	0.1	30		N	
Forb (FG)	*Chrysocephalum apiculatum*	0.2	10		N	
Forb (FG)	*Geranium antrorsum*	0.1	20		N	
	Taraxacum officinale	0.1	10		E	
Forb (FG)	*Acaena agnipila*	0.1	4		N	
	Acetosella vulgaris	0.1	30		HTE	
Forb (FG)	*Solenogyne gunnii*	0.1	20		N	
Grass & grasslike	*Poa phillipsiana*	0.1	80		N	
Forb (FG)	*Plantago varia*	0.1	10		N	
Forb (FG)	*Oreomyrrhis spp.*	0.1	5		N	
Forb (FG)	*Leptorhynchos squamatus*	0.1	1		N	
Other (OG)	*Glycine spp.*	0.1	3		N	
Grass & grasslike	*Poa spp.*	0.1	30		N	
Forb (FG)	*Acaena spp.*	0.1	2		N	
Forb (FG)	*Geranium spp.*	0.1	10		N	
Shrub (SG)	*Pimelea pauciflora*	0.1	3		N	
Shrub (SG)	*Melicytus dentatus*	0.1	1		N	
	Rubus fruticosus sp. agg.	0.1	1		HTE	
Forb (FG)	*Veronica subtilis*	0.1	10		N	
Forb (FG)	*Dichondra repens*	0.1	1		N	
	Aira spp.	0.1	1		E	
Shrub (SG)	*Discaria pubescens*	0.1	4		N	
	Crepis capillaris	0.1	1		E	
	Trifolium repens	0.2	30		E	
Forb (FG)	*Arthropodium milleflorum*	0.1	1		N	
Forb (FG)	*Euchiton japonicus*	0.1	2		N	
Shrub (SG)	*Epacris breviflora*	0.1	1		N	
Grass & grasslike	*Carex breviculmis*	0.2	200		N	
Grass & grasslike	*Juncus spp.*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	320	**Date:**	17-12-19	**Survey Name:**		**Recorders:**	RP, MP
Zone:	55	**Easting:**	641625	**Plot dimensions:**	20x50	**Midline bearing:**	152
Datum:	GDA94	**Northing:**	6038374	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	medium	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	7
	Grasses etc.:	7
	Forbs:	25
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	15
	Shrubs:	54.3
	Grasses etc.:	55.7
	Forbs:	3.8
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	2	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	2	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	1
Length of logs (m) (≥10 cm diameter, >50 cm in length)	83		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	10	60	15	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	24					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Lf Element (A)		Lf Pattern (A)		Microrelief	
		Lf Element (B)		Lf Pattern (B)			
Lithology (A)		Soil Surface Texture		Soil Colour		Soil Depth	
Lithology (B)							
Slope		Aspect		Site Drainage		Distance to nearest water & type	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			All trees with dbh 80+ are dead. Horses nearby. Rabbit burrows. Trees burnt greater than 10 years ago.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	17-12-19	Plot ID:	320	Recorders:	RP, MP

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Bossiaea foliosa*	1.5	10		N	
Shrub (SG)	*Acrothamnus hookeri*	12	135		N	
Shrub (SG)	*Hovea montana*	40	150		N	
Shrub (SG)	*Pimelea pauciflora*	0.4	4		N	
Grass & grasslike	*Poa sieberiana*	1	40		N	
Forb (FG)	*Ranunculus plebeius*	0.1	20		N	
Forb (FG)	*Senecio gunnii*	0.1	30		N	
Shrub (SG)	*Pimelea biflora*	0.2	16		N	
Forb (FG)	*Microseris lanceolata*	0.2	100		N	
Forb (FG)	*Acaena novae-zelandiae*	0.5	400		N	
Forb (FG)	*Scleranthus spp.*	0.2	2000		N	
Grass & grasslike	*Poa clivicola*	50	2000		N	
Forb (FG)	*Asperula scoparia*	0.5	4000		N	
Grass & grasslike	*Carex inversa*	1	1000		N	
Forb (FG)	*Brachyscome decipiens*	0.2	100		N	
Forb (FG)	*Stellaria pungens*	0.1	50		N	
Forb (FG)	*Hypericum gramineum*	0.1	50		N	
Grass & grasslike	*Themeda triandra*	3	200		N	
Forb (FG)	*Diuris monticola*	0.1	10		N	
	Acetosella vulgaris	0.1	30		HTE	
Tree (TG)	*Eucalyptus stellulata*	5	25		N	
Tree (TG)	*Eucalyptus pauciflora*	10	5		N	
Forb (FG)	*Viola betonicifolia*	0.1	40		N	
Forb (FG)	*Senecio pinnatifolius var. alpinus*	0.1	10		N	
Forb (FG)	*Epilobium spp.*	0.1	30		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	40		N	
	Anthoxanthum odoratum	0.5	100		E	
Forb (FG)	*Craspedia spp.*	0.2	100		N	
Forb (FG)	*Leptorhynchos squamatus subsp. Alpinus*	0.1	10		N	
	Taraxacum officinale	0.1	20		E	
	Hypochaeris radicata	0.1	15		E	
Grass & grasslike	*Agrostis venusta*	0.1	30		N	
	Crepis capillaris	0.1	20		E	
Forb (FG)	*Swainsona behriana*	0.1	30		N	
Forb (FG)	*Acaena agnipila*	0.1	30		N	
Forb (FG)	*Scleranthus biflorus*	0.1	1		N	
Forb (FG)	*Geranium antrorsum*	0.1	10		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
Grass & grasslike	*Luzula densiflora*	0.1	20		N	
Forb (FG)	*Senecio spp.*	0.2	40		N	
Shrub (SG)	*Ozothamnus secundiflorus*	0.1	1		N	
Forb (FG)	*Podolepis jaceoides*	0.1	10		N	
Forb (FG)	*Stylidium graminifolium*	0.1	100		N	
Forb (FG)	*Geranium solanderi*	0.1	4		N	
Other (OG)	*Glycine clandestina*	0.1	10		N	
Grass & grasslike	*Poa phillipsiana*	0.5	10		N	
Forb (FG)	*Cymbonotus spp.*	0.1	8		N	

BAM Site – Field Survey Form

Plot ID:	321	**Date:**	12-12-19	**Survey Name:**	Plot 321 Alpine creek trail			**Recorders:**	GS MP
Zone:	55	**Easting:**	641889	**Plot dimensions:**	20 x 50			**Midline bearing:**	200
Datum:	GDA94	**Northing:**	6032604	**IBRA region:**	Australian Alps (Snowy Mountains)			**Zone ID:**	
Plant Community Type:			303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion			**Confidence:**	high	**Photo #:**	
Vegetation Class:			Southern Tableland Grassy Woodlands			**EEC:**	no	**Confidence:**	high

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	3
	Grasses etc.:	6
	Forbs:	21
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	0.3
	Grasses etc.:	9.2
	Forbs:	8.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:	1		
20 – 29 cm:	1		
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	120		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	10	15	25	15															
Average of the 5 subplots:	23					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Alluvial_plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Brown	**Soil Depth**	
Lithology (B)							
Slope	6	**Aspect**	NE	**Site Drainage**	Good	**Distance to nearest water & type**	500 m bog

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	moderate	greaterthan10yo	
Fire damage:			
Storm damage:			
Weediness:	moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 321 Alpine creek trail				
Date:	12-12-19	**Plot ID:**	321	**Recorders:**	GS MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	25	6		N	
Forb (FG)	*Geum urbanum*	0.2	50		N	
Forb (FG)	*Bulbine bulbosa*	0.5	200		N	
	Anthoxanthum odoratum	25	2000		E	
Grass & grasslike	*Luzula densiflora*	0.1	60		N	
Forb (FG)	*Geranium potentilloides*	0.2	100		N	
	Trifolium repens	0.1	100		E	
Forb (FG)	*Acaena ovina*	2	2000		N	
	Cirsium spp.	0.1	20		E	
Forb (FG)	*Acaena novae-zelandiae*	1	1000		N	
Forb (FG)	*Craspedia coolaminica*	1	800		N	
Forb (FG)	*Asperula scoparia*	1	600		N	
Forb (FG)	*Geranium antrorsum*	0.6	400		N	
Forb (FG)	*Galium gaudichaudii*	0.1	400		N	
Grass & grasslike	*Poa clivicola*	5	1000		N	
Forb (FG)	*Hypericum gramineum*	0.1	10		N	
	Taraxacum officinale	0.1	40		E	
Grass & grasslike	*Themeda triandra*	2	100		N	
Grass & grasslike	*Carex spp.*	0.1	50		N	
Grass & grasslike	*Rytidosperma spp.*	1	200		N	
	Crepis capillaris	0.1	20		E	
Forb (FG)	*Cynoglossum australe*	0.5	200		N	
	Collomia grandiflora	0.1	10		E	
Forb (FG)	*Dichondra spp.*	0.1	100		N	
Forb (FG)	*Scleranthus spp.*	0.1	50		N	
	Tragopogon spp.	0.1	4		E	
Forb (FG)	*Plantago euryphylla*	0.2	100		N	
Forb (FG)	*Cymbonotus spp.*	0.2	20		N	
Forb (FG)	*Epilobium spp.*	0.1	40		N	
Shrub (SG)	*Bossiaea foliosa*	0.1	2		N	
Shrub (SG)	*Pimelea linifolia*	0.1	20		N	
Forb (FG)	*Podolepis jaceoides*	0.6	100		N	
	Acetosella vulgaris	0.1	60		HTE	
	Trifolium dubium	0.1	50		E	
Forb (FG)	*Ajuga australis*	0.1	10		N	
Forb (FG)	*Asperula conferta*	0.1	10		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	4		N	
Forb (FG)	*Veronica subtilis*	0.1	8		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	1	200		N	

BAM Site – Field Survey Form

Plot ID:	322	**Date:**	11-12-19	**Survey Name:**	Rock Forest	**Recorders:**	RP, PR
Zone:	55	**Easting:**	650400	**Plot dimensions:**	20x50	**Midline bearing:**	169
Datum:	GDA94	**Northing:**	6020130	**IBRA region:**	South Eastern Highlands (Monaro)	**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	medium	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	no	**Confidence:**	low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	2
	Grasses etc.:	8
	Forbs:	16
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.3
	Shrubs:	0.2
	Grasses etc.:	44.6
	Forbs:	66.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0		
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	1	2	5	1	10															
Average of the 5 subplots:	3.8					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence of stumps.
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	light	lessthan3yo	Currently grazed by cattle.
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Rock Forest				
Date:	11-12-19	**Plot ID:**	322	**Recorders:**	RP, PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	0.3	3		N	
	Rosa rubiginosa	0.2	1		HTE	
	Anthoxanthum odoratum	0.5	2000		E	
	Trifolium repens	10	5000		E	
	Poaceae indeterminate	0.1	1		E	
Forb (FG)	*Hypericum japonicum*	20	8000		N	
Forb (FG)	*Acaena spp.*	0.2	50		N	
Grass & grasslike	*Schoenus apogon*	4	10000		N	
Forb (FG)	*Hydrocotyle algida*	20	5000		N	
Forb (FG)	*Gonocarpus micranthus*	25	10000		N	
Grass & grasslike	*Carex breviculmis*	0.1	1		N	
Grass & grasslike	*Poa labillardierei*	0.1	10		N	
	Medicago spp.	0.1	1		E	
Forb (FG)	*Stellaria spp.*	0.1	80		N	
Grass & grasslike	*Luzula flaccida*	0.2	500		N	
	Holcus lanatus	0.1	20		E	
	Hypochaeris radicata	0.1	15		E	
Forb (FG)	*Ranunculus pimpinellifolius*	0.2	100		N	
Forb (FG)	*Drosera spp.*	0.1	100		N	
Forb (FG)	*Veronica subtilis*	0.1	200		N	
Grass & grasslike	*Poa hiemata*	0.1	10		N	
Forb (FG)	*Tricoryne spp.*	0.1	10		N	
	Gamochaeta purpurea	0.1	3		E	
Shrub (SG)	*Epacris impressa*	0.1	1		N	
Shrub (SG)	*Epacris paludosa*	0.1	1		N	
Forb (FG)	*Epilobium spp.*	0.1	50		N	
Grass & grasslike	*Carex fascicularis*	35	1000		N	
Grass & grasslike	*Juncus spp.*	5	20		N	
Forb (FG)	*Limosella spp.*	0.1	2		N	
	Taraxacum officinale	0.1	10		E	
	Cyperaceae indeterminate	0.1	20		E	
Forb (FG)	*Gratiola peruviana*	0.1	1		N	
Forb (FG)	*Utricularia dichotoma*	0.1	50		N	
	Cirsium vulgare	0.1	1		E	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	30		N	
Forb (FG)	*Hydrocotyle tripartita*	0.1	10		N	
Forb (FG)	*Velleia montana*	0.1	4		N	
Grass & grasslike	*Rytidosperma laeve*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	325	**Date:**	13-12-19	**Survey Name:**	Tantangara	**Recorders:**	RP, PR
Zone:	55	**Easting:**	648546	**Plot dimensions:**	20x50	**Midline bearing:**	85
Datum:	GDA94	**Northing:**	6039400	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		637: Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	medium	**Photo #:**	
Vegetation Class:		Alpine Bogs and Fens		**EEC:**	yes	**Confidence:**	low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	4
	Forbs:	7
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	0.7
	Forbs:	0.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0		
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	2	25	5	25	50															
Average of the 5 subplots:	21.4					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Drainage_depression	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	severe	lessthan3yo	Significant horse damage.
Fire damage:			
Storm damage:			
Weediness:	moderate	lessthan3yo	1 Blackberry plant outside plot. Exotic grasses.
Other:			Dry year. Mosaic of shrub-herb swamp, herbfield and carex fen. Adjacent dam very low. Adjacent extends mappin

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara						
		Date:	13-12-19	**Plot ID:**	325	**Recorders:**	RP, PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Forb (FG)	*Myosotis australis*	0.2	800		N	
	Trifolium campestre	0.1	200		E	
Forb (FG)	*Limosella spp.*	0.1	150		N	
	Centaurium spp.	0.1	1		E	
	Rosa rubiginosa	0.2	2		HTE	
Forb (FG)	*Veronica subtilis*	0.1	200		N	
	Mimulus moschatus	0.2	15		E	
Forb (FG)	*Myriophyllum pedunculatum*	0.1	10		N	
Grass & grasslike	*Juncus spp.*	0.2	30		N	
Grass & grasslike	*Anthosachne scabra*	0.2	50		N	
Grass & grasslike	*Carex spp.*	0.2	100		N	
Grass & grasslike	*Juncus spp.*	0.1	8		N	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	2		N	
Forb (FG)	*Geranium retrorsum*	0.1	1		N	
Forb (FG)	*Neopaxia australasica*	0.1	3		N	

BAM Site – Field Survey Form

Plot ID:	326	**Date:**	14-12-19	**Survey Name:**	Plot 326 Rock Forrest	**Recorders:**	GS MP
Zone:	55	**Easting:**	649871	**Plot dimensions:**	20 x 50	**Midline bearing:**	37
Datum:	GDA94	**Northing:**	6020181	**IBRA region:**	South Eastern Highlands (Monaro)	**Zone ID:**	
Plant Community Type:	637: Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	medium	**Photo #:**	
Vegetation Class:	Alpine Bogs and Fens			**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	9
	Grasses etc.:	7
	Forbs:	22
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	13
	Shrubs:	82.7
	Grasses etc.:	16
	Forbs:	44.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:	1		
20 – 29 cm:	1		
10 – 19 cm:	1		
5 – 9 cm:			
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	8		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	95	15	15	65															
Average of the 5 subplots:	39					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Swamp	**Lf Pattern (A)**	Low_hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay loam peat	**Soil Colour**	Black	**Soil Depth**	
Lithology (B)							
Slope	0 to 10	**Aspect**	SW	**Site Drainage**	Moderate to very poor	**Distance to nearest water & type**	0 m in bog

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	moderate	3to10yo	
Cultivation (inc. pasture):			
Soil erosion:	light		
Firewood / CWD removal:			
Grazing (identify native/stock):	severe	lessthan3yo	
Fire damage:			
Storm damage:			
Weediness:	moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 326 Rock Forrest				
Date:	14-12-19	Plot ID:	326	Recorders:	GS MP

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Leptospermum myrtifolium*	0.2	6		N	
Shrub (SG)	*Callistemon pityoides*	30	200		N	
Forb (FG)	*Geranium potentilloides var. potentilloides*	0.1	20		N	
	Aira spp.	4	500		E	
	Taraxacum officinale	0.1	60		E	
	Trifolium repens	0.4	1000		E	
	Hypochaeris radicata	0.1	60		E	
Forb (FG)	*Cotula alpina*	0.1	100		N	
	Holcus lanatus	3	1000		E	
Forb (FG)	*Hydrocotyle spp.*	0.5	1000		N	
	Vulpia spp.	1	600		E	
Forb (FG)	*Asperula conferta*	0.8	1000		N	
	Acetosella vulgaris	0.2	1000		HTE	
Shrub (SG)	*Baeckea utilis*	40	800		N	
	Anthoxanthum odoratum	0.2	200		E	
Forb (FG)	*Viola betonicifolia*	0.1	100		N	
	Cerastium glomeratum	0.1	50		E	
	Trifolium dubium	0.1	100		E	
Forb (FG)	*Poranthera microphylla*	0.1	30		N	
Shrub (SG)	*Monotoca scoparia*	0.1	4		N	
Shrub (SG)	*Sphaerolobium vimineum*	0.1	8		N	
Forb (FG)	*Gonocarpus micranthus*	35	3000		N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	200		N	
Grass & grasslike	*Poa sieberiana*	0.8	600		N	
	Vulpia spp.	0.1	100		E	
Grass & grasslike	*Carex appressa*	2	300		N	
Tree (TG)	*Eucalyptus pauciflora*	3	3		N	
Tree (TG)	*Eucalyptus stellulata*	10	7		N	
	Myosotis laxa	0.5	100		E	
	Erythranthe spp.	0.1	10		E	
Forb (FG)	*Epilobium spp.*	0.1	30		N	
Forb (FG)	*Xerochrysum spp.*	0.1	20		N	
Shrub (SG)	*Epacris breviflora*	1	40		N	
Forb (FG)	*Hypericum japonicum*	5	5000		N	
Shrub (SG)	*Pimelea bracteata*	1	30		N	
Shrub (SG)	*Epacris paludosa*	10	1000		N	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	80		N	
Forb (FG)	*Drosera spp.*	0.1	100		N	
Forb (FG)	*Stylidium graminifolium*	0.1	60		N	
Forb (FG)	*Ranunculus pimpinellifolius*	0.6	200		N	
Grass & grasslike	*Carex spp.*	2	2000		N	
	Crepis capillaris	0.1	4		E	
Grass & grasslike	*Poa labillardierei*	1	30		N	
Grass & grasslike	*Empodisma minus*	10	2000		N	
Grass & grasslike	*Juncus spp.*	0.1	10		N	
Forb (FG)	*Veronica subtilis*	0.1	50		N	
	Gamochaeta spp.	0.1	20		E	

Forb (FG)	*Gratiola peruviana*	0.1	40		N	
Forb (FG)	*Coronidium monticola*	0.1	4		N	
Forb (FG)	*Asteraceae indeterminate*	0.1	10		N	
Shrub (SG)	*Hakea microcarpa*	0.3	4		N	
Grass & grasslike	*Anthosachne scabra*	0.1	20		N	
Forb (FG)	*Velleia montana*	0.1	10		N	
Forb (FG)	*Arthropodium milleflorum*	0.1	10		N	
Forb (FG)	*Orchidaceae indeterminate*	1	8		N	

BAM Site – Field Survey Form

Plot ID:	329	**Date:**	10-12-19	**Survey Name:**	Plot 329 Link rd	**Recorders:**	MP GS
Zone:	55	**Easting:**	629845	**Plot dimensions:**	20 x 50	**Midline bearing:**	198
Datum:	GDA94	**Northing:**	6027226	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:			644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Subalpine Woodlands	**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	6
	Grasses etc.:	4
	Forbs:	18
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	4.9
	Grasses etc.:	7
	Forbs:	4.6
	Ferns:	2
	Other:	0
High Threat Weed cover:		1.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	2		
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1		
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	22		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	90	35	5	25	25															
Average of the 5 subplots:	36					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Dark brown	**Soil Depth**	
Lithology (B)							
Slope	1 to 45	**Aspect**	SW	**Site Drainage**	Good	**Distance to nearest water & type**	Dam 1.5 km

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	severe	greaterthan10yo	
Cultivation (inc. pasture):			
Soil erosion:	moderate	3to10yo	
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	severe		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 329 Link rd						
		Date:	10-12-19	**Plot ID:**	329	**Recorders:**	MP GS

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Anthoxanthum odoratum	35	2000		E	
	Hypochaeris radicata	0.4	200		E	
	Collomia grandiflora	0.1	60		E	
	Crepis capillaris	0.1	30		E	
	Taraxacum officinale	0.2	60		E	
Tree (TG)	*Eucalyptus pauciflora*	30	24		N	
	Dactylis glomerata	1	80		E	
	Trifolium dubium	0.2	300		E	
	Vulpia spp.	0.1	100		E	
	Acetosella vulgaris	1	300		HTE	
Forb (FG)	*Euchiton involucratus*	0.1	40		N	
	Trifolium repens	0.3	100		E	
Forb (FG)	*Senecio gunnii*	0.2	30		N	
	Achillea millefolium	0.2	50		HTE	
	Hypericum perforatum	0.1	20		HTE	
Grass & grasslike	*Poa sieberiana var. sieberiana*	0.8	100		N	
Forb (FG)	*Asperula scoparia*	2	1000		N	
Forb (FG)	*Craspedia jamesii*	0.1	25		N	
Forb (FG)	*Viola betonicifolia*	0.1	20		N	
Forb (FG)	*Coronidium monticola*	0.3	100		N	
Shrub (SG)	*Bossiaea foliosa*	1	15		N	
Forb (FG)	*Poranthera microphylla*	0.1	10		N	
Grass & grasslike	*Luzula densiflora*	0.1	30		N	
Fern (EG)	*Polystichum proliferum*	2	20		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	30		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	3		N	
Shrub (SG)	*Podolobium alpestre*	3	50		N	
Forb (FG)	*Stellaria pungens*	0.2	200		N	
Grass & grasslike	*Lomandra longifolia*	0.1	4		N	
Forb (FG)	*Celmisia spp.*	0.1	4		N	
Forb (FG)	*Bulbine bulbosa*	0.1	40		N	
Forb (FG)	*Arthropodium milleflorum*	0.3	200		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	6		N	
Forb (FG)	*Gonocarpus montanus*	0.2	300		N	
Shrub (SG)	*Pimelea linifolia*	0.1	6		N	
Shrub (SG)	*Leptospermum myrtifolium*	0.5	4		N	
Forb (FG)	*Podolepis spp.*	0.3	150		N	
	Cerastium glomeratum	0.1	10		E	
	Aira elegantissima	0.3	200		E	
Grass & grasslike	*Poa phillipsiana*	6	200		N	
Forb (FG)	*Asperula spp.*	0.1	60		N	
Shrub (SG)	*Rubus parvifolius*	0.2	10		N	
Forb (FG)	*Epilobium spp.*	0.1	10		N	
Forb (FG)	*Brachyscome decipiens*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	330	**Date:**	12-12-19	**Survey Name:**	Plot 330 Bullocks trail	**Recorders:**	GS MP
Zone:	55	**Easting:**	643036	**Plot dimensions:**	20 x 50	**Midline bearing:**	36
Datum:	GDA94	**Northing:**	6036374	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:			644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Subalpine Woodlands	**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	6
	Grasses etc.:	6
	Forbs:	22
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.2
	Shrubs:	26.1
	Grasses etc.:	37.5
	Forbs:	9.4
	Ferns:	0
	Other:	0
High Threat Weed cover:		1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:			
30 – 49 cm:			
20 – 29 cm:			
10 – 19 cm:			
5 – 9 cm:			
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	163		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	15	20	20	40															
Average of the 5 subplots:	25					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low_hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Very dry loam	**Soil Colour**	Dark brown	**Soil Depth**	
Lithology (B)							
Slope	4	**Aspect**	SW	**Site Drainage**	Good	**Distance to nearest water & type**	500 m bog

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	severe	3to10yo	
Storm damage:			
Weediness:	light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 330 Bullocks trail				
Date:	12-12-19	**Plot ID:**	330	**Recorders:**	GS MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa sieberiana var. sieberiana*	30	800		N	
Forb (FG)	*Asperula scoparia*	3	1000		N	
	Acetosella vulgaris	1	600		HTE	
Forb (FG)	*Craspedia costiniana*	1	60		N	
Grass & grasslike	*Luzula densiflora*	0.5	100		N	
Forb (FG)	*Asperula conferta*	0.4	600		N	
Grass & grasslike	*Carex breviculmis*	3	1000		N	
Shrub (SG)	*Hovea montana*	25	200		N	
Shrub (SG)	*Hakea microcarpa*	0.5	10		N	
	Cerastium glomeratum	0.1	100		E	
Grass & grasslike	*Poa phillipsiana*	1	20		N	
	Poaceae indeterminate	2	100		E	
	Taraxacum officinale	0.2	50		E	
Forb (FG)	*Stellaria pungens*	0.1	34		N	
Forb (FG)	*Arthropodium milleflorum*	0.6	900		N	
Forb (FG)	*Linum marginale*	0.1	10		N	
Forb (FG)	*Scleranthus biflorus*	0.1	10		N	
Forb (FG)	*Viola betonicifolia*	0.1	40		N	
	Collomia grandiflora	0.4	200		E	
Forb (FG)	*Oreomyrrhis argentea*	0.1	4		N	
Forb (FG)	*Taraxacum aristum*	0.1	30		N	
	Hypochaeris radicata	0.1	20		E	
Forb (FG)	*Acaena agnipila*	0.6	200		N	
Grass & grasslike	*Rytidosperma spp.*	2	500		N	
Shrub (SG)	*Ozothamnus secundiflorus*	0.1	2		N	
Forb (FG)	*Senecio gunnii*	0.2	40		N	
Forb (FG)	*Epilobium spp.*	0.1	40		N	
Forb (FG)	*Acaena novae-zelandiae*	0.5	500		N	
Tree (TG)	*Eucalyptus pauciflora*	0.2	4		N	
Forb (FG)	*Ranunculus lappaceus*	0.5	100		N	
	Crepis capillaris	0.1	10		E	
Forb (FG)	*Aphanes spp.*	0.1	20		N	
Forb (FG)	*Veronica serpyllifolia*	0.1	50		N	
Grass & grasslike	*Bromus spp.*	1	100		N	
Forb (FG)	*Senecio longipilus*	0.8	30		N	
Shrub (SG)	*Acrothamnus hookeri*	0.2	10		N	
	Vulpia spp.	3	600		E	
Forb (FG)	*Geranium antrorsum*	0.1	20		N	
Shrub (SG)	*Podolobium spp.*	0.2	50		N	
Shrub (SG)	*Melicytus spp.*	0.1	1		N	
Forb (FG)	*Asperula gunnii*	0.1	20		N	
Forb (FG)	*Poranthera microphylla*	0.1	40		N	
Forb (FG)	*Microseris lanceolata*	0.6	100		N	
	Trifolium repens	0.1	30		E	

BAM Site – Field Survey Form

Plot ID:	331	**Date:**	12-12-19	**Survey Name:**	Tantangara	**Recorders:**	RP, PR
Zone:	55	**Easting:**	648199	**Plot dimensions:**	20x50	**Midline bearing:**	318
Datum:	GDA94	**Northing:**	6038877	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	medium	**Photo #:**	
Vegetation Class:	Subalpine Woodlands			**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	6
	Grasses etc.:	6
	Forbs:	33
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	1.5
	Shrubs:	3.5
	Grasses etc.:	78.3
	Forbs:	15.2
	Ferns:	0.1
	Other:	0.1
High Threat Weed cover:		2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0		1
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0		
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	350		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	80	15	75	35	50															
Average of the 5 subplots:	51					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	moderate	lessthan3yo	Horse grazing and trampling.
Fire damage:	moderate	greaterthan10yo	Many dead trees from bushfires greater than 10 years ago.
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara						
		Date:	12-12-19	Plot ID:	331	Recorders:	RP, PR

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	1	17		N	
Tree (TG)	*Eucalyptus rubida*	0.5	6		N	
Shrub (SG)	*Daviesia ulicifolia*	1	40		N	
Shrub (SG)	*Ozothamnus thyrsoideus*	0.1	1		N	
Shrub (SG)	*Acrothamnus hookeri*	2	100		N	
Shrub (SG)	*Bossiaea foliosa*	0.1	2		N	
Grass & grasslike	*Poa sieberiana*	35	4000		N	
	Holcus lanatus	0.2	80		E	
	Trifolium repens	0.2	600		E	
	Cerastium glomeratum	0.1	200		E	
	Acetosella vulgaris	2	1600		HTE	
Forb (FG)	*Bulbine bulbosa*	0.4	100		N	
Forb (FG)	*Epilobium spp.*	0.3	1500		N	
Forb (FG)	*Geranium spp.*	0.2	70		N	
Forb (FG)	*Plantago varia*	0.2	200		N	
	Anthoxanthum odoratum	1	800		E	
	Cirsium vulgare	0.1	10		E	
	Trifolium campestre	0.7	5000		E	
Forb (FG)	*Asperula gunnii*	1	4000		N	
	Gamochaeta spp.	0.1	50		E	
Forb (FG)	*Cymbonotus preissianus*	0.2	200		N	
Grass & grasslike	*Rytidosperma spp.*	2	4000		N	
Forb (FG)	*Acaena spp.*	0.1	70		N	
Grass & grasslike	*Luzula flaccida*	1	1600		N	
Forb (FG)	*Senecio gunnii*	0.1	40		N	
	Taraxacum officinale	0.1	100		E	
Forb (FG)	*Ranunculus lappaceus*	0.1	50		N	
Forb (FG)	*Hypericum gramineum*	0.1	10		N	
Grass & grasslike	*Poa helmsii*	40	3000		N	
	Crepis capillaris	0.2	150		E	
Forb (FG)	*Acaena novae-zelandiae*	0.1	70		N	
	Trifolium arvense	0.1	400		E	
Forb (FG)	*Geranium antrorsum*	0.2	100		N	
Shrub (SG)	*Pimelea glauca*	0.2	200		N	
Forb (FG)	*Veronica spp.*	0.1	20		N	
Forb (FG)	*Galium gaudichaudii*	0.1	20		N	
Forb (FG)	*Brachyscome spathulata*	0.1	3		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Forb (FG)	*Wahlenbergia stricta*	0.1	1		N	
Forb (FG)	*Picris angustifolia*	0.1	2		N	
Forb (FG)	*Plantago antarctica*	0.1	1		N	
Forb (FG)	*Erigeron spp.*	0.1	1		N	
	Hypochaeris radicata	0.1	17		E	
Forb (FG)	*Scleranthus spp.*	0.1	2		N	
	Vulpia spp.	0.1	400		E	
Grass & grasslike	*Themeda triandra*	0.2	20		N	
Forb (FG)	*Stylidium lineare*	0.2	200		N	

	Trifolium spp.	0.1	10		E	
Shrub (SG)	*Hovea montana*	0.1	3		N	
Forb (FG)	*Leptorhynchos squamatus*	0.3	400		N	
Forb (FG)	*Brachyscome decipiens*	0.1	3		N	
Fern (EG)	*Polystichum spp.*	0.1	1		N	
Grass & grasslike	*Anthosachne scabra*	0.1	1		N	
	Aira spp.	0.1	80		E	
Forb (FG)	*Chrysocephalum semipapposum*	2	200		N	
Forb (FG)	*Craspedia spp.*	0.1	3		N	
Forb (FG)	*Veronica calycina*	0.1	8		N	
Forb (FG)	*Viola betonicifolia*	0.1	20		N	
Forb (FG)	*Arthropodium milleflorum*	8	1600		N	
Forb (FG)	*Myosotis australis*	0.1	3		N	
	Centaurium spp.	0.1	1		E	
Forb (FG)	*Taraxacum aristum*	0.1	7		N	
Other (OG)	*Glycine clandestina*	0.1	2		N	
Forb (FG)	*Podolepis jaceoides*	0.1	1		N	
Forb (FG)	*Celmisia costiniana*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	332	**Date:**	11-12-19	**Survey Name:**	Plot 332 Rock Forrest	**Recorders:**	GS PR
Zone:	55	**Easting:**	650449	**Plot dimensions:**	20 x 50	**Midline bearing:**	45
Datum:	GDA94	**Northing:**	6021179	**IBRA region:**	South Eastern Highlands (Monaro)	**Zone ID:**	
Plant Community Type:			644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	**Confidence:**	medium	**Photo #:**	
Vegetation Class:			Subalpine Woodlands	**EEC:**	no	**Confidence:**	medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	7
	Grasses etc.:	4
	Forbs:	11
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	35
	Shrubs:	16.6
	Grasses etc.:	21.2
	Forbs:	1.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:			
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1		
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		
Length of logs (m) (≥10 cm diameter, >50 cm in length)	107		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	80	55	60	80	90															
Average of the 5 subplots:	73					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Low_hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Light brown to grey	**Soil Depth**	
Lithology (B)							
Slope	2	**Aspect**	NE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	moderate	3to10yo	
Storm damage:	light	3to10yo	
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 332 Rock Forrest				
Date:	11-12-19	**Plot ID:**	332	**Recorders:**	GS PR

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	15	90		N	
Shrub (SG)	*Bossiaea foliosa*	12	250		N	
Shrub (SG)	*Hibbertia obtusifolia*	4	120		N	
Tree (TG)	*Eucalyptus rubida*	20	70		N	
Shrub (SG)	*Pimelea glauca*	0.2	500		N	
Grass & grasslike	*Poa sieberiana*	20	500		N	
Forb (FG)	*Senecio gunnii*	0.2	300		N	
Forb (FG)	*Hovea heterophylla*	0.1	10		N	
Forb (FG)	*Goodenia hederacea*	0.2	50		N	
	Poaceae indeterminate	2	200		E	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	10		N	
Forb (FG)	*Wahlenbergia stricta*	0.1	80		N	
Forb (FG)	*Viola betonicifolia*	0.1	1		N	
Forb (FG)	*Lagenifera stipitata*	0.1	1		N	
Shrub (SG)	*Brachyloma daphnoides*	0.1	100		N	
Shrub (SG)	*Podolobium procumbens*	0.1	8		N	
Forb (FG)	*Gonocarpus teucrioides*	0.1	50		N	
	Poaceae indeterminate	0.1	5		E	
Grass & grasslike	*Lomandra longifolia*	0.1	4		N	
Forb (FG)	*Scleranthus diander*	0.1	1		N	
Forb (FG)	*Stellaria pungens*	0.1	3		N	
	Hypochaeris radicata	0.1	1		E	
Grass & grasslike	*Rytidosperma spp.*	1	400		N	
Forb (FG)	*Dipodium spp.*	0.1	1		N	
Grass & grasslike	*Luzula flaccida*	0.1	1		N	
Shrub (SG)	*Acacia gunnii*	0.1	1		N	
Forb (FG)	*Stylidium montanum*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	1006	**Date:**	19-03-18	**Survey Name:**	Lobs Hole	**Recorders:**	AM, CK
Zone:	55	**Easting:**	626686.1433	**Plot dimensions:**	20m x 50m	**Midline bearing:**	310
Datum:	GDA94	**Northing:**	6038254.269	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	**Confidence:**	High	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	5
	Forbs:	0
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	3.5
	Forbs:	0
	Ferns:	0
	Other:	0
High Threat Weed cover:		35

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	40	70	5	10	70	15	5	15	3	2	40	15	65	0	0	5	0	5	0
Average of the 5 subplots:	28					21.6					24.4					2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay loam	**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	3	**Aspect**	NW	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	
Cultivation (inc. pasture):			No evidence
Soil erosion:	Moderate		Large areas of bare ground
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Severe		Macropods
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Severe		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole				
Date:	19-03-18	**Plot ID:**	1006	**Recorders:**	AM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Acetosella vulgaris	5	500		HTE	
	Hypericum perforatum	5	300		HTE	
Grass & grasslike	*Rytidosperma penicillatum*	0.3	100		N	
	Agrostis capillaris	25	500		HTE	
Grass & grasslike	*Panicum effusum*	1	50		N	
Grass & grasslike	*Poa spp.*	1	40		N	
	Centaurium erythraea	0.1	30		E	
Grass & grasslike	*Eragrostis brownii*	0.2	50		N	
	Aira elegantissima	0.1	100		E	
Grass & grasslike	*Cynodon dactylon*	1	50		N	

BAM Site – Field Survey Form

Plot ID:	1009	**Date:**	16-03-18	**Survey Name:**	X9			**Recorders:**	JA, ACM
Zone:	55	**Easting:**	625222.4455	**Plot dimensions:**	20m x 20m			**Midline bearing:**	140
Datum:	GDA94	**Northing:**	6039993.9	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion			**Confidence:**		**Photo #:**	
Vegetation Class:			Subalpine Woodlands			**EEC:**	No	**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	4
	Grasses etc.:	5
	Forbs:	1
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	2.7
	Grasses etc.:	31.5
	Forbs:	0.1
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		20.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	70	80	30	30	10	5	20	20	25	30	30	10	60	50	60	0	0	0	0	0
Average of the 5 subplots:	44					20					42					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Clay	**Soil Surface Texture**	Fine gravelly-clay in grassed area	**Soil Colour**	Light brown-orange	**Soil Depth**	shallow
Lithology (B)							
Slope	Slight slope, midline perpendicular to downslope area	**Aspect**	140°SE	**Site Drainage**	Downslope	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Cleared area adjacent to unsealed track
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Moderate	3 to 10 yo	Blackberry, briar rose.
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	X9						
		Date:	16-03-18	**Plot ID:**	1009	**Recorders:**	JA, ACM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Grevillea arenaria*	0.5	3		N	
Shrub (SG)	*Brachyloma daphnoides*	2	60		N	
	Conyza spp.	0.1	15		E	
Grass & grasslike	*Aristida ramosa*	0.1	15		N	
Grass & grasslike	*Rytidosperma penicillatum*	30	6000		N	
Shrub (SG)	*Dillwynia sericea*	0.1	1		N	
	Crepis capillaris	0.1	10		E	
	Centaurium erythraea	0.1	50		E	
	Hypericum perforatum	20	5000		HTE	
	Verbascum virgatum	0.1	40		E	
Grass & grasslike	*Carex incomitata*	1	20		N	
	Rosa rubiginosa	0.1	3		HTE	
	Aira elegantissima	1	100		E	
Forb (FG)	*Wahlenbergia spp.*	0.1	20		N	
Fern (EG)	*Cheilanthes spp.*	0.1	5		N	
Shrub (SG)	*Banksia canei*	0.1	1		N	
	Acetosella vulgaris	0.1	1		HTE	
Grass & grasslike	*Poa sieberiana*	0.2	50		N	
	Petrorhagia nanteuilii	0.1	30		E	
Grass & grasslike	*Carex breviculmis*	0.2	20		N	

BAM Site – Field Survey Form

Plot ID:	1010	**Date:**	19-03-18	**Survey Name:**	Lobs Hole	**Recorders:**	AM, CK
Zone:	55	**Easting:**	627687.2426	**Plot dimensions:**	20m x 50m	**Midline bearing:**	355
Datum:	GDA94	**Northing:**	6038169.946	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	**Confidence:**	High	**Photo #:**	
Vegetation Class:			Upper Riverina Dry Sclerophyll Forests	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	13
	Grasses etc.:	10
	Forbs:	3
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	38.1
	Shrubs:	43.2
	Grasses etc.:	18.6
	Forbs:	0.3
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		50.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	59		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	95	98	98	95	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	96.2					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Drainage depression	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay	**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	0	**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Severe		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole				
Date:	19-03-18	**Plot ID:**	1010	**Recorders:**	AM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus viminalis*	30	10		N	
Tree (TG)	*Eucalyptus robertsonii*	5	5		N	
Tree (TG)	*Eucalyptus stellulata*	3	6		N	
Shrub (SG)	*Acacia pravissima*	30	100		N	
Shrub (SG)	*Grevillea rosmarinifolia subsp. rosmarinifolia*	2	10		N	
Shrub (SG)	*Mirbelia oxylobioides*	5	20		N	
Shrub (SG)	*Banksia canei*	0.5	2		N	
	Rubus fruticosus sp. agg.	50	200		HTE	
Grass & grasslike	*Themeda triandra*	3	100		N	
Grass & grasslike	*Rytidosperma penicillatum*	0.3	100		N	
Shrub (SG)	*Rubus parvifolius*	1	30		N	
	Rosa rubiginosa	0.3	20		HTE	
Grass & grasslike	*Carex incomitata*	0.5	100		N	
Grass & grasslike	*Anthosachne scabra*	1	200		N	
Grass & grasslike	*Microlaena stipoides var. stipoides*	5	300		N	
Grass & grasslike	*Poa helmsii*	5	50		N	
Grass & grasslike	*Dichelachne inaequiglumis*	0.5	200		N	
	Hypericum perforatum	0.1	30		HTE	
Shrub (SG)	*Cassinia longifolia*	0.3	2		N	
	Centaurium erythraea	0.1	10		E	
Shrub (SG)	*Exocarpos strictus*	0.4	4		N	
Shrub (SG)	*Cassinia aculeata*	1	5		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	10		N	
	Aira elegantissima	0.1	20		E	
Forb (FG)	*Dichondra repens*	0.1	40		N	
Grass & grasslike	*Poa sieberiana var. hirtella*	3	100		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.1	5		N	
Shrub (SG)	*Bursaria spinosa*	0.5	3		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Grass & grasslike	*Poa tenera*	0.2	10		N	
Other (OG)	*Billardiera scandens*	0.1	5		N	
Shrub (SG)	*Pomaderris angustifolia*	2	20		N	
Shrub (SG)	*Olearia lirata*	0.2	5		N	
Shrub (SG)	*Pomaderris aspera*	0.1	1		N	
Shrub (SG)	*Bossiaea buxifolia*	0.2	20		N	
Tree (TG)	*Eucalyptus rubida*	0.1	2		N	

BAM Site – Field Survey Form

Plot ID:	1015	**Date:**	15-03-18	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	AM, CK
Zone:	55	**Easting:**	628253.5021	**Plot dimensions:**	20m x 50m	**Midline bearing:**	105
Datum:	GDA94	**Northing:**	6038816.712	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		311: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	15
	Grasses etc.:	6
	Forbs:	3
	Ferns:	0
	Other:	4
Sum of Cover of native vascular plants by growth form group	Trees:	32
	Shrubs:	94.3
	Grasses etc.:	9.2
	Forbs:	0.4
	Ferns:	0
	Other:	0.4
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	0
30 – 49 cm:	10	0	0
20 – 29 cm:	1	0	1
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	31		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	95	90	90	95	65	1	2	5	1	30	0	0	0	0	0	1	0	0	0	0
Average of the 5 subplots:	87					7.8					0					0.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Silty clay	**Soil Colour**	Light brown	**Soil Depth**	
Lithology (B)							
Slope	5	**Aspect**	NE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Moderate	greater than 10yo	
Storm damage:			No evidence
Weediness:			no weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	15-03-18	**Plot ID:**	1015	**Recorders:**	AM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	15	10		N	
Tree (TG)	*Eucalyptus nortonii*	7	5		N	
Tree (TG)	*Eucalyptus macrorhyncha*	10	8		N	
Shrub (SG)	*Banksia canei*	30	200		N	
Shrub (SG)	*Mirbelia oxylobioides*	35	200		N	
Shrub (SG)	*Platylobium formosum*	22	80		N	
Shrub (SG)	*Pomaderris subcapitata*	0.5	10		N	
Shrub (SG)	*Podolobium procumbens*	1	30		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	2	100		N	
Other (OG)	*Hardenbergia violacea*	0.1	5		N	
Forb (FG)	*Dianella revoluta var. revoluta*	0.2	30		N	
Grass & grasslike	*Dichelachne rara*	0.1	10		N	
Grass & grasslike	*Rytidosperma pallidum*	1	30		N	
Shrub (SG)	*Tetratheca bauerifolia*	1	50		N	
Grass & grasslike	*Lomandra longifolia*	1	20		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	10		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	20		N	
Other (OG)	*Billardiera scandens*	0.1	5		N	
Shrub (SG)	*Persoonia chamaepeuce*	0.1	5		N	
Forb (FG)	*Hovea heterophylla*	0.1	10		N	
Shrub (SG)	*Monotoca scoparia*	0.3	5		N	
Shrub (SG)	*Leucopogon virgatus*	0.1	10		N	
Grass & grasslike	*Poa sieberiana var. hirtella*	5	100		N	
Shrub (SG)	*Acacia pravissima*	3	20		N	
Shrub (SG)	*Cassinia longifolia*	0.5	5		N	
Shrub (SG)	*Choretrum pauciflorum*	0.2	3		N	
Shrub (SG)	*Leucopogon attenuatus*	0.2	5		N	
Shrub (SG)	*Correa lawrenceana var. rosea*	0.2	5		N	
Grass & grasslike	*Lepidosperma laterale*	0.1	2		N	
Other (OG)	*Cassytha pubescens*	0.1	10		N	
Other (OG)	*Glycine clandestina*	0.1	3		N	

BAM Site – Field Survey Form

Plot ID:	1020	**Date:**	21-03-18	**Survey Name:**	Lobs Hole	**Recorders:**	AM, CK
Zone:	55	**Easting:**	626930.792	**Plot dimensions:**	20m x 50m	**Midline bearing:**	319
Datum:	GDA94	**Northing:**	6036665.897	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	**Confidence:**		**Photo #:**	
Vegetation Class:			Southern Tableland Wet Sclerophyll Forests	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	7
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	45
	Shrubs:	22.3
	Grasses etc.:	40.2
	Forbs:	0.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		46.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	90	95	95	98	95	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0
Average of the 5 subplots:	94.6					0.6					0.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	5	**Aspect**	NE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Severe		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole				
Date:	21-03-18	**Plot ID:**	1020	**Recorders:**	AM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus viminalis*	30	10		N	
Tree (TG)	*Acacia dealbata*	15	40		N	
Shrub (SG)	*Cassinia longifolia*	7	20		N	
Shrub (SG)	*Exocarpos strictus*	10	30		N	
Shrub (SG)	*Pimelea pauciflora*	3	10		N	
	Rubus fruticosus sp. agg.	40	300		HTE	
	Rosa rubiginosa	1	40		HTE	
	Hypericum perforatum	5	500		HTE	
Grass & grasslike	*Anthosachne scabra*	15	1000		N	
Grass & grasslike	*Rytidosperma pallidum*	5	1000		N	
Grass & grasslike	*Echinopogon ovatus*	10	500		N	
Shrub (SG)	*Cassinia aculeata*	2	10		N	
	Potentilla recta	0.1	10		E	
Forb (FG)	*Acaena ovina*	0.1	30		N	
Forb (FG)	*Senecio quadridentatus*	0.1	20		N	
Grass & grasslike	*Dichelachne micrantha*	5	500		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.1	5		N	
	Crataegus monogyna	0.3	2		HTE	
	Centaurium erythraea	0.1	50		E	
Grass & grasslike	*Poa sieberiana var. hirtella*	5	100		N	
Grass & grasslike	*Carex breviculmis*	0.1	10		N	
	Conyza spp.	0.1	2		E	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	10		N	
	Aira elegantissima	0.5	500		E	
	Vulpia bromoides	5	1000		E	
Forb (FG)	*Oxalis perennans*	0.1	10		N	
Forb (FG)	*Hypericum gramineum*	0.1	5		N	
Shrub (SG)	*Acacia pravissima*	0.3	2		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	10		N	

BAM Site – Field Survey Form

Plot ID:	1021	**Date:**	20-03-18	**Survey Name:**	Lobs Hole	**Recorders:**	AM, CK
Zone:	55	**Easting:**	626180.3163	**Plot dimensions:**	20m x 50m	**Midline bearing:**	105
Datum:	GDA94	**Northing:**	6037290.999	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	**Confidence:**		**Photo #:**	
Vegetation Class:			Southern Tableland Wet Sclerophyll Forests	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	8
	Forbs:	2
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	56.2
	Grasses etc.:	7.9
	Forbs:	0.2
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	2	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	16		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	85	95	88	95	90	0	0	0	0	5	0	0	3	0	0	5	0	5	0	0
Average of the 5 subplots:	90.6					1					0.6					2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Clay loam	**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	10	**Aspect**	NE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate		Historical
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light		
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole				
Date:	20-03-18	**Plot ID:**	1021	**Recorders:**	AM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus viminalis*	20	8		N	
Shrub (SG)	*Cassinia longifolia*	40	100		N	
Shrub (SG)	*Dodonaea viscosa subsp. angustissima*	10	50		N	
Shrub (SG)	*Exocarpos strictus*	3	20		N	
Shrub (SG)	*Bursaria spinosa*	3	20		N	
	Rubus fruticosus sp. agg.	2	10		HTE	
Tree (TG)	*Acacia dealbata*	5	20		N	
	Hypericum perforatum	2	200		HTE	
	Rosa rubiginosa	1	30		HTE	
Grass & grasslike	*Rytidosperma penicillatum*	2	300		N	
	Centaurium erythraea	0.1	50		E	
Grass & grasslike	*Carex breviculmis*	0.2	40		N	
Grass & grasslike	*Microlaena stipoides var. stipoides*	0.2	50		N	
Grass & grasslike	*Anthosachne scabra*	3	300		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	10		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.1	10		N	
Grass & grasslike	*Rytidosperma caespitosum*	2	200		N	
Grass & grasslike	*Lachnagrostis filiformis*	0.2	20		N	
	Conyza spp.	0.1	1		E	
Shrub (SG)	*Rubus parvifolius*	0.2	3		N	
	Plantago lanceolata	0.1	5		E	
Fern (EG)	*Cheilanthes sieberi subsp. sieberi*	0.1	30		N	
	Petrorhagia nanteuilii	0.1	20		E	
	Vulpia bromoides	0.4	100		E	
	Aira elegantissima	0.2	200		E	
Grass & grasslike	*Dichelachne micrantha*	0.1	30		N	
Grass & grasslike	*Poa sieberiana var. hirtella*	0.2	10		N	

BAM Site – Field Survey Form

Plot ID:	1022	**Date:**	16-03-18	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	AM, CK
Zone:	55	**Easting:**	627545.7382	**Plot dimensions:**	20m x 50m	**Midline bearing:**	93
Datum:	GDA94	**Northing:**	6032056.553	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Subalpine Woodlands			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	8
	Grasses etc.:	8
	Forbs:	21
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	42
	Shrubs:	22.6
	Grasses etc.:	76.2
	Forbs:	5.6
	Ferns:	0
	Other:	2.1
High Threat Weed cover:		3.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	3	0	3
50 – 79 cm:	2	0	2
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	143		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	70	70	30	70	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0
Average of the 5 subplots:	58					0					0					0.8				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	3	**Aspect**	W	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	16-03-18	Plot ID:	1022	Recorders:	AM, CK

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	35	30		N	
Tree (TG)	*Eucalyptus dalrympleana*	5	7		N	
Shrub (SG)	*Cassinia aculeata*	15	30		N	
Shrub (SG)	*Coprosma hirtella*	1	20		N	
Shrub (SG)	*Acacia pravissima*	1	10		N	
Tree (TG)	*Acacia dealbata subsp. subalpina*	2	10		N	
Shrub (SG)	*Platylobium formosum*	5	200		N	
	Rubus fruticosus sp. agg.	3	10		HTE	
Grass & grasslike	*Poa sieberiana var. sieberiana*	75	1000		N	
Forb (FG)	*Asperula scoparia*	2	1000		N	
Other (OG)	*Glycine clandestina*	2	1000		N	
Forb (FG)	*Bulbine bulbosa*	0.2	30		N	
Forb (FG)	*Acaena novae-zelandiae*	0.3	200		N	
Forb (FG)	*Picris angustifolia*	0.1	40		N	
	Dactylis glomerata	0.1	10		E	
Forb (FG)	*Arthropodium milleflorum*	0.1	10		N	
Forb (FG)	*Viola betonicifolia*	0.2	100		N	
Forb (FG)	*Brachyscome spathulata*	0.1	20		N	
Forb (FG)	*Stellaria pungens*	0.3	300		N	
Other (OG)	*Clematis aristata*	0.1	30		N	
Forb (FG)	*Wahlenbergia stricta subsp. stricta*	0.1	40		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
Shrub (SG)	*Daviesia ulicifolia*	0.2	5		N	
Forb (FG)	*Coronidium monticola*	1	200		N	
	Hypochaeris radicata	0.1	30		E	
Forb (FG)	*Geranium potentilloides*	0.1	50		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.2	30		N	
Forb (FG)	*Lobelia gibbosa*	0.1	30		N	
Forb (FG)	*Veronica calycina*	0.1	50		N	
Grass & grasslike	*Anthosachne scabra*	0.2	30		N	
Grass & grasslike	*Lomandra longifolia*	0.2	20		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	20		N	
Forb (FG)	*Senecio gunnii*	0.1	10		N	
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	50		N	
Shrub (SG)	*Rubus parvifolius*	0.1	5		N	
	Trifolium repens	0.1	30		E	
Shrub (SG)	*Pimelea curviflora*	0.1	5		N	
Forb (FG)	*Senecio minimus*	0.1	3		N	
Forb (FG)	*Stackhousia monogyna*	0.1	10		N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	0.2	3		N	
Grass & grasslike	*Dichelachne hirtella*	0.1	30		N	
	Hypericum perforatum	0.1	5		HTE	
Forb (FG)	*Dianella tasmanica*	0.2	5		N	
Grass & grasslike	*Dichelachne inaequiglumis*	0.1	20		N	
Forb (FG)	*Senecio prenanthoides*	0.1	2		N	
Grass & grasslike	*Rytidosperma pallidum*	0.3	10		N	
	Rosa rubiginosa	0.1	1		HTE	

Grass & grasslike	*Rytidosperma penicillatum*	0.1	20		N	

BAM Site – Field Survey Form

Plot ID:	1024	**Date:**	21-03-18	**Survey Name:**	Lobs Hole	**Recorders:**	AM, CK
Zone:	55	**Easting:**	626891.999	**Plot dimensions:**	20m x 50m	**Midline bearing:**	315
Datum:	GDA94	**Northing:**	6033322.126	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		953: Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**		**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	9
	Grasses etc.:	10
	Forbs:	18
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	5
	Shrubs:	20.3
	Grasses etc.:	71.6
	Forbs:	2.3
	Ferns:	25
	Other:	0.1
High Threat Weed cover:		1.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	8		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	35	45	15	40	0	0	0	20	0	0	0	0	0	0	0	3	0	5	0
Average of the 5 subplots:	33					4					0					1.6				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	15	**Aspect**	NW	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Managed shurbland /grassland for powerlines
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence
Weediness:	Light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole				
Date:	21-03-18	**Plot ID:**	1024	**Recorders:**	AM, CK

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Cassinia longifolia*	15	20		N	
Tree (TG)	*Acacia dealbata*	5	10		N	
Shrub (SG)	*Exocarpos strictus*	2	20		N	
Shrub (SG)	*Daviesia latifolia*	0.5	10		N	
Shrub (SG)	*Platylobium formosum*	0.2	20		N	
Fern (EG)	*Pteridium esculentum*	25	500		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	60	1000		N	
Grass & grasslike	*Themeda triandra*	10	200		N	
Forb (FG)	*Veronica derwentiana*	0.5	20		N	
Shrub (SG)	*Pimelea linifolia*	0.1	10		N	
Forb (FG)	*Asperula scoparia*	0.2	300		N	
Other (OG)	*Glycine clandestina*	0.1	50		N	
	Hypericum perforatum	0.1	20		HTE	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	30		N	
	Acetosella vulgaris	0.1	20		HTE	
	Hypochaeris radicata	0.1	20		E	
Forb (FG)	*Gonocarpus tetragynus*	0.1	50		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	20		N	
Grass & grasslike	*Rytidosperma penicillatum*	0.4	100		N	
Grass & grasslike	*Dichelachne crinita*	0.2	50		N	
Grass & grasslike	*Lomandra longifolia*	0.2	30		N	
Forb (FG)	*Hydrocotyle sibthorpioides*	0.1	20		N	
Forb (FG)	*Stellaria pungens*	0.1	50		N	
Shrub (SG)	*Rubus parvifolius*	0.1	10		N	
Grass & grasslike	*Carex incomitata*	0.2	40		N	
Shrub (SG)	*Pimelea curviflora*	0.2	30		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.1	10		N	
	Centaurium erythraea	0.1	50		E	
Forb (FG)	*Senecio prenanthoides*	0.1	10		N	
Forb (FG)	*Dichondra repens*	0.1	200		N	
Grass & grasslike	*Anthosachne scabra*	0.2	50		N	
Forb (FG)	*Picris angustifolia*	0.1	5		N	
Forb (FG)	*Stylidium graminifolium*	0.1	3		N	
	Cerastium glomeratum	0.1	10		E	
	Rubus fruticosus sp. agg.	1	20		HTE	
Forb (FG)	*Viola betonicifolia*	0.1	50		N	
	Petrorhagia nanteuilii	0.1	20		E	
Shrub (SG)	*Mirbelia oxylobioides*	2	10		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.1	10		N	
Grass & grasslike	*Carex breviculmis*	0.2	50		N	
Forb (FG)	*Euchiton japonicus*	0.1	10		N	
Forb (FG)	*Wahlenbergia spp.*	0.1	20		N	
Shrub (SG)	*Derwentia perfoliata*	0.2	2		N	
Forb (FG)	*Epilobium billardierianum subsp. Cinereum*	0.1	30		N	
Grass & grasslike	*Rytidosperma pallidum*	0.1	20		N	
Forb (FG)	*Galium gaudichaudii*	0.1	20		N	

	Conyza spp.	0.1	2		E	

BAM Site – Field Survey Form

Plot ID:	1025	**Date:**	20-03-18	**Survey Name:**	Plot 1025 (re-named of X25)	**Recorders:**	JA, ACM
Zone:	55	**Easting:**	626744.524	**Plot dimensions:**	20m x 20m	**Midline bearing:**	53
Datum:	GDA94	**Northing:**	6037928.947	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion		**Confidence:**		**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	4
	Grasses etc.:	3
	Forbs:	1
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	36
	Shrubs:	96
	Grasses etc.:	17
	Forbs:	0.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		1.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	2	0	0
20 – 29 cm:	9	0	0
10 – 19 cm:	17	0	0
5 – 9 cm:	17	0	0
< 5 cm:	13	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	58		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	55	90	80	90	5	30	5	10	5	0	0	10	0	0	0	0	0	0	0
Average of the 5 subplots:	67					11					2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Clay	**Soil Surface Texture**	Grassed covered	**Soil Colour**	Brown	**Soil Depth**	moderate
Lithology (B)							
Slope	Downslope along midline (<10°)	**Aspect**	53°NE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Plot 1025 (re-named of X25)				
Date:	20-03-18	**Plot ID:**	1025	**Recorders:**	JA, ACM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus rubida*	15	7		N	
Tree (TG)	*Eucalyptus dives*	20	13		N	
Shrub (SG)	*Cassinia longifolia*	80	600		N	
Shrub (SG)	*Acacia pravissima*	15	200		N	
Shrub (SG)	*Brachyloma daphnoides*	0.8	10		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	50		N	
Grass & grasslike	*Themeda triandra*	15	700		N	
Grass & grasslike	*Rytidosperma penicillatum*	1	50		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	10		N	
	Hypericum perforatum	0.1	100		HTE	
	Centaurium erythraea	1	200		E	
Grass & grasslike	*Anthosachne scabra*	1	200		N	
	Rubus fruticosus sp. agg.	1	10		HTE	
Tree (TG)	*Eucalyptus nortonii*	1	1		N	

BAM Site – Field Survey Form

Plot ID:	1046	**Date:**	14-03-18	**Survey Name:**	Talbingo	**Recorders:**	JA, CW
Zone:	55	**Easting:**	625822.7811	**Plot dimensions:**	20m x 20m	**Midline bearing:**	0
Datum:	GDA94	**Northing:**	6039177.971	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Upper Riverina Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	3
	Grasses etc.:	4
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	70
	Shrubs:	20.2
	Grasses etc.:	8.4
	Forbs:	0.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		35.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	3	0	0
10 – 19 cm:	35	0	0
5 – 9 cm:	24	0	0
< 5 cm:	45	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	25		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	95	80	70	70	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	77					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Gully	**Lf Pattern (A)**	Plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Conglomerate	**Soil Surface Texture**	Loamy	**Soil Colour**	Grey-brown	**Soil Depth**	Shallow
Lithology (B)							
Slope		**Aspect**		**Site Drainage**	Poor	**Distance to nearest water & type**	150m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Moderate	greater than 10yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Talbingo				
Date:	14-03-18	**Plot ID:**	1046	**Recorders:**	JA, CW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus camphora subsp. humeana*	70	75		N	
Shrub (SG)	*Pimelea pauciflora*	20	30		N	
	Hypericum perforatum	10	4000		HTE	
	Centaurium erythraea	0.1	50		E	
	Rubus fruticosus sp. agg.	25	10		HTE	
	Crepis capillaris	0.1	10		E	
Shrub (SG)	*Exocarpos strictus*	0.1	3		N	
Forb (FG)	*Geranium solanderi*	0.1	20		N	
	Acetosella vulgaris	0.1	200		HTE	
Grass & grasslike	*Carex incomitata*	0.1	10		N	
	Rosa rubiginosa	0.1	3		HTE	
Forb (FG)	*Acaena ovina*	0.1	50		N	
Grass & grasslike	*Microlaena stipoides*	0.1	50		N	
Grass & grasslike	*Themeda triandra*	8	600		N	
Grass & grasslike	*Rytidosperma penicillatum*	0.2	50		N	
	Cirsium vulgare	0.1	5		E	
	Hypochaeris radicata	0.1	30		E	
Shrub (SG)	*Cassinia spp.*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	1047	**Date:**	15-03-18	**Survey Name:**	Talbingo			**Recorders:**	JA, CW
Zone:	55	**Easting:**	625935.4039	**Plot dimensions:**	20m x 20m			**Midline bearing:**	0
Datum:	GDA94	**Northing:**	6039185.946	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	11
	Grasses etc.:	7
	Forbs:	1
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	50
	Shrubs:	46.9
	Grasses etc.:	4.7
	Forbs:	0.1
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	3	0	0
10 – 19 cm:	8	0	0
5 – 9 cm:	16	0	0
< 5 cm:	3	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	16		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	97	50	30	95	90	0	30	3	0	0	0	0	20	0	0	0	0	30	0	1
Average of the 5 subplots:	72.4					6.6					4					6.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Conglomerate	**Soil Surface Texture**	Loamy	**Soil Colour**	Grey-brown	**Soil Depth**	Shallow
Lithology (B)							
Slope		**Aspect**		**Site Drainage**	Poor	**Distance to nearest water & type**	200m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:	Light	greater than 10yo	Historical clearing

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Talbingo				
Date:	15-03-18	**Plot ID:**	1047	**Recorders:**	JA, CW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	50	20		N	
Shrub (SG)	*Bursaria spinosa*	0.1	4		N	
Shrub (SG)	*Acacia siculiformis*	5	15		N	
Shrub (SG)	*Dodonaea viscosa*	0.1	2		N	
Shrub (SG)	*Grevillea juniperina*	0.1	1		N	
Shrub (SG)	*Brachyloma daphnoides*	40	400		N	
Shrub (SG)	*Calytrix tetragona*	1	5		N	
Shrub (SG)	*Dillwynia sericea*	0.1	3		N	
Shrub (SG)	*Melichrus urceolatus*	0.1	5		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	10		N	
Shrub (SG)	*Leucopogon virgatus var. virgatus*	0.2	15		N	
Grass & grasslike	*Lomandra spp.*	0.1	2		N	
Grass & grasslike	*Lomandra spp.*	0.1	11		N	
Forb (FG)	*Hovea heterophylla*	0.1	1		N	
Shrub (SG)	*Acrotriche serrulata*	0.1	1		N	
Grass & grasslike	*Rytidosperma pallidum*	0.2	7		N	
Grass & grasslike	*Themeda triandra*	4	200		N	
Grass & grasslike	*Agrostis spp.*	0.1	40		N	
Grass & grasslike	*Dichelachne spp.*	0.1	50		N	
	Centaurium erythraea	0.1	40		E	
	Hypericum perforatum	0.2	100		HTE	
Grass & grasslike	*Rytidosperma spp.*	0.1	50		N	
Other (OG)	*Cassytha spp.*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	1048	**Date:**	22-11-17	**Survey Name:**	Lobs Hole Ravine extra plot 302 cleared	**Recorders:**	ED, LH
Zone:	55	**Easting:**	627677.2859	**Plot dimensions:**	20m x 50m	**Midline bearing:**	105
Datum:	GDA94	**Northing:**	6038085.806	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Upper Riverina Dry Sclerophyll Forests		**EEC:**	Yes	**Confidence:**	Low

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	7
	Forbs:	4
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	9
	Shrubs:	1.4
	Grasses etc.:	5.8
	Forbs:	0.4
	Ferns:	0
	Other:	0
High Threat Weed cover:		37.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	5		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	5	15	15	5	0	0	0	0	0	0	0	0	0	0	0	0	10	10	5
Average of the 5 subplots:	14					0					0					5				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Alluvial plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Fine loam	**Soil Colour**	Dark brown	**Soil Depth**	Deep
Lithology (B)							
Slope	None	**Aspect**		**Site Drainage**		**Distance to nearest water & type**	15m to creek

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Majority of canopy removed. High prevalance of grassy weeds
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No
Grazing (identify native/stock):			No
Fire damage:			No
Storm damage:			No
Weediness:	Moderate	greater than 10yo	Great prevelance of weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine extra plot 302 cleared				
Date:	22-11-17	**Plot ID:**	1048	**Recorders:**	ED, LH

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Anthoxanthum odoratum	15	1000		E	
	Holcus lanatus	5	400		E	
	Plantago lanceolata	1	60		E	
	Trifolium repens	0.8	40		E	
	Hypericum perforatum	2	300		HTE	
Shrub (SG)	*Exocarpos strictus*	0.5	6		N	
Tree (TG)	*Acacia melanoxylon*	1	4		N	
Shrub (SG)	*Pimelea pauciflora*	0.3	1		N	
Grass & grasslike	*Poa helmsii*	2	20		N	
Shrub (SG)	*Acacia pravissima*	0.4	2		N	
	Rubus fruticosus sp. agg.	0.2	3		HTE	
Tree (TG)	*Eucalyptus viminalis*	8	10		N	
Forb (FG)	*Bulbine bulbosa*	0.1	3		N	
	Hypochaeris radicata	1	100		E	
Grass & grasslike	*Carex appressa*	0.1	1		N	
	Bromus diandrus	5	200		HTE	
	Bromus molliformis	10	400		E	
	Bromus madritensis	20	500		E	
	Lolium spp.	10	1000		E	
	Centaurium erythraea	0.2	20		E	
	Agrostis capillaris	30	1000		HTE	
Grass & grasslike	*Themeda triandra*	0.4	10		N	
Forb (FG)	*Acaena agnipila*	0.1	2		N	
Grass & grasslike	*Cynodon dactylon*	3	100		N	
	Trifolium campestre	0.2	20		E	
	Medicago polymorpha	0.1	3		E	
	Vulpia bromoides	10	100		E	
Grass & grasslike	*Carex breviculmis*	0.1	1		N	
	Agrostis capillaris	0.4	10		HTE	
Shrub (SG)	*Rubus parvifolius*	0.1	5		N	
	Trifolium arvense	0.1	20		E	
Grass & grasslike	*Luzula flaccida*	0.1	10		N	
Grass & grasslike	*Juncus sarophorus*	0.1	5		N	
Forb (FG)	*Euchiton japonicus*	0.1	3		N	
Shrub (SG)	*Atriplex spp.*	0.1	3		N	
Forb (FG)	*Ajuga australis*	0.1	2		N	

BAM Site – Field Survey Form

Plot ID:	1050	**Date:**	19-11-17	**Survey Name:**	Lobs Hole Ravine access extra plot 1	**Recorders:**	SW, AM
Zone:	55	**Easting:**	629133.7465	**Plot dimensions:**	20m x 50m	**Midline bearing:**	20
Datum:	GDA94	**Northing:**	6027980.99	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		639: Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Montane Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	6
	Grasses etc.:	4
	Forbs:	14
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	46
	Shrubs:	39.3
	Grasses etc.:	45.3
	Forbs:	2.8
	Ferns:	0
	Other:	0.3
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	4	0	3
50 – 79 cm:	1	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	130		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	60	40	90	75	60	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	65					0.2					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Other	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)	Midslope	**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Dark brown	**Soil Depth**	At least 100mm
Lithology (B)							
Slope	Gentle	**Aspect**	West facing	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence of recent logging or clearing
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence such as cut stumbs/limbs
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:			No evidence of recently fallen trees or foilage
Weediness:	Light		Some smaller weeds present
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine access extra plot 1				
Date:	19-11-17	**Plot ID:**	1050	**Recorders:**	SW, AM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus delegatensis subsp. Delegatensis*	45	20		N	
Tree (TG)	*Eucalyptus pauciflora*	1	5		N	
Shrub (SG)	*Daviesia ulicifolia*	3	20		N	
Other (OG)	*Clematis aristata*	0.2	20		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	10		N	
Shrub (SG)	*Daviesia mimosoides subsp. mimosoides*	20	50		N	
Forb (FG)	*Asperula conferta*	0.5	100		N	
	Hypochaeris radicata	0.2	50		E	
	Rubus fruticosus sp. agg.	0.2	5		HTE	
Shrub (SG)	*Podolobium alpestre*	15	50		N	
Forb (FG)	*Stellaria pungens*	1	200		N	
Other (OG)	*Glycine clandestina*	0.1	50		N	
Forb (FG)	*Chiloglottis valida*	0.2	100		N	
Shrub (SG)	*Acacia obliquinervia*	1	10		N	
Grass & grasslike	*Luzula flaccida*	0.1	20		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	20		N	
Forb (FG)	*Caladenia alpina*	0.1	20		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	5		N	
Forb (FG)	*Gonocarpus montanus*	0.1	10		N	
Forb (FG)	*Viola betonicifolia*	0.1	5		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	40	500		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	4		N	
Forb (FG)	*Poranthera microphylla*	0.1	10		N	
	Anthoxanthum odoratum	10	500		E	
	Trifolium repens	0.1	20		E	
Shrub (SG)	*Brachyloma daphnoides*	0.2	5		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.2	10		N	
Forb (FG)	*Senecio gunnii*	0.1	10		N	
	Dactylis glomerata	1	20		E	
Grass & grasslike	*Poa labillardierei var. labillardierei*	5	50		N	
Forb (FG)	*Geranium solanderi*	0.1	3		N	
Forb (FG)	*Veronica calycina*	0.1	10		N	
Forb (FG)	*Coronidium monticola*	0.1	50		N	

BAM Site – Field Survey Form

Plot ID:	2002	**Date:**	18-02-19	**Survey Name:**		**Recorders:**	RP, MP
Zone:	55	**Easting:**	649472.1847	**Plot dimensions:**	20m x 50m	**Midline bearing:**	110
Datum:	GDA94	**Northing:**	6036594.576	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	16
	Grasses etc.:	20
	Forbs:	40
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	40.6
	Grasses etc.:	150.6
	Forbs:	23.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		34

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	33	40	33	25	15	0	0	1	0	0	0	0	0	0	33	0	0	0	0	0
Average of the 5 subplots:	29.2					0.2					6.6					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	-8	**Aspect**	NWW	**Site Drainage**	Very good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Moderate	greater than 10yo	Wild horses, rabbits
Fire damage:	Light	greater than 10yo	2003 bushfires
Storm damage:			
Weediness:	Moderate	3 to 10 yo	Hypericum perforatum, Holcus lanatus, Anthoxanthum odoratum, Blackberry
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	18-02-19	Plot ID:	2002	Recorders:	RP, MP

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Hakea microcarpa*	12	60		N	
Grass & grasslike	*Themeda triandra*	15	250		N	
	Hypericum perforatum	13	500		HTE	
	Acetosella vulgaris	4	100		HTE	
	Cirsium vulgare	1	25		E	
	Holcus lanatus	4	100		E	
	Anthoxanthum odoratum	25	500		E	
Forb (FG)	*Poranthera microphylla*	1	100		N	
Forb (FG)	*Solenogyne gunnii*	0.2	20		N	
Forb (FG)	*Leptorhynchos squamatus subsp. alpinus*	0.5	80		N	
	Crepis capillaris	0.4	60		E	
Forb (FG)	*Geranium solanderi var. solanderi*	0.2	40		N	
Forb (FG)	*Acaena novae-zelandiae*	2	100		N	
Forb (FG)	*Senecio gunnii*	1	25		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	10	100		N	
Grass & grasslike	*Anthosachne scabra*	18	500		N	
Shrub (SG)	*Discaria pubescens*	0.1	6		N	
Shrub (SG)	*Dillwynia prostrata*	1	10		N	
Grass & grasslike	*Carex breviculmis*	4	500		N	
Forb (FG)	*Linum marginale*	0.1	6		N	
Forb (FG)	*Bulbine bulbosa*	1	30		N	
	Centaurium erythraea	0.1	10		E	
Grass & grasslike	*Rytidosperma laeve*	25	500		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.1	20		N	
Forb (FG)	*Scleranthus fasciculatus*	1	100		N	
Forb (FG)	*Acaena ovina*	2	100		N	
	Hypochaeris radicata	1	50		E	
Forb (FG)	*Epilobium hirtigerum*	0.3	50		N	
Grass & grasslike	*Dichelachne rara*	1	25		N	
	Aphanes arvensis	0.1	6		E	
	Trifolium spp.	0.1	4		E	
Forb (FG)	*Senecio lageniformis*	1	50		N	
Forb (FG)	*Ajuga australis*	0.8	40		N	
	Cerastium vulgare	0.5	150		E	
	Rubus anglocandicans	0.5	3		E	
Grass & grasslike	*Carex inversa*	0.1	50		N	
Forb (FG)	*Cynoglossum australe*	0.2	6		N	
Grass & grasslike	*Carex appressa*	1	25		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	1	18		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	4		N	
Shrub (SG)	*Pimelea axiflora*	1	3		N	
Shrub (SG)	*Mirbelia oxylobioides*	5	53		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
Forb (FG)	*Wahlenbergia communis*	0.1	10		N	
Forb (FG)	*Hypericum gramineum*	0.1	15		N	
Forb (FG)	*Veronica subtilis*	0.1	8		N	
Shrub (SG)	*Acrothamnus hookeri*	1	5		N	

	Trifolium repens	0.2	40		E	
Shrub (SG)	*Leucopogon spp.*	0.1	10		N	
	Tragopogon dubius	0.1	4		E	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	6		N	
Grass & grasslike	*Luzula densiflora*	0.2	40		N	
Shrub (SG)	*Hakea microcarpa*	12	60	No	N	
Grass & grasslike	*Themeda triandra*	15	250	No	N	
	Hypericum perforatum	13	500	No	HTE	
	Acetosella vulgaris	4	100	No	HTE	
	Cirsium vulgare	1	25	No	E	
	Holcus lanatus	4	100	No	E	
	Anthoxanthum odoratum	25	500	No	E	
Forb (FG)	*Poranthera microphylla*	1	100	No	N	
Forb (FG)	*Solenogyne gunnii*	0.2	20	No	N	
Forb (FG)	*Leptorhynchos squamatus subsp. Alpinus*	0.5	80	No	N	
	Crepis capillaris	0.4	60	No	E	
Forb (FG)	*Geranium solanderi var. solanderi*	0.2	40	No	N	
Forb (FG)	*Acaena novae-zelandiae*	2	100	No	N	
Forb (FG)	*Senecio gunnii*	1	25	No	N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	10	100	No	N	
Grass & grasslike	*Anthosachne scabra*	18	500	No	N	
Shrub (SG)	*Discaria pubescens*	0.1	6	No	N	
Shrub (SG)	*Dillwynia prostrata*	1	10	No	N	
Grass & grasslike	*Carex breviculmis*	4	500	No	N	
Forb (FG)	*Linum marginale*	0.1	6	No	N	
Forb (FG)	*Bulbine bulbosa*	1	30	No	N	
	Centaurium erythraea	0.1	10	No	E	
Grass & grasslike	*Rytidosperma laeve*	25	500	No	N	
Forb (FG)	*Chrysocephalum semipapposum*	0.1	20	No	N	
Forb (FG)	*Scleranthus fasciculatus*	1	100	No	N	
Forb (FG)	*Acaena ovina*	2	100	No	N	
	Hypochaeris radicata	1	50	No	E	
Forb (FG)	*Epilobium hirtigerum*	0.3	50	No	N	
Grass & grasslike	*Dichelachne rara*	1	25	No	N	
	Aphanes arvensis	0.1	6	No	E	
	Trifolium spp.	0.1	4	No	E	
Forb (FG)	*Senecio lageniformis*	1	50	No	N	
Forb (FG)	*Ajuga australis*	0.8	40	No	N	
	Cerastium vulgare	0.5	150	No	E	
	Rubus anglocandicans	0.5	3	No	E	
Grass & grasslike	*Carex inversa*	0.1	50	No	N	
Forb (FG)	*Cynoglossum australe*	0.2	6	No	N	
Grass & grasslike	*Carex appressa*	1	25	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	1	18	No	N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	4	No	N	
Shrub (SG)	*Pimelea axiflora*	1	3	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	5	53	No	N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10	No	N	
Forb (FG)	*Wahlenbergia communis*	0.1	10	No	N	
Forb (FG)	*Hypericum gramineum*	0.1	15	No	N	
Forb (FG)	*Veronica subtilis*	0.1	8	No	N	
Shrub (SG)	*Acrothamnus hookeri*	1	5	No	N	
	Trifolium repens	0.2	40	No	E	

Shrub (SG) Leucopogon spp. 0.1 10 No N

BAM Site – Field Survey Form

Plot ID:	2009	**Date:**	02-02-19	**Survey Name:**	Lobs Hole Ravine			**Recorders:**	SW, KM
Zone:	55	**Easting:**	628589.5233	**Plot dimensions:**	20m x 50m			**Midline bearing:**	65
Datum:	GDA94	**Northing:**	6038386.776	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			999: Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	11
	Grasses etc.:	7
	Forbs:	5
	Ferns:	1
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	61
	Shrubs:	67
	Grasses etc.:	53
	Forbs:	10
	Ferns:	1
	Other:	10
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	3	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	8		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	40	20	20	10	85	20	35	45	20	1	1	0	1	1	5	5	10	10	5
Average of the 5 subplots:	19					41					0.8					7				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Course grained	**Soil Colour**	Orange-brown	**Soil Depth**	At least 50cm
Lithology (B)							
Slope	45	**Aspect**	N	**Site Drainage**	Good drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	Some minor burnt trunks
Storm damage:			No evidence
Weediness:			No evidence
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	02-02-19	**Plot ID:**	2009	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	30	10		N	
Tree (TG)	*Eucalyptus nortonii*	30	13		N	
Shrub (SG)	*Kunzea parvifolia*	15	50		N	
Shrub (SG)	*Grevillea arenaria subsp. canescens*	5	30		N	
Grass & grasslike	*Lomandra longifolia*	3	50		N	
Forb (FG)	*Dianella revoluta*	4	10		N	
Shrub (SG)	*Brachyloma daphnoides*	10	80		N	
Other (OG)	*Cassytha pubescens*	5	20		N	
Shrub (SG)	*Hibbertia obtusifolia*	2	100		N	
Shrub (SG)	*Tetratheca thymifolia*	1	20		N	
Forb (FG)	*Stellaria pungens*	1	20		N	
Forb (FG)	*Gonocarpus tetragynus*	3	200		N	
Shrub (SG)	*Mirbelia oxylobioides*	10	50		N	
Grass & grasslike	*Lomandra filiformis*	1	75		N	
Shrub (SG)	*Calytrix tetragona*	10	50		N	
Grass & grasslike	*Poa sieberiana*	30	200		N	
Forb (FG)	*Galium gaudichaudii*	1	50		N	
Other (OG)	*Hardenbergia violacea*	4	30		N	
Grass & grasslike	*Poa spp.*	4	10		N	
Grass & grasslike	*Themeda triandra*	1	50		N	
Shrub (SG)	*Acacia penninervis var. penninervis*	10	30		N	
Shrub (SG)	*Indigofera australis*	1	1		N	
Other (OG)	*Billardiera scandens*	1	3		N	
Forb (FG)	*Leucochrysum albicans subsp. albicans*	1	3		N	
Grass & grasslike	*Poa spp.*	10	30		N	
Fern (EG)	*Cheilanthes sieberi*	1	40		N	
Grass & grasslike	*Lepidosperma laterale*	4	20		N	
Shrub (SG)	*Leucopogon virgatus*	2	10		N	
Shrub (SG)	*Pultenaea fasciculata*	1	5		N	
Tree (TG)	*Eucalyptus macrorhyncha*	1	1		N	

BAM Site – Field Survey Form

Plot ID:	2030	**Date:**	17-11-18	**Survey Name:**	Link Road	**Recorders:**	DK, IM
Zone:	55	**Easting:**	633272.5897	**Plot dimensions:**	20m x 50m	**Midline bearing:**	208
Datum:	GDA94	**Northing:**	6029270.669	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	5
	Grasses etc.:	6
	Forbs:	10
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	15.7
	Grasses etc.:	80.4
	Forbs:	1.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	30	35	35	45	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	41					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Other	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**	Valley		
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Brown	**Soil Depth**	
Lithology (B)							
Slope	0	**Aspect**	0	**Site Drainage**	Poor	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Light		Low cover of weeds - see species list for cover and abundance
Other:	Light		Some horse dung and compaction from hooved animals within site, but only a low amount.

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Link Road				
Date:	17-11-18	**Plot ID:**	2030	**Recorders:**	DK, IM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa labillardierei var. labillardierei*	50	300		N	
Grass & grasslike	*Poa costiniana*	10	150		N	
Grass & grasslike	*Empodisma minus*	15	10		N	
	Acetosella vulgaris	0.2	30		HTE	
Shrub (SG)	*Epacris microphylla*	10	50		N	
Shrub (SG)	*Hovea montana*	0.5	50		N	
	Hypochaeris radicata	0.1	6		E	
Forb (FG)	*Asperula gunnii*	0.1	10		N	
Grass & grasslike	*Carex gaudichaudiana*	0.1	2		N	
Forb (FG)	*Brachyscome spp.*	0.1	1		N	
Forb (FG)	*Brachyscome spp.*	0.1	2		N	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	6		N	
Forb (FG)	*Ranunculus graniticola*	0.2	20		N	
Grass & grasslike	*Luzula modesta*	0.3	30		N	
Forb (FG)	*Asperula scoparia*	0.1	20		N	
Forb (FG)	*Ranunculus pimpinellifolius*	0.2	20		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	5	100		N	
Shrub (SG)	*Cassinia monticola*	5	50		N	
Shrub (SG)	*Pimelea biflora*	0.1	3		N	
Forb (FG)	*Geum urbanum*	0.1	10		N	
Shrub (SG)	*Richea continentis*	0.1	3		N	
Forb (FG)	*Ranunculus millanii*	0.1	4		N	
Forb (FG)	*Coronidium monticola*	0.1	3		N	

BAM Site – Field Survey Form

Plot ID:	2049	**Date:**	18-11-18	**Survey Name:**	Tantangara Reservoir	**Recorders:**	SW, MP
Zone:	55	**Easting:**	648722.3559	**Plot dimensions:**	20m x 50m	**Midline bearing:**	339
Datum:	GDA94	**Northing:**	6040640.203	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	2
	Grasses etc.:	5
	Forbs:	24
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0.2
	Grasses etc.:	97.3
	Forbs:	20.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	15		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	10	5	25	10	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	13					0.6					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Lake	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loamy sand	**Soil Colour**	Light brown	**Soil Depth**	Up to 100mm
Lithology (B)							
Slope	1	**Aspect**	SE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light	less than 3yo	Some due to rabbit burrowing
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Brumbies and rabbits
Fire damage:	Light	less than 3yo	Some evidence on nearby E. pauciflora
Storm damage:			No evidence
Weediness:	Light	less than 3yo	One grass and small forb present
Other:	Light	less than 3yo	Rabbits burrowing, discarded fencing wire

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Reservoir				
Date:	18-11-18	**Plot ID:**	2049	**Recorders:**	SW, MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa meionectes*	35	200		N	
Forb (FG)	*Cymbonotus preissianus*	1	150		N	
Forb (FG)	*Veronica subtilis*	0.2	500		N	
Forb (FG)	*Poranthera microphylla*	0.2	500		N	
Forb (FG)	*Senecio pinnatifolius var. alpinus*	0.1	100		N	
Grass & grasslike	*Luzula spp.*	0.1	50		N	
Forb (FG)	*Epilobium spp.*	0.1	150		N	
Grass & grasslike	*Themeda triandra*	60	700		N	
Forb (FG)	*Asperula scoparia*	0.1	100		N	
	Aira cupaniana	0.1	10		E	
Grass & grasslike	*Carex inversa*	0.2	80		N	
Forb (FG)	*Ajuga australis*	0.1	12		N	
Forb (FG)	*Solenogyne gunnii*	0.1	6		N	
Forb (FG)	*Ranunculus graniticola*	0.1	60		N	
Shrub (SG)	*Pultenaea capitellata*	0.1	2		N	
Forb (FG)	*Acaena novae-zelandiae*	0.4	50		N	
Forb (FG)	*Craspedia jamesii*	16	120		N	
Forb (FG)	*Hypericum gramineum*	0.1	25		N	
Forb (FG)	*Geranium solanderi*	0.1	60		N	
Forb (FG)	*Senecio gunnii*	0.1	10		N	
	Acetosella vulgaris	0.1	80		HTE	
Forb (FG)	*Plantago spp.*	0.1	50		N	
Forb (FG)	*Swainsona behriana*	0.1	8		N	
Forb (FG)	*Leptorhynchos squamatus subsp. alpinus*	0.1	30		N	
Grass & grasslike	*Carex spp.*	2	60		N	
Forb (FG)	*Acaena ovina*	0.3	100		N	
	Trifolium repens	0.1	50		E	
	Trifolium dubium	0.1	150		E	
Forb (FG)	*Euchiton spp.*	0.1	80		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	50		N	
Forb (FG)	*Viola betonicifolia*	0.1	4		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
Shrub (SG)	*Pimelea linifolia*	0.1	2		N	
	Holcus lanatus	0.1	1		E	
Forb (FG)	*Lobelia pedunculata*	0.3	1000		N	
Forb (FG)	*Hovea heterophylla*	0.1	1		N	
Tree (TG)	*Eucalyptus pauciflora*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	2063	**Date:**	14-11-18	**Survey Name:**	Tantangara Road	**Recorders:**	AM, EM
Zone:	55	**Easting:**	646706.0574	**Plot dimensions:**	20m x 50m	**Midline bearing:**	205
Datum:	GDA94	**Northing:**	6025473.233	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	6
	Grasses etc.:	9
	Forbs:	19
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	6.4
	Grasses etc.:	47.2
	Forbs:	2.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	1
50 – 79 cm:	1	0	1
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	74		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	60	50	70	60	50	0	0	0	0	0	15	0	0	1	2	0	0	0	0	0
Average of the 5 subplots:	58					0					3.6					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Primarily macropods
Fire damage:	Moderate	greater than 10yo	Fire scarring
Storm damage:			No evidence
Weediness:	Severe	less than 3yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road				
Date:	14-11-18	**Plot ID:**	2063	**Recorders:**	AM, EM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	25	30		N	
Shrub (SG)	*Pimelea pauciflora*	0.2	3		N	
Shrub (SG)	*Leptospermum myrtifolium*	2	10		N	
Shrub (SG)	*Hakea microcarpa*	1	8		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	45	1000		N	
Shrub (SG)	*Bossiaea foliosa*	3	30		N	
	Anthoxanthum odoratum	50	1000		E	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	100		N	
Forb (FG)	*Bulbine bulbosa*	0.1	20		N	
Forb (FG)	*Dichondra repens*	0.2	500		N	
Grass & grasslike	*Carex breviculmis*	0.2	50		N	
Forb (FG)	*Asperula gunnii*	0.2	500		N	
Forb (FG)	*Brachyscome decipiens*	0.1	10		N	
Forb (FG)	*Geranium antrorsum*	0.1	40		N	
	Acetosella vulgaris	0.2	100		HTE	
	Hypericum perforatum	0.1	30		HTE	
Forb (FG)	*Scleranthus biflorus*	0.1	20		N	
Grass & grasslike	*Themeda triandra*	0.5	50		N	
Forb (FG)	*Poranthera microphylla*	0.1	100		N	
Grass & grasslike	*Luzula flaccida*	0.1	30		N	
Grass & grasslike	*Carex incomitata*	1	40		N	
Forb (FG)	*Acaena ovina*	0.1	50		N	
	Trifolium repens	0.3	300		E	
Forb (FG)	*Cymbonotus preissianus*	0.1	5		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	5		N	
Shrub (SG)	*Pimelea linifolia subsp. caesia*	0.1	10		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	2		N	
Forb (FG)	*Leptorhynchos squamatus subsp. alpinus*	0.1	20		N	
Forb (FG)	*Senecio gunnii*	0.1	30		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	0.1	2		N	
Forb (FG)	*Hackelia suaveolens*	0.1	5		N	
Forb (FG)	*Asperula scoparia*	0.1	30		N	
Forb (FG)	*Craspedia spp.*	0.1	20		N	
	Holcus lanatus	2	100		E	
Grass & grasslike	*Poa helmsii*	0.1	1		N	
Forb (FG)	*Ranunculus graniticola*	0.1	20		N	
	Cirsium vulgare	0.1	2		E	
Grass & grasslike	*Empodisma minus*	0.1	5		N	
Forb (FG)	*Chiloglottis valida*	0.1	10		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	10		N	
Grass & grasslike	*Anthosachne scabra*	0.1	20		N	

BAM Site – Field Survey Form

Plot ID:	2068	**Date:**	10-01-19	**Survey Name:**		**Recorders:**	RP, MP
Zone:	55	**Easting:**	630055.3254	**Plot dimensions:**	20m x 50m	**Midline bearing:**	180
Datum:	GDA94	**Northing:**	6024218.044	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	7
	Grasses etc.:	5
	Forbs:	24
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	21
	Grasses etc.:	32.6
	Forbs:	18.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	2	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	2	0	0
5 – 9 cm:	3	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	18		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	75	75	45	50	0	10	5	25	0	0	0	0	0	0	80	0	0	0	0
Average of the 5 subplots:	51					8					0					16				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	Gradual	**Aspect**	SWW	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	No evidence but likely given lack of trees
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Light	greater than 10yo	2003 bushfires
Storm damage:	Light	greater than 10yo	No storm damage detected
Weediness:	Moderate	greater than 10yo	High density of Hypochaeris radicata
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	10-01-19	Plot ID:	2068	Recorders:	RP, MP

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Hovea asperifolia*	12	60		N	
	Hypochaeris radicata	15	500		E	
	Taraxacum officinale	0.5	30		E	
Forb (FG)	*Prasophyllum sphacelatum*	0.2	52		N	
Forb (FG)	*Craspedia variabilis*	1	50		N	
Forb (FG)	*Ranunculus graniticola*	3	600		N	
Forb (FG)	*Aciphylla simplicifolia*	1	50		N	
	Dactylis glomerata	3	24		E	
Forb (FG)	*Acaena ovina*	0.8	35		N	
Forb (FG)	*Celmisia costiniana*	0.2	64		N	
Forb (FG)	*Stylidium graminifolium*	5	4000		N	
Forb (FG)	*Geranium spp.*	0.5	35		N	
Forb (FG)	*Brachyscome spathulata*	1	50		N	
	Acetosella vulgaris	0.4	40		HTE	
Forb (FG)	*Wahlenbergia spp.*	0.1	60		N	
Shrub (SG)	*Pimelea linifolia*	0.2	50		N	
	Trifolium repens	1	150		E	
Forb (FG)	*Euchiton spp.*	0.1	50		N	
Shrub (SG)	*Acrothamnus hookeri*	0.2	6		N	
Forb (FG)	*Lobelia pedunculata*	0.1	40		N	
Forb (FG)	*Thelymitra spp.*	0.2	80		N	
Forb (FG)	*Senecio gunnii*	0.1	20		N	
Forb (FG)	*Viola betonicifolia*	0.1	40		N	
Shrub (SG)	*Podolobium alpestre*	6	27		N	
Forb (FG)	*Brachyscome rigidula*	0.1	25		N	
Grass & grasslike	*Carex spp.*	0.4	70		N	
Grass & grasslike	*Poa phillipsiana*	30	750		N	
Shrub (SG)	*Daviesia ulicifolia*	2	30		N	
Grass & grasslike	*Rytidosperma erianthum*	2	100		N	
Forb (FG)	*Microtis unifolia*	0.1	6		N	
Forb (FG)	*Microseris lanceolata*	2	450		N	
	Cerastium glomeratum	0.1	12		E	
Forb (FG)	*Scleranthus spp.*	0.2	250		N	
Forb (FG)	*Poranthera microphylla*	0.1	10		N	
Forb (FG)	*Coronidium spp.*	0.1	12		N	
Grass & grasslike	*Carex appressa*	0.1	20		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	20		N	
Forb (FG)	*Euphrasia collina*	2	100		N	
Shrub (SG)	*Rhytidosporum alpinum*	0.1	20		N	
Shrub (SG)	*Phebalium squamulosum*	0.5	6		N	
Forb (FG)	*Senecio spp.*	0.2	8		N	
Grass & grasslike	*Luzula spp.*	0.1	12		N	

BAM Site – Field Survey Form

Plot ID:	2119	**Date:**	31-01-19	**Survey Name:**	Lower Lobs Hole Ravine Road	**Recorders:**	SW, KM
Zone:	55	**Easting:**	626681.907	**Plot dimensions:**	20m x 50m	**Midline bearing:**	350
Datum:	GDA94	**Northing:**	6036779.516	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	3
	Grasses etc.:	6
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	65
	Shrubs:	41
	Grasses etc.:	107
	Forbs:	16
	Ferns:	0
	Other:	0
High Threat Weed cover:		15

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	3		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	2	80	15	20	10	1	2	20	10	0	0	1	1	0	0	0	1	2	3	0
Average of the 5 subplots:	25.4					6.6					0.4					1.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Alluvial loams and clays	**Soil Surface Texture**	Fine grained	**Soil Colour**	Pale light brown	**Soil Depth**	At least 50cm
Lithology (B)							
Slope	30	**Aspect**	N	**Site Drainage**	Good drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Moderate	greater than 10yo	Some burnt trunks
Storm damage:			No evidence
Weediness:	Severe	less than 3yo	St Johns Wort and Blackberry present within plot
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lower Lobs Hole Ravine Road				
Date:	31-01-19	**Plot ID:**	2119	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus viminalis*	10	5		N	
Tree (TG)	*Acacia dealbata subsp. dealbata*	55	60		N	
Shrub (SG)	*Exocarpos strictus*	35	100		N	
	Rubus anglocandicans	25	30		E	
	Rosa rubiginosa	10	15		HTE	
Shrub (SG)	*Pultenaea fasciculata*	5	50		N	
Forb (FG)	*Chrysocephalum semipapposum*	2	200		N	
	Hypericum perforatum	5	500		HTE	
Grass & grasslike	*Rytidosperma erianthum*	60	3000		N	
Forb (FG)	*Wahlenbergia communis*	2	100		N	
Forb (FG)	*Picris angustifolia*	1	20		N	
Grass & grasslike	*Dichelachne rara*	30	1000		N	
	Verbascum virgatum	1	30		E	
Forb (FG)	*Geranium solanderi*	5	100		N	
	Tragopogon dubius	3	10		E	
	Centaurium erythraea	4	100		E	
Forb (FG)	*Oxalis spp.*	1	200		N	
	Trifolium arvense	5	50		E	
	Conyza spp.	2	10		E	
	Petrorhagia nanteuilii	1	20		E	
Grass & grasslike	*Themeda triandra*	4	100		N	
Forb (FG)	*Oxalis perennans*	2	200		N	
Forb (FG)	*Acaena ovina*	2	50		N	
Grass & grasslike	*Microlaena stipoides*	5	300		N	
Forb (FG)	*Galium gaudichaudii*	1	50		N	
Grass & grasslike	*Panicum effusum*	3	100		N	
Shrub (SG)	*Cassinia aculeata*	1	1		N	
Grass & grasslike	*Poa induta*	5	20		N	

BAM Site – Field Survey Form

Plot ID:	2133	**Date:**	30-01-19	**Survey Name:**	Lobbs Hole	**Recorders:**	RP, CG
Zone:	55	**Easting:**	626642.4535	**Plot dimensions:**	20m x 50m	**Midline bearing:**	339
Datum:	GDA94	**Northing:**	6038229.9	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	6
	Forbs:	3
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	4.6
	Forbs:	0.3
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		5.8

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	20	20	20	10	20	20	30	20	10	30	35	40	0	70	0	10	10	0	10
Average of the 5 subplots:	16					20					35					6				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**	N	**Site Drainage**	Very good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	
Cultivation (inc. pasture):	Light	greater than 10yo	
Soil erosion:	Light		
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			No evidence
Storm damage:			
Weediness:	Severe	greater than 10yo	A. vulgaris, H. perforatum, Vebascum spp., Rubus aggregata, Petrohagia nutens, Centaurium erythraea, Plantago l
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs Hole						
		Date:	30-01-19	**Plot ID:**	2133	**Recorders:**	RP, CG

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Hypericum perforatum	0.4	800		HTE	
	Acetosella vulgaris	5	1000		HTE	
Grass & grasslike	*Panicum effusum*	1	100		N	
Grass & grasslike	*Rytidosperma erianthum*	0.5	1000		N	
	Trifolium arvense	0.1	20		E	
	Centaurium erythraea	0.1	100		E	
Forb (FG)	*Wahlenbergia gracilis*	0.1	1		N	
	Verbascum virgatum	0.1	10		E	
Forb (FG)	*Oxalis perennans*	0.1	50		N	
Grass & grasslike	*Anthosachne scabra*	0.4	800		N	
Fern (EG)	*Cheilanthes sieberi*	0.1	15		N	
	Vulpia spp.	0.5	1000		E	
Forb (FG)	*Picris angustifolia*	0.1	2		N	
	Rubus fruticosus sp. agg.	0.2	2		HTE	
Grass & grasslike	*Themeda triandra*	0.1	8		N	
	Eragrostis curvula	0.1	10		HTE	
Grass & grasslike	*Microlaena stipoides*	2.5	10000		N	
	Paspalum dilatatum	0.1	1		HTE	
Grass & grasslike	*Chloris truncata*	0.1	5		N	
	Plantago lanceolata	0.1	1		E	

BAM Site – Field Survey Form

Plot ID:	2142	**Date:**	14-11-18	**Survey Name:**	Marica Firetrail	**Recorders:**	JS, SW
Zone:	55	**Easting:**	630824.8214	**Plot dimensions:**	20m x 50m	**Midline bearing:**	359
Datum:	GDA94	**Northing:**	6039007.815	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	11
	Grasses etc.:	7
	Forbs:	18
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	27.5
	Shrubs:	9
	Grasses etc.:	41.9
	Forbs:	4.2
	Ferns:	0
	Other:	0.4
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	1	0	0
30 – 49 cm:	4	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	77		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	70	80	85	85	80	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	80					1					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Dark brown	**Soil Depth**	At least 100mm
Lithology (B)							
Slope	12	**Aspect**	South	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	
Storm damage:	Light	less than 3yo	Some fallen small branches
Weediness:			No evidence
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Marica Firetrail				
Date:	14-11-18	**Plot ID:**	2142	**Recorders:**	JS, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dalrympleana subsp. dalrympleana*	7	10		N	
Tree (TG)	*Eucalyptus pauciflora*	15	30		N	
Tree (TG)	*Eucalyptus robertsonii subsp. robertsonii*	5	40		N	
Tree (TG)	*Eucalyptus dives*	0.5	4		N	
Shrub (SG)	*Platylobium formosum*	3	500		N	
Shrub (SG)	*Daviesia latifolia*	4	100		N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.3	100		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	7		N	
Forb (FG)	*Stellaria pungens*	0.2	50		N	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	20		N	
Other (OG)	*Clematis aristata*	0.2	50		N	
Shrub (SG)	*Persoonia chamaepeuce*	0.3	50		N	
Shrub (SG)	*Acacia pravissima*	0.1	3		N	
Forb (FG)	*Gonocarpus tetragynus*	0.2	100		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	35	1000		N	
Forb (FG)	*Native forb*	0.1	4		N	
Forb (FG)	*Viola betonicifolia*	0.2	100		N	
Forb (FG)	*Brachyscome spathulata*	0.1	2		N	
Forb (FG)	*Craspedia jamesii*	0.1	7		N	
Forb (FG)	*Arthropodium milleflorum*	0.3	500		N	
Grass & grasslike	*Lomandra longifolia*	5	500		N	
Grass & grasslike	*Lomandra filiformis subsp. filiformis*	1	500		N	
Forb (FG)	*Poranthera microphylla*	0.1	20		N	
Other (OG)	*Glycine clandestina*	0.2	50		N	
Shrub (SG)	*Lomatia fraseri*	0.1	1		N	
Shrub (SG)	*Cassinia aculeata*	1	20		N	
Shrub (SG)	*Olearia erubescens*	0.1	20		N	
Forb (FG)	*Asperula scoparia*	2	500		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	8		N	
Forb (FG)	*Native lilly*	0.1	2		N	
Grass & grasslike	*Luzula flaccida*	0.1	4		N	
Grass & grasslike	*Microlaena stipoides var. stipoides*	0.4	500		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	0.1	5		N	
Forb (FG)	*Coronidium monticola*	0.1	3		N	
Forb (FG)	*Hydrocotyle laxiflora*	0.1	7		N	
Forb (FG)	*Wahlenbergia stricta subsp. stricta*	0.1	1		N	
Forb (FG)	*Pterostylis foliata*	0.1	1		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	3		N	
Forb (FG)	*Thelymitra pauciflora*	0.1	2		N	
Grass & grasslike	*Anthosachne scabra*	0.1	20		N	
Forb (FG)	*Caladenia carnea*	0.1	1		N	
Shrub (SG)	*Cassinia longifolia*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	2145	**Date:**	15-11-18	**Survey Name:**	Tantangara Road	**Recorders:**	AM, EM
Zone:	55	**Easting:**	647073.0611	**Plot dimensions:**	20m x 50m	**Midline bearing:**	220
Datum:	GDA94	**Northing:**	6029349.808	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	3
	Forbs:	14
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30
	Shrubs:	15.5
	Grasses etc.:	47.1
	Forbs:	1.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		1.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	0
50 – 79 cm:	2	0	2
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	10		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	80	70	60	75	80	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0
Average of the 5 subplots:	73					0					0					2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	greater than 10yo	Historic
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:	Light		Possible fallen timber removal, very little present
Grazing (identify native/stock):	Light	less than 3yo	Horse and macropod scats
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Severe		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road				
Date:	15-11-18	**Plot ID:**	2145	**Recorders:**	AM, EM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	25	6		N	
Tree (TG)	*Eucalyptus pauciflora*	5	4		N	
Shrub (SG)	*Hakea microcarpa*	10	50		N	
Shrub (SG)	*Dillwynia prostrata*	5	100		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	45	500		N	
	Anthoxanthum odoratum	25	1000		E	
	Dactylis glomerata	5	200		E	
Forb (FG)	*Geranium antrorsum*	0.1	30		N	
Grass & grasslike	*Anthosachne scabra*	0.1	20		N	
Forb (FG)	*Senecio gunnii*	0.1	20		N	
Forb (FG)	*Scleranthus biflorus*	0.1	30		N	
Forb (FG)	*Microseris lanceolata*	0.1	10		N	
Forb (FG)	*Poranthera microphylla*	0.2	200		N	
Forb (FG)	*Asperula scoparia*	0.2	200		N	
Forb (FG)	*Brachyscome decipiens*	0.1	10		N	
Forb (FG)	*Podolepis laciniata*	0.1	30		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	3		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	5		N	
Shrub (SG)	*Olearia spp.*	0.1	20		N	
Forb (FG)	*Acaena ovina*	0.2	200		N	
	Hypochaeris radicata	0.1	30		E	
Forb (FG)	*Acaena novae-zelandiae*	0.2	100		N	
Forb (FG)	*Ranunculus graniticola*	0.1	20		N	
Grass & grasslike	*Themeda triandra*	2	80		N	
	Acetosella vulgaris	0.1	100		HTE	
Shrub (SG)	*Persoonia chamaepeuce*	0.3	5		N	
Forb (FG)	*Stellaria pungens*	0.1	20		N	
Forb (FG)	*Viola betonicifolia*	0.1	30		N	
	Agrostis capillaris	1	40		HTE	

BAM Site – Field Survey Form

Plot ID:	2161	**Date:**	31-01-19	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	SW, KM
Zone:	55	**Easting:**	625815.4398	**Plot dimensions:**	20m x 50m	**Midline bearing:**	277
Datum:	GDA94	**Northing:**	6039431.51	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	12
	Grasses etc.:	4
	Forbs:	2
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	100
	Shrubs:	188
	Grasses etc.:	5
	Forbs:	4
	Ferns:	0
	Other:	5
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	2	0	0
30 – 49 cm:	3	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	8		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	70	70	90	80	25	1	1	5	1	0	0	1	1	0	0	0	0	1	0	1
Average of the 5 subplots:	67					1.6					0.4					0.4				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Course grained	**Soil Colour**	Orange-brown	**Soil Depth**	At least 30cm
Lithology (B)							
Slope	10	**Aspect**	W	**Site Drainage**	Moderate drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	Burnt trunks on some Eucalypts
Storm damage:			No evidence
Weediness:			No evidence in plot, surrounding areas have high levels of Blackberry and St Johns Wort
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	31-01-19	**Plot ID:**	2161	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	60	24		N	
Tree (TG)	*Eucalyptus mannifera*	40	15		N	
Shrub (SG)	*Banksia canei*	80	200		N	
Shrub (SG)	*Acacia pravissima*	40	150		N	
Shrub (SG)	*Calytrix tetragona*	30	100		N	
Shrub (SG)	*Pimelea linifolia subsp. linifolia*	13	50		N	
Shrub (SG)	*Daviesia ulicifolia*	15	30		N	
Grass & grasslike	*Lomandra longifolia*	2	15		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	1	50		N	
Grass & grasslike	*Lomandra filiformis*	1	50		N	
Other (OG)	*Desmodium varians*	2	20		N	
Forb (FG)	*Stellaria pungens*	1	200		N	
Other (OG)	*Cassytha pubescens*	3	5		N	
Shrub (SG)	*Brachyloma daphnoides*	1	30		N	
Forb (FG)	*Galium ciliare*	3	75		N	
Shrub (SG)	*Hibbertia obtusifolia*	4	100		N	
Shrub (SG)	*Tetratheca thymifolia*	1	20		N	
Shrub (SG)	*Hovea montana*	1	10		N	
Shrub (SG)	*Leucopogon virgatus*	1	10		N	
Shrub (SG)	*Leucopogon attenuatus*	1	5		N	
Grass & grasslike	*Poa sieberiana*	1	100		N	
Shrub (SG)	*Acacia siculiformis*	1	5		N	

BAM Site – Field Survey Form

Plot ID:	2170	**Date:**	18-11-18	**Survey Name:**	Tantangara Reservoir	**Recorders:**	SW, MP
Zone:	55	**Easting:**	648892.1143	**Plot dimensions:**	20m x 50m	**Midline bearing:**	160
Datum:	GDA94	**Northing:**	6040407.736	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	5
	Forbs:	10
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	9.2
	Forbs:	1.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		1.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	25	2	10	2	1	1	20	1	15	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	8.8					7.6					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loam	**Soil Colour**	Brown	**Soil Depth**	Up to 100mm
Lithology (B)							
Slope	10	**Aspect**	Eastern	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:	Moderate	less than 3yo	Due to rabbit burrowing
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Moderate	less than 3yo	Brumbies and rabbits
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Moderate	less than 3yo	Grasses and small forbs
Other:	Moderate	less than 3yo	Discarded campers rubbish

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Reservoir				
Date:	18-11-18	**Plot ID:**	2170	**Recorders:**	SW, MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Anthoxanthum odoratum	90	1000		E	
	Hypericum perforatum	1	500		HTE	
Forb (FG)	*Coronidium monticola*	1	1000		N	
Grass & grasslike	*Carex spp.*	2	300		N	
	Holcus lanatus	0.1	5		E	
Forb (FG)	*Oxalis perennans*	0.1	60		N	
	Acetosella vulgaris	0.1	700		HTE	
Grass & grasslike	*Juncus spp.*	0.1	6		N	
Grass & grasslike	*Poa meionectes*	2	30		N	
Grass & grasslike	*Luzula spp.*	0.1	20		N	
Grass & grasslike	*Themeda triandra*	5	60		N	
Forb (FG)	*Solenogyne gunnii*	0.1	15		N	
	Myosotis discolor	1	20		E	
Forb (FG)	*Acaena ovina*	0.1	20		N	
	Cirsium vulgare	0.1	3		E	
Forb (FG)	*Hydrocotyle algida*	0.1	1		N	
Forb (FG)	*Euchiton spp.*	0.1	500		N	
Forb (FG)	*Cymbonotus preissianus*	0.1	5		N	
Forb (FG)	*Geranium spp.*	0.1	20		N	
Forb (FG)	*Veronica subtilis*	0.1	4		N	
Forb (FG)	*Scleranthus biflorus*	0.1	2		N	

BAM Site – Field Survey Form

Plot ID:	2172	**Date:**	11-01-19	**Survey Name:**		**Recorders:**	RP, MP
Zone:	55	**Easting:**	631830.0973	**Plot dimensions:**	20m x 50m	**Midline bearing:**	210
Datum:	GDA94	**Northing:**	6027986.186	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	7
	Grasses etc.:	5
	Forbs:	9
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	15
	Shrubs:	80.6
	Grasses etc.:	30.5
	Forbs:	1.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	19		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	0	2	4	25	5	0	0	2	1	0	0	0	2	0	0	0	0	1	0	0
Average of the 5 subplots:	7.2					0.6					0.4					0.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**	NNW	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	less than 3yo	Rabbits
Fire damage:	Moderate	greater than 10yo	2003 bushfires
Storm damage:			
Weediness:	Light	3 to 10 yo	Hypochaeris radicata, Acetosella vulgaris
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	11-01-19	Plot ID:	2172	Recorders:	RP, MP

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa sieberiana*	30	250		N	
Shrub (SG)	*Podolobium alpestre*	40	500		N	
Shrub (SG)	*Hovea montana*	5	50		N	
Shrub (SG)	*Phebalium squamulosum*	20	100		N	
Forb (FG)	*Stylidium graminifolium*	0.1	40		N	
	Hypochaeris radicata	0.1	25		E	
Grass & grasslike	*Poa spp.*	0.1	1		N	
Shrub (SG)	*Pimelea linifolia*	0.1	30		N	
Tree (TG)	*Eucalyptus pauciflora*	15	23		N	
Shrub (SG)	*Bossiaea foliosa*	15	100		N	
Forb (FG)	*Senecio gunnii*	0.1	2		N	
Grass & grasslike	*Lomandra filiformis*	0.1	6		N	
Forb (FG)	*Asperula gunnii*	0.2	150		N	
Forb (FG)	*Viola betonicifolia*	0.1	4		N	
	Bromus catharticus	0.1	6		E	
	Acetosella vulgaris	0.2	60		HTE	
Shrub (SG)	*Tasmannia xerophila*	0.1	1		N	
	Tragopogon dubius	0.1	1		E	
Grass & grasslike	*Luzula spp.*	0.1	4		N	
Forb (FG)	*Celmisia spp.*	0.2	20		N	
Forb (FG)	*Aciphylla simplicifolia*	0.1	6		N	
Shrub (SG)	*Daviesia ulicifolia*	0.4	25		N	
Forb (FG)	*Gonocarpus montanus*	0.1	4		N	
Forb (FG)	*Wahlenbergia ceracea*	0.1	10		N	
Grass & grasslike	*Carex spp.*	0.2	40		N	
Forb (FG)	*Prasophyllum spp.*	0.1	2		N	

BAM Site – Field Survey Form

Plot ID:	2180	**Date:**	29-01-19	**Survey Name:**	Lobbs Hole	**Recorders:**	RP, CG
Zone:	55	**Easting:**	626200.6867	**Plot dimensions:**	20m x 50m	**Midline bearing:**	55
Datum:	GDA94	**Northing:**	6038357.793	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:			285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	**Confidence:**	High	**Photo #:**	
Vegetation Class:			Upper Riverina Dry Sclerophyll Forests	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	6
	Grasses etc.:	4
	Forbs:	2
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	11.5
	Shrubs:	1.5
	Grasses etc.:	0.8
	Forbs:	0.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		80.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	94		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	70	50	50	80	50	0	0	0	0	5	0	0	5	0	10	0	0	0	0	0
Average of the 5 subplots:	60					1					3					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Plain	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	Flat	**Aspect**	NE	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Moderate	greater than 10yo	2003 bushfires
Storm damage:			
Weediness:	Severe	3 to 10 yo	Rubus aggregatus, Rosa rubiginosa, Hypericum perforatum
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs Hole				
Date:	29-01-19	**Plot ID:**	2180	**Recorders:**	RP, CG

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Rubus fruticosus sp. agg.	80	400		HTE	
Tree (TG)	*Acacia dealbata*	1	40		N	
Tree (TG)	*Acacia melanoxylon*	0.5	25		N	
Shrub (SG)	*Acacia pravissima*	1	40		N	
Tree (TG)	*Eucalyptus rubida*	10	80		N	
Shrub (SG)	*Cassinia longifolia*	0.1	1		N	
Grass & grasslike	*Carex appressa*	0.1	20		N	
Shrub (SG)	*Cassinia arcuata*	0.1	10		N	
Grass & grasslike	*Anthosachne scabra*	0.5	30		N	
	Cerastium glomeratum	0.1	5		E	
Forb (FG)	*Acaena novae-zelandiae*	0.1	10		N	
Grass & grasslike	*Agrostis spp.*	0.1	5		N	
Grass & grasslike	*Agrostis spp.*	0.1	5		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	5		N	
	Hypericum perforatum	0.1	1		HTE	
	Rosa rubiginosa	0.1	3		HTE	
Shrub (SG)	*Bursaria spinosa*	0.1	1		N	
Shrub (SG)	*Exocarpos strictus*	0.1	1		N	
Shrub (SG)	*Leptospermum obovatum*	0.1	1		N	
	Juncus tenuis	0.1	1		E	

BAM Site – Field Survey Form

Plot ID:	2191	**Date:**	26-11-18	**Survey Name:**	Link Road	**Recorders:**	MP, JB
Zone:	55	**Easting:**	634892.3535	**Plot dimensions:**	20m x 50m	**Midline bearing:**	250
Datum:	GDA94	**Northing:**	6029567.875	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	1
	Grasses etc.:	6
	Forbs:	11
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.3
	Grasses etc.:	101.2
	Forbs:	1.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	1					1					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No
Cultivation (inc. pasture):			No
Soil erosion:	Light	less than 3yo	From rabbits and horses
Firewood / CWD removal:			No
Grazing (identify native/stock):	Moderate	less than 3yo	Rabbits and horses
Fire damage:			No
Storm damage:			No
Weediness:	Light	less than 3yo	Some exotics
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Link Road				
Date:	26-11-18	**Plot ID:**	2191	**Recorders:**	MP, JB

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa labillardierei var. labillardierei*	85	250	No	N	
Grass & grasslike	*Poa costiniana*	10	400	No	N	
Grass & grasslike	*Juncus spp.*	4	60	No	N	
	Viola arvensis	2	900	No	E	
Forb (FG)	*Hypericum japonicum*	0.3	1000	No	N	
Grass & grasslike	*Luzula ovata*	0.4	600	No	N	
Forb (FG)	*Cardamine paucijuga*	0.2	500	Yes	N	
Forb (FG)	*Epilobium spp.*	0.2	400	No	N	
Grass & grasslike	*Carex chlorantha*	1	600	No	N	
Shrub (SG)	*Cassinia monticola*	0.3	2	No	N	
	Acetosella vulgaris	2	160	No	HTE	
Forb (FG)	*Acaena novae-zelandiae*	0.4	40	No	N	
	Cirsium vulgare	0.1	8	No	E	
Forb (FG)	*Coronidium spp.*	0.1	25	No	N	
	Cerastium glomeratum	0.1	18	No	E	
	Anthoxanthum odoratum	5	500	No	E	
Forb (FG)	*Scleranthus biflorus*	0.1	5	No	N	
Forb (FG)	*Oxalis perennans*	0.1	25	No	N	
	Taraxacum officinale	0.1	20	No	E	
Forb (FG)	*Viola betonicifolia*	0.1	6	No	N	
Forb (FG)	*Hydrocotyle algida*	0.1	100	No	N	
Forb (FG)	*Geranium spp.*	0.1	20	No	N	
Forb (FG)	*Neopaxia australasica*	0.1	20	No	N	
Grass & grasslike	*Carex breviculmis*	0.8	400	No	N	

BAM Site – Field Survey Form

Plot ID:	2195	**Date:**	17-11-18	**Survey Name:**	Snowy Mtns Hwy, Kiandra	**Recorders:**	SW, MP
Zone:	55	**Easting:**	635019.2951	**Plot dimensions:**	20m x 50m	**Midline bearing:**	305
Datum:	GDA94	**Northing:**	6028438.633	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	3
	Grasses etc.:	5
	Forbs:	21
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.7
	Grasses etc.:	36.3
	Forbs:	7.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	1	10	15	5	20	55	3	35	25	2	2	0	0	0	30	35	20	15	30
Average of the 5 subplots:	7.2					27.6					0.8					26				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loamy clay	**Soil Colour**	Brown/yellow	**Soil Depth**	Up to 20mm
Lithology (B)							
Slope	7	**Aspect**	NNW	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:	Moderate	less than 3yo	Due to historic mining activity
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Brumbies and rabbits
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Severe	less than 3yo	
Other:	Moderate	greater than 10yo	Stockpiles and disgarded rubbish

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Snowy Mtns Hwy, Kiandra				
Date:	17-11-18	**Plot ID:**	2195	**Recorders:**	SW, MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Forb (FG)	*Pterostylis mutica*	0.1	3		N	
Grass & grasslike	*Poa clivicola*	35	150		N	
	Anthoxanthum odoratum	55	500		E	
Forb (FG)	*Scleranthus biflorus*	0.1	1		N	
Forb (FG)	*Geranium antrorsum*	2	40		N	
Forb (FG)	*Scleranthus fasciculatus*	0.1	14		N	
Forb (FG)	*Oreomyrrhis eriopoda*	1	100		N	
Grass & grasslike	*Carex breviculmis*	0.1	50		N	
Forb (FG)	*Geranium retrorsum*	0.1	10		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	1	20		N	
Forb (FG)	*Asperula conferta*	0.1	500		N	
	Hypochaeris radicata	0.1	50		E	
Forb (FG)	*Veronica subtilis*	0.1	15		N	
Forb (FG)	*Acaena ovina*	2	100		N	
	Trifolium spp.	0.1	3		E	
	Holcus lanatus	0.1	8		E	
Forb (FG)	*Euchiton traversii*	0.1	14		N	
Forb (FG)	*Solenogyne gunnii*	0.1	12		N	
Forb (FG)	*Hypericum gramineum*	0.1	20		N	
Grass & grasslike	*Carex inversa*	0.1	50		N	
Forb (FG)	*Stylidium graminifolium*	0.1	24		N	
Forb (FG)	*Coronidium scorpioides*	0.5	75		N	
Shrub (SG)	*Leucopogon fraseri*	0.1	24		N	
Forb (FG)	*Epilobium spp.*	0.1	30		N	
	Taraxacum officinale	0.1	2		E	
	Cerastium glomeratum	0.1	10		E	
	Myosotis discolor	0.1	5		E	
Forb (FG)	*Hydrocotyle algida*	0.1	80		N	
Forb (FG)	*Oxalis perennans*	0.1	3		N	
Forb (FG)	*Viola betonicifolia*	0.1	16		N	
Forb (FG)	*Gonocarpus montanus*	0.1	2		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	24		N	
Shrub (SG)	*Pimelea biflora*	0.1	2		N	
Forb (FG)	*Asteraceae indeterminate*	0.1	4		N	
Shrub (SG)	*Podolobium alpestre*	0.5	2		N	
Grass & grasslike	*Carex spp.*	0.1	5		N	

BAM Site – Field Survey Form

Plot ID:	2204	**Date:**	20-02-19	**Survey Name:**	Wallaces Creek Track	**Recorders:**	MP, JB
Zone:	55	**Easting:**	633679.0021	**Plot dimensions:**	20m x 50m	**Midline bearing:**	178
Datum:	GDA94	**Northing:**	6038041.348	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:			644: Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	**Confidence:**	High	**Photo #:**	
Vegetation Class:			Subalpine Woodlands	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	11
	Grasses etc.:	6
	Forbs:	26
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	45
	Shrubs:	34.6
	Grasses etc.:	61.7
	Forbs:	8.2
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	10	0	2
20 – 29 cm:	1	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	41		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	10	60	5	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	22					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No
Cultivation (inc. pasture):			No
Soil erosion:			No
Firewood / CWD removal:			No
Grazing (identify native/stock):	Light	less than 3yo	Wild horses
Fire damage:	Light	greater than 10yo	Burnt trunks
Storm damage:			No
Weediness:			No
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Wallaces Creek Track				
Date:	20-02-19	**Plot ID:**	2204	**Recorders:**	MP, JB

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	45	11	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	55	300	No	N	
Forb (FG)	*Craspedia variabilis*	1	30	No	N	
Shrub (SG)	*Daviesia ulicifolia*	4	50	No	N	
	Acetosella vulgaris	0.1	25	No	HTE	
Grass & grasslike	*Themeda triandra*	0.3	40	No	N	
Shrub (SG)	*Podolobium alpestre*	8	26	No	N	
	Hypochaeris radicata	1	80	No	E	
Grass & grasslike	*Lomandra longifolia*	1	70	No	N	
Forb (FG)	*Microseris lanceolata*	0.8	150	No	N	
Shrub (SG)	*Gompholobium huegelii*	4	200	No	N	
Shrub (SG)	*Pimelea linifolia*	0.2	30	No	N	
Shrub (SG)	*Acrothamnus hookeri*	10	120	No	N	
Forb (FG)	*Stellaria pungens*	0.2	500	No	N	
Grass & grasslike	*Carex breviculmis*	0.2	250	No	N	
Grass & grasslike	*Luzula densiflora*	0.2	200	No	N	
Forb (FG)	*Stylidium graminifolium*	0.4	700	No	N	
Forb (FG)	*Brachyscome decipiens*	1	500	No	N	
Forb (FG)	*Hypericum gramineum*	0.4	40	No	N	
Shrub (SG)	*Bossiaea foliosa*	6	100	No	N	
Shrub (SG)	*Acacia obliquinervia*	1.5	24	No	N	
Forb (FG)	*Arthropodium milleflorum*	1	500	No	N	
Forb (FG)	*Coronidium monticola*	0.4	50	No	N	
Shrub (SG)	*Cassinia longifolia*	0.4	1	No	N	
Forb (FG)	*Chiloglottis spp.*	0.1	1	No	N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	5	80	No	N	
Forb (FG)	*Bulbine bulbosa*	0.6	250	No	N	
Shrub (SG)	*Olearia phlogopappa*	0.1	16	No	N	
Forb (FG)	*Asperula scoparia*	0.1	100	No	N	
Forb (FG)	*Wahlenbergia spp.*	0.1	6	No	N	
	Anthoxanthum odoratum	1	200	No	E	
Forb (FG)	*Geranium potentilloides var. potentilloides*	0.3	250	No	N	
Shrub (SG)	*Olearia phlogopappa*	0.1	16	No	N	
Forb (FG)	*Caladenia spp.*	0.1	10	No	N	
	Trifolium repens	0.1	30	No	E	
Forb (FG)	*Viola betonicifolia*	0.1	40	No	N	
Forb (FG)	*Acaena echinata*	0.1	40	No	N	
Forb (FG)	*Cymbonotus preissianus*	0.3	45	No	N	
Forb (FG)	*Galium spp.*	0.1	40	No	N	
	Cerastium glomeratum	0.1	25	No	E	
Forb (FG)	*Senecio gunnii*	0.1	25	No	N	
Forb (FG)	*Acaena novae-zelandiae*	0.3	50	No	N	
	Aira caryophyllea	0.1	50	No	E	
	Veronica arvensis	0.1	20	No	E	
Forb (FG)	*Podolepis jaceoides*	0.1	24	No	N	
Forb (FG)	*Ranunculus lappaceus*	0.1	20	No	N	
Forb (FG)	*Brachyscome aculeata*	0.2	50	Yes	N	

Forb (FG)	*Brachyscome spathulata*	0.1	5	No	N	
Shrub (SG)	*Tasmannia lanceolata*	0.3	2	No	N	
Forb (FG)	*Thelymitra spp.*	0.1	1	No	N	
Forb (FG)	*Diuris spp.*	0.1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	2216	**Date:**	17-11-18	**Survey Name:**	Link Road	**Recorders:**	DK, IM
Zone:	55	**Easting:**	633084.4836	**Plot dimensions:**	20m x 50m	**Midline bearing:**	31
Datum:	GDA94	**Northing:**	6028868.673	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		637: Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Alpine Bogs and Fens		**EEC:**	Yes	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	4
	Grasses etc.:	9
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	10.1
	Grasses etc.:	122.5
	Forbs:	0.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	25	70	25	25	2	2	0	0	50	35	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	33					10.8					7					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Valley flat	**Lf Pattern (A)**	Other	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**	Valley		
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Brown	**Soil Depth**	
Lithology (B)							
Slope	0	**Aspect**	0	**Site Drainage**	Poor	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Light		Sweet vernel growing out of sphagnum mounds potentially impacting ecology of sphagnum bog/fen.
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Link Road				
Date:	17-11-18	**Plot ID:**	2216	**Recorders:**	DK, IM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa labillardierei var. labillardierei*	30	300		N	
Grass & grasslike	*Poa costiniana*	30	300		N	
Shrub (SG)	*Epacris microphylla*	6	150		N	
Shrub (SG)	*Epacris paludosa*	3	75		N	
Grass & grasslike	*Empodisma minus*	30	200		N	
Grass & grasslike	*Carex gaudichaudiana*	30	1000		N	
Forb (FG)	*Ranunculus graniticola*	0.1	30		N	
Tree (TG)	*Eucalyptus stellulata*	0.1	1		N	
Grass & grasslike	*Carex appressa*	2	50		N	
	Sphagnum cristatum	15	4		N	
	Anthoxanthum odoratum	5	300		E	
	Hypochaeris radicata	0.1	5		E	
	Acetosella vulgaris	0.1	15		HTE	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	10		N	
Forb (FG)	*Ranunculus pimpinellifolius*	0.1	5		N	
Grass & grasslike	*Luzula modesta*	0.2	20		N	
Grass & grasslike	*Juncus falcatus*	0.1	5		N	
Shrub (SG)	*Baeckea gunniana*	0.1	3		N	
Forb (FG)	*Asperula gunnii*	0.1	10		N	
Forb (FG)	*Myriophyllum pedunculatum*	0.1	2		N	
Forb (FG)	*Epilobium spp.*	0.1	3		N	
Forb (FG)	*Geum urbanum*	0.1	3		N	
Shrub (SG)	*Cassinia monticola*	1	20		N	
Grass & grasslike	*Juncus spp.*	0.1	6		N	
Grass & grasslike	*Eleocharis spp.*	0.1	10		N	
	Cerastium glomeratum	0.1	2		E	
	Viola arvensis	0.1	4		E	
Forb (FG)	*Geranium neglectum*	0.1	5		N	

BAM Site – Field Survey Form

Plot ID:	2220	**Date:**	17-11-18	**Survey Name:**	Link Road	**Recorders:**	DK, IM
Zone:	55	**Easting:**	634649.5623	**Plot dimensions:**	20m x 50m	**Midline bearing:**	71
Datum:	GDA94	**Northing:**	6029626.033	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	3
	Forbs:	5
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	50.2
	Forbs:	0.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	45	35	30	20	55	30	4	2	1	2	0	0	0	0	0	0	1	0	0	0
Average of the 5 subplots:	37					7.8					0					0.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Other	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**	Valley		
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Light brown	**Soil Depth**	
Lithology (B)							
Slope	0-5	**Aspect**	154	**Site Drainage**	Poor to moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Severe		Severe grazing from rabbits
Fire damage:			
Storm damage:			
Weediness:	Severe		Sweet vernel at least 50 percent of plot
Other:	Light	greater than 10yo	Rocky/gravelly soil might indicate a site where mine spoil was dropped

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Link Road						
		Date:	17-11-18	**Plot ID:**	2220	**Recorders:**	DK, IM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa sieberiana var. sieberiana*	30	200		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	20	30		N	
	Anthoxanthum odoratum	50	500		E	
Forb (FG)	*Acaena novae-zelandiae*	0.3	50		N	
Forb (FG)	*Senecio spp.*	0.2	50		N	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	2		N	
Grass & grasslike	*Carex spp.*	0.2	20		N	
Forb (FG)	*Brachyscome spathulata*	0.1	4		N	
	Acetosella vulgaris	0.1	20		HTE	
Forb (FG)	*Coronidium scorpioides*	0.2	30		N	

BAM Site – Field Survey Form

Plot ID:	2236	**Date:**	12-11-18	**Survey Name:**	Tantangara Road	**Recorders:**	AM, JS
Zone:	55	**Easting:**	645981.9044	**Plot dimensions:**	20m x 50m	**Midline bearing:**	290
Datum:	GDA94	**Northing:**	6022839.526	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	637: Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Alpine Bogs and Fens			**EEC:**	Yes	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	7
	Grasses etc.:	11
	Forbs:	13
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	58.7
	Grasses etc.:	40.9
	Forbs:	1.5
	Ferns:	0.1
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	9		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	15	15	15	20	0	0	0	0	0	70	30	60	2	50	0	0	0	0	0
Average of the 5 subplots:	15					0					42.4					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Swamp	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	Some minor clearing for powerline
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Macropods
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Light	less than 3yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road				
Date:	12-11-18	**Plot ID:**	2236	**Recorders:**	AM, JS

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Epacris breviflora*	40	300		N	
Grass & grasslike	*Empodisma minus*	20	1000		N	
Grass & grasslike	*Poa ensiformis*	5	100		N	
Grass & grasslike	*Carex appressa*	3	200		N	
Grass & grasslike	*Poa costiniana*	5	200		N	
	Sphagnum cristatum	10	50		N	
Shrub (SG)	*Baeckea utilis*	5	100		N	
	Anthoxanthum odoratum	1	100		E	
Forb (FG)	*Asperula gunnii*	0.2	300		N	
Forb (FG)	*Hydrocotyle algida*	0.2	1000		N	
Grass & grasslike	*Luzula modesta*	0.3	200		N	
	Trifolium repens	0.1	50		E	
Forb (FG)	*Ranunculus lappaceus*	0.1	50		N	
Shrub (SG)	*Hakea microcarpa*	2	20		N	
Forb (FG)	*Oreomyrrhis ciliata*	0.1	50		N	
Shrub (SG)	*Leptospermum myrtifolium*	0.5	5		N	
Grass & grasslike	*Poa helmsii*	0.1	1		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	2	50		N	
	Holcus lanatus	0.1	10		E	
	Hypochaeris radicata	0.1	20		E	
Grass & grasslike	*Deyeuxia brachyathera*	0.1	20		N	
Forb (FG)	*Cardamine astoniae*	0.1	100		N	
	Hypericum perforatum	0.1	10		HTE	
Forb (FG)	*Senecio gunnii*	0.1	20		N	
Grass & grasslike	*Baloskion australe*	5	300		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	50		N	
	Taraxacum officinale	0.1	30		E	
Shrub (SG)	*Pimelea bracteata*	0.2	5		N	
Shrub (SG)	*Callistemon pityoides*	1	10		N	
Fern (EG)	*Blechnum penna-marina subsp. alpina*	0.1	50		N	
Grass & grasslike	*Carex gaudichaudiana*	0.2	30		N	
Forb (FG)	*Epilobium gunnianum*	0.1	100		N	
Forb (FG)	*Bulbine bulbosa*	0.1	20		N	
Forb (FG)	*Stylidium graminifolium*	0.1	40		N	
Forb (FG)	*Aciphylla glacialis*	0.1	10		N	
Tree (TG)	*Eucalyptus stellulata*	0.1	1		N	
Shrub (SG)	*Epacris paludosa*	10	100		N	
Forb (FG)	*Plantago spp.*	0.1	20		N	
Forb (FG)	*Ranunculus pimpinellifolius*	0.1	30		N	
Grass & grasslike	*Juncus sarophorus*	0.2	20		N	

BAM Site – Field Survey Form

Plot ID:	2237	**Date:**	15-11-18	**Survey Name:**	Tantangara Road	**Recorders:**	AM, EM
Zone:	55	**Easting:**	646939.8263	**Plot dimensions:**	20m x 50m	**Midline bearing:**	5
Datum:	GDA94	**Northing:**	6029409.204	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	637: Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Alpine Bogs and Fens			**EEC:**	Yes	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	7
	Grasses etc.:	8
	Forbs:	10
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	46
	Grasses etc.:	49
	Forbs:	1.1
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	90	60	60	60	80	0	0	0	0	0	5	10	20	0	10	0	0	0	0	0
Average of the 5 subplots:	70					0					9					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Swamp	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Horse scats
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Light	less than 3yo	
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road						
		Date:	15-11-18	**Plot ID:**	2237	**Recorders:**	AM, EM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Epacris paludosa*	40	500		N	
Grass & grasslike	*Empodisma minus*	25	1000		N	
Grass & grasslike	*Poa costiniana*	15	500		N	
Shrub (SG)	*Hakea microcarpa*	0.3	5		N	
Shrub (SG)	*Olearia algida*	0.1	3		N	
Grass & grasslike	*Carex appressa*	3	300		N	
Grass & grasslike	*Poa ensiformis*	5	100		N	
	Anthoxanthum odoratum	0.3	50		E	
Shrub (SG)	*Baeckea utilis*	0.3	20		N	
Shrub (SG)	*Epacris breviflora*	5	70		N	
Shrub (SG)	*Pimelea bracteata*	0.1	2		N	
Shrub (SG)	*Cassinia monticola*	0.2	5		N	
Grass & grasslike	*Luzula modesta*	0.1	40		N	
Forb (FG)	*Hydrocotyle algida*	0.2	500		N	
Forb (FG)	*Celmisia pugioniformis*	0.1	10		N	
Forb (FG)	*Coronidium scorpioides*	0.1	30		N	
Forb (FG)	*Senecio gunnii*	0.1	20		N	
Forb (FG)	*Cardamine lilacina*	0.1	50		N	
	Acetosella vulgaris	0.1	20		HTE	
Forb (FG)	*Oxalis spp.*	0.1	50		N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	0.5	50		N	
Forb (FG)	*Hypericum japonicum*	0.1	100		N	
Grass & grasslike	*Carex hebes*	0.2	100		N	
Grass & grasslike	*Poa labillardierei var. labillardierei*	0.2	2		N	
Forb (FG)	*Epilobium spp.*	0.1	50		N	
	Cirsium vulgare	0.1	2		E	
Forb (FG)	*Ranunculus lappaceus*	0.1	10		N	
	Leucanthemum vulgare	0.1	50		HTE	
	Sphagnum cristatum	0.5	20		N	
Forb (FG)	*Neopaxia australasica*	0.1	20		N	

BAM Site – Field Survey Form

Plot ID:	2238	**Date:**	19-11-18	**Survey Name:**	Tantangara Rd powerline easesment	**Recorders:**	MP, SW
Zone:	55	**Easting:**	648998.4899	**Plot dimensions:**	20m x 50m	**Midline bearing:**	200
Datum:	GDA94	**Northing:**	6035285.717	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	5
	Forbs:	26
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.2
	Shrubs:	1.4
	Grasses etc.:	93.6
	Forbs:	3.3
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	5		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	35	30	20	30	25	5	5	25	0	20	0	0	0	0	0	0	0	0	25	0
Average of the 5 subplots:	28					11					0					5				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loamy clay	**Soil Colour**	Brown	**Soil Depth**	At least 30mm
Lithology (B)							
Slope		**Aspect**	SSE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	less than 3yo	DNG - Powerline easement
Cultivation (inc. pasture):			No evidence
Soil erosion:	Light	less than 3yo	Due to maintanence vehicles using access track
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Brumbies and rabbits
Fire damage:	Light	greater than 10yo	Some scarring on nearby woodland trunks
Storm damage:			No evidence
Weediness:	Moderate	less than 3yo	Exotic forbs and grasses - Ox eye daisy
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Rd powerline easesment						
		Date:	19-11-18	**Plot ID:**	2238	**Recorders:**	MP, SW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa sieberiana var. sieberiana*	70	300		N	
Grass & grasslike	*Themeda triandra*	20	500		N	
Shrub (SG)	*Hakea microcarpa*	1	10		N	
Forb (FG)	*Veronica subtilis*	0.2	300		N	
Grass & grasslike	*Carex breviculmis*	0.5	150		N	
Forb (FG)	*Myosotis australis*	0.1	6		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	100		N	
Forb (FG)	*Craspedia spp.*	0.1	100		N	
Shrub (SG)	*Leptospermum obovatum*	0.1	6		N	
Forb (FG)	*Poranthera microphylla*	0.1	50		N	
Grass & grasslike	*Luzula flaccida*	0.1	30		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.1	30		N	
Forb (FG)	*Brachyscome decipiens*	0.1	50		N	
Forb (FG)	*Senecio longipilus*	0.1	80		N	
Forb (FG)	*Epilobium spp.*	0.1	15		N	
Forb (FG)	*Microseris lanceolata*	0.1	25		N	
	Hypochaeris radicata	0.1	30		E	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	3	60		N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	5		N	
Forb (FG)	*Scleranthus spp.*	0.1	8		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	25		N	
Shrub (SG)	*Pimelea linifolia*	0.1	3		N	
Tree (TG)	*Eucalyptus stellulata*	0.1	2		N	
Forb (FG)	*Erigeron bellidioides*	0.1	7		N	
Forb (FG)	*Leptorhynchos elongatus*	0.2	80		N	
	Leucanthemum vulgare	0.3	150		HTE	
	Acetosella vulgaris	0.1	16		HTE	
Forb (FG)	*Coronidium monticola*	0.1	50		N	
Forb (FG)	*Podolepis jaceoides*	0.4	60		N	
Tree (TG)	*Eucalyptus pauciflora*	0.1	2		N	
Forb (FG)	*Veronica calycina*	0.1	11		N	
Forb (FG)	*Ajuga australis*	0.1	12		N	
Forb (FG)	*Chrysocephalum semipapposum*	0.1	30		N	
Forb (FG)	*Cymbonotus preissianus*	0.1	6		N	
Forb (FG)	*Viola betonicifolia*	0.1	4		N	
Forb (FG)	*Acaena ovina*	0.3	80		N	
Shrub (SG)	*Leucopogon spp.*	0.1	1		N	
Forb (FG)	*Euchiton spp.*	0.1	8		N	
Forb (FG)	*Plantago spp.*	0.1	2		N	
	Trifolium repens	0.1	6		E	
	Anthoxanthum odoratum	0.1	1		E	
Forb (FG)	*Stylidium graminifolium*	0.1	4		N	
Shrub (SG)	*Acrothamnus hookeri*	0.1	3		N	
	Orchidaceae indeterminate	0.1	1		E	

BAM Site – Field Survey Form

Plot ID:	2244	**Date:**	19-11-18	**Survey Name:**	Tantangara Rd powerline easement			**Recorders:**	SW, MP
Zone:	55	**Easting:**	648953.984	**Plot dimensions:**	20m x 50m			**Midline bearing:**	178
Datum:	GDA94	**Northing:**	6035098.574	**IBRA region:**	Australian Alps (Snowy Mountains)			**Zone ID:**	
Plant Community Type:		303: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion				**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands				**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	2
	Grasses etc.:	8
	Forbs:	17
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0.1
	Shrubs:	0.2
	Grasses etc.:	79.6
	Forbs:	4.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	16		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	15	10	2	1	15	5	5	85	95	0	0	0	0	0	0	0	0	1	0
Average of the 5 subplots:	9.6					41					0					0.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Loamy clay	**Soil Colour**	Light brown/orange	**Soil Depth**	At least 100mm
Lithology (B)							
Slope	15	**Aspect**	Western	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	less than 3yo	Maintained powerline
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Brumbies and rabbits
Fire damage:	Light	greater than 10yo	Some evidence on stumps and trunks in adjacent woodland
Storm damage:			No evidence
Weediness:	Light	less than 3yo	Some grasses and small forbs
Other:	Light	less than 3yo	Easement access track in plot

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Rd powerline easement				
Date:	19-11-18	**Plot ID:**	2244	**Recorders:**	SW, MP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa sieberiana*	25	150		N	
Grass & grasslike	*Themeda triandra*	35	200		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.3	500		N	
Shrub (SG)	*Leucopogon fraseri*	0.1	1		N	
Grass & grasslike	*Poa spp.*	0.1	3		N	
	Acetosella vulgaris	0.1	200		HTE	
Tree (TG)	*Eucalyptus pauciflora*	0.1	1		N	
Forb (FG)	*Viola betonicifolia*	0.1	9		N	
Forb (FG)	*Brachyscome decipiens*	1	200		N	
Forb (FG)	*Senecio lageniformis*	0.2	200		N	
Forb (FG)	*Senecio gunnii*	0.2	150		N	
Grass & grasslike	*Carex breviculmis*	2	300		N	
Grass & grasslike	*Poa clivicola*	10	200		N	
Grass & grasslike	*Luzula spp.*	0.5	500		N	
	Vulpia bromoides	50	2000		E	
Grass & grasslike	*Carex inversa*	5	300		N	
	Leucanthemum vulgare	0.4	20		HTE	
Forb (FG)	*Craspedia variabilis*	0.1	6		N	
	Taraxacum officinale	0.1	5		E	
	Hypochaeris radicata	0.1	13		E	
Forb (FG)	*Euchiton traversii*	0.1	50		N	
Forb (FG)	*Solenogyne gunnii*	0.1	6		N	
Forb (FG)	*Ajuga australis*	0.2	30		N	
	Trifolium dubium	0.1	6		E	
Forb (FG)	*Dichondra repens*	0.1	500		N	
Forb (FG)	*Podolepis jaceoides*	1.5	30		N	
Forb (FG)	*Poranthera microphylla*	0.1	15		N	
Forb (FG)	*Ranunculus lappaceus*	0.1	30		N	
Forb (FG)	*Leptorhynchos squamatus*	0.2	40		N	
Shrub (SG)	*Hakea microcarpa*	0.1	1		N	
Forb (FG)	*Epilobium spp.*	0.1	15		N	
Forb (FG)	*Scleranthus spp.*	0.1	6		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	3		N	
Grass & grasslike	*Anthosachne scabra*	2	150		N	
	Anthoxanthum odoratum	0.1	4		E	

BAM Site – Field Survey Form

Plot ID:	2250	**Date:**	14-11-18	**Survey Name:**	Tantangara Road	**Recorders:**	AM, EM
Zone:	55	**Easting:**	646399.874	**Plot dimensions:**	20m x 50m	**Midline bearing:**	15
Datum:	GDA94	**Northing:**	6025212.207	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	4
	Grasses etc.:	5
	Forbs:	13
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	1.5
	Grasses etc.:	45.4
	Forbs:	1.3
	Ferns:	0.2
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	50	30	25	30	10	30	10	15	45	15	5	40	30	5	0	0	0	0	0
Average of the 5 subplots:	31					22					19					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Historical clearing for powerline
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light		Macropod scats
Fire damage:			No evidence
Storm damage:			No evidence
Weediness:	Moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara Road				
Date:	14-11-18	**Plot ID:**	2250	**Recorders:**	AM, EM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa sieberiana var. sieberiana*	40	500		N	
	Anthoxanthum odoratum	40	1000		E	
Forb (FG)	*Poranthera microphylla*	0.1	50		N	
Shrub (SG)	*Podolobium alpestre*	1	5		N	
Forb (FG)	*Calotis glandulosa*	0.1	40		N	
Forb (FG)	*Ajuga australis*	0.1	100		N	
Forb (FG)	*Oreomyrrhis eriopoda*	0.1	30		N	
Fern (EG)	*Ophioglossum lusitanicum*	0.2	500		N	
Forb (FG)	*Scleranthus biflorus*	0.1	20		N	
	Hypericum perforatum	0.2	40		HTE	
Shrub (SG)	*Leptospermum myrtifolium*	0.2	5		N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	5	200		N	
Grass & grasslike	*Luzula flaccida*	0.1	30		N	
	Acetosella vulgaris	0.1	20		HTE	
Grass & grasslike	*Carex breviculmis*	0.1	10		N	
Forb (FG)	*Goodenia hederacea subsp. alpestris*	0.1	20		N	
Forb (FG)	*Veronica subtilis*	0.1	10		N	
Shrub (SG)	*Acrothamnus hookeri*	0.2	5		N	
Forb (FG)	*Geranium antrorsum*	0.1	20		N	
Forb (FG)	*Euchiton japonicus*	0.1	100		N	
Forb (FG)	*Acaena ovina*	0.1	40		N	
Forb (FG)	*Veronica calycina*	0.1	30		N	
Grass & grasslike	*Carex hebes*	0.2	100		N	
Shrub (SG)	*Ozothamnus thyrsoideus*	0.1	1		N	
Forb (FG)	*Asperula scoparia*	0.1	10		N	
Forb (FG)	*Stylidium graminifolium*	0.1	20		N	
	Verbascum thapsus subsp. Thapsus	0.1	2		E	

BAM Site – Field Survey Form

Plot ID:	2262	**Date:**	04-04-19	**Survey Name:**	Tantagara, waters edge 2	**Recorders:**	JA, KS
Zone:	55	**Easting:**	648671.3088	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	9
Datum:	GDA94	**Northing:**	6039792.783	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	1
	Grasses etc.:	4
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.1
	Grasses etc.:	53.9
	Forbs:	23.5
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	1	4	8	3	11	18	1	3	4	55	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	5.4					16.2					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:	Severe	less than 3yo	Inundation from dam

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantagara, waters edge 2				
Date:	04-04-19	**Plot ID:**	2262	**Recorders:**	JA, KS

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Hemarthria uncinata*	50	8000	No	N	
Grass & grasslike	*Juncus spp.*	3	150	No	N	
Grass & grasslike	*Carex chlorantha*	0.8	350	No	N	
Forb (FG)	*Euchiton spp.*	0.2	100	No	N	
Forb (FG)	*Persicaria prostrata*	8	55	No	N	
Forb (FG)	*Centipeda minima subsp. Minima*	15	8000	No	N	
Forb (FG)	*Oxalis spp.*	0.1	500	No	N	
	Hypochaeris spp.	0.1	200	No	E	
	Acetosella vulgaris	0.1	250	No	HTE	
	Hypericum perforatum	0.3	50	No	HTE	
	Holcus lanatus	0.2	250	No	E	
	Agrostis stolonifera	3	500	No	E	
Shrub (SG)	*Rubus spp.*	0.1	1	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	3	No	N	
Forb (FG)	*Isotoma fluviatilis*	0.1	100	No	N	
Grass & grasslike	*Rytidosperma penicillatum*	0.1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	2265	**Date:**	02-04-19	**Survey Name:**	Snowy 2.0			**Recorders:**	JA, KS
Zone:	55	**Easting:**	626599.2543	**Plot dimensions:**	20 x 50 m			**Midline bearing:**	30
Datum:	GDA94	**Northing:**	6038069.537	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Upper Riverina Dry Sclerophyll Forests			**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	8
	Grasses etc.:	4
	Forbs:	2
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	62.3
	Shrubs:	37.1
	Grasses etc.:	5.5
	Forbs:	0.3
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	6
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	32		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	100	92	80	95	60	0	1	0	0	5	0	1	0	0	0	0	0	0	0	0
Average of the 5 subplots:	85.4					1.2					0.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Light	greater than 10yo	Sapling density
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Snowy 2.0				
Date:	02-04-19	**Plot ID:**	2265	**Recorders:**	JA, KS

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus mannifera*	60	30	No	N	
Shrub (SG)	*Acacia pravissima*	30	40	No	N	
Shrub (SG)	*Calytrix tetragona*	4	25	No	N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	2	17	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	10	No	N	
Shrub (SG)	*Pimelea spp.*	0.1	100	No	N	
Forb (FG)	*Dianella revoluta*	0.2	50	No	N	
Grass & grasslike	*Lomandra longifolia*	5	45	No	N	
Tree (TG)	*Acacia melanoxylon*	0.3	6	No	N	
Shrub (SG)	*Cassinia spp.*	0.5	5	No	N	
Grass & grasslike	*Poa sieberiana*	0.1	15	No	N	
Grass & grasslike	*Lomandra filiformis*	0.3	10	No	N	
Other (OG)	*Cassytha glabella*	0.1	30	No	N	
Forb (FG)	*Senecio spp.*	0.1	2	No	N	
Shrub (SG)	*Podolobium procumbens*	0.2	3	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	5	No	N	
Tree (TG)	*Eucalyptus rubida*	2	1	No	N	
Shrub (SG)	*Dillwynia sericea*	0.1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	2267	**Date:**	10-04-19	**Survey Name:**	Lobs Hole			**Recorders:**	MP, IM
Zone:	55	**Easting:**	625402.1397	**Plot dimensions:**	20 x 50			**Midline bearing:**	274
Datum:	GDA94	**Northing:**	6039366.707	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion			**Confidence:**	Medium	**Photo #:**	
Vegetation Class:			Upper Riverina Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	10
	Grasses etc.:	10
	Forbs:	6
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	60.1
	Shrubs:	23.6
	Grasses etc.:	10.1
	Forbs:	1
	Ferns:	0
	Other:	0
High Threat Weed cover:		83

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	15	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	1	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	67		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	90	95	90	50	94	0	0	5	45	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	83.8					10.2					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Red-brown	**Soil Depth**	Deep
Lithology (B)							
Slope		**Aspect**	Sw	**Site Drainage**	Good	**Distance to nearest water & type**	Less than 200m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:	Moderate	greater than 10yo	Charred stumps
Weediness:	Severe	less than 3yo	Thick near 95% cover of blackberry with some st johns wort
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole						
		Date:	10-04-19	**Plot ID:**	2267	**Recorders:**	MP, IM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Shrub (SG)	*Acacia pravissima*	15	100		N	
Shrub (SG)	*Exocarpos strictus*	2	10		N	
	Rubus fruticosus sp. agg.	80	1000		HTE	
Grass & grasslike	*Rytidosperma spp.*	1	30		N	
Shrub (SG)	*Cassinia aculeata*	3	30		N	
Shrub (SG)	*Rubus parvifolius*	0.3	5		N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.3	200		N	
	Hypericum perforatum	3	100		HTE	
Shrub (SG)	*Pimelea linifolia subsp. caesia*	2	30		N	
Grass & grasslike	*Themeda triandra*	6	200		N	
Grass & grasslike	*Carex appressa*	2	30		N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.2	4		N	
Shrub (SG)	*Cassinia longifolia*	0.5	10		N	
Forb (FG)	*Asperula conferta*	0.2	10		N	
Shrub (SG)	*Acacia siculiformis*	0.1	1		N	
Shrub (SG)	*Mirbelia oxylobioides*	0.2	6		N	
Grass & grasslike	*Anthosachne scabra*	0.2	15		N	
Grass & grasslike	*Aristida ramosa*	0.2	6		N	
Grass & grasslike	*Carex spp.*	0.1	3		N	
	Hypochaeris radicata	0.1	4		E	
Grass & grasslike	*Lomandra filiformis*	0.2	8		N	
Forb (FG)	*Dichondra repens*	0.2	30		N	
Forb (FG)	*Viola betonicifolia*	0.1	1		N	
Forb (FG)	*Stellaria pungens*	0.1	1		N	
Shrub (SG)	*Banksia canei*	0.2	1		N	
Grass & grasslike	*Microlaena stipoides*	0.1	20		N	
Shrub (SG)	*Bursaria spinosa*	0.3	2		N	
Tree (TG)	*Acacia dealbata*	0.1	1		N	
Grass & grasslike	*Luzula flaccida*	0.1	1		N	
Forb (FG)	*Hydrocotyle spp.*	0.1	3		N	
Tree (TG)	*Eucalyptus viminalis*	40	30		N	
Tree (TG)	*Eucalyptus mannifera*	20	25		N	

BAM Site – Field Survey Form

Plot ID:	2269	**Date:**	10-04-19	**Survey Name:**		**Recorders:**	MP, IM
Zone:	55	**Easting:**	624596.6415	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	180
Datum:	GDA94	**Northing:**	6040798.222	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	18
	Grasses etc.:	7
	Forbs:	11
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	40
	Shrubs:	58
	Grasses etc.:	25
	Forbs:	3.3
	Ferns:	0
	Other:	1
High Threat Weed cover:		2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	3	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	12		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	15	20	10	40	0	0	0	5	0	85	85	80	80	55	0	0	0	5	5
Average of the 5 subplots:	20					1					77					2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Silty clay	**Soil Colour**	Red brown	**Soil Depth**	
Lithology (B)							
Slope		**Aspect**	180	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:	Moderate	3 to 10 yo	Walking track through plot

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	10-04-19	Plot ID:	2269	Recorders:	MP, IM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Forb (FG)	*Eriochilus cucullatus*	0.1	2	No	N	
Tree (TG)	*Eucalyptus pauciflora*	25	35	No	N	
Shrub (SG)	*Dodonaea viscosa subsp. angustifolia*	35	100	No	N	
Grass & grasslike	*Rytidosperma spp.*	0.2	50	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	20	400	No	N	
Other (OG)	*Cassytha pubescens*	1	40	No	N	
	Hypericum perforatum	2	100	No	HTE	
Shrub (SG)	*Cryptandra amara*	6	150	No	N	
Grass & grasslike	*Dichelachne rara*	4	100	No	N	
Shrub (SG)	*Exocarpos strictus*	3	30	No	N	
Forb (FG)	*Hovea heterophylla*	1	100	No	N	
Shrub (SG)	*Banksia canei*	5	15	No	N	
Shrub (SG)	*Brachyloma daphnoides*	0.5	20	No	N	
Forb (FG)	*Senecio prenanthoides*	0.1	15	No	N	
Shrub (SG)	*Acacia pravissima*	6	100	No	N	
Shrub (SG)	*Leucopogon virgatus*	0.5	40	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.2	150	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	60	No	N	
	Centaurium spp.	1.5	800	No	E	
Forb (FG)	*Stellaria pungens*	0.8	300	No	N	
Shrub (SG)	*Pimelea linifolia*	0.1	50	No	N	
Grass & grasslike	*Lomandra filiformis*	0.1	25	No	N	
Shrub (SG)	*Dillwynia rudis*	0.2	10	No	N	
Forb (FG)	*Orchidaceae indeterminate*	0.1	10	No	N	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	20	No	N	
Tree (TG)	*Eucalyptus mannifera*	15	4	No	N	
Forb (FG)	*Stylidium graminifolium*	0.6	80	No	N	
Forb (FG)	*Euchiton involucratus*	0.1	4	No	N	
Forb (FG)	*Geranium spp.*	0.1	50	No	N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	30	No	N	
Shrub (SG)	*Grevillea arenaria*	0.3	5	No	N	
Grass & grasslike	*Luzula spp.*	0.1	10	No	N	
	Trifolium spp.	0.1	4	No	E	
	Vulpia spp.	0.1	4	No	E	
Forb (FG)	*Asteraceae indeterminate*	0.1	2	No	N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	0.5	100	No	N	
Shrub (SG)	*Indigofera australis*	0.1	4	No	N	
Shrub (SG)	*Bursaria spinosa*	0.3	3	No	N	
	Verbascum virgatum	0.1	1	No	E	
Shrub (SG)	*Acrotriche serrulata*	0.2	2	No	N	
Shrub (SG)	*Pimelea curviflora*	0.1	4	No	N	
Shrub (SG)	*Melichrus urceolatus*	0.1	4	No	N	
Shrub (SG)	*Acacia gunnii*	0.1	5	No	N	
Shrub (SG)	*Leucopogon ericoides*	0.4	15	No	N	

BAM Site – Field Survey Form

Plot ID:	2273	**Date:**	12-04-19	**Survey Name:**	Rock forest			**Recorders:**	IM, DK
Zone:	55	**Easting:**	651223.1034	**Plot dimensions:**	20 x 50 m			**Midline bearing:**	286
Datum:	GDA94	**Northing:**	6020792.419	**IBRA region:**	South Eastern Highlands (Monaro)			**Zone ID:**	
Plant Community Type:			679: Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Subalpine Woodlands			**EEC:**	Yes	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	2
	Grasses etc.:	9
	Forbs:	17
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	30.2
	Shrubs:	1.1
	Grasses etc.:	5.8
	Forbs:	1.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	3	0	0
50 – 79 cm:	6	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	96		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	5	20	10	15	4	2	8	2	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	12					3.4					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	2	**Aspect**	SE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Open woodland next to pasture
Cultivation (inc. pasture):	Severe	greater than 10yo	
Soil erosion:	Light	greater than 10yo	Hooved compaction
Firewood / CWD removal:			
Grazing (identify native/stock):	Severe	greater than 10yo	Sheep and cattle
Fire damage:	Light	greater than 10yo	
Storm damage:	Light		Large fallen tree limbs
Weediness:	Severe		Improved pasture species and other weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Rock forest				
Date:	12-04-19	**Plot ID:**	2273	**Recorders:**	IM, DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus stellulata*	30	7	No	N	
Grass & grasslike	*Themeda triandra*	3	300	No	N	
	Anthoxanthum odoratum	80	2000	No	E	
Forb (FG)	*Dichondra repens*	0.2	100	No	N	
	Cirsium spp.	0.2	30	No	E	
Forb (FG)	*Acaena spp.*	0.1	30	No	N	
Grass & grasslike	*Luzula spp.*	0.1	2	No	N	
Forb (FG)	*Oxalis spp.*	0.1	1	No	N	
Shrub (SG)	*Pimelea pauciflora*	1	5	No	N	
Grass & grasslike	*Anthosachne scabra*	0.1	20	No	N	
Grass & grasslike	*Microlaena stipoides*	2	200	No	N	
Forb (FG)	*Euchiton spp.*	0.1	2	No	N	
	Taraxacum officinale	0.1	30	No	E	
Forb (FG)	*Hydrocotyle spp.*	0.1	3	No	N	
	Hypochaeris radicata	0.2	20	No	E	
Grass & grasslike	*Poaceae spp.*	0.1	30	No	N	
Forb (FG)	*Asteraceae indeterminate*	0.1	10	No	N	
Forb (FG)	*Stellaria pungens*	0.1	4	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	2	No	N	
	Dactylis glomerata	0.1	10	No	E	
	Trifolium spp.	0.1	100	No	E	
Forb (FG)	*Ranunculus spp.*	0.1	20	No	N	
	Centaurium spp.	0.1	20	No	E	
Forb (FG)	*Chrysocephalum apiculatum*	0.1	10	No	N	
Forb (FG)	*Geranium spp.*	0.1	3	No	N	
Forb (FG)	*Acaena spp.*	0.1	7	No	N	
Forb (FG)	*Asperula scoparia*	0.1	20	No	N	
Grass & grasslike	*Rytidosperma spp.*	0.1	10	No	N	
	Acetosella vulgaris	0.3	300	No	HTE	
Forb (FG)	*Solenogyne gunnii*	0.1	2	No	N	
Forb (FG)	*Senecio spp.*	0.1	3	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	0.2	20	No	N	
Grass & grasslike	*Carex appressa*	0.1	3	No	N	
Shrub (SG)	*Rubus parvifolius*	0.1	1	No	N	
Forb (FG)	*Lagenophora stipitata*	0.1	1	No	N	
Tree (TG)	*Eucalyptus pauciflora*	0.1	2	No	N	
Forb (FG)	*Plantago spp.*	0.1	2	No	N	
	Aira spp.	0.1	1	No	E	
Grass & grasslike	*Carex inversa*	0.1	1	No	N	
Tree (TG)	*Eucalyptus rubida*	0.1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	2275	**Date:**	13-04-19	**Survey Name:**		**Recorders:**	IM, DK
Zone:	55	**Easting:**	650061.4356	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	45
Datum:	GDA94	**Northing:**	6021751.309	**IBRA region:**	South Eastern Highlands (Monaro)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	1
	Shrubs:	6
	Grasses etc.:	7
	Forbs:	14
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	8
	Shrubs:	4.6
	Grasses etc.:	64.4
	Forbs:	1.6
	Ferns:	0
	Other:	0
High Threat Weed cover:		5

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	45	35	65	30	5	5	8	5	7	4	3	0	0	0	1	17	0	5	1	1
Average of the 5 subplots:	36					5.8					0.8					4.8				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Other	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**	Valley		
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	0	**Aspect**	0	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Pasture
Cultivation (inc. pasture):	Severe	greater than 10yo	Pasture
Soil erosion:	Light		Grazing and hooves
Firewood / CWD removal:			
Grazing (identify native/stock):	Severe	greater than 10yo	Sheep and cattle
Fire damage:			
Storm damage:			
Weediness:	Severe		Sweet vernal and cocks foot
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	13-04-19	Plot ID:	2275	Recorders:	IM, DK

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	8	1	No	N	
Shrub (SG)	*Pimelea pauciflora*	2	3	No	N	
Grass & grasslike	*Themeda triandra*	30	500	No	N	
Grass & grasslike	*Anthosachne scabra*	1	50	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	3	50	No	N	
Grass & grasslike	*Microlaena stipoides*	0.2	20	No	N	
Grass & grasslike	*Rytidosperma spp.*	30	500	No	N	
	Acetosella vulgaris	5	1000	No	HTE	
Shrub (SG)	*Daviesia ulicifolia*	2	3	No	N	
Forb (FG)	*Cymbonotus preissianus*	0.2	30	No	N	
	Hypochaeris radicata	0.2	100	No	E	
Forb (FG)	*Senecio spp.*	0.1	30	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	2	No	N	
	Anthoxanthum odoratum	0.3	50	No	E	
	Dactylis glomerata	0.1	20	No	E	
Forb (FG)	*Solenogyne gunnii*	0.2	50	No	N	
	Centaurium spp.	0.1	18	No	E	
Forb (FG)	*Poranthera microphylla*	0.1	2	No	N	
Forb (FG)	*Ranunculus spp.*	0.1	2	No	N	
Shrub (SG)	*Pultenaea polifolia*	0.2	3	No	N	
Forb (FG)	*Asperula scoparia*	0.1	10	No	N	
Shrub (SG)	*Bossiaea foliosa*	0.2	1	No	N	
Shrub (SG)	*Pultenaea procumbens*	0.1	1	No	N	
Forb (FG)	*Geranium spp.*	0.1	5	No	N	
	Trifolium spp.	0.1	20	No	E	
Forb (FG)	*Einadia spp.*	0.1	5	No	N	
Forb (FG)	*Wahlenbergia spp.*	0.1	3	No	N	
Forb (FG)	*Acaena spp.*	0.1	20	No	N	
Forb (FG)	*Stellaria pungens*	0.1	6	No	N	
Forb (FG)	*Scleranthus biflorus*	0.1	4	No	N	
Forb (FG)	*Oxalis perennans*	0.1	6	No	N	
Shrub (SG)	*Pimelea linifolia*	0.1	2	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	2	No	N	
	Aira spp.	0.1	3	No	E	
Grass & grasslike	*Aristida ramosa*	0.1	2	No	N	

BAM Site – Field Survey Form

Plot ID:	2276	**Date:**	14-04-19	**Survey Name:**	2276			**Recorders:**	MP, CE
Zone:	55	**Easting:**	624563.6143	**Plot dimensions:**	20 x 50 m			**Midline bearing:**	154
Datum:	GDA94	**Northing:**	6041770.869	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Subalpine Woodlands			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	5
	Shrubs:	12
	Grasses etc.:	8
	Forbs:	14
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	15.9
	Shrubs:	46.6
	Grasses etc.:	61.2
	Forbs:	1.7
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		6.3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	2	0	0
30 – 49 cm:	3	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	33		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	70	50	60	45	50	0	0	0	0	0	0	3	2	0	10	0	15	0	0
Average of the 5 subplots:	49					10					1					5				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Quartzs and stone	**Soil Surface Texture**	Loamy	**Soil Colour**	Browm	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**	SW	**Site Drainage**	Good	**Distance to nearest water & type**	50m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Moderate	less than 3yo	Rubus fructicosis agg
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	25-03-06 0:00				
Date:	14-04-19	Plot ID:	2276	Recorders:	MP, CE

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Themeda triandra*	55	500	No	N	
Shrub (SG)	*Bursaria spinosa*	20	100	No	N	
Shrub (SG)	*Exocarpos strictus*	1	20	No	N	
	Potentilla recta	0.6	50	No	E	
	Hypericum perforatum	1	100	No	HTE	
Grass & grasslike	*Poa costiniana*	5	100	No	N	
Shrub (SG)	*Banksia canei*	3	10	No	N	
Tree (TG)	*Eucalyptus rubida*	2	2	No	N	
Tree (TG)	*Eucalyptus stellulata*	5	3	No	N	
	Rosa rubiginosa	0.1	3	No	HTE	
	Rubus fruticosus sp. agg.	5	20	No	HTE	
Tree (TG)	*Acacia melanoxylon*	1.5	3	No	N	
	Centaurium spp.	0.1	60	No	E	
Grass & grasslike	*Rytidosperma spp.*	0.1	10	No	N	
Forb (FG)	*Geranium spp.*	0.1	10	No	N	
Other (OG)	*Glycine clandestina*	0.2	15	No	N	
Grass & grasslike	*Lomandra filiformis*	0.6	20	No	N	
	Paspalum dilatatum	0.1	10	No	HTE	
Forb (FG)	*Dichondra repens*	0.2	100	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	60	No	N	
Tree (TG)	*Eucalyptus dives*	0.4	1	No	N	
	Acetosella vulgaris	0.1	12	No	HTE	
Shrub (SG)	*Pimelea linifolia*	1	100	No	N	
Shrub (SG)	*Leucopogon ericoides*	0.4	20	No	N	
Forb (FG)	*Hypericum gramineum*	0.1	4	No	N	
	Conyza spp.	0.1	4	No	E	
Shrub (SG)	*Leucopogon virgatus*	0.8	20	No	N	
Shrub (SG)	*Dodonaea viscosa subsp. Angustissima*	3	30	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	15	25	No	N	
Forb (FG)	*Dianella spp.*	0.2	15	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	4	No	N	
Forb (FG)	*Ajuga australis*	0.1	4	No	N	
Forb (FG)	*Asperula conferta*	0.1	50	No	N	
	Hypochaeris radicata	0.1	8	No	E	
Grass & grasslike	*Dichelachne rara*	0.1	10	No	N	
Forb (FG)	*Oxalis perennans*	0.1	4	No	N	
Forb (FG)	*Hovea heterophylla*	0.1	6	No	N	
Shrub (SG)	*Pimelea curviflora*	0.2	20	No	N	
Grass & grasslike	*Luzula spp.*	0.1	8	No	N	
Shrub (SG)	*Brachyloma daphnoides*	2	40	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	4	No	N	
Forb (FG)	*Hydrocotyle laxiflora*	0.1	10	No	N	
Tree (TG)	*Eucalyptus dalrympleana*	7	11	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	1	No	N	
Shrub (SG)	*Acrotriche serrulata*	0.1	2	No	N	
Forb (FG)	*Cymbonotus spp.*	0.1	4	No	N	
Forb (FG)	*Acaena spp.*	0.2	10	No	N	

Grass & grasslike	*Poa helmsii*	0.2	4	No	N	
	Verbascum virgatum	0.1	4	No	E	
Forb (FG)	*Plantago spp.*	0.1	6	No	N	

BAM Site – Field Survey Form

Plot ID:	2284	**Date:**	14-05-19	**Survey Name:**	LHRR	**Recorders:**	JB, DK
Zone:	55	**Easting:**	625378.9112	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	172
Datum:	GDA94	**Northing:**	6039762.785	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	3
	Grasses etc.:	2
	Forbs:	9
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	7.6
	Grasses etc.:	36
	Forbs:	5.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		40.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	5	1	5	2	5	5	2	0	5	3	5	10	0	2	10	0	0	0	0	0
Average of the 5 subplots:	3.6					3					5.4					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**		**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope		**Aspect**		**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	D. Grassland
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Light	less than 3yo	Rabbits
Fire damage:			
Storm damage:			
Weediness:	Light	less than 3yo	Weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	LHRR				
Date:	14-05-19	**Plot ID:**	2284	**Recorders:**	JB, DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Potentilla spp.	0.1	1	No	E	
Forb (FG)	*Patersonia spp.*	5	40	No	N	
Shrub (SG)	*Brachyloma daphnoides*	5	20	No	N	
	Hypericum perforatum	20	500	No	HTE	
	Rosa rubiginosa	0.1	5	No	HTE	
Grass & grasslike	*Themeda triandra*	35	300	No	N	
Forb (FG)	*Oxalis spp.*	0.1	1	No	N	
	Acetosella vulgaris	20	600	No	HTE	
Shrub (SG)	*Mirbelia oxylobioides*	2.5	2	No	N	
Shrub (SG)	*Exocarpos strictus*	0.1	2	No	N	
Forb (FG)	*Plantago spp.*	0.1	40	No	N	
Forb (FG)	*Geranium spp.*	0.1	10	No	N	
Forb (FG)	*Acaena spp.*	0.1	20	No	N	
	Taraxacum officinale	0.2	20	No	E	
Forb (FG)	*Asteraceae indeterminate*	0.1	1	No	N	
	Sphagnum spp.	0.1	1	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	1	10	No	N	
Forb (FG)	*Geranium spp.*	0.1	10	No	N	
	Verbascum spp.	0.1	2	No	E	
Forb (FG)	*Asteraceae indeterminate*	0.1	1	No	N	
	Verbascum spp.	0.1	1	No	E	
Forb (FG)	*Iridaceae indeterminate*	0.1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	3003	**Date:**	30-01-19	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	SW, KM
Zone:	55	**Easting:**	626091.1022	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	260
Datum:	GDA94	**Northing:**	6039214.589	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	13
	Grasses etc.:	5
	Forbs:	7
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	47
	Shrubs:	77.7
	Grasses etc.:	90.3
	Forbs:	1
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		25.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	5	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	31		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	15	20	20	30	1	2	10	0	2	0	0	0	0	1	0	0	0	0	0
Average of the 5 subplots:	19					3					0.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Alluvial loams and clays	**Soil Surface Texture**	Loamy, closer to clay	**Soil Colour**	light brown	**Soil Depth**	At least 50m
Lithology (B)							
Slope	10	**Aspect**	N	**Site Drainage**	Good drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			no evidence
Cultivation (inc. pasture):			no evidence
Soil erosion:			no evidence
Firewood / CWD removal:			no evidence
Grazing (identify native/stock):			
Fire damage:	Moderate	greater than 10yo	Moderate fire scaring on trunk of at least 5 Eucalyptus
Storm damage:			no evidence
Weediness:	Moderate	less than 3yo	St Johns Wort present in plot
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	30-01-19	**Plot ID:**	3003	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus mannifera*	35	25	No	N	
Tree (TG)	*Eucalyptus dives*	10	10	No	N	
Shrub (SG)	*Exocarpos strictus*	8	25	No	N	
Shrub (SG)	*Banksia spp.*	20	10	No	N	
Shrub (SG)	*Bursaria spinosa subsp. spinosa*	1	3	No	N	
Shrub (SG)	*Calytrix tetragona*	25	75	No	N	
Shrub (SG)	*Acacia floribunda*	0.5	2	No	N	
Shrub (SG)	*Acacia siculiformis*	2	10	No	N	
Shrub (SG)	*Rubus parvifolius*	0.3	5	No	N	
Shrub (SG)	*Daviesia ulicifolia*	0.5	20	No	N	
Grass & grasslike	*Themeda triandra*	60	2000	No	N	
	Hypericum perforatum	25	500	No	HTE	
	Centaurium erythraea	0.1	20	No	E	
Other (OG)	*Desmodium varians*	0.1	5	No	N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	20	300	No	N	
Grass & grasslike	*Rytidosperma erianthum*	10	200	No	N	
Shrub (SG)	*Pimelea curviflora*	0.1	10	No	N	
Grass & grasslike	*Dichelachne rara*	0.1	30	No	N	
Shrub (SG)	*Bossiaea foliosa*	0.1	2	No	N	
Tree (TG)	*Eucalyptus rubida*	2	5	No	N	
Shrub (SG)	*Pultenaea fasciculata*	0.1	10	No	N	
Forb (FG)	*Wahlenbergia spp.*	0.1	2	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	1	No	N	
Other (OG)	*Glycine clandestina*	0.1	10	No	N	
Forb (FG)	*Galium gaudichaudii*	0.2	150	No	N	
Forb (FG)	*Brunoniella australis*	0.1	2	No	N	
Forb (FG)	*Oxalis perennans*	0.2	50	No	N	
Forb (FG)	*Geranium solanderi var. solanderi*	0.2	20	No	N	
	Rosa rubiginosa	0.4	5	No	HTE	
Shrub (SG)	*Cassinia longifolia*	20	10	No	N	
Grass & grasslike	*Poaceae spp.*	0.2	50	No	N	
Forb (FG)	*Asteraceae indeterminate*	0.1	25	No	N	
Forb (FG)	*Asteraceae indeterminate*	0.1	2	No	N	

BAM Site – Field Survey Form

Plot ID:	3006	**Date:**	12-02-19	**Survey Name:**	Marica	**Recorders:**	MP, CW
Zone:	55	**Easting:**	632621.3583	**Plot dimensions:**	20 x 50	**Midline bearing:**	220
Datum:	GDA94	**Northing:**	6038430.652	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:	639: Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Montane Wet Sclerophyll Forests			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	11
	Grasses etc.:	4
	Forbs:	13
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	80
	Shrubs:	42.3
	Grasses etc.:	15.3
	Forbs:	10.1
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	620		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	98	80	40	95	95	1	10	5	2	2	0	0	0	0	0	0	5	0	0	1
Average of the 5 subplots:	81.6					4					0					1.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**	SE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):	Light	less than 3yo	Animal diggings and scats rara
Fire damage:	Severe	greater than 10yo	Fallen timber, charcoal in leaf litter, fire marks on trees
Storm damage:	Moderate	3 to 10 yo	Abundant fallen timber
Weediness:	Light		Hypochaeris radicata
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Marica						
		Date:	12-02-19	**Plot ID:**	3006	**Recorders:**	MP, CW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	10	10	No	N	
Shrub (SG)	*Acacia obliquinervia*	25	120	No	N	
Tree (TG)	*Eucalyptus delegatensis subsp. delegatensis*	70	100	No	N	
Forb (FG)	*Goodenia hederacea subsp. alpestris*	4	500	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	3	50	No	N	
Forb (FG)	*Stellaria pungens*	1	250	No	N	
Forb (FG)	*Viola betonicifolia*	2	800	No	N	
Shrub (SG)	*Polyscias sambucifolia*	3	80	No	N	
Shrub (SG)	*Platylobium formosum*	5	100	No	N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	12	450	No	N	
Shrub (SG)	*Pimelea spp.*	0.5	80	No	N	
Forb (FG)	*Wahlenbergia gloriosa*	0.6	250	No	N	
Forb (FG)	*Coronidium monticola*	1	150	No	N	
Forb (FG)	*Stylidium graminifolium*	0.8	150	No	N	
Shrub (SG)	*Acrothamnus hookeri*	0.2	1	No	N	
Forb (FG)	*Brachyscome spathulata*	0.1	4	No	N	
Shrub (SG)	*Lomatia myricoides*	2	7	No	N	
Forb (FG)	*Galium spp.*	0.1	2	No	N	
Forb (FG)	*Poranthera microphylla*	0.1	10	No	N	
Shrub (SG)	*Daviesia ulicifolia*	6	50	No	N	
Shrub (SG)	*Cassinia aculeata*	0.1	2	No	N	
Other (OG)	*Clematis aristata*	0.1	10	No	N	
Shrub (SG)	*Olearia erubescens*	0.2	4	No	N	
	Hypochaeris radicata	0.1	2	No	E	
Forb (FG)	*Senecio gunnii*	0.1	8	No	N	
Forb (FG)	*Craspedia spp.*	0.1	1	No	N	
Grass & grasslike	*Lomandra longifolia*	0.1	4	No	N	
Forb (FG)	*Arthropodium milleflorum*	0.1	8	No	N	
Shrub (SG)	*Coprosma hirtella*	0.2	2	No	N	
Forb (FG)	*Senecio prenanthoides*	0.1	1	No	N	
Shrub (SG)	*Persoonia chamaepeuce*	0.1	1	No	N	
Grass & grasslike	*Deyeuxia monticola var. monticola*	0.2	8	No	N	

BAM Site – Field Survey Form

Plot ID:	3029	**Date:**	29-01-19	**Survey Name:**	Lobs Hole Ravune	**Recorders:**	SW, KM
Zone:	55	**Easting:**	625860.5193	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	38
Datum:	GDA94	**Northing:**	6039179.13	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:	729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	1
	Grasses etc.:	4
	Forbs:	5
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.3
	Grasses etc.:	85.4
	Forbs:	3.5
	Ferns:	0.2
	Other:	0.2
High Threat Weed cover:		70

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	25	2	10	15	10	2	5	5	2	0	0	30	0	5	1	0	2	1	0	0
Average of the 5 subplots:	12.4					2.8					7.2					0.6				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	loamy clay	**Soil Colour**	redish brown	**Soil Depth**	at least 50cm
Lithology (B)							
Slope	10	**Aspect**	N	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Historic, campground, power easement nearby, roads nearby
Cultivation (inc. pasture):			no evidence
Soil erosion:	Moderate	3 to 10 yo	Likely product of clearing and feral pest grazing (rabbits, horses)
Firewood / CWD removal:			no evidence
Grazing (identify native/stock):	Moderate	less than 3yo	Rabbit scats present
Fire damage:			no evidence
Storm damage:			no evidence
Weediness:	Severe	less than 3yo	Blackberry surrounding, St Johns Wort in plot
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravune						
		Date:	29-01-19	**Plot ID:**	3029	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Themeda triandra*	85	3000	No	N	
	Hypericum perforatum	60	500	No	HTE	
Forb (FG)	*Brachyscome spp.*	0.1	5	No	N	
Forb (FG)	*Hypericum gramineum*	3	100	No	N	
	Aira spp.	0.2	100	No	E	
	Acetosella vulgaris	10	1000	No	HTE	
	Verbascum virgatum	0.1	7	No	E	
	Petrorhagia nanteuilii	0.3	50	No	E	
Grass & grasslike	*Rytidosperma erianthum*	0.1	10	No	N	
Other (OG)	*Convolvulus angustissimus*	0.2	50	No	N	
Fern (EG)	*Cheilanthes sieberi*	0.2	50	No	N	
Forb (FG)	*Picris angustifolia subsp. merxmuelleri*	0.1	10	No	N	
Grass & grasslike	*Poaceae spp.*	0.1	10	No	N	
Grass & grasslike	*Panicum effusum*	0.2	30	No	N	
Shrub (SG)	*Brachyloma daphnoides*	0.3	7	No	N	
Forb (FG)	*Wahlenbergia spp.*	0.1	1	No	N	
Forb (FG)	*Asteraceae indeterminate*	0.2	100	No	N	

BAM Site – Field Survey Form

Plot ID:	3060	**Date:**	20-02-19	**Survey Name:**		**Recorders:**	MP, CW
Zone:	55	**Easting:**	626431.8529	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	230
Datum:	GDA94	**Northing:**	6038192.198	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	9
	Grasses etc.:	7
	Forbs:	5
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	51
	Shrubs:	33.5
	Grasses etc.:	22.2
	Forbs:	0.8
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		2.4

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	4	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	8	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	65		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	40	75	90	97	80	25	0	0	0	1	0	0	0	0	15	0	0	0	0	0
Average of the 5 subplots:	76.4					5.2					3					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Andesite	**Soil Surface Texture**	Loamy	**Soil Colour**	Grey brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**	NE	**Site Drainage**	Good	**Distance to nearest water & type**	330m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Moderate	less than 3yo	Rosa rubiginosa, rubus fruticosis agg.
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:							
		Date:	20-02-19	**Plot ID:**	3060	**Recorders:**	MP, CW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus nortonii*	25	20	No	N	
Grass & grasslike	*Lomandra filiformis*	5	250	No	N	
Shrub (SG)	*Acacia pravissima*	20	300	No	N	
Tree (TG)	*Acacia dealbata*	5	50	No	N	
Shrub (SG)	*Dodonaea viscosa subsp. Angustissima*	4	60	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.2	150	No	N	
Shrub (SG)	*Calytrix tetragona*	1	90	No	N	
Forb (FG)	*Hypericum gramineum*	0.1	40	No	N	
Grass & grasslike	*Themeda triandra*	4	100	No	N	
Grass & grasslike	*Rytidosperma pilosum*	1	50	No	N	
	Centaurium erythraea	0.1	25	No	E	
	Rosa rubiginosa	0.8	50	No	HTE	
Forb (FG)	*Hovea heterophylla*	0.3	80	No	N	
Forb (FG)	*Acaena echinata*	0.1	30	No	N	
Forb (FG)	*Euchiton involucratus*	0.1	20	No	N	
Shrub (SG)	*Bursaria spinosa*	3	80	No	N	
Grass & grasslike	*Rytidosperma erianthum*	10	300	No	N	
Shrub (SG)	*Brachyloma daphnoides*	2	90	No	N	
	Hypericum perforatum	0.1	15	No	HTE	
	Rubus fruticosus sp. agg.	1.5	60	No	HTE	
Tree (TG)	*Eucalyptus dives*	20	15	No	N	
Grass & grasslike	*Juncus spp.*	0.2	25	No	N	
Other (OG)	*Cassytha spp.*	0.1	8	No	N	
Shrub (SG)	*Cassinia longifolia*	1	10	No	N	
Grass & grasslike	*Dichelachne micrantha*	1	150	No	N	
Shrub (SG)	*Pimelea curviflora*	0.6	100	No	N	
Tree (TG)	*Eucalyptus rubida*	1	8	No	N	
Shrub (SG)	*Exocarpos strictus*	0.9	25	No	N	
	Conyza spp.	0.1	4	No	E	
	Hypochaeris radicata	0.1	2	No	E	
Shrub (SG)	*Leptospermum minutifolium*	1	6	No	N	
Grass & grasslike	*Rytidosperma laeve*	1	50	No	N	

BAM Site – Field Survey Form

Plot ID:	3076	**Date:**	05-02-19	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	SW, KM
Zone:	55	**Easting:**	626305.6539	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	250
Datum:	GDA94	**Northing:**	6039139.16	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	16
	Grasses etc.:	5
	Forbs:	5
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	54
	Shrubs:	184
	Grasses etc.:	41
	Forbs:	8
	Ferns:	0
	Other:	7
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	5	0	0
20 – 29 cm:	1	0	1
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	22		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	85	90	90	85	80	5	5	10	5	5	1	0	2	1	2	0	0	0	1	0
Average of the 5 subplots:	86					6					1.2					0.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Medium-fine grained	**Soil Colour**	Dark orange-brown	**Soil Depth**	At least 30cm
Lithology (B)							
Slope	<5	**Aspect**	275	**Site Drainage**	Moderate drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Moderate	less than 3yo	Plot adjacent to road
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Moderate	greater than 10yo	Some trees have burn marks from trunk to crown
Storm damage:	Severe	3 to 10 yo	At least 7 fallen Eucalyptus or Banksia, most leaves browned off
Weediness:			No evidence
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	05-02-19	**Plot ID:**	3076	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	40	12	No	N	
Tree (TG)	*Eucalyptus mannifera*	10	3	No	N	
Shrub (SG)	*Acacia pravissima*	20	50	No	N	
Shrub (SG)	*Epacris celata*	15	50	No	N	
Shrub (SG)	*Acacia saliciformis*	10	20	No	N	
Shrub (SG)	*Daviesia ulicifolia*	10	50	No	N	
Shrub (SG)	*Banksia canei*	60	200	No	N	
Grass & grasslike	*Lomandra longifolia*	10	50	No	N	
	Polypogon spp.	10	50	No	E	
Shrub (SG)	*Hibbertia linearis*	5	100	No	N	
Forb (FG)	*Gonocarpus tetragynus*	1	200	No	N	
Forb (FG)	*Stellaria pungens*	4	100	No	N	
Shrub (SG)	*Brachyloma daphnoides*	10	50	No	N	
Grass & grasslike	*Lomandra filiformis*	5	50	No	N	
Grass & grasslike	*Poa spp.*	20	200	No	N	
Shrub (SG)	*Acacia gunnii*	1	20	No	N	
Shrub (SG)	*Tetratheca thymifolia*	1	300	No	N	
Grass & grasslike	*Carex appressa*	1	10	No	N	
Tree (TG)	*Acacia dealbata*	4	5	No	N	
Grass & grasslike	*Entolasia stricta*	5	20	No	N	
Shrub (SG)	*Leucopogon ericoides*	3	50	No	N	
Shrub (SG)	*Leucopogon virgatus*	3	40	No	N	
Forb (FG)	*Brachyscome decipiens*	1	1	No	N	
Shrub (SG)	*Pimelea linifolia*	5	50	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	31	100	No	N	
Other (OG)	*Cassytha spp.*	5	20	No	N	
Forb (FG)	*Senecio quadridentatus*	1	1	No	N	
Shrub (SG)	*Exocarpos strictus*	5	10	No	N	
Other (OG)	*Billardiera scandens*	2	1	No	N	
Forb (FG)	*Boronia nana var. hyssopifolia*	1	1	No	N	
Shrub (SG)	*Monotoca scoparia*	3	20	No	N	
Shrub (SG)	*Hovea montana*	2	10	No	N	

BAM Site – Field Survey Form

Plot ID:	3101	**Date:**	02-02-19	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	SW, KM
Zone:	55	**Easting:**	625169.0592	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	310
Datum:	GDA94	**Northing:**	6040319.697	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		1191: Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	7
	Grasses etc.:	4
	Forbs:	4
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	25
	Shrubs:	126
	Grasses etc.:	15
	Forbs:	4
	Ferns:	5
	Other:	1
High Threat Weed cover:		10

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	10		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	10	10	5	5	20	85	60	25	5	5	1	3	10	30	30	10	10	15	10	10
Average of the 5 subplots:	10					36					14.8					11				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Fine grained	**Soil Colour**	Orange-brown	**Soil Depth**	At least 30cm
Lithology (B)							
Slope	25	**Aspect**	SW	**Site Drainage**	Good drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:			No evidence
Storm damage:	Light	less than 3yo	Some Eucalyptus fallen off or snapped off branches
Weediness:	Moderate	less than 3yo	St Johns Wort and Centurion ethyium present in plot
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	02-02-19	**Plot ID:**	3101	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus rubida*	5	1		N	
Tree (TG)	*Eucalyptus pauciflora*	15	5		N	
Shrub (SG)	*Bursaria spinosa*	50	200		N	
Shrub (SG)	*Grevillea arenaria subsp. Canescens*	15	50		N	
Shrub (SG)	*Acacia pravissima*	20	100		N	
Shrub (SG)	*Brachyloma daphnoides*	30	200		N	
Grass & grasslike	*Dichelachne rara*	5	100		N	
Other (OG)	*Glycine clandestina*	1	1		N	
Grass & grasslike	*Rytidosperma erianthum*	3	150		N	
	Centaurium erythraea	5	300		E	
Grass & grasslike	*Austrostipa scabra*	5	100		N	
Shrub (SG)	*Dodonaea viscosa subsp. Angustissima*	4	50		N	
Grass & grasslike	*Poa spp.*	2	100		N	
	Trifolium arvense	1	50		E	
Forb (FG)	*Stellaria pungens*	1	200		N	
Forb (FG)	*Oxalis perennans*	1	50		N	
Shrub (SG)	*Exocarpos strictus*	5	20		N	
Tree (TG)	*Acacia dealbata subsp. Dealbata*	5	20		N	
	Aira spp.	5	500		E	
Shrub (SG)	*Leucopogon ericoides*	2	20		N	
Fern (EG)	*Cheilanthes distans*	5	50		N	
Forb (FG)	*Geranium solanderi*	1	10		N	
Forb (FG)	*Gonocarpus tetragynus*	1	20		N	
	Hypericum perforatum	10	200		HTE	

BAM Site – Field Survey Form

Plot ID:	3117	**Date:**	14-02-19	**Survey Name:**	Marica	**Recorders:**	MP, CW
Zone:	55	**Easting:**	631614.9697	**Plot dimensions:**	20 x 50	**Midline bearing:**	300
Datum:	GDA94	**Northing:**	6038948.502	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	4
	Shrubs:	12
	Grasses etc.:	7
	Forbs:	12
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	64
	Shrubs:	25.3
	Grasses etc.:	10.7
	Forbs:	3.2
	Ferns:	0
	Other:	1.4
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	0
50 – 79 cm:	1	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	103		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	96	50	73	75	85	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	75.8					0.2					0.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Quartzs and stone	**Soil Surface Texture**	Loamy	**Soil Colour**	Brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**	Nw	**Site Drainage**	Good	**Distance to nearest water & type**	270m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Moderate	3 to 10 yo	Charred trees
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Marica						
		Date:	14-02-19	**Plot ID:**	3117	**Recorders:**	MP, CW

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus radiata*	20	18	No	N	
Tree (TG)	*Eucalyptus viminalis*	30	40	No	N	
Tree (TG)	*Eucalyptus pauciflora*	10	20	No	N	
Shrub (SG)	*Daviesia latifolia*	6	80	No	N	
Other (OG)	*Clematis aristata*	0.9	40	No	N	
Shrub (SG)	*Cassinia aculeata*	10	100	No	N	
Shrub (SG)	*Platylobium formosum*	4	100	No	N	
Shrub (SG)	*Persoonia chamaepeuce*	3	100	No	N	
Forb (FG)	*Stellaria pungens*	0.2	180	No	N	
Forb (FG)	*Asperula scoparia*	1	500	No	N	
Forb (FG)	*Viola betonicifolia*	1	200	No	N	
Grass & grasslike	*Lomandra filiformis*	2	250	No	N	
Forb (FG)	*Stackhousia monogyna*	0.1	10	No	N	
Forb (FG)	*Poranthera microphylla*	0.1	8	No	N	
Grass & grasslike	*Lomandra longifolia*	0.3	6	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	6	100	No	N	
Forb (FG)	*Wahlenbergia stricta*	0.1	25	No	N	
Forb (FG)	*Arthropodium milleflorum*	0.1	25	No	N	
Other (OG)	*Glycine clandestina*	0.5	80	No	N	
Shrub (SG)	*Olearia spp.*	0.3	40	No	N	
Grass & grasslike	*Dichelachne spp.*	0.2	250	No	N	
Shrub (SG)	*Tetratheca bauerifolia*	1	80	No	N	
Forb (FG)	*Senecio prenanthoides*	0.1	15	No	N	
Shrub (SG)	*Daviesia mimosoides*	0.3	6	No	N	
Grass & grasslike	*Poa sieberiana var. cyanophylla*	2	80	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	4	No	N	
Shrub (SG)	*Pimelea linifolia*	0.1	10	No	N	
Shrub (SG)	*Olearia erubescens*	0.1	1	No	N	
Tree (TG)	*Acacia dealbata*	4	20	No	N	
Forb (FG)	*Brachyscome spathulata*	0.1	15	No	N	
Forb (FG)	*Stylidium graminifolium*	0.2	50	No	N	
Forb (FG)	*Acaena spp.*	0.1	1	No	N	
Grass & grasslike	*Dichelachne hirtella*	0.1	25	No	N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	0.1	1	No	N	
Shrub (SG)	*Ozothamnus thyrsoideus*	0.3	1	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	40	No	N	
Grass & grasslike	*Luzula densiflora*	0.1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	3151	**Date:**	06-02-19	**Survey Name:**	Lobbs hole	**Recorders:**	RP, CG
Zone:	55	**Easting:**	628437.2221	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	345
Datum:	GDA94	**Northing:**	6038775.761	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		311: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	17
	Grasses etc.:	8
	Forbs:	13
	Ferns:	1
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	36
	Shrubs:	33.9
	Grasses etc.:	38.1
	Forbs:	4.1
	Ferns:	1
	Other:	0.2
High Threat Weed cover:		3

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	3	0	2
20 – 29 cm:	1	0	2
10 – 19 cm:	1	0	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	20		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	60	24	21	72	25	6	0	9	1	0	0	1	0	7	9	0	0	0	0	0
Average of the 5 subplots:	40.4					3.2					3.4					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	-33 (steep)	**Aspect**	NW	**Site Drainage**	Very good	**Distance to nearest water & type**	50-200m, creek

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Light	greater than 10yo	200e fires
Storm damage:			
Weediness:	Light	greater than 10yo	Hypericum perforatum
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs hole				
Date:	06-02-19	**Plot ID:**	3151	**Recorders:**	RP, CG

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus nortonii*	18	12	No	N	
Shrub (SG)	*Grevillea arenaria subsp. Canescens*	20	200	No	N	
Shrub (SG)	*Bursaria spinosa*	3	25	No	N	
	Centaurium erythraea	1	400	No	E	
	Hypericum perforatum	3	1000	No	HTE	
Grass & grasslike	*Themeda triandra*	30	1200	No	N	
Forb (FG)	*Gonocarpus tetragynus*	2	500	No	N	
Fern (EG)	*Cheilanthes austrotenuifolia*	1	120	No	N	
Shrub (SG)	*Indigofera australis*	0.2	7	No	N	
Forb (FG)	*Wahlenbergia communis*	0.1	45	No	N	
Other (OG)	*Glycine clandestina*	0.1	25	No	N	
Forb (FG)	*Oxalis perennans*	0.1	20	No	N	
Grass & grasslike	*Lomandra longifolia*	1	60	No	N	
Grass & grasslike	*Poa spp.*	0.1	1	No	N	
Forb (FG)	*Ranunculus collinus*	0.5	75	No	N	
Shrub (SG)	*Acacia siculiformis*	0.1	1	No	N	
Forb (FG)	*Vittadinia cuneata*	0.1	1	No	N	
Shrub (SG)	*Brachyloma daphnoides*	1	60	No	N	
Shrub (SG)	*Melichrus urceolatus*	1	3	No	N	
Grass & grasslike	*Poa sieberiana*	5	250	No	N	
Shrub (SG)	*Leucopogon ericoides*	0.5	3	No	N	
Shrub (SG)	*Acacia amoena*	2	7	No	N	
Shrub (SG)	*Pomaderris subcapitata*	2	40	No	N	
Shrub (SG)	*Dillwynia sericea*	0.2	10	No	N	
Grass & grasslike	*Rytidosperma erianthum*	0.5	70	No	N	
Forb (FG)	*Euchiton sphaericus*	0.5	45	No	N	
Shrub (SG)	*Calytrix tetragona*	0.1	1	No	N	
Shrub (SG)	*Exocarpos strictus*	0.5	3	No	N	
Grass & grasslike	*Carex breviculmis*	1	300	No	N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	2	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	2	45	No	N	
	Petrorhagia nanteuilii	0.1	25	No	E	
	Aira cupaniana	0.1	6	No	E	
Forb (FG)	*Cynoglossum spp.*	0.1	2	No	N	
Forb (FG)	*Leucochrysum albicans subsp. albicans*	0.1	10	No	N	
Shrub (SG)	*Tetratheca ciliata*	0.1	3	No	N	
Shrub (SG)	*Cassinia longifolia*	1	7	No	N	
Forb (FG)	*Senecio quadridentatus*	0.1	1	No	N	
Grass & grasslike	*Lepidosperma laterale*	0.3	10	No	N	
Tree (TG)	*Eucalyptus macrorhyncha*	18	9	No	N	
Other (OG)	*Convolvulus angustissimus*	0.1	2	No	N	
Shrub (SG)	*Dodonaea viscosa*	0.1	2	No	N	
Forb (FG)	*Dianella longifolia*	0.2	25	No	N	
Shrub (SG)	*Leucopogon fraseri*	0.1	6	No	N	
Grass & grasslike	*Dichelachne rara*	0.2	50	No	N	
Forb (FG)	*Oxalis exilis*	0.1	2	No	N	
	Trifolium arvense	0.1	40	No	E	

Forb (FG)	*Erigeron conyzoides*	0.1	3	No	N	

BAM Site – Field Survey Form

Plot ID:	3152	**Date:**	20-02-19	**Survey Name:**	Tantangara	**Recorders:**	JA, DK
Zone:	55	**Easting:**	648639.4809	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	58
Datum:	GDA94	**Northing:**	6038974.746	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:	1224: Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Temperate Montane Grasslands			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	3
	Grasses etc.:	6
	Forbs:	22
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.3
	Grasses etc.:	40.6
	Forbs:	52.3
	Ferns:	0
	Other:	0.1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	1	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	20	15	25	20	20	1	1	0	15	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	20					3.6					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Other	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**	Valley		
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	6	**Aspect**	NE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:	Moderate		Rabbits scratchings
Firewood / CWD removal:			
Grazing (identify native/stock):	Moderate		Rabbits, horses and macropods
Fire damage:			
Storm damage:			
Weediness:	Light		Sweet vernal
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara						
		Date:	20-02-19	**Plot ID:**	3152	**Recorders:**	JA, DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Themeda triandra*	40	600	No	N	
Forb (FG)	*Chrysocephalum semipapposum*	50	400	No	N	
Forb (FG)	*Epilobium spp.*	0.2	200	No	N	
	Cirsium vulgare	0.1	20	No	E	
Forb (FG)	*Geranium antrorsum*	0.1	50	No	N	
	Hypochaeris radicata	0.1	100	No	E	
Forb (FG)	*Acaena ovina*	0.1	50	No	N	
	Anthoxanthum odoratum	2	400	No	E	
Grass & grasslike	*Anthosachne scabra*	0.1	50	No	N	
Grass & grasslike	*Carex spp.*	0.1	15	No	N	
Grass & grasslike	*Dichelachne spp.*	0.1	5	No	N	
	Crepis capillaris	0.1	50	No	E	
Grass & grasslike	*Poa labillardierei*	0.1	1	No	N	
Forb (FG)	*Plantago spp.*	0.1	10	No	N	
Forb (FG)	*Asperula conferta*	0.2	200	No	N	
Forb (FG)	*Poranthera microphylla*	0.1	50	No	N	
Shrub (SG)	*Dillwynia prostrata*	0.1	1	No	N	
Forb (FG)	*Leptorhynchos squamatus*	0.1	1	No	N	
Forb (FG)	*Galium ciliare*	0.1	10	No	N	
Forb (FG)	*Swainsona spp.*	0.1	1	No	N	
Forb (FG)	*Cynoglossum australe*	0.1	100	No	N	
	Trifolium repens	0.1	50	No	E	
Forb (FG)	*Oreomyrrhis spp.*	0.1	10	No	N	
Forb (FG)	*Geranium solanderi*	0.1	1	No	N	
Forb (FG)	*Ranunculus lappaceus*	0.1	1	No	N	
Forb (FG)	*Dianella spp.*	0.1	1	No	N	
Forb (FG)	*Veronica gracilis*	0.1	1	No	N	
Forb (FG)	*Cymbonotus spp.*	0.1	50	No	N	
Forb (FG)	*Hovea heterophylla*	0.1	10	No	N	
Other (OG)	*Glycine clandestina*	0.1	5	No	N	
Shrub (SG)	*Discaria pubescens*	0.1	1	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	5	No	N	
Forb (FG)	*Coronidium monticola*	0.1	1	No	N	
Forb (FG)	*Scleranthus biflorus*	0.1	20	No	N	
Shrub (SG)	*Pimelea spp.*	0.1	1	No	N	
Forb (FG)	*Asperula spp.*	0.1	1	No	N	
Grass & grasslike	*Poa sieberiana*	0.2	50	No	N	

BAM Site – Field Survey Form

Plot ID:	3155	**Date:**	18-02-19	**Survey Name:**	Lobbs hole	**Recorders:**	RP, CG
Zone:	55	**Easting:**	628057.3104	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	17
Datum:	GDA94	**Northing:**	6038746.064	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	

Plant Community Type:	300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	**Confidence:**	High	**Photo #:**	
Vegetation Class:	Southern Tableland Wet Sclerophyll Forests	**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	25
	Grasses etc.:	10
	Forbs:	13
	Ferns:	0
	Other:	3
Sum of Cover of native vascular plants by growth form group	Trees:	37
	Shrubs:	93.7
	Grasses etc.:	13.9
	Forbs:	5.2
	Ferns:	0
	Other:	0.8
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	6	0	4
20 – 29 cm:	1	0	1
10 – 19 cm:	1	0	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	15		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	25	60	33	80	60	0	0	0	0	0	0	0	2	3	5	0	0	0	0	0
Average of the 5 subplots:	51.6					0					2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	Gentle (-15)	**Aspect**	W	**Site Drainage**	Good	**Distance to nearest water & type**	100m, creek

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Light	greater than 10yo	2003 fires
Storm damage:			
Weediness:	Light	greater than 10yo	Centaurium erythrium, rubus anglocandicans
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs hole				
Date:	18-02-19	**Plot ID:**	3155	**Recorders:**	RP, CG

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus mannifera*	2	2	No	N	
Tree (TG)	*Eucalyptus dives*	10	3	No	N	
Tree (TG)	*Eucalyptus robertsonii*	25	11	No	N	
Shrub (SG)	*Acacia pravissima*	20	80	No	N	
Shrub (SG)	*Banksia canei*	20	60	No	N	
Shrub (SG)	*Cassinia longifolia*	5	10	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	30	220	No	N	
Shrub (SG)	*Platylobium formosum*	5	50	No	N	
	Centaurium erythraea	0.2	30	No	E	
Grass & grasslike	*Lomandra longifolia*	0.5	50	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.5	60	No	N	
Grass & grasslike	*Dichelachne rara*	0.5	60	Yes	N	
Grass & grasslike	*Anthosachne scabra*	0.5	45	No	N	
Grass & grasslike	*Poa sieberiana*	8	350	No	N	
Shrub (SG)	*Leucopogon virgatus*	0.1	3	Yes	N	
Grass & grasslike	*Rytidosperma spp.*	1	100	No	N	
Grass & grasslike	*Microlaena stipoides*	0.8	70	Yes	N	
Shrub (SG)	*Bossiaea buxifolia*	4	300	Yes	N	
Forb (FG)	*Ranunculus collinus*	1	80	Yes	N	
Other (OG)	*Billardiera scandens*	0.5	14	No	N	
Forb (FG)	*Boronia nana var. hyssopifolia*	0.8	150	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.8	120	No	N	
Forb (FG)	*Dianella longifolia*	1	30	Yes	N	
Other (OG)	*Cassytha pubescens*	0.2	3	Yes	N	
Grass & grasslike	*Lomandra filiformis*	0.2	25	No	N	
Forb (FG)	*Geranium solanderi*	0.1	1	Yes	N	
Shrub (SG)	*Coprosma quadrifida*	1	6	Yes	N	
Shrub (SG)	*Leucopogon fletcheri*	0.1	50	Yes	N	
Forb (FG)	*Hovea heterophylla*	0.3	12	No	N	
Shrub (SG)	*Tetratheca thymifolia*	0.1	1	Yes	N	
Shrub (SG)	*Gompholobium huegelii*	0.4	20	No	N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	0.2	7	Yes	N	
Shrub (SG)	*Tetratheca ericifolia*	1	80	Yes	N	
Shrub (SG)	*Acacia floribunda*	1	5	Yes	N	
Forb (FG)	*Stylidium graminifolium*	0.1	3	No	N	
Grass & grasslike	*Echinopogon cheelii*	0.2	20	Yes	N	
Forb (FG)	*Wahlenbergia communis*	0.1	1	Yes	N	
Forb (FG)	*Acaena novae-zelandiae*	0.2	60	No	N	
Grass & grasslike	*Poa phillipsiana*	2	40	Yes	N	
Forb (FG)	*Senecio spp.*	0.1	1	Yes	N	
Shrub (SG)	*Omphacomeria acerba*	1	10	Yes	N	
Forb (FG)	*Oxalis perennans*	0.5	45	No	N	
Shrub (SG)	*Monotoca scoparia*	0.5	4	No	N	
Shrub (SG)	*Podolobium procumbens*	1	60	No	N	
Forb (FG)	*Pimelea curviflora var. sericea*	0.1	5	Yes	N	
Shrub (SG)	*Melichrus urceolatus*	0.1	3	Yes	N	
Other (OG)	*Glycine clandestina*	0.1	5	No	N	

Shrub (SG)	*Rubus parvifolius*	1	10	No	N	
	Rubus anglocandicans	2	20	No	E	
Shrub (SG)	*Pimelea linifolia subsp. caesia*	0.1	10	Yes	N	
Shrub (SG)	*Cassinia aculeata*	0.2	1	No	N	
Shrub (SG)	*Exocarpos strictus*	0.2	1	No	N	
Shrub (SG)	*Calytrix tetragona*	1	25	No	N	
Grass & grasslike	*Poa spp.*	0.2	40	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	1	No	N	
Shrub (SG)	*Melicytus dentatus*	0.2	2	No	N	

BAM Site – Field Survey Form

Plot ID:	3173	**Date:**	19-02-19	**Survey Name:**	Tantangara south			**Recorders:**	IM, CK
Zone:	55	**Easting:**	645907.526	**Plot dimensions:**	20 x 50 m			**Midline bearing:**	103
Datum:	GDA94	**Northing:**	6023169.526	**IBRA region:**	Australian Alps (Snowy Mountains)			**Zone ID:**	
Plant Community Type:			1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:			Subalpine Woodlands			**EEC:**	No	**Confidence:**	Medium

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	4
	Grasses etc.:	4
	Forbs:	19
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	65
	Shrubs:	14.2
	Grasses etc.:	5.4
	Forbs:	4.7
	Ferns:	0
	Other:	0.6
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	3	0	1
50 – 79 cm:	3	0	0
30 – 49 cm:	1	0	1
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	261		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	99	60	70	60	8	0	0	2	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	67.8					2.2					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Brown	**Soil Depth**	
Lithology (B)							
Slope	10	**Aspect**	E	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Light	greater than 10yo	
Storm damage:			
Weediness:	Light		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara south				
Date:	19-02-19	**Plot ID:**	3173	**Recorders:**	IM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	30	24	No	N	
Shrub (SG)	*Ozothamnus thyrsoideus*	4	50	No	N	
Tree (TG)	*Acacia dealbata*	5	50	No	N	
Grass & grasslike	*Poa sieberiana var. sieberiana*	5	300	No	N	
Other (OG)	*Glycine clandestina*	0.5	50	No	N	
Forb (FG)	*Lobelia pedunculata*	0.1	3	No	N	
Forb (FG)	*Senecio gunnii*	2	30	No	N	
Forb (FG)	*Stellaria pungens*	0.3	50	No	N	
Forb (FG)	*Poranthera microphylla*	0.1	5	No	N	
Grass & grasslike	*Themeda triandra*	0.1	2	No	N	
Forb (FG)	*Veronica derwentiana*	0.2	10	No	N	
	Anthoxanthum odoratum	2	30	No	E	
Forb (FG)	*Geranium potentilloides*	0.2	6	No	N	
Forb (FG)	*Craspedia spp.*	0.1	1	No	N	
Tree (TG)	*Eucalyptus dalrympleana*	30	18	No	N	
Forb (FG)	*Asperula scoparia*	0.2	50	No	N	
Forb (FG)	*Lagenophora stipitata*	0.1	3	No	N	
Forb (FG)	*Wahlenbergia stricta*	0.1	5	No	N	
Forb (FG)	*Senecio spp.*	0.1	2	No	N	
Grass & grasslike	*Lomandra filiformis subsp. coriacea*	0.2	8	No	N	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	1	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	10	No	N	
Forb (FG)	*Dianella tasmanica*	0.1	1	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	1	No	N	
Other (OG)	*Clematis aristata*	0.1	6	No	N	
Forb (FG)	*Pterostylis parviflora*	0.1	1	No	N	
Forb (FG)	*Coronidium scorpioides*	0.5	20	No	N	
Forb (FG)	*Pseuderanthemum variabile*	0.1	15	No	N	
Forb (FG)	*Plantago varia*	0.1	10	No	N	
Shrub (SG)	*Cassinia aculeata*	10	300	No	N	
Forb (FG)	*Ranunculus lappaceus*	0.1	1	No	N	
Shrub (SG)	*Olearia erubescens*	0.1	3	No	N	
Forb (FG)	*Senecio prenanthoides*	0.1	2	No	N	

BAM Site – Field Survey Form

Plot ID:	3179	**Date:**	06-02-19	**Survey Name:**	Lobs Hole Ravine	**Recorders:**	SW, KM
Zone:	55	**Easting:**	626864.9002	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	250
Datum:	GDA94	**Northing:**	6036770.526	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Wet Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	5
	Grasses etc.:	6
	Forbs:	8
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	120
	Shrubs:	59
	Grasses etc.:	83
	Forbs:	14
	Ferns:	0
	Other:	0
High Threat Weed cover:		21

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	3	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	1		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	85	85	45	5	5	10	3	5	2	0	0	0	1	0	0	0	0	0	0	0
Average of the 5 subplots:	45					4					0.2					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Medium-fine grained	**Soil Colour**	Light brown/pale orange	**Soil Depth**	At least 30cm
Lithology (B)							
Slope	25	**Aspect**	N	**Site Drainage**	Good drainage	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			No evidence
Cultivation (inc. pasture):			No evidence
Soil erosion:			No evidence
Firewood / CWD removal:			No evidence
Grazing (identify native/stock):			No evidence
Fire damage:	Light	greater than 10yo	Some burnt trunks
Storm damage:	Light	less than 3yo	One fallen down Exocarpos stricta
Weediness:	Severe	less than 3yo	Substainal amounts of blackberry, Rubis rubiginosa approx 85% and 15% cover, respectively. St Johns Wort and C
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs Hole Ravine				
Date:	06-02-19	**Plot ID:**	3179	**Recorders:**	SW, KM

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Acacia dealbata subsp. Subalpina*	40	150	No	N	
Shrub (SG)	*Exocarpos strictus*	15	150	No	N	
	Hypericum perforatum	5	200	No	HTE	
Forb (FG)	*Acaena ovina*	2	100	No	N	
	Aira spp.	5	100	No	E	
	Rosa rubiginosa	15	30	No	HTE	
Shrub (SG)	*Cassinia aculeata*	20	50	No	N	
Shrub (SG)	*Pimelea linifolia*	20	150	No	N	
	Rubus anglocandicans	85	200	No	E	
Tree (TG)	*Eucalyptus viminalis*	80	50	No	N	
Forb (FG)	*Geranium solanderi var. solanderi*	4	100	No	N	
	Crataegus monogyna	1	1	No	HTE	
Forb (FG)	*Dichondra repens*	3	50	No	N	
Grass & grasslike	*Microlaena stipoides var. stipoides*	25	1000	No	N	
Grass & grasslike	*Rytidosperma erianthum*	25	2000	No	N	
	Centaurium erythraea	1	100	No	E	
Grass & grasslike	*Anthosachne scabra*	10	500	No	N	
Forb (FG)	*Chrysocephalum semipapposum*	1	20	No	N	
Grass & grasslike	*Poa sieberiana*	20	2000	No	N	
Shrub (SG)	*Gompholobium huegelii*	2	2	No	N	
Grass & grasslike	*Lomandra longifolia*	2	2	No	N	
Grass & grasslike	*Rytidosperma spp.*	1	1	No	N	
Forb (FG)	*Oxalis perennans*	1	50	No	N	
Shrub (SG)	*Bursaria spinosa*	2	10	No	N	
Forb (FG)	*Asteraceae indeterminate*	1	3	No	N	
Forb (FG)	*Wahlenbergia communis*	1	1	No	N	
Forb (FG)	*Senecio spp.*	1	1	No	N	

BAM Site – Field Survey Form

Plot ID:	3181	**Date:**	18-02-19	**Survey Name:**	Tantangara	**Recorders:**	JA, DK
Zone:	55	**Easting:**	649432.9575	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	152
Datum:	GDA94	**Northing:**	6038349.018	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1225: Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Temperate Montane Grasslands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	2
	Grasses etc.:	1
	Forbs:	4
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	2.1
	Grasses etc.:	0.1
	Forbs:	0.8
	Ferns:	0
	Other:	0
High Threat Weed cover:		32

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	35	45	50	30	5	10	5	3	0	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	33					3.8					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Lake	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	1	**Aspect**	N	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe		Unsure -highly modified lake edge with car tracks
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Severe		Horses
Fire damage:			
Storm damage:			
Weediness:	Severe		Sweet vernal and agrostis stolonifera
Other:			Dam construction and horse grazing has changed species composition

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Tantangara						
		Date:	18-02-19	**Plot ID:**	3181	**Recorders:**	JA, DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
	Anthoxanthum odoratum	55	500	No	E	
	Agrostis capillaris	30	500	No	HTE	
	Acetosella vulgaris	2	500	No	HTE	
	Verbascum virgatum	0.2	30	No	E	
Forb (FG)	*Persicaria prostrata*	0.5	25	No	N	
Shrub (SG)	*Dillwynia prostrata*	2	10	No	N	
	Cirsium vulgare	0.1	5	No	E	
	Hypochaeris radicata	0.1	50	No	E	
Grass & grasslike	*Juncus spp.*	0.1	10	No	N	
Forb (FG)	*Euchiton spp.*	0.1	200	No	N	
Forb (FG)	*Asperula spp.*	0.1	5	No	N	
Shrub (SG)	*Pimelea spp.*	0.1	1	No	N	
Forb (FG)	*Centipeda minima subsp. Minima*	0.1	1	No	N	
	Crepis capillaris	0.1	2	No	E	

BAM Site – Field Survey Form

Plot ID:	3184	**Date:**	20-02-19	**Survey Name:**	lobs hole	**Recorders:**	RP, CG
Zone:	55	**Easting:**	626438.0211	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	47
Datum:	GDA94	**Northing:**	6037952.518	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:	299: Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion			**Confidence:**	High	**Photo #:**	
Vegetation Class:	Southern Tableland Dry Sclerophyll Forests			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	6
	Grasses etc.:	2
	Forbs:	4
	Ferns:	1
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	62
	Shrubs:	41
	Grasses etc.:	0.2
	Forbs:	2.3
	Ferns:	0.1
	Other:	0.1
High Threat Weed cover:		85.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	2	0	0
50 – 79 cm:	1	0	0
30 – 49 cm:	4	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	1	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	48		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	25	60	45	14	0	0	0	0	1	0	0	15	0	60	0	0	0	0	0
Average of the 5 subplots:	38.8					0.2					15					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Footslope	**Lf Pattern (A)**	Hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	steep	**Aspect**	SSE	**Site Drainage**	Good	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:	Light	greater than 10yo	2003 fires
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Severe	greater than 10yo	choked in Blackberry
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	lobs hole						
		Date:	20-02-19	**Plot ID:**	3184	**Recorders:**	RP, CG

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus spp.*	30	8	No	N	
Other (OG)	*Clematis aristata*	0.1	2	No	N	
Tree (TG)	*Acacia dealbata*	30	19	No	N	
	Rubus fruticosus sp. agg.	80	1000	No	HTE	
Shrub (SG)	*Cassinia aculeata*	2	7	No	N	
Shrub (SG)	*Cassinia longifolia*	10	15	No	N	
Forb (FG)	*Oxalis exilis*	0.1	10	No	N	
Forb (FG)	*Geranium solanderi*	2	60	No	N	
	Crataegus monogyna	3	6	No	HTE	
	Holcus lanatus	1	17	No	E	
Shrub (SG)	*Acacia pravissima*	5	18	No	N	
	Rosa rubiginosa	2	3	No	HTE	
Shrub (SG)	*Acacia spp.*	2	1	No	N	
	Cerastium glomeratum	1	25	No	E	
Shrub (SG)	*Bursaria spinosa*	20	50	No	N	
	Hypericum perforatum	0.1	10	No	HTE	
	Centaurium erythraea	0.1	2	No	E	
	Verbascum virgatum	0.1	1	No	E	
Grass & grasslike	*Microlaena spp.*	0.1	21	No	N	
Grass & grasslike	*Carex appressa*	0.1	1	No	N	
Fern (EG)	*Asplenium trichomanes*	0.1	5	No	N	
Forb (FG)	*Euchiton involucratus*	0.1	1	No	N	
Forb (FG)	*Dichondra repens*	0.1	8	No	N	
	Prunus cerasifera	1	1	No	E	
	Rubus anglocandicans	95	1000	No	E	
	Cerastium spp.	0.1	2	No	E	
Tree (TG)	*Eucalyptus spp.*	2	1	No	N	
Shrub (SG)	*Acacia spp.*	2	1	No	N	

BAM Site – Field Survey Form

Plot ID:	3193	**Date:**	25-03-19	**Survey Name:**	Marika			**Recorders:**	JA, RP
Zone:	55	**Easting:**	629423.9642	**Plot dimensions:**	20 x 50			**Midline bearing:**	158
Datum:	GDA94	**Northing:**	6039452.502	**IBRA region:**	South Eastern Highlands (Bondo)			**Zone ID:**	
Plant Community Type:			311: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion			**Confidence:**	Medium	**Photo #:**	
Vegetation Class:			Southern Tableland Grassy Woodlands			**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	15
	Grasses etc.:	3
	Forbs:	3
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	47.2
	Shrubs:	18.5
	Grasses etc.:	15.2
	Forbs:	0.4
	Ferns:	0
	Other:	0.5
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	4	0	21
20 – 29 cm:	1	0	3
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	15		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	50	80	25	10	5	1	0	0	0	15	8	5	2	0	1	10	18	0	0	0
Average of the 5 subplots:	34					3.2					3.2					5.6				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**	Slightly Gritty	**Soil Colour**	Dark brown	**Soil Depth**	10cm
Lithology (B)							
Slope	approx. 22 deg	**Aspect**	N	**Site Drainage**	Very good	**Distance to nearest water & type**	500m to creek estimated to be at bottom of mountain

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:	Light	less than 3yo	No evidence of weeds
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Marika						
		Date:	25-03-19	**Plot ID:**	3193	**Recorders:**	JA, RP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus dives*	45	44		N	
Tree (TG)	*Eucalyptus macrorhyncha*	2	2		N	
Tree (TG)	*Eucalyptus nortonii*	0.2	1		N	
Grass & grasslike	*Rytidosperma pallidum*	15	250		N	
Shrub (SG)	*Leionema lamprophyllum subsp. obovatum*	3	19		N	
Shrub (SG)	*Monotoca scoparia*	5	40		N	
Shrub (SG)	*Leucopogon virgatus*	0.3	20		N	
Other (OG)	*Hardenbergia violacea*	0.1	3		N	
Shrub (SG)	*Banksia canei*	0.5	2		N	
Shrub (SG)	*Tetratheca bauerifolia*	0.3	60		N	
Shrub (SG)	*Dillwynia phylicoides*	6	120		N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	2	6		N	
Shrub (SG)	*Brachyloma daphnoides*	0.2	20		N	
Forb (FG)	*Dianella longifolia*	0.2	35		N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	15		N	
Shrub (SG)	*Acacia gunnii*	0.1	1		N	
Shrub (SG)	*Mirbelia oxylobioides*	0.6	12		N	
Other (OG)	*Cassytha glabella*	0.4	50		N	
Grass & grasslike	*Lomandra longifolia*	0.1	20		N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	5		N	
Shrub (SG)	*Omphacomeria acerba*	0.1	1		N	
Forb (FG)	*Stylidium spp.*	0.1	1		N	
Forb (FG)	*Hovea heterophylla*	0.1	1		N	
Shrub (SG)	*Persoonia chamaepeuce*	0.1	1		N	
Shrub (SG)	*Platylobium formosum*	0.1	1		N	
Shrub (SG)	*Bossiaea buxifolia*	0.1	1		N	

BAM Site – Field Survey Form

Plot ID:	3205	**Date:**	26-03-19	**Survey Name:**	Marica	**Recorders:**	JA, RP
Zone:	55	**Easting:**	629292.422	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	113
Datum:	GDA94	**Northing:**	6039367.169	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		311: Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion		**Confidence:**	Low	**Photo #:**	
Vegetation Class:		Southern Tableland Grassy Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	18
	Grasses etc.:	3
	Forbs:	5
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	30.5
	Shrubs:	15.7
	Grasses etc.:	3.2
	Forbs:	0.5
	Ferns:	0
	Other:	1
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	1		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	15	2	10	1	0	1	0	0	5	15	50	60	55	90	33	15	100	100	3
Average of the 5 subplots:	8.6					1.2					54					50.2				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Dark brown	**Soil Depth**	2cm
Lithology (B)							
Slope	Slight	**Aspect**	S	**Site Drainage**	Well drained	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Marica						
		Date:	26-03-19	**Plot ID:**	3205	**Recorders:**	JA, RP

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus macrorhyncha*	10	5	No	N	
Tree (TG)	*Eucalyptus dives*	20	17	No	N	
Tree (TG)	*Eucalyptus nortonii*	0.5	1	No	N	
Shrub (SG)	*Grevillea neurophylla*	0.5	1	No	N	
Shrub (SG)	*Calytrix tetragona*	6	400	No	N	
Forb (FG)	*Hovea heterophylla*	0.1	10	No	N	
Grass & grasslike	*Poa sieberiana*	3	100	No	N	
Forb (FG)	*Stylidium spp.*	0.1	25	No	N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	5	300	No	N	
Shrub (SG)	*Platylobium formosum*	0.1	5	No	N	
Shrub (SG)	*Tetratheca bauerifolia*	0.3	80	No	N	
Shrub (SG)	*Pimelea spp.*	0.1	5	No	N	
Grass & grasslike	*Rytidosperma pallidum*	0.1	10	No	N	
Shrub (SG)	*Leucopogon virgatus*	0.5	25	No	N	
Shrub (SG)	*Gompholobium huegelii*	0.1	1	No	N	
Shrub (SG)	*Monotoca scoparia*	0.1	20	No	N	
Shrub (SG)	*Persoonia chamaepeuce*	0.1	5	No	N	
Shrub (SG)	*Bossiaea buxifolia*	0.1	5	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.2	100	No	N	
Grass & grasslike	*Lomandra longifolia*	0.1	5	No	N	
Other (OG)	*Cassytha glabella*	1	50	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	0.9	1	No	N	
Shrub (SG)	*Banksia canei*	0.3	1	No	N	
Shrub (SG)	*Acacia obliquinervia*	0.5	3	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.1	80	No	N	
Shrub (SG)	*Cassinia aculeata*	0.3	1	No	N	
Shrub (SG)	*Brachyloma daphnoides*	0.1	2	No	N	
Forb (FG)	*Thelymitra spp.*	0.1	2	No	N	
Forb (FG)	*Eriochilus cucullatus*	0.1	5	No	N	
Shrub (SG)	*Dillwynia rudis*	0.5	25	No	N	

BAM Site – Field Survey Form

Plot ID:	3213	**Date:**	22-02-19	**Survey Name:**	Lobs hole	**Recorders:**	IM, CK
Zone:	55	**Easting:**	625702.3025	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	215
Datum:	GDA94	**Northing:**	6039227.345	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion		**Confidence:**		**Photo #:**	
Vegetation Class:		Upper Riverina Dry Sclerophyll Forests		**EEC:**		**Confidence:**	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	0
	Grasses etc.:	2
	Forbs:	0
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0
	Grasses etc.:	50.1
	Forbs:	0
	Ferns:	0
	Other:	0
High Threat Weed cover:		30.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	1	1	0	1	2	10	15	60	5	5	2	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	1					19					0.4					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Brown	**Soil Depth**	
Lithology (B)							
Slope	8	**Aspect**	W	**Site Drainage**		**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Light		
Fire damage:			
Storm damage:			
Weediness:	Moderate		
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobs hole					
		Date:	22-02-19	**Plot ID:**	3213	**Recorders:**	IM, CK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Themeda triandra*	50	1000	No	N	
	Hypericum perforatum	30	500	No	HTE	
	Rubus fruticosus sp. agg.	0.1	3	No	HTE	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	2	No	N	

BAM Site – Field Survey Form

Plot ID:	3222	**Date:**	27-03-19	**Survey Name:**	Lobbs hole	**Recorders:**	RP, JA
Zone:	55	**Easting:**	628870.9802	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	338
Datum:	GDA94	**Northing:**	6038615.554	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		999: Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion		**Confidence:**	Medium	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	16
	Grasses etc.:	6
	Forbs:	13
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	8.1
	Shrubs:	33.4
	Grasses etc.:	60.6
	Forbs:	2.3
	Ferns:	0
	Other:	0.2
High Threat Weed cover:		0.2

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	1
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	1	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	23		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	15	19	1	15	15	8	1	0	20	2	15	10	2	2	5	12	2	0	0	0
Average of the 5 subplots:	13					6.2					6.8					2.8				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**	Mountains	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**	Pale grey pinkish brownish	**Soil Depth**	2cm
Lithology (B)							
Slope	42degrees, very steep	**Aspect**	W	**Site Drainage**	Very good	**Distance to nearest water & type**	550m to creek at bottom of mountain

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:			
Storm damage:			
Weediness:			Only centaurium sp.
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	Lobbs hole				
Date:	27-03-19	**Plot ID:**	3222	**Recorders:**	RP, JA

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus nortonii*	8	3	No	N	
Shrub (SG)	*Bursaria spinosa*	3	5	No	N	
Shrub (SG)	*Acacia siculiformis*	5	22	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	20	38	No	N	
Shrub (SG)	*Dodonaea viscosa*	2	15	No	N	
Shrub (SG)	*Grevillea neurophylla*	0.2	18	No	N	
Tree (TG)	*Acacia dealbata*	0.1	1	No	N	
Shrub (SG)	*Acacia obliquinervia*	1	4	No	N	
Shrub (SG)	*Grevillea arenaria*	0.2	3	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.7	150	No	N	
Grass & grasslike	*Lomandra filiformis*	0.2	25	No	N	
Grass & grasslike	*Poa sieberiana*	25	500	No	N	
Grass & grasslike	*Themeda triandra*	35	800	No	N	
Other (OG)	*Glycine clandestina*	0.1	10	No	N	
Forb (FG)	*Plantago spp.*	0.1	5	No	N	
Grass & grasslike	*Anthosachne scabra*	0.2	30	No	N	
	Centaurium spp.	0.1	50	No	E	
Forb (FG)	*Hypericum gramineum*	0.1	10	No	N	
Shrub (SG)	*Leucopogon virgatus*	0.3	10	No	N	
Shrub (SG)	*Pimelea biflora*	0.1	35	No	N	
Grass & grasslike	*Lomandra multiflora subsp. Multiflora*	0.1	15	No	N	
Forb (FG)	*Hydrocotyle laxiflora*	0.1	5	No	N	
Shrub (SG)	*Leucopogon fletcheri subsp. brevisepalus*	0.3	3	No	N	
Grass & grasslike	*Lepidosperma cf. laterale*	0.1	4	No	N	
Forb (FG)	*Galium spp.*	0.1	1	No	N	
Forb (FG)	*Dianella revoluta*	0.5	100	No	N	
Shrub (SG)	*Acrotriche serrulata*	0.3	5	No	N	
Shrub (SG)	*Platylobium formosum*	0.5	10	No	N	
Forb (FG)	*Leptorhynchos squamatus*	0.1	1	No	N	
Forb (FG)	*Acaena ovina*	0.1	5	No	N	
Forb (FG)	*Eriochilus cucullatus*	0.1	10	No	N	
Forb (FG)	*Dianella longifolia*	0.1	2	No	N	
Shrub (SG)	*Olearia myrsinoides*	0.1	3	No	N	
Shrub (SG)	*Astrotricha ledifolia*	0.2	1	No	N	
	Hypericum perforatum	0.2	50	No	HTE	
Shrub (SG)	*Cassinia aculeata*	0.1	2	No	N	
Forb (FG)	*Asperula spp.*	0.1	2	No	N	
Other (OG)	*Desmodium varians*	0.1	15	No	N	
Forb (FG)	*Euchiton spp.*	0.1	2	No	N	
Shrub (SG)	*Pimelea spp.*	0.1	1	No	N	
Forb (FG)	*Xerochrysum viscosum*	0.1	5	No	N	

BAM Site – Field Survey Form

Plot ID:	3303	**Date:**	25-06-19	**Survey Name:**	LINK RD	**Recorders:**	MP DK
Zone:	55	**Easting:**	628407.8108	**Plot dimensions:**	50X20	**Midline bearing:**	228
Datum:	GDA94	**Northing:**	6027219.862	**IBRA region:**	Australian Alps (Snowy Mountains)	**Zone ID:**	
Plant Community Type:		1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Subalpine Woodlands		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	5
	Grasses etc.:	7
	Forbs:	15
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	2.1
	Grasses etc.:	81.3
	Forbs:	9.9
	Ferns:	0
	Other:	0
High Threat Weed cover:		0.1

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	0	0	0
50 – 79 cm:	0	0	0
30 – 49 cm:	0	0	0
20 – 29 cm:	0	0	0
10 – 19 cm:	0	0	0
5 – 9 cm:	0	0	0
< 5 cm:	0	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	95	75	70	50	50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	68					0.2					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillslope	**Lf Pattern (A)**		**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)		**Soil Surface Texture**		**Soil Colour**		**Soil Depth**	
Lithology (B)							
Slope	1	**Aspect**	W	**Site Drainage**	Moderate	**Distance to nearest water & type**	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):	Severe	greater than 10yo	Cleared duringpowerlines being built. Prob a laydown
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):	Light		Macropod
Fire damage:			
Storm damage:			
Weediness:	Moderate		Some exotic grasses. Close to a road
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	LINK RD						
		Date:	25-06-19	**Plot ID:**	3303	**Recorders:**	MP DK

GF Code	***Top 3 native species in each growth form group: Full species name mandatory*** ***All other native and exotic species: Full species name where practicable***	Cover	Abund	Voucher	N, E or HTE	Stratum
Grass & grasslike	*Poa helmsii*	5	50		N	
Grass & grasslike	*Poa spp.*	25	500		N	
Shrub (SG)	*Bossiaea foliosa*	0.1	2		N	
Shrub (SG)	*Hakea microcarpa*	0.4	2		N	
Shrub (SG)	*Pimelea linifolia*	1	60		N	
Forb (FG)	*Scleranthus biflorus*	2	1000		N	
Forb (FG)	*Epilobium spp.*	1	2000		N	
Grass & grasslike	*Carex spp.*	1	900		N	
	Hypochaeris radicata	1	250		E	
Forb (FG)	*Geranium spp.*	0.2	80		N	
Grass & grasslike	*Rytidosperma pilosum*	50	2000		N	
Forb (FG)	*Stellaria pungens*	0.1	10		N	
Forb (FG)	*Pratia spp.*	0.2	100		N	
Forb (FG)	*Oreomyrrhis spp.*	0.2	100		N	
	Acetosella vulgaris	0.1	50		HTE	
Forb (FG)	*Acaena spp.*	0.2	60		N	
Forb (FG)	*Ranunculus spp.*	0.1	10		N	
Forb (FG)	*Ajuga australis*	0.3	25		N	
Forb (FG)	*Acaena novae-zelandiae*	0.1	10		N	
	Trifolium repens	0.1	4		E	
Shrub (SG)	*Podolobium alpestre*	0.4	8		N	
	Conyza spp.	0.1	1		E	
Forb (FG)	*Cardamine spp.*	0.1	40		N	
Forb (FG)	*Euchiton spp.*	0.3	1000		N	
Grass & grasslike	*Lomandra spp.*	0.1	30		N	
Forb (FG)	*Asperula scoparia*	0.1	15		N	
Forb (FG)	*Asteraceae indeterminate*	1	150		N	
	Poaceae indeterminate	3	250		E	
Forb (FG)	*Oreomyrrhis argentea*	4	300		N	
Grass & grasslike	*Luzula spp.*	0.1	10		N	
Shrub (SG)	*Acrothamnus hookeri*	0.2	4		N	
Grass & grasslike	*Carex inversa*	0.1	4		N	

BAM Site – Field Survey Form

Plot ID:	5205	**Date:**	05-03-19	**Survey Name:**	BH5205	**Recorders:**	JA, CW
Zone:	55	**Easting:**	630576.401	**Plot dimensions:**	20 x 50 m	**Midline bearing:**	280
Datum:	GDA94	**Northing:**	6038890.714	**IBRA region:**	South Eastern Highlands (Bondo)	**Zone ID:**	
Plant Community Type:		953: Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion		**Confidence:**	High	**Photo #:**	
Vegetation Class:		Southern Tableland Dry Sclerophyll Forests		**EEC:**	No	**Confidence:**	High

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	12
	Grasses etc.:	4
	Forbs:	16
	Ferns:	0
	Other:	2
Sum of Cover of native vascular plants by growth form group	Trees:	21
	Shrubs:	46.8
	Grasses etc.:	80.7
	Forbs:	2.1
	Ferns:	0
	Other:	0.6
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Stem count (euc)	Stem count (non-euc)	Stems with Hollows
80 + cm:	1	0	1
50 – 79 cm:	0	0	0
30 – 49 cm:	1	0	0
20 – 29 cm:	1	0	0
10 – 19 cm:	1	0	0
5 – 9 cm:	1	0	0
< 5 cm:	1	0	0
Length of logs (m) (≥10 cm diameter, >50 cm in length)	31		

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.
For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each):	55	28	73	50	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots:	56.6					0					0					0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		**Lf Element (A)**	Hillcrest	**Lf Pattern (A)**	Low hills	**Microrelief**	
		Lf Element (B)		**Lf Pattern (B)**			
Lithology (A)	Quartzs and stone	**Soil Surface Texture**	Loamy	**Soil Colour**	Brown	**Soil Depth**	Moderate
Lithology (B)							
Slope		**Aspect**		**Site Drainage**	Moderate	**Distance to nearest water & type**	155m

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging):			
Cultivation (inc. pasture):			
Soil erosion:			
Firewood / CWD removal:			
Grazing (identify native/stock):			
Fire damage:	Moderate	greater than 10yo	Charred felled branches
Storm damage:			
Weediness:			
Other:			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Survey Name:	BH5205				
Date:	05-03-19	**Plot ID:**	5205	**Recorders:**	JA, CW

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	Cover	Abund	Voucher	N, E or HTE	Stratum
Tree (TG)	*Eucalyptus pauciflora*	10	35	No	N	
Tree (TG)	*Eucalyptus dalrympleana*	1	1	No	N	
Tree (TG)	*Eucalyptus robertsonii*	10	4	No	N	
Shrub (SG)	*Cassinia aculeata*	0.5	7	No	N	
Shrub (SG)	*Daviesia latifolia*	20	85	No	N	
Shrub (SG)	*Platylobium formosum*	25	180	No	N	
Grass & grasslike	*Poa sieberiana*	80	800	No	N	
	Centaurium erythraea	0.5	5	No	E	
Forb (FG)	*Stellaria pungens*	0.5	300	No	N	
Forb (FG)	*Viola betonicifolia*	0.1	10	No	N	
Forb (FG)	*Geranium solanderi*	0.1	5	No	N	
Forb (FG)	*Cynoglossum australe*	0.1	5	No	N	
Shrub (SG)	*Hibbertia obtusifolia*	0.1	10	No	N	
Shrub (SG)	*Tetratheca bauerifolia*	0.1	20	No	N	
Grass & grasslike	*Themeda triandra*	0.1	5	No	N	
Grass & grasslike	*Poaceae spp.*	0.1	10	No	N	
Forb (FG)	*Stylidium graminifolium*	0.1	10	No	N	
Forb (FG)	*Hypericum gramineum*	0.1	10	No	N	
Shrub (SG)	*Persoonia chamaepeuce*	0.3	45	No	N	
Other (OG)	*Clematis aristata*	0.1	1	No	N	
Other (OG)	*Glycine clandestina*	0.5	100	No	N	
Forb (FG)	*Brachyscome spp.*	0.1	1	No	N	
Shrub (SG)	*Pimelea spp.*	0.1	5	No	N	
Forb (FG)	*Gonocarpus tetragynus*	0.2	400	No	N	
Shrub (SG)	*Acrotriche serrulata*	0.2	25	No	N	
Shrub (SG)	*Gompholobium huegelii*	0.1	2	No	N	
Shrub (SG)	*Acacia pravissima*	0.1	1	No	N	
Forb (FG)	*Oxalis spp.*	0.1	10	No	N	
Forb (FG)	*Euphrasia collina*	0.1	1	No	N	
Forb (FG)	*Veronica plebeia*	0.1	25	No	N	
Shrub (SG)	*Mirbelia oxylobioides*	0.2	8	No	N	
Forb (FG)	*Oreomyrrhis spp.*	0.1	5	No	N	
Forb (FG)	*Brachyscome spp.*	0.1	5	No	N	
Shrub (SG)	*Choretrum pauciflorum*	0.1	10	No	N	
Forb (FG)	*Acaena spp.*	0.1	1	No	N	
Forb (FG)	*Podolepis hieracioides*	0.1	2	No	N	
Grass & grasslike	*Lomandra spp.*	0.5	150	No	N	
Forb (FG)	*Pelargonium spp.*	0.1	20	No	N	

Annexure B

Vegetation integrity assessment – plot data

Table B.1 Vegetation integrity data

plot	zone	easting	northing	bearing	Comp Tree	Comp Shrub	Comp Grass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollow trees	Fun Litter Cover	Fun Len Fallen Logs	Fun Tree Stem 5 to 9	Fun Tree Stem 10 to 19	Fun Tree Stem 20 to 29	Fun Tree Stem 30 to 49	Fun Tree Stem 50 to 79	Fun Tree Regen	Fun High Threat Exotic
7	55	628781	6050388	140	1	4	7	18	0	0	25.0	6.4	27.8	3.8	0.0	0.0	2	1	46.0	79.0	1	1	1	1	1	1	0.4
42	55	624855	6041940	257	6	14	6	11	0	1	23.8	6.8	8.2	2.3	0.0	0.1	1	2	50.0	17.0	0	0	0	0	1	0	0.5
45	55	646276	6041689	355	0	0	5	6	0	0	0.0	0.0	23.5	3.7	0.0	0.0	0	0	12.6	0.0	0	0	0	0	0	0	30.0
58	55	645454	6041030	41	0	1	3	7	0	0	0.0	0.1	20.6	1.5	0.0	0.0	0	0	33.0	0.0	0	0	0	0	0	0	70.0
70	55	624595	6040563	280	3	10	14	12	3	0	33.0	51.0	40.9	3.4	4.5	0.0	2	0	44.0	27.0	1	1	1	1	1	0	4.2
71	55	624411	6040491	260	1	6	5	9	0	0	5.0	37.8	20.6	1.1	0.0	0.0	0	0	41.0	8.0	1	1	1	0	0	1	5.6
72	55	624718	6040447	218	4	10	9	8	2	0	10.1	40.3	37.6	1.0	0.7	0.0	0	0	32.0	4.0	0	1	1	1	0	0	6.2
79	55	625588	6039630	50	1	13	8	7	0	2	10.0	65.8	6.3	2.7	0.0	0.2	3	0	90.0	19.0	0	0	0	0	1	0	0.1
80	55	625548	6039580	20	2	15	6	6	1	0	15.5	9.8	5.4	1.1	0.1	0.0	1	1	76.0	41.0	0	0	0	0	1	0	0.1
94	55	626021	6038814	187	2	10	6	15	0	0	43.0	39.7	40.2	1.9	0.0	0.0	0	6	75.6	37.0	1	1	1	1	0	1	0.6
104	55	626333	6038703	290	1	2	7	6	0	0	15.0	3.2	36.4	1.2	0.0	0.0	0	0	2.6	0.0	1	1	0	0	0	1	7.1
105	55	632919	6038714	240	2	10	4	12	0	1	37.0	10.2	20.7	5.2	0.0	0.3	1	0	70.0	0.0	0	0	0	0	0	0	0.0
110	55	626313	6038411	270	3	7	9	10	0	1	26.5	4.6	8.3	1.4	0.0	0.1	3	3	33.0	63.0	1	1	1	1	1	1	0.2
132	55	636309	6038310	218	0	5	3	15	0	0	0.0	13.2	70.4	6.7	0.0	0.0	0	0	18.2	43.0	0	0	0	0	0	1	3.2
139	55	625891	6038121	160	2	11	4	10	0	2	65.0	59.2	3.5	1.3	0.0	0.8	0	0	85.0	18.0	1	1	1	1	0	1	0.0
144	55	626943	6038109	10	1	1	5	3	0	0	60.0	0.2	17.4	0.5	0.0	0.0	0	0	15.6	4.0	1	1	1	0	0	0	86.5
154	55	625887	6037831	210	3	8	6	10	1	2.0	21.0	75.2	3.3	1.1	0.1	0	0	0.0	48.2	2	1	1	1	1	0	1.0	0.4
156	55	626038	6037661	171	4	5	4	8	1	0	45.0	74.0	4.5	3.9	0.1	0.0	0	0	29.0	20.0	1	1	1	1	0	1	1.5
163	55	650022	6037378	80	2	4	2	8	0	0	30.0	1.7	2.0	2.5	0.0	0.0	1	0	63.0	25.0	0	0	0	0	0	0	1.6
164	55	649063	6037391	117	1	3	8	5	0	0	2.0	27.2	23.5	2.1	0.0	0.0	0	0	9.0	0.0	1	1	1	0	0	1	0.7
167	55	648817	6037148	328	2	4	6	8	0	0	12.0	7.3	45.4	6.6	0.0	0.0	1	0	35.0	20.0	0	1	1	1	1	1	0.0
169	55	626538	6037092	170	1	3	3	10	1	1	25.0	14.0	40.0	1.9	0.3	0.1	0	0	18.0	3.0	1	1	0	0	0	1	8.7
172	55	626847	6034263	60	4	7	2	7	1	1	60.0	96.1	70.0	1.3	0.8	0.1	1	2	52.0	12.0	0	1	1	1	1	1	0.1
173	55	627163	6033834	84	3	4	0	2	1	0	4.0	8.2	0.0	0.2	1.0	0.0	0	0	22.0	17.0	1	0	1	0	0	1	0.1
174	55	626962	6036924	110	1	2	6	6	1	0	5.0	50.0	5.7	0.9	0.1	0.0	0	0	8.2	0.0	0	0	0	0	0	0	29.0
177	55	647788	6033583	143	3	6	6	17	0	0	55.0	3.2	70.5	1.9	0.0	0.0	13	2	60.6	57.0	1	1	1	1	1	1	0.0
178	55	647441	6032429	179	2	9	5	11	0	0	1.1	12.4	85.3	1.3	0.0	0.0	0	0	43.0	12.0	0	0	0	0	0	1	0.3
180	55	647634	6031827	55	2	7	6	17	0	0	70.0	2.1	75.6	8.2	0.0	0.0	3	3	60.0	45.0	1	1	1	1	1	1	0.0
183	55	626501	6038371	115	2	3	5	8	0	0	0.5	0.5	70.7	1.4	0.0	0.0	0	0	5.8	0.0	0	0	0	0	0	0	0.2
187	55	628142	6046952	90	3	10	6	6	1	1	2.0	10.8	7.2	3.8	60.0	0.5	0	0	77.6	84.0	0	0	0	0	0	0	1.1
188	55	627887	6038243	190	1	13	4	5	0	1	35.0	119.0	10.2	1.4	0.0	0.2	0	4	79.0	48.0	1	1	1	1	0	1	0.0
193	55	626913	6036373	347	2	6	5	11	1	0	5.5	28.1	0.7	27.7	0.1	0.0	1	1	48.0	24.0	1	1	1	0	1	1	4.0
196	55	627835	6038500	180	3	7	3	5	0	0	41.0	17.3	0.3	0.5	0.0	0.0	6	3	95.0	54.0	1	1	1	1	1	1	85.9
207	55	646746	6026381	80	4	9	3	19	0	2	21.5	4.1	25.6	7.2	0.0	0.3	6	1	100.0	110.0	0	0	0	0	0	0	0.1
208	55	632677	6038494	180	3	11	3	10	0	1	26.7	12.6	1.4	1.8	0.0	0.2	0	0	72.0	165.0	0	0	0	0	0	0	0.0
210	55	647404	6030027	260	1	6	5	21	0	0	30.0	24.8	62.2	4.1	0.0	0.0	0	0	98.6	9.0	0	0	0	0	0	0	0.3

Table B.1 Vegetation integrity data

plot	zone	easting	northing	bearing	Comp Tree	Comp Shrub	Comp Grass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollow trees	Fun Litter Cover	Fun Len Fallen Logs	Fun Tree Stem 5 to 9	Fun Tree Stem 10 to 19	Fun Tree Stem 20 to 29	Fun Tree Stem 30 to 49	Fun Tree Stem 50 to 79	Fun Tree Regen	Fun High Threat Exotic
211	55	638667	6037714	256	2	5	4	17	0	0	20.5	4.4	70.7	4.8	0.0	0.0	0	0	21.0	75.0	0	0	1	1	0	1	0.3
212	55	648509	6038412	110	3	8	2	24	0	0	2.8	2.2	20.2	9.8	0.0	0.0	0	0	64.0	202.0	0	0	0	0	0	0	0.6
216	55	627033	6033444	211	6	7	5	18	0	2	22.3	6.9	72.3	4.0	0.0	0.3	4	4	28.0	43.0	1	1	1	1	1	1	0.2
218	55	625998	6038194	318	2	14	5	9	1	1	0.2	85.6	3.6	3.3	0.2	1.0	0	0	20.0	0.0	1	1	0	0	0	1	0.5
223	55	627499	6031739	155	4	5	6	18	2	3	37.0	8.6	62.2	11.0	1.1	4.0	8	3	40.0	277.0	1	1	1	1	1	1	0.2
225	55	637691	6036233	130	0	6	3	18	0	0	0.0	79.5	15.4	2.6	0.0	0.0	0	0	3.4	0.0	0	0	0	0	0	0	0.1
300	55	650236	6020385	103	0	0	2	3	0	0	0.0	0.0	50.0	0.4	0.0	0.0	0	0	50.0	0.0	0	0	0	0	0	0	1.0
301	55	649850	6020667	345	3	4	8	29	1	1	76.0	0.5	57.5	4.7	0.1	0.2	1	0	72.0	132.0	1	1	1	1	1	1	0.1
306	55	649818	6021020	342	1	2	10	15	0	0	40.0	0.2	39.0	10.5	0.0	0.0	0	0	30.0	13.0	0	0	1	1	0	1	0.0
307	55	648679	6040477	119	2	0	7	23	0	0	5.0	0.0	86.4	4.2	0.0	0.0	0	0	24.0	17.0	0	0	0	1	0	1	0.2
308	55	641678	6032634	45	0	5	7	31	0	0	0.0	27.3	47.9	16.7	0.0	0.0	0	0	24.0	2.0	0	0	0	0	0	0	0.5
309	55	643073	6036281	39	0	4	8	24	0	0	0.0	11.2	76.5	17.2	0.0	0.0	0	0	60.0	0.0	0	0	0	0	0	0	0.7
311	55	626627	6023086	10	0	2	5	9	1	0	0.0	0.2	1.7	1.0	0.2	0.0	0	0	22.0	0.0	0	0	0	0	0	0	0.5
312	55	635238	6029808	150	0	0	8	16	1	0	0.0	0.0	34.8	2.2	0.1	0.0	0	0	70.0	0.0	0	0	0	0	0	0	0.1
313	55	635245	6036864	35	0	3	9	13	0	0	0.0	3.7	56.7	2.0	0.0	0.0	0	0	54.0	0.0	0	0	0	0	0	0	0.1
314	55	643962	6036188	70	0	6	8	26	0	0	0.0	7.3	58.8	3.5	0.0	0.0	0	0	50.0	0.0	0	0	0	0	0	0	0.1
316	55	647014	6036326	322	0	7	11	27	1	0	0.0	11.2	39.9	4.5	0.1	0.0	0	0	27.6	0.0	0	0	0	0	0	0	0.2
319	55	650587	6020380	197	1	4	5	16	0	1	50.0	0.4	1.5	2.2	0.0	0.1	4	2	13.4	96.0	1	1	1	1	1	0	0.2
320	55	641625	6038374	152	2	7	7	25	0	1	15.0	54.3	55.7	3.8	0.0	0.1	2	1	24.0	83.0	1	1	0	1	0	1	0.1
321	55	641889	6032604	200	1	3	6	21	0	0	25.0	0.3	9.2	8.9	0.0	0.0	0	0	23.0	120.0	1	1	1	1	0	1	0.1
322	55	650400	6020130	169	1	2	8	16	0	0	0.3	0.2	44.6	66.5	0.0	0.0	0	0	3.8	0.0	0	0	0	0	0	0	0.2
325	55	648546	6039400	85	0	0	4	7	0	0	0.0	0.0	0.7	0.8	0.0	0.0	0	0	21.4	0.0	0	0	0	0	0	1	0.2
326	55	649871	6020181	37	2	9	7	22	0	0	13.0	82.7	16.0	44.6	0.0	0.0	0	0	39.0	8.0	0	1	1	1	0	1	0.2
329	55	629845	6027226	198	1	6	4	18	1	0	30.0	4.9	7.0	4.6	2.0	0.0	3	0	36.0	22.0	1	1	1	1	1	1	1.3
330	55	643036	6036374	36	1	6	6	22	0	0	0.2	26.1	37.5	9.4	0.0	0.0	0	0	25.0	163.0	0	0	0	0	0	1	1.0
331	55	648199	6038877	318	2	6	6	33	1	1	1.5	3.5	78.3	15.2	0.1	0.1	0	1	51.0	350.0	0	0	0	0	0	1	2.0
332	55	650449	6021179	45	2	7	4	11	0	0	35.0	16.6	21.2	1.3	0.0	0.0	1	0	73.0	107.0	1	1	1	1	1	1	0.0
1006	55	626686	6038254	310	0	0	5	0	0	0	0.0	0.0	3.5	0.0	0.0	0.0	0	0	28.0	0.0	0	0	0	0	0	0	35.0
1009	55	625222	6039994	140	0	4	5	1	1	0	0.0	2.7	31.5	0.1	0.1	0.0	0	0	44.0	0.0	0	0	0	0	0	1	20.2
1010	55	627687	6038170	355	4	13	10	3	0	1	38.1	43.2	18.6	0.3	0.0	0.1	0	0	96.2	59.0	1	1	1	1	0	1	50.4
1015	55	628254	6038817	105	3	15	6	3	0	4	32.0	94.3	9.2	0.4	0.0	0.4	1	1	87.0	31.0	1	1	1	1	1	1	0.0
1020	55	626931	6036666	319	2	5	7	6	0	0	45.0	22.3	40.2	0.6	0.0	0.0	0	0	94.6	0.0	0	1	1	1	1	1	46.3
1021	55	626180	6037291	105	2	5	8	2	1	0	25.0	56.2	7.9	0.2	0.1	0.0	0	0	90.6	16.0	1	1	0	0	1	1	5.0
1022	55	627546	6032057	93	3	8	8	21	0	2	42.0	22.6	76.2	5.6	0.0	2.1	5	5	58.0	143.0	1	1	1	1	1	1	3.2
1024	55	626892	6033322	315	1	9	10	18	1	1	5.0	20.3	71.6	2.3	25.0	0.1	0	0	33.0	8.0	0	0	0	0	0	0	1.2
1025	55	626745	6037929	53	3	4	3	1	0	0	36.0	96.0	17.0	0.1	0.0	0.0	0	0	67.0	58.0	1	1	1	1	0	1	1.1

Table B.1 Vegetation integrity data

plot	zone	easting	northing	bearing	Comp Tree	Comp Shrub	Comp Grass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollow trees	Fun Litter Cover	Fun Len Fallen Logs	Fun Tree Stem 5 to 9	Fun Tree Stem 10 to 19	Fun Tree Stem 20 to 29	Fun Tree Stem 30 to 49	Fun Tree Stem 50 to 79	Fun Tree Regen	Fun High Threat Exotic
1046	55	625823	6039178	0	1	3	4	2	0	0	70.0	20.2	8.4	0.2	0.0	0.0	0	0	77.0	25.0	1	1	1	0	0	1	35.2
1047	55	625935	6039186	0	1	11	7	1	0	1	50.0	46.9	4.7	0.1	0.0	0.1	0	0	72.4	16.0	1	1	1	1	0	1	0.2
1048	55	627677	6038086	105	2	5	7	4	0	0	9.0	1.4	5.8	0.4	0.0	0.0	0	0	14.0	5.0	1	1	1	0	0	0	37.6
1050	55	629134	6027981	20	2	6	4	14	0	2	46.0	39.3	45.3	2.8	0.0	0.3	4	3	65.0	130.0	1	1	1	1	1	1	0.2
2002	55	649472	6036595	110	0	16	20	40	0	0	0.0	40.6	150.6	23.8	0.0	0.0	0	0	29.2	0.0	0	0	0	0	0	0	34.0
2009	55	628590	6038387	65	3	11	7	5	1	3	61.0	67.0	53.0	10.0	1.0	10.0	0	0	19.0	8.0	1	1	1	1	0	1	0.0
2030	55	633273	6029271	208	0	5	6	10	0	0	0.0	15.7	80.4	1.2	0.0	0.0	0	0	41.0	0.0	0	0	0	0	0	0	0.2
2049	55	648722	6040640	339	1	2	5	24	0	0	0.1	0.2	97.3	20.1	0.0	0.0	0	0	13.0	15.0	0	0	0	0	0	0	0.1
2063	55	646706	6025473	205	1	6	9	19	0	0	25.0	6.4	47.2	2.1	0.0	0.0	2	2	58.0	74.0	1	0	1	1	1	1	0.3
2068	55	630055	6024218	180	0	7	5	24	0	0	0.0	21.0	32.6	18.3	0.0	0.0	0	0	51.0	18.0	1	1	1	1	0	1	0.4
2119	55	626682	6036780	350	2	3	6	8	0	0	65.0	41.0	107.0	16.0	0.0	0.0	1	0	25.4	3.0	0	1	0	0	0	1	15.0
2133	55	626642	6038230	339	0	0	6	3	1	0	0.0	0.0	4.6	0.3	0.1	0.0	0	0	16.0	0.0	0	0	0	0	0	0	5.8
2142	55	630825	6039008	359	4	11	7	18	0	2	27.5	9.0	41.9	4.2	0.0	0.4	1	0	80.0	77.0	1	1	1	1	1	1	0.0
2145	55	647073	6029350	220	2	5	3	14	0	0	30.0	15.5	47.1	1.8	0.0	0.0	3	2	73.0	10.0	1	0	1	1	1	1	1.1
2161	55	625815	6039432	277	2	12	4	2	0	2	100.0	188.0	5.0	4.0	0.0	5.0	2	0	67.0	8.0	1	1	1	1	1	1	0.0
2170	55	648892	6040408	160	0	0	5	10	0	0	0.0	0.0	9.2	1.9	0.0	0.0	0	0	8.8	0.0	0	0	0	0	0	0	1.1
2172	55	631830	6027986	210	1	7	5	9	0	0	15.0	80.6	30.5	1.1	0.0	0.0	0	0	7.2	19.0	1	1	1	0	0	1	0.2
2180	55	626201	6038358	55	3	6	4	2	0	0	11.5	1.5	0.8	0.2	0.0	0.0	0	0	60.0	94.0	1	1	1	1	0	1	80.2
2191	55	634892	6029568	250	0	1	6	11	0	0	0.0	0.3	101.2	1.8	0.0	0.0	0	0	1.0	0.0	0	0	0	0	0	0	2.0
2195	55	635019	6028439	305	0	3	5	21	0	0	0.0	0.7	36.3	7.2	0.0	0.0	0	0	7.2	0.0	0	0	0	0	0	0	0.0
2204	55	633679	6038041	178	1	11	6	26	0	0	45.0	34.6	61.7	8.2	0.0	0.0	0	2	22.0	41.0	1	0	1	1	0	1	0.1
2216	55	633084	6028869	31	1	4	9	8	0	0	0.1	10.1	122.5	0.8	0.0	0.0	0	0	33.0	0.0	0	0	0	0	0	0	0.1
2220	55	634650	6029626	71	0	0	3	5	0	0	0.0	0.0	50.2	0.9	0.0	0.0	0	0	37.0	0.0	0	0	0	0	0	0	0.1
2236	55	645982	6022840	290	1	7	11	13	1	0	0.1	58.7	40.9	1.5	0.1	0.0	0	0	15.0	9.0	0	0	0	0	0	1	0.1
2237	55	646940	6029409	5	0	7	8	10	0	0	0.0	46.0	49.0	1.1	0.0	0.0	0	0	70.0	0.0	0	0	0	0	0	0	0.2
2238	55	648998	6035286	200	2	5	5	26	0	0	0.2	1.4	93.6	3.3	0.0	0.0	0	0	28.0	5.0	0	0	0	0	0	0	0.4
2244	55	648954	6035099	178	1	2	8	17	0	0	0.1	0.2	79.6	4.6	0.0	0.0	0	0	9.6	16.0	0	0	0	0	0	0	0.5
2250	55	646400	6025212	15	0	4	5	13	1	0	0.0	1.5	45.4	1.3	0.2	0.0	0	0	31.0	0.0	0	0	0	0	0	0	0.3
2262	55	648671	6039793	9	0	1	4	6	0	0	0.0	0.1	53.9	23.5	0.0	0.0	0	0	5.4	0.0	0	0	0	0	0	0	0.4
2265	55	626599	6038070	30	3	8	4	2	0	1	62.3	37.1	5.5	0.3	0.0	0.1	1	6	85.4	32.0	1	1	1	1	0	1	0.0
2267	55	625402	6039367	274	3	10	10	6	0	0	60.1	23.6	10.1	1.0	0.0	0.0	0	0	83.8	67.0	1	1	1	1	0	1	83.0
2269	55	624597	6040798	180	2	18	7	11	0	1	40.0	58.0	25.0	3.3	0.0	1.0	0	0	20.0	12.0	1	1	1	1	0	1	2.0
2273	55	651223	6020792	286	3	2	9	17	0	0	30.2	1.1	5.8	1.8	0.0	0.0	9	0	12.0	96.0	0	0	0	1	1	1	0.3
2275	55	650061	6021751	45	1	6	7	14	0	0	8.0	4.6	64.4	1.6	0.0	0.0	0	0	36.0	0.0	1	1	1	1	0	1	5.0
2276	55	624564	6041771	154	5	12	8	14	0	1	15.9	46.6	61.2	1.7	0.0	0.2	2	0	49.0	33.0	1	1	1	1	1	1	6.3
2284	55	625379	6039763	172	0	3	2	9	0	0	0.0	7.6	36.0	5.8	0.0	0.0	0	0	3.6	0.0	0	0	0	0	0	0	40.1

Table B.1 Vegetation integrity data

plot	zone	easting	northing	bearing	Comp Tree	Comp Shrub	Comp Grass	Comp Forbs	Comp Ferns	Comp Other	Struc Tree	Struc Shrub	Struc Grass	Struc Forbs	Struc Ferns	Struc Other	Fun Large Trees	Fun Hollow trees	Fun Litter Cover	Fun Len Fallen Logs	Fun Tree Stem 5 to 9	Fun Tree Stem 10 to 19	Fun Tree Stem 20 to 29	Fun Tree Stem 30 to 49	Fun Tree Stem 50 to 79	Fun Tree Regen	Fun High Threat Exotic
3003	55	626091	6039215	260	3	13	5	7	0	2	47.0	77.7	90.3	1.0	0.0	0.2	0	0	19.0	31.0	1	1	1	1	0	0	25.4
3006	55	632621	6038431	220	2	11	4	13	0	1	80.0	42.3	15.3	10.1	0.0	0.1	0	0	81.6	620.0	1	1	1	0	0	1	0.0
3029	55	625861	6039179	38	0	1	4	5	1	1	0.0	0.3	85.4	3.5	0.2	0.2	0	0	12.4	0.0	1	1	0	0	0	0	70.0
3060	55	626432	6038192	230	4	9	7	5	0	1	51.0	33.5	22.2	0.8	0.0	0.1	0	0	76.4	65.0	1	1	1	1	0	0	2.4
3076	55	626306	6039139	250	3	16	5	5	0	2	54.0	184.0	41.0	8.0	0.0	7.0	0	1	86.0	22.0	1	1	1	1	0	1	0.0
3101	55	625169	6040320	310	3	7	4	4	1	1	25.0	126.0	15.0	4.0	5.0	1.0	0	0	10.0	10.0	1	1	0	1	0	1	10.0
3117	55	631615	6038949	300	4	12	7	12	0	2	64.0	25.3	10.7	3.2	0.0	1.4	2	0	75.8	103.0	1	1	1	1	1	1	0.0
3151	55	628437	6038776	345	2	17	8	13	1	2	36.0	33.9	38.1	4.1	1.0	0.2	0	4	40.4	20.0	1	1	1	1	0	1	3.0
3152	55	648639	6038975	58	0	3	6	22	0	1	0.0	0.3	40.6	52.3	0.0	0.1	0	0	20.0	0.0	1	0	0	0	0	0	0.0
3155	55	628057	6038746	17	3	25	10	13	0	3	37.0	93.7	13.9	5.2	0.0	0.8	0	5	51.6	15.0	1	1	1	1	0	1	0.0
3173	55	645908	6023170	103	3	4	4	19	0	2	65.0	14.2	5.4	4.7	0.0	0.6	6	2	67.8	261.0	1	1	1	1	1	1	0.0
3179	55	626865	6036771	250	2	5	6	8	0	0	120.0	59.0	83.0	14.0	0.0	0.0	1	0	45.0	1.0	1	1	1	1	0	1	21.0
3181	55	649433	6038349	152	0	2	1	4	0	0	0.0	2.1	0.1	0.8	0.0	0.0	0	0	33.0	0.0	0	0	0	0	0	0	32.0
3184	55	626438	6037953	47	3	6	2	4	1	1	62.0	41.0	0.2	2.3	0.1	0.1	3	0	38.8	48.0	1	1	1	1	1	1	85.1
3193	55	629424	6039453	158	3	15	3	3	0	2	47.2	18.5	15.2	0.4	0.0	0.5	0	24	34.0	15.0	1	1	1	1	0	1	0.0
3205	55	629292	6039367	113	3	18	3	5	0	1	30.5	15.7	3.2	0.5	0.0	1.0	0	0	8.6	1.0	1	1	1	1	0	1	0.0
3213	55	625702	6039227	215	0	0	2	0	0	0	0.0	0.0	50.1	0.0	0.0	0.0	0	0	1.0	0.0	0	0	0	0	0	0	30.1
3222	55	628871	6038616	338	2	16	6	13	0	2	8.1	33.4	60.6	2.3	0.0	0.2	0	1	13.0	23.0	1	1	1	1	0	1	0.2
3303	55	628408	6027220	228	0	5	7	15	0	0	0.0	2.1	81.3	9.9	0.0	0.0	0	0	68.0	0.0	0	0	0	0	0	0	0.1
5205	55	630576	6038891	280	3	12	4	16	0	2	21.0	46.8	80.7	2.1	0.0	0.6	1	1	56.6	31.0	1	1	1	1	0	1	0.0
5211	55	630229	6039070	41	3	14	4	4	0	1	60.0	45.6	25.5	0.9	0.0	0.5	3	2	78.6	25.0	1	1	1	1	1	0	0.0
167M	55	648817	6037148	328	2	4	6	8	0	0	12.0	7.3	45.4	6.6	0.0	0.0	1	0	35.0	20.0	0	1	1	1	1	1	0.0
207D	55	646746	6026381	80	4	9	3	19	0	2	21.5	4.1	25.6	7.2	0.0	0.3	6	1	100.0	110.0	0	0	0	0	0	0	0.1
210P	55	647404	6030027	260	1	6	5	21	0	0	30.0	24.8	62.2	4.1	0.0	0.0	0	0	98.6	9.0	0	0	0	0	0	0	0.3
2195B	55	635019	6028439	305	0	3	5	21	0	0	0.0	0.7	36.3	7.2	0.0	0.0	0	0	7.2	0.0	0	0	0	0	0	0	0.0
3076B	55	626306	6039139	250	3	16	5	5	0	2	54.0	184.0	41.0	8.0	0.0	7.0	0	1	86.0	22.0	1	1	1	1	0	1	0.0
3184M	55	626438	6037953	47	3	6	2	4	1	1	62.0	41.0	0.2	2.3	0.1	0.1	3	0	38.8	48.0	1	1	1	1	1	1	85.1

Annexure C

Fauna survey effort summary

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Lobs Hole Ravine		LH	05-12-17	05-12-17	9:40	10:40	1:00
Bird surveys	Lobs Hole Ravine		GM	05-12-17	05-12-17	9:50	10:50	1:00
Bird surveys	Wallace Creek		GM , LH	05-12-17	05-12-17	12:15	13:15	1:00
Bird surveys	Marica		GM , LH	07-12-17	07-12-17	14:55	15:55	1:00
Bird surveys	Port Phillip track		NG , ED	07-12-17	07-12-17	8:07	9:13	1:06
Bird surveys	Wallace Creek		GM , LH	07-12-17	07-12-17	8:40	9:40	1:00
Bird surveys	Tantangara South		GM , LH	10-12-17	10-12-17	7:30	8:30	1:00
Bird surveys	Plateau		SW , LH	12-01-18	12-01-18	8:50	9:50	1:00
Bird surveys	Plateau		SW , LH	12-01-18	12-01-18	7:30	8:30	1:00
Bird surveys	Plateau		NG , LH	14-01-18	14-01-18	8:55	9:55	1:00
Bird surveys	Plateau		NG , LH	14-01-18	14-01-18	10:51	12:05	1:14
Bird surveys	Lobs Hole		DJ , AR	21-01-18	21-01-18	14:40	15:40	1:00
Bird surveys	Lobs Hole		DJ , AR	21-01-18	21-01-18	16:40	17:40	1:00
Bird surveys	Marica		AR , ACM	30-01-18	30-01-18	11:00	15:00	4:00
Bird surveys	Lobs Hole Ravine		GM , CK	07-02-18	07-02-18	7:25	8:25	1:00
Bird surveys	Lobs Hole Ravine		GM , CK	07-02-18	07-02-18	9:45	10:45	1:00
Bird surveys	Tantangara south		GM , CK	08-02-18	08-02-18	8:50	9:50	1:00
Bird surveys	Talbingo Dam	transect 1	DJ	16-03-18	16-03-18	8:20	9:00	0:40
Bird surveys	Talbingo Dam	transect 10	DJ	16-03-18	16-03-18	15:30	16:10	0:40
Bird surveys	Talbingo Dam	transect 2	DJ	16-03-18	16-03-18	9:00	9:40	0:40
Bird surveys	Talbingo Dam	transect 3	DJ	16-03-18	16-03-18	9:45	10:25	0:40
Bird surveys	Talbingo Dam	transect 4	DJ	16-03-18	16-03-18	10:40	11:20	0:40
Bird surveys	Talbingo Dam	transect 5	DJ	16-03-18	16-03-18	12:00	12:40	0:40

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Talbingo Dam	transect 6	DJ	16-03-18	16-03-18	12:45	13:25	0:40
Bird surveys	Talbingo Dam	transect 7	DJ	16-03-18	16-03-18	13:30	14:10	0:40
Bird surveys	Talbingo Dam	transect 8	DJ	16-03-18	16-03-18	14:10	14:50	0:40
Bird surveys	Talbingo Dam	transect 9	DJ	16-03-18	16-03-18	15:00	15:30	0:30
Bird surveys	Talbingo	BS1	GD , DK	16-10-18	16-10-18	8:08	9:08	1:00
Bird surveys	Talbingo	BS2	GD , DK	16-10-18	16-10-18	9:36	10:37	1:01
Bird surveys	Talbingo	BS3	GD , DK	16-10-18	16-10-18	10:48	11:48	1:00
Bird surveys	Talbingo	BS4	GD , DK	16-10-18	16-10-18	12:44	13:44	1:00
Bird surveys	Talbingo	BS5	GD , DK	16-10-18	16-10-18	13:52	14:52	1:00
Bird surveys	Tantangara south	BS19	AS, AR	01-11-18	01-11-18	11:45	15:30	3:45
Bird surveys	Tantangara south	BS21	CK, BR	03-11-18	03-11-18	14:02	14:55	0:53
Bird surveys	Tantangara south	BS22	CK, BR	03-11-18	03-11-18	12:30	13:20	0:50
Bird surveys	Lobs Hole Ravine rd	BS13	CK, BR	04-11-18	04-11-18	13:16	14:20	1:04
Bird surveys	Tantangara south	BS20	AS, AR	04-11-18	04-11-18	8:05	11:05	3:00
Bird surveys	Lobs Hole Ravine rd	BS14	BR, CK, JB	05-11-18	05-11-18	10:45	13:39	2:54
Bird surveys	Tantangara	BS23	AS, AR	05-11-18	05-11-18	8:30	11:00	2:30
Bird surveys	Tantangara	BS24	AS, AR	05-11-18	05-11-18	11:30	13:45	2:15
Bird surveys	Talbingo Dam	BS5	DJ, BR	07-11-18	07-11-18	14:30	15:00	0:30
Bird surveys	Talbingo Dam Wall	BS6	PF, BR	07-11-18	07-11-18	15:00	15:30	0:30
Bird surveys	Alpine Hill Powerline	BS7	EL, CK, BR	08-11-18	08-11-18	10:46	11:31	0:45
Bird surveys	Alpine Hill Powerline	BS8	EL, CK, BR	08-11-18	08-11-18	11:35	12:15	0:40

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Lobs Hole Ravine rd	BS10	JB, DJ	29-11-18	29-11-18	10:55	11:40	0:45
Bird surveys	Lobs Hole Ravine rd	BS11	JB, DJ	29-11-18	29-11-18	8:26	9:30	1:04
Bird surveys	Lobs Hole Ravine rd	BS12	JB, DJ	29-11-18	29-11-18	9:40	10:29	0:49
Bird surveys	Lobs Hole Ravine rd	BS13	JB, DJ	29-11-18	29-11-18	14:11	15:34	1:23
Bird surveys	Gulf creek trail	BS17	DJ, BR	30-11-18	30-11-18	15:15	16:25	1:10
Bird surveys	Schofield trail	BS18	DJ, BR	30-11-18	30-11-18	13:34	14:45	1:11
Bird surveys	Alpine Hill Powerline	BS7	DJ, BR	01-12-18	01-12-18	15:27	16:25	0:58
Bird surveys	Alpine Hill Powerline	BS8	DJ, BR	01-12-18	01-12-18	16:28	17:02	0:34
Bird surveys	Tantangara	BS24	EL, AR	10-01-19	10-01-19	13:00	14:10	1:10
Bird surveys	Boundary Trail	BS15	EL, AR	11-01-19	11-01-19	10:15	12:00	1:45
Bird surveys	Boundary Trail	BS16	EL, AR	11-01-19	11-01-19	12:15	13:45	1:30
Bird surveys	Marica	BS3	EL, AR	12-01-19	12-01-19	10:10	11:50	1:40
Bird surveys	Marica	BS1	EL, AR	13-01-19	13-01-19	12:45	16:15	3:30
Bird surveys	Schofield trail	BS18	AS, BR	13-01-19	13-01-19	13:45	15:00	1:15
Bird surveys	Marica	BS2	EL, AR	13-01-19	13-01-19	10:00	12:00	2:00
Bird surveys	Tantangara south	BS20	AS, BR	14-01-19	14-01-19	14:58	15:58	1:00
Bird surveys	Lobs Hole Ravine rd	BS11	EL, AR	15-01-19	15-01-19	17:40	19:00	1:20
Bird surveys	Lobs Hole Ravine rd	BS12	AS, BR	15-01-19	15-01-19	17:45	18:45	1:00

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Tantangara south	BS19	AS, BR	15-01-19	15-01-19	7:36	8:58	1:22
Bird surveys	Tantangara south	BS21	EL, AR	15-01-19	15-01-19	6:20	8:20	2:00
Bird surveys	Tantangara south	BS22	EL, AR	15-01-19	15-01-19	9:35	10:55	1:20
Bird surveys	Tantangara	BS25	AS, BR	15-01-19	15-01-19	10:52	12:00	1:08
Bird surveys	Lobs Hole Ravine rd	BS10	AS, BR	16-01-19	16-01-19	12:30	13:45	1:15
Bird surveys	Lobs Hole Ravine rd	BS13	BR, AS	16-01-19	16-01-19	9:07	11:07	2:00
Bird surveys	Lobs Hole Ravine rd	BS14	EL, AR	16-01-19	16-01-19	9:21	11:25	2:04
Bird surveys	Tantangara	BS25	ER, AM	16-01-19	16-01-19	13:04	14:49	1:45
Bird surveys	Marica	BS4	ER, AM	16-01-19	16-01-19	7:43	10:53	3:10
Bird surveys	Lobs Hole Ravine rd	BS9	EL, AR	16-01-19	16-01-19	12:18	13:20	1:02
Bird surveys	Boundary Trail	BS15	AM, BR	17-01-19	17-01-19	8:15	9:04	0:49
Bird surveys	Boundary Trail	BS16	AS, ER	17-01-19	17-01-19	7:45	10:10	2:25
Bird surveys	Gulf creek trail	BS17	AM, BR	17-01-19	17-01-19	10:52	11:28	0:36
Bird surveys	Schofield trail	BS18	AS, ER	17-01-19	17-01-19	11:30	13:45	2:15
Bird surveys	Talbingo Dam	BS5	EL, AR	17-01-19	17-01-19	11:30	11:55	0:25
Bird surveys	Talbingo Dam Wall	BS6	AR, EL	17-01-19	17-01-19	12:50	13:50	1:00
Bird surveys	Alpine Hill Powerline	BS7	CK, IC	17-01-19	17-01-19	6:54	8:30	1:36
Bird surveys	Alpine Hill Powerline	BS8	CK, IC	17-01-19	17-01-19	9:30	10:20	0:50
Bird surveys	Lobs Hole Ravine rd	BS14	CK, IC	20-01-19	20-01-19	14:20	15:40	1:20

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Tantangara south	BS21	ER, MW	20-01-19	20-01-19	14:04	16:00	1:56
Bird surveys	Tantangara	BS23	ER, MW	21-01-19	21-01-19	9:30	11:30	2:00
Bird surveys	Gulf creek trail	BS17	ER, MW	23-01-19	23-01-19	14:39	15:17	0:38
Bird surveys	Tantangara south	BS20	CK, IC	24-01-19	24-01-19	11:45	12:20	0:35
Bird surveys	Tantangara south	BS22	ER, MW	24-01-19	24-01-19	14:00	15:15	1:15
Bird surveys	Marica	BS1	JW, GS	31-01-19	31-01-19	16:08	16:40	0:32
Bird surveys	Marica	BS2	JW, GS	31-01-19	31-01-19	16:48	17:28	0:40
Bird surveys	Marica	BS3	JW, GS	01-02-19	01-02-19	16:05	17:10	1:05
Bird surveys	Marica	BS4	JW, GS	01-02-19	01-02-19	17:34	17:51	0:17
Bird surveys	Tantangara south	BS19	JW, GS	03-02-19	03-02-19	16:08	17:28	1:20
Bird surveys	Tantangara	BS23	JW, GS	04-02-19	04-02-19	17:13	17:50	0:37
Bird surveys	Tantangara	BS24	JW, GS	04-02-19	04-02-19	15:32	16:00	0:28
Bird surveys	Lobs Hole Ravine rd	BS11	JW, GS	05-02-19	05-02-19	17:01	17:37	0:36
Bird surveys	Lobs Hole Ravine rd	BS12	JW, GS	05-02-19	05-02-19	16:11	16:55	0:44
Bird surveys	Talbingo Dam	BS5	JB, DF	05-02-19	05-02-19	17:48	18:00	0:12
Bird surveys	Talbingo Dam Wall	BS6	JB, DJ	05-02-19	05-02-19	17:00	17:33	0:33
Bird surveys	Boundary Trail	BS15	GS, JW	07-02-19	07-02-19	16:06	16:54	0:48
Bird surveys	Boundary Trail	BS16	GS, JW	08-02-19	08-02-19	10:48	11:43	0:55
Bird surveys	Tantangara	BS25	GS, JW	08-02-19	08-02-19	13:48	14:40	0:52
Bird surveys	Marica	BS2	AS, IC	11-02-19	11-02-19	13:00	13:42	0:42
Bird surveys	Marica	BS1	AS, IC	12-02-19	12-02-19	13:40	14:40	1:00

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Lobs Hole Ravine rd	BS10	JB, DF	14-02-19	14-02-19	13:52	14:52	1:00
Bird surveys	Marica	BS4	AS, IC	14-02-19	14-02-19	15:00	15:40	0:40
Bird surveys	Marica	BS3	JB, IC	05-03-19	05-03-19	10:37	11:39	1:02
Bird surveys	Rock Forest	BS30	JB OM	07-04-19	07-04-19	14:15	15:50	1:35
Bird surveys	Alpine trail	BS29	JB OM	08-04-19	08-04-19	9:45	11:44	1:59
Bird surveys	Rock Forest	BS31	JB OM	08-04-19	08-04-19	14:10	15:00	0:50
Bird surveys	Middle Creek	BS26	CW, DK	11-04-19	11-04-19	12:08	13:44	1:36
Bird surveys	Lobs Hole Ravine rd	BS27	CW, DK	12-04-19	12-04-19	10:50	11:50	1:00
Bird surveys	Rock Forest	BS31	IM, DK	15-04-19	15-04-19	10:49	12:54	2:05
Bird surveys		BS47	AR CB	25-10-19	25-10-19	11:44	12:27	0:43
Bird surveys	Bullocks Hill	BS49	CB AR	27-10-19	27-10-19	8:11	8:59	0:48
Bird surveys	Bullocks Hill	BS48	CB AR	27-10-19	27-10-19	9:05	9:38	0:33
Bird surveys	Link Rd	BS54	CB AR	28-10-19	28-10-19	8:22	9:20	0:58
Bird surveys	Links Rd (near Lobs Hole Ravine Rd)	BS53	CB AR	28-10-19	28-10-19	9:36	10:24	0:48
Bird surveys	Nungar Creek Trail. Low eucalyptus woodland	BS50	CB AR	28-10-19	28-10-19	11:46	12:29	0:42
Bird surveys	Lobs Hole - North Road	BS41	AR CB	30-10-19	30-10-19	9:27	11:01	1:33
Bird surveys	Talbingo Reservoir	BS40	AR CB	30-10-19	30-10-19	11:04	12:19	1:15
Bird surveys	Nungar trail. Open Eucalyptus woodland	BS51	AR CB	31-10-19	31-10-19	10:06	10:35	0:29

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Bird surveys	Nungar trail	BS52	AR CB	31-10-19	31-10-19	11:14	11:51	0:36
Bird surveys	Rock forest	BS42	CK AM	06-11-19	06-11-19	7:49	9:49	1:59
Bird surveys	Rock forest	BS43	CK AM	06-11-19	06-11-19	10:09	11:15	1:05
Bird surveys	lobs hole	BS55	CW AR	19-11-19	19-11-19	9:08	10:14	1:06
Bird surveys	Lobs Hole new area	BS55	AR- KS	22-11-19	22-11-19	9:04	10:17	1:12
Bird surveys	Rock forest	BS43	KS, LH	10-12-19	10-12-19	7:12	8:13	1:01
Bird surveys		LOBSNTH-MOD2	EL AR	10-12-19	10-12-19	10:08	15:51	5:43
Bird surveys	Rock Forest	BS42	KS, LH	11-12-19	11-12-19	6:22	7:32	1:09
Bird surveys	Rock forest	BS31	KS, LH	11-12-19	11-12-19	9:10	11:10	1:59
Bird surveys	link rd near 3 mile dam	BS54	AR KS	12-12-19	12-12-19	7:46	9:39	1:53
Bird surveys	Lobs Hole	BS41	EL GM	13-12-19	13-12-19	9:24	11:40	2:16
Bird surveys	Lobs Hole	BS40	EL GM	13-12-19	13-12-19	11:55	13:53	1:58
Bird surveys	Off bullocks	BS47	PFLH	16-12-19	16-12-19	7:09	8:25	1:16
Bird surveys	Off bullocks hill fire trail	BS49	PFLH	16-12-19	16-12-19	8:25	9:37	1:11
Bird surveys	Off bullocks hill firetrail	BS48	PFLH	16-12-19	16-12-19	9:43	10:57	1:14
Bird surveys	nungar creek	BS52	PFLH	17-12-19	17-12-19	6:22	7:22	1:00
Bird surveys	Bullocks Hill area	BS51	PFLH	17-12-19	17-12-19	8:11	9:37	1:26
Bird surveys	Link Rd	BS50	PFLH	17-12-19	17-12-19	9:55	10:59	1:04
Bird surveys	Bullocks Hill area	BS47	EL GM	17-12-19	17-12-19	17:10	18:22	1:12
Bird surveys	Link Rd	BS53	EL JB	18-12-19	18-12-19	17:12	18:22	1:09
Owl surveys	Lobs Hole Ravine	LHRR1	JB , DK	07-05-18	20-06-19			8

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Owl surveys	Lobs Hole Ravine	LHRR2	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR3	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR4	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR5	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR6	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR7	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR8	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR9	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR10	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR11	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR12	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR13	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR13	JB , DK	16-06-19	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR14	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR15	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR16	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR17	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR18	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR19	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR20	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR21	JB , DK	07-05-18	20-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR22	JB , DK	16-06-19	26-06-19			8
Owl surveys	Lobs Hole Ravine	LHRR23	JB , DK	16-06-19	26-06-19			8

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Owl surveys	Lobs Hole Ravine	LHRR24	JB , DK	16-06-19	26-06-19			8
Owl surveys	Marica	MT1	JB , DK	08-05-18	20-06-19			8
Owl surveys	Marica	MT2	JB , DK	08-05-18	12-05-18			4
Owl surveys	Marica	MT3	JB , DK	08-05-18	20-06-19			8
Owl surveys	Marica	MT4	JB , DK	08-05-18	20-06-19			8
Owl surveys	Marica	MT5	JB , DK	08-05-18	20-06-19			8
Owl surveys	Marica	MT6	JB , DK	08-05-18	20-06-19			8
Owl surveys	Marica	MT7	JB , DK	08-05-18	12-05-18			4
Owl surveys	Marica	MT9	JB , DK	16-06-19	20-06-19			4
Terrestrial trapping	Marica	TA01	NG , ED	08-12-17	12-12-17			4
Terrestrial trapping	Lobs Hole Ravine	TA02	GM , LH	04-12-17	08-12-17			4
Terrestrial trapping	Lobs Hole	TAT01	NG , ED	12-12-17	16-12-17			4
Terrestrial trapping	Talbingo Reservoir (south of boat ramp)	TAT02	SW, DJ , KS	17-03-18	22-03-18			4
Terrestrial trapping	Lobs Hole Ravine	TAT03	GM , LH	04-12-17	08-12-17			4
Terrestrial trapping	Marica	TAT05	NG , ED	08-12-17	12-12-17			4
Terrestrial trapping	Lobs Hole Ravine Road	TAT06	NG , ED	12-12-17	16-12-17			4
Terrestrial trapping	Talbingo Intake	TAT07	SW, DJ , KS	17-03-18	22-03-18			4
Terrestrial trapping	Yarrangobilly River	TAT08	SW, DJ , KS	17-03-18	22-03-18			4
Terrestrial trapping	Link Rd	TAT09	SW, DJ , KS	17-03-18	22-03-18			4
Terrestrial trapping	Plateau	TT01	SW , KS	06-02-18	10-02-18			4
Terrestrial trapping	Tantangara north	TT02	NG	04-12-17	08-12-17			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Terrestrial trapping	Marica	TT03	NG , ED	08-12-17	12-12-17			4
Terrestrial trapping	Marica	TT04	NG , ED	08-12-17	12-12-17			4
Terrestrial trapping	Tantangara Dam	TT05	GM , LH	08-12-17	12-12-17			4
Terrestrial trapping	Port Phillip Trail	TT06	NG	04-12-17	08-12-17			4
Terrestrial trapping	Lobs Hole	TT07	NG , ED	12-12-17	16-12-17			4
Terrestrial trapping	Tantangara Dam	TT08	GM , LH	08-12-17	12-12-17			4
Terrestrial trapping	Plateau	TT09	SW , KS	06-02-18	10-02-18			4
Terrestrial trapping	Wallace's creek trail	TT-1	GD, EL	30-10-18	04-11-18			4
Terrestrial trapping	Port Phillip Trail	TT10	NG	04-12-17	08-12-17			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-10	CK, GM	14-10-18	18-10-18			4
Terrestrial trapping	Plateau, Bullocks Hill Trail	TT11	NG	04-12-17	08-12-17			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-11	CK, GM	14-10-18	18-10-18			4
Terrestrial trapping	Tantangara Dam	TT12	GM , LH	08-12-17	12-12-17			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-12	CK, GM	14-10-18	18-10-18			4
Terrestrial trapping	Tantangara Dam	TT13	GM , LH	08-12-17	12-12-17			4
Terrestrial trapping	Tantangara Camp	TT-13	JB, AS	12-03-19	16-03-19			4
Terrestrial trapping	Plateau	TT14	SW , KS	06-02-18	10-02-18			4
Terrestrial trapping	Tantangara south	TT-14	AR, ER	29-11-18	03-12-18			4
Terrestrial trapping	Lobs Hole Ravine	TT15	GM , LH	04-12-17	08-12-17			4
Terrestrial trapping	Tantangara south	TT-15	AR, ER	29-11-18	03-12-18			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Terrestrial trapping	Hains Hut Trail	TT16	GM , LH	04-12-17	04-12-17			4
Terrestrial trapping	Tantangara North	TT-16	JB, AS	12-03-19	16-03-19			4
Terrestrial trapping	Lobs Hole Ravine	TT17	SW, DJ , KS	17-03-18	22-03-18			4
Terrestrial trapping	Kings cross rd	TT-17	GD, EL	04-11-18	14-11-18			4
Terrestrial trapping	Kings cross rd	TT-18	GD, EL	04-11-18	14-11-18			4
Terrestrial trapping	Kings cross rd	TT-19	GD, EL	04-11-18	14-11-18			4
Terrestrial trapping	Marica	TT-2	GD, EL	30-10-18	04-11-18			4
Terrestrial trapping	Kings cross rd	TT-20	GD, EL	04-11-18	14-11-18			4
Terrestrial trapping	Three mile dam	TT-21	GM, PF	23-10-18	27-10-18			4
Terrestrial trapping	Three mile dam	TT-22	GM, PF	23-10-18	27-10-18			4
Terrestrial trapping	Three mile dam	TT-23	GM, PF	23-10-18	27-10-18			4
Terrestrial trapping	Three mile dam	TT-24	GM, PF	23-10-18	27-10-18			4
Terrestrial trapping	Tantangara	TT-25	GM, PF	27-10-18	31-10-18			4
Terrestrial trapping	Tantangara	TT-26	GM, PF	27-10-18	31-10-18			4
Terrestrial trapping	Tantangara	TT-27	GM, PF	27-10-18	31-10-18			4
Terrestrial trapping	Tantangara	TT-28	GM, PF	27-10-18	31-10-18			4
Terrestrial trapping	Talbingo	TT-29	PF, AS	18-11-18	26-11-18			4
Terrestrial trapping	Wallace Creek Trail	TT-3	GD, EL	30-10-18	04-11-18			4
Terrestrial trapping	Talbingo	TT-30	PF, AS	18-11-18	26-11-18			4
Terrestrial trapping	Talbingo	TT-31	PF, AS	18-11-18	26-11-18			4
Terrestrial trapping	Talbingo	TT-32	PF, AS	18-11-18	26-11-18			4
Terrestrial trapping	Marica	TT-33	BR, LH	29-11-18	03-12-18			4
Terrestrial trapping	Marica	TT-34	BR, LH	29-11-18	03-12-18			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Terrestrial trapping	Marica	TT-35	BR, LH	29-11-18	03-12-18			4
Terrestrial trapping	Marica	TT-36	BR, LH	29-11-18	03-12-18			4
Terrestrial trapping	Sawmill / Alpine powerline track	TT-37	GM, AM	12-02-19	16-02-19			4
Terrestrial trapping	Sawmill / Alpine powerline track	TT-38	GM, AM	12-02-19	16-02-19			4
Terrestrial trapping	Sawmill / Alpine powerline track	TT-39	GM, AM	12-02-19	16-02-19			4
Terrestrial trapping	Snowy HWY	TT-4	GD, EL	30-10-18	04-11-18			4
Terrestrial trapping	Sawmill / Alpine powerline track	TT-40	GM, AM	12-02-19	16-02-19			4
Terrestrial trapping	Schofields track	TT-41	GM, AM	16-02-19	20-02-19			4
Terrestrial trapping	Schofields track	TT-42	GM, AM	16-02-19	20-02-19			4
Terrestrial trapping	Circuits trail	TT-43	GM, AM	16-02-19	20-02-19			4
Terrestrial trapping	Brayshaws trail	TT-44	GM, AM	16-02-19	20-02-19			4
Terrestrial trapping	Circuit trail	TT-45	AR, ER	29-11-18	03-12-18			4
Terrestrial trapping	Circuit trail	TT-46	AR, ER	29-11-18	03-12-18			4
Terrestrial trapping	Tantangara Quarry	TT-49	JB, AS	12-03-19	16-03-19			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-5	DJ, KS	12-10-18	16-10-18			4
Terrestrial trapping	Tantangara	TT-50	IM, DK	13-04-19	17-04-19			4
Terrestrial trapping	Alpine Trail	TT-51	JB OM	05-04-19	09-04-19			4
Terrestrial trapping	Nungar trail	TT-52	JB OM	05-04-19	09-04-19			4
Terrestrial trapping	Lobs Hole Ravine	TT-54	DK, CW	09-04-19	13-04-19			4
Terrestrial trapping	Rock Forest	TT-59	JB OM	05-04-19	09-04-19			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Terrestrial trapping	Lobs Hole Ravine rd	TT-6	DJ, KS	12-10-18	16-10-18			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-7	DJ, KS	12-10-18	16-10-18			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-8	DJ, KS	12-10-18	16-10-18			4
Terrestrial trapping	Lobs Hole Ravine rd	TT-9	JB, AS	16-03-19	20-03-19			4
Remote cameras - small	Lobs Hole Ravine	RC01-0743	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Lobs Hole Ravine	RC01-5218	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Lobs Hole Ravine	RC01-0593	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Lobs Hole Ravine	RC01-4961	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Lobs Hole Ravine Road	RC01-5412	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Lobs Hole Ravine Road	RC01-0741	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Marica	RC01-5257	NG , ED	06-12-17	11-12-17			5
Remote cameras - small	Marica	RC01-0411	NG , ED	06-12-17	11-12-17			5
Remote cameras - small	Port Phillip Track	RC01-0759	NG , ED	06-12-17	11-12-17			5
Remote cameras - small	Port Phillip Track	RC01-5220	NG , ED	06-12-17	11-12-17			5

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Bullocks Hill	RC01-5254	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Bullocks Hill	RC01-5219	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Bullocks Hill	RC01-0561	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Bullocks Hill	RC01-5143	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Bullocks Hill	RC01-0576	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Bullocks Hill	RC01-5198	GM , LH	06-12-17	11-12-17			5
Remote cameras - small	Lobs Hole Ravine Road	RC02-0411		12-12-17	16-12-17			4
Remote cameras - small	Lobs Hole Ravine Road	RC02-0561		12-12-17	16-12-17			4
Remote cameras - small	Tantangara south	RC02-0576		12-12-17	16-12-17			4
Remote cameras - small	Nungar trail	RC02-0593		12-12-17	16-12-17			4
Remote cameras - small	Bullocks Hill	RC02-0741		12-12-17	16-12-17			4
Remote cameras - small	Tantangara south	RC02-0743		12-12-17	16-12-17			4
Remote cameras - small	Tantangara south	RC02-0759		12-12-17	16-12-17			4
Remote cameras - small	Nungar trail	RC02-4961		12-12-17	16-12-17			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Lobs Hole Ravine Road	RC02-5143		12-12-17	16-12-17			4
Remote cameras - small	Lobs Hole Ravine Road	RC02-5198		12-12-17	16-12-17			4
Remote cameras - small	Tantangara south	RC02-5218		12-12-17	16-12-17			4
Remote cameras - small	Tantangara south	RC02-5219		12-12-17	16-12-17			4
Remote cameras - small	Bullocks Hill	RC02-5220		12-12-17	16-12-17			4
Remote cameras - small	Bullocks Hill	RC02-5254		12-12-17	16-12-17			4
Remote cameras - small	Bullocks Hill	RC02-5257		12-12-17	16-12-17			4
Remote cameras - small	Tantangara south	RC02-5412		12-12-17	16-12-17			4
Remote cameras - small	Marica	RC03-0411		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-0561		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-0593		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-0743		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-0759		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-4961		17-12-17	30-12-17			13

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Marica	RC03-5143		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-5219		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-5220		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-5254		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-5257		17-12-17	30-12-17			13
Remote cameras - small	Marica	RC03-5412		17-12-17	30-12-17			13
Remote cameras - small	Lobs Hole Ravine	RC04-7487	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7906	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7510	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-4961	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-5412	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7480	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7774	CD , LH	09-01-18	25-01-18			16
Remote cameras - small	Lobs Hole Ravine	RC04-5257	CD , LH	09-01-18	26-01-18			17

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Lobs Hole Ravine	RC04-7855	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-5218	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7778	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-5143	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7636	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-0898	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-5220	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-5219	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7683	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-5198	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7716	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Lobs Hole Ravine	RC04-7495	CD , LH	09-01-18	26-01-18			17
Remote cameras - small	Marica	RC05-5143	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-5412	CK , SW	27-01-18	10-02-18			14

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Marica	RC05-5218	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-4961	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-5219	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-5257	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-5198	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-5220	CK , SW	27-01-18	10-02-18			14
Remote cameras - small	Marica	RC05-7480	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Marica	RC05-7495	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7906	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-0898	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7855	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7510	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7636	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7778	CK , SW	28-01-18	10-02-18			13

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Talbingo Intake	RC05-7683	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7774	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7487	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Talbingo Intake	RC05-7716	CK , SW	28-01-18	10-02-18			13
Remote cameras - small	Marica	RC06-7683	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Marica	RC06-7480	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Marica	RC06-7487	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Marica	RC06-0898	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Bullocks Hill track	RC06-5198	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Bullocks Hill track	RC06-7778	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Wallace Creek Fire Trail	RC06-5257	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Wallace Creek Fire Trail	RC06-5219	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Coppermine Trail	RC06-4961	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Coppermine Trail	RC06-5143	CK , GM	11-02-18	22-02-18			11

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Bullocks Hill track	RC06-7855	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Bullocks Hill track	RC06-7636	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Plateau	RC06-7510	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Plateau	RC06-7716	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Plateau	RC06-7906	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Plateau	RC06-7774	CK , GM	11-02-18	22-02-18			11
Remote cameras - small	Marica	RC06-7495	CK , GM	12-02-18	22-02-18			10
Remote cameras - small	Marica	RC06-5218	CK , GM	12-02-18	22-02-18			10
Remote cameras - small	Marica	RC06-5412	CK , GM	12-02-18	22-02-18			10
Remote cameras - small	Marica	RC06-5220	CK , GM	12-02-18	22-02-18			10
Remote cameras - small	Lobs Hole Ravine Road	RC07-5220	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-5198	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7510	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7480	DK , AR	23-02-18	09-03-18			14

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Lobs Hole Ravine Road	RC07-5218	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-5143	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7487	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-4961	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-5257	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7683	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-5412	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7774	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7855	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7636	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7495	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-5219	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7716	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7096	DK , AR	23-02-18	09-03-18			14

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Lobs Hole Ravine Road	RC07-0898	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole Ravine Road	RC07-7778	DK , AR	23-02-18	09-03-18			14
Remote cameras - small	Lobs Hole	RC08-5219	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7480	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7483	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7855	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7716	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-5143	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-5218	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7495	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-5220	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-5198	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-5412	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7636	JB , KS	10-03-18	24-03-18			14

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Lobs Hole	RC08-7906	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-5257	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-0898	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-4961	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7683	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7510	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7778	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Lobs Hole	RC08-7774	JB , KS	10-03-18	24-03-18			14
Remote cameras - small	Wallace Creek Fire Trail	RC09-7716	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Wallace Creek Fire Trail	RC09-5198	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Lobs Hole Ravine	RC09-5218	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-7855	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Talbingo Intake	RC09-7906	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Talbingo Intake	RC09-7495	SW , KS	26-03-18	20-04-18			25

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Boat Ramp	RC09-7683	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Boat Ramp	RC09-7774	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Lobs Hole Ravine	RC09-4961	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Lobs Hole Ravine	RC09-5257	SW , KS	26-03-18	20-04-18			25
Remote cameras - small	Lobs Hole Ravine	RC09-7636	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-7480	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-5220	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-5219	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-5143	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-7778	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-7510	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-7487	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-0898	SW , KS	26-03-18	19-04-18			24
Remote cameras - small	Lobs Hole Ravine	RC09-5412	SW , KS	26-03-18	19-04-18			24

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Lobs Hole Ravine	RC10-01A	DK, CW	10-04-19	09-05-19			29
Remote cameras - small	Lobs Hole Ravine	RC10-01B	DK, CW	10-04-19	09-05-19			29
Remote cameras - small	Tantangara rd	RC10-02A	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Tantangara rd	RC10-02B	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Lobs Hole Ravine	RC10-03A	DK, CW	10-04-19	09-05-19			29
Remote cameras - small	Lobs Hole Ravine	RC10-03B	DK, CW	10-04-19	09-05-19			29
Remote cameras - small	Tantangara rd	RC10-04A	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Tantangara rd	RC10-04B	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Rock Forest	RC10-05A	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Rock Forest	RC10-05B	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Rock Forest	RC10-06A	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Rock Forest	RC10-06B	JB, OM	06-04-19	07-05-19			31
Remote cameras - small	Marica	RC-BH4104A	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5212	JB, AS	15-03-19	04-04-19			20

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Marica	RC-BH4104B	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5201	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5202	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5203	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5204	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5211	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5208	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Marica	RC-BH5206	JB, AS	15-03-19	04-04-19			20
Remote cameras - small	Alpine creek trail	RC11-17A	CK AM	02-11-19	20-11-19			18
Remote cameras - small	Alpine creek fire trail	RC11-17B	CK AM	02-11-19	20-11-19			18
Remote cameras - small	Alpine creek trail	RC11-16B	CK AM	02-11-19	20-11-19			18
Remote cameras - small	Alpine creek trail	RC11-16A	CK AM	02-11-19	20-11-19			18
Remote cameras - small	Link road	RC11-18B	CK AM	03-11-19	20-11-19			17
Remote cameras - small	Link road	RC11-18A	CK AM	03-11-19	20-11-19			17

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Link road	RC11-19A	CK AM	03-11-19	20-11-19			17
Remote cameras - small	Link road	RC11-19B	CK AM	03-11-19	20-11-19			17
Remote cameras - small	Wallace's creek fire trail	RC11-07B	CK AM	03-11-19	20-11-19			17
Remote cameras - small	Wallace's creek fire trail	RC11-07A	CK AM	03-11-19	20-11-19			17
Remote cameras - small	Wallace's Creek	RC11-08B	CK AM	03-11-19	19-11-19			16
Remote cameras - small	Wallace's creek	RC11-08A	CK AM	03-11-19	19-11-19			16
Remote cameras - small	Nungar trail	RC11-15B	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Nungar trail	RC11-15A	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Bullocks hill trail	RC11-14A	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Rock forest	RC11-06A	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Rock forest	RC11-06B	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Rock forest	RC11-04B	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Rock forest	RC11-04A	CK AM	04-11-19	20-11-19			16
Remote cameras - small	Bullocks hill trail	RC11-14B	CK AM	04-11-19	20-11-19			16

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - small	Talbingo reservoir	RC11-03B	CK AM	05-11-19	23-11-19			18
Remote cameras - small	Talbingo reservoir	RC11-03A	CK AM	05-11-19	23-11-19			18
Remote cameras - small	Link Rd	RC11-20B	AR- KS	22-11-19	10-12-19			18
Remote cameras - small	link rd	RC11-20A	AR KS	22-11-19	10-12-19			18
Remote cameras - small	Talbingo dam	RC11-02A	AR CW	23-11-19	11-12-19			18
Remote cameras - small	Talbingo dam	RC11-02B	AR CW	23-11-19	11-12-19			18
Remote cameras - small	Talbingo dam	RC11-01B	AR CW	23-11-19	11-12-19			18
Remote cameras - small	Talbingo dam	RC11-01A	AR CW	23-11-19	11-12-19			18
Regional surveys	Goat ridge road	RSM-1A	DK, GD	12-10-18	30-10-18			18
Regional surveys	Goat ridge road	RSM-1B	DK, GD	12-10-18	30-10-18			18
Regional surveys	Goat ridge road	RSM-1C	AS, BR	11-01-19	01-02-19			21
Regional surveys	Goat ridge road	RSM-1D	AS, BR	11-01-19	01-02-19			21
Regional surveys	Goat ridge road	RSM-2A	DK, GD	12-10-18	30-10-18			18
Regional surveys	Goat ridge road	RSM-2B	DK, GD	12-10-18	30-10-18			18
Regional surveys	Goat ridge road	RSM-2C	AS, BR	11-01-19	01-02-19			21
Regional surveys	Goat ridge road	RSM-2D	AS, BR	11-01-19	01-02-19			21
Regional surveys	Goat ridge road	RSM-3A	DK, GD	13-10-18	31-10-18			18
Regional surveys	Goat ridge road	RSM-3B	DK, GD	13-10-18	31-10-18			18

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Goat ridge road	RSM-3C	AS, BR	12-01-19	30-01-19			18
Regional surveys	Goat ridge road	RSM-3D	AS, BR	12-01-19	30-01-19			18
Regional surveys	Link road	RSM-4A	DK, GD	12-10-18	31-10-18			19
Regional surveys	Link road	RSM-4B	DK, GD	12-10-18	31-10-18			19
Regional surveys	Link road	RSM-4C	AS, BR	12-01-19	30-01-19			18
Regional surveys	Link road	RSM-4D	AS, BR	12-01-19	30-01-19			18
Regional surveys	Goat ridge road	RSM-5A	DK, GD	14-10-18	31-10-18			17
Regional surveys	Goat ridge road	RSM-5B	DK, GD	14-10-18	31-10-18			17
Regional surveys	Goat ridge road	RSM-5C	AS, BR	12-01-19	04-02-19			23
Regional surveys	Goat ridge road	RSM-5D	AS, BR	12-01-19	04-02-19			23
Regional surveys	Link road	RSM-6A	DK, GD	14-10-18	31-10-18			17
Regional surveys	Link road	RSM-6B	DK, GD	14-10-18	31-10-18			17
Regional surveys	Link road	RSM-6C	AS, BR	12-01-19	04-02-19			23
Regional surveys	Link road	RSM-6D	AS, BR	12-01-19	04-02-19			23
Regional surveys	Link road	RSM-7A	DK, GD	13-10-18	30-10-18			17
Regional surveys	Link road	RSM-7B	DK, GD	13-10-18	30-10-18			17
Regional surveys	Link road	RSM-8A	DK, GD	13-10-18	30-10-18			17
Regional surveys	Link road	RSM-8B	DK, GD	13-10-18	30-10-18			17
Regional surveys	Link road	RSM-8C	AS, BR	14-01-19	03-02-19			20
Regional surveys	Link road	RSM-8D	AS, BR	14-01-19	03-02-19			20
Regional surveys	Lobs Hole Ravine rd	RSM-9A	DK, GD	15-10-18	30-10-18			15
Regional surveys	Lobs Hole Ravine rd	RSM-9B	DK, GD	15-10-18	30-10-18			15

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Link Rd/ Wallace's Ck firetrail/transmission line	RSM-10A	PF, ER	15-11-18	17-12-18			32
Regional surveys	Link Rd/ Wallace's Ck firetrail/transmission line	RSM-10B	PF, ER	15-11-18	17-12-18			32
Regional surveys	Link Rd/ Wallace's Ck firetrail/transmission line	RSM-10C	AR, EL	17-01-19	05-02-19			19
Regional surveys	Link Rd/ Wallace's Ck firetrail/transmission line	RSM-10D	AR, EL	17-01-19	05-02-19			19
Regional surveys	Goat ridge road	RSM-11A	DK, GD	15-10-18	30-10-18			15
Regional surveys	Goat ridge road	RSM-11B	DK, GD	15-10-18	30-10-18			15
Regional surveys	Goat ridge road	RSM-12A	DK, GD	14-10-18	30-10-18			16
Regional surveys	Goat ridge road	RSM-12B	DK, GD	14-10-18	30-10-18			16
Regional surveys	Dead Man's Firetrail	RSM-13A	DK, SV	27-10-18	15-11-18			19
Regional surveys	Dead Man's Firetrail	RSM-13B	DK, SV	27-10-18	15-11-18			19
Regional surveys	Dead Man's Firetrail	RSM-13C	AS, BR	14-01-19	03-02-19			20
Regional surveys	Dead Man's Firetrail	RSM-13D	AS, BR	14-01-19	03-02-19			20
Regional surveys	Ravine Road	RSM-14A	DK, SV	28-10-18	15-11-18			18

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Ravine Road	RSM-14B	DK, SV	28-10-18	15-11-18			18
Regional surveys	Ravine Road	RSM-14C	AM, ER	15-01-19	04-02-19			20
Regional surveys	Ravine Road	RSM-14D	AM, ER	15-01-19	04-02-19			20
Regional surveys	Lobs Hole Ravine rd	RSM-15A	DK, GD	15-10-18	30-10-18			15
Regional surveys	Lobs Hole Ravine rd	RSM-15B	DK, GD	15-10-18	30-10-18			15
Regional surveys	Lobs Hole Ravine rd	RSM-15C	AS, BR	12-01-19	04-02-19			23
Regional surveys	Lobs Hole Ravine rd	RSM-15D	AS, BR	12-01-19	04-02-19			23
Regional surveys	Wallace’s creek fire trail	RSM-16A	PF, SW	16-11-18	19-12-18			33
Regional surveys	Wallace’s creek fire trail	RSM-16B	PF, SW	16-11-18	19-12-18			33
Regional surveys	Wallace’s creek fire trail	RSM-16C	ER, MW	20-01-19	07-02-19			18
Regional surveys	Wallace’s creek fire trail	RSM-16D	ER, MW	20-01-19	07-02-19			18
Regional surveys	Dead Man's Firetrail	RSM-17A	DK, SV	25-10-18	17-12-18			53
Regional surveys	Dead Man's Firetrail	RSM-17B	DK, SV	25-10-18	17-12-18			53
Regional surveys	Dead Man's Firetrail	RSM-18A	DK, SV	26-10-18	17-12-18			52
Regional surveys	Dead Man's Firetrail	RSM-18B	DK, SV	26-10-18	17-12-18			52

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Dead Man's Firetrail	RSM-18C	AS, BR	14-01-19	05-02-19			22
Regional surveys	Dead Man's Firetrail	RSM-18D	AS, BR	14-01-19	05-02-19			22
Regional surveys	Dead Man's Firetrail	RSM-19A	DK, SV	27-10-18	15-11-18			19
Regional surveys	Dead Man's Firetrail	RSM-19B	DK, SV	27-10-18	15-11-18			19
Regional surveys	Dead Man's Firetrail	RSM-19C	AS, BR	14-01-19	03-02-19			20
Regional surveys	Dead Man's Firetrail	RSM-19D	AS, BR	14-01-19	03-02-19			20
Regional surveys	Dead Man's Firetrail	RSM-20A	DK, SV	31-10-18	15-11-18			15
Regional surveys	Dead Man's Firetrail	RSM-20B	DK, SV	31-10-18	15-11-18			15
Regional surveys	Dead Man's Firetrail	RSM-20C	AS, BR	14-01-19	30-01-19			16
Regional surveys	Dead Man's Firetrail	RSM-20D	AS, BR	14-01-19	30-01-19			16
Regional surveys	Ravine Road	RSM-21A	DK, SV	28-10-18	28-11-18			31
Regional surveys	Ravine Road	RSM-21B	DK, SV	28-10-18	28-11-18			31
Regional surveys	Ravine Road	RSM-21C	AM, ER	15-01-19	06-02-19			22
Regional surveys	Ravine Road	RSM-21D	AM, ER	15-01-19	06-02-19			22
Regional surveys	Wallace's creek fire trail	RSM-22A	PF, SW	16-11-18	19-12-18			33
Regional surveys	Wallace's creek fire trail	RSM-22B	PF, SW	16-11-18	19-12-18			33

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Wallace's creek fire trail	RSM-22C	ER, MW	24-01-19	09-02-19			16
Regional surveys	Wallace's creek fire trail	RSM-22D	ER, MW	24-01-19	09-02-19			16
Regional surveys	Dead Man's Firetrail	RSM-23A	DK, SV	25-10-18	17-12-18			53
Regional surveys	Dead Man's Firetrail	RSM-23B	DK, SV	25-10-18	17-12-18			53
Regional surveys	Dead Man's Firetrail	RSM-24A	DK, SV	27-10-18	17-12-18			51
Regional surveys	Dead Man's Firetrail	RSM-24B	DK, SV	27-10-18	17-12-18			51
Regional surveys	Wallace's creek fire trail	RSM-25A	PF, SW	16-11-18	08-01-19			53
Regional surveys	Wallace's creek fire trail	RSM-25B	PF, SW	16-11-18	08-01-19			53
Regional surveys	Ravine Road	RSM-26A	DK, SV	30-10-18	18-12-18			49
Regional surveys	Ravine Road	RSM-26B	DK, SV	30-10-18	18-12-18			49
Regional surveys	Ravine Road	RSM-27A	DK, SV	27-10-18	22-11-18			26
Regional surveys	Ravine Road	RSM-27B	DK, SV	27-10-18	22-11-18			26
Regional surveys	Ravine Road	RSM-28A	DK, SV	28-10-18	27-11-18			30
Regional surveys	Ravine Road	RSM-28B	DK, SV	28-10-18	27-11-18			30
Regional surveys	Ravine Road	RSM-28C	JB, AS	16-03-19	04-04-19			19
Regional surveys	Ravine Road	RSM-28D	JB, AS	16-03-19	04-04-19			19
Regional surveys	West of Wallace Creek Fire Trail	RSM-29A	ER, AR	03-12-18	08-01-19			36

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	West of Wallace Creek Fire Trail	RSM-29B	ER, AR	03-12-18	08-01-19			36
Regional surveys	West of Wallace Creek Fire Trail	RSM-29C	ER, MW	22-01-19	10-02-19			19
Regional surveys	West of Wallace Creek Fire Trail	RSM-29D	ER, MW	22-01-19	10-02-19			19
Regional surveys	West of Wallace Creek Fire Trail	RSM-30A	GM, PF	26-10-18	20-11-18			25
Regional surveys	West of Wallace Creek Fire Trail	RSM-30B	GM, PF	26-10-18	20-11-18			25
Regional surveys	West of Wallace Creek Fire Trail	RSM-30C	ER, MW	23-01-19	08-02-19			16
Regional surveys	West of Wallace Creek Fire Trail	RSM-30D	ER, MW	23-01-19	08-02-19			16
Regional surveys	O'Hares Firetrail	RSM-31A	DK, SV	31-10-18	18-12-18			48
Regional surveys	O'Hares Firetrail	RSM-31B	DK, SV	31-10-18	18-12-18			48
Regional surveys	O'Hares Firetrail	RSM-31C	AR, EL	14-01-19	07-02-19			24
Regional surveys	O'Hares Firetrail	RSM-31D	AR, EL	14-01-19	07-02-19			24
Regional surveys	Ravine Road	RSM-32A	DK, SV	27-10-18	22-11-18			26
Regional surveys	Ravine Road	RSM-32B	DK, SV	27-10-18	22-11-18			26
Regional surveys	Ravine Road	RSM-32C	AR, EL	14-01-19	03-02-19			20
Regional surveys	Ravine Road	RSM-32D	AR, EL	14-01-19	03-02-19			20
Regional surveys	Ravine Road	RSM-33A	DK, SV	29-10-18	20-12-18			52
Regional surveys	Ravine Road	RSM-33B	DK, SV	29-10-18	20-12-18			52
Regional surveys	Ravine Road	RSM-33C	AR, EL	14-01-19	07-02-19			24
Regional surveys	Ravine Road	RSM-33D	AR, EL	14-01-19	07-02-19			24

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Wallace's creek fire trail	RSM-34A	AS, LH	26-11-18	09-01-19			44
Regional surveys	Wallace's creek fire trail	RSM-34B	AS, LH	26-11-18	09-01-19			44
Regional surveys	Wallace's creek fire trail	RSM-35A	LH, AS	25-11-18	09-01-19			45
Regional surveys	Wallace's creek fire trail	RSM-35B	LH, AS	25-11-18	09-01-19			45
Regional surveys	Wallace's creek fire trail	RSM-35C	ER, MW	21-01-19	08-02-19			18
Regional surveys	Wallace's creek fire trail	RSM-35D	ER, MW	21-01-19	08-02-19			18
Regional surveys	O'Hares Firetrail	RSM-36A	DK, SV	30-10-18	18-12-18			49
Regional surveys	O'Hares Firetrail	RSM-36B	DK, SV	30-10-18	18-12-18			49
Regional surveys	O'Hares Firetrail	RSM-36C	SV, LM	30-01-19	13-02-19			14
Regional surveys	O'Hares Firetrail	RSM-36D	SV, LM	30-01-19	13-02-19			14
Regional surveys	O'Hares Firetrail	RSM-37A	DK, SV	30-10-18	18-12-18			49
Regional surveys	O'Hares Firetrail	RSM-37B	DK, SV	30-10-18	18-12-18			49
Regional surveys	O'Hares Firetrail	RSM-38A	DK, SV	29-10-18	20-12-18			52
Regional surveys	O'Hares Firetrail	RSM-38B	DK, SV	29-10-18	20-12-18			52
Regional surveys	Wallace's creek fire trail	RSM-39A	BR, DJ	04-12-18	09-01-19			36
Regional surveys	Wallace's creek fire trail	RSM-39B	BR, DJ	04-12-18	09-01-19			36
Regional surveys	Wallace's creek fire trail	RSM-39C	JW, GS	02-02-19	21-02-19			19

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Wallace's creek fire trail	RSM-39D	JW, GS	02-02-19	21-02-19			19
Regional surveys	Wallace's creek fire trail	RSM-40A	BR, DJ	04-12-18	09-01-19			36
Regional surveys	Wallace's creek fire trail	RSM-40B	BR, DJ	04-12-18	09-01-19			36
Regional surveys	Wallace's creek fire trail	RSM-41A	BR, DJ	04-12-18	09-01-19			36
Regional surveys	Wallace's creek fire trail	RSM-41B	BR, DJ	04-12-18	09-01-19			36
Regional surveys	Wallace's creek fire trail	RSM-41C	JW, GS	02-02-19	21-02-19			19
Regional surveys	Wallace's creek fire trail	RSM-41D	JW, GS	02-02-19	21-02-19			19
Regional surveys	Wallace's creek fire trail	RSM-42A	BR, DJ	04-12-18	11-01-19			38
Regional surveys	Wallace's creek fire trail	RSM-42B	BR, DJ	04-12-18	11-01-19			38
Regional surveys	Wallace's creek fire trail	RSM-42C	JW, GS	02-02-19	21-02-19			19
Regional surveys	Wallace's creek fire trail	RSM-42D	JW, GS	02-02-19	21-02-19			19
Regional surveys	Wallace's creek fire trail	RSM-43A	BR, DJ	05-12-18	09-01-19			35
Regional surveys	Wallace's creek fire trail	RSM-43B	BR, DJ	05-12-18	09-01-19			35
Regional surveys	Wallace's creek fire trail	RSM-44A	BR, LH	27-11-18	09-01-19			43

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Wallace's creek fire trail	RSM-44B	BR, LH	27-11-18	09-01-19			43
Regional surveys	Wallace's creek fire trail	RSM-45A	BR, LH	27-11-18	09-01-19			43
Regional surveys	Wallace's creek fire trail	RSM-45B	BR, LH	27-11-18	09-01-19			43
Regional surveys	Wallace's creek fire trail	RSM-45C	LM, SV	02-02-19	26-02-19			24
Regional surveys	Wallace's creek fire trail	RSM-45D	LM, SV	02-02-19	26-02-19			24
Regional surveys	Wallace's creek fire trail	RSM-46A	GM, PF	26-10-18	20-11-18			25
Regional surveys	Wallace's creek fire trail	RSM-46B	GM, PF	26-10-18	20-11-18			25
Regional surveys	Wallace's creek fire trail	RSM-46C	CK, IC	16-01-19	07-02-19			22
Regional surveys	Wallace's creek fire trail	RSM-46D	CK, IC	16-01-19	07-02-19			22
Regional surveys	Wallace's creek fire trail	RSM-47A	BR, DJ	03-12-18	10-01-19			38
Regional surveys	Wallace's creek fire trail	RSM-47B	BR, DJ	03-12-18	10-01-19			38
Regional surveys	Wallace's creek fire trail	RSM-47C	SV, LM	31-01-19	14-02-19			14
Regional surveys	Wallace's creek fire trail	RSM-47D	SV, LM	31-01-19	14-02-19			14
Regional surveys	Wallace's creek fire trail	RSM-48A	AS, AR	05-11-18	27-11-18			22

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Wallace's creek fire trail	RSM-48B	AS, AR	05-11-18	27-11-18			22
Regional surveys	Marica	RSM-49A	AS, AR	01-11-18	27-11-18			26
Regional surveys	Marica	RSM-49B	AS, AR	01-11-18	27-11-18			26
Regional surveys	Marica	RSM-50A	AS, AR	01-11-18	20-11-18			19
Regional surveys	Marica	RSM-50B	AS, AR	01-11-18	20-11-18			19
Regional surveys	Marica	RSM-50C	CK, IC	15-01-19	05-02-19			21
Regional surveys	Marica	RSM-50D	CK, IC	15-01-19	05-02-19			21
Regional surveys	Marica	RSM-51A	AS, AR	01-11-18	20-11-18			19
Regional surveys	Marica	RSM-51B	AS, AR	01-11-18	20-11-18			19
Regional surveys	Marica	RSM-51C	CK, IC	15-01-19	05-02-19			21
Regional surveys	Marica	RSM-51D	CK, IC	15-01-19	05-02-19			21
Regional surveys	Marica	RSM-52A	AS, AR	02-11-18	16-12-18			44
Regional surveys	Marica	RSM-52B	AS, AR	02-11-18	16-12-18			44
Regional surveys	Marica	RSM-53A	AS, AR	03-11-18	16-12-18			43
Regional surveys	Marica	RSM-53B	AS, AR	03-11-18	16-12-18			43
Regional surveys	Marica	RSM-54A	AS, AR	02-11-18	29-11-18			27
Regional surveys	Marica	RSM-54B	AS, AR	02-11-18	29-11-18			27
Regional surveys	Marica	RSM-54C	CK, IC	21-01-19	06-02-19			16
Regional surveys	Marica	RSM-54D	CK, IC	21-01-19	06-02-19			16
Regional surveys	Marica	RSM-55A	AS, AR	03-11-18	29-11-18			26
Regional surveys	Marica	RSM-55B	AS, AR	03-11-18	29-11-18			26
Regional surveys	Marica	RSM-55C	CK, IC	21-01-19	06-02-19			16
Regional surveys	Marica	RSM-55D	CK, IC	21-01-19	06-02-19			16

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Marica	RSM-56A	AS, AR	02-11-18	16-12-18			44
Regional surveys	Marica	RSM-56B	AS, AR	02-11-18	16-12-18			44
Regional surveys	Marica	RSM-56C	CK, IC	22-01-19	07-02-19			16
Regional surveys	Marica	RSM-56D	CK, IC	22-01-19	07-02-19			16
Regional surveys	Wallace's creek trail	RSM-57A	GM, PF	26-10-18	16-12-18			51
Regional surveys	Wallace's creek trail	RSM-57B	GM, PF	26-10-18	16-12-18			51
Regional surveys	Wallace's creek trail	RSM-57C	CK, IC	23-01-19	07-02-19			15
Regional surveys	Wallace's creek trail	RSM-57D	CK, IC	23-01-19	07-02-19			15
Regional surveys	Marica	RSM-58A	BR, DJ	06-12-18	08-01-19			33
Regional surveys	Marica	RSM-58B	BR, DJ	06-12-18	08-01-19			33
Regional surveys	Marica	RSM-58C	CK, IC	20-01-19	06-02-19			17
Regional surveys	Marica	RSM-58D	CK, IC	20-01-19	06-02-19			17
Regional surveys	Marica	RSM-59A	BR, DJ	06-12-18	08-01-19			33
Regional surveys	Marica	RSM-59B	BR, DJ	06-12-18	08-01-19			33
Regional surveys	Marica	RSM-59C	CK, IC	20-01-19	06-02-19			17
Regional surveys	Marica	RSM-59D	CK, IC	20-01-19	06-02-19			17
Regional surveys	Marica	RSM-60A	AS, AR	04-12-18	08-01-19			35
Regional surveys	Marica	RSM-60B	AS, AR	04-12-18	08-01-19			35
Regional surveys	Marica	RSM-61A	AS, AR	04-12-18	08-01-19			35
Regional surveys	Marica	RSM-61B	AS, AR	04-12-18	08-01-19			35
Regional surveys	Marica	RSM-61C	CK, IC	22-01-19	07-02-19			16

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Regional surveys	Marica	RSM-61D	CK, IC	22-01-19	07-02-19			16
Regional surveys	Coppermine trail	RSM-62A	AS, AR	03-11-18	20-11-18			17
Regional surveys	Coppermine trail	RSM-62B	AS, AR	03-11-18	20-11-18			17
Regional surveys	Wallace's creek trail	RSM-63A	GM, PF	26-10-18	20-11-18			25
Regional surveys	Wallace's creek trail	RSM-63B	GM, PF	26-10-18	20-11-18			25
Regional surveys	Wallace's creek trail	RSM-63C	CK, IC	15-01-19	05-02-19			21
Regional surveys	Wallace's creek trail	RSM-63D	CK, IC	15-01-19	05-02-19			21
Regional surveys	Coppermine trail	RSM-64A	AS, AR	03-11-18	24-11-18			21
Regional surveys	Coppermine trail	RSM-64B	AS, AR	03-11-18	24-11-18			21
Regional surveys	Coppermine trail	RSM-64C	CK, IC	16-01-19	04-02-19			19
Regional surveys	Coppermine trail	RSM-64D	CK, IC	16-01-19	04-02-19			19
Regional surveys	Coppermine trail	RSM-65A	GM, PF	26-10-18	20-11-18			25
Regional surveys	Coppermine trail	RSM-65B	GM, PF	26-10-18	20-11-18			25
Regional surveys	Coppermine trail	RSM-65C	CK, IC	16-01-19	04-02-19			19
Regional surveys	Coppermine trail	RSM-65D	CK, IC	16-01-19	04-02-19			19
Regional surveys	Coppermine trail	RSM-66A	AS, AR	03-11-18	24-11-18			21
Regional surveys	Coppermine trail	RSM-66B	AS, AR	03-11-18	24-11-18			21
Regional surveys	Coppermine trail	RSM-66C	CK, IC	16-01-19	04-02-19			19
Regional surveys	Coppermine trail	RSM-66D	CK, IC	16-01-19	04-02-19			19
Remote cameras - large	Marica	RCL01-0593	CK , GM	10-02-18	13-03-18			31

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - large	Marica	RCL01-9048	CK , GM	10-02-18	14-03-18			32
Remote cameras - large	Port Phillip Track	RCL01-0759	CK , GM	12-02-18	13-03-18			29
Remote cameras - large	Port Phillip Track	RCL01-0561	CK , GM	12-02-18	13-03-18			29
Remote cameras - large	Tantagara South	RCL01-0411	CK , GM	12-02-18	13-03-18			29
Remote cameras - large	Tantagara South	RCL01-8914	CK , GM	12-02-18	13-03-18			29
Remote cameras - large	Gooandra	RCL01-8909	CK , GM	12-02-18	13-03-18			29
Remote cameras - large	Gooandra	RCL01-0743	CK , GM	12-02-18	13-03-18			29
Remote cameras - large	Lobs Hole	RCL02-0561	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Lobs Hole	RCL02-0593	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Lobs Hole	RCL02-0411	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Lobs Hole	RCL02-0759	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Lobs Hole	RCL02-9048	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Lobs Hole	RCL02-8914	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Lobs Hole	RCL02-8909	CK , DJ	15-03-18	20-04-18			36

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - large	Lobs Hole	RCL02-0743	CK , DJ	15-03-18	20-04-18			36
Remote cameras - large	Link Road, south of Lobs Hole Ravine Rd	RCL-04B	AR-KS	22-11-19	10-12-19			18
Remote cameras - large	Lobs Hole Ravine Rd	RCL-04A	AR KS	22-11-19	10-12-19			18
Remote cameras - large	Alpine Creek	RCL-05A	KS, JA	28-11-19	16-12-19			18
Remote cameras - large	Alpine Creek Trail	RCL-05B	KS, JA	28-11-19	16-12-19			18
Arboreal trapping	Lobs Hole Ravine	TA02	GM , LH	04-12-17	08-12-17			4
Arboreal trapping	Lobs Hole	TAT01	NG , ED	12-12-17	16-12-17			4
Arboreal trapping	Talbingo Reservoir (south of boat ramp)	TAT02	SW, DJ , KS	17-03-18	22-03-18			4
Arboreal trapping	Plateau	TAT04	SW , KS	06-02-18	10-02-18			4
Arboreal trapping	Marica	TAT05	NG , ED	08-12-17	12-12-17			4
Arboreal trapping	Lobs Hole Ravine Road	TAT06	NG , ED	12-12-17	16-12-17			4
Arboreal trapping	Talbingo Intake	TAT07	SW, DJ , KS	17-03-18	22-03-18			4
Arboreal trapping	Yarrangobilly River	TAT08	SW, DJ , KS	17-03-18	22-03-18			4
Arboreal trapping	Link Rd	TAT09	SW, DJ , KS	17-03-18	22-03-18			4
Arboreal trapping	Marica	TT04	NG , ED	08-12-17	12-12-17			4
Arboreal trapping	Lobs Hole Ravine rd	TT-10	CK, GM	14-10-18	18-10-18			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Arboreal trapping	Lobs Hole Ravine rd	TT-11	CK, GM	14-10-18	18-10-18			4
Arboreal trapping	Lobs Hole Ravine rd	TT-12	CK, GM	14-10-18	18-10-18			4
Arboreal trapping	Tantangara Camp	TT-13	JB, AS	12-03-19	16-03-19			4
Arboreal trapping	Tantangara south	TT-14	AR, ER	29-11-18	03-12-18			4
Arboreal trapping	Tantangara south	TT-15	AR, ER	29-11-18	03-12-18			4
Arboreal trapping	Tantangara North	TT-16	JB, AS	12-03-19	16-03-19			4
Arboreal trapping	Three mile dam	TT-24	GM, PF	23-10-18	27-10-18			4
Arboreal trapping	Tantangara	TT-25	GM, PF	27-10-18	31-10-18			4
Arboreal trapping	Tantangara	TT-27	GM, PF	27-10-18	31-10-18			4
Arboreal trapping	Tantangara	TT-28	GM, PF	27-10-18	31-10-18			4
Arboreal trapping	Talbingo	TT-29	PF, AS	18-11-18	26-11-18			4
Arboreal trapping	Talbingo	TT-30	PF, AS	18-11-18	26-11-18			4
Arboreal trapping	Talbingo	TT-31	PF, AS	18-11-18	26-11-18			4
Arboreal trapping	Talbingo	TT-32	PF, AS	18-11-18	26-11-18			4
Arboreal trapping	Marica	TT-33	BR, LH	29-11-18	03-12-18			4
Arboreal trapping	Marica	TT-34	BR, LH	29-11-18	03-12-18			4
Arboreal trapping	Marica	TT-35	BR, LH	29-11-18	03-12-18			4
Arboreal trapping	Sawmill / Alpine powerline track	TT-39	GM, AM	12-02-19	16-02-19			4
Arboreal trapping	Sawmill / Alpine powerline track	TT-40	GM, AM	12-02-19	16-02-19			4
Arboreal trapping	Schofields track	TT-42	GM, AM	16-02-19	20-02-19			4
Arboreal trapping	Brayshaws trail	TT-44	GM, AM	16-02-19	20-02-19			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Arboreal trapping	Circuit trail	TT-45	AR, ER	29-11-18	03-12-18			4
Arboreal trapping	Circuit trail	TT-46	AR, ER	29-11-18	03-12-18			4
Arboreal trapping	Lobs Hole Ravine rd	TT-5	DJ, KS	12-10-18	16-10-18			4
Arboreal trapping	Lobs Hole Ravine, Wallace's creek	TT-53	DK, CW	09-04-19	13-04-19			4
Arboreal trapping	Lobs Hole Ravine	TT-55	DK, CW	09-04-19	13-04-19			4
Arboreal trapping	Marica	TT-56	CW, MP	13-04-19	17-04-19			4
Arboreal trapping	Lobs Hole Ravine	TT-57	DK, CW	09-04-19	13-04-19			4
Arboreal trapping	Lobs Hole Ravine	TT-58	DK, CW	10-04-19	14-04-19			4
Arboreal trapping	Rock Forest	TT-59	JB OM	05-04-19	09-04-19			4
Arboreal trapping	Lobs Hole Ravine rd	TT-6	DJ, KS	12-10-18	16-10-18			4
Arboreal trapping	Lobs Hole Ravine rd	TT-7	DJ, KS	12-10-18	16-10-18			4
Arboreal trapping	Lobs Hole Ravine rd	TT-8	DJ, KS	12-10-18	16-10-18			4
Arboreal trapping	Lobs Hole Ravine rd	TT-9	JB, AS	16-03-19	20-03-19			4
Arboreal trapping	Link Road	TT-65	CB AR	27-10-19	31-10-19			4
Arboreal trapping	Link Road	TT-66	CB AR	27-10-19	31-10-19			4
Arboreal trapping	Link Road	TT-67	CB AR	27-10-19	31-10-19			4
Arboreal trapping	Rock Forest	TT-62	KS, LH	10-12-19	14-12-19			4
Arboreal trapping	Rock Forest	TT-63	KS, LH	10-12-19	14-12-19			4
Arboreal trapping	Rock Forest	TT-64	KS, LH	10-12-19	14-12-19			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Spotlighting	Wallace Creek		GM , LH	13-12-17	13-12-17	21:00	23:00	2:00
Spotlighting	Yarrangobilly River		GM , LH	13-12-17	14-12-17	23:50	1:50	2:00
Spotlighting	O'Hares Firetrail		GM , LH	14-12-17	15-12-17	23:30	1:30	2:00
Spotlighting	Lobs Hole Ravine		GM , LH	14-12-17	14-12-17	2:30	4:30	2:00
Spotlighting	Lobs Hole Ravine		GM , LH	25-01-18	25-01-18	0:45	1:45	1:00
Spotlighting	Lobs Hole Ravine		AR , DL	27-01-18	27-01-18	1:45	2:30	0:45
Spotlighting	O'Hares Firetrail		AR , DL	27-01-18	28-01-18	23:20	0:20	1:00
Spotlighting	Marica		GM , LH	27-01-18	27-01-18	0:45	1:45	1:00
Spotlighting	Lobs Hole Ravine		AR , DL	28-01-18	28-01-18	1:05	2:05	1:00
Spotlighting	Marica		GM , LH	28-01-18	28-01-18	0:20	1:20	1:00
Spotlighting	Marica		AR , ACM	29-01-18	29-01-18	2:20	3:00	0:40
Spotlighting	Marica		GM , LH	29-01-18	29-01-18	21:30	22:45	1:15
Spotlighting	Lobs Hole Ravine		AR , ACM	29-01-18	29-01-18	21:00	22:30	1:30
Spotlighting	Lobs Hole Ravine		AR , ACM	29-01-18	30-01-18	22:55	0:05	1:10
Spotlighting	Lobs Hole Ravine		AR , ACM	30-01-18	30-01-18	0:40	1:55	1:15
Spotlighting	Lobs Hole Ravine		GM , CK	08-02-18	08-02-18	21:00	22:00	1:00
Spotlighting	Marica		GM, CK, KS , CW	13-02-18	13-02-18	21:00	21:30	0:30
Spotlighting	Wallace Creek		SW , DJ	19-03-18	20-03-18	23:28	1:00	1:32
Spotlighting	Boat Ramp		SW , DJ	19-03-18	19-03-18	21:07	22:30	1:23
Spotlighting	Proposed campsite		SW , DJ	20-03-18	20-03-18	2:30	3:30	1:00
Spotlighting	Proposed campsite		SW , DJ	20-03-18	20-03-18	3:45	4:05	0:20
Spotlighting	Talbingo Reservoir		SW , KS	22-03-18	23-03-18	19:30	0:00	4:30
Spotlighting	Lobs Hole Ravine		SW , KS	23-03-18	24-03-18	23:30	1:00	1:30

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Spotlighting	Lobs Hole Ravine		SW , KS	23-03-18	23-03-18	22:00	23:00	1:00
Spotlighting	Alternate access to Link rd		SW , DJ	23-03-18	23-03-18	20:00	21:00	1:00
Spotlighting	Alpine Hill Powerline	SL-7	GD, EL	07-11-18	07-11-18	20:28	21:57	1:29
Spotlighting	Tantangara South	SL-21	CK, BR, PF	07-11-18	07-11-18	21:00	22:00	1:00
Spotlighting	Tantangara South	SL-22	CK, BR, PF	07-11-18	07-11-18	20:08	20:57	0:49
Spotlighting	Lobs Hole Ravine rd	SL-13	EL, BR	08-11-18	08-11-18	20:33	21:53	1:20
Spotlighting	Yarrangobilly River	SL-10	JB, JW	15-12-18	16-12-18	23:21	0:22	1:01
Spotlighting	Yarrangobilly River	SL-10	JB, JW	16-12-18	16-12-18	21:55	0:14	2:19
Spotlighting	Mines trail	SL-12	JB, JW	16-12-18	16-12-18	0:20	0:58	0:38
Spotlighting	Mines trail	SL-12	JB, JW	17-12-18	17-12-18	0:20	0:58	0:38
Spotlighting	Yarrangobilly River	SL-10	JB, JW	18-12-18	18-12-18	20:55	21:46	0:51
Spotlighting	Lobs Hole Ravine rd	SL-11	JB, JW	20-12-18	20-12-18	21:12	22:02	0:50
Spotlighting	Mines trail	SL-12	JB, JW	09-01-19	09-01-19	1:02	1:42	0:40
Spotlighting	Lobs Hole Ravine rd	SL-11	JB, JW	10-01-19	10-01-19	0:44	1:26	0:42
Spotlighting	Wallace's creek trail	SL-1	JB, JW	11-01-19	12-01-19	23:40	0:22	0:42
Spotlighting	Wallace's creek trail	SL-2	JB, JW	11-01-19	11-01-19	23:14	23:39	0:25
Spotlighting	Talbingo	SL-5	JB, JW	11-01-19	11-01-19	20:59	21:13	0:14
Spotlighting	Talbingo	SL-6	JB, JW	11-01-19	11-01-19	21:36	21:53	0:17

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Spotlighting	Lobs Hole Ravine rd	SL-11	JB, JW	11-01-19	11-01-19	0:11	1:30	1:19
Spotlighting	Tantangara South	SL-23	JB, JW	12-01-19	12-01-19	21:07	22:03	0:56
Spotlighting	Tantangara South	SL-24	JB, JW	12-01-19	12-01-19	22:10	23:24	1:14
Spotlighting	Boundary Trail	SL-15	JB, JW	13-01-19	13-01-19	21:12	22:12	1:00
Spotlighting	Boundary Trail	SL-16	JB, JW	13-01-19	13-01-19	22:14	23:19	1:05
Spotlighting	Boundary Trail	SL-17	JB, JW	13-01-19	13-01-19	23:21	23:55	0:34
Spotlighting	Schofield trail	SL-18	JB, JW	14-01-19	14-01-19	21:00	22:12	1:12
Spotlighting	Tantangara North	SL-19	JB, JW	14-01-19	14-01-19	22:56	23:56	1:00
Spotlighting	Tantangara South	SL-25	JB, JW	14-01-19	14-01-19	21:00	22:03	1:03
Spotlighting	Tantangara North	SL-20	JB, JW	15-01-19	15-01-19	23:13	23:50	0:37
Spotlighting	Alpine Hill Powerline	SL-7	JB, CW	16-01-19	16-01-19	21:23	22:10	0:47
Spotlighting	Tantangara South	SL-21	JW, GS	03-02-19	04-02-19	23:00	0:12	1:12
Spotlighting	Tantangara South	SL-22	GS, JW	03-02-19	03-02-19	21:40	22:21	0:41
Spotlighting	Alpine Hill Powerline	SL-7	JB, DF	04-02-19	04-02-19	20:37	21:18	0:41
Spotlighting	Alpine Hill Powerline	SL-8	JB, DF	04-02-19	04-02-19	21:21	21:56	0:35
Spotlighting	Tantangara North	SL-19	JW, GS	04-02-19	04-02-19	20:45	21:40	0:55
Spotlighting	Talbingo	SL-5	JB, DF	05-02-19	05-02-19	22:54	23:02	0:08
Spotlighting	Talbingo	SL-6	JB, DF	05-02-19	05-02-19	22:03	22:27	0:24
Spotlighting	Boundary Trail	SL-15	JB, DF	07-02-19	07-02-19	21:10	22:13	1:03
Spotlighting	Boundary Trail	SL-16	JB, DF	07-02-19	07-02-19	22:13	23:25	1:12
Spotlighting	Boundary Trail	SL-17	JB, DF	07-02-19	07-02-19	23:25	0:00	0:35

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Spotlighting	Schofield trail	SL-18	DF, JB	08-02-19	08-02-19	20:37	21:32	0:55
Spotlighting	Tantangara South	SL-21	JB, DF	08-02-19	08-02-19	22:41	23:50	1:09
Spotlighting	Alpine Hill Powerline	SL-8	JB, DF	09-02-19	09-02-19	1:04	1:45	0:41
Spotlighting	Tantangara South	SL-23	JB, DF	09-02-19	09-02-19	21:18	22:09	0:51
Spotlighting	Lobs Hole Ravine rd	SL-13	JB, DF	10-02-19	10-02-19	21:53	23:25	1:32
Spotlighting	Lobs Hole Ravine rd	SL-14	JB, JD	10-02-19	11-02-19	23:27	0:39	1:12
Spotlighting	Tantangara South	SL-24	JB, DF	10-02-19	10-02-19	1:04	2:03	0:59
Spotlighting	Tantangara South	SL-25	JB, DF	10-02-19	10-02-19	0:03	1:03	1:00
Spotlighting	Wallace's creek trail	SL-1	JB, DF	11-02-19	11-02-19	21:45	22:39	0:54
Spotlighting	Wallace's creek trail	SL-2	JB, DF	11-02-19	11-02-19	21:14	21:45	0:31
Spotlighting	Wallace's creek trail	SL-4	JB, DF	11-02-19	11-02-19	22:40	23:00	0:20
Spotlighting	Talbingo	SL-5	JB, DF	13-02-19	13-02-19	22:41	22:53	0:12
Spotlighting	Talbingo	SL-6	JB, DF	13-02-19	13-02-19	21:47	22:09	0:22
Spotlighting	Alpine Hill Powerline	SL-8	JB	14-02-19	14-02-19	0:09	1:17	1:08
Spotlighting	Schofield trail	SL-18	AR, EL	18-02-19	18-02-19	21:05	22:45	1:40
Spotlighting	Tantangara North	SL-19	AR, EL	19-02-19	19-02-19	0:00	1:00	1:00
Spotlighting	Lobs Hole Ravine rd	SL-13	AR, EL	20-02-19	21-02-19	22:40	0:20	1:40

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Spotlighting	Lobs Hole Ravine rd	SL-14	AR, EL	20-02-19	20-02-19	0:20	2:35	2:15
Spotlighting	Tantangara North	SL-20	AR, EL	21-02-19	21-02-19	2:00	2:35	0:35
Spotlighting	Tantangara South	SL-22	JB, JW	07-01-19	07-01-19	21:47	22:32	0:45
Spotlighting	Tantangara	SL-20	JB, AS	20-03-19	21-03-19	20:05	21:05	1:00
Spotlighting	Marica	SL-1	JB, OM	10-04-19	10-04-19	20:02	21:28	1:26
Spotlighting	Marica	SL-2	JB, OM	10-04-19	10-04-19	19:11	20:00	0:49
Spotlighting	Marica	SL-4	JB, OM	10-04-19	10-04-19	21:29	21:59	0:30
Spotlighting	Rock Forest	SL-33	JB, GS	08-05-19	08-05-19	19:39	21:02	1:23
Spotlighting	Rock Forest	SL-33	JB, OM	09-04-19	09-04-19	22:00	22:51	0:51
Spotlighting	Rock Forest	SL-33	JB, DK	13-05-19	13-05-19	20:23	21:21	0:58
Spotlighting	Lobs Hole Ravine rd	SL-14	JB, DK	15-05-19	15-05-19	17:40	19:59	2:19
Spotlighting	Lobs Hole Ravine rd	SL-30	JB, DK	15-05-19	15-05-19	23:14	23:57	0:43
Spotlighting	Lobs Hole Ravine rd	SL-31	JB, DK	15-05-19	15-05-19	21:16	21:56	0:40
Spotlighting	Lobs Hole Ravine rd	SL-32	JB, DK	15-05-19	15-05-19	20:32	20:55	0:23
Spotlighting	Tantangara	SL-24	JB, PF	30-05-19	31-05-19	23:54	0:44	0:50
Spotlighting	Tantangara	SL-25	JB, PF	30-05-19	30-05-19	22:28	23:17	0:49
Spotlighting	Tantangara	SL-23	JB, PF	30-05-19	30-05-19	20:35	21:47	1:12
Spotlighting	Lobs Hole Ravine rd	SL-30	JB, DK	17-06-19	17-06-19	18:18	18:56	0:38
Spotlighting	Lobs Hole Ravine rd	SL-31	JB, DK	17-06-19	17-06-19	20:52	21:13	0:21

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Spotlighting	Lobs Hole Ravine rd	SL-32	JB, DK	17-06-19	17-06-19	19:01	19:29	0:28
Spotlighting	Marica	SL-4	JB, DK	18-06-19	18-06-19	23:04	23:39	0:35
Spotlighting	Lobs Hole Ravine rd	SL-30	JB, DK	19-06-19	19-06-19	21:36	22:17	0:41
Spotlighting	Lobs Hole Ravine rd	SL-31	JB, DK	19-06-19	19-06-19	18:33	19:13	0:40
Spotlighting	Lobs Hole Ravine rd	SL-32	JB, DK	19-06-19	19-06-19	20:48	21:26	0:38
Spotlighting	3 Mile	SL-54	EL GM	14-12-19	14-12-19	21:20	22:07	0:46
Spotlighting	Link Rd	SL-53	EL GM	14-12-19	14-12-19	22:11	23:10	0:59
Spotlighting	Rock Forest	SL-44	EL GM	15-12-19	15-12-19	0:24	1:28	1:04
Spotlighting	3 Mile Dam	SL-54	EL GM	15-12-19	15-12-19	21:10	21:43	0:33
Spotlighting	Link Rd	SL-53	EL GM	15-12-19	15-12-19	21:43	22:25	0:41
Spotlighting	Rock Forest	SL-44	EL GM	15-12-19	16-12-19	23:16	0:23	1:07
Spotlighting	Off alpine creek trail	SL-43	EL GM	16-12-19	16-12-19	21:30	22:32	1:02
Spotlighting	Alpine creek fire trail	SL-42	EL GM	16-12-19	16-12-19	22:36	23:43	1:06
Spotlighting	Link Rd	SL-43	EL GM	17-12-19	17-12-19	21:18	22:18	1:00
Spotlighting	Rock Forest	SL-42	EL GM	17-12-19	17-12-19	22:20	23:20	1:00
Koala SAT	Talbingo Dam	EW1	CK , PF	18-05-18	18-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW10	CW , DK	02-05-18	02-05-18			
Koala SAT	Lobs Hole Ravine rd	EW100	CK , PF	16-05-18	16-05-18			

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Koala SAT	Talbingo	EW101	CK, CW , PF	19-05-18	19-05-18			
Koala SAT	Lobs Hole Ravine rd	EW102	CK , PF	15-05-18	15-05-18			
Koala SAT	Talbingo	EW111	CK, CW , PF	19-05-18	19-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW12	CW , DK	02-05-18	02-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW130	DK , CW	03-05-18	03-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW132	DK , CW	03-05-18	03-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW136	DK , CW	03-05-18	03-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW139	DK , CW	03-05-18	03-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW15	CW , DK	02-05-18	02-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW16	CW , DK	01-05-18	01-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW17	CW , DK	01-05-18	01-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW18	CW , DK	01-05-18	01-05-18			
Koala SAT	Talbingo North	EW2	DK , JB	21-04-18	21-04-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW21	CW , DK	01-05-18	01-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW22	CW , DK	01-05-18	01-05-18			
Koala SAT	Talbingo	EW23	CK , PF	19-05-18	19-05-18			

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Koala SAT	Talbingo	EW25	CK , PF	20-05-18	20-05-18			
Koala SAT	Talbingo North	EW26	DK , JB	21-04-18	21-04-18			
Koala SAT	Talbingo North	EW27	DK , JB	21-04-18	21-04-18			
Koala SAT	Talbingo	EW28	CK , PF	20-05-18	20-05-18			
Koala SAT	Talbingo	EW29	CK , PF	20-05-18	20-05-18			
Koala SAT	Talbingo North	EW30	DK , JB	21-04-18	21-04-18			
Koala SAT	Talbingo	EW31	CK , PF	18-05-18	18-05-18			
Koala SAT	Talbingo	EW32	CK, CW , PF	20-05-18	20-05-18			
Koala SAT	Talbingo	EW33	CK, CW , PF	20-05-18	20-05-18			
Koala SAT	Talbingo	EW35	CK, CW , PF	19-05-18	19-05-18			
Koala SAT	Talbingo North	EW38	DK , JB	21-04-18	21-04-18			
Koala SAT	Talbingo	EW39	CK, CW , PF	19-05-18	19-05-18			
Koala SAT	Yarrangobilly River	EW41	CK , PF	18-05-18	18-05-18			
Koala SAT	Yarrangobilly River	EW42	CK , PF	17-05-18	17-05-18			
Koala SAT	Yarrangobilly River	EW43	CK , PF	17-05-18	17-05-18			
Koala SAT	Yarrangobilly River	EW45	CK , PF	17-05-18	17-05-18			
Koala SAT	Yarrangobilly River	EW46	CK , PF	18-05-18	18-05-18			
Koala SAT	Yarrangobilly River	EW48	CK , PF	17-05-18	17-05-18			
Koala SAT	Lobs Hole Ravine rd	EW49	CK , PF	17-05-18	17-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW5	CW , DK	03-05-18	03-05-18			
Koala SAT	Lobs Hole Ravine rd	EW50	CK , PF	17-05-18	17-05-18			

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Koala SAT	Construction camp	EW51	DK , CW	04-05-18	04-05-18			
Koala SAT	Construction camp	EW52	DK , CW	04-05-18	04-05-18			
Koala SAT	Construction camp	EW53	DK , CW	05-05-18	05-05-18			
Koala SAT	Construction camp	EW54	DK , CW	05-05-18	05-05-18			
Koala SAT	Talbingo	EW55	CK , PF	18-05-18	18-05-18			
Koala SAT	Lobs Hole Ravine rd	EW56	CK , PF	17-05-18	17-05-18			
Koala SAT	Construction camp	EW57	DK , CW	04-05-18	04-05-18			
Koala SAT	Construction camp	EW58	DK , CW	05-05-18	05-05-18			
Koala SAT	Construction camp	EW59	DK , CW	05-05-18	05-05-18			
Koala SAT	Construction camp	EW62	DK , CW	04-05-18	04-05-18			
Koala SAT	Construction camp	EW63	DK , CW	05-05-18	05-05-18			
Koala SAT	Construction camp	EW64	DK , CW	06-05-18	06-05-18			
Koala SAT	Talbingo	EW68	CK , PF	18-05-18	18-05-18			
Koala SAT	Construction camp	EW69A	DK , CW	06-05-18	06-05-18			
Koala SAT	Lobs Hole Ravine rd	EW69B	CK , PF	16-05-18	16-05-18			
Koala SAT	Construction camp	EW70	DK , CW	06-05-18	06-05-18			
Koala SAT	Construction camp	EW71A	DK , CW	06-05-18	06-05-18			
Koala SAT	Lobs Hole Ravine rd	EW71B	CK , PF	16-05-18	16-05-18			
Koala SAT	Construction camp	EW72	DK , CW	06-05-18	06-05-18			
Koala SAT	Construction camp	EW77A	DK , CW	06-05-18	06-05-18			
Koala SAT	Lobs Hole Ravine rd	EW77B	CK , PF	16-05-18	16-05-18			

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Koala SAT	Lobs Hole Ravine rd	EW78	CK , PF	17-05-18	17-05-18			
Koala SAT	Upper Lob's Hole Ravine rd	EW8	CW , DK	03-05-18	03-05-18			
Koala SAT	Talbingo	EW85	CK , PF	19-05-18	19-05-18			
Koala SAT	Lobs Hole Ravine rd	EW86	CK , PF	16-05-18	16-05-18			
Koala SAT	Lobs Hole Ravine rd	EW87	CK , PF	16-05-18	16-05-18			
Koala SAT	Lobs Hole Ravine rd	EW94	CK , PF	15-05-18	15-05-18			
Koala SAT	Lobs Hole Ravine rd	EW95	CK , PF	17-05-18	17-05-18			
Koala SAT	Lobs Hole Ravine rd	EW97	CK , PF	15-05-18	15-05-18			
Koala SAT	Lobs Hole Ravine rd	EW98	CK , PF	15-05-18	15-05-18			
Koala SAT	Lobs Hole Ravine rd	EW99	CK , PF	15-05-18	15-05-18			
Songmeters	Talbingo	KSM1	CK, GM	16-10-18	16-12-18			61
Songmeters	Lobs Hole Ravine rd	KSM2	DJ, KS	16-10-18	17-12-18			62
Songmeters	Lobs Hole Ravine rd	KSM3	DJ, KS	16-10-18	17-12-18			62
Songmeters	Wallace's creek trail	KSM4	DJ, KS	16-10-18	17-12-18			62
Songmeters	Marica	KSM5	DJ, KS	16-10-18	16-12-18			61

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Remote cameras - arboreal	Talbingo dam	AC-01A	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-01B	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-02A	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-02B	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-03A	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-03B	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-04A	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo	AC-04B	AR	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-05A	AR CW	23-11-19	11-12-19			18
Remote cameras - arboreal	Talbingo dam	AC-05B	AR CW	23-11-19	11-12-19			18
Microbat acoustic detection	Nungar Trail	MB-Nungar 2	JB, OM	06-04-19	10-04-19			4
Microbat acoustic detection	Nungar Trail	MB-Nungar 1	JB, OM	06-04-19	10-04-19			4
Microbat acoustic detection	Tantangara	MB-Tantangara 2	JB, OM	07-04-19	11-04-19			4
Microbat acoustic detection	Tantangara	MB-Tantangara 1	JB, OM	07-04-19	11-04-19			4

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Microbat acoustic detection	Gooandra track	MB-Eucumbene	JB, OM	10-04-19	12-04-19			2
Microbat acoustic detection	Link Road	MB-Bullocks	JB, OM	10-04-19	17-04-19			7
Microbat acoustic detection	Middle Creek	MB-Middle	CW, DK	11-04-19	17-04-19			6
Microbat acoustic detection	Wallace's Creek	MB-WC	CW, MP	13-04-19	17-04-19			4
Microbat acoustic detection	Yarrangobilly River	MB-YR1	CW, MP	13-04-19	17-04-19			4
Microbat acoustic detection	Yarrangobilly River	MB-YR2	CW, MP	13-04-19	17-04-19			4
Microbat acoustic detection	Talbingo reservoir	MB04	AR CB	29-10-19	05-11-19			7
Microbat acoustic detection	Talbingo reservoir	MB03	AR CB	30-10-19	05-11-19			6
Microbat acoustic detection	Talbingo reservoir	MB02	AM CB	30-10-19	05-11-19			6
Microbat acoustic detection	Talbingo reservoir	MB01	AR CB	30-10-19	05-11-19			6
Booroolong Frog surveys	Bottom of Yarra 1	Yarra 1	JB, JW	11-12-18	12-12-18	21:43	1:35	3:52
Booroolong Frog surveys	Top of Yarra 1 & Wallace Creek	Yarra 1 & Yarra 2	JB, JW	12-12-18	13-12-18	20:41	0:25	3:44
Booroolong Frog surveys	Wallace Creek	Yarra 2	JB, JW	15-12-18	15-12-18	21:29	22:29	1:00
Booroolong Frog surveys	Yarrangobilly River & Wallace Creek	Yarra 2	JB, JW	16-12-18	17-12-18	21:54	1:26	3:32

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Booroolong Frog surveys	Yarrangobilly River	Yarra 1	JB, JW	17-12-18	18-12-18	21:02	3:02	6:00
Booroolong Frog surveys	Yarrangobilly River & Wallace Creek	Yarra 2	JB, JW	18-12-18	19-12-18	21:44	1:19	3:35
Booroolong Frog surveys	Bottom of Yarra 1	Yarra 1	JB, JW	19-12-18	20-12-18	22:03	0:42	2:39
Booroolong Frog surveys	Yarrangobilly River	Yarra 1 & Yarra 2	JB, JW	08-01-19	09-01-19	20:56	0:25	3:29
Booroolong Frog surveys	Yarrangobilly River	Yarra 1	JB, JW	09-01-19	10-01-19	21:03	0:19	3:16
Booroolong Frog surveys	Yarrangobilly River & Wallace Creek	Yarra 2	JB, JW	10-01-19	10-01-19	21:38	23:50	2:12
Booroolong Frog surveys	Sheepstation Creek		GM , LH	14-12-17	14-12-17	21:00	22:40	1:40
Booroolong Frog surveys	O'Hares Creek		GM , LH	14-12-17	15-12-17	23:30	2:00	2:30
Booroolong Frog surveys	Yarrangobilly River		NG , CD	11-01-18	12-01-18	21:12	3:20	6:08
Booroolong Frog surveys	Yarrangobilly River		NG , KS	12-01-18	12-01-18	21:13	23:52	2:39
Booroolong Frog surveys	Wallace Creek		NG , KS	12-01-18	12-01-18	0:45	2:13	1:28
Booroolong Frog surveys	Wallace creek		NG , AR	19-01-18	19-01-18	21:21	22:36	1:15
Booroolong Frog surveys	Yarrangobilly River		NG , AR	20-01-18	20-01-18	0:04	2:01	1:57
Booroolong Frog surveys	Wallace creek		AR , DL	23-01-18	23-01-18	21:40	22:45	1:05

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Booroolong Frog surveys	Yarrangobilly River		AR , DL	23-01-18	24-01-18	23:40	1:50	2:10
Booroolong Frog surveys	O'Hares creek		GM , LH	24-01-18	24-01-18	21:30	23:00	1:30
Booroolong Frog surveys	Sheepstation Creek		GM , LH	24-01-18	25-01-18	23:57	0:40	0:43
Booroolong Frog surveys	O'Hares Creek		AR , DL	27-01-18	27-01-18	22:00	23:20	1:20
Alpine Tree Frog surveys	Bullocks creek	BULLOCKS	GS, JW	31-01-19	01-02-19	20:38	0:17	3:39
Alpine Tree Frog surveys	Bullocks creek	BULLOCKS HEA	GS, JW	05-02-19	05-02-19	20:56	22:41	1:45
Alpine Tree Frog surveys	Tantangara Trib 1	TANTANG TRIB	JW, DF	06-02-19	06-02-19	20:14	20:49	0:35
Alpine Tree Frog surveys	Tantangara Trib 2	TANTANG TRIB	JW, DF	06-02-19	06-02-19	20:49	23:42	2:53
Alpine Tree Frog surveys	Eucumbene river-tributary	EUC TRIBUTAR	GS, JW	06-02-19	06-02-19	1:03	1:24	0:21
Alpine Tree Frog surveys	Eucumbene river	EUC DOWNSTREA	GS, JW	06-02-19	06-02-19	0:00	0:35	0:35
Alpine Tree Frog surveys	Nungar Trib 1	NUNGAR 1	JW, DF	07-02-19	07-02-19	1:19	1:37	0:18
Alpine Tree Frog surveys	Nungar Trib 2	NUNGAR TRIB	GS, JW	07-02-19	07-02-19	21:07	21:37	0:30
Alpine Tree Frog surveys	Tantangara Trib 3	TANTANG TRIB	JW, DF	07-02-19	07-02-19	0:17	0:55	0:38
Alpine Tree Frog surveys	Nungar 2 & 3		NG , CD	09-01-18	09-01-18	22:12	23:55	1:43

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Alpine Tree Frog surveys	Murrumbidgee River 3		NG , CD	10-01-18	11-01-18	21:40	0:06	2:26
Alpine Tree Frog surveys	Kelly's Plain Creek		NG , CD	11-01-18	11-01-18	1:03	3:05	2:02
Alpine Tree Frog surveys	Murrumbidgee River 4		SW , LH	12-01-18	12-01-18	21:30	22:30	1:00
Alpine Tree Frog surveys	Boundary creek 2		SW , LH	12-01-18	13-01-18	23:15	0:30	1:15
Alpine Tree Frog surveys	Mufflers creek 1		SW , LH	12-01-18	12-01-18	1:20	2:20	1:00
Alpine Tree Frog surveys	Eucumbene 2		NG , LH	14-01-18	14-01-18	22:22	23:53	1:31
Alpine Tree Frog surveys	Tantangara 1		NG , AR	17-01-18	18-01-18	22:06	0:01	1:55
Alpine Tree Frog surveys	Gooandra 1		NG , AR	18-01-18	18-01-18	0:01	0:55	0:54
Alpine Tree Frog surveys	Gooandra 2		NG , AR	18-01-18	18-01-18	1:48	2:07	0:19
Alpine Tree Frog surveys	Boundary creek 2		NG , AR	18-01-18	19-01-18	23:08	0:16	1:08
Alpine Tree Frog surveys	Tantangara North		NG , AR	18-01-18	18-01-18	21:28	22:29	1:01
Alpine Tree Frog surveys	Murrumbidgee river 4		NG , AR	19-01-18	19-01-18	0:31	1:29	0:58
Alpine Tree Frog surveys	Tantangara 2		NG , AR	19-01-18	19-01-18	2:12	2:56	0:44
Alpine Tree Frog surveys	Eucumbene 1		NG , AR	21-01-18	21-01-18	21:43	22:31	0:48

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Alpine Tree Frog surveys	Murrumbidgee River 2		NG , AR	21-01-18	22-01-18	23:32	1:07	1:35
Alpine Tree Frog surveys	Nungar 1		NG , AR	22-01-18	22-01-18	22:01	23:04	1:03
Alpine Tree Frog surveys	Murrumbidgee river 4		AR , DL	24-01-18	24-01-18	22:40	23:45	1:05
Alpine Tree Frog surveys	Tantangara 2		AR , DL	24-01-18	24-01-18	21:00	21:35	0:35
Alpine Tree Frog surveys	Tantangara North		AR , DL	25-01-18	25-01-18	0:42	2:10	1:28
Alpine Tree Frog surveys	Murrumbidgee 1		AR, DL , GM	25-01-18	26-01-18	21:20	1:30	4:10
Alpine Tree Frog surveys	Kelly's Plain Creek		AR , DL	26-01-18	26-01-18	21:30	22:30	1:00
Alpine Tree Frog surveys	Tantangara south		AR , DL	26-01-18	26-01-18	23:00	0:00	1:00
Alpine Tree Frog surveys	Mufflers Creek		GM , LH	26-01-18	26-01-18	21:30	23:10	1:40
Alpine Tree Frog surveys	Kelly's Plain Creek		GM , LH	27-01-18	27-01-18	21:20	23:00	1:40
Alpine Tree Frog surveys	Tantangara North & Mufflers Creek		GM , LH	28-01-18	28-01-18	21:00	22:30	1:30
Alpine Tree Frog surveys	Kelly's Plain Creek		AR , ACM	28-01-18	28-01-18	21:10	22:00	0:50
Alpine Tree Frog surveys	Tantangara south		AR , ACM	28-01-18	29-01-18	22:30	0:30	2:00
Alpine Tree Frog surveys	Rock Forest		JB, OM	09-04-19	09-04-19	23:04	23:11	3:00

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Alpine Tree Frog surveys	Rock Forest - Camerons		JB, OM	09-04-19	09-04-19	20:00	21:40	4:00
Northern Corroboree Frog surveys	Plateau		GM, ED, AR, DK, HB	19-02-18	19-02-18			
Northern Corroboree Frog surveys	Tantangara south		AR, HB, ED	20-02-18	20-02-18			
Northern Corroboree Frog surveys	Tantangara north		GM, ED, AR, DK, HB, LH	21-02-18	21-02-18			
Northern Corroboree Frog surveys	Gooandra track		ED, DK	22-02-18	22-02-18			
Northern Corroboree Frog surveys	Bullocks Hill		GM, LH, ED, HB, CW	23-02-18	23-02-18			
Northern Corroboree Frog surveys	Murrumbidgee (west)		GM, LH	24-02-18	24-02-18			
Northern Corroboree Frog surveys	Tantangara south		LH, GM	25-02-18	25-02-18			
Northern Corroboree Frog surveys	Marica		LH, GM	26-02-18	26-02-18			
Tile grids	Hains Hut track	TG01	LH	22-12-17	10-10-18			292
Tile grids	Gooandra	TG02	NG & ED	09-12-17	17-01-18			39
Tile grids	Tantagara North	TG03	LH	23-12-17	10-10-18			291

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Tile grids	Goandra	TG04	ED, GM & LH	10-12-17	19-10-18			313
Tile grids	Gooandra	TG05	ED, GM & LH	10-12-17	29-01-18			50
Tile grids	Tantagara Rd South	TG06	ED, GM & LH	10-12-17	11-10-18			305
Tile grids	Gooandra	TG07	NG & ED	09-12-17	12-01-18			34
Tile grids	Port Phillip Track	TG08	LH	11-12-17	18-10-18			311
Tile grids	Bullocks Hill track	TG09	SW & LH	22-12-17	18-10-18			300
Tile grids	Tantagara Rd South	TG10	ED, GM & LH	10-12-17	09-10-18			303
Tile grids	Tantagara Rd South	TG11	ED, GM & LH	10-12-17	09-10-18			303
Tile grids	Tantagara North	TG12	LH	23-12-17	10-10-18			291
Tile grids	Snowy Mountains Hwy	TG13	NG & ED	09-12-17	13-01-18			35
Tile grids	Port Phillip Track	TG14	LH	23-12-17	10-10-18			291
Tile grids	Goandra	TG15	ED, GM & LH	10-12-17	11-10-18			305
Tile grids	Bullocks Hill Fire Trail	TG16	NG & ED	09-12-17	17-01-18			39
Tile grids	Snowy Mountains Hwy	TG17	NG & ED	09-12-17	09-10-18			304
Tile grids	Bullocks Hill track	TG18	NG & ED	09-12-17	09-10-18			304
Tile grids	Bullocks Hill track	TG19	NG & ED	09-12-17	18-10-18			313
Tile grids	Snowy Mountains Hwy	TG20	LH, SW, KS & HB	13-01-18	09-10-18			269
Tile grids	Port Phillip Track	TG21	LH	11-12-17	29-01-18			49
Tile grids	Gooandra	TG22	SW & LH	12-01-18	18-10-18			279

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Tile grids	Gooandra	TG23	NG & AR	17-01-18	29-01-18			12
Tile grids	Bullocks Hill track	TG24	NG & AR	17-01-18	18-10-18			274
Tile grids	Gooandra	TG25	LH & GM	29-01-18	09-10-18			253
Tile grids	Gooandra	TG26	LH & GM	29-01-18	25-02-18			27
Tile grids	Port Phillip Track	TG27	LH & GM	29-01-18	18-10-18			262
Tile grids	Lobs Hole Ravine Road	TG28	DK & JB	06-03-18	10-10-18			218
Tile grids	Lobs Hole Ravine Road	TG29	JB & DK	07-03-18	04-11-18			242
Tile grids	Wallace's creek fire trail	TG30	JB & DK	07-03-18	18-10-18			225
Tile grids	Wallace's creek fire trail	TG31	JB & DK	06-03-18	18-10-18			226
Tile grids	Wallace's creek fire trail	TG32	JB & DK	06-03-18	18-10-18			226
Tile transects	Tantangara south	TG10		09-10-18	14-04-19			187
Tile transects	Tantangara south	TG11		09-10-18	14-04-19			187
Tile transects	Wallace's creek trail	TG17		09-10-18	26-02-19			140
Tile transects	East of Snowy Mountains HWY	TG25		09-10-18	11-04-19			184
Tile transects	Prt Phillip Trail	TG14		10-10-18	14-12-18			65
Tile transects	Tantangara road below powerline easement	TG06		11-10-18	08-04-19			179
Tile transects	Gooandara trail	TG15		11-10-18	07-04-19			178

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Tile transects	East of Snowy Mountains HWY	TG22		18-10-18	11-04-19			175
Tile transects	Prt Phillip Trail	TG27		18-10-18	14-12-18			57
Tile transects	Wallace's creek trail	TG30		18-10-18	12-02-19			117
Tile transects	Wallace's creek trail	TG31		18-10-18	11-04-19			175
Tile transects	Wallace's creek trail	TG32		18-10-18	11-04-19			175
Tile transects	Connors Hill west slope	TG33		18-10-18	05-03-19			138
Tile transects	Old Kiandra gold fields	TG34		18-10-18	21-11-18			34
Tile transects	Kiandra old highway	TG35		18-10-18	12-02-19			117
Tile transects	Kiandra Ticket Both	TG36		18-10-18	15-04-19			179
Tile transects	Link Road	TG37		18-10-18	05-03-19			138
Tile transects	Wallace's Creek Trail	TG38		18-10-18	27-11-18			40
Tile transects	Three Mile Dam	TG39		18-10-18	27-11-18			40
Tile transects	Three Mile Dam	TG40		18-10-18	27-11-18			40
Tile transects	Wallace's creek trail	TG41		18-10-18	27-11-18			40
Tile transects	Bullocks Hill Trail	TG43		18-10-18	07-04-19			171
Tile transects	Bullocks Hill Trail	TG44		18-10-18	27-11-18			40
Tile transects	Nungar Trail	TG45		18-10-18	27-11-18			40

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Tile transects	Nungar Trail	TG46		18-10-18	08-04-19			172
Tile transects	Port Phillip Trail	TG48		18-10-18	14-12-18			57
Tile transects	Gooandra trail	TG04		19-10-18	19-11-18			31
Tile transects	Murrimbidgee River and Nungar Creek	TG47		19-10-18	15-04-19			178
Tile transects	Prt Phillip Trail	TG49		19-10-18	29-11-18			41
Tile transects	West of Currango Homestead	TG50		19-10-18	29-11-18			41
Tile transects	Tantangara dam wall	TG51		19-10-18	18-02-19			122
Tile transects	Gulf Creek Trail	TG52		19-10-18	18-02-19			122
Tile transects	Gulf Creek Trail	TG53		19-10-18	18-02-19			122
Tile transects	Bugtown road south	TG54		19-10-18	17-05-19			210
Tile transects	Tantangara south	TG029		20-10-18	17-02-19			120
Tile transects	Tantangara south	TG030		20-10-18	17-02-19			120
Tile transects	Tantangara south	TG034		20-10-18	18-02-19			121
Tile transects	Tantangara road powerline easement	TG035		20-10-18	15-01-19			87
Tile transects	Nungar Trail	TG036		20-10-18	10-01-19			82
Tile transects	Tantangara south	TG037		20-10-18	14-04-19			176
Tile transects	Tantangara south	TG038		20-10-18	14-04-19			176
Tile transects	Kings Cross Road	TG001		24-10-18	14-01-19			82

Table C.1 Fauna survey efforts summary

Survey type	Site name	Location	Surveyors	Start date	End date	Start time	End time	Total effort
Tile transects	Dip creek, Snowy Hwy	TG006		24-10-18	11-04-19			169
Tile transects	Gooandara trail	TG022		24-10-18	07-04-19			165
Tile transects	Gooandara trail	TG027		24-10-18	07-04-19			165
Tile transects	Gooandara trail	TG028		24-10-18	07-04-19			165
Tile transects	Circuits trail	TG031		24-10-18	17-02-19			116
Tile transects	Circuits trail	TG032		24-10-18	17-02-19			116
Tile transects	Circuits trail	TG033		24-10-18	17-02-19			116
Tile transects	Tantangara dam firetrail	TG039		24-10-18	15-04-19			173
Tile transects	Lobs Hole Ravine Rd	TG29		04-11-18	21-03-19			137
Tile transects	Kings Cross Road	TG55		05-11-18	05-03-19			120
Tile transects	Tantangara Dam rd	TG56		08-11-18	06-04-19			149
Tile transects	Gooandra Hill	TG57		20-12-18	16-04-19			117
Tile transects	Gooandra Hill	TG58		20-12-18	16-04-19			117
Tile transects	Rock Forest	TG59		06-04-19	17-05-19			41
Tile transects	Rock Forest	TG60		06-04-19	17-05-19			41
Tile transects	Rock Forest	TG61		06-04-19	17-05-19			41

Annexure D

Targeted survey weather conditions

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
04-12-17	4.3	10	1.6	ESE	61
05-12-17	4.7	10.6	22.6	ESE	70
06-12-17	6	11.4	0.2	WSW	41
07-12-17	7.3	16.1	0.8	W	59
08-12-17	5.4	12.9	3.4	NNW	46
12-12-17	12.2	21.8	0	NW	37
13-12-17	14.7	23.8	0	W	50
14-12-17	17.1	21.9	0	NW	57
15-12-17	12.9	20.6	1.4	W	41
16-12-17	13.6	21.9	0	WNW	35
09-01-18	12.2	18.2	36	NW	52
10-01-18	8.7	21	2.4	E	30
11-01-18	12.1	21.8	0	N	37
12-01-18	15.1	22	0	WSW	70
13-01-18	9.6	13	37.2	W	76
14-01-18	1.4	12.7	31	S	56
17-01-18	7.6	20.3	0	ESE	48
18-01-18	12.3	23.9	0	W	24
19-01-18	16.4	27.5	0	ENE	44
20-01-18	20.1	29.6	0	E	52
21-01-18	20.1	27	0	NNE	48
22-01-18	20.4	25	0	W	72
23-01-18	15.7	25.7	1	NW	74
24-01-18	15.5	19.7	11.4	N	44
25-01-18	15.5	21.8	0.8	NNW	30
26-01-18	15.7	24.7	0.8	E	43
27-01-18	15.2	22	0	E	46
28-01-18	14.8	24.9	0	ENE	39
29-01-18	15	24.5	2.4	ENE	35
30-01-18	17	18.6	0	WNW	46
07-02-18	13.1	24.2	0	WNW	39
08-02-18	16.8	26.5	0	E	43
19-02-18	11.9	15.6	0	ESE	83
20-02-18	6.7	16.8	0	ESE	93

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
21-02-18	7.6	19.2	0	ESE	30
22-02-18	12.7	21.3	0	E	28
23-02-18	14.2	23.3	0	WNW	31
24-02-18	16.2	23.3	0	WNW	70
25-02-18	15.3	16	31.6	ESE	80
26-02-18	5.8	14.6	3.2	E	81
27-02-18	4.7	20.8	0	E	39
28-02-18	12	22.1	0	WNW	91
01-03-18	9.5	20.2	0	ESE	48
02-03-18	7	19.1	0	E	41
03-03-18	9.5	22.1	0	WNW	44
04-03-18	13.4	22.5	0	WNW	44
05-03-18	8.9	19.6	0	ESE	63
06-03-18	4.7	14.5	0	ESE	65
07-03-18	6.9	20.2	0	ESE	44
08-03-18	9.5	21.9	0	E	41
09-03-18	11.9	22.7	0	ESE	28
10-03-18	12	22.8	0	W	26
11-03-18	13.1	23.3	0	SE	35
12-03-18	14	22.9	0	ESE	50
13-03-18	5.9	20	0	ESE	41
14-03-18	8.5	19.8	0	ESE	44
15-03-18	11.9	20.5	0	NW	43
16-03-18	8.5	20.2	0	WNW	39
17-03-18	8.9	22.2	1.4	W	43
18-03-18	13.4	19.3	0	WNW	83
19-03-18	6.1	17.3	0	W	35
20-03-18	6.7	16.8	0	ESE	93
21-03-18	5.4	11.3	0	ESE	80
22-03-18	4.8	14	0	ESE	89
23-03-18	14.2	23.3	0	WNW	31
24-03-18	8.5	15	0	NNW	39
25-03-18	11.4	13.7	1.8	W	83
26-03-18	-0.6	6	21.6	WNW	91

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
27-03-18	-0.5	14.9	0	NNE	26
28-03-18	5.3	18.5	0	WNW	30
29-03-18	11.9	21.4	0	NW	46
30-03-18	13	19.8	0	WNW	37
31-03-18	10.4	19.9	0	NW	33
01-04-18	9.9	18.7	0	W	30
02-04-18	12.7	20.2	0	W	46
03-04-18	6.9	19.3	0	E	35
04-04-18	10.8	20.1	0	E	24
05-04-18	11.9	20.2	0	NW	41
06-04-18	12.6	19.8	0	WNW	41
07-04-18	9.8	18.5	0	WNW	39
08-04-18	11.1	19.8	0	WSW	41
09-04-18	13.1	19.6	0	W	50
10-04-18	12.4	20.6	0	W	41
11-04-18	14.7	23.3	0	N	39
12-04-18	15	21.7	0	NW	80
13-04-18	11.1	17.6	0	NNW	89
14-04-18	5.2	10	13.8	WNW	106
15-04-18	1.8	8.2	18.8	WNW	91
16-04-18	2.5	9.5	26.2	W	81
17-04-18	5.1	14.7	1.6	WSW	39
18-04-18	6.9	14.7	0	ENE	22
19-04-18	8.4	16.3	0	WSW	30
20-04-18	9.4	17.2	0	ESE	31
21-04-18	9.8	16.9	0	WNW	26
01-05-18	6.5	15.2	0	ESE	26
02-05-18	8.8	12.3	0	NNW	41
03-05-18	8.1	15.2	0	NNW	57
04-05-18	4.4	4.9	36.6	WNW	89
05-05-18	0.8	8	13.6	W	57
06-05-18	3.1	11	0	SSW	30
07-05-18	5.2	11.3	0	WNW	52
08-05-18	5.8	12.4	0	WSW	31

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
09-05-18	5.6	10.2	0	NW	41
10-05-18	2.3	2.4	1	W	72
11-05-18	-3.3	4.6	11.8		
12-05-18	-2.9	3.4	0.2		
15-05-18	3.5	8.6	0	ESE	33
16-05-18	-0.3	7.3	0	ESE	50
17-05-18	1.2	8.1	0	WNW	24
18-05-18	0.3	7.4	0	WSW	30
19-05-18	0.9	5.4	0.2	WNW	28
20-05-18	-1.2	4.2	0	W	43
01-10-18	4	14	0	W	28
02-10-18	6.9	15.5	0	WNW	31
03-10-18	10.1	10.6	0	NW	50
04-10-18	5	9.5	18.8	ESE	67
05-10-18	2.3	8.1	0	ESE	67
06-10-18	-0.1	13.8	0	ESE	54
07-10-18	4.6	15.2	0	ESE	52
08-10-18	6.2	16.3	0	WNW	30
09-10-18	7.2	15.3	0	WNW	37
10-10-18	2.4	5.8	18	ESE	83
11-10-18	-0.7	8.5	0	ESE	91
12-10-18	0.2	10.3	0	ESE	76
13-10-18	1.4	14.4	0	ESE	65
14-10-18	5.5	14.2	0	NE	54
15-10-18	5.8	17.2	0	NE	52
16-10-18	7.3	19.1	0	NE	52
17-10-18	8.7	11.9	5.2	NW	41
18-10-18	7.6	13.3	14.8	NW	50
19-10-18	7.1	17.2	0	NNW	31
20-10-18	9.4	15.6	0	WNW	74
21-10-18	1.4	12.6	1.2	ESE	33
22-10-18	6.5	16.3	0	W	31
23-10-18	8.8	19.3	0	WNW	59
24-10-18	3.4	15.5	0	ESE	43

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
25-10-18	3.2	14.4	0	E	35
26-10-18	5.3	15.1	0	WSW	35
27-10-18	7.9	15	0	W	65
28-10-18	1.5	15.7	0	WNW	26
29-10-18	7.4	17.3	0	WSW	30
30-10-18	7.4	17.5	0	W	43
31-10-18	10.1	20.5	0	SW	48
01-11-18	13.1	24.3	0	NNW	61
02-11-18	14.9	20.8	0	NNW	83
03-11-18	5.3	14.5	1.8	W	67
04-11-18	5.6	17.2	0	WSW	39
05-11-18	9.8	15.9	0	NNW	52
06-11-18	11.5	12.9	8	WNW	70
07-11-18	9.4	9.7	66.2	WNW	65
08-11-18	-1.3	8.5	10.6	W	35
09-11-18	1.3	9.9	0	WNW	39
10-11-18	4.1	13.8	0	W	37
11-11-18	7.7	17	0	ESE	35
12-11-18	8.6	19.4	0	W	31
13-11-18	13.5	16.9	0	N	39
14-11-18	9.8	14	8.4	NNW	50
15-11-18	9.9	16.7	16.6	ESE	54
16-11-18	2.7	15.4	0	ESE	46
17-11-18	5.6	14.8	0	ESE	63
18-11-18	3.6	17.5	0	ESE	65
19-11-18	6.3	17.8	0	E	30
20-11-18	10.8	18.3	0	N	57
21-11-18	10.8	12	24.2	W	63
22-11-18	-0.4	2.5	34	W	91
23-11-18	-0.1	4.2	33.2	WNW	70
24-11-18	1.2	8.6	61.4	SW	46
25-11-18	3	11.3	3	WSW	37
26-11-18	3.7	15.5	0	ESE	50
27-11-18	6.1	15.7	0	ENE	35

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
28-11-18	7.6	10.6	1	ESE	76
29-11-18	4.8	14.3	0.2	ESE	63
30-11-18	6.7	16	0.6	WNW	50
01-12-18	8.7	19.7	0	WNW	44
02-12-18	11.2	11.3	0.2	WNW	76
03-12-18	2.4	11.7	9	W	70
04-12-18	4.3	18	0	ESE	48
05-12-18	6.8	19	0	E	43
06-12-18	9.6	21.2	0	WNW	35
07-12-18	14.2	23.3	0	WNW	31
08-12-18	15.6	23.5	0	SE	54
09-12-18	15.9	21.2	0	ESE	43
10-12-18	9.8	20.5	13.2	ESE	43
11-12-18	10.3	20.3	0	NE	41
12-12-18	11.3	20.8	0	NE	37
13-12-18	11.3	16.4	16	ENE	74
14-12-18	9.6	17.8	20.2	E	56
15-12-18	10.9	17.1	8.8	NE	54
16-12-18	10.9	15.1	0	N	37
17-12-18	10.3	20	0.4	NW	39
18-12-18	10.8	22.6	0	ESE	44
19-12-18	12.8	20.7	0		
20-12-18	14.4	22.9	0	E	41
21-12-18	9.1	17.8	0	SE	63
22-12-18	4.2	13.7	2.6	ESE	70
23-12-18	3.7	17.3	0	ESE	44
24-12-18	9.2	20.7	0	WNW	30
25-12-18	14.1	23.4	0	WNW	33
26-12-18	16.2	26.2	0	WNW	54
27-12-18	17	28.2	0	N	37
28-12-18	19.1	25.2	0	N	46
29-12-18	19.1	27.5	0	WNW	50
30-12-18	18.2	23.5	0	NNE	43
31-12-18	16.2	21.8	0.4	WNW	57

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
01-01-19	14.7	25.6	1.4	W	33
02-01-19	18.5	27.5	0	WNW	61
03-01-19	15.9	26.2	0	N	44
04-01-19	18.1	29.1	0.6	WNW	44
05-01-19	19.8	23.2	0	NNW	54
06-01-19	6.7	21.5	1.4	E	46
07-01-19	9.5	21.7	0	ESE	44
08-01-19	13.8	21.4	0	WNW	87
09-01-19	11.5	20.8	19.8	W	59
10-01-19	9.3	21.9	0	E	46
11-01-19	12.2	21.2	0	SW	57
12-01-19	13.2	25.4	9.4	NNE	35
13-01-19	13.4	27.3	0	ESE	50
14-01-19	13.2	27.6	0	ESE	39
15-01-19	20.3	30.6	0	ESE	44
16-01-19	20.8	32.3	0	ESE	63
17-01-19	20.1	30.4	0	ESE	69
18-01-19	18.3	28.3	0.4	ESE	69
19-01-19	14.6	26.6	7.8	SW	39
20-01-19	14.1	26.1	0	ESE	57
21-01-19	13.7	26.5	0	ESE	56
22-01-19	18.3	26.9	0	NW	31
23-01-19	19.6	27.9	2.8	ESE	48
24-01-19	15.4	28.3	0	E	35
25-01-19	19.7	30.6	0	WNW	43
26-01-19	21.7	29.3	0	N	61
27-01-19	14.7	17.4	4.6	W	41
28-01-19	13.1	17.5	2.2	NE	33
29-01-19	13.2	24.6	3.6	NNW	37
30-01-19	15.1	24.8	4.6	N	54
31-01-19	16.5	23.7	8	NNW	65
01-02-19	7.5	19.7	0	ESE	56
02-02-19	10.1	22.4	0	ENE	46
03-02-19	14.8	25.1	0	WSW	44

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
04-02-19	14.3	25.5	5.6	E	57
05-02-19	13.3	18.8	18.6		
06-02-19	13.4	24.1	6.8	ESE	57
07-02-19	12.7	18.9	0	ENE	35
08-02-19	13.6	17.6	8.8	NW	43
09-02-19	9.5	11.9	4.8	W	81
10-02-19	2.9	16.2	2.8	SW	39
11-02-19	7.1	18.7	0	W	50
12-02-19	11.4	17.9	0	WNW	96
13-02-19	2.3	12.2	0	W	48
14-02-19	3.9	18.1	0	ESE	50
15-02-19	7.8	23	0	ESE	48
16-02-19	13.2	21.4	0	NW	28
17-02-19	14.6	22.9	0	NW	50
18-02-19	16.4	24.7	0	WNW	91
19-02-19	13	20.5	3.8	NNW	48
20-02-19	7.1	20.2	0	ESE	35
21-02-19	8.6	21.5	0	ESE	54
22-02-19	8.5	22.4	0	ESE	46
23-02-19	8.8	20.4	0	ESE	63
24-02-19	6.4	20.7	0	ESE	76
25-02-19	10.4	22.5	0	ESE	44
26-02-19	12.9	23.2	0	ESE	46
27-02-19	13.6	24.9	0	ESE	46
28-02-19	13.7	23.2	0	ENE	28
01-03-19	13.7	25.1	0	ENE	39
02-03-19	11.5	23.6	0	ENE	35
03-03-19	14.4	24.3	0	WSW	35
04-03-19	16.9	26.1	0	ENE	43
05-03-19	12.8	20.2	14.4	N	67
06-03-19	8.6	10.3	15.4	NNW	67
07-03-19	0.1	17.1	2.4	ESE	35
08-03-19	4.1	18.6	0	WNW	37
09-03-19	10.6	20.6	1.6	WSW	37

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
10-03-19	12.2	17.8	0	WNW	61
11-03-19	9.1	17.4	5.6	WNW	41
12-03-19	9.2	15.3	0	WNW	48
13-03-19	6.2	16.9	0	NNW	35
14-03-19	7.9	18.2	0	ESE	43
15-03-19	8.1	17.9	0	ESE	76
16-03-19	8.5	18.2	0	ESE	74
17-03-19	9.9	16.8	0	ESE	74
18-03-19	8.7	15.5	0.2	SE	67
19-03-19	11.3	19.2	0.2	ESE	43
20-03-19	11.8	19.8	7.6	ESE	41
21-03-19	12.6	21.5	8	ESE	39
22-03-19	12.8	17.1	4.8	E	37
23-03-19	10.1	16.6	19	N	28
24-03-19	10.5	16.5	0.6	NW	57
25-03-19	10.9	11.9	23.2	WNW	74
26-03-19	0.5	9.6	16.4	WSW	50
27-03-19	1.2	16.8	0	ESE	33
28-03-19	8.6	16.4	0	NNW	31
29-03-19	11.2	13.5	0	W	52
30-03-19	5.4	5.5	35.6	W	61
31-03-19	-1.3	7.1	15.4	W	54
01-04-19	-0.3	13.4	0.2	NW	30
02-04-19	6.1	14.8	0	ENE	30
03-04-19	8.9	15.5	0	ESE	48
04-04-19	7.7	10.9	0	ESE	48
05-04-19	8.2	15.6	3.4	E	44
06-04-19	9.5	16.3	0	N	43
07-04-19	8.4	15.3	0	WNW	46
08-04-19	10.2	15	0	WNW	52
09-04-19	6.4	9.6	0	WNW	52
10-04-19	-0.1	11.4	0	ESE	39
11-04-19	3.3	12.8	0	E	30
12-04-19	6.1	13.5	0	WNW	33

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
13-04-19	7.9	14.1	0	ESE	46
14-04-19	5.3	16.8	0	E	39
15-04-19	7	15.5	0	E	43
16-04-19	9.4	16.5	0	W	28
17-04-19	9.6	16	0	W	28
01-05-19	8.8	11.8	0	NNW	63
02-05-19	8.4	12.8	2.8	N	57
03-05-19	9.7	11.6	42	NW	70
04-05-19	2.7	6.2	2.6	WNW	39
05-05-19	2.3	8.8	0.2	SE	46
06-05-19	1	8.8	0.2	SE	50
07-05-19	1.6	7.1	0	NW	35
08-05-19	0.8	2.6	10.8	WNW	76
09-05-19	0.9	5.3	2.6	W	33
10-05-19	2.1	4.2	0	NW	41
11-05-19	-0.3	5.5	9	SW	35
12-05-19	1.2	7.9	0	SSW	30
13-05-19	1	10.1	0	NNW	20
14-05-19	3.8	10.8	0	W	22
15-05-19	4.9	11.8	0	N	17
16-05-19	5	11.5	0	NNE	20
17-05-19	3.7	10.6	0	W	30
18-05-19	5.7	12.3	0	ESE	28
19-05-19	5.6	12.1	0	NNE	28
20-05-19	6.6	11.6	0	NNW	39
21-05-19	7.1	9.9	1.2	NNW	39
22-05-19	6.4	12.9	0	NW	28
23-05-19	6.4	11.8	0	WNW	19
24-05-19	5.2	9.8	0	WNW	30
25-05-19	5.9	10.9	1.2	WNW	76
26-05-19	1.2	4.1	22.8	WNW	72
27-05-19	-2.4	-0.7	11.2	WNW	80
28-05-19	-2.7	1.9	2.2	NW	76
29-05-19	-1.7	-0.8	33	WNW	93

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
30-05-19	-3.9	0.6	5.8	WNW	31
31-05-19	-3.6	3.6	0.2	SSW	35
16-06-19	0.9	6.5	0	ESE	39
17-06-19	-0.4	7.8	0	ESE	50
18-06-19	1.6	4.6	0	WNW	56
19-06-19	-3	2.5	2.4	NNW	20
20-06-19	-3.5	2.6	0	N	31
21-06-19	-4.7	2.9	0	SE	50
22-06-19	-3.3	3.8	0	SE	57
23-06-19	-2.6	2.6	0	ESE	70
24-06-19	-2	6.6	0	ESE	70
25-06-19	-0.4	8.9	0	ESE	46
26-06-19	1.2	9.7	0	ESE	33
25-10-19	13.1	17.8	0	NNW	85
26-10-19	1.9	5.8	5.8	W	94
27-10-19	-1.3	8.8	0.8	W	56
28-10-19	1.8	14.5	0	SSW	31
29-10-19	7.2	17.1	0	W	35
30-10-19	10.9	19.3	0	W	30
31-10-19	11.9	21.7	0	W	33
01-11-19	13.9	22.5	0	NNW	43
02-11-19	14.1	20	0	WNW	61
03-11-19	9.6	12.8	19.8	N	52
04-11-19	5.9	10	33.2	WNW	61
05-11-19	0.8	9.5	4.2	W	41
06-11-19	2.1	11.6	0	WNW	72
07-11-19	0.6	6.9	0	W	74
08-11-19	0.7	3.7	2.6	WNW	61
09-11-19	-3.5	2	26.8	W	56
10-11-19	-2.1	7.5	0.8	W	59
11-11-19	1.8	14.9	0	W	43
12-11-19	6.9	14.4	0	WNW	69
13-11-19	-2.5	8.5	0	WNW	57
14-11-19	-0.6	12.3	0	W	41

Table D.1 Weather conditions during surveys for Snowy 2.0

Date	Min Temp (°C)	Max Temp (°C)	Rain (mm)	Max wind direction	Max wind speed (km/hr)
15-11-19	4.7	13.8	0	WNW	70
16-11-19	3.7	14.3	0	WNW	48
17-11-19	3.3	14.3	0	WNW	33
18-11-19	4.5	16	0	WNW	43
19-11-19	7.5	21.7	0	WNW	65
20-11-19	11	23.1	0	WNW	31
21-11-19	15	27.6	0	NNW	50
22-11-19	17.2	22.6	0	NNW	54
23-11-19	11.3	20	0	WNW	43
24-11-19	8.2	19.8	0	WNW	41
25-11-19	11.8	21.9	0	WNW	50
26-11-19	13	14	0	WNW	96
27-11-19	-0.7	14	5.2	WNW	31
28-11-19	7.6	19.2	0	W	35
29-11-19	12.2	22.2	0	W	63
30-11-19	8.9	11.3	0.2	NW	56
01-12-19	1.9	7.4	0.2	WNW	74
02-12-19	-0.1	2.8	18	W	76
03-12-19	-0.4	7.4	7	WNW	63
04-12-19	0.4	12.4	0	W	70
05-12-19	4.6	16.4	0	WNW	74
06-12-19	7.6	15.4	0	W	63
07-12-19	5.3	17.6	0	WSW	46
08-12-19	8.2	21.5	0	WNW	31
09-12-19	12.5	24	0	NW	41
10-12-19	17.8	26	0	W	48
11-12-19	11	21.4	0	WNW	43
12-12-19	7	19.1	0	ESE	39
13-12-19	6.2	16.6	0	WNW	31
14-12-19	8	18.7	0	WNW	43
15-12-19	8.8	18.7	0	W	67
16-12-19	8	22.2	0	W	39
17-12-19	12.3	25.2	0	ESE	46

Annexure E

Water Quality Results

E.1 Plateau

The below baseline data has been assigned to one of the following categories:

- **Summer and autumn dry weather conditions** – Streamflow over summer/autumn is proportionally an order of magnitude lower than winter/spring. During dry weather conditions, summer/autumn streamflow is predominantly groundwater fed (ie baseflow). The water quality of summer/autumn streamflow reflects the groundwater origins of the water and generally exhibits higher salinity and carbonate levels than winter/spring streamflow. Minor watercourses with intermittent flow regimes will typically be dry from mid-summer to the end of autumn.

- **Winter and spring dry weather conditions** – Dry weather streamflow during winter/spring is interpreted to be a combination of interflow and groundwater inflows. The water quality generally exhibits lower salinity and carbonate levels than summer/autumn streamflow. Minor watercourses with intermittent flow regimes will typically maintain a constant flow over winter and spring.

- **Wet weather conditions** – Water quality during wet weather conditions is poorly understood, with minimal data collected from watercourses in the plateau.

For further detailed assessment please refer to EMM (2019f).

Table E.1 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Field Parameters														
Temperature	°C	-	14/0	9.8	13.3	22.3	18/0	5.4	9.6	13.9	-	-	-	-
Dissolved oxygen	%	90-110[1]	11/11	**69**	**81**	**87**	13/11	**39**	**69**	105	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	14/0	36	38	41	18/0	19	30	37	-	-	-	-
pH	-	6.5-8.0[1]	14/1	6.6	7.3	7.7	17/4	**6.4**	7.4	7.8	-	-	-	-
Oxidising and reducing potential	-	-	14/0	-14	80	116	17/0	63	99	173	-	-	-	-
Turbidity	NTU	2-25[1]	12/0	1.1	1.5	2.5	16/0	1.0	1.5	3.2	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	14/0	<5	<5	5	18/0	<5	<5	8	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	14/0	9	12	16	18/0	4	9	12	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-									-	-	-	-

Table E.1 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Analytical results – nutrients														
Ammonia	mg/L	0.013	14/0	<0.01	<0.01	<0.01	18/3	<0.01	<0.01	**0.03**	-	-	-	-
Oxidised nitrogen	mg/L	0.015	14/9	0.01	**0.03**	**0.05**	18/7	<0.01	0.01	**0.05**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	14/0	<0.1	<0.1	<0.1	18/0	<0.1	<0.1	<0.1	-	-	-	-
Total nitrogen	mg/L	0.25	14/1	<0.1	<0.1	<0.1	18/0	<0.1	<0.1	<0.1	-	-	-	-
Reactive phosphorus	mg/L	0.015	14/0	<0.01	<0.01	<0.01	18/0	<0.01	<0.01	<0.01	-	-	-	-
Total phosphorus	mg/L	0.020	14/2	<0.01	<0.01	**0.04**	18/1	<0.01	<0.01	0.01	-	-	-	-
Total organic carbon	mg/L	-	14/0	<1	<1	2	18/0	<1	1	2	-	-	-	-
Dissolved organic carbon	mg/L	-	14/0	<1	1	2	18/0	<1	1	3	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	12/0	<0.004	<0.004	<0.004	12/0	<0.004	<0.004	<0.004	-	-	-	-

Table E.1 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	14/4	0.01	0.02	**0.03**	18/5	0.01	0.02	**0.03**	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	14/0	0.002	0.003	0.004	18/0	0.002	0.003	0.008	-	-	-	-
Beryllium (Be)	mg/L	-	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	14/1	<0.05	<0.05	<0.05	18/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	14/0	<0.0001	<0.0001	<0.0001	18/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	14/1	<0.001	<0.001	0.001	18/0	<0.001	<0.001	0.001	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	14/0	<0.05	0.06	0.09	18/0	<0.05	<0.05	0.05	-	-	-	-
Lead (Pb)	mg/L	0.001	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	14/0	0.002	0.004	0.006	18/0	<0.001	0.002	0.004	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	14/0	<0.0001	<0.0001	<0.0001	18/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Nickel (Ni)	mg/L	0.008	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	14/0	<0.01	<0.01	<0.01	18/0	<0.01	<0.01	<0.01	-	-	-	-

Table E.1 Baseline water quality results summary: Eucumbene River (PL_SW_003, PL_SW_006, PL_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Silver (Ag)	mg/L	0.00002[6]	14/0	<0.001	<0.001	<0.001	18/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	14/0	<0.01	<0.01	<0.01	18/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	14/0	<0.005	<0.005	<0.005	18/3	<0.005	<0.005	**0.006**	-	-	-	-

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

E.2 Ravine

The below baseline data has been assigned to one of the following categories:

- **Summer and autumn dry weather conditions** – Streamflow over summer/autumn is proportionally an order of magnitude lower than winter/spring. During dry weather conditions, summer/autumn streamflow is predominantly groundwater fed (ie baseflow). The water quality of summer/autumn streamflow reflects the groundwater origins of the water and generally exhibits higher salinity and carbonate levels than winter baseflow. Minor watercourses with intermittent flow regimes will typically be dry from mid-summer to the end of autumn.

- **Winter and spring dry weather conditions** – Dry weather streamflow during winter/spring is interpreted to be a combination of interflow and groundwater inflows. The water quality generally exhibits lower salinity and carbonate levels than summer/autumn streamflow. Minor watercourses with intermittent flow regimes will typically maintain a constant streamflow over winter/spring.

- **Wet weather conditions** – Water quality during wet weather conditions is poorly understood, with data from only two sampling rounds available since the commencement of sampling in 2018.

For further detailed assessment please refer to EMM (2019f).

Table E.2 Baseline water quality results summary: Yarrangobilly River (PN_SW_001, LH_SW_004, LH_SW_006, LH_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Field Parameters														
Temperature	°C	-	27/0	13.4	20.9	23.6	31/0	4.0	9.3	18.7	5/0	14.5	15.8	17.8
Dissolved oxygen	%	90-110[1]	27/22	**39**	**78**	93	31/21	**2**	**77**	112	5/4	**0**	**61**	92
Electrical conductivity	µS/cm	30-350[1]	27/0	66	160	187	31/0	26	70	109	5/0	89	116	155
pH	-	6.5-8.0[1]	27/15	7.5	**8.0**	**8.5**	31/11	7.1	7.8	**8.2**	5/1	**6.2**	7.3	7.9
Oxidising and reducing potential	-	-	27/0	-20	108	149	27/0	51	164	210	5/0	78	96	157
Turbidity	NTU	2-25[1]	23/0	0.0	0.4	1.7	21/0	0.8	1.6	4.4	5/1	6.4	13.7	**42.1**
Analytical results – general														
Suspended solids	mg/L	-	27/0	<2[8]	<5[8]	5	31/0	<5	<5	<5	5/0	<5	10	148
Total hardness (as $CaCO_3$)	mg/L	-	20/0	22	75	88	31/0	7	32	53	5/0	43	51	78
Total alkalinity (as $CaCO_3$)	mg/L	-	7/0	29	86	109	1/0	16	16	16	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	27/2	<0.01[8]	<0.01[8]	<0.1[8]	30/7	<0.01	<0.01	**0.02**	5/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	23/14	<0.01	**0.02**	**0.05**	31/11	<0.01	<0.01	**0.03**	5/1	<0.01	<0.01	**0.03**
Total kjeldahl nitrogen	mg/L	-	23/0	<0.1	<0.1	<0.1	30/0	<0.1	<0.1	0.1	5/0	<0.1	0.1	2.1
Total nitrogen	mg/L	0.25	27/1	<0.1	<0.1	0.1	30/0	<0.1	<0.1	0.1	5/2	<0.1	0.1	**2.1**

Table E.2 Baseline water quality results summary: Yarrangobilly River (PN_SW_001, LH_SW_004, LH_SW_006, LH_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Reactive phosphorus	mg/L	0.015	20/0	<0.01	<0.01	<0.01	31/1	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	27/1	<0.01	<0.01	0.01	30/1	<0.01	<0.01	0.01	5/2	<0.01	0.02	**0.20**
Total organic carbon	mg/L	-	20/0	1	2	7	30/0	<1	2	3	5/0	2	2	4
Dissolved organic carbon	mg/L	-	20/0	<1	2	2	30/0	1	2	5	5/0	2	3	4
Analytical results – inorganics														
Cyanide	mg/L	0.004	16/0	<0.004	<0.004	<0.004	16/0	<0.004	<0.004	<0.004	5/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	20/5	<0.01	<0.01	**0.04**	30/19	0.01	**0.03**	**0.11**	5/0	<0.01	<0.01	0.01
Arsenic (As)	mg/L	0.0008[2,6]	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	20/0	0.018	0.026	0.036	30/0	0.011	0.016	0.026	5/0	0.013	0.024	0.029
Beryllium (Be)	mg/L	-	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	20/0	<0.05	<0.05	<0.05	30/0	<0.05	<0.05	<0.05	5/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	20/0	<0.0001	<0.0001	<0.0001	30/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	20/1	<0.001	<0.001	<0.001	30/1	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	20/0	<0.001	<0.001	<0.001	30/2	<0.001	<0.001	0.001	5/5	**0.002**	**0.006**	**0.027**
Iron (Fe)	mg/L	0.3[4]	20/0	<0.05	<0.05	0.08	30/0	<0.05	<0.05	0.07	5/0	<0.05	<0.05	<0.05
Lead (Pb)	mg/L	0.001	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001

Table E.2 Baseline water quality results summary: Yarrangobilly River (PN_SW_001, LH_SW_004, LH_SW_006, LH_SW_007)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Manganese (Mn)	mg/L	1.2	20/0	<0.001	0.002	0.002	30/0	<0.001	0.001	0.002	5/0	0.002	0.004	0.006
Mercury (Hg)	mg/L	0.00006[6]	20/0	<0.0001	<0.0001	<0.0001	30/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Selenium (Se)	mg/L	0.005[6]	20/0	<0.01	<0.01	<0.01	30/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	20/0	<0.001	<0.001	<0.001	30/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	20/0	<0.01	<0.01	<0.01	30/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	20/0	<0.005	<0.005	<0.005	30/7	<0.005	<0.005	**0.006**	5/2	<0.005	<0.005	**0.006**

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
8. Where more than one LOR has been used in the reporting of an analyte, the lowest and highest LOR are considered in calculating 10th percentile, median and 90th percentile values.

Bold denotes WQO value is exceeded.

Table E.5 Baseline water quality results summary: Wallace's Creek (LH_SW_001, LH_SW_002, LH_SW_003)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Field Parameters														
Temperature	°C	-	9/0	13.0	14.6	19.4	10/0	3.5	6.4	13.6	-	-	-	-
Dissolved oxygen	%	90-110[1]	8/7	**72**	**80**	92	10/7	**62**	**77**	105	-	-	-	-
Electrical conductivity	µS/cm	30-350[1]	9/0	65	163	185	10/0	36	64	89	-	-	-	-
pH	-	6.5-8.0[1]	9/2	**6.2**	7.5	**8.4**	10/1	6.8	7.8	8.0	-	-	-	-
Oxidising and reducing potential	-	-	9/0	12	101	167	9/0	-19	170	210	-	-	-	-
Turbidity	NTU	2-25[1]	7/0	0.2	0.4	0.7	7/1	0.1	1.3	**152.0**	-	-	-	-
Analytical results – general														
Suspended solids	mg/L	-	9/0	<2[8]	<5[8]	5	10/0	<5	<5	<5	-	-	-	-
Total hardness (as $CaCO_3$)	mg/L	-	6/0	42	67	94	10/0	16	28	55	-	-	-	-
Total alkalinity (as $CaCO_3$)	mg/L	-	3/0	38	99	104	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	9/0	<0.01[8]	<0.01[8]	<0.1[8]	10/1	<0.01	<0.01	0.01	-	-	-	-
Oxidised nitrogen	mg/L	0.015	6/3	<0.01	0.02	**0.04**	10/3	<0.01	<0.01	**0.02**	-	-	-	-
Total kjeldahl nitrogen	mg/L	-	6/0	<0.1	<0.1	<0.1	10/0	<0.1	<0.1	0.1	-	-	-	-
Total nitrogen	mg/L	0.25	9/0	<0.05[8]	<0.1[8]	0.15	10/1	<0.1	<0.1	0.1	-	-	-	-
Reactive phosphorus	mg/L	0.015	6/0	<0.01	<0.01	<0.01	10/2	<0.01	<0.01	**0.02**	-	-	-	-

Table E.5 Baseline water quality results summary: Wallace's Creek (LH_SW_001, LH_SW_002, LH_SW_003)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Total phosphorus	mg/L	0.020	9/0	<0.01	0.01	0.02	10/0	<0.01	<0.01	0.02	-	-	-	-
Total organic carbon	mg/L	-	6/0	<1	2	25	10/0	<1	1	2	-	-	-	-
Dissolved organic carbon	mg/L	-	6/0	1	1	2	10/0	1	2	4	-	-	-	-
Analytical results – inorganics														
Cyanide	mg/L	0.004	4/0	<0.004	<0.004	<0.004	4/0	<0.004	<0.004	<0.004	-	-	-	-
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	6/0	<0.01	<0.01	<0.01	10/0	<0.01	<0.01	0.02	-	-	-	-
Arsenic (As)	mg/L	0.0008[2,6]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Barium (Ba)	mg/L	-	6/0	0.060	0.082	0.106	10/0	0.029	0.044	0.057	-	-	-	-
Beryllium (Be)	mg/L	-	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Boron (B)	mg/L	0.09	6/0	<0.05	<0.05	<0.05	10/0	<0.05	<0.05	<0.05	-	-	-	-
Cadmium (Cd)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	10/0	<0.0001	<0.0001	<0.0001	-	-	-	-
Total chromium (Cr)	mg/L	0.00001[3,6]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Cobalt (Co)	mg/L	0.0014[4]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Copper (Cu)	mg/L	0.001	6/1	<0.001	<0.001	**0.003**	10/2	<0.001	<0.001	**0.002**	-	-	-	-
Iron (Fe)	mg/L	0.3[4]	6/0	<0.05	<0.05	<0.05	10/0	<0.05	<0.05	0.06	-	-	-	-
Lead (Pb)	mg/L	0.001	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Manganese (Mn)	mg/L	1.2	6/0	0.001	0.002	0.002	10/0	<0.001	<0.001	0.001	-	-	-	-
Mercury (Hg)	mg/L	0.00006[6]	6/0	<0.0001	<0.0001	<0.0001	10/0	<0.0001	<0.0001	<0.0001	-	-	-	-

Table E.5 Baseline water quality results summary: Wallace's Creek (LH_SW_001, LH_SW_002, LH_SW_003)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Nickel (Ni)	mg/L	0.008	6/0	<0.001	<0.001	0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Selenium (Se)	mg/L	0.005[6]	6/0	<0.01	<0.01	<0.01	10/0	<0.01	<0.01	<0.01	-	-	-	-
Silver (Ag)	mg/L	0.00002[6]	6/0	<0.001	<0.001	<0.001	10/0	<0.001	<0.001	<0.001	-	-	-	-
Vanadium (V)	mg/L	0.006[4,6]	6/0	<0.01	<0.01	<0.01	10/0	<0.01	<0.01	<0.01	-	-	-	-
Zinc (Zn)	mg/L	0.0024[6]	6/1	<0.005	<0.005	**0.006**	10/3	<0.005	<0.005	**0.008**	-	-	-	-

Table E.6 Baseline water quality results summary: Lick Hole Gully (LH_SW_005)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Field Parameters														
Temperature	°C	-	1/0	16.9	16.9	16.9	5/0	8.6	13.2	13.9	1/0	16.7	16.7	16.7
Dissolved oxygen	%	90-110[1]	1/1	**60**	**60**	**60**	5/5	**48**	**62**	**70**	1/1	**1**	**1**	**1**
Electrical conductivity	µS/cm	30-350[1]	1/1	**801**	**801**	**801**	5/5	**403**	**640**	**814**	1/1	**783**	**783**	**783**
pH	-	6.5-8.0[1]	1/0	7.8	7.8	7.8	5/0	7.1	7.5	7.8	1/0	6.8	6.8	6.8
Oxidising and reducing potential	-	-	1/0	136	136	136	4/0	131	159	221	1/0	116	116	116
Turbidity	NTU	2-25[1]	1/1	**198.0**	**198.0**	**198.0**	3/1	0.4	3.4	**73.4**	1/0	0.7	0.7	0.7

Table E.6 Baseline water quality results summary: Lick Hole Gully (LH_SW_005)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Analytical results – general														
Suspended solids	mg/L	-	1/0	172	172	172	5/0	<5	12	168	1/0	5	5	5
Total hardness (as $CaCO_3$)	mg/L	-	1/0	474	474	474	5/0	305	310	497	1/0	402	402	402
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Analytical results – nutrients														
Ammonia	mg/L	0.013	1/0	<0.01	<0.01	<0.01	5/2	<0.01	<0.01	**0.02**	1/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	1/0	<0.01	<0.01	<0.01	5/2	<0.01	0.01	**0.11**	1/0	<0.01	<0.01	<0.01
Total kjeldahl nitrogen	mg/L	-	1/0	0.4	0.4	0.4	5/0	<0.1	<0.1	0.2	1/0	0.2	0.2	0.2
Total nitrogen	mg/L	0.25	1/1	**0.4**	**0.4**	**0.4**	5/0	<0.1	0.1	0.2	1/0	0.2	0.2	0.2
Reactive phosphorus	mg/L	0.015	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	1/1	**0.16**	**0.16**	**0.16**	5/1	<0.01	<0.01	**0.08**	1/0	<0.01	<0.01	<0.01
Total organic carbon	mg/L	-	1/0	3	3	3	5/0	<1	1	2	1/0	3	3	3
Dissolved organic carbon	mg/L	-	1/0	3	3	3	5/0	<1	2	5	1/0	5	5	5

Table E.6 Baseline water quality results summary: Lick Hole Gully (LH_SW_005)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	WQO value[1]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]	# Samples/ exceedances[7]	Min/10P[5]	Median	Max/90P[5]
Analytical results – inorganics														
Cyanide	mg/L	0.004	1/0	<0.004	<0.004	<0.004	3/0	<0.004	<0.004	<0.004	1/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Arsenic (As)	mg/L	0.0008[2,6]	1/0	<0.001	<0.001	<0.001	5/1	<0.001	<0.001	**0.001**	1/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	1/0	0.153	0.153	0.153	5/0	0.108	0.116	0.128	1/0	0.113	0.113	0.113
Beryllium (Be)	mg/L	-	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	1/0	<0.05	<0.05	<0.05	5/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	1/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001
Total chromium (Cr)	mg/L	0.00001[3,6]	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	1/1	**0.011**	**0.011**	**0.011**	5/5	**0.002**	**0.003**	**0.008**	1/1	**0.010**	**0.010**	**0.010**
Iron (Fe)	mg/L	0.3[4]	1/0	<0.05	<0.05	<0.05	5/0	<0.05	<0.05	<0.05	1/0	<0.05	<0.05	<0.05
Lead (Pb)	mg/L	0.001	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	1/0	0.009	0.009	0.009	5/0	0.002	0.002	0.015	1/0	0.002	0.002	0.002
Mercury (Hg)	mg/L	0.00006[6]	1/0	<0.0001	<0.0001	<0.0001	5/0	<0.0001	<0.0001	<0.0001	1/0	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	0.002	1/0	0.002	0.002	0.002
Selenium (Se)	mg/L	0.005[6]	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	1/0	<0.001	<0.001	<0.001	5/0	<0.001	<0.001	<0.001	1/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	1/0	<0.01	<0.01	<0.01	5/0	<0.01	<0.01	<0.01	1/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	1/0	<0.005	<0.005	<0.005	5/1	<0.005	<0.005	**0.006**	1/1	**0.006**	**0.006**	**0.006**

Notes: 1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.

2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.
Bold denotes WQO value is exceeded.

Table E.7 Baseline water quality results summary: Minor watercourses (LH_SW_008, LH_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Field Parameters														
Temperature	°C	-	3/0	12.4	14.0	21.3	7/0	8.4	11.1	20.5	2/0	14.0	14.3	14.5
Dissolved oxygen	%	90-110[1]	3/3	**39**	**39**	**45**	7/7	**35**	**63**	**75**	2/2	**57**	**58**	**59**
Electrical conductivity	µS/cm	30-350[1]	3/0	79	87	107	7/0	42	63	83	2/0	70	72	74
pH	-	6.5-8.0[1]	3/1	6.7	7.8	**8.3**	7/1	**6.5**	7.1	7.9	2/0	7.1	7.4	7.7
Oxidising and reducing potential	-	-	3/0	113	118	162	6/0	151	179	223	2/0	165	169	173
Turbidity	NTU	2-25[1]	3/0	0.1	0.4	1.0	7/0	0.2	0.9	5.7	2/0	5.2	5.7	6.3
Analytical results – general														
Suspended solids	mg/L	-	3/0	<5	<5	5	7/0	<5	<5	8	2/0	<5	<5	<5
Total hardness (as $CaCO_3$)	mg/L	-	3/0	35	39	45	7/0	21	28	39	2/0	28	29	30
Total alkalinity (as $CaCO_3$)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-

Table E.7 Baseline water quality results summary: Minor watercourses (LH_SW_008, LH_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Analytical results – nutrients														
Ammonia	mg/L	0.013	3/0	<0.01	<0.01	<0.01	7/3	<0.01	0.01	**0.03**	2/0	<0.01	<0.01	<0.01
Oxidised nitrogen	mg/L	0.015	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	0.01	2/0	<0.01	<0.01	<0.01
Total kjeldahl nitrogen	mg/L	-	3/0	<0.1	<0.1	<0.1	7/0	<0.1	<0.1	2.4	2/0	0.3	0.3	0.3
Total nitrogen	mg/L	0.25	3/0	<0.1	<0.1	<0.1	7/1	<0.1	<0.1	**2.4**	2/2	**0.3**	**0.3**	**0.3**
Reactive phosphorus	mg/L	0.015	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	2/0	<0.01	<0.01	<0.01
Total phosphorus	mg/L	0.020	3/2	<0.01	**0.04**	**0.06**	7/1	<0.01	<0.01	**1.12**	2/1	0.02	**0.03**	**0.03**
Total organic carbon	mg/L	-	3/0	<1	<1	1	7/0	<1	<1	2	2/0	7	8	8
Dissolved organic carbon	mg/L	-	3/0	1	1	1	7/0	<1	2	5	2/0	7	8	8
Analytical results – inorganics														
Cyanide	mg/L	0.004	3/0	<0.004	<0.004	<0.004	5/0	<0.004	<0.004	<0.004	2/0	<0.004	<0.004	<0.004
Analytical results – metals (dissolved)														
Aluminium (Al)	mg/L	0.027	3/0	<0.01	<0.01	<0.01	7/1	<0.01	0.02	**0.10**	2/2	**0.10**	**0.14**	**0.17**
Arsenic (As)	mg/L	0.0008[2,6]	3/0	<0.001	<0.001	<0.001	7/1	<0.001	<0.001	**0.002**	2/0	<0.001	<0.001	<0.001
Barium (Ba)	mg/L	-	3/0	0.014	0.015	0.020	7/0	0.010	0.011	0.017	2/0	0.012	0.013	0.013
Beryllium (Be)	mg/L	-	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Boron (B)	mg/L	0.09	3/0	<0.05	<0.05	<0.05	7/0	<0.05	<0.05	<0.05	2/0	<0.05	<0.05	<0.05
Cadmium (Cd)	mg/L	0.00006[6]	3/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	2/0	<0.0001	<0.0001	<0.0001

Table E.7 Baseline water quality results summary: Minor watercourses (LH_SW_008, LH_SW_009)

			Summer/autumn dry weather conditions				Winter/spring dry weather conditions				Wet weather conditions			
	Unit	**WQO value[1]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**	**# Samples/ exceedances[7]**	**Min/10P[5]**	**Median**	**Max/90P[5]**
Total chromium (Cr)	mg/L	0.00001[3,6]	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Cobalt (Co)	mg/L	0.0014[4]	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.001	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	0.001	2/0	<0.001	<0.001	<0.001
Iron (Fe)	mg/L	0.3[4]	3/0	<0.05	<0.05	<0.05	7/0	<0.05	<0.05	0.06	2/0	0.14	0.18	0.21
Lead (Pb)	mg/L	0.001	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Manganese (Mn)	mg/L	1.2	3/0	<0.001	<0.001	0.020	7/0	<0.001	<0.001	0.001	2/0	0.002	0.002	0.002
Mercury (Hg)	mg/L	0.00006[6]	3/0	<0.0001	<0.0001	<0.0001	7/0	<0.0001	<0.0001	<0.0001	2/0	<0.0001	<0.0001	<0.0001
Nickel (Ni)	mg/L	0.008	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	0.002	2/0	<0.001	<0.001	<0.001
Selenium (Se)	mg/L	0.005[6]	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	2/0	<0.01	<0.01	<0.01
Silver (Ag)	mg/L	0.00002[6]	3/0	<0.001	<0.001	<0.001	7/0	<0.001	<0.001	<0.001	2/0	<0.001	<0.001	<0.001
Vanadium (V)	mg/L	0.006[4,6]	3/0	<0.01	<0.01	<0.01	7/0	<0.01	<0.01	<0.01	2/0	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.0024[6]	3/0	<0.005	<0.005	<0.005	7/0	<0.005	<0.005	<0.005	2/0	<0.005	<0.005	<0.005

Notes:
1. The WQO values for field parameters and nutrients refer to the WQO values for physical and chemical stressors in south-east Australia (upland river) that are reported in Tables 3.3.2 and 3.3.3 of ANZECC/ARMCANZ (2000). Toxicant trigger values are for the protection of 99% of aquatic species.
2. For As (V).
3. For Cr (VI).
4. Refers to a low reliability WQO value.
5. If less than 10 samples are available, the minimum value is reported instead of the 10th percentile value and the maximum value is reported instead of the 90th percentile value.
6. Denotes WQO lower than Limit of Reporting (LOR) (or laboratory detection limits). Exceedances below LOR are not identified in the baseline data.
7. An exceedance refers to any result that is above detection limit and exceeds the WQO value. Where a range is given for the WQO value, exceedances are determined in relation to the upper limit for turbidity and electrical conductivity, the lower limit for dissolved oxygen and the lower and upper limit for pH.

Bold denotes WQO value is exceeded.

Annexure F

Baseline Stygofauna Assessment

Snowy 2.0 Project

Baseline Stygofauna Study



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Cover Photo: Kathryn Korbel

Glossary

18S rDNA	18S ribosomal DNA is the DNA sequence of eukaryotic genome that encodes small subunit RNA in the ribosome of the cell. 18S rDNA is applied in the classification above species level.
Alpine bogs and fens	Wetlands occurring in the Snowy Mountains region in which saturated sediments give rise to peat formation.
CO1	Mitochondrial Cytochrome Oxidase 1 (CO1) gene. CO1 is a gene that is often used as a DNA barcode to identify animal species and can distinguish closely related species.
eDNA	Environmental DNA - DNA isolated directly from an environmental sample (e.g. sediment, soil, water).
EIS	Environmental Impact Statement
GDE	Groundwater Dependent Ecosystem
Metazoan	Multi-celled animal
OEH	Office of Environment and Heritage (NSW)
OTU	Operational Taxonomic Unit - a label for similar or related taxa based on DNA sequence similarity of a specific taxonomic marker gene.
PCR	Polymerase chain reactions - The sequence of chemical reactions to generate many copies of targeted pieces of DNA
Stygobiont	A species strongly bound to groundwater habitats and typically adapted morphologically to the groundwater environment (adj. Stygobiotic)
Stygofauna	Collective term for any fauna that live in groundwater systems

Summary

Snowy Hydro Limited is proposing to build the Snowy 2.0 Project to increase the hydro power generation capacity of the Snowy Hydro scheme. EMM Consulting is preparing the Main Works Environmental Impact Statement (EIS) and supporting technical studies. As part of the consultation process for the Project, the NSW Office of Environment and Heritage (OEH) requested a baseline stygofauna study be completed in this unique alpine area.

In November 2018, EMM engaged Macquarie University to undertake a baseline stygofauna study, involving field sampling in the shallow and deep fractured rock aquifers and alpine bogs and fens across the Snowy 2.0 Project area, to provide a baseline on the presence or absence of stygofauna. A total of 11 monitoring bores accessing fractured rock aquifers and five drive point piezometers accessing alpine bogs and fens were sampled and analysed using traditional counts and morphological identifications, as well as analyses of environmental DNA (eDNA) derived from water samples.

Morphological analyses identified harpacticoid copepods in the Gooandra Volcanics aquifer that are likely to be obligate groundwater invertebrates (stygobionts). These are also likely to be new, undescribed taxa. Seven other taxa were identified from other aquifers and alpine bog and fen locations but it is unclear whether these are stygobiotic. The eDNA identified an ostracod (Cyprididae) in both the Gooandra Volcanics and adjoining Ravine formation, and a number of other metazoan taxa, many of which are likely to be surface species or taxa common in groundwater but not specifically adapted to the groundwater environment. Likely stygobiotic copepods and potentially stygobiotic ostracods were found in two of the five alpine bogs and fens sampled.

As a baseline stygofauna study, this sampling has identified the occurrence of obligate groundwater invertebrates in the fractured rock aquifers and colluvial aquifers associated with the alpine bogs and fens of the Snowy 2.0 Project area. Importantly, the sampling program has not been exhaustive and further sampling is needed before definitive statements of the absence of stygofauna in certain areas (or beyond certain depths) can be made.

Acknowledgements

This report was prepared by Prof Grant Hose. Aquifer sampling was undertaken by Dr Kathryn Korbel and Tess Nelson. Aquifer sample processing was done by Dr Kathryn Korbel with QA/QC by Grant Hose. Alpine bog and fen samples were collected by EMM staff and processed by Grant Hose. Grant Hose identified, enumerated and photographed the specimens found. Environmental DNA (eDNA) samples were collected by Dr Kathryn Korbel and Tess Nelson. eDNA extraction and amplification was done by Dr Ammara Sajjad. Bioinformatic processing of eDNA sequence data was done by Dr Anthony Chariton.

Project scope

Snowy Hydro Limited is proposing to build the Snowy 2.0 Project to increase the hydro power generation capacity of the Snowy Hydro scheme in the area north of Cabramurra in the Snowy Mountains between Tantangara Reservoir in the east and Talbingo Reservoir in the west. EMM Consulting is responsible for all the environmental and water studies for the Snowy 2.0 environmental impact statement (EIS) and has just completed evaluating the submissions on the Exploratory Works EIS. As part of the consultation process for the Project, the NSW OEH requested a baseline stygofauna study be completed in this unique alpine area.

In November 2018, EMM engaged Macquarie University to undertake field sampling and to provide a baseline report on the presence or absence of stygofauna in the shallow and deep fractured rock aquifers and alpine bogs and fens across the Snowy 2.0 Project area.

EMM identified and provided a list of 16 sites from which they requested samples to be collected. These include existing monitoring bores accessing fractured rock aquifers at various depths and in different lithologies, as well as alpine swamps.

Objective

The objective of the sampling program was to determine the presence or absence of stygofauna in aquifers and alpine bogs and fens associated with the Snowy 2.0 Project.

Background

Aquifers across Australia can support a diverse range of surface and subsurface ecosystems that are groundwater dependent. Surface groundwater dependent ecosystems (GDEs) include the red gum forests of the Murray River flood plain, the artesian mound springs in the central arid zone of Australia, and peat swamps along the Great Dividing Range. In subsurface GDEs, the presence of groundwater creates unique environments, inhabited by potentially diverse subterranean fauna communities, containing species (referred to as stygofauna) not found in surface water environments. All of these above and below ground systems depend on groundwater to maintain the structure and function of the ecosystem.

Changes to the availability and quality of groundwater resulting from surface activities, changes in aquifer recharge or water losses from an aquifer due to groundwater abstraction or aquifer interference can significantly impact subsurface GDEs. Tunneling activities, proposed to be undertaken as part of the Snowy Hydro 2.0 project, have the potential to change the movement and availability of groundwater to GDEs across parts of the project area. In light of the potential risk that this poses to GDEs, a survey of the stygofauna diversity of aquifers in the project area was commissioned as part of the supporting technical documentation required for the Main Works EIS.

Overview of groundwater ecosystems

Groundwater ecosystems differ greatly from surface water environments in terms of biota and key ecological variables and processes. There is no light underground and, consequently, there are usually no primary producers in groundwater ecosystems. Overall, vertebrates are rare in groundwater and the fauna typically comprise invertebrates, and microbes, including bacteria, fungi and protozoa. In aquifers where pore spaces are large enough, microinvertebrates from groups such as Turbellaria (non-parasitic flatworms), Rotifera (pseudocoelomates), Nematoda (roundworms) and Protozoa (single-celled organisms) may be present (Humphreys 2006). Meiofauna may also be present, and comprises predominantly crustaceans from the groups Copepoda, Syncarida, Amphipoda, Isopoda and Ostracoda, but may include insects, molluscs, oligochaetes and mites (Humphreys 2006). It is common for crustaceans to dominate total species abundance and diversity of the groundwater invertebrate community (Korbel & Hose 2011) whereas insects are relatively uncommon (Humphreys 2006).

Most biota found in groundwater ecosystems are highly-evolved, obligate groundwater-dwelling invertebrates (stygobionts) that are not found in surface water environments. Stygobionts have evolved the common morphological traits of lack of eyes, hardened body parts, lack of body pigments, worm-like body shapes and enhanced non-ocular sensory appendages in response to the pressures of the groundwater environment (Humphreys 2006). As a result, many species are morphologically very similar, requiring specialist taxonomic expertise, or genetic analysis to distinguish different species. In addition to stygobionts, groundwater ecosystems may also contain non-groundwater adapted species (stygophiles) and accidental or transient surface-dwelling species (stygoxenes) (Sket 2008).

Stygofauna are typically sparsely and heterogeneously distributed within an aquifer, and specimen collection is limited to sampling within bores and wells (Larned 2012). As a result, sampling of stygofauna using nets or pumps to collect whole organisms can be 'hit and miss', particularly when sampled only once. Environmental DNA (eDNA) provides a means to improve the efficacy of sampling of cryptic biota or in difficult to access habitats (such as stygofauna in aquifers) because rather than requiring a whole organism for detection, the presence of an organism may be determined from DNA shed in the environment sampled, thus demonstrating the presence of the organism without requiring its capture or collection (Creer *et al.* 2016; Niemiller *et al.* 2018). It should be noted that eDNA analyses have limitations that include uncertainty of the persistence and mobility of DNA in the environment, potential contamination, and database deficiencies that complicate the assignment of taxonomy (Deiner *et al.* 2017; Cristescu & Hebert 2018). However, combining traditional collection methods and morphological identification with analyses of eDNA provides a comprehensive picture of the diversity of groundwater ecosystems (Korbel *et al.* 2017).

Aquifers of the Snowy 2.0 Project area

It is proposed, as part of the Snowy 2.0 Project, that a tunnel is constructed linking Tantangara and Talbingo Reservoirs, with the tunnel passing through several geological formations in which the fractures and fissures in the rock are saturated and form fractured rock aquifers. Fractured rock aquifers commonly support stygofauna, with the size and nature of the voids or fractures and water chemistry being key determinants of the suitability of those aquifers as habitat for stygofauna (Hose *et al.* 2014). It is likely that different formations (even overlying formations) may support different populations

of stygofauna, particularly where they are disconnected (i.e., there is no water flow between them). Accordingly, the sampling regime for this baseline stygofauna study focused on sampling aquifers in a range of different geological formations.

In addition to fractured rock aquifers, there are a number of colluvial aquifers that sustain alpine bogs and fens on the surface. The degree of connectivity between these aquifers is still under investigation but the current conceptual modelling suggests there is negligible connection (EMM Water Characterisation Report, in prep). Alpine bogs and fens are common across the Kosciuszko National Park, yet there are several variants based on vegetation and soil stratigraphy (Hope *et al.* 2012). All are listed as an Endangered Ecological Community (Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions) under the NSW *Threatened Species Conservation Act 1995*, and as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Alpine bogs and fens are considered highly sensitive to environmental change (Hope *et al.* 2012) although their hydrology remains, in most cases, poorly studied. The alpine bogs and fens also contain unique flora and fauna (Hope *et al.* 2012), which could include stygofauna that may inhabit the saturated bog and fen sediments (e.g. Hose *et al.* 2017).

Methods

Sampling locations

Samples of groundwater were collected from monitoring bores accessing various shallow and deep aquifers, and from drive point piezometers accessing alpine bogs and fens across the Snowy 2.0 Project area (Figure 1). Sites were chosen by EMM, and were focused within 2 km of the proposed tunneling and shaft excavation works, as numerical modelling suggested this is the area in which aquifer drawdown, if caused, is most likely. Two sites outside the assumed area of potential impact (one north and one south of the tunnel alignment) were also included as reference sites.

Aquifer sampling

Sampling methods varied between sites depending on the location of existing in-bore infrastructure and the rate of replenishment of the groundwater in the bore. Sample collection methods are outlined in Table 1. All monitoring bores accessing the aquifers (except PB01) were constructed from 50 mm PVC pipes with 1 mm slotted screens. All PVC monitoring bores had 2-3 mm gravel pack between the annulus of the bore hole and PVC screen. PB01 was an open hole with no screen or gravel pack.

Physico-chemical water quality in each monitoring bore was recorded at the time of sampling using hand held meters. These data were collected and provided by EMM.

Alpine bog and fen sampling

A single drive point piezometer was installed in each of five alpine bogs and fens. The drive point was driven through the colluvial swamp sediments as far as possible. Water was collected from these drive points using a low flow pump. Bogs and fens sampled, depths of drive points and sample volumes are provided in Table 1. The alpine bog and fen habitat may be considered as either a surface water or groundwater system, or as the hyporheic ecotone (where surface and groundwater systems intersect), depending on the inputs and connectivity to groundwater in each bog or fen. With the limited knowledge of bog/fen-groundwater interactions at the time the study commenced, we have assumed that all alpine bogs and fens are potentially groundwater connected.

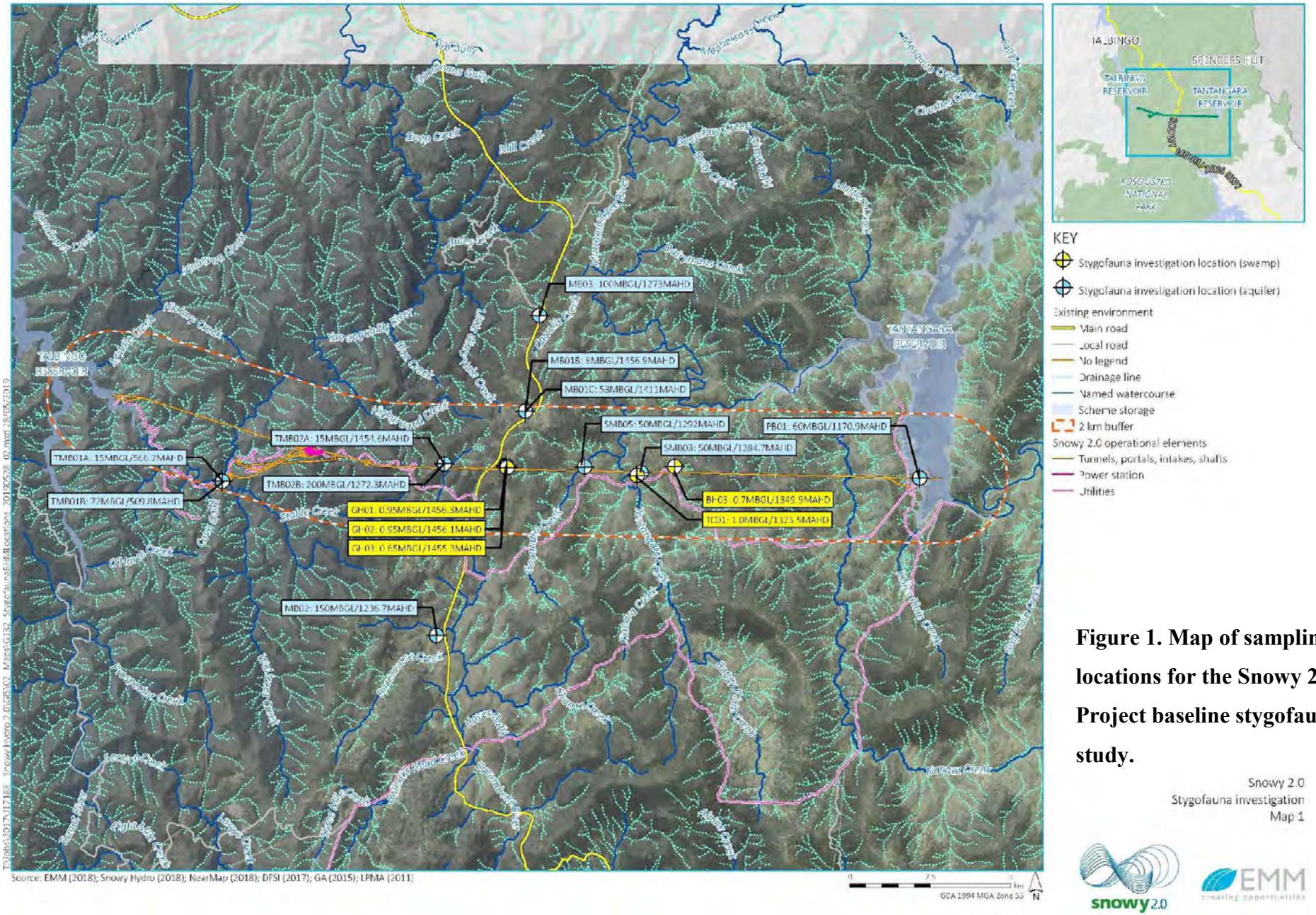


Figure 1. Map of sampling locations for the Snowy 2.0 Project baseline stygofauna study.

Table 1. Sampling methods used for each monitoring bore/piezometer.

Bore/ Piezometer	Habitat	Formation	Depth (m)	Screen Depth (m)	Bailer Volume (L)	Low-flow pump volume (L)*	Number of net hauls
PB01	Aquifer	Kellys Plain Volcanics	60	Open hole	2	-	5
TMB02A	Aquifer	Gooandra Volcanics	15	11-14	-	33 (>2 h)	-
TMB02B	Aquifer	Gooandra Volcanics	200	191-197	-	60	-
SMB05	Aquifer	Gooandra Volcanics	50	40-49	2		5
SMB03	Aquifer	Temperance Formation	50	40-49	2		5
MB03	Aquifer	Gooandra Volcanics	101	92-98	-	50	-
MB01B	Aquifer	Tertiary Basalt	7.5	5.3-6.8	50 (until empty)		-
MB01C	Aquifer	Gooandra Volcanics	52	45-51	-	55 (2 h)	-
MB02	Aquifer	Gooandra Volcanics	150	141-147	-	4 (2 h)	-
TMB01A	Aquifer	Boraig Group	14	11-14	-	50 (2 h)	5
TMB01B	Aquifer	Ravine Formation	72	63-69	-	40 (2 h)	-
BH03	Alpine bog/fen	-	0.7	0.4-0.7	-	2	-
GH01	Alpine bog/fen	-	0.95	0.55-0.95	-	10	-
GH02	Alpine bog/fen	-	0.95	0.55-0.95	-	10	-
GH03	Alpine bog/fen	-	0.65	0.35-0.65	-	10	-
TC01	Alpine bog/fen	-	1.0	0.6-0.1	-	1	-

* (2 h) Indicates pumping ceased after 2 h

Sample collection and processing

Several methods were employed and tailored to each sampling location to ensure adequate sampling was achieved. Low flow pumps (Solinst Model 408 double valve gas driven pump, Solinst, Canada) had been installed permanently in several monitoring bores as part of routine water quality sampling for the Snowy 2.0 project. Where present, these low flow pumps were used to collect samples for stygofauna analysis. Low flow pump intakes were located opposite known fractures in the fractured rock groundwater system. Pumps were operated with the aim of collecting 100 L of water, or for 2 h whichever came first. For shallow monitoring bores that were emptied by pumping, sampling was continued for 2 h in order to collect water that replenished the

monitoring bore. Monitoring bores in which pumps were not installed were sampled using a combination of plankton nets (50-µm mesh) and bailers. Plankton nets were lowered as far as possible into the monitoring bore and hauled through the water column to collect any fauna. This process was repeated five times. Where a bailer was used, the bailer was lowered as far as possible into the monitoring bore and hauled through the water column, with the intention of collecting 10 L of water. The contents of the plankton nets and bailers from each location were combined.

The water removed from the aquifer monitoring bores and swamp drive points by pumping, net hauls and bailers was sieved through a 50 µm mesh sieve. The contents of the sieve were carefully transferred to sample jars and preserved in 100% undenatured ethanol. All sampling equipment was washed between sites and carefully inspected to avoid contamination between samples. All equipment used for collection of samples for eDNA analysis was rinsed with bleach (sodium hypochlorite solution) between samples.

Preserved samples were analysed in the laboratory and all invertebrates removed, identified and enumerated. Samples were stained using Rose Bengal, which stains stygofauna pink and makes them easier to find among debris and sediment in the samples. Quality assurance of the sample processing procedure was done by double processing three (SMB03, TMB02B and PB01) of the 16 samples (20%). Re-processing was done by an independent operator to ensure that no stygofauna were missed through laboratory processing.

All specimens collected were identified to the lowest practicable level using morphological traits and keys. Relatively little is known of the distribution and detailed taxonomy of stygofauna in eastern Australia (compared to western Australia, Hose *et al.* 2015) and few taxonomic keys are available for the morphological identification of specimens beyond family level. Preliminary morphological identifications of Harpacticoida copepods were done using the key by Wells (2007). Each specimen was classified based on the likelihood of it being an obligate groundwater organism using the classification of Sket (2008) based on the presence of typical stygobiotic traits such as a lack of eyes and body pigmentation, and enhanced sensory appendages.

eDNA analysis

After invertebrate samples were collected, additional samples of groundwater were collected from each of the 11 aquifer monitoring bores for the purpose of eDNA analysis.

After collection, samples were placed immediately on ice and at 0-4°C until processing within 6 hours of collection.

Aquifer samples were analysed to characterise the eukaryotic community of the groundwater using high throughput amplicon sequencing targeting informative regions of the 18S ribosomal DNA and mitochondrial Cytochrome Oxidase 1 (CO1) genes. The 18S rDNA gene provides broad taxonomic coverage across the eukaryote (non-bacterial) domain but can provide limited taxonomic resolution (Clarke *et al.* 2017). In contrast, CO1 gene provides greater taxonomic resolution of metazoans, enhanced by large reference databases. CO1 primers were chosen as they efficiently detect zooplankton, including crustacea (Leray *et al.* 2013; Clarke *et al.* 2017), which are common in groundwater (Humphrey 2006).

Groundwater samples collected from the aquifers were processed by vacuum filtration using sterile 0.2 µm mixed cellulose membranes (Pall Corp., Port Washington, USA). Water was added in 100 mL increments until the membrane became clogged with sediment and the passage of water was limited. As such the volume of filtered water varied (350 mL – 500 mL). Membranes were transferred using sterilised forceps into sterile petri dishes and stored at -20°C for transport and then at -80°C until DNA extraction. The filtration apparatus was sterilised between samples by rinsing with 100% ethanol and flaming.

Filters were thawed under sterile laboratory conditions and 0.25 mg of sediment and 1 cm^2 of finely shredded filter paper from each sample were used for subsequent analyses. DNA was extracted from membranes using MoBio PowerSoil DNA kits, following the manufacturer's directions, with the exception on an increase in the incubation time (30 min instead of 5 min) to maximise the extraction process. For each extract, two primers were targeted: a 200-500-bp fragment of the 18S rDNA gene which designed to capture a wide breadth of eukaryotes (Hardy *et al.* 2010); and a region on the mitochondrial gene CO1, designed to target metazoans (Leray *et al.* 2013). Primers and tags used are listed in Appendix 1. Polymerase chain reactions (PCR) was performed on the 18S rDNA gene using the protocols described in Korbel *et al.* (2017) and using the protocol of Deagle *et al.* (2018) for the CO1 gene. In addition to the groundwater samples a positive control (*Crocodylus*) and one negative water control was included in each PCR.

In preparation for sequencing, the labelled products for each gene were mixed in equimolar concentrations, with a final clean-up performed using AMPure XP. The

Illumina MiSeq sequencing was performed by the Ramaciotti Centre, UNSW. Illumina data was processed using an in-house custom pipeline, GHAP, based on USearch (Edgar 2013). The GHAP hybrid pipeline takes files of reads and produces tables of classified OTUs and their associated read counts across all samples. The raw Miseq Illumina data was de-multiplexed, de-replicated and then clustered at 97% similarity to generate OTUs. A representative sequence from each OTU was then classified by comparison against a curated set of 18S reference sequences derived from the SILVA SSU reference set. For both the datasets (18S rDNA and CO1), potentially erroneous sequences (OTUs) were removed using a two-step process. The initial stage involved removing all OTUs with poor matches to the database (average identify <80). Secondly, for each gene, the amount of potential cross-contamination between samples (tag-jumping) and false reads were estimated by the proportion of false sequences in the positive controls. For the 18S rDNA dataset, this resulted in all OTUS which contributed to less than 0.0013 % of the total reads in a sample being removed, with the value increased to 0.017% for the CO1 dataset.

Results

Fractured rock aquifers

Physico-chemical water quality was variable across the project area (Table 2). The pH ranged from slightly acidic (5.9) at TMB02A to slightly basic at PB01 (9.25) and MB01B (10.63) (Table 2). With the exception of TMB01B in the ravine formation (EC= 1641 µS/cm), the electrical conductivity of the groundwater was below 360 µS/cm.
The dissolved oxygen concentrations were variable across the project area and showed no clear trend with depth from which the samples were collected (mid screen depth) or the sampling method used (Tables 1,2). Oxidation-reduction potential (ORP) values were indicative of mildly to strongly reducing environments across all sites.

Table 2. Physico-chemical water quality parameters for aquifer samples. Data provided by EMM for sampling event in November 2018.

Site	Units	PB01	TMB02 A	TMB02 B	SMB05	SMB03	MB03	MB01B	MB01C	MB02	TMB01 A	TMB01 B
pH		9.25	5.90	8.52	7.09	7.71	6.43	10.63	7.52	6.78	6.71	7.59
Electrical conductivity	µS/cm	102.4	19.6	84.9	213.3	231.6	104.3	234.4	53.4	32.4	354	1641
Dissolved Oxygen	mg/L	1.67	7.87	6.27	2.75	2.89	8.94	5.69	0.99	0.06	0.25	0.33
Temperature	°C	13.9	8.8	8.4	12.9	11.2	9.8	13.1	9.1	10.4	14.5	14.1
Oxidation-reduction potential	mV	-104.6	172	98.2	-145.7	-141.3	171.4	70.4	17	127	-67.2	-230.2
Mid screen depth	m	Open Hole	12.5	194	44.5	44.5	95	6.5	48	144	12.5	66

A total of eight aquatic invertebrate taxa were collected from several locations in the Gooandra Volcanics formation, the Kellys Plain formation and the Temperance formation but not from other geological settings. Specimens assumed to be stygofauna were collected from four of the 11 sites (Table 3), with the harpacticoid copepods (TMB02A) likely to be stygobiotic (Table 3). The specimens collected had the typical characteristics of stygobiotic species; lack of eyes and pigmentation and enhanced sensory appendages. Preliminary morphological identification of the harpacticoid copepod suggests it is of the family Parastenocarididae. The copepod nauplii collected at TMB02A is potentially stygobiotic, although it is difficult to identify taxa at this early life stage.

The nematode, rotifer and oligochaete specimens (from four sites) may be stygobiotic. Specimens from these groups are common in soil and surface water and it is difficult to establish their specific affinity with groundwater, particularly considering the lack of taxonomic resolution possible. Although commonly associated with aquatic habitats, the Collembola collected in sample MB01B are not considered to be stygofauna, and instead reside on the water surface (see Deharveng et al. 2008). They are not truly aquatic and not stygobiotic.

Three samples, SMB03, TMB02B and PB01 were double processed as part of quality assurance procedures. No animals were identified in any of the samples during the second processing (Table 3).

Alpine bogs and fens

A total of eight aquatic invertebrates were collected from four of the five alpine bog/fens (excluding BH03; Table 3). Only a small sample volume was collected from BH03 which may explain the lack of fauna found. The bog/fen samples contained several potentially stygobiotic taxa (Table 3), with harpacticoid copepods collected from two sites (GH01 and GH02). These specimens had the morphological traits typical of stygobiotic species (Appendix 2) and are likely to be obligate groundwater species. Preliminary morphological identification of these copepods suggests they are of the family Canthocamptidae.

Ostracods were found in samples from the alpine bogs and fens GH01 and GH02 (Table 2). The ostracod specimens were damaged during collection making morphological identification beyond class (Ostracoda) difficult.

Table 3. Abundance of invertebrates collected in samples from fractured rock aquifers and alpine bogs and fens.

Site	Stygobiotic	Fracture Rock Aquifers											Alpine Bogs and Fens				
		TMB02A	TMB02B	SMB05	MB03	MB01C	MB02	PB01	SMB03	MB01B	TMB01A	TMB01B	BH03	GH01	GH02	GH03	TC01
Annelida																	
Clitellata																	
Oligochaeta sp.	Y?	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-
Arthropoda																	
Chelicerata																	
Arachnida																	
Acarina sp.	Y?	-	-	-	-	-	-	1	-	-	-	-	-	2	1	-	1
Hexapoda																	
Collembola																	
Poduromorpha																	
Hypogastruridae sp.	N	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-
Symphypleona																	
Sminthuridae sp.	N	-	-	-	-	-	-	-	-	19	-	-	-	-	1	-	-
Crustacea																	
Copepoda																	
Copepod nauplii	?	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parastenocarididae sp.	Y	2	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Canthocamptidae sp.	Y	0	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-
Ostracoda																	
Ostracoda sp.	Y?	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-
Rotifera																	
Rotifera sp.	Y?	-	-	-	-	2	-	-	2	-	-	-	-	-	-	1	-
Nematoda																	
Nematoda sp.	Y?	52	-	-	-	1	-	2	-	-	-	-	-	4	7	1	-
Total Diversity		**3**	**0**	**0**	**0**	**2**	**0**	**3**	**1**	**2**	**0**	**0**	**0**	**4**	**7**	**2**	**1**
Total Abundance		**56**	**0**	**0**	**0**	**3**	**0**	**4**	**2**	**20**	**0**	**0**	**0**	**9**	**16**	**2**	**1**
QA/QC Samples		**-**	✓	**-**	**-**	**-**	**-**	✓	✓	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Y = Stygobiotic, Y? = likely to be stygobiotic, N = unlikely to be stygobiotic, ✓ = No specimens detected.

Aquifer eDNA analysis

All samples amplified for the 18S gene, and all but one amplified for the CO1 gene (Figure 2). Sample PB01 did not amplify for CO1 as indicated by the missing bright band highlighted in Figure 2. Negative and positive controls responded as expected (Figure 2).

18S sequencing

The 18S analysis provides a different view of the metazoan communities in the aquifer. Full data from the 18S sequencing is provided in Table 4; however, those data should be interpreted with caution, particularly for microorganisms, since these monitoring bores were not purged prior to sampling. Accordingly, we are focusing here only on the metazoan (multi-celled) animals.

All samples amplified for the 18S gene and had on average 80,000 sequence reads. A total of 25 distinct metazoan taxa were identified (Table 4), which reflected most of the higher taxa (e.g. Collembola, Nematoda and Rotifera) also recorded in the manually processed samples (Table 3). Interestingly, the 18S analysis did not detect the stygobiotic copepod found in TMB02A, but rather the only metazoan in that sample was a nematode. The only crustaceans identified in the 18S analysis were ostracods (family Cyprididae). This family of ostracods contains many stygobiotic species, so it is possible that the taxon collected is also stygobiotic. The analysis of the 18S gene also identified a suite of meiofauna, including nematodes, rotifers and gastrotrichs (worm-like, pseudocoelomate invertebrates) which may be stygobiotic, but which are also found in soils. The insects detected are unlikely to be stygobiotic and are most likely surface taxa that have fallen in to the monitoring bores during collection. This is particularly problematic for monitoring bores, such as those sampled here, that do not have a casing extending above ground level.

Cytochrome Oxidase 1 sequencing

Sequences for the CO1 gene were obtained for all samples except PB01. A total of 53 distinct OTUs representing invertebrate metazoans were identified from the 10 samples (Table 5). The CO1 analysis identified a large number of OTUs that were matched most closely to sequences of unknown invertebrates – caution should be exercised when inferring taxonomy from low (<~90%) matches. There were no crustaceans identified in

any samples using CO1. There were a number of rotifer and nematode taxa in all monitoring bores which are potentially stygobiotic.

Many of the insects detected in the samples were Collembola, which are commonly found on the water surface in the monitoring bores, as well as thrips which are likely to have fallen into the monitoring bore during collection. There are numerous taxa for which only very coarse level taxonomy could be defined (Table 5), which reflects current limitation in the coverage of CO1 reference databases and does not reflect the quality of the sequences analysed.

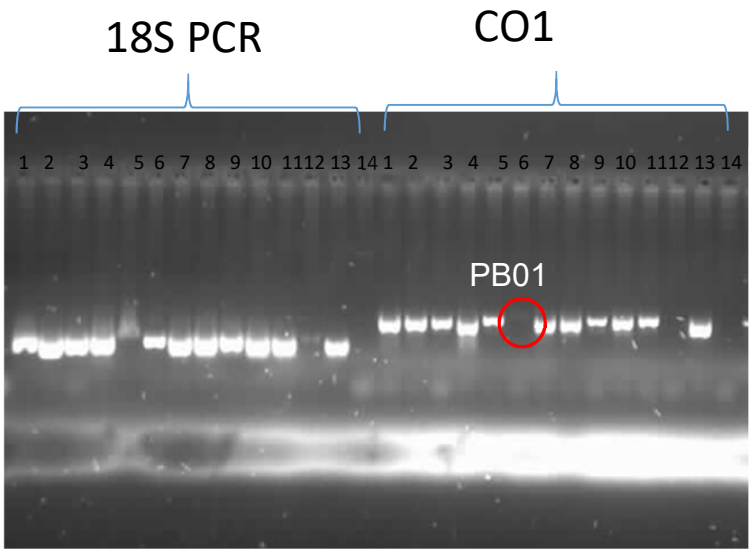


Figure 2. Photo of gel electrophoresis for 18S and CO1 genes extracted and amplified from aquifer samples.

Table 4. Metazoan taxa identified from aquifer samples using next generation sequencing of the 18S gene. Values reported for each taxon reflect sequence read numbers.

OTU	Kingdom	Phylum	Class	Order	Family	MB01B	MB01C	MB02	MB03	PB01	SMB03	SMB05	TBB02A	TMB01A	TMB01B	TMB02B
OTU_33	Metazoa	Annelida	Clitellata	Haplotaxida	Aeolosomatidae	25	0	0	6222	0	0	0	0	0	0	0
OTU_1035	Metazoa	Annelida	Clitellata	Haplotaxida	Enchytraeidae	41	0	0	0	0	0	0	0	0	0	0
OTU_222	Metazoa	Annelida	Clitellata	Haplotaxida	Enchytraeidae	0	0	0	0	0	0	0	0	540	0	0
OTU_243	Metazoa	Arthropoda	Collembola	Entomobryomorpha	Isotomidae	54	13	0	0	0	0	428	0	29	0	0
OTU_332	Metazoa	Arthropoda	Collembola	Entomobryomorpha	Paronellidae	0	0	0	0	0	0	0	0	292	0	0
OTU_1670	Metazoa	Arthropoda	Collembola	Poduromorpha	Hypogastruridae	121	0	0	0	0	16	0	0	98	0	0
OTU_179	Metazoa	Arthropoda	Collembola	Poduromorpha	Hypogastruridae	257	18	0	0	360	0	0	0	114	0	0
OTU_780	Metazoa	Arthropoda	Collembola	Poduromorpha	Hypogastruridae	0	0	0	0	0	32	0	0	17	0	0
OTU_238	Metazoa	Arthropoda	Collembola	Symphypleona	Sminthuridae	0	0	0	0	0	0	0	0	644	0	0
OTU_363	Metazoa	Arthropoda	Collembola	Symphypleona	Sminthuridae	0	0	0	0	210	0	19	0	0	0	0
OTU_367	Metazoa	Arthropoda	Insecta	Orthoptera	Lentulidae	0	0	0	0	204	0	0	0	0	0	0
OTU_566	Metazoa	Arthropoda	Insecta	Thysanoptera	Thripidae	0	0	0	0	0	0	0	0	101	0	0
OTU_939	Metazoa	Arthropoda	Ostracoda	Podocopida	Cyprididae	0	0	0	0	0	0	0	0	0	20	27
OTU_343	Metazoa	Gastrotricha	Gastrotricha ic	Chaetonotida	-	0	0	268	0	0	0	0	0	0	0	0
OTU_115	Metazoa	Gastrotricha	Gastrotricha ic	Chaetonotida	Chaetonotidae	0	0	0	1516	0	0	0	0	0	0	0
OTU_2143	Metazoa	Nematoda	Chromadorea	Araeolaimida	Plectidae	0	0	0	12	0	0	0	0	0	0	0
OTU_356	Metazoa	Nematoda	Chromadorea	Araeolaimida	Plectidae	537	0	0	0	0	0	0	0	0	0	0
OTU_99	Metazoa	Nematoda	Chromadorea	Araeolaimida	Plectidae	2325	0	0	0	0	0	0	0	0	0	0
OTU_166	Metazoa	Nematoda	Chromadorea	Monhysterida	-	806	0	0	0	0	0	0	0	0	0	0
OTU_9	Metazoa	Nematoda	Chromadorea	Rhabditida	Filaroididae	0	0	0	0	0	23	0	15787	0	0	30
OTU_203	Metazoa	Nematoda	Chromadorea	Tylenchida	Tylenchidae	680	0	0	0	0	0	0	0	0	0	0
OTU_376	Metazoa	Nematoda	Enoplea	Dorylaimida	Nordiidae	229	0	0	0	0	0	0	0	0	0	0
OTU_161	Metazoa	Nematoda	Enoplea	Mermithida	-	872	0	0	0	0	0	0	0	0	0	0
OTU_174	Metazoa	Rotifera	Bdelloidea	Adinetida	-	826	0	0	16	17	0	0	0	16	0	0
OTU_1839	Metazoa	Rotifera	Bdelloidea	Philodinida	Philodinidae	116	0	0	0	0	0	0	33	0	0	0

Table 5. Metazoan taxa identified from aquifer samples using next generation sequencing of the CO1 gene.

OTU	Phylum	Subphylum	Class	Order	Family	Genus	MB01B	MB01C	MB02	MB03	SMB03	SMB05	TBB02A	TMB01A	TMB01B	TMB02B
OTU_1547	metazoan uk						0	0	14	0	0	0	0	0	0	0
OTU_1636	metazoan uk						0	0	0	16	0	0	0	0	0	0
OTU_362	metazoan uk						9	0	18	0	0	0	0	19	0	0
OTU_404	metazoan uk						0	0	15	0	0	0	40	0	0	37
OTU_326	metazoan uk						11	0	0	5	0	0	68	0	0	45
OTU_211	metazoan uk						13	0	0	0	0	0	32	0	0	103
OTU_351	metazoan uk						0	0	0	0	0	0	81	0	0	70
OTU_195	metazoan uk						0	0	0	121	0	0	0	0	0	38
OTU_2129	metazoan uk						0	0	0	0	37	0	55	0	0	97
OTU_169	metazoan uk						0	0	0	0	19	0	102	0	0	92
OTU_291	metazoan uk						0	0	178	5	19	0	0	0	59	0
OTU_94	metazoan uk						7	0	0	0	0	0	0	0	0	488
OTU_100	metazoan uk						167	0	392	6	0	0	0	204	0	0
OTU_15	metazoan uk						59	940	135	17	0	0	417	0	0	589
OTU_11	metazoan uk						0	6	691	14	1068	2	836	0	0	1055
OTU_1642	Annelida	Annelida ic					0	0	12	0	0	0	0	0	0	0
OTU_370	Annelida	Annelida ic					0	0	0	0	0	0	78	18	0	43
OTU_553	Arthropoda	Chelicerata					13	0	0	0	0	0	0	0	0	43
OTU_105	Arthropoda	Hexapoda					0	0	316	3	0	0	0	7	0	0
OTU_1535	Arthropoda	Chelicerata	Arachnida				0	6	0	0	0	0	0	0	0	0
OTU_59	Arthropoda	Hexapoda	Collembola				1260	24	0	0	0	0	0	52	0	0
OTU_151	Arthropoda	Hexapoda	Collembola	Poduromorpha	Hypogastruridae	-	427	8	0	0	13	0	0	14	0	0
OTU_204	Arthropoda	Hexapoda	Collembola	Poduromorpha	Hypogastruridae	Ceratophysella	72	0	0	0	128	0	0	0	0	0
OTU_82	Arthropoda	Hexapoda	Collembola	Poduromorpha	Hypogastruridae	Ceratophysella	25	0	16	0	971	3	0	0	0	0
OTU_628	Arthropoda	Hexapoda	Insecta				0	0	0	0	0	35	0	0	0	0
OTU_580	Arthropoda	Hexapoda	Insecta				0	0	0	0	0	87	0	0	0	0
OTU_259	Arthropoda	Hexapoda	Insecta				0	9	32	0	0	0	51	112	0	40
OTU_262	Arthropoda	Hexapoda	Insecta				235	16	0	0	0	2	0	0	0	0
OTU_60	Arthropoda	Hexapoda	Insecta				9	0	0	0	0	95	0	0	570	0
OTU_1265	Arthropoda	Hexapoda	Insecta	Thysanoptera			9	0	0	0	0	0	0	10	0	0
OTU_513	Arthropoda	Hexapoda	Insecta	Thysanoptera			0	0	50	11	0	0	0	10	0	0
OTU_103	Arthropoda	Hexapoda	Insecta	Thysanoptera			17	0	13	14	0	0	0	175	182	0
OTU_27	Arthropoda	Hexapoda	Insecta	Thysanoptera			63	0	175	41	0	0	0	48	1350	0
OTU_28	Arthropoda	Hexapoda	Insecta	Thysanoptera			15	0	0	9	0	0	0	1189	473	34

OTU_12	Arthropoda	Hexapoda	Insecta	Thysanoptera			19	0	0	0	0	2	0	392	2444	0
OTU_276	Arthropoda	Hexapoda	Insecta	Thysanoptera	Phlaeothripidae		0	0	159	0	0	2	0	9	0	0
OTU_44	Arthropoda	Hexapoda	Insecta	Thysanoptera	Phlaeothripidae		0	0	0	0	0	0	0	245	779	15
OTU_594	Cnidaria	Cnidaria ic	Hydrozoa				0	0	0	0	0	19	0	27	0	0
OTU_545	Cnidaria	Cnidaria ic	Hydrozoa				0	24	0	0	0	0	23	0	0	23
OTU_45	Cnidaria	Cnidaria ic	Scyphozoa				0	0	0	0	0	0	0	0	890	0
OTU_570	Nematoda	Nematoda ic	Chromadorea				0	0	0	0	0	31	0	7	0	0
OTU_789	Nematoda	Nematoda ic	Chromadorea	Tylenchida			0	0	0	0	0	11	0	19	0	0
OTU_48	Nematoda	Nematoda ic	Chromadorea	Tylenchida			7	841	0	11	0	2	0	0	0	0
OTU_495	Nematoda	Nematoda ic	Enoplea				0	0	0	0	0	0	0	0	52	0
OTU_3443	Nematoda	Nematoda ic	Enoplea				0	0	0	0	0	0	41	0	143	0
OTU_190	Nematoda	Nematoda ic	Enoplea				46	8	172	0	0	0	0	0	0	0
OTU_93	Nematoda	Nematoda ic	Enoplea				26	0	0	0	342	0	102	25	0	15
OTU_640	Rotifera	Rotifera ic	Monogononta				0	0	0	0	0	0	28	0	0	19
OTU_665	Rotifera	Rotifera ic	Monogononta				0	0	46	17	0	0	0	0	0	39

Discussion

The stygofauna found in the aquifers in the Snowy 2.0 Project area are similar to those encountered in other fractured rock systems in NSW, in which harpacticoid copepods are relatively common (Hose & Lategan 2012; Hose *et al.* 2016). Copepods are among the most common crustaceans encountered in groundwater (Galassi *et al.* 2009). Other fauna, including the ostracods, nematodes and rotifers are also common elements of aquifer fauna in Australia and elsewhere (Hose *et al.* 2014).

Likely stygobiotic copepods were found in the Gooandra Volcanics (monitoring bore TMB02A) and likely stygobiotic ostracods (based on eDNA analysis) were identified in both the Gooandra Volcanics (monitoring bore TMB02B) and the adjoining Ravine formation (TMB01B). A desktop review of available literature indicates that limited stygofauna studies have been undertaken within fractured rock aquifers of the region, thus there is limited data for comparison. There were no records available from the nearby Yarrangobilly Karst (Eberhard & Spate 1994), although undescribed copepods have been recorded in the Cooleman Plain Karst in the Kosciuszko National Park.

Ostracods were identified from monitoring bore depths up to 200 m, with the majority of other taxa collected from monitoring bores shallower than 75 m. The identification of ostracods in TMB02B, which is screened at 191-197 m below ground level, is unexpected because stygofauna are generally rare at depths beyond 70 m (Hose et al. 2014). The detection of ostracods at this depth may reflect strong vertical permeability in the aquifer which allows rapid recharge from shallow to deep aquifers. Since only eDNA, and no whole specimens were detected at TMB02B, it may be that recharge water containing the DNA signature of stygobionts has migrated to depth but the actual stygobiont populations all occur at shallower depth.

The tendency for stygofauna to be more abundant and common in shallower aquifers is generally due to oxygen and nutrient concentrations being greatest in shallow aquifers and decreasing with depth (Humphreys 2006). Interestingly, the dissolved oxygen concentration in water from TMB02B was relatively high for groundwaters (6.2 mg/L, Appendix 2) and well above the concentration considered to be limiting to stygofauna broadly (Hose *et al.* 2014, Hahn 2006). This high concentration at depth may also reflect the vertical permeability and rapid recharge in the aquifer and could also explain the identification of fauna in the deep sample. However, the dissolved oxygen

concentration from TMB01B was relatively low (0.3 mg/L) and yet ostracods were identified from the sample.

Potentially-stygobiotic copepods, and a variety of meiofauna including ostracods, were collected in the bog/fen samples. Initial analyses of the copepods suggest that they were from a different family to those found in the aquifer, although the bog/fen copepods had all the traits expected of stygobiotic taxa and are thus may be obligate groundwater fauna. The groundwater associations of all other taxa are not clear. Based on collections of copepods from peat-like swamps in the southern highlands of NSW (Hose 2008), it is likely that the species in different bogs/fens are genetically distinct, and potentially different species. However, this can only be confirmed by undertaking DNA analysis of actual specimens. There are no records of invertebrate fauna surveys of the alpine bogs and fens; however, the stygofauna collected were similar to those recorded in the peat-like swamps further north along the Great Dividing Range (Hose 2008, Hose *et al.* 2017, Hardwick 2019).

The absence of likely stygofauna in some aquifer samples may reflect the challenges of sample collection, that include the low permeability strata at that location, the recent installation of the monitoring bores, and the sampling methods possible. Although a reasonable volume of sample was collected from each aquifer monitoring bore (Table 1), the varying methods make comparison among samples difficult. Future surveys should attempt to standardise the sampling approach across sites, which was unfortunately not possible in this study due to existing infrastructure in some aquifer monitoring bores, and very low permeability of the aquifers that limited the amount of sample that could be collected in a reasonable time period. However, the results suggest that each method (or combination) was effective in collecting fauna. In the bog/fen samples particularly, the small sample volume may be problematic, particularly for sites BH03 and TC01. Furthermore, the bog/fen samples were collected shortly after the piezometers were installed and, ideally, piezometers and monitoring bores should be allowed to settle in for some months before sampling (WA EPA 2016). Consequently, these results should not be interpreted as strong evidence of the absence of fauna in these swamps. Further sampling is needed before drawing this conclusion.

The lack of stygofauna in the reference sites north and south of the proposed tunnel alignment does not mean that stygofauna do not exist in these areas. Both monitoring bores were deep and it is possible that stygofauna would have been detected at these sites if shallow monitoring bores existed and were able to be sampled. The lack of fauna

in some samples should not be taken as evidence of them not occurring in that aquifer or swamp. Importantly, several repeat samples may be needed to adequately characterise groundwater communities (Eberhard *et al.* 2009; Hose & Lategan 2012). For example, Hose and Lategan (2012) showed that in fractured rock systems in NSW, new stygofauna taxa were collected after sampling a particular monitoring bore five times. Further, more detailed taxonomic resolution of the fauna identified in both morphological and eDNA analyses is desirable to inform the significance of the fauna in a regional context.

Threats of change to groundwater levels

Changes to the hydrological regime of the groundwater poses a major threat to GDEs (Kath *et al.* 2018), which include both the aquifers and potentially the alpine swamps if they are hydraulically connected. The lowering of water tables may result in a loss of habitat and changed environmental conditions in both the aquifer and alpine bog/fen habitats that remains, although there is limited knowledge of how complex fractured rock aquifers will be affected. Recent reviews have highlighted that ecological responses to groundwater depletion is a key knowledge gap, and should be afforded the highest research priority (Larned 2012, Kath *et al.* 2018).

Declining water levels can leave organisms stranded or isolated in unsaturated areas. In laboratory studies, 20 to 100% of stygofauna were stranded following rapid groundwater declines (Tomlinson 2008; Stumpp & Hose 2013), with large differences in the response and thus vulnerability of different taxa. In particular, Stumpp & Hose (2013) showed that the majority of cyclopoid copepods (collected from alluvial aquifers) were stranded in unsaturated sediments when water tables were lowered. A similar, high proportion of alluvial groundwater amphipods were stranded when water tables were lowered in laboratory experiments (Tomlinson 2008). Following drawdown, the survival of stygobiotic amphipods and syncarids in unsaturated sediments is limited beyond 48 hours (Tomlinson 2008; Stumpp & Hose 2013). Predicting the response of biota to drawdown will depend heavily on the hydrogeological properties of the aquifer, particularly the void size and ability of the matrix to hold water (through capillary forces) as the water table declines.

Conclusion and recommendations

The baseline stygofauna study of the Snowy 2.0 Project has demonstrated that obligate groundwater organisms (stygobionts) are present in the fractured rock aquifers and shallow colluvial aquifers associated with the alpine bogs and fens of the region. This has been a preliminary examination and is unlikely to have detailed the full diversity and distribution of stygofauna in the study area. A more complete picture of the diversity and distribution of stygofauna in the study and threats to them could be achieved through:

- further sampling by government and industry to resolve the taxonomy of stygofauna present in fractured rock aquifers and alpine bogs and fens (where relevant);
- further sampling by government and industry to determine the spatial distribution of stygofauna in areas remote from any impacts of the project, to inform conservation and protection measures (this may require installation and sampling of additional shallow monitoring bores);
- further sampling by government and industry, including repeat sampling, to strengthen conclusions about the presence or absence of stygofauna across the project area, characterising depth limitations (where possible); and
- developing a more detailed understanding of the connectivity of alpine bogs/fens and fractured rock aquifers to determine the likely risks to alpine bogs and fens and stygofauna as a result of impacts to aquifers associated with the Snowy 2.0 Project.

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Appendices

Appendix 1. List of primers and tags used to mark samples for eDNA sequencing.

#	Samples	18S-F Primer[1]	18S-R Reverse[1]	F Primer[2]	R Reverse[2]
1	TMB01A	All18SF-b01	All18SR-b03	mICOIint_F-b01	mICOIint_R-b03
2	TMB01B	All18SF-b02	All18SR-b03	mICOIint_F-b02	mICOIint_R-b03
3	TMB02B	All18SF-b03	All18SR-b03	mICOIint_F-b03	mICOIint_R-b03
4	MB01B	All18SF-b04	All18SR-b03	mICOIint_F-b04	mICOIint_R-b03
5	MB01C	All18SF-b05	All18SR-b03	mICOIint_F-b05	mICOIint_R-b03
6	PB01	All18SF-b06	All18SR-b03	mICOIint_F-b06	mICOIint_R-b03
7	MB03	All18SF-b07	All18SR-b03	mICOIint_F-b07	mICOIint_R-b03
8	MB02	All18SF-b08	All18SR-b03	mICOIint_F-b08	mICOIint_R-b03
9	TBB02A	All18SF-b09	All18SR-b03	mICOIint_F-b09	mICOIint_R-b03
10	SMB03	All18SF-b10	All18SR-b03	mICOIint_F-b10	mICOIint_R-b03
11	SMB05	All18SF-b11	All18SR-b03	mICOIint_F-b11	mICOIint_R-b03
12	-ve control	All18SF-b12	All18SR-b03	mICOIint_F-b12	mICOIint_R-b03
13	+ve control croc	All18SF-b13	All18SR-b03	mICOIint_F-b13	mICOIint_R-b03
14	-ve control	All18SF-b14	All18SR-b03	mICOIint_F-b14	mICOIint_R-b03

1 Hardy *et al.* (2010), 2 Leray *et al.* (2013)

Appendix 2. Images of selected invertebrates

Fig A3.1 TMB02A (fractured rock aquifer) Harpacticoida: Parastenocarididae

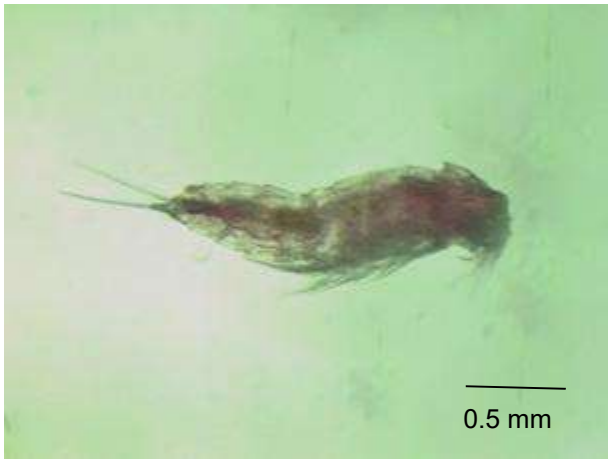


Fig A3.2 TMB02A (fractured rock aquifer) Nematoda

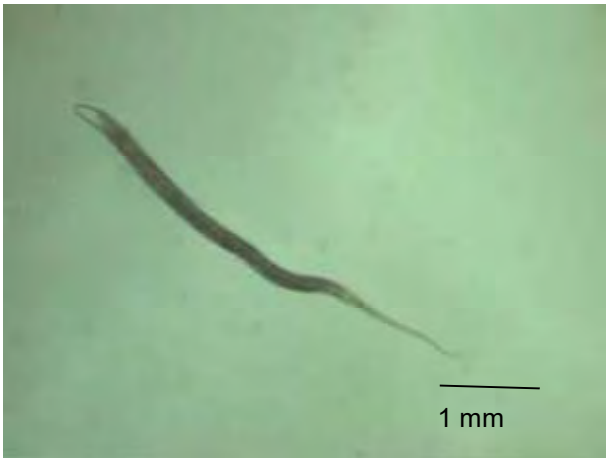


Fig A3.3 TMB02A (fractured rock aquifer) Copepod nauplii

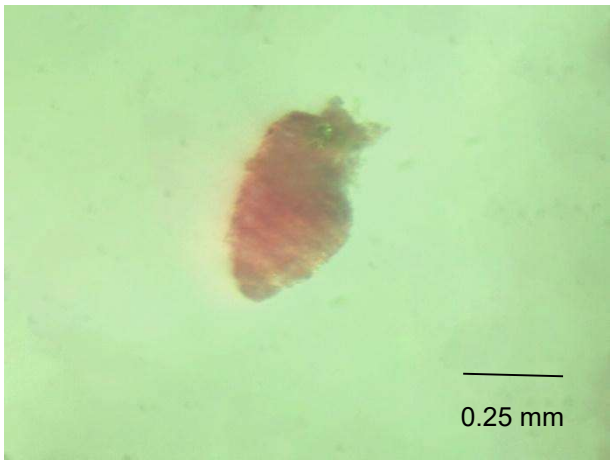


Fig A3.4 SMB03 (fractured rock aquifer) Bdelloid rotifer

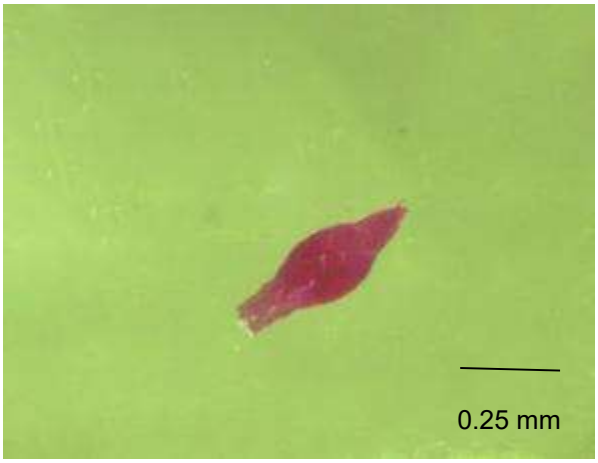


Fig A3.5 GH01 (alpine bog/fen) Harpacticoida: Canthocamptidae



Fig A3.6 GH01 (alpine bog/fen) Ostracoda

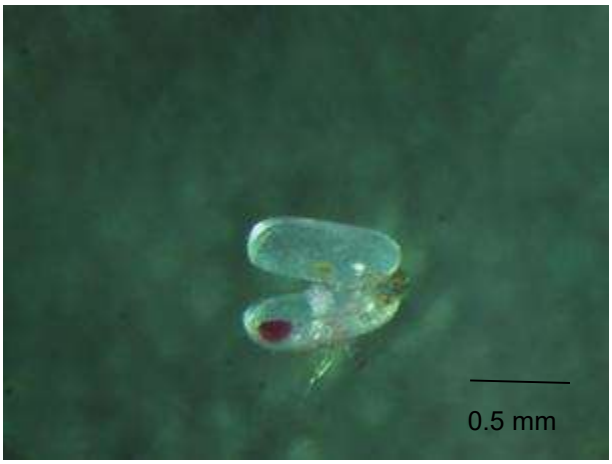


Fig A3.7 GH03 (alpine bog/fen) Harpacticoida: Canthocamptidae

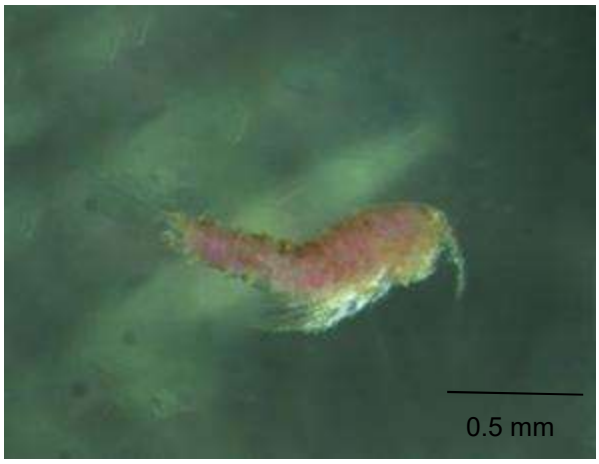


Fig A3.8 GH03 (alpine bog/fen) Acarina (mite)

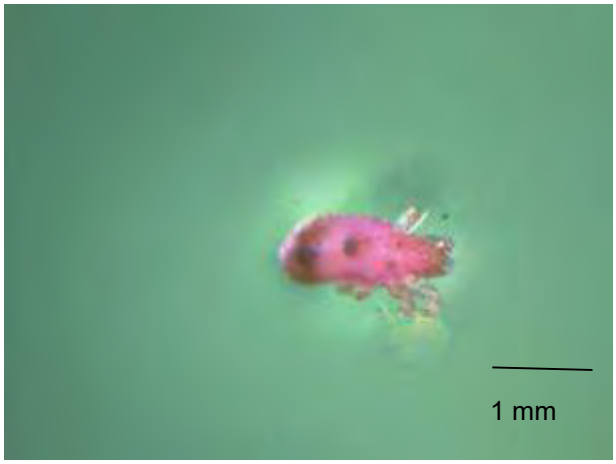


Fig A3.9 GH03 (alpine bog/fen) Ostracoda



Appendix 3. Nearest match for sequenced 18S OTUs in Genbank

OTU	Species (nearest match)	Accession	Match%
OTU_33	Aeolosoma sp. GG-2011	HQ691213.1.1763	99.3
OTU_222	Haplotaxis cf. gordioides 09.132	HE800206.1.1583	99.3
OTU_1035	Henlea perpusilla	GU901909.1.1743	100
OTU_939	Cypridopsis sp. QY-2003	AY457057.1.1739	100
OTU_238	Sminthuridae environmental sample	EF024572.1.1766	99.3
OTU_243	Desoria tigrina	JN981033.1.1748	99.3
OTU_332	Cyphoderopsis sp. BXW-2014	KM978408.1.1672	98.6
OTU_179	Gomphiocephalus hodgsoni	EU368601.1.1746	98.6
OTU_1670	Hypogastrura sp. CB02	AY338691.1.1731	98.6
OTU_780	Hypogastrura sp. CB02	AY338691.1.1731	97.1
OTU_363	Sphaeridia pumilis	AY145140.1.1748	100
OTU_367	Lentula callani	KM853234.1.1623	100
OTU_566	Thrips imaginis (plague thrips)	KC513018.1.1818	100
OTU_343	uncultured microeukaryote	JN705525.1.1373	100
OTU_115	Chaetonotus cf. oculifer TK188	JQ798576.1.1710	100
OTU_99	Tylocephalus auriculatus	AF202155.1.1734	100
OTU_356	Plectus acuminatus	AF037628.1.1674	100
OTU_2143	Chronogaster typica	KJ636360.1.1698	98.5
OTU_166	Paralamyctes environmental sample	EF024168.1.1785	99.3
OTU_9	(Oslerus osleri)	AY295812.1.1697	94.8
OTU_203	(Neopsilenchus magnidens)	KJ869328.1.1705	96.4
OTU_376	Enchodelus cf. nepalensis 1 JH-2014	KJ636402.1.1704	97.0
OTU_161	Nematoda sp. MQ26	JQ894731.1.1617	99.3
OTU_174	uncultured bdelloid rotifer	GQ922286.1.1635	98.6
OTU_1839	Philodina megalotrocha	KF561102.1.1731	99.3

Appendix 4. Nearest match for sequenced CO1 OTUs in Genbank

OTU	Species (nearest match)	Accession	Match%
OTU_1547	Indet Cecidomyidae	KM634518.1	82.0
OTU_1636	Pleurotus citrinopileatus	GU070911	83.0
OTU_362	Vexillifera sp.	MH349032.1	87.0
OTU_404	Indet. Mycetophilidae	KR460889.1	82.0
OTU_326	Acanthamoeba sp.	MH124198.1	94.0
OTU_211	Parvamoeba sp.	JN202434.1	86.4
OTU_351	Myzocytiopsis sp.	KT257395.1	87.1
OTU_195	Paravannella sp.	KF895382.1	86.1
OTU_2129	Parvamoeba sp.	JN202434.1	84.7
OTU_169	Cunea sp.	KP862852.1	84.2
OTU_291	Indet. metazoan	GU070902	89.4
OTU_94	Vexillifera sp.	MH349032.1	85.3
OTU_100	Indet. metazoan	GU070901	86.6
OTU_15	Indet. metazoan	GU070901	86.7
OTU_11	Indet. metazoan	KX665223.1	87.1
OTU_1642	Verticillium sp.	CP009079.1	89.6
OTU_370	Annelida sp.	EU835658	95.2
OTU_553	Haptoglossa sp. DM2	KT257394.1	83.5
OTU_105	(Heterotarsus_carinula)	KU188332	79.8
OTU_1535	(Orumcekia_sp._ZZ625)	KY778905	80.7
OTU_59	(Protaphorura_sp._LD_11_061_1)	KU508214	83.8
OTU_151	Hypogastruridae_sp._BOLD:AAC8039	KM617463	100
OTU_204	Ceratophysella_denticulata_L3	JX261884	99.0
OTU_82	Ceratophysella_sp._1_CADH-2011	HQ732041	99.7
OTU_628	(Trichobius_johnsonae)	KY882242	82.2
OTU_580	(Insecta_sp._SHSY141205)	KU720137	80.8
OTU_259	(Aguna_aurunce_hypozonius)	JF761342	80.3
OTU_262	(Insecta_sp._SHSY141205)	KU720137	83.2
OTU_60	(Insecta_sp._SHSY141205)	KU720137	81.8
OTU_1265	(Haplothrips_tenuipennis)	KP845857	89.4
OTU_513	(Haplothrips_tenuipennis)	KP845857	89.1
OTU_103	(Haplothrips_tenuipennis)	KP845857	86.5
OTU_27	(Haplothrips_tenuipennis)	KP845857	88.1
OTU_28	(Haplothrips_tenuipennis)	KP845857	88.4
OTU_12	(Haplothrips_tenuipennis)	KP845857	89.3
OTU_276	(Haplothrips_tenuipennis)	KP845857	91.6

OTU_44	(Haplothrips_tenuipennis)	KP845857	91.0
OTU_594	(Turritopsis_chevalense)	KX096598	80.9
OTU_545	(Xingyurella_xingyuarum)	MF135583	80.6
OTU_45	(Mastigias_sp._IDBEDKK)	KU900918	80.9
OTU_570	(Bursaphelenchus_cocophilus)	AY508039	80.8
OTU_789	(Bursaphelenchus_cocophilus)	AY508039	85.0
OTU_48	(Bursaphelenchus_cocophilus)	AY508039	85.1
OTU_495		KY011951	84.6
OTU_3443		KY011951	82.0
OTU_190		KY011951	84.5
OTU_93		KY011951	81.7
OTU_640	(Asplanchna_sieboldi)	AF416994	81.9
OTU_665	(Asplanchna_sieboldi)	AF416994	83.3

Annexure G

Assessment of serious and irreversible impacts (SAII)

G.1 SAII assessment – Clover Glycine

Table G.1 SAII assessment – Clover Glycine

Criteria	Discussion
The action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII	Original designs for the Snowy 2.0 Main Works included Circuits Trail, to the east of Tantangara Road. Following targeted surveys within this area, the footprint was altered to avoid these areas and direct impacts to a large population of over 600 Clover Glycine, as well as other threatened flora. Existing access tracks and roads have been utilised for Main Works, with impacts restricted to the removal of some adjacent vegetation to wide some sections. Ultimately reducing direct impacts to intact native vegetation and threatened species habitat. Mitigation measures including monitoring programs for weeds, pathogens and predator and pest species will be implemented to prevent the increase in invasive species and pathogens within the project area. Additional mitigation measures have been designed to reduced indirect impacts to threatened species, including the Clover Glycine.
The size of the local population directly and indirectly impacted by the development, clearing or biodiversity certification	A total 975 individuals of Clover Glycine were recorded across the study area. Out of these, 10 individuals (approximately 1% of the local population) will be directly impacted as a result of Main Works.
The extent to which the impact exceeds any threshold for the potential entity that is specified in the Guidance to assist a decision-maker to determine a serious and irreversible impact	The TBDC does not provide a threshold for this species as it is currently under development.
The likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population, including but not limited to: • **an estimate of the change in habitat available to the local population as a result of the proposed development;** • **the proposed loss, modification, destruction or isolation of the available habitat used by the local population; and** **modification of habitat required for the maintenance of processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.**	Main Works will result in the direct removal of 0.57 ha of Clover Glycine habitat. The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral pigs and rabbits), that may potentially degrade or modify habitat used by the local population. Appropriate mitigation measures will be implemented to ensure the Main Works does not result in any indirect impacts that may modify or destroy available habitat used by the local population.

Table G.1 SAII assessment – Clover Glycine

Criteria	Discussion
The likely impact on the ecology of the local population. At a minimum, address (for flora) how the proposal is likely to affect the ecology and biology of any residual plant population that will remain post development including where information is available: • **pollination cycle;** • **seedbanks;** • **recruitment; and** **interactions with other species (e.g. pollinators, host species, mycorrhizal associations).**	The Clover Glycine is known to be a self-pollinating and is also known to be pollinated by bees (Carter and Sutter 2010). The seeds of Clover Glycine are most likely stored in the soil seed bank for future germination. Seeds are likely to germinate after an appropriate fire event. The Clover Glycine can also re-sprout from the tap root post fire. Reproduction may also be vegetative through the rhizome/thickened tap root (Carter and Sutter 2010). The project is unlikely to result in impacts to key pollinators or affect natural fire regimes associated with germination.
A description of the extent to which the local population will become fragmented or isolated as a result of the proposed development	The existing Clover Glycine population is separated into subpopulations by existing tracks and roads throughout the KNP. The Main Works will result in the removal of vegetation adjacent to Tantangara Dam and adjacent to Tantangara Road. The species is not predicted to become further fragmented or isolated as a result of the project.
The relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range	The estimated total population of Clover Glycine is 7,000 plants (Carter & Sutter 2010). The population recorded during targeted surveys for Snowy 2.0 is the only known population in NSW. Other populations occur in Victoria, Tasmania and South Australia. These populations are geographically isolated. Within the local population, 10 plants out of an observed 973 (1.03%) will be directly impacted, with potential for indirect impacts from weeds and pest species if not managed appropriately. Large areas of suitable, high-quality habitat will remain intact.
The extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral pigs and rabbits). Known threats to the Clover Glycine include the competition of Ox-eye daisy and trampling by pigs. Prior to construction, it is proposed weed controls will be implemented where possible. During the clearing works appropriate disposal and management of weeds will be implemented to stop the spread of existing weed species. Wash down stations will be constructed at suitable locations to stop the spread of weeds and introduction of new species. A weed and pathogen monitoring program will be implemented to ensure impacts arising from clearing are within prediction. Similarly, a pest and predator monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pest and predatory species.
An estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion	There were seven records of the Clover Glycine within NSW prior to targeted surveys. About 140 populations containing approximately 7,000 individuals have been recorded since 1980 (Carter & Sutter 2010). The population of Clover Glycine within the region includes 975 individuals.

Table G.1 SAII assessment – Clover Glycine

Criteria	Discussion
The measure/s proposed to contribute to the recovery of the species in the IBRA subregion	The offset strategy for Snowy 2.0 Main Works included a number of proposed conservation measures to be implemented within KNP to benefit the species and communities being impacted. This includes conservation actions that will directly benefit Clover Glycine. These conservation actions have taken the Clover Glycine Recovery Plan (Carter and Sutter 2010) into consideration.

G.2 SAII assessment – Mauve Burr-daisy

Table G.2 SAII assessment – Mauve Burr-daisy

Criteria	Discussion
The action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII	Original designs for the project included construction of the power station complex in the plateau area, including a number of ancillary facilities and impacts. Identification of sensitive biodiversity values, including the Mauve Burr-daisy, resulted in a strong focus on relocating project elements. This resulted in a significant reduction in impacts across the plateau area, with only the communication cables to be located in this area. Existing access tracks and roads have been utilised for Main Works, including the removal of some adjacent vegetation to wide some sections. Ultimately reducing direct impacts to intact native vegetation and threatened species habitat. Mitigation measures including monitoring programs for weeds, pathogens and predator and pest species will be implemented to prevent the increase in invasive species and pathogens within the project area. Additional mitigation measures have been designed to reduced indirect impacts to threatened species, including the Mauve Burr-daisy.
The size of the local population directly and indirectly impacted by the development, clearing or biodiversity certification	A total 44,222 individuals of Mauve Burr-daisy were recorded across the study area. Out of these, 3,714 individuals will be directly impacted as a result of Main Works.
The extent to which the impact exceeds any threshold for the potential entity that is specified in the Guidance to assist a decision-maker to determine a serious and irreversible impact	The TBDC does not provide a threshold for this species as it is currently under development.

Table G.2 SAII assessment – Mauve Burr-daisy

Criteria	Discussion
The likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population, including but not limited to: • **an estimate of the change in habitat available to the local population as a result of the proposed development;** • **the proposed loss, modification, destruction or isolation of the available habitat used by the local population; and** **modification of habitat required for the maintenance of processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.**	Main Works will result in the direct removal of 7.80 ha of Mauve Burr-daisy habitat. The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral pigs and rabbits), that may potentially degrade or modify habitat used by the local population. Appropriate mitigation measures will be implemented to ensure the Main Works does not result in any indirect impacts that may modify or destroy available habitat used by the local population.
The likely impact on the ecology of the local population. At a minimum, address (for flora) how the proposal is likely to affect the ecology and biology of any residual plant population that will remain post development including where information is available: • **pollination cycle;** • **seedbanks;** • **recruitment; and** **interactions with other species (e.g. pollinators, host species, mycorrhizal associations).**	Limited information is provided on the ecology of the Mauve Burr-daisy. The species is known to pollinate by the dispersal of burrs stuck to animals. The KNP is home to a large diversity of fauna species throughout the park. The project is unlikely to result in impacts to the pollination of the Mauve Burr-daisy.
A description of the extent to which the local population will become fragmented or isolated as a result of the proposed development	The Mauve Burr-daisy is known to occur along road edges and disturbed patches of vegetation and was recorded along existing tracks within the National Park. There are 44,222 individuals of the species across the survey area. The species occurs across a large fragmented landscape, with NP tracks and disturbance from human recreational activities. The species is not predicted to become further fragmented or isolated as a result of the project.
The relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range	The Mauve Burr-daisy is known to occur on the Monaro and Kosciuszko regions as well as in the upper Shoalhaven catchment. The population recorded within the project area is not considered an important local population with the species recorded extensively throughout the survey area and broader KNP.
The extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral pigs and rabbits). Prior to construction, it is proposed weed controls will be implemented where possible. During the clearing works appropriate disposal and management of weeds will be implemented to stop the spread of existing weed species. Wash down stations will be constructed at suitable locations to stop the spread of weeds and introduction of new species. A weed and pathogen monitoring program will be implemented to ensure impacts arising from clearing are within prediction. Similarly, a pest and predator monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pest and predatory species.

Table G.2 SAII assessment – Mauve Burr-daisy

Criteria	Discussion
An estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion	Prior to targeted surveys, 133 records of *Calotis glandulosa* were recorded within the Australian Alps IBRA region with a total of 368 records within NSW. The recorded population within the survey area is over 3,600 individuals.
The measure/s proposed to contribute to the recovery of the species in the IBRA subregion.	The offset strategy for Snowy 2.0 Main Works included a number of proposed conservation measures to be implemented within KNP to benefit the species and communities being impacted. This includes conservation actions that will directly benefit Mauve Burr-daisy.

G.3 SAII assessment – Smoky Mouse

Table G.3 SAII assessment – Smoky Mouse

Criteria	Discussion
The action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII	Since the initial identification of the Smoky Mouse along Lobs Hole Ravine Road, a number of options for widening the road have been considered. Regional surveys were undertaken for these species, with the species recorded over large areas, placing the original finding of Smoky Mouse on Lobs Hole Ravine Road in a broader regional context. This has negated much of the benefit of alternative options to widening of Lobs Hole Ravine Road. Consideration was also given to fencing of Lobs Hole Ravine Road in order to minimise impacts to Smoky Mouse, with provision of under-road crossing points via culvert. Concerns were raised that this measure may result in significant fragmentation and loss of connectivity, and thus alternative measures have been proposed. Indirect impacts could occur due to fauna vehicle strike if vehicles are moving during the night time when the Smoky Mouse is active. A reduced speed limit will be imposed on Lobs Hole Ravine Road at night when fauna species are likely to be most active. Mitigation measures including monitoring programs for weeds, pathogens and predator and pest species will also be implemented to prevent the increase in invasive species and pathogens within the project area. Additional mitigation measures have been designed to reduced indirect impacts to threatened species, including the Smoky Mouse.
The size of the local population directly and indirectly impacted by the development, clearing or biodiversity certification	Smoky Mouse was recorded at 78 locations throughout the survey area. Main Works will result in the removal of 84.29 ha of Smoky Mouse habitat.
The extent to which the impact exceeds any threshold for the potential entity that is specified in the Guidance to assist a decision-maker to determine a serious and irreversible impact	The SAII threshold for Smoky Mouse is identified as the Threatened Biodiversity Data Collection (TBDC) as “mapped important areas”. Given the population that has been identified regionally (see below) this area would be considered important to the conservation of the species. Direct impacts to 84.29 ha of Smoky Mouse habitat will result from Main Works.

Table G.3 SAII assessment – Smoky Mouse

Criteria	Discussion
The likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population, including but not limited to: • **an estimate of the change in habitat available to the local population as a result of the proposed development;** • **the proposed loss, modification, destruction or isolation of the available habitat used by the local population; and** **modification of habitat required for the maintenance of processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.**	Main Works will result in the removal of 84.29 ha of Smoky Mouse habitat. There is also potential for Main Works to reduce the quality of habitat, as a result of increased weed abundance or introduction of pathogens. Indirect impacts to 142.51 ha of Smoky Mouse habitat have been assessed in additional to the direct impacts. Additionally, a number of mitigation measures including weed control prior to construction, construction of washdown stations and implementation of a weed and pathogen monitoring program will ensure habitat quality is maintained including hygiene protocols to prevent introduction of weeds, the spread of weeds or the spread of pathogens. Habitat to the north of the Marica area will result in isolation due to the removal of large areas of intact vegetation. However, all areas not retained for permanent infrastructure within the Main Works will be rehabilitated and revegetated.
The likely impact on the ecology of the local population. At a minimum, address the following (for fauna): • **breeding;** • **foraging;** • **roosting; and** **dispersal or movement pathways.**	Smoky Mouse occur in small discrete colonies based around patches of dense heath. They shelter in small groups, sometimes comprising a male and up to five breeding females, in a large, complex burrow system that can be up to 10 m^2 and more than 25m in length, with multiple nesting chambers (Ford et al. 2003; Woods & Ford 2000). Breeding occurs from September–April (Menkhorst, P. and Broome, L. 2006). Given the observed presence of males and females, the survey area is likely to support a breeding population of the Smoky Mouse. Given the observed presence of males and females, the survey area is likely to support a breeding population of the Smoky Mouse. The project will result in direct impacts to 84.29 ha of suitable habitat, with potential for additional indirect impacts through weed invasion, increased predation from Cats and Foxes and fragmentation. Mitigation measures will be implemented to reduce the impacts of weeds and predators on the species. Given the willingness of the species to cross roads such as Link Road (G.Madani pers. obs.) it is unlikely the access roads proposed will result in fragmentation of this breeding population, and prevent dispersal or other breeding activities. A threatened species monitoring program will be implemented to ensure impacts arising from the project are within prediction.
A description of the extent to which the local population will become fragmented or isolated as a result of the proposed development	The Smoky Mouse population has been recorded across a broad area within the region, over an estimated 6,000 to 7,000 ha. The species was recorded to the west and east of Lobs Hole Ravine Road and across the Marica area. The vegetation within this area is largely intact, spreading south to Lobs Hole Ravine and north towards Coppermine Firetrail. Access tracks will be constructed within Marica, with some clearing of vegetation spanning over 300 m wide. This has the potential to fragment Smoky Mouse recorded to the north of the disturbance footprint at Marica. Mitigation measures to avoid and reduce vehicles strike on Smoky Mouse will be implemented to ensure their safe movement across the road including avoiding and minimising vehicle movements at night and reducing speed limits.

Table G.3 SAII assessment – Smoky Mouse

Criteria	Discussion
The relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range	Targeted surveys recorded the Smoky Mouse at 78 locations across the survey area. These surveys have demonstrated that the population found within Marica and Lobs Hole Ravine are part of an extensive population in this northern section of KNP, ranging from Coppermine Firetrail in the north, to Wallace's Creek Firetrail in the east, Link Road in the south and close to the Tumut River in the west. The species is likely to have a sporadic but extensive distribution within this area.
The extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population	The Main Works has the potential to result in the introduction and spread of weed species, and increase in abundance of feral animals (including feral cats, foxes and feral pigs). Weed control will be undertaken prior to construction works, where possible. Washdown stations will be constructed at suitable locations with hygiene protocols implemented to ensure weeds are not brought in with vehicles, machinery or by foot. Additionally, a weed and pathogen monitoring program will be implemented. A feral animal control program will be implemented during the construction and operational phases to minimise impacts of feral animals on wildlife. Waste will be stored appropriately in inaccessible bins and disposed off-site.
An estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion	The size of the location population of Smoky Mouse is unknown. The species was recorded at 78 locations across the survey area. Regional surveys undertaken across 66 sites recorded the Smoky Mouse at 40 locations, spanning from the west of Lobs Hole Ravine Road up to Marica and Coppermine Fire Trail. The nearest live records to survey area are from an artificial boulderfield constructed on an old rock stockpile at Happy Jacks dating to 2015. The species is also was well-represented as subfossil remains in the pellets at roost sites of the Sooty Owl (*Tyto tenebricosa*) at Yarrangobilly Caves (Ford 1998), and three Smoky Mouse were found deceased at Yarrangobilly Caves, suspected cat kills. Several recent remains (estimated between one and three years old) have also been identified amongst hundreds of small mammals remains at Sooty Owl roosts currently in use in this cave system (R. Bilney, Forestry Corporation, pers comm. March 2018, cited in Schulz and Broome (2018). This suggest a population occurs within the foraging range of the Sooty Owl (200-1000 ha, DECC 2006b). However, recent surveys in this area have failed to re-locate the species (Schulz and Broome 2018).
The measure/s proposed to contribute to the recovery of the species in the IBRA subregion.	The Smoky Mouse subpopulations adjacent to Lobs Hole Ravine Road are currently being monitored as part of the Exploratory Works Biodiversity Management Plan. The offset strategy for Snowy 2.0 Main Works included a number of proposed conservation measures to be implemented within KNP to benefit the species and communities being impacted. This includes conservation actions that will directly benefit Smoky Mouse.

Annexure H

Credit Report

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00018035/BAAS18030/20/00019037	Snowy Hydro MW - RTS Addendum	26/11/2019
Assessor Name	Report Created	BAM Data version *
	21/02/2020	22
Assessor Number	BAM Case Status	Date Finalised
	Open	To be finalised
Assessment Revision	Assessment Type	
1	Major Projects	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion								
26	637_Poor	1.4	0.0	0.25	Moderate Sensitivity to Potential Gain	1.75		0
27	637_Medium	6.7	0.1	0.25	Moderate Sensitivity to Potential Gain	1.75		1

28	637_High	19.2	5.3	0.25	Moderate Sensitivity to Potential Gain	1.75		44
							Subtotal	**45**
Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion								
29	639_DNG	62.0	0.5	0.25	High Sensitivity to Potential Gain	1.50		11
30	639_Other	36.0	0.7	0.25	High Sensitivity to Potential Gain	1.50		9
31	639_High	25.2	22.3	0.25	High Sensitivity to Potential Gain	1.50		210
							Subtotal	**230**
Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion								
32	643_Low	6.6	0.2	0.25	Moderate Sensitivity to Potential Gain	1.25		0
							Subtotal	**0**
Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion								
33	644_DNG	13.7	13.4	0.25	High Sensitivity to Potential Gain	1.50		69
34	644_Poor	19.7	0.2	0.25	High Sensitivity to Potential Gain	1.50		1
35	644_Other	26.6	18.3	0.25	High Sensitivity to Potential Gain	1.50		183
36	644_Medium	11.4	1.9	0.25	High Sensitivity to Potential Gain	1.50		8
37	644_High	24.1	157.5	0.25	High Sensitivity to Potential Gain	1.50		1424
							Subtotal	**1685**
Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion								
38	679_Other	9.1	0.1	0.25	High Sensitivity to Potential Gain	1.50		1

39	679_High	5.0	0.4	0.25	High Sensitivity to Potential Gain	1.50		1
							Subtotal	**2**
Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion								
20	303_DNG	9.8	4.3	0.25	High Sensitivity to Potential Gain	2.50		26
21	303_Poor	0.3	0.1	0.25	High Sensitivity to Potential Gain	2.50		1
22	303_Other	30.4	1.1	0.25	High Sensitivity to Potential Gain	2.50		21
23	303_Medium	10.3	1.1	0.25	High Sensitivity to Potential Gain	2.50		7
24	303_High	37.9	50.9	0.25	High Sensitivity to Potential Gain	2.50		1206
							Subtotal	**1261**
Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion								
5	296_Low	3.7	1.1	0.25	High Sensitivity to Potential Gain	1.50		0
6	296_DNG	41.2	0.4	0.25	High Sensitivity to Potential Gain	1.50		6
7	296_Poor	4.2	0.1	0.25	High Sensitivity to Potential Gain	1.50		0
8	296_Medium	54.4	21.7	0.25	High Sensitivity to Potential Gain	1.50		443
9	296_High	24.7	16.5	0.25	High Sensitivity to Potential Gain	1.50		153
							Subtotal	**602**
Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion								
40	729_Low	0.3	0.0	0.25	High Sensitivity to Potential Gain	1.50		0

41	729_DNG	11.5	1.0	0.25	High Sensitivity to Potential Gain	1.50		4
42	729_Medium	55.7	6.4	0.25	High Sensitivity to Potential Gain	1.50		134
43	729_High	32.1	35.8	0.25	High Sensitivity to Potential Gain	1.50		431
							Subtotal	**569**
Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion								
1	285_DNG	0.6	1.5	0.25	High Sensitivity to Potential Gain	2.00		0
2	285_Poor	23.3	0.5	0.25	High Sensitivity to Potential Gain	2.00		5
3	285_Medium	36.9	4.8	0.25	High Sensitivity to Potential Gain	2.00		88
4	285_High	56.7	0.1	0.25	High Sensitivity to Potential Gain	2.00		4
							Subtotal	**97**
Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion								
44	953_DNG	12.0	1.5	0.25	High Sensitivity to Potential Gain	1.50		7
45	953_High	47.4	13.8	0.25	High Sensitivity to Potential Gain	1.50		246
							Subtotal	**253**
Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion								
46	999_Medium	23.1	4.3	0.25	High Sensitivity to Potential Gain	1.50		37
47	999_High	33.0	22.8	0.25	High Sensitivity to Potential Gain	1.50		283
							Subtotal	**320**

Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion								
25	311_High	24.6	23.1	0.25	High Sensitivity to Potential Gain	1.50		213
							Subtotal	**213**
Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment								
12	300_DNG	1.7	1.1	0.25	High Sensitivity to Potential Gain	1.50		0
13	300_Other	20.1	5.4	0.25	High Sensitivity to Potential Gain	1.50		40
14	300_Medium	25.5	8.2	0.25	High Sensitivity to Potential Gain	1.50		78
15	300_High	35.2	49.4	0.25	High Sensitivity to Potential Gain	1.50		652
							Subtotal	**770**
Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion								
16	302_Low	18.6	1.9	0.25	High Sensitivity to Potential Gain	1.75		15
17	302_Other	24.5	2.4	0.25	High Sensitivity to Potential Gain	1.75		26
18	302_Medium	24.4	1.4	0.25	High Sensitivity to Potential Gain	1.75		15
19	302_High	22.9	0.3	0.25	High Sensitivity to Potential Gain	1.75		3
							Subtotal	**59**
Riparian Ribbon Gum - Robertsons Peppermint - Apple Box riverine very tall open forest of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion								
10	299_Medium	34.5	0.2	0.25	High Sensitivity to Potential Gain	1.75		3

11	299_High	45.6	1.4	0.25	High Sensitivity to Potential Gain	1.75		27
							Subtotal	**30**
Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion								
48	1191_DNG	22.4	1.3	0.25	High Sensitivity to Potential Gain	2.50		18
49	1191_Medium	35.9	1.1	0.25	High Sensitivity to Potential Gain	2.50		26
50	1191_High	42.2	12.4	0.25	High Sensitivity to Potential Gain	2.50		326
							Subtotal	**370**
Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion								
51	1196_DNG	24.4	40.5	0.25	High Sensitivity to Potential Gain	1.50		370
52	1196_Poor	0.9	0.1	0.25	High Sensitivity to Potential Gain	1.50		1
53	1196_Other	11.1	0.3	0.25	High Sensitivity to Potential Gain	1.50		1
54	1196_Medium	53.3	0.9	0.25	High Sensitivity to Potential Gain	1.50		19
55	1196_High	36.5	211.2	0.25	High Sensitivity to Potential Gain	1.50		2890
							Subtotal	**3281**
Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion								
56	1224_Low	3.8	0.2	0.25	High Sensitivity to Potential Gain	1.50		1
57	1224_Poor	17.0	5.9	0.25	High Sensitivity to Potential Gain	1.50		37
58	1224_Medium	48.9	9.9	0.25	High Sensitivity to Potential Gain	1.50		181
59	1224_High	36.1	197.4	0.25	High Sensitivity to Potential Gain	1.50		2671
							Subtotal	**2890**

Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion								
60	1225_Low	4.9	0.6	0.25	High Sensitivity to Potential Gain	1.50		0
61	1225_Poor	11.6	1.5	0.25	High Sensitivity to Potential Gain	1.50		6
62	1225_Medium	19.4	2.2	0.25	High Sensitivity to Potential Gain	1.50		16
63	1225_High	31.4	19.3	0.25	High Sensitivity to Potential Gain	1.50		228
							Subtotal	**250**
							Total	**12927**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits
Caladenia montana / Caladenia montana (Flora)						
300_High	35.2	0.35	0.25	1.5	False	5
729_DNG	11.5	0.09	0.25	1.5	False	0
729_Medium	55.7	0.04	0.25	1.5	False	1
729_High	32.1	0.55	0.25	1.5	False	7
953_High	47.4	0.31	0.25	1.5	False	6
999_High	33.0	0.15	0.25	1.5	False	2
1191_Medium	35.9	0.2	0.25	1.5	False	3
1191_High	42.2	0.03	0.25	1.5	False	0
					Subtotal	**24**

Callocephalon fimbriatum / Gang-gang Cockatoo (Fauna)						
296_Medium	54.4	0.31	0.25	2	False	8
296_High	24.7	0.01	0.25	2	False	0
300_High	35.2	0.57	0.25	2	False	10
729_High	32.1	1.2	0.25	2	False	19
953_High	47.4	0.9	0.25	2	False	21
1196_High	36.5	1.91	0.25	2	False	35
					Subtotal	**93**
Calotis glandulosa / Mauve Burr-daisy (Flora)						
303_DNG	9.8	0.06	0.25	3	True	0
303_Other	30.4	0.25	0.25	3	True	6
303_High	37.9	1.31	0.25	3	True	37
637_High	19.2	0.4	0.25	3	True	6
644_Other	26.6	0.2	0.25	3	True	4
644_High	24.1	0.86	0.25	3	True	16
1196_DNG	24.4	0.9	0.25	3	True	16
1196_High	36.5	8.87	0.25	3	True	243
1224_High	36.1	8.55	0.25	3	True	231
1225_High	31.4	0.5	0.25	3	True	12
					Subtotal	**571**

Calotis pubescens / Max Mueller's Burr-daisy (Flora)						
1196_High	36.5	0.24	0.25	2	False	4
1224_High	36.1	2.35	0.25	2	False	42
					Subtotal	**46**
Carex raleighii / Raleigh Sedge (Flora)						
637_High	19.2	0.04	0.25	2	False	0
644_High	24.1	0.21	0.25	2	False	3
1224_High	36.1	0.55	0.25	2	False	10
1225_High	31.4	0.04	0.25	2	False	1
					Subtotal	**14**
Cercartetus nanus / Eastern Pygmy-possum (Fauna)						
296_Poor	4.2	0.05	0.25	2	False	0
296_Medium	54.4	21.69	0.25	2	False	590
296_High	24.7	16.51	0.25	2	False	204
300_Other	20.1	5.38	0.25	2	False	54
300_Medium	25.5	8.17	0.25	2	False	104
300_High	35.2	49.4	0.25	2	False	869
302_Other	24.5	2.4	0.25	2	False	29
302_Medium	24.4	1.41	0.25	2	False	17
302_High	22.9	0.34	0.25	2	False	4
311_High	24.6	23.11	0.25	2	False	284

639_Other	36.0	0.65	0.25	2	False	12
639_High	25.2	22.27	0.25	2	False	280
729_Medium	55.7	6.43	0.25	2	False	179
729_High	32.1	35.81	0.25	2	False	575
953_High	47.4	13.83	0.25	2	False	327
999_Medium	23.1	4.31	0.25	2	False	50
999_High	33.0	22.84	0.25	2	False	377
1196_Poor	0.9	0.07	0.25	2	False	0
1196_Other	11.1	0.27	0.25	2	False	2
1196_Medium	53.3	0.94	0.25	2	False	25
1196_High	36.5	211.2	0.25	2	False	3854
					Subtotal	**7836**
Cyclodomorphus praealtus / Alpine She-oak Skink (Fauna)						
1224_Poor	17.0	5.85	0.25	2	False	50
1224_Medium	48.9	9.87	0.25	2	False	241
1224_High	36.1	197.44	0.25	2	False	3561
					Subtotal	**3852**
Discaria nitida / Leafy Anchor Plant (Flora)						
1224_High	N/A	1	0.25	2	False	2
1225_High	N/A	44	0.25	2	False	88
					Subtotal	**90**

Glycine latrobeana / Glycine latrobeana (Flora)						
637_Medium	6.7	0.01	0.25	3	True	0
644_Other	26.6	0.16	0.25	3	True	3
1196_High	36.5	0.1	0.25	3	True	3
1224_Medium	48.9	0.08	0.25	3	True	3
1224_High	36.1	1.18	0.25	3	True	32
					Subtotal	**41**
Haliaeetus leucogaster / White-bellied Sea-Eagle (Fauna)						
296_Medium	54.4	9.27	0.25	2	False	252
300_High	35.2	13.56	0.25	2	False	238
729_High	32.1	0.3	0.25	2	False	5
					Subtotal	**495**
Litoria booroolongensis / Booroolong Frog (Fauna)						
285_Poor	23.3	0.01	0.25	2	False	0
296_Low	3.7	0.07	0.25	2	False	0
296_High	24.7	0.01	0.25	2	False	0
300_High	35.2	0.55	0.25	2	False	10
302_Low	18.6	1.31	0.25	2	False	12
302_Other	24.5	1.43	0.25	2	False	17
302_Medium	24.4	1.18	0.25	2	False	14
302_High	22.9	0.32	0.25	2	False	4

					Subtotal	**57**
Litoria verreauxii alpina / Alpine Tree Frog (Fauna)						
303_High	37.9	3.27	0.25	2	False	62
637_Poor	1.4	0.03	0.25	2	False	0
637_Medium	6.7	0.07	0.25	2	False	0
637_High	19.2	1.84	0.25	2	False	18
644_DNG	13.7	0.34	0.25	2	False	2
644_Other	26.6	0.41	0.25	2	False	5
644_High	24.1	3.01	0.25	2	False	36
1224_Poor	17.0	1.52	0.25	2	False	13
1224_Medium	48.9	2.03	0.25	2	False	50
1224_High	36.1	29.19	0.25	2	False	526
1225_Low	4.9	0.26	0.25	2	False	1
1225_Poor	11.6	1.22	0.25	2	False	7
1225_Medium	19.4	0.27	0.25	2	False	3
1225_High	31.4	10.94	0.25	2	False	172
					Subtotal	**895**
Mastacomys fuscus / Broad-toothed Rat (Fauna)						
637_Poor	1.4	0.03	0.25	2	False	0
637_Medium	6.7	0.12	0.25	2	False	0
637_High	19.2	5.29	0.25	2	False	51

1224_Poor	17.0	2.38	0.25	2	False	20
1224_Medium	48.9	3.47	0.25	2	False	85
1224_High	36.1	127.74	0.25	2	False	2304
1225_Poor	11.6	1.47	0.25	2	False	9
1225_Medium	19.4	2.16	0.25	2	False	21
1225_High	31.4	19.32	0.25	2	False	304
					Subtotal	**2794**
Myotis macropus / Southern Myotis (Fauna)						
299_High	45.6	0.8	0.25	2	False	18
1191_DNG	22.4	0.05	0.25	2	False	1
1191_High	42.2	3.16	0.25	2	False	67
					Subtotal	**86**
Prasophyllum retroflexum / Kiandra Leek Orchid (Flora)						
303_High	37.9	0.14	0.25	2	False	3
644_Other	26.6	0.02	0.25	2	False	0
644_High	24.1	0.16	0.25	2	False	2
679_Other	9.1	0.01	0.25	2	False	0
679_High	5.0	0.02	0.25	2	False	0
1196_High	36.5	0.02	0.25	2	False	0
1224_High	36.1	5.49	0.25	2	False	99
1225_High	31.4	0.25	0.25	2	False	4

					Subtotal	**108**
Pseudomys fumeus / Smoky Mouse (Fauna)						
300_High	35.2	4.4	0.25	3	True	116
639_Other	36.0	0.65	0.25	3	True	18
639_High	25.2	19.26	0.25	3	True	364
644_Other	26.6	0.28	0.25	3	True	6
644_Medium	11.4	0.09	0.25	3	True	1
644_High	24.1	93.79	0.25	3	True	1696
729_High	32.1	0.05	0.25	3	True	1
953_High	47.4	13.56	0.25	3	True	482
1196_High	36.5	94.71	0.25	3	True	2592
					Subtotal	**5276**
Pterostylis foliata / Slender Greenhood (Flora)						
1196_High	36.5	0.28	0.25	2	False	5
					Subtotal	**5**
Thelymitra alpicola / Thelymitra alpicola (Flora)						
637_High	19.2	0.01	0.25	1.5	False	0
644_High	24.1	0.04	0.25	1.5	False	0
1224_High	36.1	0.02	0.25	1.5	False	0
					Subtotal	**0**

Annexure I

EPBC PMST Report

Australian Government
Department of the Environment and Energy

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.

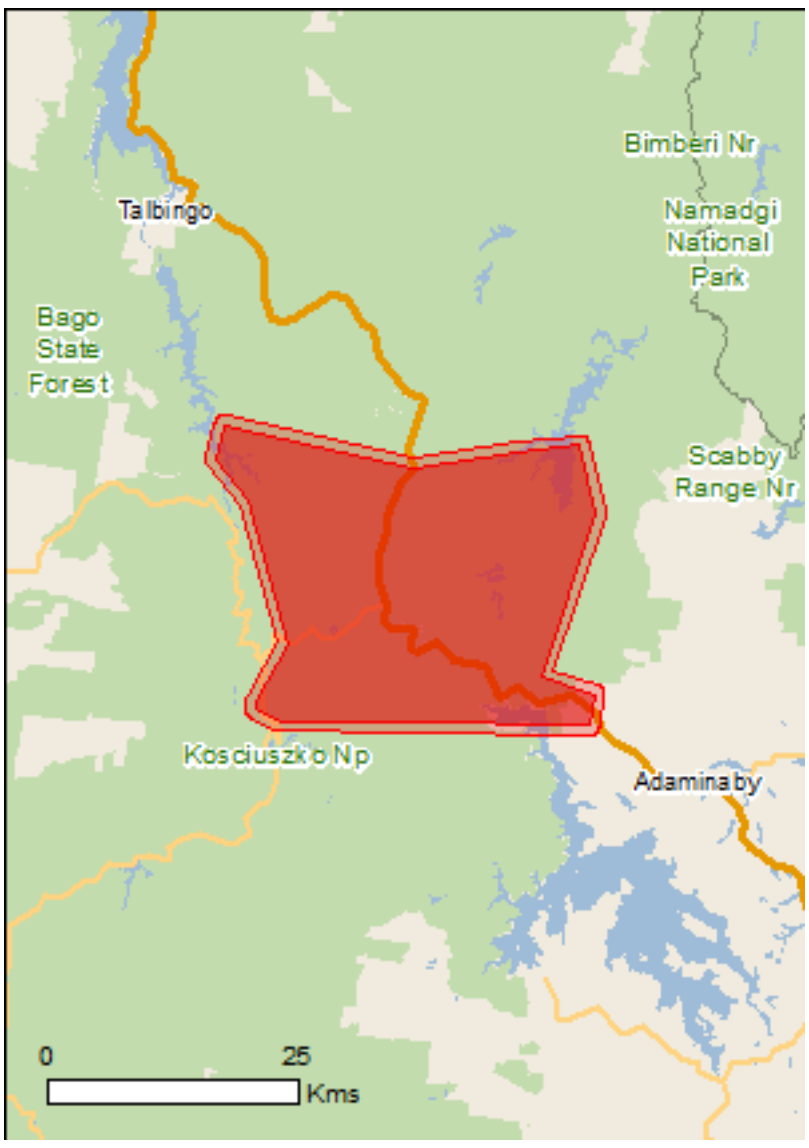
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/01/20 16:49:42

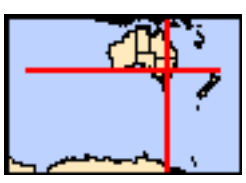
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 1.0Km



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:	38
Listed Migratory Species:	12

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:	18
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:	32
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 - 600km upstream
Riverland	600 - 700km 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 likely to 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 likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	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
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Fish		
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Translocated population known to occur within area
Frogs		
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat known to occur within area
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat may occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat may occur within area
Litoria spenceri Spotted Tree Frog [25959]	Endangered	Species or species habitat may occur within area
Litoria verreauxii alpina Alpine Tree Frog, Verreaux's Alpine Tree Frog [66669]	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
Pseudophryne pengilleyi Northern Corroboree Frog [66670]	Critically Endangered	Species or species habitat likely to 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 known to occur within area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	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 [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		

Name	Status	Type of Presence
Calotis glandulosa Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat known to occur within area
Colobanthus curtisiae Curtis' Colobanth [23961]	Vulnerable	Species or species habitat likely to occur within area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat known to occur within area
Prasophyllum bagoense Bago Leek-orchid [84276]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum innubum Brandy Marys Leek-orchid [83603]	Critically Endangered	Species or species habitat known to occur within area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Pterostylis oreophila Blue-tongued Orchid, Kiandra Greenhood [22903]	Critically Endangered	Species or species habitat known to occur within area
Rutidosis leiolepis Monaro Golden Daisy [21490]	Vulnerable	Species or species habitat known 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 [64721]	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 [Resource Information]

* 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

Name	Threatened	Type of Presence
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely 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 known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		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
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

Name	Threatened	Type of Presence
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
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely 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
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 known 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]

Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

Invasive Species [Resource Information]

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 Resouces Audit, 2001.

Name	Status	Type of Presence

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		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

Name	Status	Type of Presence
		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		
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
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may 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
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		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

-35.954355 148.67674,-35.95241 148.510572,-35.951298 148.401738,-35.942682 148.379766,-35.936567 148.380109,-35.895972 148.409292,-35.792165 148.373586,-35.762362 148.34406,-35.737564 148.351957,-35.768212 148.520185,-35.757626 148.613912,-35.752332 148.668157,-35.800798 148.682577,-35.919608 148.633481,-35.931841 148.681203,-35.954355 148.67674

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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Annexure J

EPBC Act protected matters likelihood of occurrence assessment

J.1 Likelihood of occurrence assessment – threatened ecological communities

Table J.1 Likelihood of occurrence assessment – threatened ecological communities

Threatened Ecological Community	EPBC Act[1]	BC Act[2]	Likelihood of occurrence	Justification
Alpine Sphagnum Bogs and Associated Fens	EN	E3	Recorded	Alpine Sphagnum Bogs and Associated Fens community is found in permanently wet areas, such as along streams, drainage lines, valley edges and valley floors in alpine, sub-alpine and montane areas, on general to moderate slopes. The characteristic floristics, of which Sphagnum is a major component, are maintained by summer groundwater seepage. This community was recorded within the survey area and occurs within the disturbance footprint.
Natural Temperate Grassland of the South Eastern Highlands	CE	-	Negligible	Natural Temperate Grasslands of the South Eastern Highlands occurs at elevations of 250-1200 m, on a wide range of topographic positions and on soils derived from a variety of substrates. It occurs as a naturally treeless or sparsely treed community. Treeless grasslands in the study area are considered sub-alpine grasslands, derived from cold-air drainage in low-lying depressions. In the study area these grasslands lie outside of the South-east Highlands. Sub-alpine grasslands which are excluded from the community (TSSC 2016a).
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	E3	Negligible	White Box-Yellow Box-Blakely's Red Gum Grassy Woodlands occurs from Queensland to South Australia, with the predicted distribution of the community including the northern end of the survey area at Talbingo. The community occurs as a grassy woodland or derived grassland community dominated by White Box (*Eucalyptus albens*), Yellow Box (*E.melliodora*) or Blakely's Red Gum (*E.blakelyi*) in the east of the community's range, or Grey Box (*E. microcarpa* or *E. moluccana*) in the Nandewar bioregion. One PCT mapped during the detailed vegetation mapping (PCT 302 - Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion) is aligned with this TEC in the BioNet Vegetation Classification. However, this community is not dominated by any of the characteristics species outlined above and does not meet the criteria outlined in TSSC (2006) for the community. The community was not identified during detailed vegetation mapping.

Notes: 1. EPBC Act status: CE – critically endangered, EN – endangered, VU – vulnerable
2. BC Act status: E4B – critically endangered, E3 – endangered, V2 - vulnerable

J.2 Likelihood of occurrence assessment – threatened flora

Table J.2 Likelihood of occurrence assessment – threatened flora

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Calotis glandulosa	Mauve Burr-daisy	VU	-	High	Recorded	The Mauve Burr-daisy is a sprawling, branches herb occurring in montane and subalpine grasslands in the Australian Alps. It is mostly found in subalpine grassland (dominated by *Poa* spp.) and montane or natural temperate grassland dominated by Kangaroo Grass and Snow Gum Woodlands within the Monaro area. The species is common on roadsides as it known to colonise on bare patches. There are 24 records of this species within 10 km of the study area. Suitable habitat was identified during initial surveys. The species was recorded within the disturbance footprint during targeted surveys.
Colobanthus curtisiae	Curtis' Colobanth	VU	-	Moderate	Low	Curtis' Colobanth, is a glabrous tufted perennial herb to 40 mm high, forming small clumps from laterally branching short stems. The species is known to occur in a wide variety of vegetation communities, including lowland *Poa* and *Themeda* grasslands, to grassy and shrubby woodland/forests and rockplates. It occurs on gentle slopes with elevations of between 160 m to 1300 m. The species is most commonly found on soils derived from sandstone as well as clay loams derived from dolerite and basalt. The species has not been recorded within 10 km of the study area. Given the limited understanding of the species' ecology, Curtis' Colobanth was considered a candidate species requiring further consideration. The species was considered to have potential to occur on gently sloping areas with basalt derived soils in the upper reaches of Lobs Hole Ravine Road. This species was not recorded during targeted surveys.

Table J.2 Likelihood of occurrence assessment – threatened flora

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Glycine latrobeana	Clover Glycine	VU	E4A	Moderate	Recorded	Clover Glycine is a decumbent to ascending herb growing to only a few centimetres high. Leaves are trifoliate, providing the name. The species is endemic to south-eastern Australia, where it is widely distributed from Port Pirie in South Australia, through much of Victoria to near Hobart in Tasmania. There are historical records of the species from Delegate and near Tom Groggin; however, subsequent searches have failed to locate these plants. In 2011 a population of Clover Glycine was located at Kelly's Plain in Kosciuszko National Park. The species is recorded from grassland and grassy woodland, with the species restricted to a ~ 3 ha area in NSW. There are seven records of this species within 10 km of the study area. Prior to survey, the species was known from a very small number of sites on Kelly's Plain. The species was recorded within the disturbance footprint during targeted surveys.
Leucochrysum albicans var. *tricolor*	Hoary Sunray	EN	-	High	Recorded	The Hoary Sunray is a small, perennial paper daisy endemic to south-eastern Australia, where it occurs in NSW, the ACT Victoria and Tasmania. In NSW the species occurs in an area roughly bounded by Albury, Bega and Goulburn, occupying grasslands, grassy areas in woodlands and dry open forests, and modified habitats, on a variety of soil types. There are 10 records of this species within 10 km of the project area. The study area is just within the known distribution, with the species recorded along the Snowy Mountains Highway near Rock Forest. The species was recorded within the disturbance footprint during targeted surveys.

Table J.2 Likelihood of occurrence assessment – threatened flora

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Prasophyllum bagoense	Bago Leek-orchid	CE	E4A	Low	Low	The Bago Leek-orchid is a slender, tuberous, terrestrial orchid growing singly or in loose groups. The species is known from a single population at McPhersons Plain, east of Tumbarumba in the Southern Tablelands of New South Wales. The species' habitat is a sub-alpine treeless plain at an elevation of approximately 1200 m where it grows in wet sedgeland, tall wet heathland, open heathland extending onto adjacent eucalypt woodland. The species grows in moist to wet shallow clay loam. The underlying basalt geology may be an important feature. There are seven records of this species within 10 km of the study area, all to the west. The survey area is outside of the know distribution of the species.
Prasophyllum innubum	Brandy Marys Leek-orchid	CE	E4A	Moderate	Low	Brandy Mary's Leek-orchid is a terrestrial herb growing singly or in loose groups, with an erect leaf 25–50 cm long and with 6–20 small brownish-purple flowers with white or pinkish labellums. The species is restricted to a 45 km^2 area east of Tumbarumba in the Southern Tablelands in Bago State Forest and adjacent private land. It grows beside small streams and peatland Sphagnum hummocks, in adjacent grassy flats and also extending into open woodland at around 1,200 m elevation. The underlying basalt geology may be an important feature. There are two records of this species within 10 km of the study area. Prior to surveys the species was thought to have a restricted distribution. Surveys were undertaken based on advice from Geoff Robertson (DPIE, pers. comm.) targeting basalt outcropping and suitable Alpine bog and fen habitat. The species was recorded within the survey area, however the species was not recorded within the disturbance footprint.

Table J.2 Likelihood of occurrence assessment – threatened flora

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Prasophyllum petilum	Tarengo Leek Orchid	EN	E1	Negligible	Negligible	The Tarengo Leek-orchid is a slender herb to 30 cm, its cylindrical leaf reaching 25 cm. A narrow flowering spike is produced in October to November, with 5 to 18 flowers. The species is found at four sites in NSW at Captains Flat, Ilford, near Delegate and near Boorowa (north of the survey area) where it occurs on relatively fertile soils in grassy woodland or natural grassland. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution for this species.
Pterostylis oreophila	Blue-tongued Orchid	CE	E4A	Moderate	Low	The Blue-tongued Greenhood is a terrestrial orchid growing to 200 mm tall, with dark green, fleshy, flat leaves. The solitary flowers are erect, light green and white. The recurved labellum is a distinctive bluish or blue-green (aqua) colour. The species occurs at 20 locations in four distinct geographic locations including the Kiandra and Bago areas of NSW. The species grows beside small montane and subalpine streams under tall dense thickets of Mountain Tea Tree (Leptospermum grandiflorum), in black oozing mud or less commonly in peaty soils and sphagnum mounds. There are five records of this species within 10 km of the study area. Marginal habitat was conservatively assumed to occur in the survey area along Lobs Hole Ravine Road and the plateau area. The species was not recorded during targeted surveys.
Rutidosis leiolepis	Monaro Golden Daisy	VU	V	High	Low	The Monaro Golden Daisy, is a low, tufted perennial with dark green leaves, with a woolly under surface, to about 10 cm. The solitary, slightly domed flower-heads are about 15 mm across, and occur on erect woolly stems to about 25 cm tall. The species is known from 21 locations in Kosciuszko National Park on high (sub-alpine) treeless plains, mainly above an altitude of 1,200 m. There are 16 records of this species within 10 km of the study area. Suitable habitat was identified during initial surveys. The species was recorded within the survey area, however the species was not recorded within the disturbance footprint.

Table J.2 Likelihood of occurrence assessment – threatened flora

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Swainsona recta	Small Purple-pea	EN	-	Low	Negligible	The Small Purple-pea is a slender erect herb growing 30 cm tall. Pre-European settlement the species occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum, Yellow Box and Candlebark. The Small Purple-pea is known to grow in association with understorey dominants including Kangaroo Grass, Poa Tussocks and Spear-grasses. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution for this species.
Thesium australe	Austral Toadflax	VU	V	Moderate	Low	Austral Toadflax is a hairless, yellow-green perennial herb with slender wiry stems to 40 cm high and tiny white flowers. The species occurs in NSW, the ACT, Queensland and Victoria and has a sporadic and widespread distribution within this range. The species occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast and is often found in association with Kangaroo Grass (*Themeda australis*). There are 20 records of this species within 10 km of the study area. Marginal habitat was identified during initial surveys. This species was not recorded during targeted surveys.
Xerochrysum palustre	Swamp Everlasting	VU	-	High	Low	The Swamp Everlasting is a small erect herb, endemic to south-eastern Australia with a distribution spanning south-eastern NSW through Victoria to north-eastern Tasmania. It is found growing at elevations of up to 1,300 m. The species grows in wetlands including sedge swamps and shallow freshwater marshes, often on heavy black clay soils. There are five records of this species within 10 km of the study area. The species has previously been recorded in Boggy Plain, above the proposed communications cable route and was therefore included as a candidate species. However, the species was not recorded during targeted surveys.

Notes: 1. EPB Act status: CE- critically endangered, EN – endangered, VU – vulnerable

2. BC Act status: E4A – critically endangered, E1 – endangered, E2 – endangered population, V– vulnerable

J.3 Likelihood of occurrence assessment – threatened fauna

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Birds						
Anthochaera phrygia	Regent Honeyeater	CE	E4A	Negligible	Negligible	The Regent Honeyeater is a striking, predominantly black and yellow bird. Its head and neck are black, with warty pink or yellow skin around the eyes. Endemic to mainland south-eastern Australia, the species has a patchy distribution from south-east Queensland, through NSW and the ACT into central Victoria. Records are widely distributed across this range, but the species is only found regularly at a few localities in NSW and Victoria. Most records of regent honeyeaters come from box-ironbark eucalypt associations, where the species seems to prefer more fertile sites with higher soil water content. Other forest types regularly utilised by the Regent Honeyeater include wet lowland coastal forest dominated by Swamp Mahogany (*Eucalyptus robusta*), Spotted Gum-Ironbark associations and riverine woodlands. The species has not been recorded within 10 km of the study area. The study area does not support key habitat or feed tree species. The species has been recorded in the Southeast Highlands, but most records are located north east of the study area on more fertile plains.
Calidris ferruginea	Curlew Sandpiper	CE	E1	Negligible	Negligible	The Curlew Sandpiper is a small, slim sandpiper. Inland, the species mainly occur around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They forage at the edges of shallow pools and drains of intertidal mudflats and sandy. The species has not been recorded within 10 km of the study area. The study area does not provide suitable waterbodies with muddy or sandy edges.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Grantiella picta	Painted Honeyeater	VU	V	Low	Low	The Painted Honeyeater has black upperparts, white underparts, black spots on its flanks and yellow edges to the flight and tail feathers. The bill is a deep pink and the eye red. The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory, with inland slopes of the Great Dividing Range seeing greatest concentrations and almost all records of breeding. The species has a specialist diet mainly consisting of mistletoe fruits, but also includes nectar. The species inhabits mistletoes in a variety of vegetation types, including eucalypt forests/woodlands, riparian woodlands, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species has not been recorded within 10 km of the study area and the species has not been recorded from similar montane of sub-alpine habitats in the region. The study area is outside the known distribution of the species and does not support suitable habitat providing abundant Mistletoes.
Hirundapus caudacutus	White-throated Needletail	VU	-	Moderate	Recorded	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges. Breeds in Asia. White-throated Needletails almost always forage aerially, at heights up to 'cloud level'. There are no records of the species within 10 km of the study area. The species was recorded flying on three separate occasions adjacent to the disturbance footprint.
Lathamus discolor	Swift Parrot	CE	E1	Low	Low	The Swift Parrot is a small fast-flying, nectivorous parrot which occurs in eucalypt forests in south eastern Australia. The species breeds in Tasmania and migrate to mainland Australia in autumn. During winter the parrots disperse across a broad landscape, foraging on nectar and lerps in eucalypt forests, particularly inland box-ironbark and grassy woodlands, and Coastal Swamp Mahogany (E. robusta) and Spotted Gum (Corymbia maculata) woodland when in flower. There are no records of the species within 10 km of the study area; however, the species was reported on Lobs Hole Ravin Road in 2017. Although the species may be vagrant within the study area, the survey area does not provide abundant winter flowering eucalypts which would provide a key food source curing the winter mainland migration period (Saunders and Tzaros 2011).

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Numenius madagascariensis	Eastern Curlew	CE	-	Negligible	Negligible	The Eastern Curlew is the largest migratory shorebird in the world, migrating to Australia during the northern hemisphere winter. In Australia, the species has a primarily coastal distribution, inhabiting sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. The species has not been recorded within 10 km of the study area. The study area does not provide suitable intertidal habitat.
Rostratula australis	Australian Painted Snipe	EN	E1	Low	Low	The Australian Painted Snipe is a stocky wading bird, endemic to Australia and has been recorded at wetlands in all states and territories. The species inhabits shallow ephemeral and permanent freshwater (occasionally brackish) wetlands. The species has not been recorded within 10 km of the study area. The study area does not provide suitable wetland habitat for this species.
Small terrestrial mammals						
Burramys parvus	Mountain Pygmy-possum	EN	E1	Low	Low	The Mountain Pygmy-possum is the largest of the five species of Pygmy-possum with a head-body length of 10–11 cm, a tail length of 13–15 cm and adults weigh 35–80 g. The species is endemic to alpine, sub-alpine and montane areas of mainland south-eastern Australia, occurring in three separate regions: Kosciuszko National Park in NSW, and Mt Buller and Mt Bogong-Mt Higginbotham in Victoria. The species' ecology is linked to the highly seasonal environment. It occupies mostly boulderfields and rock screes, around or above the upper limits of the tree-line, associated with shrubby heath vegetation. Boulderfields with good rock structure and long snow duration provide a favourable microclimate. Proximity to permanent water has been found to be a key driver of suitable habitat. There are 277 records of the species within 10 km of the study area from the Happy Jacks spoil site and Bolton's Hill. Boulderfields in the survey area, along Lobs Hole Ravine Road, have been previously surveyed for the species by OEH (Linda Broome, DPIE, pers. comm.). These sites are not located close to permanent water and thought to be unsuitable for the species. Despite this, a conservative approach was taken, and the species was included as a candidate species. The species was not recorded during surveys.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Mastacomys fuscus mordicus	Broad-toothed Rat	VU	V, E2	High	Recorded	The Broad-toothed Rat is a native rodent with a broad face, short tail and stocky body. It has fine, dense fur which is brown tinged with rufous above, merging to a paler grey underneath. The fur may have a green tinge due to the presence of algae. The species has a highly fragmented distribution, with scattered records across the Great Dividing Range from near Warburton in Victoria to the Brindabella Range in the ACT and up into the Barrington Tops in NSW, with at least one poorly-known subpopulation in coastal areas of far East Gippsland and south-eastern NSW. In alpine and sub-alpine areas the species inhabits alpine and subalpine heathlands, grassland adjacent to boulder outcrops, swamps, sedgelands and occasionally forests with grassy understories. There are 99 records of the species within 10 km of the study area. Scats of the species were recorded during initial surveys, and this species was recorded during targeted surveys.
Pseudomys fumeus	Smoky Mouse	EN	E4A	Moderate	Recorded	The Smoky Mouse is a small native rodent endemic to mainland south-eastern Australia, where it occurs in Victoria, NSW and the ACT. The species has a relatively wide but disjunct distribution within this broad range; populations are small and fragmented. The precise habitat requirements of the Smoky Mouse are not clear. A wide range of vegetation communities are occupied, from damp coastal heath in East Gippsland, to sub-alpine heath. However, in the South Eastern Highland most records are from ridgeline dry heathy open-forest. There are six records of the species within 10 km of the study area, with five from the Happy Jack's spoil dump, and one historical record of the species from near Yarrangobilly Caves, recorded from a Quoll scat. Bones of the Smoky Mouse have also been recorded in owl pellets during the excavation of a number of caves in the Lobs Hole Ravine area (to the south-west of the survey area) and around Yarrangobilly Caves. Although the species has a sparse distribution, the species was included as a candidate species given nearby records. The species was recorded within the study area above 1,100 m AHD. Sub-alpine woodlands above 1,100 m are deemed suitable habitat.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Large terrestrial mammals						
Dasyurus maculatus	Spotted-tailed Quoll	EN	V	High	Recorded	The Spotted-tailed Quoll is one of Australia's largest extant marsupial carnivores, and has a distinctive spotted appearance. The species is primarily forest-dependent , and occupies a wide range of habitat types, including rainforest, wet and dry sclerophyll forest, coastal heathland, scrub and dunes, woodland, heathy woodland, swamp forest, mangroves, on beaches and sometimes in grassland or pastoral areas adjacent to forested areas. The species has home ranges of several hundred to several thousand hectares in size and will use multiple dens. moving between den sites every 1-4 days. The species occurs at low densities. There are 11 records of the species within 10 km of the study area, to the west and north. The species has potential to occupy the survey area at low densities, with large areas of suitable habitat present. In the survey area, the species is likely to be wide ranging, making detection challenging. All areas of the survey area are deemed to provide suitable habitat, with suitable denning sites focused on boulderfields, and areas with a high density of hollow logs (sub-alpine areas and along the Yarrangobilly River. One scat record was recorded near Wallace's Creek Fire Trail; however, the species was not detected during targeted surveys. The species is considered a high likelihood of occurrence in the survey area, albeit at low densities.
Arboreal mammals						
Petauroides volans	Greater Glider	VU	E2	Moderate	Low	The Greater Glider is the largest gliding possum in Australia. The species is distributed across eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. The species is restricted to eucalypt forests and woodlands, typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The species distribution may be patchy even in suitable habitat. There are 3 records of the species within 10 km of the study area, to the west on the Bago Plateau. Suitable, taller, montane, moist eucalypt forests with old trees and abundant hollows is found along the upper sections of Lobs Hole Ravine Road an along the Yarrangobilly River. The species was not recorded during targeted surveys.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Phascolarctos cinereus	Koala	VU	V, E2	Moderate	Low	The Koala is a tree-dwelling, medium-sized marsupial, distributed from Cairns to South Australia, however, the listed population does not include Victoria or South Australia. Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by species from the genus Eucalyptus. The distribution of Koalas is also affected by altitude, with the species limited to below 800 m ASL. The species has not been recorded within 10 km of the study area. Although the species is considered rare in Kosciuszko National Park, a precautionary approach to the species occupancy was undertaken, with suitable Eucalypt forest and woodland below 800 m elevation deemed to provide suitable habitat. The species was not recorded during targeted surveys.
Bats						
Pteropus poliocephalus	Grey-headed Flying-fox	VU	V	Low	Negligible	The Grey-headed Flying-fox is a large, endemic megachiropteran bat occurring in south-eastern Australia. The species distribution extends from Bundaberg in Queensland to Melbourne in Victoria, and from the coast inland to the western slopes of NNSW. There are some contemporary records from South Australia. The Grey-headed Flying-fox feeds on nectar and pollen from flowers of canopy trees and fleshy fruits from rainforest trees and vines, with regional preferences shown. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution of the species.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Amphibians						
Litoria booroolongensis	Booroolong Frog	EN	E1	High	Recorded	The Booroolong Frog is a medium size, stream dwelling frog. It is nocturnal but can be seen during day on rocks in or near the water. The species is restricted to NSW and north-eastern Victoria, predominantly along western-flowing streams of the Great Dividing Range between 200 and 1,300 m above sea level. The Booroolong Frog is associated with permanent streams in a variety of vegetation types. Primary habitat requirements are extensive rock bank structures along permanent rivers with the key feature of these rock structures being rock crevices in relatively shallow, slow to medium-flowing sections of stream. By day frogs shelter under rocks or amongst vegetation near the ground along the edge of the steam. Breeding is known to occur in spring and early summer, from October to early January. Egg deposition sites are typically in shallow, slow-flowing sections of stream or isolated rock pools along stream margins. Tadpoles take 2-4 months to develop, metamorphosing in late summer to early autumn. There are two records within 10 km of the study area, from the Yarrangobilly River. Given known records of the species along the Yarrangobilly River, upstream of Lobs Hole, the species was included as a candidate species. The Booroolong Frog was recorded along the entire length of the Yarrangobilly River within the survey area and is likely to extend upstream to at least Blue Creek Firetrail.
Litoria castanea	Yellow-spotted Tree Frog	EN	E4A	Negligible	Negligible	The Yellow-spotted Tree Frog has only recently (2010) been recorded in the wild again. Before this it had not been recorded in the wild since the 1970s. It has a disjunct distribution, being recorded on the New England Tableland and on the southern highlands from Lake George to Bombala. There are unconfirmed reports from near Bathurst and Orange. Found in large permanent ponds, lakes and dams with an abundance of bulrushes and other emergent vegetation. It shelters during autumn and winter under fallen timber, rocks, other debris or thick vegetation. The species has not been recorded within 10 km of the study area. The distribution of the species is highly restricted (Dave Hunter, DPIE, pers. comm.) and the study area is outside the known distribution of the species.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Litoria raniformis	Southern Bell Frog	VU	E1	Negligible	Negligible	The Growling Grass Frog is a large frog, with females exceeding 100 mm in length. The species is endemic to south-eastern Australia. In NSW the species occurs from Bombala in the far south-eastern corner of the state, through the Southern Tablelands, and along the Murrumbidgee and Murray Rivers. The Growling Grass Frog inhabits a wide range of still waterbodies, including lagoons, swamps, lakes, ponds, farm dams, irrigation channels and quarries and may occupy slow-flowing sections of streams and rivers. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution of the species and does not support suitable still waterbodies or slow-flowing stream habitat.
Litoria spenceri	Spotted Tree Frog	EN	E4A	Negligible	Negligible	The Spotted Tree Frog is extremely rare and occurs in scattered, geographically isolated populations. It occurs among boulders or debris along naturally vegetated, rocky fast flowing upland streams and rivers. It is known from two streams in southern NSW on the north-west side of the Great Dividing Range. In summer, during the breeding season, adults bask on large in-stream boulders while juveniles occupy shingle banks. In winter animals are thought to hibernate in vegetation outside of the mainstream environment. There are four records of the species within 10 km of the study area. Due to extremely limited population distribution in NSW (Dave Hunter, DPIE, pers. comm.) this species is considered unlikely to occur within the study area.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Litoria verreauxii alpina	Alpine Tree Frog	VU	E1	High	Recorded	The Alpine Tree Frog is a relatively small Hylid frog, growing to approximately 3 cm in length. The species occurs in the alpine and sub-alpine zones of south-eastern NSW and Victoria, generally higher than 1100 metres above sea level and is the only frog species known to occur above the winter snowline on the Australian mainland. The Alpine Tree Frog breeds in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are slow flowing or still. Non-breeding habitat and overwintering refuges are poorly known but are likely to include flat rocks, fallen logs, leaf litter and other ground debris. There are 11 records of the species within 10 km of the study area. The species was known to occur at a limited number of sites in KNP and was included for survey. The species was recorded during targeted surveys at a number of watercourses across the plateau area.
Pseudophryne corroboree	Southern Corroboree Frog	CE	E4A	Low	Negligible	The Southern Corroboree Frog and Northern Corroboree are distinctive and easily recognised because of their striking dorsal colour patterns consisting of bright yellow or green longitudinal stripes alternating with black stripes. The two frog species have a limited geographic distribution. The Southern Corroboree Frog now occurs in a small number of remnant populations along the north-western edge of its former range (within Kosciuszko National Park, from Smiggin Holes in the south, and northwards to the Maragle Range. The species breeds in pools and seepages in sphagnum bogs, wet tussock grasslands, fens and wet heath. They also forage and shelter in montane forest, sub-alpine woodland and tall heath adjacent to the breeding areas. The Southern Corroboree Frog is highly restricted to areas above 1,300 m ASL. There are three records of the species within 10 km of the study area, all to the south. The study area is outside the restricted distribution of this species.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Pseudophryne pengilleyi	Northern Corroboree Frog	CE	E4A	Moderate	Low	The Northern Corroboree Frog occurs throughout the Fiery Range and Bogong Mountains in Kosciuszko National Park, Bondo State Forest, Micalong State Forest, and Wee Jasper State Forest in NSW, and along the Brindabella Ranges in Namadgi National Park in the ACT, and Bimberi Nature Reserve and Brindabella National Park in NSW. Breeding and foraging habitat is the same as above. There is one records of the species within 10 km of the study area. The species was known to occur in the northern section of KNP and was included as a candidate species following identification of potential habitat during initial surveys. The species was not recorded during targeted surveys.
Reptiles						
Cyclodomorphus praealtus	Alpine She-oak Skink	EN	E1	High	Recorded	The Alpine She-oak Skink is a medium-sized member of the lizard family Scincidae. The species has a restricted distribution, known from eight broad locations above 1,500 m in the Australian Alps from Omeo Plain in the south, to Kiandra in the north. It occupies alpine grasslands, alpine heathland, alpine grassy heathland and grassy areas with a very sparse cover of Snow Gums (Eucalyptus pauciflora). There is one record of the species within 10 km of the study area. The Alpine She-oak Skink has been recorded from sub-alpine grasslands in KNPO previously and was included as a candidate species. The species was recorded during targeted surveys at a number of sites across the plateau area.
Liopholis guthega	Guthega Skink	EN	E1	Low	Low	The Guthega Skink occurs between 1,600 and 2,170 m within open Snowy Gum woodland with grassy or shrubby understoreys, dry tussock grassland, and tall and short heath. The species prefers habitats with rocky or sub-surface boulders hidden beneath soil or thick vegetation. There are no records of the species within 10 km of the study area. The study area lacks suitable rocky habitat within the required altitude for this species.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Fish			**FM Act[3]**			
Maccullochella macquariensis	Trout Cod	EN	E	High	Recorded	Trout Cod were described originally from the Macquarie River, but there is now only one self-sustaining population of Trout Cod remaining in the wild in the Murray River between Yarrawonga and Barmah. No waterways within the study area are identified by DPI (2016) as supporting the species, although the survey area lies within the natural distribution of this species. Although the only self-sustaining population occurs in the Murray River, this species has recently been stocked in Talbingo Reservoir. Its predicted distribution also includes the survey area. Trout Cod is known to occur within Talbingo Reservoir, within the Mid and Lower Murrumbidgee River Catchments and within the Murray River Catchment to Hume Reservoir. It also has a moderate likelihood of occurrence within the Upper Tumut River Catchment and the Yarrangobilly River Catchment.
Maccullochella peelii	Murray Cod	VU	-	Moderate	Moderate	The Murray Cod was formerly widespread and abundant in the lower and mid-altitude reaches of the Murray-Darling Basin but now has a patchy distribution and abundance across its historic range. The species has been found in diverse habitats including flowing and standing waters, small, clear, rocky streams on the inland slopes and uplands of the Great Dividing Range, large, turbid, meandering slow-flowing rivers, creeks, anabranches, and lakes and larger billabongs of the inland plains of the Murray Darling Basin. Murray Cod has a moderate likelihood of occurrence within the Lower Tumut River Catchment. Project activities would only impact on Murray Cod occurring in the Mid Murrumbidgee Catchment. None of the catchments within the study area are considered to include 'important populations'.

Table J.3 Likelihood of occurrence assessment – threatened fauna

Scientific name	Common name	EPBC Act[1]	BC Act[2]	Likelihood of occurrence (desktop assessment)	Likelihood of occurrence (following targeted survey)	Justification
Macquaria australasica	Macquarie Perch	EN	E	High	High	The Macquarie Perch is found in the Murray-Darling Basin, particularly the upstream reaches of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW. The draft National Recovery Plan for Macquarie Perch identifies four self-sustaining populations; none are within the survey area. Macquarie Perch prefer clear water and deep, rocky holes with extensive cover in the form of aquatic vegetation, large boulders, debris and overhanging banks. They spawn in spring or summer and lay their eggs over stones and gravel in shallow, fast-flowing upland streams or flowing parts of rivers. Macquarie Perch inhabiting impoundments would likely undertake upstream spawning migration in October to mid-January after which adults usually move from the streams to the lake. Migration may not be necessary in stream dwelling fish. Surveys undertaken for Snowy 2.0 (Cardno 2019) have determined that Macquarie Perch occur within the Lower Tumut River Catchment (below Blowering Reservoir), within the Mid and Lower Murrumbidgee River Catchments and within the Murray River Catchment to Hume Reservoir. It is not considered present in Talbingo or Tantangara reservoirs or any of the other waterways with the potential to be directly affected by construction activities associated with Snowy 2.0.

J.4 Likelihood of occurrence assessment – migratory species

Table J.4 Likelihood of occurrence assessment – migratory species

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence (desktop assessment	Likelihood of occurrence (targeted survey)	Justification
Migratory Marine Birds					
Apus pacificus	Fork-tailed Swift	Mi	Negligible	Negligible	Almost exclusively aerial (foraging). The Fork-tailed Swift breeds in Asia but migrates to Australia from September to April. Individuals or flocks can be observed hawking for insects at varying heights from only a few metres from the ground and up to 300 metres high. There is one record of the Fork-tailed Swift within 10 km of the study area. The study area does not support suitable habitat.
Migratory Terrestrial Species					
Hirundapus caudacutus	White-throated Needletail	Mi	Moderate	Recorded	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges. Breeds in Asia. White-throated Needletails almost always forage aerially, at heights up to 'cloud level'. There are 18 records of the White-throated Needletail within 10 km of the study area. The species was recorded flying on three separate occasions adjacent to the disturbance footprint.
Monarcha melanopsis	Black-faced Monarch	Mi	Negligible	Negligible	A migratory species found during the breeding season in damp gullies in temperate rainforests. Disperses after breeding into more open woodland. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution of the species and does not support suitable rainforest habitat.
Motacilla flava	Yellow Wagtail	Mi	Negligible	Negligible	Regular spring-summer visitor in north of Australia, rare vagrant or occasional visitor farther south. Found in marshes, damp paddocks, airfields, cultivated fields, lawns and estuaries. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution of the species and does not support suitable habitat.

Table J.4 Likelihood of occurrence assessment – migratory species

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence (desktop assessment	Likelihood of occurrence (targeted survey)	Justification
Myiagra cyanoleuca	Satin Flycatcher	Mi	High	Recorded	The Satin Flycatcher inhabits 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. The species can occur at elevations of up to 1,400 m ASL. The Satin Flycatcher breeds in heavily vegetated gullies. There are 51 records of the species within 10 km of the study area. Suitable habitat occurs for this species within the study area. The Satin Flycatcher was recorded within and adjacent to the disturbance footprint.
Rhipidura rufifrons	Rufous Fantail	Mi	Moderate	Low	Migratory species that prefers dense, moist undergrowth of tropical rainforests and scrubs. The species mainly inhabits wet sclerophyll forests often in gullies dominated by eucalypts such as Tallow-wood (Eucalyptus microcorys), Mountain Grey Gum (E. cypellocarpa), Narrow-leaved Peppermint (E. radiata), Mountain Ash (E. regnans), Alpine Ash (E. delegatensis), Blackbutt (E. pilularis). During migration it can stray into gardens and more open areas. There are 11 records of the species within 10 km of the study area. The survey area and study area support suitable habitat for this species. The species was not recorded during targeted surveys.
Migratory Wetlands Species					
Actitis hypoleaucos	Common Sandpiper	Mi	Negligible	Negligible	Inhabits a wide range of coastal and inland wetlands, often with muddy or rocky margins. Also known to occur at estuaries, billabongs, dams, pools and lakes, often associated with mangroves. The species has not been recorded within 10 km of the study area. The study area does not support suitable wetland habitat.
Calidris acuminata	Sharp-tailed Sandpiper	Mi	Negligible	Negligible	The Sharp-tailed Sandpiper forages at the edge of water within wetlands or intertidal mudflats, either on bare wet mud, sand or shallow water. They will also forage among inundated vegetation of saltmarsh, grass or sedges. Roosting occurs at the edges of wetlands, on wet open mud or sand or in sparse vegetation. The species has not been recorded within 10 km of the study area. The study area does not support suitable wetland habitat.

Table J.4 Likelihood of occurrence assessment – migratory species

Scientific name	Common name	EPBC Act[1]	Likelihood of occurrence (desktop assessment	Likelihood of occurrence (targeted survey)	Justification
Calidris ferruginea	Curlew Sandpiper	Mi	Negligible	Negligible	Inhabits sheltered intertidal mudflats, non-tidal swamps, lagoons and lakes near the coast. Infrequently recorded inland. The species has not been recorded within 10 km of the study area. The study area does not provide suitable waterbodies with muddy or sandy edges.
Calidris melanotos	Pectoral Sandpiper	Mi	Negligible	Negligible	Scarce, but regular visitor, usually recorded in summer from November to March. Widespread but scattered records in Australia. Usually found in fresh to saline wetlands, floodplains, swamps, estuaries and lagoons, sometimes with emergent or fringing vegetation such as grass. The species has not been recorded within 10 km of the study area. The study area is outside the known distribution of the species, and does not support suitable wetlands habitat.
Gallinago hardwickii	Latham's Snipe	Mi	High	Recorded	Typically found on wet soft ground or shallow water with good cover of tussocks. Often found in wet paddocks, seepage areas below dams. There are 24 records of the species within 10 km of the study area. Alpine bogs and fens and sub-alpine wet grasslands provide suitable habitat for this species. The species was recorded within and adjacent to the disturbance footprint.
Numenius madagascariensis	Eastern Curlew	Mi	Negligible	Negligible	Occurs in sheltered coasts, especially estuaries, embayment's, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats often with beds of seagrass. The species has not been recorded within 10 km of the study area. The study area does not provide suitable intertidal habitat.

Notes: 1. EPBC Act status: Mi – migratory

Annexure K

EPBC Act significant impact criteria assessments

K.1 Alpine Sphagnum Bogs and Associated Fens

Table K.1 Significant impact criteria assessment – Alpine Sphagnum Bogs and Associated Fens

Ecological community profile	**Alpine Sphagnum Bogs and Associate Fens** **Status:** Endangered (EPBC Act) **Distribution:** The Alpine Sphagnum Bogs and Associated Fens ecological community is found across alpine, subalpine and some montane areas of Tasmania, Victoria, NSW and the (ACT). The community primarily occurs within the Australian Alps, the Tasmanian Central Highlands and the Tasmanian Southern Ranges IBRA bioregions. **Ecology:** The key to bog formation is a good supply of groundwater and an impeded drainage system. Many of the plant species which occur within this community are rarely found in other vegetation communities (DoE 2015b). This TEC can be defined by the presence or absence of Sphagnum spp.. Bogs are found in permanently wet areas with a good supply of groundwater and an impeded drainage system. Under these conditions, decomposition of organic materials is incomplete, eventually forming peat that underlies the community (DEWHA 2008b). **Threats:** The main identified threats to the Alpine Sphagnum Bogs and Associated Fens community include: • fire; • exotic weed invasion; • grazing and trampling by non-native animals; • tourism; and • increase human infrastructure.
Criteria	**Discussion**
Reduce the extent of an ecological community	The Main Works will result in removal of 1.03 ha of the ecological community, representing less than 0.01% of the national extent of the community. An additional 6.93 ha of Alpine Sphagnum Bogs and Associated Fens is mapped within the groundwater drawdown area. This area may be subject to impacts arising from changes in hydrology, including changes in species composition, but is unlikely to be lost as a result of the proposed action. Alpine Sphagnum Bogs and Associate Fens have been recently affected by bushfires across the Kosciuszko National Park. It is estimated 33.87 ha of the community has been directly affect by the fires, representing 39.36% of the community recorded across the survey area. The removal of 1.03 ha of Alpine Sphagnum Bogs and Associated Fens will result in the reduction of 1.2% of mapped vegetation within the survey area. Whilst some areas of the project area are within non fire affected areas, majority of the project lies within fire mapped areas. It is unlikely the project will significantly reduce the extent of the ecological community, despite the reduction of the community due to fires. Large areas across the Plateau and Tantangara Dam region which were not mapped as fire affect areas, will not be directly impacted by the Main Works.
Fragment or increase fragmentation of an ecological community	The project area is located within the KNP, within an area of extensive native vegetation extending throughout the project area and across the region. The project area includes existing firetrails, tracks and the Snowy Mountains Highway. Alpine Sphagnum Bogs and Associated Fens occurs in small patches throughout the project area, adjacent to existing tracks and roads. Considering the existing roads create existing fragmentation, and the patchy nature of the community, it is unlikely the Main Works will increase any fragmentation already occurring.

Table K.1 Significant impact criteria assessment – Alpine Sphagnum Bogs and Associated Fens

Adversely affect habitat critical to the survival of an ecological community	Direct impacts to the Alpine Sphagnum Bogs and Associated Fens ecological community will result in the removal of 1.03 ha of vegetation. This represents approximately 0.01% of the national extent of the community. A further 6.93 ha of the community is mapped within the groundwater drawdown area and may be subject to impacts arising from changes in hydrology. The 6.93 ha that will be subject to drawdown represents 8% of the 86 ha mapped within the survey area, 0.08% of the mapped extent of the community in the Snowy Mountains (OEH 2012b) and 0.06% of the 11,100-ha mapped at a national scale (TSSC 2009). While there is a high risk of predicted impact to some portion of the community, as defined in Serov et al. (2012), the overall risk to the community and listed community is considered low. Recent fires to the region burnt approximately 40% of the mapped community within the survey area. The project will impact on some areas outside of mapped fire affected areas; however considering the small portion (0.01%) of the national extent will be removed, it is not likely the project will significantly affect habitat critical to the survival of the community with 52.18 ha of non-burnt vegetation remaining within the survey area.
Modify or destroy abiotic factors necessary for an ecological community's survival	The community is highly dependent on groundwater, forming part of a mosaic of alpine and subalpine communities with close hydrological and ecological connections. The Main Works project has the potential to cause indirect impacts to groundwater draw down. PCT 637, aligned with the ecological community, will experience a drawdown of >0.5 m to 6.93 ha of the community. These changes in hydrology have the capacity to impact on abiotic factors necessary for the community's survival, particularly through changing the anaerobic processes that assist formation of organic matter (peat). Although the project is likely to impact on groundwater within these areas of Alpine Sphagnum Bogs and Associated Fens, it is not likely the project will significantly impact the ecological community to the point of decline. A groundwater and GDE monitoring program will be implemented to ensure groundwater drawdown and associated impacts to GDEs are within prediction.
Cause a substantial change in the species composition of an occurrence of an ecological community	Species within the Alpine Sphagnum Bogs and Associated Fens ecological community area largely dependent of groundwater. There is some potential for a change in the species composition of the ecological community as a result of changes in hydrology. Vegetation composition of Alpine Sphagnum Bogs and Associated Fens will be monitored as a part of the GDE monitoring program. The Main Works also has the potential to increase or introduced weed species into the ecological community, where works are located adjacent to the community. Mitigation measures will be implemented to ensure the project does not cause a degradation or change in vegetation integrity. These measures include weed control prior to construction, washdown stations, hygiene protocols and a weed and pathogen monitoring program.

Table K.1 Significant impact criteria assessment – Alpine Sphagnum Bogs and Associated Fens

Cause a substantial reduction in the quality or integrity of the listed ecological community	Main Works will result in the reduction of 1.03 ha of the ecological community. The ecological community also has the potential of reduction in quality and integrity due to groundwater draw down. These areas include 6.93 ha of the community, 8% of the mapped extent across the survey area, 0.08% of the mapped extent of the community in the Snowy Mountains (OEH 2012b) and 0.06% of the 11,100-ha mapped at a national scale (TSSC 2009). The Main Works also has the potential to increase weeds and pathogens within the project area, ultimately affecting the quality of habitat for 4.41 ha of the community. Mitigation measures will be implemented to protect the community, these include: • weed control prior to construction works being undertaken, where possible; • appropriate disposal and management of weeds during clearing works; • active weed control within 50 m of key infrastructure in areas where significant weeds occur, such as Tantangara Reservoir; • construction of wash-down stations at a suitable location; • collection of native seed and alpine sod for propagation; and • implementation of a weed and pathogen monitoring program. Therefore, given the extent of the ecological community and the mitigation measures in place to protect the quantity and quality of remaining vegetation it is unlikely Main Works will result in a substantial reduction in quality of the listed community.
Interfere with the recovery of an ecological community	DoE (2015) identify multiple recovery objectives for the ecological community Alpine Sphagnum Bogs and Associated Fens. The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including pigs and deer). Mitigation measures such as washdown stations, weed control prior to construction, implementation of weed and pathogen monitoring program and a predator monitoring program will be completed to prevent the potential impacts. Based on the proposed mitigation measures, the Main Works will not interfere with the recovery actions listed for Alpine Sphagnum Bogs and Associated Fens.
Conclusion	The Main Works is unlikely to have a significant impact on the Alpine Sphagnum Bogs and Associated Fens as: • the project will result in direct impacts to 1.03 ha, representing less than 0.01% of the national extent of the community will be directly removed; • the project will result in indirect changes to 6.93 ha through changes in hydrology, representing 0.06% of the national distribution of the community; and • mitigation measures including hygiene protocols, a weed monitoring program and a groundwater and GDE monitoring program will be implemented to protect the community from any indirect impacts which may arise from the project.

K.2 Mauve Burr-daisy

Table K.2 Significant impact criteria assessment – Mauve Burr-daisy

Species profile	**Mauve Burr-daisy (*Calotis glandulosa*)** **Status:** Vulnerable (EPBC & BC Act) **Distribution:** The Mauve Burr-daisy is endemic to NSW and occurs on the Kosciuszko and Monaro regions, and is known from three sites in the upper Shoalhaven catchment (DEWHA 2008c, OEH 2018b). **Biology:** The Mauve Burr-daisy is a small branched herb growing to 35 cm high. Solitary flower heads are 2 cm wide, often white, mauve or blue with a yellow centre. Leaves are soft, bright green and hairy (OEH 2018b). **Habitat requirements:** The species grows in montane and subalpine grasslands, natural temperate grasslands dominated by Kangaroo Grass, and Snow Gum Woodlands. The species is known to colonise bare patches, often occurring on roadsides. **Threats:** The main threats associated with the Mauve Burr-daisy include: • loss and degradation of habitat and/or populations from road works, clearing of habitat for residential and agricultural developments, intensification of grazing regimes, invasion of weeds, and by horses; • potential encroachment and competition from invasive species such as Burgan (*Kunzea ericoides*) and Violet Kunzea (*Kunzea parvifolia*); • removal of species by pigs; and • cattle and sheep grazing (OEH 2018b).
Criteria	**Discussion**
Lead to a long-term decrease in the size of an important population	Important populations have not been defined for the Mauve Burr-daisy. However, given the 44,222 individuals recorded of the species resulting from surveys undertaken for Snowy 2.0 represent 98.9% of the national population of the species we conclude that the population of the species in KNP is considered an important population. The Mauve Burr-daisy is known to occur across the Kosciuszko and Monaro regions. Extensive surveys undertaken for Snowy 2.0 have resulted in a vast number of records across the project area and adjacent areas. Approximately 3,714 individuals were recorded within the Main Works disturbance footprint, out of a total of 44,222 individuals recorded across the broader survey area, with an additional 502 records of the species nationally. The species was recorded up north along Port Phillip track, throughout the Plateau and Tantangara and east towards Circuits trail. The species is known to occur within disturbed areas such as along tracks and heavily grazed pastures. This reflected the areas in which the species was recorded within throughout the project area. Main Works will result in the removal of approximately 3,714 individuals, representing approximately 8% of the national population of the species; however, this likely represents a serious underestimate given the results of surveys for Snowy 2.0. In addition, it is likely that the species will recolonise the edges of roads constructed as a part of Snowy2.0. Due to recent fires within Kosciuszko National Park 82.71 ha of Mauve Burr-daisy habitat has been burnt across the survey area, representing 54.9% of the recorded population within the survey area. The project area is largely restricted to burnt areas, with a small portion of the study area across the Plateau and adjacent to Tantangara Dam not mapped within fire affected areas. Given the extent of habitat and individuals remaining in the locality, the Main Works is unlikely to lead to a long-term decrease in the size of an important population.

Table K.2 Significant impact criteria assessment – Mauve Burr-daisy

Reduce the area of occupancy for an important population	The Main Works project will result in clearing of 7.80 ha of Mauve Burr-daisy habitat. The species has been recorded across the survey area, with suitable habitat mapped throughout the broader region. Considering the Main Works will result in the removal of approximately 8% of the population of Mauve Burr-daisy, it is unlikely Main Works will reduce the area of occupancy for an important population.
Fragment an existing important population into two or more populations	The Mauve Burr-daisy is known to occur along road edges and disturbed patches of vegetation and was recorded along existing tracks within the KNP. There are 44,222 individuals of the species across the survey area. Large areas of suitable habitat supporting the will remain undisturbed. Construction of the project will not result in fragmentation of this population. It is unlikely that the Main Works will result in additional fragmentation of an important population.
Adversely affect habitat critical to the survival of a species	Where feasible, existing tracks and roads will be used as part of the Project, resulting in the reduction of impact to adjacent vegetation. This has resulted in reduced impacts to Mauve Burr-daisy habitat. Suitable habitat will be removed throughout the project area. Larger patches of vegetation to be removed within Tantangara are restricted to the edge of Tantangara Reservoir. This area has been subject to extensive disturbance from invasive species such as horses and rabbits, as well as human activity. This vegetation is not considered suitable habitat for the species, with records limited to higher quality areas. The Main Works will result in the removal of 7.80 ha of Mauve Burr-daisy habitat. However, given the extent of the species and suitable habitat across the broader region, it unlikely the Main Works will adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	The Mauve Burr-daisy is pollinated by animals which disperse the sticky burrs to new sites. The KNP is home to a large diversity of fauna species throughout the park. The Main Works is not considered to significant impact these fauna species. No significant disruption to the breeding cycle of the important population of the species will result.
Modify, destroy, remove, isolate or decrease the availability habitat to the extent that the species is likely to decline	Main Works will result in the direct removal of 7.80 ha of Mauve Burr-daisy habitat. Indirect impacts may occur due to weed invasion and/or increase in the abundance of feral pigs. Controls have been implemented to minimise these impacts. Considering the large extent of suitable vegetation across the broader region, as evidenced by the results of surveys undertaken for Snowy 2.0, it is unlikely the Main Works will result in a significant decrease of availability of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Main Works has the potential to result in the introduction and spread of weed species. Known threats to the Mauve Burr-daisy include habitat degradation from invasion of weeds. Prior to construction, it is proposed weed controls will be implemented where possible. During the clearing works appropriate disposal and management of weeds will be implemented to stop the spread of existing weed species. Wash down stations will be constructed at suitable locations to stop the spread of weeds and introduction of new species. A weed and pathogen monitoring program will be implemented to ensure impacts arising from clearing are within prediction. Similarly, a pest and predator monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pest and predatory species. Based on the proposed mitigation measures it is not expected the Main Works will result in a significant increase of invasive species.
Introduce disease that may cause the species to decline	There are no known diseases associated with the Mauve Burr-daisy. A pest and predatory monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pests (including the pig), and impacts to threatened species remain within prediction. Wash-down stations will be constructed at suitable locations.
Interfere substantially with the recovery of the species	There is no Recovery Plan for the Mauve Burr-daisy.

Table K.2 Significant impact criteria assessment – Mauve Burr-daisy

Conclusion	The Main Works will not have a significant impact on the Mauve Burr-daisy as: • impacts will occur to a small portion of the population recorded as a part of surveys undertaken for Snowy 2.0, with large areas of suitable habitat remaining within KNP; • potential impacts arising from increase feral animal activity, weeds and pathogens will be managed through implementation of feral animal control programs, as well as strict hygiene protocols and weed management programs.

K.3 Clover Glycine

Table K.3 Significant impact criteria assessment – Clover Glycine

Species profile	**Clover Glycine (*Glycine latrobeana*)** **Status:** Vulnerable (EPBC Act), Critically Endangered (BC Act) **Distribution:** The Clover Glycine is endemic to south-eastern Australia, widely distributed from Port Pirie in South Australia, through much of Victoria to near Hobart in Tasmania. The species was recently discovered in Kosciuszko National Park. **Biology:** The Clover Glycine is a low-growing herb growing to only a few cm high, with classic clover leaves, split into three. The species has up to eight small purple flowers with dark brown seed pods (OEH 2018b). **Habitat requirements:** The species mainly occurs in grassland and grassy woodland habitats, less often in dry forests, and rarely in heathland. Populations within NSW often occur up to 1,300m ASL (OEH 2018c). **Threats:** The main threats associated with Clover Glycine are: • feral horse damage including the dispersion of weeds such as Ox-eye Daisy, leaving manure piles and feeding on plants; • competition with invasive species such as Ox-eye Daisy; • small population size increasing vulnerability to local extinction in NSW; • trampling and rooting caused by feral pigs; and • poor recruitment limiting the viability of the population (OEH 2018c).
Criteria	**Discussion**
Lead to a long-term decrease in the size of an important population	Important populations have not been defined for the Clover Glycine in the recovery plan. As described in DoE (2013b) an important population can include populations that are near the limit of the species range. A small population was only recently discovered within KNP (OEH 2018c). The population recorded within the survey area should be considered an important population, considering the limited extent of the species within the KNP. The largest sub-population was recorded to the east of the project area, including 637 individuals. This area was avoided during the design process, avoiding the majority of records. The estimated population of Clover Glycine is 7,000 plants (Carter & Sutter 2010) with 931 records nationally. During targeted surveys undertaken for Snowy 2.0, a population of 975 individuals was recorded across the survey area. Out of this population, approximately 10 individuals will be removed as part of the Main Works, representing 1% of the regional population of the specie and 0.5% of the estimated national population. Main Works has the potential for residual, indirect impacts including the introduction and/or increase of exotic weeds and invasive species (such as feral pigs). Mitigation measures such as hygiene protocols, washdown requirements, a weed and pathogen monitoring and a pest and predator program will be implemented to ensure Main Works does not result in a significant increase in numbers of invasive flora and fauna species. Recent fires within the survey area have resulted in the direct disturbance of 4.4% of Clover Glycine habitat. However, considering avoidance measures it is not considered Main Works will significantly impact on any important habitat for the species. With the implementation of the above mitigation measures and a threatened species monitoring program the impacts to the Clover Glycine will be greatly reduced. No-go zones will be applied to protect the remaining sub-populations. Considering the size of the subpopulation to the east of the project area it is unlikely the project will result in a long-term decrease in the size of an important population.

Table K.3 Significant impact criteria assessment – Clover Glycine

Reduce the area of occupancy for an important population	The Clover Glycine has been recorded within the eastern extent of the survey area including Alpine Creek Trail, Tantangara and Circuits Trail. Main Works will result in the direct removal of 0.57 ha of Clover Glycine habitat (10 individuals). This will result in the removal of approximately 0.1% of the estimated national population of the species. Large occupied areas in the region will remain unimpacted. The recorded population within KNP is considered an important population, therefore the Main Works will result in the reduction of area of occupancy for an important population. However, a significant sub-population to the east of the project area will be avoided.
Fragment an existing important population into two or more populations	The existing Clover Glycine population is separated into subpopulations by existing tracks and roads throughout the KNP. The Main Works will result in the removal of vegetation adjacent to Tantangara Dam and adjacent to Tantangara Road, where there is existing fragmentation occurring. It is unlikely this will be significantly exacerbated. Therefore, it is unlikely the Main Works will result in any additional fragmenting of an important population.
Adversely affect habitat critical to the survival of a species	The Clover Glycine has been recorded within the eastern extent of the project area around Tantangara Reservoir and Tantangara Road. Impacts in this locality will be, predominantly, within low condition vegetation adjacent to Tantangara Reservoir. These areas provide sub-optimal habitat for the Clover Glycine. The majority of records obtained during surveys for Snowy 2.0 were recorded to the east of the project area along Circuits Trail, in high condition vegetation. The Main Works project will result in the removal of 10 individuals (0.57 ha). The species has been recorded within PCT 303 - Black Sally grassy low woodland in valleys in the upper slopes sub-region of the NSW South Western Slopes Bioregion and western South Eastern Highlands Bioregion, PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion and PCT 1224 - Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion and PCT 1225 - Sub-alpine grasslands of valley floors, southern South Eastern Highlands Bioregion and Australian Alps Bioregion. Large areas of these communities will be directly impacted by Main Works, ultimately reducing potential habitat for the Clover Glycine. However, the largest occupied area recorded during surveys for Snowy 2.0 has been avoided through changes to the design of the project. Due to the recent fires within the KNP, 4.4% of recorded habitat for the Clover Glycine has been affected. Large sub-populations to the north and east of the project area near Tantangara Dam are not mapped within the fire affected areas. Considering the extent of the fire within the locality, these sub-populations will be important to the survival of the species. Detailed design process has avoided these areas and will therefore not be affected by the Main Works project. The Main Works will result in impacts to 1% of the regional population of the species. Large areas of suitable habitat will remain unimpacted. Therefore, it is not expected the Main Works will adversely affect habitat critical to the survival of the Clover Glycine.
Disrupt the breeding cycle of an important population	The Clover Glycine is known to be a self-pollinating species, as well as pollinated by bees (DoE 2019a). The Main Works is unlikely to impact on these pollinating mechanisms. Approximately 0.1% of the known population will be removed as a result of Main Works, with remaining populations remaining unimpacted. Sub-populations within Circuits Trail and Alpine Creek Trail will not be impacted by Main Works, subsequently the breeding of these self-pollinating sub-populations will not be impacted.
Modify, destroy, remove, isolate or decrease the availability habitat to the extent that the species is likely to decline	Main Works will result in the direct removal of 0.57 ha of Clover Glycine habitat. This represents a small portion (<1%) of the available habitat for the species in the region. Indirect impacts may occur due to weed invasion and/or increase in the abundance of feral pigs. Controls such as construction of wash-down stations, weed control prior to construction and appropriate disposal and management of weeds during clearing works will be implemented. Additionally, a weed and pathogen monitoring program and a feral species monitoring program will be implemented to ensure Main Works does not result in a significant increase in weeds or pest species. The Main Works will remove Clover Glycine habitat and reduce the availability of habitat within the project area likely to cause a decline in the species population. However, given the extent of the species across the region, it is unlikely the Main Works will result in a signification decline in the total population of the Clover Glycine.

Table K.3 Significant impact criteria assessment – Clover Glycine

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Main Works has the potential to result in the introduction and spread of weed species. Known threats to the Clover Glycine include the competition of Ox-eye daisy and trampling by pigs. Prior to construction, it is proposed weed controls will be implemented where possible. During the clearing works appropriate disposal and management of weeds will be implemented to stop the spread of existing weed species. Wash down stations will be constructed at suitable locations to stop the spread of weeds and introduction of new species. A weed and pathogen monitoring program will be implemented to ensure impacts arising from clearing are within prediction. Based on the proposed mitigation measures it is not expected the Main Works will result in an increase of invasive species.
Introduce disease that may cause the species to decline	Whilst disease is not recognised as a threat to the Clover Glycine, introduction of *Phytophthora cinnamomi* could result in "dieback" and impacts to habitat. The construction of wash-down stations required for weeds as well as *P. cinnamomi* will be provided during construction activities. A weed and pathogen monitoring program will be implemented to ensure Main Works does not result in the increase or introduction of weeds and pathogens. Based on the proposed mitigation measures, it is unlikely the Main Works will result in the introduction of *P. cinnamomi*.
Interfere substantially with the recovery of the species	Carter and Sutter (2010) identify multiple recovery objectives for the Clover Glycine. The Main Works has the potential to result in the introduction and spread of weed species. Mitigation measures such as washdown stations, weed control prior to construction and implementation of weed and pathogen monitoring program. Based on the proposed mitigation measures, the Main Works will not interfere with the recovery actions listed for the Clover Glycine.
Conclusion	The Clover Glycine was recently discovered within KNP, with limited known records prior to targeted surveys. It is not considered the project will have a significant impact on the entire species as: • Main Works will directly impact on 1% of the regional population and 0.1% of the estimated national population; and • potential impacts arising from increase feral animal activity, weeds and pathogens will be managed through implementation of feral animal control programs, as well as strict hygiene protocols and weed management programs.

K.4 White-throated Needletail

Table K.4 Significant impact criteria assessment – White-throated Needletail

Species profile	**White-throated Needletail (*Hirundapus caudacutus*)** **Status:** Vulnerable & Migratory (EPBC) **Distribution:** The White-throated Needletail is widespread in eastern and south-eastern Australia, and only occurring as vagrants in the Northern Territory and Western Australia (TSSC 2019). The species breeds in Asia and is recorded passing through eastern China, the Korean Peninsula and Japan (DoE 2020b). Most White-throated Needletails are known to spend the non-breeding season in Australasia (DoE 2020b). **Biology:** The White-throated Needletail is a large swift with long curved pointed wings and white markings. Adults have a dark-olive head and neck, with juveniles similar in appearance (TSSC 2019). Their tail is short and square, with a white undertail. The underwing is black brown with glossy grey-brown flight feathers and the bill is black (TSSC 2019). **Breeding:** The White-throated Needletail does not breed in Australia (DoE 2020b). **Habitat Requirements:** Within Australia, the White-throated Needletail is almost exclusively aerial. Although they occur over most types of habitat, they are most often recorded over wooded areas and in coastal areas they are sometimes seen flying over sandy beaches or mudflats (DoE 2020b). The species almost always forages aerially within Australia, at heights up to 'cloud level'. The species has been recorded roosting in dense foliage or hollows of trees within forests and woodland (DoE 2020b). **Threats:** There are few known threats associated with the White-throated Needletail in Australia. Collision with overhead wires, windows and lighthouses only affects a few individuals and is not known as a threat to the species overall (DoE 2020b).
Criteria	**Discussion**
Lead to a long-term decrease in the size of an important population	An important population has not been defined for the White-throated Needletail. The population within KNP is not considered an important population considering it was only recorded three times flying over the eastern extent of the survey area and no records of the species roosting. Considering the species was only recorded aerially, it is unlikely Main Works will lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy for an important population	Snowy 2.0 Main Works will not result in any reduction of area of occupancy for the White-throated Needletail as the species is only considered to occur aerially.
Fragment an existing important population into two or more populations	The Main Works project is unlikely to fragment an existing important population of the White-throated Needletail considering the species is likely to occur aerially within the study area.
Adversely affect habitat critical to the survival of a species	The White-throated Needletail was only recorded on three separate occasions flying over the project area. The species was not recorded roosting or foraging within the Main Works survey area. Therefore, the Main Works disturbance footprint is not considered to have habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	The White-throated Needletail breeding range is confined to Asia, therefore the Main Works will not impact on the species breeding cycle.

Table K.4 Significant impact criteria assessment – White-throated Needletail

Modify, destroy, remove, isolate or decrease the availability habitat to the extent that the species is likely to decline	The Main Works will result in the removal of native vegetation. However, it is considered unlikely to impact availability of habitat for the species to roost in within the locality such that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral cats, foxes and feral pigs). Prior to construction activities weed control will be undertaken. Appropriate disposal and management of weeds during the clearing works will be implemented to prevent the dispersal of seeds. Washdown stations will be constructed and will be required for weeds and well as *P.cimmamomi*. additionally, a weed and pathogen monitoring program will be implemented. During construction period, waste will be stored appropriated in inaccessible bins and disposed off-site, preventing an increase in feral animals. A pest and predator monitoring program will also be implanted to ensure Main Works does not result in a significant increase in numbers of pest and predatory species. Based on the above mitigations, it is unlikely the Main Works will result in invasive species becoming established.
Introduce disease that may cause the species to decline	There are no known diseases associated with the White-throated Needletail.
Interfere substantially with the recovery of the species	There is no Recovery Plan for the White-throated Needletail.
Conclusion	The Main Works will not have a significant impact on the White-throated Needletail as: • the species was only recorded aerially over the disturbance footprint, and is considered a low likelihood of roosting within the footprint.

K.5 Broad-toothed Rat

Table K.5 Significant impact criteria assessment – Broad-toothed Rat

Species profile	**Broad-toothed Rat (*Mastacomys fuscus mordicus*)** **Status:** Vulnerable (EPBC & BC Act) **Distribution:** The species has a highly fragmented distribution, with scattered records from Victoria, ACT and NSW (TSSC 2016b). Within NSW the species occurs in the wet alpine and subalpine heaths and woodlands in Kosciuszko National Park, adjacent Nature reserves and State Forests in the south of the state, and on the Barrington Tops (OEH 2017c). **Biology:** The Broad-toothed Rat is a small, tubby rodent with brown fine fur above and paler grey underneath. They have small, round ears with tufts of hair inside. It's head and body length is 14-17 cm and a tail length of 10-13 cm. Home ranges vary seasonally, between 0.1 ha to 0.3 ha. The species is herbivorous, with grasses forming most of its diet. The Broad-toothed Rat is mostly nocturnal, fathering is food at night (OEH 2017c). **Breeding:** Breeding is seasonal, with females giving birth to one or two litters (of 1-4 young) per season between October and March (TSSC 2016). Sexual maturity is reached between 6-12 months. **Habitat Requirements:** The Broad-toothed Rat lives in a complex of runways through dense vegetation of wet grass, sedge and heath environments, and under now in winter. Sheltering nests or grass are built in understory or under logs. In winter they huddle together in nests for warmth (OEH 2017c). **Threats:** The main threats associated with the Broad-toothed Rat are: • predation by feral cats; • habitat loss, fragmentation and degradation from roads, ski runs, buildings, horses and feral pigs; • human killings due to misidentification for vermin; • catastrophic fire events, including localised extinctions due to hazard reduction burning; • grazing by stock, rabbits and hares causing elimination of grass cover and trampling by stock; • invasion of habitat by exotic weeds such as Scotch broom (*Cytisus scoparius*) and Blackberry; • global warming causing loss of snow cover rsulting in increased exposure to pest species in alpine areas; • competition for food from feral pigs; • predation by European red foxes; • damage from recreational activities; and • lack of distribution information (OEH 2017c).

Table K.5 Significant impact criteria assessment – Broad-toothed Rat

Lead to a long-term decrease in the size of an important population	An important population has not been defined for the Broad-toothed Rat. The population within KNP is considered an important population considering it is the largest national population of the species, occurs over a large relatively unfragmented area and would be considered important for breeding and dispersal as well as maintaining genetic diversity. The Main Works project will result in clearing of 61.47 ha of habitat for the Broad-toothed Rat. The species estimated area of occupancy 444 km^2 (TSSC 2016b), Therefore the area of impact represents 0.1% of the estimated area of occupancy for the species at a national scale. The Broad-toothed Rat was recorded occurs in areas of Alpine bogs and fens and sub-alpine wet grasslands, as well as adjacent areas of sub-alpine dry grasslands with a dense midstorey. These communities occur over extensive areas within KNP. The Main Works has the potential to result in residual, indirect impacts such as the introduction or increase in exotic weeds. This could potentially lead to habitat degradation. Weed control prior to construction works will be undertaken. Appropriate disposal and management of weeds during the clearing works will be implemented to minimise any seed dispersal. Washdown stations will be constructed at suitable locations to prevent the further spread of weeds. Additionally, a weed and pathogen monitoring program will be implemented. Invasive species such as the European red fox predate on the Broad-toothed Rat, while wild horses degrade habitat and disturb the species. Waste will be appropriately disposed of to minimise the risk of increasing feral animals. A pest and predator monitoring program will be implemented to ensure the Main Works will not result in signification increase in numbers of pest and predatory species. Snowy 2.0 Main Works will result in impacts to 61.47 ha of habitat, representing 0.1% of the estimated area of occupancy for the species at a national scale. Therefore, the Main Works is unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy for an important population	Recent fires that affected the KNP have resulted in the disturbance of 886.90 ha of Broad-toothed Rat habitat within the survey area. This equates to approximately 34% of burnt habitat. Snowy 2.0 Main Works will result in direct impact to 61.47 ha of habitat for the species. Given the extent of habitat remaining within the locality that has not been impacted by fires, it is unlikely the Main Works will significantly reduce the area of occupancy for an important population.
Fragment an existing important population into two or more populations	In the area occupied by the Broad-toothed Rat, impacts will occur. largely, adjacent to areas of existing disturbance. The key construction area in this region will be adjacent to Tantangara Reservoir, resulting in no additional fragmentation at this location. The area in KNP is slightly fragmented by existing tracks and roads throughout the Park. However, it is considered unlikely that this is impacting of connectivity of the species. Wherever feasible, works have been sited to utilise this existing network of roads. Given the above, it is unlikely the Main Works will result in any additional fragmenting of an important population.
Adversely affect habitat critical to the survival of a species	The Main Works project will result in clearing of 61.47 ha of habitat for the Broad-toothed Rat. The Broad-toothed Rat was recorded throughout the project area, spanning from Link Road, across the Plateau, Tantangara and up to Port Phillip Track. The species is well known within the KNP, with suitable dense grassy and Alpine bog and fen vegetation throughout the region. The Main Works also has the potential for indirect impacts such as introduction/increase in weeds and pathogens and increase in predatory and pest species. Threats to the Broad-toothed Rat include predation by these feral species. To ensure the Main Works does not result in a significant increase in numbers of pest and predatory species, mitigation measures will be implemented. These include waste to be stored appropriated in inaccessible bins and disposed off-site and the implementation of a pest and predator monitoring program. Additionally, to ensure the project does not result in habitat degradation due to the increase of exotic weeds, the construction of wash-down stations, appropriate hygiene protocols and a weed and pathogen monitoring program will be implemented. Due to recent fires within the KNP, 34% of recorded habitat for the Broad-toothed Rat has been affected. Areas not mapped within fire affected areas include the plateau and Tantangara Dam. These areas contain suitable habitat for the Broad-toothed Rat. However, give the extent of the species across NSW it is unlikely the removal of vegetation within these unburnt areas will adversely affect habitat critical to the survival of the species.

Table K.5 Significant impact criteria assessment – Broad-toothed Rat

Disrupt the breeding cycle of an important population	The Broad-toothed Rat breeds during spring and summer, with a gestation period of 35 days (Hyett & Shaw 1980). Breeding is seasonal, with females giving birth to one or two litters per season (TSSC 2016). Snowy 2.0 Main Works will not fragment an existing population and will impacts on a small portion of the regional and national area of habitat for the species. Given this, the proposed action will not disrupt the breeding cycle of the species.
Modify, destroy, remove, isolate or decrease the availability habitat to the extent that the species is likely to decline	The project will result in removal of 61.47 ha of habitat for the species. There is potential for the Main Works to further reduce the quality of retained habitat due to the increase of exotic weeds or the introduction of pathogens. A number of mitigation measures will be implemented to ensure the habitat quality is maintained. This includes construction of washdown stations, active weed control and implementation of a weed and pathogen monitoring program. Additionally, after construction all areas not retained for permanent infrastructure will be revegetated and rehabilitated. This will include collection of native seed and alpine sod for propagation. Based on the above mitigation measures, proposed rehabilitation areas and extensive suitable habitat within the locality, it is not expected the Main Works will result in a loss or habitat availability to the extent the species declines.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral cats, foxes and feral pigs). Prior to construction activities weed control will be undertaken. Appropriate disposal and management of weeds during the clearing works will be implemented to prevent the dispersal of seeds. Washdown stations will be constructed and will be required for weeds and well as *P.cimmamomi*. additionally, a weed and pathogen monitoring program will be implemented. During construction period, waste will be stored appropriated in inaccessible bins and disposed off-site, preventing an increase in feral animals. A pest and predator monitoring program will also be implanted to ensure Main Works does not result in a significant increase in numbers of pest and predatory species. Based on the above mitigations, it is unlikely the Main Works will result in invasive species becoming established.
Introduce disease that may cause the species to decline	*Phytophthora cinnamomi* is a recognised threat to the Broad-toothed Rat, that can affect habitat. By the transportation of machinery, vehicles and people there is potential they may carry soil which contains the mould. Mitigation measures including strict hygiene protocols and washdown stations before entering the KNP will be implement. A Weed and pathogen monitoring program will be implemented to assess for the presence of P.*cimmamomi*.
Interfere substantially with the recovery of the species	There is no Recovery Plan for the Broad-toothed Rat.
Conclusion	The Main Works will not have a significant impact on the Broad-toothed Rat as: • 61.47 ha of habitat will be removed, representing 0.1% of the national area of occupancy for the species; • the species is known to occur throughout the locality, with large areas of suitable high-quality vegetation remaining; and • potential impacts arising from increase feral animal activity, weeds and pathogens will be managed through implementation of feral animal control programs, as well as strict hygiene protocols and weed management programs.

K.6 Smoky Mouse

Table K.6 Significant impact criteria assessment – Smoky Mouse

Species profile	**Smoky Mouse (*Pseudomys fumeus*)** **Status:** Critically Endangered (EPBC Act), Endangered (BC Act) **Distribution:** The Smoky Mouse is endemic to mainland south-eastern Australia, where it occurs in Victoria, New South Wales and the Australian Capital Territory. The species has a relatively wide but disjunct distribution, populations are small and fragmented, and there appear to have been local extinctions in several areas. It occurs in four IBRA regions (South East Highlands, South East Corner, Australian Alps and Victorian Midlands). Capture sites range from near sea level to at least 1,800 m altitude (Menkhorst and Broome 2008a, 2008b). KNP has a known population of Smoky Mouse, with records from Yarrangobilly to the north-east and Happy Jacks to the south. Within this range, populations are fragmented and generally low in number, but can fluctuate in size. There is also evidence of apparent local extinctions. While records in new areas are still being obtained, the apparent instability of Smoky Mouse populations is of concern (Menkhorst and Broome 2008a, 2008b). **Biology:** The Smoky Mouse is similar in size to a small rat, with a head and body length averaging about 90 mm and a tail averaging 140 mm (OEH 2018d). The Smoky Mouse is primarily herbivorous but also consumes invertebrates, with diet varying seasonally according to food availability and energetic demands. At the summit of Mt William, Cockburn (1981a) found that the fruiting bodies of underground fungi predominated in the diet in winter and early spring, with a small proportion of seeds and soil invertebrates. There was a sudden switch to flowers, seeds and Bogong Moths *Agrostis infusa* in late spring–early summer, while seeds predominated through summer and autumn (Menkhorst and Broome 2008a, 2008b). Males have been surveyed as transient moving between sub-populations in search of mates (Ford et al. 2003). Long-term survival of the population may therefore be contingent on recruitment and immigration between habitat patches, and the regional dynamics of resource availability (Harrison 1994). A characteristic of Smoky Mouse colonies is their ephemeral nature, both spatially and temporally. There are numerous examples of unsuccessful attempts to locate the species at sites where it had been found only a few months previously (eg. Lawrence 1986; Lintermans 1988; Ford et al. 2003; DECC, FNSW unpublished data). This may be due to shifts in home range following fluctuations in resource availability due to climatic fluctuations, or to differences in trappability, or, in the longer-term, to vegetation succession. **Breeding:** Smoky Mice occurs in small discrete colonies based around patches of dense heath. They sheltered in small groups, sometimes comprising a male and up to five breeding females, in a large, complex burrow system that can be up to 10 m2 and more than 25m in length, with multiple nesting chambers (Ford et al. 2003; Woods & Ford 2000; Ford in prep.). Breeding occurred from September–April, and 1–2 litters, each of 3–4 young, were produced after a gestation period of about 30 days (Menkhorst and Broome 2008a, 2008b).

Table K.6 Significant impact criteria assessment – Smoky Mouse

	Habitat Requirements: The precise habitat requirements of the Smoky Mouse are not clear. A wide range of vegetation communities are occupied, from damp coastal heath in East Gippsland, to sub-alpine heath. A characteristic of Smoky Mouse localities, except those in wet gullies, is a floristically diverse shrub layer with members of the plant families Epacridaceae, Fabaceae and Mimosaceae well represented (Menkhorst and Broome 2008a, 2008b). Habitat types the Smoky Mouse has been recorded in include coastal heath to dry ridgeline forest, sub-alpine heath and, occasionally, wetter gullies (Menkhorst and Seebeck 1981). Ground cover is also likely to be critical and can be in the form of dense low vegetation, such as occurs in heaths, or grass tussocks, rocks and logs in more open habitats. Soil conditions also need to be conducive to burrowing and growth of hypogeal fungi, a major component of the diet (Menkhorst and Broome 2008a, 2008b). **Threats:** The main threats associated with the Smoky Mouse are: • loss of habitat, primarily through timber harvesting and road construction; • too frequent burning; • predation from feral cats, foxes, and domestic cats and dogs; • dieback caused by *Phytophthora cinnamomic*; • uncertainty about the species' density and distribution; • reduction of food resources and shrub cover due to feral herbivore grazing; • loss of site occupancy/low recruitment leading to metapopulation collapse; and • senescing of understorey vegetation on long unburnt sites.
Criteria	**Discussion**
Lead to a long-term decrease in size of a population	Initial surveys undertaken in 2017/18 identified a Smoky Mouse population occurring in the southern portion of the Exploratory Works survey area, along the upper sections of Lobs Hole Ravine Road, with the species recorded at 12 locations. Regional surveys undertaken in 2018/19 have identified the species across a broad area above 1,100 m, from Coppermine Firetrail in the north, Wallace's Creek Firetrail in the east, Link Road in the south and the Elliott Way ion the west. In November 2020 a new potential record of Smoky Mouse was recorded on a remote camera along Alpine Creek Fire Trail. This record has extended the existing population distribution from west of the Snowy Mountains Highway to include the connected patch of vegetation to the south west of Alpine Creek Fire Trail. The species is now known from 78 locations. This population is considered significant, being one of the largest known populations of the species. Original surveys found the species to be solely associated with PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion. Subsequent surveys have identified the species as being associated with six additional PCTs: • PCT 300 –Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment (single record); • PCT 639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record); • PCT643 – Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion (single record); • PCT 644 –Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion (five records); • PCT 729 – Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion (two records); and • PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record).

Table K.6 Significant impact criteria assessment – Smoky Mouse

	The species was found above 1,100m ASL, although it is noted that regional surveys did not include locations below this elevation. However, surveys for Snowy 2.0 have included locations below this elevation. Despite this, associations with elevation remain unclear. All records are all along the upper sections of a north-south ridge. Vegetation consist of tall forests dominated by Mountain Gum and Snow Gum, with some other associated species. There is generally a moderate to dense shrubby midstorey with varying abundance of shrubs from the plant family *Fabaceae* (with some *Epacridaceae* and *Mimosaceae*), and dense groundcover with abundant sub-shrubs, logs and leaf litter. This type of microhabitat is believed to be preferred by the species to take refuge from predators. Main Works will result in direct impacts to 84.29 ha of habitat for the species. Indirect impacts also have potential to occur as a result of Main Works due to an increase in feral animal predation. As a result of increased disturbances in local area there is potential for feral animal numbers to increase. The feral cat and European fox are recognised threats to Smoky Mouse. A pest and predatory monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pest and predatory species. Additionally, Main Works has the potential for indirect impacts from fragmentation, fauna vehicle collisions, weeds and pathogens to further impact this species if unmitigated. Placement of speed restrictions on key roads and implementation of monitoring programs such as threatened species, and weeds and pathogens. Recent fires to the KNP have impacted approximately 1,593 ha of Smoky Mouse habitat within the survey area. This equates to approximately 90% of Smoky Mouse habitat within the survey area burnt. All vegetation within the study area to the west of the Snowy Mountains Highway has been impacted by the fires. A small portion of habitat alone Alpine Creek Fire Trail is not mapped as recently burnt, however mapping was completed with imagery from the 8 January 2020. Impacts to Smoky Mouse habitat are li limited within this area, with removal of vegetation adjacent to existing tracks. Although the Main Works will impact the species it is unlikely it will lead to a long-term decrease in size of a population given the large area of available habitat in the region.

Table K.6 Significant impact criteria assessment – Smoky Mouse

Reduce the area of occupancy for the species	The Smoky Mouse population has been recorded across the region, over an estimated 6,000 to 7,000 ha. In these areas, the species has been recorded across seven PCTs: • PCT 300 –Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment (single record); • PCT 639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record); • PCT 643 – Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion (single record); • PCT 644 –Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion (five records); • PCT 729 – Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion (two records); • PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record); and • PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (19 records). This is a large tract of sub-alpine forest which provides suitable habitat for the species and supports Smoky Mouse populations. Recent fires within the KNP have significantly reduced the habitat of the Smoky Mouse. Approximately 90% of Smoky Mouse habitat within the survey area has been impacted by fires. The majority of Smoky Mouse habitat to be impacted by the Main Works is within fire impacted areas. A small portion of habitat remains along Alpine Creek Fire Trail. This vegetation is on the edge of the fire mapped areas and is likely to have been indirectly impacted by the fires. The direct impact to 84.29 ha of habitat for the species, representing less than 2% of the available habitat in the region. Main Works will largely impact fire affected areas of Smoky Mouse habitat. However, considering there is some potential for Smoky Mouse habitat to remain along Alpine Creek Fire Trail, the impact to habitat within this section is limited and will not have a significant impact on the species.
Fragment an existing population into two or more populations	The Smoky Mouse population has been recorded across a broad area within the region, over an estimated 6,000 to 7,000 ha. The species was recorded to the west and east of Lobs Hole Ravine Road and across the Marica area. The vegetation within this area is largely intact, spreading south to Lobs Hole Ravine and north towards Coppermine Firetrail. Access tracks will be constructed within Marica, with some clearing of vegetation spanning over 300 m wide. This has the potential to fragment Smoky Mouse recorded to the north of the disturbance footprint at Marica. The Smoky Mouse was also recorded within the vegetation along Alpine Creek Fire Trail. This area has already been subject to fragmentation due to existing tracks. Therefore, it is unlikely the Main Works will further fragment the existing population. Mitigation measures to avoid and reduce vehicles strike on Smoky Mouse will be implemented to ensure their safe movement across the road including avoiding and minimising vehicle movements at night and reducing speed limits.

Table K.6 Significant impact criteria assessment – Smoky Mouse

Adversely affect habitat critical to survival of a species	Primary habitat for the Smoky Mouse is located on upper ridgelines and slopes above 1,100m, within the following vegetation communities: • PCT 300 –Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment (single record); • PCT 639 - Alpine Ash - Snow Gum shrubby tall open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record); • PCT 643 – Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps Bioregion (single record); • PCT 644 –Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion (five records); • PCT 729 – Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion (two records); • PCT 953 - Mountain Gum - Snow Gum - Broad-leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion (single record); and • PCT 1196 - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (19 records). Main Works will result in clearing of 84.29 ha of Smoky Mouse habitat. Although the Main Works includes minimisation and mitigation measures, the project will result in a large direct impact to habitat critical to the survival of the Smoky Mouse. There are limited known populations of the Smoky Mouse. The population record within the Main Works is a critical population for the survival of the species.
Disrupt breeding cycle of a population	Smoky Mouse occur in small discrete colonies based around patches of dense heath. They shelter in small groups, sometimes comprising a male and up to five breeding females, in a large, complex burrow system that can be up to 10 m2 and more than 25m in length, with multiple nesting chambers (Ford et al. 2003; Woods & Ford 2000). Breeding occurs from September–April (Menkhorst, P. and Broome, L. 2006). Given the observed presence of males and females, the survey area is likely to support a breeding population of the Smoky Mouse. The project will result in direct impacts to 84.29 ha of suitable habitat, with potential for additional indirect impacts through weed invasion, increased predation from Cats and Foxes and fragmentation. Mitigation measures will be implemented to reduce the impacts of weeds and predators on the species. Given the willingness of the species to cross roads such as Link Road (G.Madani pers. obs.) it is unlikely the access roads proposed will result in fragmentation of this breeding population, and prevent dispersal or other breeding activities. A threatened species monitoring program will be implemented to ensure impacts arising from the project are within prediction. Given the above, it is unlikely that the proposed action will disrupt the breeding cycle of this population of the species.

Table K.6 Significant impact criteria assessment – Smoky Mouse

Modify, destroy, remove, isolate or degrade habitat to the extent that the species is likely to decline	Main Works will result in the removal of 84.29 ha of Smoky Mouse habitat. These areas to be removed are dispersed across the project area and are not likely to significant impact on the species by fragmenting their population. The majority of impacts will occur as a result of the construction of access roads. Wherever feasible, existing roads have been upgraded, with new roads limited to the area between Marica and Lobs Hole. The Marica area will also be a focus for construction of the ventilation shaft, surge shaft yard, accommodation camp and stockpile areas, resulting in a large area of impact. Despite this, area to the east and west will not be fragmented other than by access roads. Given the willingness of the species to cross roads such as Link Road (G.Madani pers. obs.) it is unlikely the access roads proposed will result in fragmentation of habitat for the species. Controls will be put in place to minimise fauna vehicle strike. There is also potential for Main Works to reduce the quality of habitat, as a result of increased weed abundance or introduction of pathogens. A number of mitigation measures, including weed control prior to construction, construction of washdown stations and implementation of a weed and pathogen monitoring program will ensure habitat quality is maintained including hygiene protocols to prevent introduction of weeds, the spread of weeds or the spread of pathogens. There is potential for the project to result in removal and degradation of habitat, with 84.29 ha of habitat to be directly impacted. Despite this, large areas of suitable habitat will remain, and it is unlikely that the species will decline as a result of the proposed works.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral cats, foxes and feral pigs). Weed control will be undertaken prior to construction works, where possible. Washdown stations will be constructed at suitable locations with hygiene protocols implemented to ensure weeds are not brought in with vehicles, machinery or by foot. Additionally, a weed and pathogen monitoring program will be implemented. A feral animal control program will be implemented during the construction and operational phases to minimise impacts of feral animals on wildlife. Waste will be stored appropriately in inaccessible bins and disposed off-set. Based on the mitigation measures outlined above, it is not expected that Main Works will result in introduction of any disease that will case the species to decline. However, the effectiveness of these mitigation measures cannot be quantified.
Introduce disease that may cause the species to decline	A recognised threat to Smoky Mouse is dieback of susceptible heath species caused by *Phytophthora cinnamomi.* The fungus is a soil-borne water mould that produces an infection which causes a condition in plants called "root rot" or "dieback". It is a threat in some areas due to the substantial habitat changes that result in infected patches of vegetation. By bringing in vehicles, machinery and people there is potential they may carry soil which contains the mould. Mitigation measures including strict hygiene protocols to disinfect footwear, machinery and vehicles before entering the KNP and works areas will be implemented. Monitoring will occur during construction and operational phases to assess for the presence of the *P.cinnamomi* in susceptible vegetation communities. No introduction of soil is proposed to minimise any chances of introducing diseases. Based on the mitigation measures outlined above, it is not expected that Main Works will result in introduction of any disease that will case the species to decline. However, the effectiveness of these mitigation measures cannot be quantified.

Table K.6 Significant impact criteria assessment – Smoky Mouse

Interfere with the recovery of the species	Main Works is not expected to interfere with the recovery of the Smoky Mouse. A population has been recorded in the project area, and habitats are in good condition. Clearing of 84.29 ha of Smoky Mouse habitat will result from Main Works. The extent of the regional population is in the order of 6,000 ha to 7,000 ha of available habitat. There is potential for impacts to Smoky Mouse populations from vehicle strike. The Main Works will result in an increase in vehicles and trucks using the access road, therefore increasing risk of Smoky Mouse population decline. Impacts from vehicle strike are more likely to occur at night as the species is nocturnal and during breeding season when males are more transitory. Proposed mitigation measures to address vehicle strike including placement of speed restrictions on key roads to minimise potential for fauna vehicle strike. Indirect impacts also have potential to occur as a result of Main Works due to an increase in feral animal predation. As a result of increased disturbances in local area there is potential for feral animal numbers to increase. The feral Cat and European Fox are recognised threats to Smoky Mouse. Therefore a feral animal monitoring and control program will be implemented.
Conclusion	The Main Works is considered likely to have a significant impact on the Smoky Mouse as: • although 84.29 ha (1.4%) of an estimated 6,000 – 7,000 ha of habitat will be removed, this area represents the largest extant population of the species known; • there is potential for indirect impacts to occur, including increase predation and spread of *P.cinnamomi*; and • this area is likely to be critical to the survival of the species.

K.7 Spotted-tailed Quoll

Table K.7 Significant impact criteria assessment – Spotted-tailed Quoll

Species profile	**Spotted-tailed Quoll (*Dasyurus maculatus*)** **Status:** Endangered (EPBC Act), Vulnerable (BC Act) **Distribution:** The Spotted-tailed Quoll's distribution has reduced significantly since European settlement. The species is now found in eastern NSW, eastern Victoria, south-east and north-east Queensland, and Tasmania. DELWP (2016) identifies the Spotted-tail Quoll population in KNP as an important population as the area is a stronghold for the species and important for research. **Biology:** The Spotted-tailed Quoll is one of Australia's largest extant marsupial carnivores, and has a distinctive spotted appearance. It's larger size and spotted tail distinguish it from other quoll species. Males can grow to 1.3 m in length, whilst females are generally smaller growing to about 85 cm in length. The average lifespan is relative short, estimating between three to five years (DELWP 2016). The carnivorous species hunts on the ground and in trees, consuming a variety of prey including gliders, possums, small wallabies, rats, birds, rabbits, reptiles and invertebrates (OEH 2017c). **Breeding:** Breeding does not always occur in successive years, however most females produce a litter annually. The average litter size is five young with both sexes maturing at about one year of age (OHE 2017c). **Habitat Requirements:** The species is primarily forest-dependent, and occupies a wide range of habitat types, including rainforest, wet and dry sclerophyll forest, coastal heathland, scrub and dunes, woodland, heathy woodland, swamp forest, mangroves, on beaches and sometimes in grassland or pastoral areas adjacent to forested areas. Individuals use hollow-bearing trees, fallen logs, small caves, rocky outcrops and cliff faces as den sites. The species has home ranges of several hundred to several thousand hectares in size and will use multiple dens, moving between den sites every 1-4 days. The species occurs at low densities (DELWP 2016, DEWHA 2009a, DSE 2011a). **Threats:** The main threats facing the Spotted-tailed Quoll include: • loss, fragmentation and degradation of habitat; • competition with introduced predators such as cats and foxes; • deliberate poisoning, shooting and trapping, primarily in response to chicken predation; • roadkill; and • poisoning from eating cane toads in the wild (OEH 2017c).
Criteria	**Discussion**
Lead to a long-term decrease in size of a population	Main Works will result in clearing of 335.22 ha of Spotted-tailed Quoll habitat. Large areas of suitable habitat will remain in the locality. Indirect impacts also have potential to occur as a result of Main Works including an increase in feral animal predation as a result of increased disturbances. The feral cat and dog, and European fox are recognised threats to Spotted-tailed Quoll. A pest and predatory monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of feral animals. Given the greater extent of habitat remaining in the locality, and distribution of the species, it is unlikely Main Works will lead to a long-term decrease in the size of an important population.

Table K.7 Significant impact criteria assessment – Spotted-tailed Quoll

Reduce the area of occupancy for the species	The Main Works will result in clearing of 335.22 ha of Spotted-tailed Quoll habitat. The Spotted-tailed Quoll has large home ranges of several hundred to several thousand hectares in size in which the species occurs at low densities (DELWP 2016b, DEWHA 2009a, DSE 2011a). In the locality, the species is likely to be wide ranging, with the Main Works area forming a small part of a much larger home range. A significant amount of Spotted-tailed Quoll habitat has been impacted by the recent fires; with all vegetation west of the Snowy Mountain Highway impacted and across the southern extent of the Plateau and Tantangara. An estimated 4,601 ha of Spotted-tailed Quoll habitat has been affected by the fires, representing 65% of habitat within the survey area. Main Works will result in the loss of 335.22 ha of habitat for this species. However, given the large home range of this species and the extensive areas of habitat for the important population spread across KNP, the impact arising from Main Works will not result in a detectable decrease in the area of occupancy for the important population.
Fragment an existing population into two or more populations	Main Works will result in fragmentation of habitat within Lobs Hole and spreading east to the Snowy Mountains Highway. All areas not retained for permanent infrastructure will be revegetated and rehabilitated following the construction of Snowy 2.0 Main Works. This will result in large patches of vegetation providing connection across the project area.
Adversely affect habitat critical to survival of a species	Habitat critical to the survival of the Spotted-tailed Quoll is identified as "large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey" (DELWP 2016). The vegetation in the locality would meet this criterion; however, such habitat is limited within the survey area, with suitable denning sites focused on boulderfields on Lobs Hole Ravine Road, and areas with a high density of hollow logs in sub-alpine areas along Lobs Hole Ravine Road. Main Works will result in the removal of 335.22 ha of habitat, with large patches of connecting vegetation provided adjacent. Therefore, it is not considered Main Works will not adversely affect habitat critical to the survival of the species.
Disrupt breeding cycle of a population	The Spotted-tailed Quoll has a low overall reproductive output, with some females breeding only once or twice during their lives. Den sites include rock crevices, hollow logs, tree hollows, caves and boulder tumbles, and are critical to breeding success (DELWP 2016). Male biased dispersal is likewise critical to the species, to ensure sufficient gene flow between sub-populations. No den sites were identified within the survey area; therefore Main Works is not likely to disrupt the breeding cycle of the Spotted-tailed Quoll population.
Modify, destroy, remove, isolate or degrade habitat to the extent that the species is likely to decline	Main Works will result in direct impacts to habitat for the Spotted-tailed Quoll, with 432.29 ha of habitat to be directly impacted. Indirect impacts may occur due to weed invasion or spread of pathogens. Controls have been implemented to minimise these impacts. The project design incorporated identified biodiversity values, with clearing focused on areas of lower quality/disturbed habitat. There is potential for Main Works to reduce the quality of habitat, as a result of increase weed abundance or introduction of pathogens. A number of mitigation measures, including construction of washdown stations, active weed control prior to construction works, an the implementation of a weed and pathogen monitoring program to ensure habitat quality is maintained including hygiene protocols to prevent introduction of weeds, the spread of weeds or the spread of pathogens. Given the above mitigation measures and restriction of removal of vegetation to existing disturbed areas, it is not considered Main Works will not result in a decrease in the availability or quality of habitat for the Spotted-tailed Quoll.

Table K.7 Significant impact criteria assessment – Spotted-tailed Quoll

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Main Works has the potential to result in the introduction and spread of weed species, and increase in abundance of feral animals (including feral cats, foxes and feral pigs). Weed control will be undertaken prior to construction works, where possible. Washdown station swill be constructed at suitable locations for use during the Main Works construction period. Hygiene protocols will be put in place to ensure weeds are not brought in with vehicles, machinery or by foot. Competition and predation by feral animals is identified as a threat to the Spotted-tail Quoll (DELWP 2016). A feral animal control program will be implemented during the construction and operational phases to minimise impacts of feral animals on wildlife. Waste will be stored appropriately in inaccessible bins and disposed off-set. Based on the proposed mitigation measures it is not expected that Main Works will result in an increase of invasive species.
Introduce disease that may cause the species to decline	Whilst disease is not recognised as a threat to the Spotted-tailed Quoll, introduction of *P. cinnamomi* could result in "dieback" and impacts to forest habitat. Mitigation measures including strict hygiene protocols to disinfect footwear, machinery and vehicles before entering the KNP and works areas will be implemented. No introduction of soil is proposed to minimise any chances of introducing diseases.
Interfere with the recovery of the species	DoELWP (2016) identifies a number of recovery objectives. The Main Works will not interfere with any of these objectives.
Conclusion	The project will not have a significant impact on the Spotted-tailed Quoll as: • the species has large home ranges of several hundred to several thousand hectares size; • the species is predicted to occur at low densities; • no denning sites were identified within the project area, therefore will not disrupt the breeding cycle of the species; and • potential impacts arising from increased feral activity, weeds and pathogens will be managed through implementation of feral animal control programs, as well as strict hygiene protocols and weed management programs.

K.8 Booroolong Frog

Table K.8 Significant impact criteria assessment – Booroolong Frog

Species profile	**Booroolong Frog (*Litoria booroolongensis*)** **Status:** Endangered (EPBC & BC Act) **Distribution:** The Booroolong Frog is restricted to tablelands and slopes in NSW and north-eastern Victoria (DoE 2019b). It is predominantly found along western-flowing streams of the Great Diving Range between 200 and 1,300m above sea level. **Biology:** The Booroolong Frog is a medium-sized, stream dwelling frog with grey, olive or brown colouring. The abdomen is white, and skin has a slightly warty appearance. It is nocturnal but can be seen during day on rocks in or near the water. **Breeding:** Breeding is known to occur in spring and early summer, from October to early January. Egg deposition sites are typically in shallow, slow-flowing sections of stream or isolated rock pools along stream margins (OEH 2012a). Tadpoles take 2 to 4 months to develop, metamorphosing in late summer to early autumn (Anstis 2002). **Habitat Requirements:** The species is known to occur in a variety of vegetation types alongside permanent streams. Primary habitat requirements are extensive rock bank structures along permanent rivers with the key feature of these rock structures being rock crevices in relatively shallow, slow to medium-flowing sections of stream (Hunter 2007). Adults tend to occur on or near cobble banks or bedrock structures within stream margins, or near slow-flowing connected or isolated pools that contain suitable rock habitats. **Threats:** The main threats associated with the Booroolong Frog are: • modification of steam channels and loss of cobble banks; • loss of native streamside vegetation; • damage to stream margins by stock; • predation of eggs and tadpoles by introduced fish; • weed invasion of streamside habitats, particularly by willows; • disease - chytrid fungus; • changes to water quality through sedimentation and use of herbicides or pesticides near streams; • stream drying caused by severe drought or water extraction/impoundment; • large amounts of sedimentation due to wild horse activity in the National Park, causing filling of breeding crevices; • high density of fossicking and in particular the illegal use of powered sluices and deliberate damming of stretches to facilitate use; and • cause damage and erosion to stream margins.

Table K.8 Significant impact criteria assessment – Booroolong Frog

Criteria	Discussion
Lead to a long-term decrease in size of a population	The Booroolong Frog was recorded during targeted surveys across the survey area. All sightings were associated with the Yarrangobilly River and nearby tributaries flowing into the river. The records are restricted to the Lobs Hole area. Individuals were recorded on the edge of the stream banks associated with rocks or under vegetation, or in small pools of shallow water. All records (except for two) were found within the in-stream environment or on riverbank edges. One exception is a record found 130 m to the east of Yarrangobilly River, which is expected to be due to high rainfall that had occurred days prior to the survey that inundated the riverbank areas. It is likely that this population extends upstream to at least Blue Creek Firetrail (Dave Hunter, DPIE, pers. comm.). It is estimated approximately 0.08 ha of Booroolong Frog breeding habitat and 1.33 ha of Booroolong Frog foraging habitat will be disturbed as a result of Main Works. All areas not retained for permanent infrastructure will be revegetated and rehabilitated following the construction of Snowy 2.0 Main Works. Therefore, reducing the long-term impacts and loss of habitat to the Booroolong Frog. A number of mitigation measures will be implemented to reduce the potential of indirect impacts on Booroolong Frog populations. A key focus is managing water quality and in-stream environments to ensure that coarse sediment does not enter the waterway and result in changes to habitat structure for the species. A comprehensive stormwater management and erosion and sediment control plan are outlined above, identifying identifies the measures to be implemented. A potential indirect threat to the Booroolong Frog population may occur from introduction of 'Chytridiomycosis' disease to the area. This disease is caused by an infection with the Amphibian Chytrid Fungus (*Batrachochytrium dendrobatidis*) which has been identified as the cause of amphibian declines and extinctions on different continents (OEH 2012). By bringing in vehicles, machinery and people there is potential they may carry spores which then spread into water bodies. Mitigation measures including hygiene protocols to disinfect footwear, machinery and vehicles before entering the KNP and works areas will be implemented. A monitoring program for the Booroolong Frog population has been implemented to monitor the species prior to construction and during construction activities. This will continue to secure and protect the population. Recent fires within the KNP have impacted on all Booroolong Frog habitat along Yarrangobilly River and Wallaces Creek Fire trail. Main Works will not result in the removal of any unburnt critical vegetation for the Booroolong Frog. Given that the Main Works will result in the removal of less than 1 ha of breeding habitat, and mitigation measures will be implemented to ensure habitat quality is maintained, it is not expected the Main Works will decrease the size of an important population.
Reduce the area of occupancy for the species	Main Works will result in direct impacts to 1.33 ha of foraging habitat and 0.08 ha of breeding habitat. Bridge structures will be constructed for crossings over Wallace's Creek and Yarrangobilly River. This will impact on in-stream breeding habitat for the species. Additionally, riparian vegetation will be removed for bridge construction and infrastructure. This will ultimately reduce the area of occupancy for the species.
Fragment an existing population into two or more populations	The targeted frog surveys to date have recorded the Booroolong Frog within the Yarrangobilly River, Sheep Station Creek and Wallace's Creek in close proximity to where they join the Yarrangobilly River. These watercourses and in-stream environments which support the Booroolong Frog populations will not be directly impacted by the proposed works. Stream flow will be maintained, and riparian vegetation retained. Some fragmentation may occur due to the removal of vegetation along the edge of the watercourses. The two access road crossings over Booroolong River and Wallace's Creek will have bridge structures to ensure connectivity is maintained. As a result of bridge design and mitigation measures proposed, it is expected the Main Works will not significant fragment an existing population.

Table K.8 Significant impact criteria assessment – Booroolong Frog

Adversely affect habitat critical to survival of a species	Approximately 137 individual Booroolong Frogs were recorded during targeted surveys across the survey area. All sightings were associated with the Yarrangobilly River and nearby tributaries flowing into the river. All records (except for one) were found within the in-stream environment or on riverbank edge. Direct impacts to 1.33 ha of foraging habitat and 0.08 ha of breeding habitat will occur. The Main Works has been largely located to avoid direct instream impacts. Removal of vegetation within 50m has been largely avoided, with exception to areas for bridge construction and large infrastructure. Post construction it is likely a large portion of the disturbance areas can be rehabilitated, therefore resulting in a temporary loss of foraging habitat. A number of mitigation measures will be implemented to reduce potential for indirect impacts on Booroolong Frog primary habitats. A key focus is managing water quality and in-stream environments to ensure that coarse sediment does not enter the waterway and result in changes to habitat structure for the species. A comprehensive stormwater management and erosion and sediment control plan will be developed which identifies the measures to be implemented. At high risk areas such as bridge crossings of Yarrangobilly River and Wallace's Creek measures will be put in place to prevent sediment and rock entering the watercourse including sediment fencing, diversions and detention ponds. Runoff from spoil piles will also be managed to ensure there is no contamination or sediment entering adjacent watercourses. No change to stream flows will occur as a result of Main Works. Fauna spotters will also be present and check areas prior to clearing for Booroolong Frog and translocate them to adjacent habitats away from impacts. Given that Main Works will impact less than 1 ha of breeding habitat and the mitigation measures to be put in place, it is not expected the Main Works will adversely affect critical habitat.
Disrupt breeding cycle of a population	Breeding is known to occur in spring and early summer, from October to early January. Egg deposition sites are typically in shallow, slow-flowing sections of stream or isolated rock pools along stream margins (OEH 2012). Tadpoles take 2-4 months to develop, metamorphosing in late summer to early autumn (Anstis 2002). Survival rates are low with 10% annual survival for adult males and 20% annual survival for adult females (Hunter 2001). The proposed Main Works have the potential to disrupt the breeding cycle of the Booroolong Frog population. Direct impacts will occur to 0.15 ha of instream environment. If works in these areas occur during the breeding period for the species localised impacts to breeding amy result. There is also potential for indirect impacts to breeding to result from noise, with night-time noise levels of >65 dB experienced along the Yarrangobilly River. This is equivalent to a normal conversation. These noise levels have the potential to impact on male calling behaviour and result in spatial displacement (Caorsi et al. 2018, Paris et al. 2009). These impacts will occur during construction only. The Main Works will also not have an impact on stream flow, and mitigation measures are being put in place to ensure water quality is maintained, such as the management of stormwater runoff. As a result of largely avoiding breeding habitat, not disrupting or changing water flows, and putting mitigation measures in place to maintain water quality and habitat features and minimise noise impacts, it is not expected the proposed works will disrupt the breeding cycle of a population.

Table K.8 Significant impact criteria assessment – Booroolong Frog

Modify, destroy, remove, isolate or degrade habitat to the extent that the species is likely to decline	Minor loss of Booroolong Frog primary habitat will occur. The Main Works have been located to largely avoid Yarrangobilly River, associated tributaries and fringing vegetation which contain their preferred habitats, and is where the species have been recorded. For those development areas in proximity to Yarrangobilly River majority of construction will occur 50m back from the river. The exception are two bridges associated with access road upgrades and small patches of vegetation required for removal for large infrastructure. The bridge construction will require minor in-stream environments and therefore primary habitat for Booroolong Frog but there may be minor clearing required of riparian vegetation to allow for construction of the bridge upgrades. There is potential for the Main Works to reduce quality of habitat. For primary habitats this quality reduction may be as a result of sediment runoff in the form of coarse rock material coming into the river. This has potential to reduce the habitat suitability for Booroolong Frogs by filling in small rock crevices and pools. A potential impact to quality of foraging habitat may come from an increase in weed abundance as a result of clearing in adjacent areas and introduction of weeds from vehicles/machinery etc. A number of mitigation measures will be implemented to ensure habitat quality is maintained. These include: Comprehensive stormwater management and erosion and sediment control measures to ensure coarse rock material and sediment does not enter the waterways and result in changes to habitat structure for the species; Retain a 50 m buffer to watercourses from development where achievable to protect Booroolong Frog foraging habitats and reduce potential for indirect impacts on species; Implement hygiene protocols to prevent introduction of weeds and a weed control program to prevent the spread of weeds into riparian vegetation; and Feral animal control program to minimise impacts to in-stream environments from feral pigs. Based on the Main Works avoiding primary and foraging habitats, and mitigation measures proposed, it is not expected the works will result in a loss of habitat availability or habitat quality.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including wild dogs, feral cats, foxes and feral pigs). Weed control prior to construction works will be undertaken. Appropriate disposal and management of weeds during construction will be completed to reduce the potential of seed disposal. Washdown stations will be constructed for weeds as well as *P.cimmamomi*. Additionally, a weed and pathogen monitoring program will be implemented. Additional measures will be put in place to reduced the potential of increasing predatory and pest species. Including appropriate waste bins supplied during construction, no waste will be left outside. A pest and predatory monitoring program will be implanted to ensure the Main Works does not result in a significant increase in numbers of pest and predatory species. Based on the above mitigation measures, it is not expected the Main Works will result in an increase of invasive species. It is proposed that as a result of the project increasing effort around weed control and feral animal control there may be an improvement in habitat quality and reduction of invasive species in the area.
Introduce disease that may cause the species to decline	A potential threat to the Booroolong Frog population may occur from introduction of 'Chytridiomycosis' disease to the area. This disease is caused by an infection with the Amphibian Chytrid Fungus (*Batrachochytrium dendrobatidis*) which has been identified as the cause of amphibian declines and extinctions on different continents (OEH 2012a). By bringing in vehicles, machinery and people there is potential they may carry spores which then spread into water bodies. Mitigation measures including hygiene protocols to disinfect footwear, machinery and vehicles before entering the KNP and works areas will be implemented. No introduction of soil is proposed to minimise any chances of introducing diseases.
Interfere with the recovery of the species	The proposed Main Works is not expected to interfere with the recovery of the Booroolong Frog population. There is a large population that has been recorded in the project area, and habitats are in good condition. Comprehensive mitigation measures as detailed above will be implemented to ensure indirect impacts are managed.

Table K.8 Significant impact criteria assessment – Booroolong Frog

Conclusion	The Main Works will not have a significant impact on the Booroolong Frog population as: • primary in-stream habitat will largely be avoided, with 0.08 ha of direct impact and a 50 m vegetation buffer will be utilised where possible; • vegetation removed as a result of temporary infrastructure will be rehabilitated after construction; • mitigation measures will be put in place to reduce the indirect impacts to in-stream habitat quality, predator species and vegetation quality; and • water flows will not be impacted.

K.9 Alpine Tree Frog

Table K.9 Significant impact criteria assessment – Alpine Tree Frog

Species profile	**Alpine Tree Frog (*Litoria verreauxii alpina*)** **Status:** Vulnerable (EPBC Act), Endangered (BC Act) **Distribution:** The Alpine Tree Frog is known to occur in the south-eastern NSW and Victorian high country (alpine and sub-alpine zones), generally above 1,100m ASL. Historical records indicate the species was once widespread and abundant throughout the alpine and sub-alpine zones of south-eastern Australia (DoE 2014c). **Biology:** The Alpine Tree Frog is a relatively small frog with variable colouring including green, brown and grey forms. They have a black stripe from the nostrils, through the eyes down to their foreleg. The distinguishing feature is its warty back. **Breeding:** Breeding populations occur on plains or open valleys where there are stream side pools, fens and bogs, but is also be associated with artificial waterbodies such as small dams and reservoirs. Breeding occurs in December with males calling from the water edges of the pools, and eggs are attached to submerged vegetation. Tadpoles metamorphose into froglets in late summer (OEH 2017d). **Habitat Requirements:** The Alpine Tree Frog is known to occur in a wide variety of habitats including woodland, heath, grassland and herb fields. During the non-breeding season individuals may be found amongst litter, under logs, beneath flat stones in stream beds or in rocky areas near streams (DoE 2014c). **Threats:** The main threats associated with the Alpine Tree Frog are: • loss or modification of habitat including damage by feral horses; • changes to natural water flows as a result of groundwater extraction; • disease - chytrid fungus; • climate change including increased UV-B radiation; and • poor knowledge of the species' distribution and population dynamics across its range (OEH 2017d).

Table K.9 Significant impact criteria assessment – Alpine Tree Frog

Criteria	Discussion
Lead to a long-term decrease in the size of an important population	Important populations have not been defined for the Alpine Tree Frog. There are records of this species within the area spanning from northern NSW to Vic. Using a precautionary approach and the definitions in the significant impact guidelines (DoE 2013a) it is possible that the population recorded across the Main Works survey area is an important population as the species has a limited distribution and would therefore be considered important as a key source population and for maintaining genetic diversity. That said, the recorded population is extensive and includes the catchments of the Eucumbene River, Murrumbidgee River, Tantangara Creek, Gooandra Creek and Nungar Creek. The Alpine Tree Frog was recorded within multiple locations across the project area; around the edges of Tantangara Reservoir, breeding within the fluctuating levels of the Reservoir between MOL and FSL, Bullocks Hill Creek, along Nungar Creek, and Tantangara Tributaries. Habitat has been defined as the area between FSL and MOL in Tantangara Reservoir and suitable watercourses, plus areas within the 50 m of suitable breeding habitat. Impacts arising from Main Works include clearing of 22.87 ha of habitat for this species. Areas not retained for permanent infrastructure will be revegetated and rehabilitated. Several mitigation measures will be implemented to reduce potential for indirect impacts on Alpine Tree Frog populations. These include monitoring water quality, hygiene protocols to stop the spread of disease such as Chytrid Fungus and manage runoff to ensure no contamination or sediment entering adjacent watercourses. Recent fires within the KNP have impacted 70 ha of Alpine Tree Frog habitat which is approximately 9.8% of habitat across the survey area. A significant amount of recorded Alpine Tree Frog habitat within the survey area has not been mapped within the fire extent. The removal of 22.87 ha of habitat for this species represents approximately 3% of recorded habitat. Given the extent of the known populations throughout the region, it is unlikely the Main Works will result in a long-term decrease in the size of an important population.
Reduce the area of occupancy for an important population	The Main Works will result in the reduction to 22.87 ha of Alpine Tree Frog habitat across the project area. The species was recorded throughout the survey area with large populations recorded to the north of Tantangara Reservoir. Suitable stream habitat occurs throughout the locality, providing high quality breeding and foraging habitat. The recent fires that have affected KNP have resulted in impacts to 9.8% of recorded Alpine Tree Frog habitat. The removal of 22.87 ha of habitat mostly coincides with areas mapped as burnt vegetation. Therefore, it was considered if potential measures could be taken to avoid further impact to unburnt areas. However, due to design of the accommodation camp, infrastructure and intake gate structures it is not feasible to relocate these elements. A conservative approach has been taken to assume that the Main Works will reduce the area of occupancy for an important population and will result in a significant impact on the occupancy for the species.
Fragment an existing important population into two or more populations	The Main Works will result in a reduction of 22.87 ha of Alpine Tree Frog habitat. Existing tracks and roads throughout the KNP will be used for the Main Works. Additional vegetation clearing adjacent to these tracks will not cause any additional fragmentation on the species.

Table K.9 Significant impact criteria assessment – Alpine Tree Frog

Adversely affect habitat critical to the survival of a species	Over 300 individual Alpine Tree Frogs were recorded during targeted surveys, including an additional 1,800 tadpoles. Key project elements were removed from the plateau area to reduce the direct impacts on the species. Direct impacts to 22.87 ha of breeding and foraging habitat will occur. A number of mitigation measures will be implemented to reduce potential for indirect impacts on Alpine Tree Frog primary habitat. A key focus is managing water quality and in-stream environments to ensure that coarse sediment does not enter the waterway and result in changes to habitat structure for the species. A comprehensive stormwater management and erosion and sediment control plan will be developed which identifies the measures to be implemented. Hygiene protocols will be implemented to reduce the potential of exotic weeds spreading and degrading habitat. This will include washdown stations, appropriate disposal of weeds during clearing works, and the implementation of a weed and pathogen monitoring program. As a result of the recent fires within the KNP, a conservative approach has been taken to assume all habitat within unburnt areas is considered critical habitat. Consideration was taken to avoid unburnt areas, however due to design of critical infrastructure it is not feasible to relocate these elements. Unaffected fire areas that will be removed as part of the Main Works are considered important and therefore a conservative approach was taken to assume the project will adversely affect habitat critical for the Alpine Tree Frog.
Disrupt the breeding cycle of an important population	Breeding is known to occur in December. The Alpine Tree Frog lays its eggs in deep pools, including fens, stream cut-offs, lakes and reservoirs. Tadpoles were recorded within the project area during targeted surveys. Direct impacts will occur to breeding habitat and in-stream environments as a result of road upgrades and bridge structures. The project also has the potential to mobilise large amounts of sediment and significantly impact on breeding habitat for the Alpine Tree Frog. Mitigation measures will be put in placed to manage the impact on breeding habitat. These include management of sedimentation via sediment and erosion control plants for each construction zone, natural erosion controls incorporating organic materials, micro water capture and contour shaping, diversion of clear water around construction areas, collection of run-off from roof areas and treatment of wastewater using membrane filtration prior to disposal into Reservoirs. Additional a surface water monitoring program will be implemented to ensure run-off does not impact on sensitive breeding environments. As a result of mitigation measures, it is not considered the Main Works will have a significant impact to the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability habitat to the extent that the species is likely to decline	Main Works will result in the loss of 22.87 ha of Alpine Tree Frog habitat, and has the potential to result in indirect impacts such as the increase in exotic weed species and feral animals (including cats, foxes and feral pigs). Mitigation measures will be in place to reduce any potential indirect impacts to habitat including hygiene protocols and a weed and pathogen monitoring program. Management of sedimentation will be conducted to ensure water quality will not be impacted as a result of construction activities. Implementation of a surface water monitoring program as well as run-off collection and treatment of wastewater will reduce any impacts of modification to the species habitat. Given the extent of the recent fires within the locality, and the majority of habitat to be impacted is within unburnt areas of the park, it is considered the Main Works will have a significant impact to the availability of habitat that the species is likely to decline.

Table K.9 Significant impact criteria assessment – Alpine Tree Frog

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Main Works has the potential to result in the introduction and spread of exotic weeds, and increase in abundance of feral animals including feral cats, foxes and feral pigs). Weed control prior to construction works will be undertaken. Appropriate disposal and management of weeds during construction will be completed to reduce the potential of seed disposal. Washdown stations will be constructed for weeds as well as *P.cimmamomi*. Additionally, a weed and pathogen monitoring program will be implemented. Additional measures will be put in place to reduced the potential of increasing predatory and pest species. Including appropriate waste bins supplied during construction, no waste will be left outside. A pest and predatory monitoring program will be implanted to ensure the Main Works does not result in a significant increase in numbers of pest and predatory species. Based on the above mitigation measures, it is not expected the Main Works will result in an increase of invasive species. It is proposed that as a result of the project increasing effort around weed control and feral animal control there may be an improvement in habitat quality and reduction of invasive species in the area
Introduce disease that may cause the species to decline	A potential threat to the Alpine Tree Frog populations may occur from introduction of 'Chytridiomycosis' disease to the area. This disease is caused by an infection with the Amphibian Chytrid Fungus (*Batrachochytrium dendrobatidis*) which has been identified as the cause of amphibian declines and extinctions on different continents (OEH, 2012). By bringing in vehicles, machinery and people there is potential they may carry spores which then spread into water bodies. Mitigation measures including hygiene protocols to disinfect footwear, machinery and vehicles before entering the KNP and works areas will be implemented. No introduction of soil is proposed to minimise any chances of introducing diseases.
Interfere substantially with the recovery of the species	There is no Recovery Plan for the Alpine Tree Frog, therefore the Main Works will not interfere with the recovery of the species.
Conclusion	A conservative approach has been undertaken to determine the Main Works will have a significant impact on the Alpine Tree Frog as: • although 22.87 ha (3% of recorded habitat) of habitat will be removed, most of this area is within unburnt areas; • there is potential for indirect impacts to occur, including increased habitat degradation due to pest species and spread of chytrid fungus; and • this area is likely to be habitat for an important population.

K.10 Alpine She-oak Skink

Table K.10 Significant impact criteria assessment – Alpine She-oak Skink

Species profile	**Alpine She-oak (*Cyclodomorphus praealtus*)** **Status:** Endangered (EPBC & BC Act) **Distribution:** The species is endemic to NSW and Victoria, restricted to sub-alpine and alpine grasslands and grassy heathland. It is known to occur above 1,500 m in the Australian Alps from Omeo Plain to Kiandra (DEWHA 2009b). **Biology:** The Alpine She-oak Skink is a medium-sized skink, approximately 350 mm in length, with a snout to vent length of up to 130 mm. It is olive-green to reddish-brown with smooth, overlapping scales. The Alpine She-oak has four distinct limbs with five fingers or toes. It can be distinguished from other She-oaks in Australia by its distribution and the species has fewer than 60 subcaudal scales on the underside of any original tails (OEH 2017e). **Breeding:** The Alpine She-oak Skink gives birth to live young and a study of preserved museum specimens found several females, with previous studies suggesting breeding period is within summer. **Habitat Requirements:** The species is associated with the Alpine Sphagnum Bogs and Associated Fens EPBC listed TEC. The Alpine She-oak Skink has specific habitat requirements, preferring tree-less or very lightly treed areas containing tussock grasses and/or low heath. It is known to have relatively small home ranges, remaining in the same general area for long periods of time (OEH 2017e). **Threats:** The main threats associated with the Alpine She-oak Skink include: • changes in vegetation structure within preferred habitat brought about by wildfire, weed invasion, and climate change; • grazing, trampling and ground disturbance by feral horses, deer and pigs; • construction of infrastructure in alpine areas such as roads, tracks, buildings and ski runs resulting in loss and fragmentation of subalpine and alpine habitat; • predation by rats, foxes, cats and dogs; and • lack of knowledge of the distribution and habitat requirements of the species. (OEH 2017e).

Table K.10 Significant impact criteria assessment – Alpine She-oak Skink

Criteria	Discussion
Lead to a long-term decrease in size of a population	The Alpine She-oak Skink is endemic to NSW and Victoria, recorded within the Australian Alps in NSW. The Alpine She-oak Skink is known to occur across the project area ranging from Link Road, across the Plateau, adjacent to Tantangara Road and up to Port Phillip Track. Thirty-seven individuals were recorded from 24 locations across the survey area. The largest distance the species has been recorded moving is roughly 45 meters (OEH 2017e). With a conservative approach of applying a 100 m buffer, the Main Works potentially may impact seven of these sights; however, it is likely the species will move out of the works area during construction works. The Main Works will result in the removal of 80.83 ha of habitat. This represents less than 4% of remaining habitat mapped within the survey area. The Main Works also has the potential for indirect impacts on the species including the introduction and spread of exotic weed species and increase in predatory species. A number of mitigation measures will be implemented to reduce potential indirect impacts on the species. A key focus is on hygiene protocols and weed control such as appropriate disposal a weed and pathogen monitoring program. Additional mitigation measures for predatory and pest species include appropriate waste disposal and the implementation of a pest and predatory monitoring program. Recent fires within the KNP have impacted on 779.5 ha of Alpine She-oak Skink habitat, representing approximately 34% of mapped habitat within the survey area. The Main Works will impact on unburnt areas of Alpine She-oak Skink habitat. However, considering the available habitat within the locality it is not considered the project will leave to a long-term decrease in size of a population.
Reduce the area of occupancy for the species	Significant reductions of impacts in the plateau area, including suitable sub-alpine grassland habitat, has resulted in reduction to direct impacts of Alpine She-oak Skink. The Main Works will result in the removal of 80.83 ha of habitat. This represents approximately 4% of the suitable habitat mapped as part of the broader survey area, and a minor component of suitable habitat in the region. The recent fires within the KNP have impacted on 34% of Alpine She-oak Skink habitat within the survey area. Most of the 80.83 ha of habitat to be removed as a result of the Main Works is within mapped fire affected areas. Consideration was taken to avoid unburnt areas, however due to design of critical infrastructure it is not feasible to relocate these elements. Although the project will reduce the area of occupancy for the species, including areas which are not within mapped fire affected areas it is not considered Main Works will have a significant impact considering the extent of the species and suitable vegetation remaining within the locality.
Fragment an existing population into two or more populations	The existing populations of the Alpine She-oak Skink occur alongside tracks and roads within project area. The Main Works is not likely to contribute to any additional fragmentation on the population. Large areas of suitable habitat where the species has been recorded remain in the locality.
Adversely affect habitat critical to survival of a species	Habitat critical to the survival of the Alpine She-oak Skink has not been defined. The Main Works will result in the removal of 80.83 ha of habitat. This represents approximately 4% of the suitable habitat mapped as part of surveys for Snowy 2.0 and a very minor component of suitable habitat in the region. Approximately 34% of Alpine She-oak Skink habitat within the survey area has recently been affected by fires. Majority of the habitat to be removed as a part of Main Works has not been affected by the fires. However, considering the small percentage of habitat to be removed as part of the Main Works it is not considered the project will adversely affect habitat critical to the survival of the species.
Disrupt breeding cycle of a population	The Alpine She-oak Skink is known to produce up to five young per litter in later summer (DoE 2019X). Little is known about the breeding biology of the species (OEH 2017e). Main Works will result in the removal of 80.83 ha of habitat, which will potentially impact on the breeding cycle of the species.

Table K.10 Significant impact criteria assessment – Alpine She-oak Skink

Modify, destroy, remove, isolate or degrade habitat to the extent that the species is likely to decline	The Main Works will result in clearing of 80.83 ha of Alpine She-oak Skink habitat. The project also has the result in indirect impacts such as the increase in exotic weed species and feral animals (including cats, foxes and feral pigs). Mitigation measures will be put in place to reduce any potential indirect impacts to habitat including washdown stations, hygiene protocols, active weed control and the implementation of a weed and pathogen monitoring program. A pest and predatory monitoring program will also be implemented to ensure Main Works does not result in a significant increase in numbers of pests and predatory species. Majority of records were outside of the project area, the northern extent of the plateau, south of Link Road and Port Philip Track. These areas provide suitable tussock dominated habitat for the species. Therefore, it is unlikely the removal of 80.83 ha of vegetation will result in the decline of the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The Main Works has the potential to result in the introduction and spread of weed species and increase in abundance of feral animals (including feral deer, cats, dogs, foxes and pigs). Known threats to the Alpine She-oak Skink include trampling and ground disturbance by feral horses, deer and pigs, as well as predation by rats, foxes, cats and dogs. Prior to construction, it is proposed weed controls will be implemented where possible. During the clearing works appropriate disposal and management of weeds will be implemented to stop the spread of existing weed species. Wash down stations will be constructed at suitable locations to stop the spread of weeds and introduction of new species. A weed and pathogen monitoring program will be implemented to ensure impacts arising from clearing are within prediction. Similarly, a pest and predator monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pest and predatory species. Based on the proposed mitigation measures it is not expected the Main Works will result in an increase of invasive species.
Introduce disease that may cause the species to decline	There are no known diseases associated with the Alpine She-oak Skink. The Main Works has the potential to result in an increase of invasive species, such as the pig, which have the potential to transmit disease. A pest and predatory monitoring program will be implemented to ensure Main Works does not result in a significant increase in numbers of pests (including the pig) and impacts to threatened species remain within prediction. Wash-down stations will be constructed at suitable locations for weeds and pathogens.
Interfere with the recovery of the species	There is no Recovery Plan for the Alpine She-oak Skink, therefore the Main Works will not interfere with the recovery of the species.
Conclusion	The project will not have a significant impact on the Alpine She-oak Skink as: • thirty-seven individuals were recorded at 24 locations across the survey area, one of which may potentially be directly impacted by the Main Works; • the removal of 80.83 ha of habitat represents less than 4% of suitable habitat across the broader region; and • mitigation measures will be put in place to reduce the potential of spread and introduction of weed species and the increase in predatory species.

K.11 Satin Flycatcher

Table K.11 Significant impact criteria assessment for Satin Flycatcher

Species profile	**Satin Flycatcher (*Myiagra cyanoleuca*)** **Status:** Migratory (EPBC Act) **Distribution:** The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand. The species is found along the east coast of Australia from far northern Queensland to Tasmania, including South Australia (BirdLife 2019a). The Satin Flycatcher occurs at many scattered sites in New Guinea and offshore islands (DoE 2019b). **Biology:** The Satin Flycatcher is a small blue-black and white bird with a small crest. Males are glossy blue-black above, with a blue-black chest and white below, while females are duskier blue-black above, with an orange-red chin, throat and breast, and white underpants (BirdLife 2019a). Juvenile birds are dark brown-grey above, with pale streaks and buff edges to the wing feathers. **Habitat requirements:** Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands. During migration they occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. The species are often found near wetlands or watercourses (DoE 2019b). **Threats:** The main threats associated with the Satin Flycatcher include the loss of mature forests as a result of clearing and logging of forests in south-eastern Australia (DoE 2019b).
Criteria	**Discussion**
Substantially modify destroy or isolate an area of important habitat.	Main Works project area does not contain important habitat for the Satin Flycatcher. The species was recorded on five separate occasions across the survey area. Two individuals were recorded within Marica, another two were recorded along Tantangara Road and five individuals were recorded across the Plateau. The *Referral guideline for 14 birds listed as migratory under the EPBC Act* (DoE 2014d) identifies a substantial loss or modification of important habitat are those that are likely to meet or exceed the thresholds of 1,700 individuals of Satin Flycatcher. Nine individuals have been recorded across the broad survey area, therefore as defined by the EPBC (DoE 2014d), the Main Works project area does not support important habitat. Consequently, Main works is not likely to not substantially modify, destroy or isolate an area of important habitat.
Result in an invasive species becoming established in an area of important habitat.	The *Referral guideline for 14 birds listed as migratory under the EPBC Act* (DoE 2014d) lists Black Rat (*Rattus rattus*) and invasive vines of riparian habitat (including Rubber Vine (*Cryptostegia grandiflora*)) as invasive species harmful to the Satin Flycatcher. As discussed above, the project area does not contain important habitat for the species and will not result in invasive species becoming established in an area of important habitat.
Disrupt the breeding cycle of a population.	Similarly to the guidelines for important habitat, the guidelines for disrupting the breeding cycle of a population is defined by affecting more than 1,700 individuals. The Main Works project area does not support substantial breeding habitat for a large population, therefore will not disrupt the breeding cycle of the Satin Flycatcher population.
Conclusion	Main Works is unlikely to result in a significant impact on Satin Flycatcher as: • the project area does not contain important habitat for the species; and • an ecologically significant proportion of the population will not be disrupted.

K.12 Latham's Snipe

Table K.12 Significant impact criteria assessment for Latham's Snipe

Species profile	**Latham's Snipe (*Gallinago hardwickii*)** **Status:** Migratory (EPBC Act) **Distribution:** The Latham's Snipe is a non-breeding migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage. The species breeds in Japan and on the east Asian mainland (BirdLife 2019b). **Biology:** The Latham's Snipe is the largest snipe in Australia; mainly brown plumage, with a long straight bill and short pointed wings. The upper body is boldly patterned with black, brown and white. The sexes are similar in appearance and do not show seasonal variation unlike other migratory waders. Juveniles in fresh plumage differ only slightly from adults (DoE 2019c). **Habitat requirements:** The Latham's Snipe occurs in permanent and ephemeral wetlands up to 2,000m ASL. The species inhabits open, freshwater wetlands with low, dense vegetation. **Threats:** The main threats associated with the Latham's Snipe include the loss of habitat caused by the drainage and modification of wetlands, diversion of water for storage or agriculture, development of land and land management practices such as mowing of habitat. The species was also previously legally hunted (DoE 2019c).
Criteria	**Discussion**
Substantially modify destroy or isolate an area of important habitat.	The Latham's Snipe was recorded adjacent to Tantangara Reservoir and across the Plateau within and adjacent to the Main Works project area. Vegetation along the southern end of Tantangara Reservoir contains sub-optimal foraging habitat. Main Works project area may support areas of important habitat for the Latham's Snipe as per the guidelines identified in *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DEE 2017b). The observation of 58 records (107 individuals) of the species during surveys undertaken for Snowy 2.0 indicates these sub-alpine areas may support at least 0.4% of the flyway population of this migratory shorebird species. Snowy 2.0 Main Works will impact on 81.86 ha of habitat for this species. Given the availability of habitat in the region Snowy 2.0 Main Works is unlikely to substantially modify this area of important habitat.
Result in an invasive species becoming established in an area of important habitat.	The *Threat Abatement Plan for predation by the European red fox* (DEWHA 2008b) identifies the Latham's Snipe as one of the species likely to be affected by the European red fox. Main Works will not result in an increase or introduction of the European red fox into an area of important habitat. As discussed above, the project area does not contain important habitat for the species and will not result in invasive species becoming established in an area of important habitat.
Disrupt the breeding cycle of a population.	The Latham's Snipe breeding range is confined to Japan and far eastern Russia, therefore the Main Works will not impact the species breeding cycle.
Conclusion	Main Works is unlikely to result in a significant impact on Latham's Snipe as: • the project will result in impacts to 81.86 ha of habitat for an important population, with large areas of high-quality habitat remaining in the region for this important population; and • the proposed action will not disrupt the breeding cycle of the species.